Aboriginal Archaeological Report: 164 Station Street, Penrith, NSW

for

Parkview Penrith Pty Ltd

Final Report

August 2012

AHMS

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GLOSSARY

Aboriginal Cultural Heritage Assessment (ACHA)	A document developed to assess the archaeological and cultural values of an area, generally required as part of an Environmental Assessment (EA).
Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010	Guidelines developed by OEH to guide formal Aboriginal community consultation undertaken as part of an Aboriginal Cultural Heritage Assessment (ACHA).
Aboriginal Heritage Impact Permit (AHIP)	The statutory instrument that the Director General of the Office of Environment and Heritage (OEH) (formerly the Department of Environment, Climate Change and Water (DECCW)) issues under Section 90 of the *National Parks and Wildlife Act 1974* to allow the investigation (when not in accordance with certain guidelines), impact and/or destruction of Aboriginal objects. AHIPs are not required for a project subject to Part 3A of the *Environmental Planning and Assessment Act* 1979 or State Significant Major Developments subject to Part 4 of the Act.
Aboriginal object	A statutory term defined under the *National Parks and Wildlife Act 1974* as, 'any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains'.
Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales	Guidelines developed by OEH to inform the structure, practice and content of any archaeological investigations undertaken as part of an Aboriginal Cultural Heritage Assessment (ACHA).
Department of Environment, Climate Change and Water (DECCW)	Now known as the Office of Environment and Heritage (OEH), Department of Premier and Cabinet.
Department of Planning and Infrastructure (DPI)	The Consent Authority for development applications made in accordance with Part 3A of the *Environmental Planning and Assessment Act 1979.*
Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales	Guidelines developed by OEH, outlining the first stage of a two stage process in determining whether Aboriginal objects and/or areas of archaeological interest are present within a subject area. The findings of a due diligence assessment may lead to the development of an Aboriginal Cultural Heritage Assessment.

Environmental Assessment (EA)	A document summarising the assessment of environmental impacts of a development which supports an application for approval under Part 3A of the *Environmental Planning and Assessment Act 1979.*
Environmental Planning and Assessment Act 1979	Statutory instrument that provides planning controls and requirements for environmental assessment in the development approval process. The Act is administered by the DPI.
Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW	Guidelines developed by OEH to inform the structure and content of an Aboriginal Cultural Heritage Assessment (ACHA).
Isolated Find	An isolated find is usually considered a single artefact or stone tool, but can relate to any product of prehistoric Aboriginal societies. The term "object" is used in the ACHA, to reflect the definitions of Aboriginal stone tools or other products in the *National Parks and Wildlife Act 1974.*
National Parks and Wildlife Act 1974	The primary piece of legislation for the protection of Aboriginal cultural heritage in NSW. Part 6 of this Act outlines the protection afforded to and offences relating to disturbance of Aboriginal objects. The Act is administered by OEH.
Office of Environment and Heritage (OEH)	The OEH is responsible for managing the Aboriginal Heritage (and other) provisions of the *National Parks and Wildlife Act 1974.*
Potential Archaeological Deposit (PAD)	An area assessed as having the potential to contain Aboriginal objects. PADs are commonly identified on the basis of landform types, surface expressions of Aboriginal objects, surrounding archaeological material, disturbance, and a range of other factors. While not defined in the *National Parks and Wildlife Act 1974*, PADs are generally considered to retain Aboriginal objects and are therefore protected and managed in accordance with that Act.
Proponent	A corporate entity, Government agency or an individual in the private sector which proposes to undertake a development project. The proponent for this project is Parkview Penrith Pty Ltd.

ABBREVIATIONS

ACHA	Aboriginal Cultural Heritage Assessment
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
AHMS	Archaeological and Heritage Management Solutions
BP	Before present (AD 1950)
CHL	Commonwealth Heritage List
DCP	Development Control Plan
DECCW	Department of Environment, Climate Change and Water (now OEH)
DP	Deposited Plan
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ERS	Eastern Regional Sequence
ka	Abbreviation for thousands of years ago (e.g. 1 ka equals 1,000 years ago)
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
LTO	Land Titles Office
NHL	National Heritage List
NPW Act	*National Parks and Wildlife Act 1974*
OEH	Office of Environment and Heritage (formerly DECCW)
PAD	Potential Archaeological Deposit
RAP	Registered Aboriginal party
REP	Regional Environmental Plan
RNE	Register of the National Estate
SHR	State Heritage Register
SHI	State Heritage Inventory
WHL	World Heritage List

SUMMARY

Background

- In 2006, Archaeological and Heritage Management Solutions (AHMS), was commissioned by Parkview Penrith Pty Ltd to undertake an Aboriginal Heritage Assessment of 164 Station Street, Penrith, NSW (also referred to as the 'Nepean Green Project'). The site condition has not had any significant changes; however, there have been changes to current Aboriginal heritage guidelines. Accordingly the 2006 report has been updated and this assessment presents a modified version of the 2006 report. This assessment was undertaken to: 1) provide information to inform a Concept Approval application made under the transitional Part 3A provisions of the Environmental Planning & Assessment Act 1979 for the proposed development; and 2) to provide the necessary documentation for future development of parts of the site under Part 4 of the Environmental Planning & Assessment Act 1979.
- This report is written in accordance with the Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation, (DEC, 2005), the Code of Practice for Archaeological Investigations of Aboriginal Objects in New South Wales (DECCW, 2010) and Aboriginal Cultural Heritage Community Consultation Requirements for Proponents (DECCW, 2010); these documents purportedly defining best practice standards and processes for Aboriginal heritage assessment in NSW.
- Aboriginal community consultation was informally undertaken with three of the known Aboriginal stakeholders in the region – Deerubbin LALC, Darug Tribal Aboriginal Corporation and Darug Custodian Aboriginal Corporation as part of the 2006 assessment. For the current assessment AHMS has undertaken formal Aboriginal consultation in accordance with *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010).
- The 2006 assessment included an archaeological predictive model which was informed by detailed background analysis of previous archaeological investigations in the region and information from the AHIMS database. A site survey was also undertaken in conjunction with the Aboriginal communities in 2006. The site remains unchanged since this time.
- The 2006 assessment identified the northern part of the subject site as heavily disturbed by existing industrial and commercial structures. The southern part of the site was considered to be relatively undisturbed, with only market gardening being evident since the 1940's. Geo-technical information for the site indicated that it is situated on the Cranebrook Formation – a geological deposit that has been shown to contain Aboriginal

objects at significant depths and of significant age. The Cranebrook Formation is composed of two stratigraphic units, the Richmond and Penrith Units. Only the Richmond Unit has potential to contain Aboriginal objects at depth, although both units have potential for Aboriginal objects to exist on the surface. It is unclear, which unit the subject site is situated on, although the distance from the Nepean River indicates that it is probably the Penrith Unit.

- Subsequently, it has been concluded that:
    - The entire subject area has potential to contain cultural deposits within the sandy clay unit that variously underlies natural topsoils and imported fills. The degree of potential is considered low, however the potential antiquity and significance of any cultural deposits within the sandy-clay unit indicates that the sandy-clay unit should be considered to have high sensitivity.
    - The area marked green on **Figure 16** has a moderate to high potential to contain more recent Holocene Aboriginal sites within remnant original A-horizon soils.
- The recommendations of this assessment are:

General Recommendations

- Consultation between Parkview Penrith Pty Ltd and the Registered Aboriginal Parties should be maintained as appropriate throughout the design and construction stages of the proposed development.
- If the boundaries of the proposed development are revised to include areas not investigated during this archaeological assessment and the overall ACHA, assessment of these additional areas should be undertaken in order to identify and appropriately manage Aboriginal objects, sites and/or places that may exist in these areas.
- Parkview Penrith Pty Ltd should ensure that the removal of any Aboriginal object or the disturbance or destruction of any Aboriginal site or place is undertaken professionally, in consultation with relevant Registered Aboriginal Parties, according to applicable heritage statutory requirements and is documented, as appropriate to the level of significance of the object, site or place.
- Parkview Penrith Pty Ltd should ensure that any project-related Aboriginal heritage reports or documents are prepared in accordance with and/or comply with applicable statutory requirements and best practice professional standards. Where appropriate, findings of this assessment are provided to OEH AHIMS Registrar and the relevant Registered Aboriginal Parties.

- Parkview Penrith Pty Ltd should advise all relevant personnel and contractors involved in the design, construction and operation of the proposed development, of the relevant heritage issues, legislative requirements and recommendations identified in the present ACHA.
- In the event that previously undiscovered Aboriginal objects, sites or places (or potential Aboriginal objects, sites or places) are discovered during construction, all works in the vicinity of the find should cease and Parkview Penrith Pty Ltd should determine the subsequent course of action in consultation with a heritage professional, relevant Registered Aboriginal Parties and/or the relevant State government agency.
- Should any skeletal material be identified that may be Aboriginal, the *Coroner's Act 1980* requires that all works should cease and the NSW Police and the NSW Coroner's office should be contacted. Should the burial prove to contain Aboriginal ancestral remains, consultation with a heritage professional, relevant Registered Aboriginal Parties and/or the relevant State government agency, should be undertaken by Parkview Penrith Pty Ltd.

Specific Recommendations

- Should potential impacts be proposed to the Nepean Green PAD (**Figure 16**), further sub-surface investigation and characterisation of these deposits is required prior to any development. This assessment has been developed in accordance with relevant guidelines to allow any sub-surface excavations to be undertaken in accordance with methods outlined in *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010). However, please note that the potential depth of some of these deposits may require the use of alternative methods to those set out in the Code. This would necessitate the requirement for an application to be made for an Aboriginal Heritage Impact Permit (for archaeological testing) from the Office of Environment & Heritage prior to being implemented. Should Aboriginal objects be identified through this process, an AHIP for their destruction would need to be obtained from the Office of Environment and Heritage prior to development. Consideration of conservation and/or other mitigation measures, and the long term management of the recovered Aboriginal objects would also be required.
- Areas highlighted in blue in **Figure 16** are considered to have low potential to contain Aboriginal objects in deposits >1.3 m below the surface. Where impacts below this level would ensue, further assessment to determine the presence/absence of Aboriginal objects would be required. Given the extent of disturbance to the soil profile caused by historical development and land use in this area, it is recommended that sub-surface investigations should be undertaken within the Nepean Green PAD and that the results of those investigations should then be used to extrapolate the extent of potential Aboriginal heritage constraints within the area highlighted in blue. Any management requirements and/or other approvals identified through works in

the Nepean Green PAD, should similarly be applied to the areas highlighted in blue in **Figure 16** (if below the upper fill layers).

- Three copies of this report should be forwarded to the *NSW Office of Environment and Heritage - Planning and Aboriginal Heritage Section, Metropolitan Branch, Environment Protection and Regulation Group* (PO Box 668, Parramatta, NSW 2124).
- One copy of the report should be forwarded to each of the following Aboriginal stakeholders: Deerubbin LALC, Darug Custodian Aboriginal Corporation, Darug Tribal Aboriginal Corporation, Darug Aboriginal Cultural Heritage Assessments, Darug Aboriginal Landcare, Darug Land Observations, and Tocomwall.

1. INTRODUCTION

1.1 Proponent Details

This report has been prepared by Archaeological & Heritage Management Solutions Pty Ltd (AHMS) on behalf of the proponent, Parkview Penrith Pty Limited:

Proponent	Archaeological Advisor
Parkview Penrith Pty Ltd PO Box R1779 Royal Exchange NSW 1225 **Contact Person:** Amy Romero T. 02 9506 1544 F:0 2 9506 1599 E: amy.romero@pview.com.au	**Archaeological & Heritage Management Solutions Pty Ltd** 349 Annandale Street Annandale NSW 2038 **Contact Person:** Alan Williams T. 02 9555 4000 F. 02 9555 7005 M. 0408 203 180 E: awilliams@ahms.com.au

1.2 Background

In 2006, Archaeological and Heritage Management Solutions Pty Ltd (AHMS), was commissioned by Parkview Penrith Pty Ltd (JPG) (the proponent) to undertake an Aboriginal Cultural Heritage Assessment (ACHA) of 164 Station Street, Penrith (hereafter the 'subject area') in advance of proposed mixed commercial and residential development.

While there have not been any significant changes to the site condition, due the introduction of new Aboriginal heritage management guidelines by the Office of Environment & Heritage (OEH) in 2010, this assessment presents a modified version of the 2006 assessment. The assessment is based primarily on the 2006 assessment, but has been re-structured and (where relevant) supplemented, to meet the current standards and requirements.

The purpose of the ACHA is to investigate and assess the Aboriginal cultural heritage that may be affected by the proposed development. The present *Archaeological Report* forms part of the overall ACHA, and specifically addresses the Aboriginal archaeological heritage that may be affected by the proposed development. The ACHA provides the broader cultural context for the archaeological heritage addressed in the present report.

This report was undertaken in accordance with Guidelines for *Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005) as well as the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, April

2011), *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, April 2010), and *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, September 2010).

1.3 Subject Area

The subject area comprises 164 Station Street, Penrith, NSW (Lot 12 in DP 234581). The subject area is located in the suburb of Penrith, between Jamison Road to the south, Woodriff Street to the east and Station Street to the west. The southern portion of the subject area is currently open space and the northern portion contains the former Panasonic assembly and distribution facilities, which is currently being used for light industrial activities. The subject land is 78,550sqm and currently zoned R4.

The general location of the subject area is shown on **Figure 1** overleaf.

1.4 Proposed Development & Project Framework

Approval for this proposed development was originally sought in 2008. At that time, Penrith City Council (PCC) approved a range of elements set out in the development application, including floor space, building heights, envelopes.

Parkview Penrith now proposes an alternative development on the subject area, and a Concept Approval application under the transitional Part 3A provisions of the Act been submitted to DPI. The current application proposes a mixed use development including bulky goods, residential apartments, a tavern, neighbourhood shops, offices and public domain improvements (**Figure 2**).

In tandem with the Concept Approval, Parkview Penrith Pty Ltd is also seeking Project Approval for the bulky goods use which comprises a Masters Hardware retail store (13,603 m^2 in size) with up to 380 car park spaces.

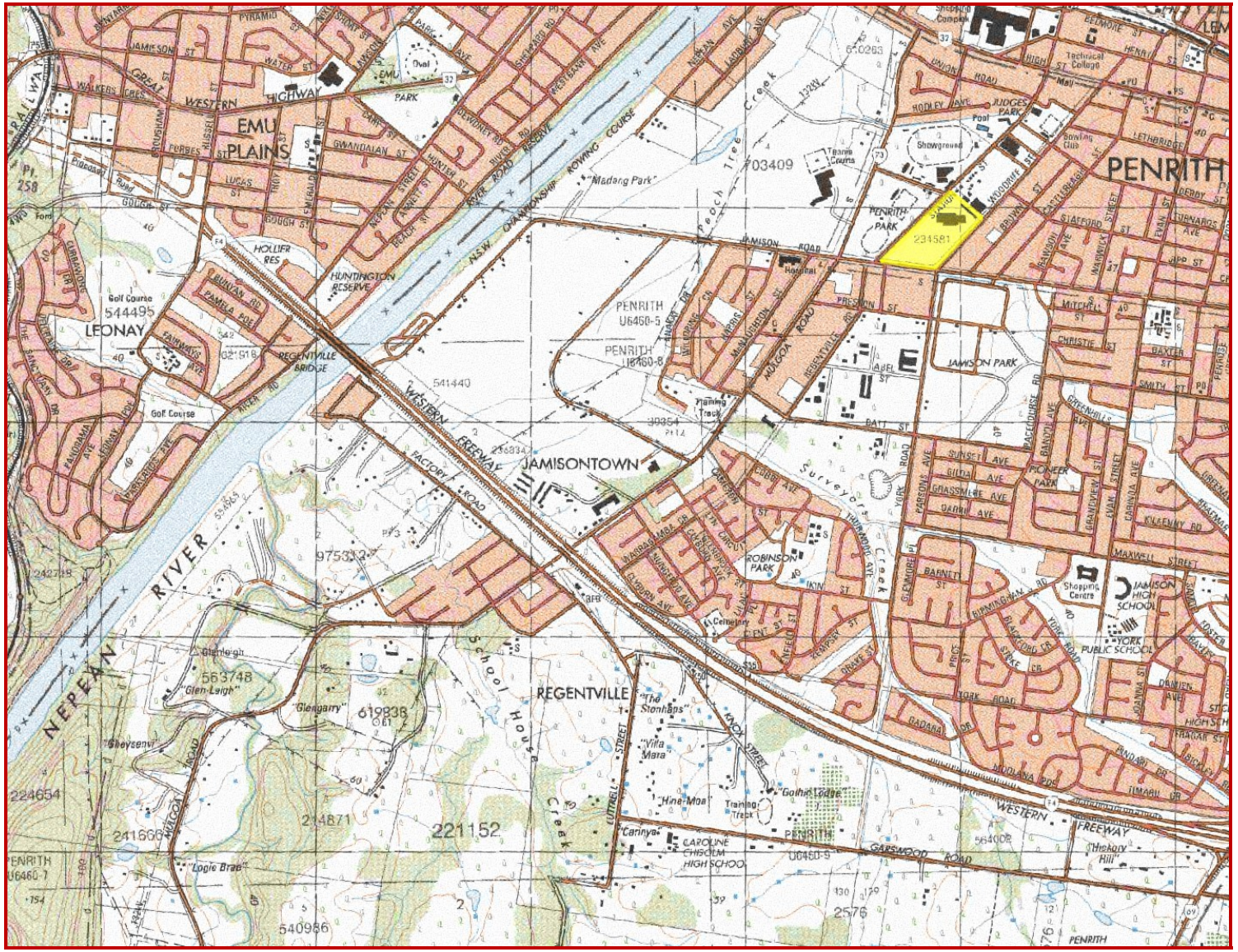

Figure 1. General location of the subject area

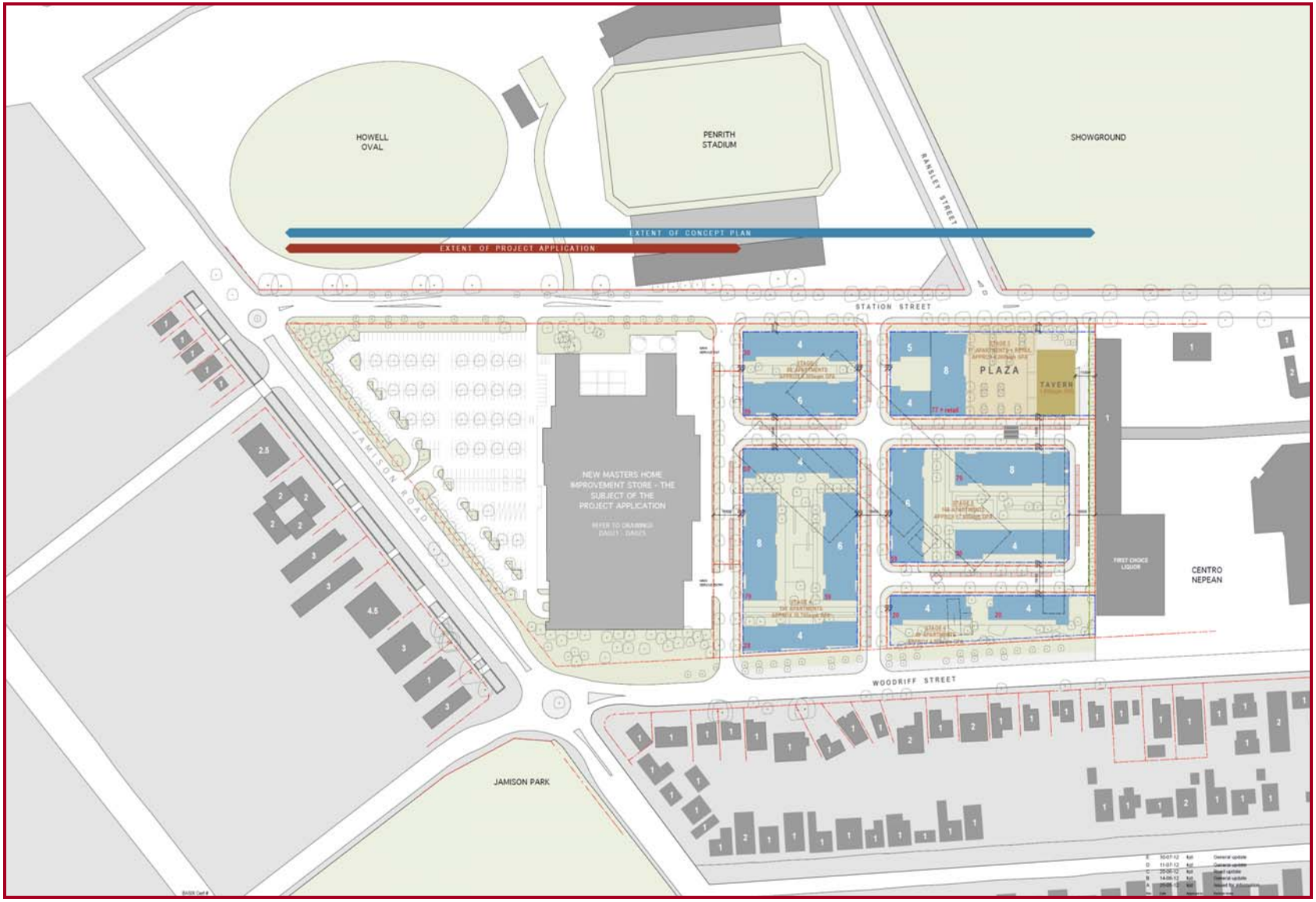

Figure 2. The proposed concept design for the subject area.

1.5 Report Aims and Objectives

The principal aims of the assessment are to:

- Outline the statutory requirements relevant to the subject area with regard to Aboriginal cultural heritage.
- Carry out background research to identify known Aboriginal objects, sites and places, and to identify the potential for any unknown objects and places of significance within the subject area.
- Undertake Aboriginal Community Consultation in accordance with the OEH's *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010.*
- Carry out a survey of the subject area to rediscover and assess known items, identify previously unrecorded items, and assess the Aboriginal archaeological potential of the subject area.
- Develop preliminary mapping of the known and potential Aboriginal cultural heritage sites in the subject area.
- Assess the archaeological (scientific) significance of any Aboriginal sites or objects that may be impacted by the proposed development.
- Identify any possible constraints to the proposed development.
- Assess the potential for direct and indirect impact to Aboriginal cultural heritage that would ensue as a result of undertaking the proposed development.
- Identify and recommend measures to mitigate any potential adverse heritage impacts.

1.6 Limitations

This report is based on existing and publically available environmental and archaeological information, reports about the subject area, and relevant site visits. It did not include any independent verification of the results or interpretations of externally sourced reports (except where the site inspection and field survey indicated inconsistencies). This report includes some predictions about the probability of subsurface archaeological materials to exist in certain landforms/landscapes of the subject area. The predictions were based on surface indications noted during the field investigation, and environmental context. It is acknowledged, however, that sub-surface materials may survive in landform/landscape contexts despite surface and environmental indicators that may suggest that they do not. The converse also applies.

The Aboriginal Heritage Information Management System (AHIMS) information was provided to AHMS by OEH. Information in the archaeological assessment report reflects the scope and the accuracy of the AHIMS site data, which in some instances is limited.

1.7 Authorship and Acknowledgements

The 2006 assessment was written by Jim Wheeler, now Manager Victoria AHMS. This report was re-structured and supplemented by Alan Williams. Alan Williams (BSc (Hons), MSc, MAACAI) is a Senior Archaeologist with AHMS, and has 10+ years' experience in Aboriginal archaeology. The report was reviewed by Peter Douglas, Director, and Lisa Newell, Associate Director. Reporting assistance was provided by Oliver Brown, Senior Archaeologist.

AHMS thanks the following organisations for their involvement in the investigation and their contributions to this report:

- Parkview Penrith Pty Ltd.
- Urbis.
- Deerubbin Local Aboriginal Land Council (DLALC).
- Darug Custodian Aboriginal Corporation (DCAC).
- Darug Aboriginal Cultural Heritage Assessments (DACHA).
- Darug Tribal Aboriginal Corporation (DTAC).
- Darug Land Observations.
- Darug Aboriginal Landcare Inc.
- Tocomwall.

2. STATUTORY HERITAGE CONTEXT

2.1 Commonwealth Legislation

2.1.1 *Environment Protection & Biodiversity Conservation Act 1999*

The *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act) provides for the protection of natural and cultural heritage places. The Act establishes (amongst other things) a Commonwealth Heritage List (CHL) and a National Heritage List (NHL). Places on the NHL are of natural or cultural significance at a national level and can be in public or private ownership. The CHL is limited to places owned or occupied by the Commonwealth which are of heritage significance for certain specified reasons.

The project does not affect any site or place included on the NHL or CHL for its Aboriginal cultural heritage values.

2.1.2 *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* preserves and protects areas (particularly sacred sites) and objects of particular significance to Aboriginal Australians from damage or desecration. Steps necessary for the protection of a threatened place are outlined in a gazetted Ministerial Declaration (Sections 9 and 10 of the Act).

As well as providing protection to areas, the Act can also protect objects through a Declaration, which can also apply to Aboriginal skeletal remains (Section 12). While it is a Commonwealth act, it can be applied at a State level if the State is unwilling or unable to provide protection for sites or objects.

The project does not affect any site or place currently subject to a Declaration.

2.1.3 *Native Title Act 1993*

The *Native Title Act, 1993* (Commonwealth) provides recognition and protection for native title. The Act established the National Native Title Tribunal to administer land claims by Aboriginal people. The Act also provides for Indigenous Land Use Agreements, which allow native title claimants and/or holders control over the use and management of affected land and waters.

A search of the National Native Title Tribunal Registers was undertaken on 22 May 2012, and returned the following results in the subject area:

Register Type	NNTT Reference Numbers
National Native Title Register	Nil
Register of Native Title Claims	NC97/7
Unregistered Claimant Applications	Nil
Register of Indigenous Land Use Agreements	Nil

NC 97/7 is one of six active native title claims that the Gundungurra Tribal Council Aboriginal Corporation have over large parts of the Blue Mountains and Penrith LGA. The proposed claim area does not encompass the subject area.

2.2 NSW Legislation

2.2.1 *Environmental Planning and Assessment Act 1979*

The *Environmental Planning and Assessment Act 1979* (EP&A Act) requires that environmental and heritage impacts are considered by consent authorities prior to granting development approvals. The relevant sections of the EP&A Act are:

- Part 3A: A single assessment and approval system for major development and infrastructure projects [note that Part 3A has now been repealed and replaced with Part 4 (Division 4.1)].
- Part 4: Development that requires consent under consideration of environmental planning instruments.
- Part 5: An assessment process for activities undertaken by Public Authorities and for developments that do not require development consent but an approval under another mechanism.

While Concept Plan approval is sought under the Part 3A transitional provisions of the Act, further approvals under the *National Parks & Wildlife Act, 1974* which protects Aboriginal cultural heritage in NSW are not required. In those instances, management of Aboriginal heritage follows the applicable Aboriginal assessment guidelines (*the Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation, July 2005*) and any relevant statement of commitments included in the Part 3A Development Approval.

2.2.2 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) provides blanket protection for Aboriginal objects (material evidence of indigenous occupation) and Aboriginal places (areas of cultural significance to the Aboriginal community) across NSW. An Aboriginal object is defined as:

> *... any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.*

An Aboriginal place is any place declared to be an Aboriginal place by the Minister for the Environment, under Section 84 of the Act.

It is an offence to disturb Aboriginal objects or places without a permit authorised by the Director-General of the Office of Environment and Heritage (OEH formerly DECCW). In addition, anyone who discovers an Aboriginal object is obliged to report the discovery to OEH.

The operation of the NPW Act is administered by OEH. With regard to the assessment of Aboriginal cultural heritage, OEH has endorsed the following guidelines:

- *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (2010).
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (2010).
- *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (2010).
- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (2011).

The provisions of the NPW Act that require various approvals or permits to disturb or discover Aboriginal deposits, objects and places are not applicable to Part 3A projects with Project Approval.

2.2.3 Aboriginal Land Rights Act 1983

The *Aboriginal Land Rights Act, 1983* allows for the transfer of ownership to an Aboriginal Land Council of vacant Crown land not required for an essential purpose or for residential land. These lands are then managed and maintained by the local Aboriginal Land Council.

No places within the subject area are currently subject to Aboriginal Land Claims.

3. ABORIGINAL COMMUNITY CONSULTATION

3.1 Background

Aboriginal community consultation was undertaken as part of the 2006 assessment. The consultation at the time is understood to have included the three known Aboriginal organisations that practised Aboriginal cultural heritage in the Cumberland Plain. However, it cannot be demonstrated that the consultation in 2006 followed any formal guidelines (all of which have now been superseded).

The following section has been taken from the original 2006 assessment report, outlining the consultation and findings that were undertaken at that time:

> *Consultation with the local Aboriginal community was undertaken to determine the cultural significance of the study area.*
>
> *The Deerubbin Local Aboriginal Land Council (DLALC) represents the local Aboriginal community in western Sydney. The Darug Tribal Aboriginal Corporation (DTAC) and Darug Custodian Aboriginal Corporation (DCAC) represent descendents of the Darug people, the traditional owners of western Sydney. DLALC, DTAC and DCAC were consulted to provide advice about the cultural heritage values of the study area and appropriate management of Aboriginal heritage during development.*
>
> *Site survey was undertaken in partnership with:*
>
> - *Mr Phil Khan of Deerubbin Local Aboriginal Land Council.*
> - *Mr Alan Evans of Darug Tribal Aboriginal Corporation.*
> - *Ms Leanne Watson of Darug Custodian Aboriginal Corporation.*
>
> *The recommendations of this report have been developed in consultation with DLALC, DTAC and DCAC. In preparing this assessment we have considered the views of the local Aboriginal community regarding the cultural heritage significance of the study area and management of Aboriginal heritage during development. The representative groups have reviewed this report and have provided written comments regarding the cultural values of the study area and our proposed management of Aboriginal heritage during re-zoning and future development (included in Appendix 1).*
>
> *OUTCOMES OF CONSULTATION*
> *The outcomes that have emerged to date as a result of consultation with the Aboriginal community regarding cultural heritage values of the study area and management of Aboriginal heritage during development include the following:*

I. *The Aboriginal representative groups requested consultation about, and involvement in, all stages of the Aboriginal heritage management process so that Aboriginal community views are considered in management outcomes.*

II. *All Aboriginal sites and objects have cultural value to the local Aboriginal community as an important demonstration of Aboriginal use and occupation of the landscape prior to European dispossession. The degree of cultural significance is a matter for the local Aboriginal community to determine.*

III. *The Aboriginal representative groups provided written support for our recommendations, including support for our recommended programme of archaeological test excavation in areas of development impact to determine the nature, extent and significance of any Aboriginal archaeological deposits prior to site development. The Aboriginal representative groups have requested that they be involved in any further archaeological investigations at the site.*

IV. *The Darug Custodian Aboriginal Corporation has specifically recommended that any cultural material found during archaeological excavations should be re-buried on-site after analysis has been completed.*

3.2 The Current Process

For the proposed Part 3A Concept Approval application, formal Aboriginal consultation in accordance with the Part 3A *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC July 2005) is required. These guidelines actually refer to a now defunct set of Office of Environment & Heritage guidelines from 2004. Subsequently, best practise now uses the current Aboriginal consultation procedure outlined in *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010).

The 2010 guidelines have six broad phases:

1. Pre-notification – identification of the Aboriginal parties in a region by contacting various State government agencies.
2. Notification – contacting identified Aboriginal parties and advertising in the local print media for interested Aboriginal parties.
3. Presentation of Project – advising the Registered Aboriginal Parties (RAPs) of the project, which may involve meetings and/or site visits.
4. Methodology – providing the RAPs with the proposed field methodology. Tasks (2) and (3) are often combined.
5. Impacts and Mitigation Options – discussion of potential impacts to heritage and appropriate mitigation options before developing the report.

6. Report review – review of the final report.

The consultation process has two aims. The first is to consult with knowledge holders to identify cultural places and values that may be affected by the project. The second is to obtain input on the proposed assessment methodology, and comment on the assessment report and management recommendations.

3.3 This Assessment

Due to long time delays since the 2006 assessment, and the changes in proposed development, it was recommended that Aboriginal consultation be re-initiated for this assessment. Subsequently, Aboriginal consultation was re-started following the steps outlined in *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010) (see **Section 3.2**).

The following sections outline the Aboriginal consultation that has been undertaken for this assessment.

3.3.1 Pre-Notification

Initiation of the consultation process was undertaken in June 2012. As required by the guidelines, letters were sent to the organisations listed below on the 1 June 2012 requesting information on Aboriginal individuals/organisations that may hold cultural knowledge relevant to determining the significance of Aboriginal objects and places within the subject area. The following organisations have been contacted with a request for information:

- OEH.
- Deerubbin Local Aboriginal Land Council.
- Office of the Registrar, *Aboriginal Land Rights Act, 1983.*
- National Native Title Tribunal.
- NTSCorp.
- Penrith City Council.
- Hawkesbury Nepean Catchment Management Authority.

Several responses from the organisations were received in early June 2012 (**ACHA Appendix 1**). They provide the following list of Aboriginal individuals/organisations who may have had an interest in the subject area:

- Deerubbin LALC.

- Darug Custodian Aboriginal Corporation.
- Darug Aboriginal Cultural Heritage Assessments.
- Darug Land Observations.
- Darug Tribal Aboriginal Corporation.
- Darug Aboriginal Land Inc.
- Tocomwall.
- Gunjeewong Cultural Heritage Aboriginal Corporation.

3.3.2 Notification and Registration of Interest

Each of the Aboriginal organisations outlined in **Section 3.3.1** were notified via letter, e-mail and/or phone call of the project on the 15 June 2012 (**ACHA Appendix 1**). The information provided included a brief description of the project, the proposed assessment and contact details for both the proponent and archaeological consultant. A period of 20 days was supplied to respond to the notification (5 July 2012).

In addition, a newspaper advert was placed in the *Penrith Star*, containing notification of the project, and an invitation to register an interest (**ACHA Appendix 1**). The advert was published on the 21 June 2012 and provided 14 days to respond.

To date, the following Aboriginal organisations have registered an interest in the project:

- Darug Land Observations.
- Darug Tribal Aboriginal Corporation.
- Darug Aboriginal Cultural Heritage Assessments.
- Deerubbin Local Aboriginal Land Council.
- Darug Custodian Aboriginal Corporation.
- Darug Aboriginal Landcare Incorporated.
- Tocomwall.

In accordance with Section 4.1.6 of the guidelines, details of the Registered Aboriginal Parties were provided to OEH and the Deerubbin LALC.

3.3.3 Presentation of Information/Methodology

In accordance with Sections 4.2 and 4.3 of the OEH guidelines, a document detailing the proposed assessment methodology was sent to the RAPs for comment on 6 July 2012 (**ACHA Appendix 1**). This document included a detailed description of the proposed development; and the re-structured Aboriginal Cultural Heritage Assessment. The document outlined in detail how the methodology and finalisation periods of the ACHA were being combined, and sought approval to do so. The document also sought information from the RAPs in regard to how they wished to be consulted, how they wished cultural information to be managed, and other relevant matters. A period of 28 days was provided to the RAPs to provide any comments.

In addition, AHMS undertook a series of site inspections and meetings on the 17 July 2012 with all RAPs (excluding the Darug Tribal Aboriginal Corporation who failed to respond to several requests to attend). The meeting provided an opportunity for physical inspection of the site by the RAPs, and to discuss and dispute/elaborate/agree with the findings and recommendation of the report.

All responses received have been included in **ACHA Appendix 1**.

3.3.4 Field Investigations

As outlined in **Section 3.3.3**, a site inspection was undertaken with several of the RAPs on the 17 July 2012. The site inspection was undertaken by:

- Darug Land Observations (Gordon and Ron Workman).
- Deerubbin Local Aboriginal Land Council (Steve Randall).
- Darug Custodian Aboriginal Corporation (Justine Coplin).
- Tocomwall (Scott Franks).
- Darug Aboriginal Cultural Heritage Assessments (Celestine Eveningham).

For insurance reasons Darug Aboriginal Landcare Inc (Des Dyer) could not participate in the field inspection, but a meeting was held with them on the same day near the study area.

Darug Tribal Aboriginal Corporation did not respond to any correspondence and therefore did not attend the meeting or site inspection.

3.3.5 Review of Recommendations and Report

Under Section 4.3.6 of the OEH 2010 guidelines, potential heritage management options require discussion and/or development with the RAPs. This was undertaken in a series of meetings with the RAPs on the 17 July 2012. A focus of the meetings was to discuss the

archaeological findings and associated recommendations. All RAPs who were spoken to, indicated their support of both the findings and recommendations of this report. There were two further outcomes of these meetings:

1. Cultural information suggests that the former Great Western Highway (now Jamison Road, south of the subject area) was an old songline, and therefore, the site is in close proximity to known cultural activities. This, therefore, concurs with, and supplements, the archaeological findings of the report.

2. Some concern was raised over the how the identification of unexpected/unknown Aboriginal objects would be undertaken during the development. To address this, the RAPs suggested cultural monitoring should be undertaken. AHMS personnel suggested that the requirement (or not) of any form of monitoring should probably occur following the proposed test excavations recommended through this assessment. Since monitoring would probably not be required if no Aboriginal objects were recovered through these excavations.

The current report was provided in draft form to the RAPs for review. Comments were received from four of the groups, supporting the overall findings and recommendations. Comments received are outlined in the consultation log, and the written correspondence received from the RAPs in relation to the report is included in **ACHA Appendix 1**.

4. ENVIRONMENTAL CONTEXT

4.1 Background

Archaeological assessment reports include information about the environmental context of subject areas because of the important role environmental characteristics played in influencing the types of archaeological sites in any given area. Physical environments influenced both the type and availability of natural resources, cultural activities and the types of archaeological sites that may be found in an area subject archaeological assessment.

A determination of the former environmental context is essential to develop accurate models of cultural activity, site distribution patterns and the archaeological potential of any given area. The environmental setting of the subject area is described below.

4.2 Landscape

Bannerman and Hazelton's (1990) soil landscapes of the Penrith 1:100,000 map sheet indicates that the subject area lies on the 'Richmond' fluvial soil landscape. Jones and Clark's (1991) geology of the Penrith 1:100,000 map sheet shows the subject area is underlain the 'Cranebrook Formation' alluvial terrace unit.

The subject area is situated on a quaternary alluvial terrace of the Nepean River. It is situated on a flat terrace landform with very low slope gradients. The closest drainage line is an ephemeral watercourse, draining land to the east, which has been canalised underneath Jamison Road. The original course of this drainage line may have crossed the southern portion of the subject area prior to construction of Jamison Road. Higher-order drainage lines are located approximately 1 kilometre from the subject area (Surveyors Creek to the south and Peach Tree Creek to the west) and the Nepean River is located 1.5 kilometres to the west.

4.2.1 Geology

Local parent material comprises quaternary alluvium consisting of sand, silt and gravels derived from sandstone and shale catchment area of the Nepean River.

The local Cranebrook terrace formation has been the subject of intensive geomorphological investigation and archaeological investigation (as will be discussed later in the report). The most detailed geomorphological analysis was undertaken by Nanson and Young (1987). They demonstrated that the Cranebrook Terrace was deposited by the Nepean River during a period when it was a high-discharge stream on a braid plain. Since then the Nepean River has remained laterally stable and as a result the terrace deposits are largely undisturbed.

In their 1987 paper, Nanson & Young reported a large number of radiocarbon and thermoluminescence dates that indicated the terrace material was deposited between 40 – 45,000 years before present. In a recent paper, Stockton & Nanson (2004) have reported new dating that suggests the terrace material (also corresponding with units beneath the subject area) was deposited between 50 – 110,000 years before present.

Nanson & Young describe the Cranebrook terrace as two stratigraphic units comprising (1987):

- An upper 6 – 9 metres of sandy-clay orange and orange mottled overburden; overlying
- An abrupt but undulating change to a deposit of weakly cemented gravels 5 – 7 metres thick. This unit overlies Ashfield shale of the Wianamatta Group.

Within this paper, Stockton & Nanson (2004) identified two stratigraphic units, the Pernrith Unit and Richmond Unit (**Figure 3**). While similar, the two units are of differing age, with the Penrith Unit generally being considered too old for Aboriginal objects to occur. Groundtruth Consulting Pty Ltd [Peter Mitchell] (2010) in a study of the Penrith Lakes Development scheme, immediately north of the subject area elaborated on these units:

> *Based on comparative dates obtained downstream in the vicinity of Windsor and Richmond the Penrith Unit is now thought to be coeval with the Clarendon Terrace with the basal gravel having been deposited during Marine Oxygen Isotope Stage 5 (OIS 5 = 130,000 to 80,000 years ago). The Richmond Unit is coeval with the Lowlands Formation and these gravels were deposited during OIS 3 (65,000 to 33,000 years ago). Both OIS 3 and 5 were periods of warmer climate. According to Nanson et al., (2003) the fine sediments of the Richmond unit were deposited on a floodplain at a higher level than the present channel and they have bracketed them between 20,000 and 15,000 years ago. This age range however depends on three TL* [Thermo-luminescence] *samples collected near the southern end of the PLDC* [Penrith Lakes Development Company] *area and no dates have been obtained from sediments at the northern end near the junction with Cranebrook Creek.*
>
> **Figure 3***... summarises the present understanding of valley stratigraphy and if the ascribed ages are correct then an important implication of this pattern is that whilst Aboriginal sites may occur anywhere across the surface of these units, the only sediment that might contain buried sites is the 'overburden' material in the Richmond Unit. It should be noted however that claims have been made, refuted, and remade that artefacts have been recovered from Richmond Unit gravel (Stockton and Nanson 2004). Up to the time of the test excavations reported here the fine-grained overburden sediments of the Richmond Unit had not been well dated or well tested archaeologically.*

From the perspective of Aboriginal archaeology it is very important to note that in none of the detailed work discussed above has there been any recognition of buried land surfaces or soil profiles and that it is now clear that most of the stratigraphic units across the PLDC area are older than the generally accepted duration of Aboriginal occupation of Australia. It follows that deeply buried Aboriginal sites are unlikely to be present. This conclusion is supported by the failure to identify any Pleistocene or deeply buried sites over decades of quarry monitoring (Kohen 1981 to 2004) and in a large excavation experiment conducted by Kohen (1997a) set up specifically to test for the presence or absence of deep artefacts.

If buried land surfaces are present they would be expected in the fine overburden material and if they contain Aboriginal archaeology this will be confined to the Richmond Unit as the Penrith Unit fines are probably too old.

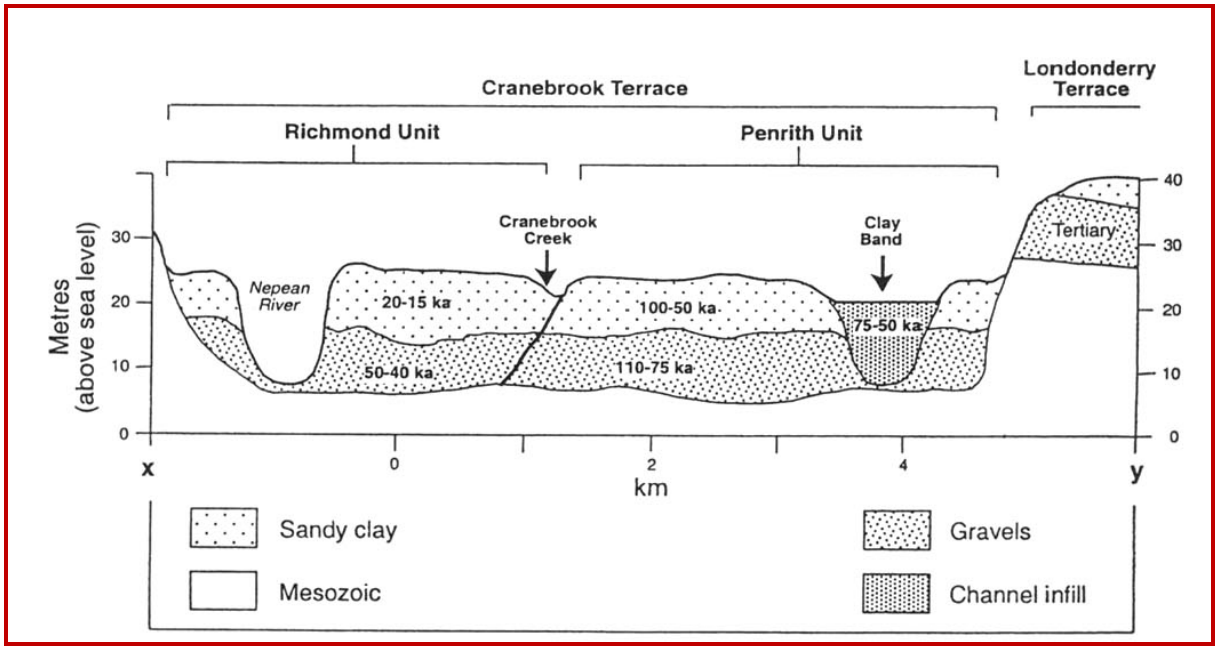

Figure 3. A schematic diagram of the Cranebrook Formation at the Penrith Lakes Development scheme (north of the subject area), looking north. This diagram collates and summarises a range of studies and models of the deposit to give an indication of location and age (Source: Stockton & Nanson, 2004; Mitchell, 2010).

4.2.2 Soils

Bannerman and Hazelton (1990) describe the general pattern of soils on the Richmond landscape as follows:

- Reddish-brown loamy sand A-horizon topsoil. Approx 400 mm thick. Occurs on terrace edges; overlying

- Brown sandy-clay loam A-horizon topsoil. Approx 400 – 1000 mm thick. Occurs across the landscape except where it has been removed by erosion; overlying
- Alternating layers of brown mottled light clay and brown mottled stiff medium-heavy clay sub-soil.

Topsoils of the Richmond landscape are slightly acidic.

Geotechnique Pty Ltd undertook a geotechnical and contaminated sites assessment of the subject area in May 2005. Their report was provided to assist in assessing the nature and depth of soil deposits below current ground and the degree of prior land-use disturbance across the site.

Geotechnique excavated 80 boreholes using a bobcat-mounted drill rig to assess sub-ground properties and contamination levels. They divided the subject area into a northern portion, which currently contains the Panasonic assembly and distribution facilities and a southern portion comprising a grassed paddock.

Sub-ground profiles of the northern portion comprised (*Geotechnique*, 2005):

- Up to 350mm surface cover comprising hard surfaces (roads and concrete) underlain by gravel sub-base; over
- Silty-clay topsoil 150 – 300 mm thick in undisturbed areas; or
- Silty sandy clay fills 200 – 1300 mm thick in disturbed areas; overlying
- Silty sandy-clay to silty clay 2000 mm thick; over
- River gravels encountered at depths of between 3.5 and 5.5 metres below current ground and continuing for depths of up to 12 metres below ground.

Sub-ground profiles of the southern portion comprised:

- Silty clay topsoil up to 300mm thick; over
- Silty-sandy clay of low plasticity to silty clay of high plasticity up to 6 metres thick; overlying
- River gravels encountered in two boreholes at depths of 6 metres and 6.3 metres below current ground.

The borehole data indicates that soil profiles of the northern portion have been disturbed up to 1.6 metres below current ground, however, other parts are substantially

undisturbed. Profiles in the southern portion appear to be undisturbed (although mixing and homogenization of the upper topsoil unit is likely). Sub-ground profiles revealed across the subject area correspond with the stratigraphy of the Cranebrook terrace described by Nanson & Young, confirming the subject area is located on the Cranebrook formation.

4.3 Vegetation

The natural vegetation of a landscape is an important consideration, because it provided Aboriginal people with resources. Bark from trees could be stripped to make canoes, shields and other items. The vegetation itself provided food resources such as edible plants and also habitats for animals such as possums and birds which could be hunted.

During exploration along the Hawkesbury / Nepean River in 1791 Captain-Lieutenant Watkin Tench made the following comment on soils, vegetation and fauna bordering the Hawkesbury River (Tench in Fitzhardinge, 1979, p. 226):

> *The whole of the country we passed was poor, and the soil within a mile of the river changed to a coarse deep sand, which I have invariable found to compose its banks, in every part, without exception, that I ever saw. The stream at this place is about three hundred and fifty feet wide; the water pure and excellent to the taste; the banks are about twenty feet high, and covered with trees, many of which had been evidently bent by the force of the current, in the direction which it runs, and some of them contained rubbish and drift wood in their branches, at least forty-five feet above the level of the stream. We saw many ducks.*

The mapped route of this exploration party suggests that this is likely to be further north nearer Richmond than Penrith, but the description provides a good general of the Nepean River at the time of European settlement. Given the amount of debris observed along the river at that time, it is probable that the river and surrounding land had been subject to at least one substantial flooding event not long beforehand.

Original vegetation has been entirely cleared from the site, but at the time of European contact with Aboriginal people living in the locality it would have comprised of open forest dominated by broad-leaved apple (*Angophora subvelutina*), forest red gum, cabbage gum, red cedar, coachwood and melaleuca. Understorey was generally sparse across the Cumberland Plain but early settlers reported it was much thicker on the banks of the Nepean.

4.4 Water

The subject area is situated 1.5 km east of the Nepean River (**Figure 1**). Between the Nepean River and the subject area is another higher order creek identified as Peach Tree creek. Surveyor Creek to the south is also within 1 km.

A minor tributary (which eventually joins Peach Tree Creek), is located immediately south of Jamisons Road, and it may at one time have crossed through the subject area.

The one-in-100-year flood level in the Penrith area is 26.1 m AHD. The subject area is generally between 20-30 m AHD and some parts may flood. However, during significant flood events, such as the 1867 flood (which peaked at approximately 20 m AHD), it appears that the subject area was just outside the flood zone (**Figure 4**). The subject area may, therefore, have formed a temporary refuge/river's edge during times of flood.

Figure 4. Map showing the extent of the 1867 flood event. The subject area is indicated by the arrow (Source: State Emergency Services NSW).

4.5 Land-Use History

As part of the detailed geotechnical work undertaken at the subject site, a brief review of previous land use was undertaken *Geotechnique* (2005). This provides information on the original landscape of the site, and identifies where disturbance and impacts have occurred to the soil profile.

Using primarily aerial photographs, *Geotechnique* demonstrated that little development occurred within the site until the 1950's. Prior to this, the area was characterised by market gardens in the north, and relatively undisturbed vegetation in the south. From the 1950's, development of structures begins to occur in the north of the site. Factories, roads, parking bays, warehouses and other ancillary activities were all constructed between 1961 and 1978; through this time the southern portion of the site appears relatively undisturbed, although some landscaping and de-vegetation has occurred. The current appearance of the subject site (**Figure 5**) has been consistent since 1978.

The findings of the review indicate that while disturbance has been extensive in the northern portions of the subject site, the southern parts have been relatively un-impacted and may contain an intact soil profile, a fact confirmed by the geotechnical works (see **Section 4.2.2.**).

Figure 5. Photograph of the subject site, looking west. Note the extensive development to the north (right) of the site compared with the undisturbed appearance of the southern (left) portions of the site.

5. REGIONAL AND LOCAL CHARACTER OF ABORIGINAL LAND USE

5.1 Regional Context

Archaeologists examine regional and local trends in the distribution of previously identified Aboriginal sites in order to determine past settlement and site location patterns and any identifiable causal relationship between location, environment and topography. ,. This often provides evidence about economic and social systems in the past and also assists archaeologists in predicting likely site types, site locations and the nature of the archaeological resource in a given area.

The subject area falls within the Cumberland Plain region. The archaeology of the region has been well documented through a large number of academic studies, regional management studies and impact assessment investigations over the past 30 years. More than 4,500 sites have been recorded and registered with the OEH Aboriginal Heritage Information Management System (AHIMS) for Sydney, reflecting both the wealth of archaeology in the region and the number of archaeological investigations undertaken. The Cumberland Plain is the most intensively investigated archaeological landscape in Australia.

The dominant site types in the Sydney region (in the 15 - 20 % frequency range) are rock shelters with midden deposit, rock shelters with art, rock art engravings and open artefact scatters (Attenbrow, 2002). Site types in the 5 - 15 % range include rock shelters with artefacts, grinding grooves and open middens. The distribution, density and size of sites is largely dependent on environmental context. For instance, middens are found in close proximity to marine, estuarine and less often, freshwater bodies. Rock shelters are only found in areas of exposed sandstone escarpment and grinding grooves are found on areas of exposed flat bedded sandstone near a source of water.

5.1.1 Early Occupation

Aboriginal occupation in the region dates back well into the Pleistocene period (i.e. before 10,000 years ago). This evidence comes from radiocarbon dates retrieved from excavated sites at Cranebrook Terrace (41,700 years before present [BP]), Shaw's Creek K2 (14,700 BP), and George & Charles St Parramatta (c.25,000 – 30,000 BP) (Jo McDonald Cultural Heritage Management Pty Ltd, 2005; Kohen et al., 1984; Nanson et al., 1987). Other sites include Burrill Lake and Bass Point on the south coast with dates >15,000, and Loggers Shelter and Tempe House, the latter a hearth on Cooks River, both dating to early Holocene (5-10,000 years BP) (Attenbrow, 1987; Bowdler, 1984; Lampert, 1971; Jo McDonald Cultural Heritage Management Pty Ltd, 2006a). More recently, AHMS has recently obtained ages of between 12, 000 – 15,000 years BP for PT12, an artefact scatter

within a sand dune overlooking Hawkesbury River in Pitt Town (AHMS, 2010, Williams et al., 2012).

The dating of Cranebrook Terrace has been widely criticised, but has never been withdrawn from publication, and they are still considered the earliest in Sydney. It is, however, considered that the George and Charles Street site is the oldest reliable date for Aboriginal occupation in the Sydney region, although these dates similarly have interpretation issues.

The early occupation sites dating to the late Pleistocene /early Holocene have been found in deep stratified rockshelter deposits and within alluvial deposits, particularly on the margins of large rivers such as the Hawkesbury-Nepean and Parramatta Rivers. Drawing on this evidence, McDonald has recently argued that early occupation of the Sydney basin was focused on these primary river systems and characterised by a high degree of 'residential mobility' between a small number of sites (McDonald, 2008). However, the survivability and taphonomic loss of older sites in such a heavily urbanised environment must also be considered (Surovell et al. 2007) with these areas receiving only minimal impact from the coastal plains for example.

5.1.2 Intensification during the Holocene

The vast majority of dated sites in the Sydney region are less than 5,000 years old (35 out of a total of 48 dated sites) (Attenbrow, 2002). It has been argued that this is a result of increased populations and 'intensification' of cultural activity during this period. The prevalence of sites dating to the last 5,000 years may also be a result of the last significant rise in sea level, approximately 7,000 years ago (Sloss et al., 2007). The sea level rise would have submerged many of the older sites along the coastal fringe and forced Aboriginal groups westward to the current coastline.

In an attempt to better understand changes in use and occupation during the Holocene period, Val Attenbrow undertook a detailed study of the Upper Mangrove Creek catchment to the north of Sydney (Attenbrow, 2006). Attenbrow's study found significant changes in site patterning during the Holocene. She concluded that population was unlikely to have changed, but the use of sites, most notably in the last 2,000 years did. This increased use of sites appeared in the archaeological record as increasing population.

Holdaway et al. (2008) similarly suggest that populations did not increase in the late Holocene, but that the evidence reflects taphonomic change. Conversely, Smith et al. (2008) and Williams et al. (2010), both suggest that populations were far larger in the last 2,000 years than any preceding period. Using radiocarbon data and regional studies, they demonstrate that there is an increasing use of sites in all locations at this time, which cannot be explained by movement of people across the landscape, but rather indicates increasing numbers of people using more of the landscape.

This issue is still widely contested in archaeological literature, but whatever the reason, archaeological sites within the Sydney Basin are dominated by late Holocene sites.

5.1.3 Regional Site Patterns

More than 4,500 sites have been recorded and registered with the OEH *Aboriginal Heritage Information Management System* (AHIMS) for Sydney, reflecting both the wealth of archaeology in the region and the number of archaeological investigations undertaken.

The dominant site types in the Sydney region (in the 15 - 20 % frequency range) are rock shelters with midden deposit, rock shelters with art, rock art engravings and open artefact scatters (Attenbrow, 2002). Site types in the 5 - 15 % range include rock shelters with artefacts, grinding grooves and open middens (Attenbrow, 2002). The distribution, density and size of sites are largely dependent on environmental context. For instance, middens are found in close proximity to marine, estuarine and, less often, freshwater bodies. Rockshelters are only found in areas of exposed sandstone escarpment, and grinding grooves are found on areas of exposed flat bedded sandstone near a source of water.

A study of the regional archaeology of the Cumberland Plain by Kohen made a number of findings about site location patterns in the Sydney area. The study demonstrated that proximity to water was an important factor in site patterning. Kohen found that 65 % of open artefact scatter sites were located within 100 m of permanent fresh water (Kohen, 1986). Only 8% of sites were found more than 500 m away from permanent fresh water. In short, Kohen argued that open artefact scatters are larger, more complex and more densely clustered along permanent creek and river lines. Kohen's study also found that silcrete (51%) and chert (34%) are the most common raw materials used to manufacture stone artefacts. Other raw materials include quartz, basalt and quartzite.

Although the patterns described above have been generally supported by subsequent investigations, Kohen's study was limited by a reliance on surface evidence. Extensive excavation across the Cumberland Plain has since shown that areas with no surface evidence often contain sub-surface deposits buried beneath current ground surfaces. This is a critical consideration in aggrading soil landscapes, such as those commonly found across the Cumberland Plain. In a 1997 study of the Cumberland Plain, McDonald (1997) found that:

- 17 out of 61 excavated sites had no surface artefacts prior to excavation.
- The ratio of recorded surface to excavated material was 1:25.
- None of the excavated sites could be properly characterised on the basis of surface evidence. In short, surface evidence (or the absence of surface evidence) does not necessarily indicate the potential, nature or density of sub-surface material.

The results of McDonald's study clearly highlight the limitations of surface survey in identifying archaeological deposits in this landscape. The study also shows the importance of test excavation in establishing the nature and density of archaeological material on the Cumberland Plain.

McDonald has undertaken over 20 years of consulting archaeology in the Cumberland Plain, and like Kohen has developed predictive models for the distribution of Aboriginal objects.

In a recent publication, White and McDonald (2010, p. 29) summarised this model as follows:

> *Topographic and stream order variables correlate with artefact density and distribution. High artefact density concentrations may have resulted from large number of artefact discard activities and/or from intensive stone flaking. Highest artefact densities occur on terraces and lower slopes associated with 4th and 2nd order streams, especially 50 – 100 m from 4th order streams. Upper slopes have sparse discontinuous artefact distributions but artefacts are still found in these landscape settings.*

5.2 Local Context

The Hawkesbury/Nepean River – A Summary

The margins of the Hawkesbury River in western Sydney have formed a focus of archaeological research for nearly 70 years (e.g. McCarthy 1948; Stockton and Holland 1974). Initially, these investigations took the form of academic research, but more recently have shifted towards consulting projects associated with development (e.g. White and McDonald, 2010).

One of the first investigations in the region was at Lapstone Creek, located southwest of Emu Plains in the foothills of the Blue Mountains (McCarthy, 1948). Initially undated, this site was one of several used by McCarthy and others to differentiate the Bondaian and Eloueran assemblages (e.g. Lampert, 1966, 1971; McBryde, 1966, 1974; Megaw, 1965, 1968; Moore 1970, 1981) (**Figure 6**). Radiocarbon ages giving a basal age of ~4 ka for the site were published in the late 1960s from archived samples of charcoal (Polach et al., 1967; McCarthy, 1978). As part of the original study, McCarthy also identified several 'surface workshops' containing a mixture of the two assemblages, running along the banks of the river between Castlereagh and Emu Plains.

In the 1970s, Stockton and Holland (1974) undertook excavations at several rockshelters in the Blue Mountains (including Kings Tableland, Walls Cave, Lyrebird Dell and Springwood Creek), which indicated the occupation of the region through the Last Glacial Maximum and Terminal Pleistocene. Excavations revealed that the initial occupation of the region had occurred by ~22 ka, with a Capertian assemblage dominating the period between ~12 – 6 ka and a Bondaian assemblage between ~3 ka to European arrival (and peaking after 0.6 ka). A sterile phase was identified between the two assemblages. As part of these works a disturbed rockshelter at Shaws Creek (K1) was excavated, with preliminary findings indicating potential for deep-time deposits in close proximity to the Hawkesbury River (Stockton, 1973).

Kohen subsequently undertook excavations of KII rockshelter, a site in better condition immediately east of K1 (Kohen, 1986; Kohen et al., 1984). This excavation identified two

main assemblages: a lower assemblage (within units 1 – 4/phases VI-IV) composed of amorphous core/flake tools and thick flakes; and an upper assemblage (within units 5 and 6/phases I-III) including backed blades, geometric microliths, edge-ground hatchets and bipolar/scalar pieces (Kohen et al., 1984). The lower assemblage was dominated by chert (also referred to as silicified tuff), while the upper assemblage was dominated by igneous and metamorphic materials, as well as an increasing abundance of silcrete. Radiocarbon ages for the two assemblages indicated that the lower assemblage had a minimum age of 13 ka, while the upper assemblage in various forms was present from 4 - 1.2 ka. In contrast to Stockton (1973), Kohen saw no evidence of a hiatus between the two assemblages. With the exception of the Cranebrook Terrace, this site is currently the earliest evidence of occupation along the Hawkesbury River (**Figure 6**).

In the same study, Kohen also referred to an open stratified site at Jamisons Creek, Emu Plains, where two ages suggest an initial occupation from ~7 ka, with a proliferation of backed blades associated with a hearth at ~3ka (Kohen et al., 1984) (**Figure 6**). Thermo-luminescence dates of an open site at Regentville (RS 1), similarly found a focus of occupation between 5.2 ± 0.5 ka (W 1892) and a basal age 7.6 ± 0.8 ka (W 1893) (McDonald, 1995).

The earliest date for alleged Aboriginal occupation in the region comes from the Cranebrook Terrace where five 'flaked' pebbles identified as stone tools by Stockton were found within a gravel pit (Stockton and Holland, 1974). Subsequent work by Nanson et al. (1987) demonstrated these gravels to be ~ 40 ka. These dates would have made this the oldest site on the east coast of Australia. However, the validity of the 'flaked' pebbles as artefacts, their provenance (several were located at the base of the section out of situ) and the association between the ages (which ranged from 10 – 42 ka) and the artefacts have been the source of controversy ever since the publication. Mulvaney and Kamminga (1999) rejected this site, and despite extensive monitoring of the Penrith gravel pits over the past 30 years no other comparable artefacts or evidence of early human occupation has come to light at those levels (see Mitchell, 2010, for further discussion).

More recently, excavations by Austral Archaeology Pty Ltd at the Windsor Museum site recovered an extensive artefact assemblage within a sand dune deposit dated to between 149 ka and 8.5 ka (Mitchell, pers. comm.) (**Figure 6**). Correlating the thermo-luminescence ages with the archaeology has proved to be difficult, as the sediments are known to be bioturbated, but it is very likely that the oldest artefacts are of late Pleistocene age.

As part of a salvage excavation for the Rouse Hill Infrastructure project, a basal layer of silicified tuff artefacts was recovered at RH/CC2, a stratified open site. Although the assemblage was not dated, it was considered to reflect a terminal Pleistocene age (Jo McDonald Cultural Heritage Management, 2005) (**Figure 6**). Consulting work on the western Cumberland Plain by Smith (1986) at Quakers Hill and by McDonald *et al.* (1994) at Second Ponds Creek has resulted in the recovery of hearths and other features in association with extensive artefact scatters dated to the late Holocene. Further afield, in tributaries of the Hawkesbury River, studies at Upper Mangrove Creek (Attenbrow, 2004),

Darling Mills SF 2 rockshelter (Attenbrow, 1993), and MR/1 (Moore, 1981) have all demonstrated terminal Pleistocene and early Holocene occupation.

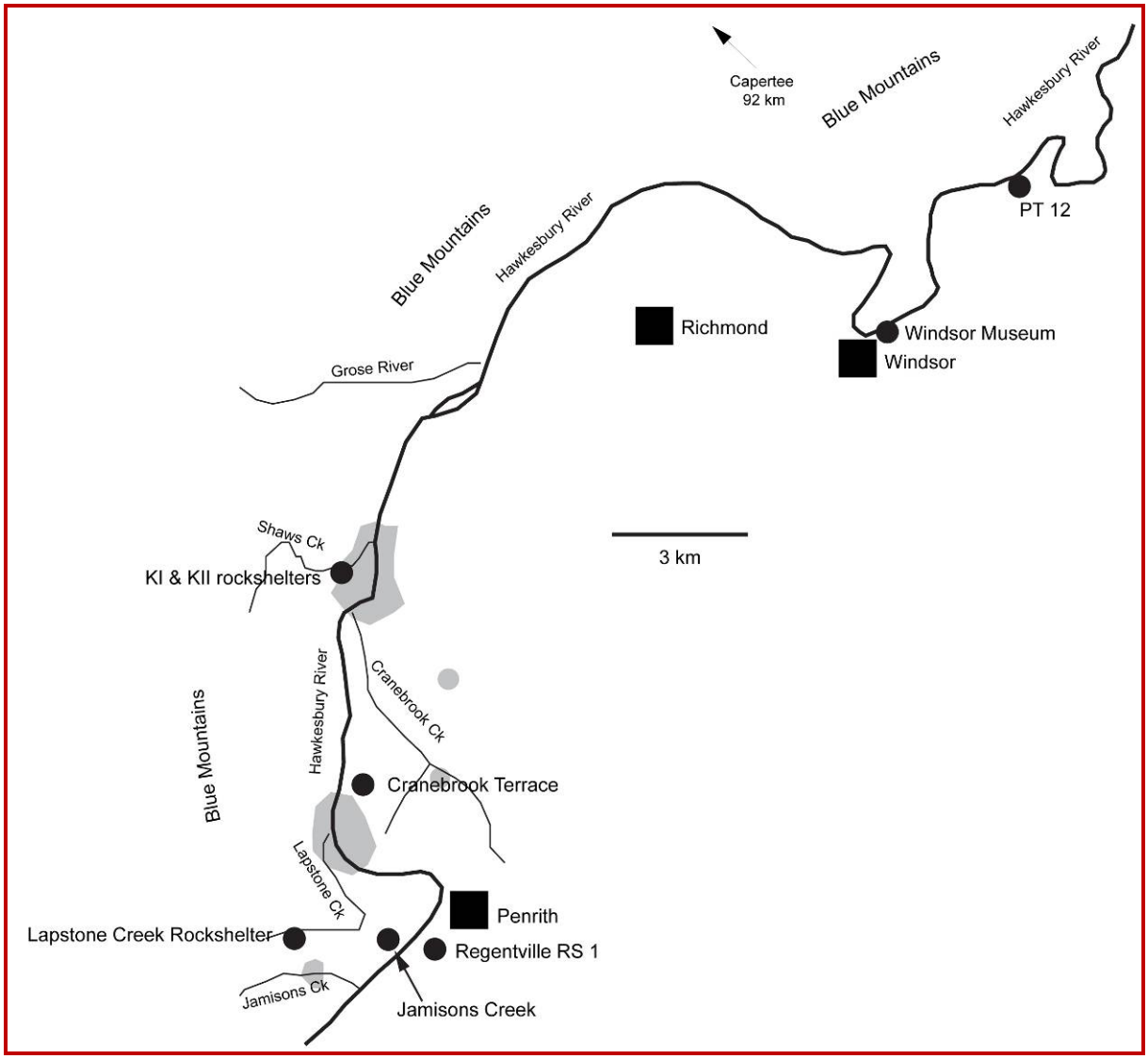

Figure 6. Map showing the archaeological sites (circles) and their location to major conurbations (squares) discussed in the text. The grey shading indicates large surface artefact scatters identified by McCarthy.

Consulting Studies

This section provides a summary of archaeological investigations undertaken in the local area to provide an indication of local site patterning and the nature of the local archaeological resource (**Figure 6**). The earlier investigations were carried out as part of academic research projects and more recent investigations were undertaken for development impact assessment and/or salvage prior to development.

Cranebrook Terrace 1974 - 2004

The quaternary alluvial deposits of the Cranebrook terrace formation, the stratigraphic unit that underlies the current study area, were the subject of an archaeological study undertaken by Stockton and Holland in 1974 (Stockton & Holland, 1974). During an investigation of quarrying operations near the Nepean River where the Penrith Lakes complex is now located, Stockton and Holland reported the discovery of a range of 'choppers and steep-edged scrapers', including one chopper that was reportedly in-situ within the gravel unit. A radiocarbon date of approx 30,000 BP was obtained from a log found within the gravel unit from which the artefacts were found.

Subsequent geomorphological investigations of the Cranebrook terrace deposits by Nanson & Young (Nanson et al., 1987) included a series of radiocarbon and thermoluminescence dates which indicated the terrace deposits dated to the period 40,000 – 45,000 BP. This suggests an even earlier date for the cultural material reported by Stockton and Holland. More recent geomorphological investigations by Nanson have significantly revised the earlier dating of terrace deposits, however, the unit that contained the cultural material reported by Stockton and Holland is now thought to date to the period 40,000 – 50,000 BP (Stockton & Nanson, 2004).

The Cranebrook terrace findings have been criticised on a number of fronts. Firstly, it has been argued that the cultural material identified by Stockton and Holland was not in-situ and may have derived from more recent units above the Pleistocene terrace. The recent significant revision of dating presented by Nanson also suggests that more work needs to be done to confidently assess the age of the terrace deposits. Secondly, the identification of the stones as cultural artefacts has also been questioned (Mulvaney & Kamminga, 1999). However, in her textbook *Archaeology of the Dreamtime*, Josephine Flood reports personally examining the stones and concluding there are definite artefacts amongst the collection, including ovoid scrapers and choppers characteristic of the pre-Bondaian core-tool and scraper tradition (Flood, 1995).

In conclusion, although there are real concerns about the integrity of the artefacts and dating of the terrace deposits, on balance it is likely that at least some of the artefactual material derives from gravel deposits that date to the Pleistocene period. Therefore the Cranebrook Terrace deposits should be considered a regionally significant geo-archaeological unit.

Jamisons Creek – 1977 - 1984

In the late 1970's and early 1980's Jim Kohen investigated an extensive artefact scatter site on a terrace of the Nepean River beside Jamisons Creek (Kohen, 1984). Jamisons Creek is located to the west of our study area on the opposite site of the Nepean.

A surface collection of the Jamisons Creek site recovered almost 10,000 stone artefacts over an area of 775 square metres. All major categories of stone tools were found including stone axe heads, uniface pebble tools, elouera adze flakes, bondi points, geometric microliths, thumbnail discoid scrapers, bipolar cores, single and multiplatform cores and blade cores. Raw material types included chert, basalt, quartz from the Nepean gravels, quartzite, silcrete and siliceous wood. In addition to stone artefacts, post-contact artefacts were also found, including clay pipe bowl fragments and ceramics indicating that the site had been continuously used until at least the 1830s. Excavations at the site revealed a 1.5 metre deep deposit dating from 7,000 to 1,500 years BP. Unfortunately the site was heavily disturbed during the development of a sporting complex in 1984.

Lapstone Creek Salvage - 1977

In 1977 a salvage surface collection was carried out by Kohen at Lapstone Creek, between the railway line and the Great Western Highway, Emu Plains. The work was carried out prior to a housing development (Kohen, 1977). A large number of stone artefacts, including retouched implements, were recovered from the site. Ceramic pieces and broken glass, some with retouch, were also found dating to the period 1820-1840. Analyses of the assemblage indicated that the site had been continuously occupied for a long time period (estimated at around 24,000 years BP). The earliest industry was characterised by uniface pebble tools and scrapers made on cores and thick flakes. The Bondaian industry was not well represented in the assemblage (Backed artefacts were surprisingly rare). Eloueras, fabricators and edge-ground axes were also found and are thought to have extended into the contact period.

Shaws Creek KII – 1979-1980

In 1979-80, a team led by Jim Kohen and Eugene Stockton excavated a rockshelter called KII on the right bank of Shaws Creek. The site was located 700 metres upstream of the confluence of Shaws Creek and the Nepean River (Kohen et al., 1981), on the western side of the river. The excavations recovered in excess of 25,000 pieces of worked stone and over 600 bone fragments. A series of 8 radiocarbon dates on charcoal samples indicated the site was occupied from c.13,000 BP.

The upper units of deposit contained a Bondaian assemblage with backed artefacts and fragments of ground-edged axes. The underlying earlier units lacked the forms and technology associated with Bondaian industry. These earlier deposits contained tools made on cores, pebbles and thick flakes with steep-angled retouch. The suite of evidence indicated the importance of sites located on resource intersection zones and the exceptional preservation conditions that are found in deep rockshelter sites.

South Penrith Development Site - 1981

In 1981 Dallas conducted an archaeological survey of land south of Penrith for a proposed housing development (Dallas, 1981). The 800 hectares of land were bounded by Mulgoa Creek and Bringelly Road. Twenty sites were located during the field survey on either hill tops / elevated land or in close proximity to creeks. These consisted of 13 artefact scatters, some with potential for undisturbed deposits, and 7 isolated finds. Dallas recommended that a sample of the sites be preserved and managed within open space zones as a record of Aboriginal occupation in the area.

Mobile Home Village, Penrith - 1989

Pam Dean-Jones undertook an archaeological survey of a proposed mobile home village site, 1 kilometre west of the current study area (Dean-Jones, 1989).

The survey identified four isolated finds (yellow chert and black siltstone) and the potential for archaeological deposits within the sandy clay loam subsoil 150 mm below ground surface levels. Cortex on the artefacts indicated the isolated finds were made from river pebble source material. The report recommended a Section 90 Consent to Destroy for the isolated finds and archaeological monitoring of landscaping earthworks required for the mobile home village.

Regentville RS1 1994 - 1999

A series of archaeological investigations have been undertaken at a site called Regentville RS1, located approximately 4 kms south of the study area between Mulgoa Creek and the Nepean River. The various investigations summarised below were undertaken in advance of an electricity sub-station development.

The initial archaeological survey, undertaken by Oakley & Koettig in 1994, identified the site RS1 and recommended test excavation (Oakley & Koettig, 1994). Following the assessment, the site was subject to two phases of test excavation by Koettig & Hughes in 1995 and McDonald et al in 1996. Finally, the site was subject to salvage excavations undertaken by Craib & Bonhomme et al in 1999.

The initial test excavation found possible pre-bondaian occupation may have been present on the basis of heavily patinated artefacts 600 – 800 mm below ground surfaces (Koettig & Hughes, 1995). The subsequent test excavations by McDonald et al found a low density of stone artefacts, none of which appeared to be pre-Bondaian in age. However, McDonald et al collected six samples of deposit in association with artefacts for thermo-luminescence

(TL) dating. The dates ranged from 3,000 – 12,000 BP, suggesting occupation may have extended back into the Pleistocene (McDonald et al., 1996).

The discrepancy between dating and the technology was examined during the salvage excavation undertaken by Craib & Bonhomme et al (1999). They found that the stone artefacts were middle to late Bondaian and had been vertically displaced by natural processes such as bioturbation. This pushed the artefacts into older sediments, explaining McDonald's TL dates extending into the Pleistocene.

Rouse Hill Infrastructure Development 1993 - 2005

Jo McDonald Cultural Heritage Management Pty Ltd and *Brayshaw McDonald Pty Ltd* have undertaken a series of investigations associated with various stages of the Rouse Hill Infrastructure Development throughout the 1990's and most recently in 2005 (Jo McDonald CHM 2005, 2002 a & b, 1999; Brayshaw McDonald 1993 a, b & c). The investigations covered a large area of urban release land in the vicinity of Kellyville and Rouse Hill. Although the development areas are located some 15 kilometres to the north-east of Penrith, the intensity and scale of the investigations give them relevance to understanding archaeological patterns across the Cumberland Plain. The intensity of study is reflected in the fact that a large proportion of the sites registered on the AHIMS were recorded as part of the ongoing Rouse Hill investigations. More than 1,800 square metres have been excavated during the project, yielding almost 68,000 stone artefacts.

Some key elements of McDonald's findings are presented in point-form below.

- Prior to excavation, many sites had little or no indication of artefacts on the ground surface – potential archaeological deposits should be identified on the basis of low levels of previous land use disturbance.
- The percentage of indurated mudstone as a preferred raw material increased toward the northern end of the study area, while silcrete (mostly heat-treated) was predominant further south. There was an absence of obvious conservation strategies and identified local stone sources. This is problematic for explaining the variation in preferred stone types across the area.
- Most artefacts were small indicating people prepared and heat-treated stone near source and carried selected materials back to residential sites.
- McDonald's interpretation of the results of earlier excavation found that a range of functionally different site types were located in a range of differing environmental contexts, suggesting a complex relationship between site use, environment and resource distribution (particularly water sources). Subsequent investigations in the Second Ponds creek valley[1] modified this interpretation,

[1] Jo McDonald CHM 2005

suggesting that while lithic assemblages decreased in scale and repetition further away from water, the composition of assemblages remained fairly consistent across the entire landscape.

- Backed artefacts (commonly found across the landscape) were mostly made using asymmetric alternating flaking and considerable variation in their morphology suggests they were not standardised.

- Functional analysis of the backed artefacts indicates they were multi-functional – used as spear barbs and as hand-held tools for plant / animal processing.

- Areas with sparse lithic scatter represent low levels of accumulated activity. Areas with > 20 lithics per square metre are likely to contain knapping concentrations.

- The presence of silicified tuff may indicate pre-Bondaian occupation.

- Fluvial deposits on a lower order tributary of Second Ponds Creek yielded a Pleistocene date. Although the date was not associated with cultural activity, it indicates significant changes in hydrology over time and suggests there is a potential for investigating Pleistocene occupation on lower-order drainage lines.

Pitt Town Residential Development - 2006

As a result of a 2005 assessment, test excavation was undertaken within a residential development (known as the Cleary Precinct or PT 12) in Pitt Town in 2006 (AHMS, 2006). The investigation was intended to sample landforms within the subject area; to determine whether Aboriginal sites and/or objects were, or were likely to be, present in sub-surface deposits; and to gain an understanding of the nature, integrity and significance of these sites and objects.

The excavation consisted of 12 test trenches, situated on the five identified landforms; riverbank, hillslope, floodplain, flood channel, and alluvial terrace overlying a sand levee. A total of 1,054 stone artefacts were recovered from the excavation, at densities of up to 148/m². In order of prevalence, the material consisted of tuff, silcrete, quartz, quartzite and chert. The assemblage consisted of flakes, cores and debitage, backed blades and a few bipolar cores.

The results of the investigation indicated that:

- Soil disturbance from agricultural land use practices was generally restricted to the upper levels of the soil profile; (ie. the top 20 to 30 cm).

- Bioturbation varied in soils across the subject area.
- Artefact density varied across the different landforms, as follows:
  - very few artefacts were found on the river bank.
  - no artefacts were found within the flood channel and flood plain.
  - there was a low density of artefacts within the texture-contrast soils on the northern edge of Lot 18.
  - there was a moderate to high density of artefacts on the alluvial terrace and terrace slopes.
  - there was a concentration of flaked stone above the 1:100 year flood level, between 20 and 24 m AHD.
  - there was a decrease in artefact density in a southerly direction towards Hall Street (indicating that distance to and/or views of the Hawkesbury River were important factors).
- The elevated alluvial terrace and terrace slopes contained a deep, stratified stone assemblage with signs of spatial patterning and at least two distinct occupation phases (upper phase being a typical Bondaian industry, dominated by silcrete; lower phase presumably pre-Bondaian, dominated by tuff). There were also signs of temporal patterning across landforms.
- Alluvial, rather than aeolian, processes were responsible for site formation and preservation on the sand terrace.

It was considered that the identified Aboriginal sites and deposits had high cultural and archaeological significance for their integrity, rarity and representative values. It was recommended that a significant portion of the alluvial terraces be set aside as a Conservation Area, reserved from development. Salvage excavation of an additional area, to be impacted by development, was also recommended.

Pitt Town Residential Development - 2011

In 2010, Cleary was proposed for residential development and, following recommendations from earlier assessments (see above), along with advice from the Office of Environment and Heritage (then Department of Environment, Climate Change and Water), a salvage excavation was undertaken in the deepest and least disturbed part of the sand body that had been identified in a bore-hole program across the levee (AHMS, 2011). The work included the excavation of a 25 m^2 open area in the centre of the deposit (**Figure 7**). All excavation was done by hand in contiguous 50 x 50 cm squares and in 5 cm arbitrary spits. Excavation was continued to sterile deposits ranging between 128 and 182 cm below surface (22.52 – 23.08 m AHD). All excavated sediment was wet sieved through a 3 mm mesh.

The excavations recovered 1,356 stone artefacts and/or manuports. This equated to an average of 46 artefacts/m^2 within the excavations, with several individual squares having

more than 50 artefacts. A total of 134 complete flakes were present within this assemblage. The assemblage was dominated by tuff (n=946) and silcrete (n=220) with lesser proportions of quartzite (n=49), quartz (n=40), volcanic (n=74) and chert (n=32). As outlined below, these raw materials can be divided between three assemblages, with the tuff and quartzite occurring almost exclusively in the lower depths and silcrete in the upper deposits.

The artefacts could be divided into three discrete assemblages, based on composition and spatial location (**Figure 8**):

1. An upper assemblage composed of primarily Bondaian assemblage silcrete artefacts, including backed blades and thumbnail scrapers. No eloueras or bipolar flakes were evident however, indicating an absence of a late Bondaian industry. Specialised cores for producing backed blades were evident on site indicating production of these tools was occurring at PT12.

2. Two lower assemblages of amorphous pebble-tools and manuports composed of tuff. Occasional rough scrapers were also present. A peak in quartzite and volcanic materials occurred in the lower deposits. Indications of core reduction and flake production from cobbles were evident. These assemblages were considered Capertian assemblage in appearance. A possible piece of grindstone was identified within this assemblage.

A total of six Optically Stimulated Luminescence dates were taken from the sand unit (focussing on spits 14-16) and the iron hardpan. These indicate a basal age of the sand body between 50,000 – 65,000 years ago. The lower artefact assemblage appears to date to between ~15 – 11 ka, while the upper assemblage dates to between ~10 – 5 ka (although typologically is more likely to be <4.5 ka in age).

The results of the salvage excavation at Cleary have been presented in a publication, in the journal *Australian Archaeology* (Williams et al., 2012). A summary of the article's findings is as follows:

> *Salvage excavations of 25 m^2 on a levee adjacent to the Hawkesbury River identified a 1.5 m deep sand body containing three discrete artefact assemblages. While problematic, six Optically Stimulated Luminescence ages provided a chronology of the sand body, which began forming > 60 ka. Peak artefact numbers of the two lowest assemblages were centred on ~15 ka and ~11 ka, and retained Capertian characteristics, including amorphorous pebble-tools and manuports composed of locally-derived river cobbles probably exposed through entrenchment of the river during lower sea-level. Comparisons with nearby KII rockshelter shows a similar assemblage dated to ~13 ka. The upper assemblage was dominated by backed artefacts composed primarily of silcrete. Reliable OSL ages indicate this assemblage may have been deposited in the early Holocene with a backed blade proliferation centred at ~ 5 ka, although comparisons with other local studies suggest an*

age of <4.5ka is more likely. Along with other studies, the site indicates the systematic exploitation of resources, such as river cobbles, along the Hawkesbury River from ~15 ka before an apparent abandonment of the Pitt Town region in the early/mid-Holocene. Late Holocene artefact numbers suggest a subdued re-occupation of the area following this hiatus.

Figure 7. Photograph of the open area salvage at the Cleary Precinct, looking southeast.

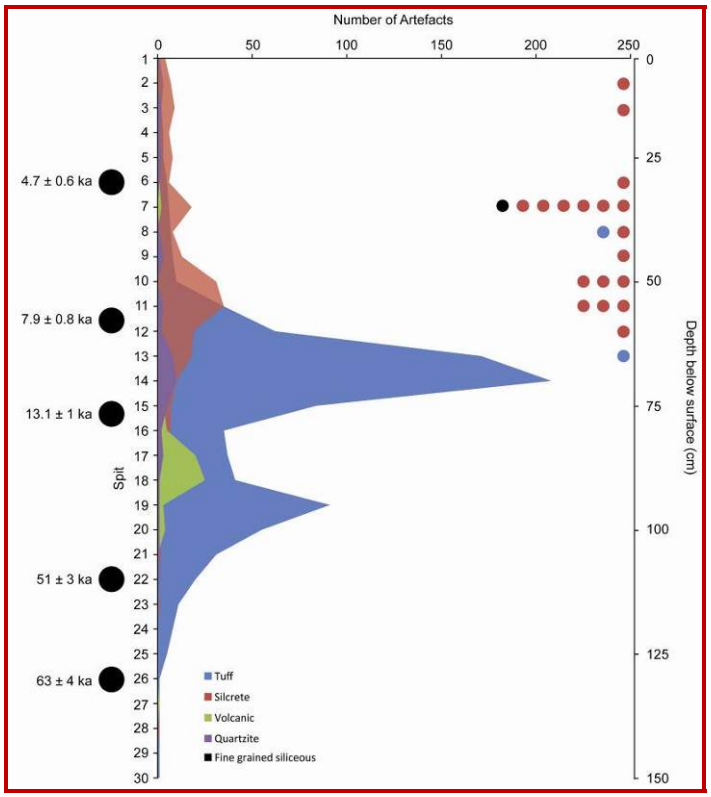

Figure 8. Artefact distributions from the salvage excavations within the Cleary Precinct. OSL ages are presented on the left. Individual backed blades are presented in the top right.

5.3 AHIMS Search Results

5.3.1 2006 Assessment

As part of the 2006 assessment, a search of the OEH *Aboriginal Heritage Information Management System* (AHIMS) for an 6 kilometre by 6 kilometre area surrounding the subject area was undertaken to identify previously recorded sites. A total of 27 sites and isolated finds have been recorded within the search area, encompassing the following site types and frequencies:

- Open Camp (artefact scatter) – 23.
- Isolated Find – 3.
- Rock Engraving – 1.

Although no sites have been recorded within the subject area, the search results provide an indication of local site type patterning.

The predominance of stone artefact site types is typical for landscapes on shale and alluvium across the Cumberland Plain (including the subject area). The local geology, distribution of natural resources and land-use history dictates that particular site types will not be found within the subject area. For example, rock shelters and grinding grooves are only found within areas of exposed sandstone bedrock, which are located further to the north of the subject area where Hawkesbury sandstone country rises off the Cumberland Plain. Scarred trees are only where original vegetation survives, not in locations such as the subject area where original vegetation has been cleared. The search results reflect the role of geology and distribution of resources in settlement patterning.

5.3.2 This Assessment

Due to the length of time elapsed since the 2006 assessment, a new search of the OEH AHIMS database was undertaken on 14 June 2012. The search similarly sought for a known or previously recorded Aboriginal objects, sites or places within a 2 kilometre square centred on the subject site. This search was undertaken on 14 June 2012.

The search found three Aboriginal sites registered within this region (**Table 1** and **9**). As with the previous search, none of the sites were in the vicinity of the subject area.

Table 1. Registered Aboriginal sites in the vicinity of the subject area (source: AHIMS search dated 14 June 2012).

Site ID	Site name	Site features	Within subject area
45-5-0539	RP3 Peach Tree Creek	Artefact/Open Camp Site	No

Site ID	Site name	Site features	Within subject area
45-5-0540	RP4 Peach Tree Creek	Artefact/Open Camp Site	No
45-5-0541	RP5 Penrith Leagues Club	Artefact/Open Camp Site	No

5.4 Archaeological Predictions

Based upon information compiled within the AHIMS, and the background data reviewed above, a number of conclusions can be made about the Aboriginal archaeology of the subject area. A review of the regional and local archaeological record demonstrates that the most common site types in the local area are artefact scatters and isolated finds.

Previous excavations and surveys on the Cumberland Plain indicate that stone artefact scatters are larger and more frequently located in close proximity to water sources. The size (scale and repetition) of sites generally increase according to permanence of water (stream order) and localized stream characteristics like permanent ponds and wetlands.

The subject site is located in the vicinity of the Hawkesbury/Nepean River. While the actual watercourse is some 1.5 km from the subject site, its elevation and proximity meant it would have been one of the closest places to the river during times of flood. This has two ramifications: 1) it would have been attractive to prehistoric settlement during periods of high water flow and flood; and 2) flooding is unlikely to have removed, eroded or scoured the soil profile (and any archaeological deposits) that may be present. The subject area is also located near an ephemeral drainage line on the southern boundary of the subject area, Surveyors Creek and Peach Tree Creek. This indicates that sources of fresh water (and associated littoral resources) are abundant near the subject area and may have facilitated extended and/or repeated Aboriginal occupation and use of the area in the past.

The lack of stone outcropping across the local landscape indicates Aboriginal people would have relied on importing stone some distance from outcrop sources or local sourcing of flake-able materials within Nepean River gravels. The Nepean River was an important source of flake-able stone, found in gravel bars on the river and in old gravel deposits exposed by erosion on river banks and terraces. The majority of stone artefacts found in the vicinity of the Nepean derive from pebbles and cobbles sourced from river gravels.

A wider review of the Nepean River shows it to be one of the most significant archaeological landscapes of the Sydney Basin. Archaeological research over 70 years has consistently demonstrated extensive and old archaeological materials on the banks of the Hawkesbury/Nepean River. The earliest evidence of such occupation comes from a number of Aboriginal objects found in the Cranebrook Formation at nearby Cranebrook Terrace (some 3-4 km from the subject site), which are dated to ~40 ka. Other archaeological sites along the river all demonstrate occupation becomes more common at ~15 ka and

continues through into recent times. The local archaeological record is dominated by rockshelters and/or deeply buried artefactual materials – the latter occurring through the complex movement and deposition of the Nepean River and its adjacent deposits.

Importantly, based on a review of GroundTruth Consulting Pty Ltd's work and the geotechnical information of the subject area, the site is situated on the Cranebrook Formation. These deposits have been extensively investigated as part of the Penrith Lakes Scheme, north of the subject area, and are considered to have the potential to contain Pleistocene (>10 ka) archaeological deposits. However, within the archaeological discipline this view is beginning to change with few old sites having been found over the last 30 years of research. Research in the 1980s indicates that Cranebrook Formation consists of an upper sandy clay alluvium (some 6 m in thickness), which dates from 100,000 – 50,000 BP, and an under-lying gravel deposit that dates from 75,000 – 110,000 BP. More recent work shows this to be only part of a more complex geomorphology, with the Cranebrook Formation being composed of two similar units, the Richmond Unit and Penrith Unit. Only the former is considered to have been deposited during the accepted time of Aboriginal colonisation. [2] The Richmond Unit is generally close to the Nepean River, with the Penrith Unit occurring further away between the Richmond Unit and surrounding Londonderry clay landforms (**Figure 3**). Given the subject site's distance from the River, it is likely that the site is situated on the Penrith Unit, but this cannot be determined without further investigation. Regardless, Aboriginal objects of younger ages do appear to occur only within the upper overburden and A-horizons of both the Richmond and Penrith Unit. Dean-Jones' assessment of a site just to the west of the subject area suggests that stone artefacts seen on the surface may derive from the sandy-clay unit underlying surface topsoils. Taking the above into consideration, the upper six metres of sandy-clay alluvial deposit and overlying A-horizon topsoils should be considered to have potential to contain Aboriginal cultural material

[2] Currently the oldest accepted dates for Aboriginal occupation of the continent are c. 55,000 years BP. These come from dating of two rock shelters in northern Australia.

Figure 9. Registered AHIMS sites near the subject area plotted according to AHIMS coordinates.

6. FIELD SURVEY

6.1 General

A formal site survey was undertaken by AHMS as part of the 2006 assessment. Due to the time delays between the former and current assessments, changes in statutory requirements and regulatory processes, and the existence of several new Aboriginal individuals/organisations within the region, a further site visit was undertaken during the consultation process (see **Section 3**)

6.2 The 2006 Assessment

6.2.1 General

The survey was carried out on 26 June 2006 by archaeologist Jim Wheeler in partnership with Phil Khan of the *Deerubbin Local Aboriginal Land Council*, Alan Evans of the *Darug Tribal Aboriginal Corporation* and Leanne Watson of the *Darug Custodian Aboriginal Corporation*. The survey covered the entire subject area.

The objectives of the survey were to identify any Aboriginal sites, objects or potential archaeological deposits (PAD's). The investigation also assessed the extent to which past land-uses may have affected the natural soil profiles. This information was used to assess the depth and potential integrity (intactness) of natural soil profiles across the subject area and the likely impact of development.

6.2.2 Field Methods

The subject area was considered as a single survey unit because all the land is within a single topographic landform element of **terrace plain** (Speight, 1990).

The survey was comprehensive. The subject area was traversed on foot, with the aim of locating and examining any areas of ground surface visibility. Areas of erosion and ground exposure (e.g. tracks, ant nests, eroded surfaces, etc) were examined for archaeological evidence such as stone artefacts. This approach was used because artefacts may be detected in areas where soils are exposed and visible, whereas stone artefacts will not be detected in areas where soils are covered by grass or vegetation. Ground surfaces and cuttings were also examined to determine the degree of soil disturbance, erosion and potential for archaeological deposits below current ground.

During the survey, detailed field notes were made and photographs taken to document landscape configuration, soil profiles, soil disturbance, ground visibility and vegetation types.

Identifying Stone Artefacts

Accurate identification of Aboriginal stone artefact(s) is critical in any archaeological assessment- because stone artefacts are the primary source of physical evidence for past Aboriginal use and occupation across most landscapes. Stone that has been deliberately modified in the process of making implements constitutes the 'Aboriginal objects' within the most common site types including - isolated finds, open camps (artefact scatters), rockshelters with deposit, quarries and within shell middens. Given the strict legal protection provided for 'Aboriginal objects' under *Section 90* of the *National Parks & Wildlife Act 1974*, it is critical that Aboriginal objects are recognised and identified at a level of certainty beyond reasonable doubt.

Accordingly, for the purposes of recording and reporting Aboriginal objects, we define 'stone artefacts' as items that have demonstrable evidence of deliberate modification in the form of fracture, abrasion and/or pitting. On some sites raw materials of a type commonly used to make artefacts may be found that have no physical evidence of deliberate modification. If the stone type is exotic to the local area, it is often classified as a 'manuport'.[3] Because such objects have no demonstrable physical traits of deliberate modification, for the purposes of recording and reporting they will not be considered *Aboriginal Objects* but will be considered as potential objects and included in our assessment and identification of potential archaeological deposits (PADs).

Although detailed technological and typological description of stone artefacts is provided for objects found during each assessment, evidence of deliberate modification can be broadly categorized into:

- Flakes and flake scars on cores.[4]
- Abrasion caused by grinding and/or use-wear.
- Pitting caused by percussion.

Physical traits (e.g. Wright 1972, 1994; Cotterell & Kamminga, 1987) used to demonstrate the categories described above are shown on **Figures 11-13** below.

[3] *Unmodified stone carried onto a site by Aboriginals.*

[4] *Pieces of stone from which flakes are struck.*

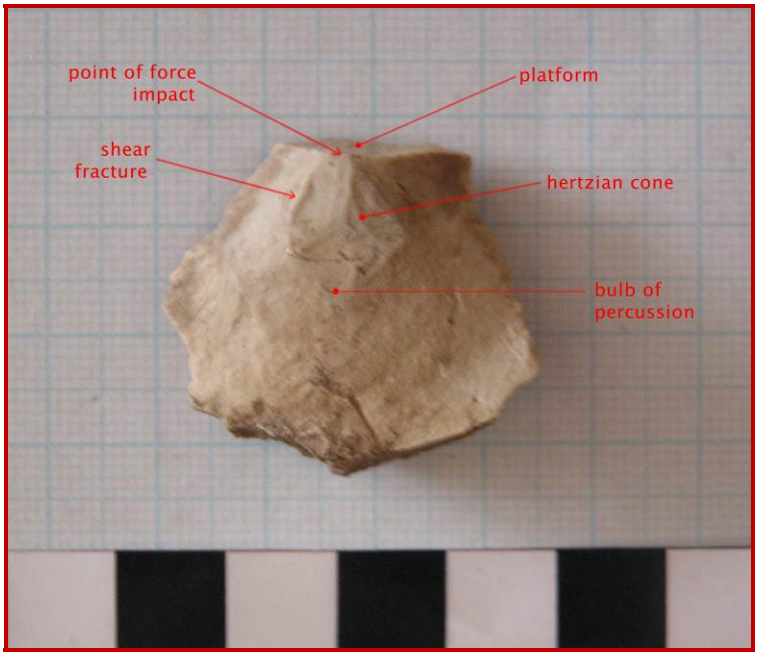

Figure 10. Flake: The flake shown above demonstrates the distinctive 'conchoidal fracture' produced by percussion flaking on stone types that have isotropic flaking properties. Common traits include: striking platform, point of force impact, ringcrack, hertzian cone, shear fracture, bulb of percussion, eraillure scar, lances and undulations.

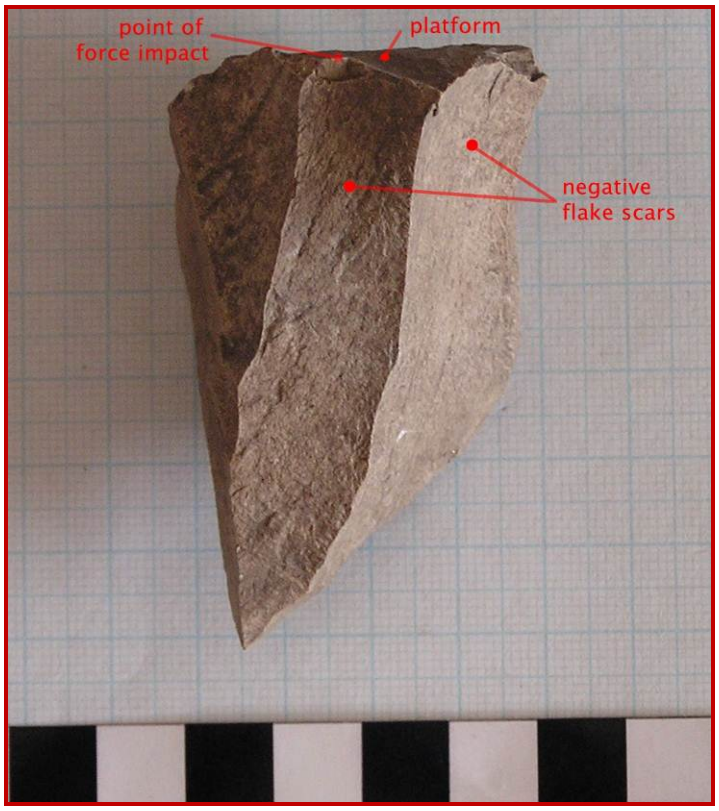

Figure 11. Core with elongated negative flake scars made when flakes were struck off. Cores have scars which are the negative of features seen on flakes.

Figure 12. Hammerstone with pitting caused by percussion. The pitting is only evident on the tip of the stone indicating it has not occurred naturally but deliberately as a result of percussion impact with a core.

Figure 13. Basalt axe with abraded ground edge (to right). Polish and chipping caused during use (use-wear) can be seen on the working edge. Pitting on the flat central surface shows the implement was also used as an anvil for bi-polar flaking. It is a fine example of an implement with direct evidence for multiple uses.

6.2.3 Survey Coverage

Effective coverage is calculated by multiplying the % ground exposure (or visibility for detecting artefacts) by the % survey coverage (or actual area surveyed). The calculation of effective coverage shows the effectiveness of the surface survey in detecting surface archaeological sites and accordingly, how much weight ought to be put on the results.

As discussed above, the subject area was treated as a single survey unit. **Table 2** displays the survey coverage data. The data indicates that the survey was ineffective in detecting surface sites.

Table 2. Effective Survey Coverage

Survey Unit	Ground Exposure %	Survey Coverage %	Degree of Soil Disturbance	Estimate of Effective Coverage %
1 – terrace plain	2 %	100 %	Low - Moderate	2 %

6.2.4 Survey Results

This section presents the results of the archaeological survey. A description of results is provided, followed by an analysis of archaeological potential.

No Aboriginal sites or objects were identified within the subject area.

The extremely low ground surface visibility encountered during the survey indicates the investigation was ineffective in identifying whether or not surface sites and/or objects are present (**Figure 14**). Across more than 98 % of the subject area thick grasses or hard surfaces prevented the survey team from viewing the ground surface (refer to Figure 5.5). Soil exposures were limited to a few isolated patches of sheet/rill erosion. Effective coverage was 2 %, which is not an adequate sample on which to make meaningful conclusions about the presence or absence of surface sites or objects.

Figure 14. Typical visibility encountered during survey (looking SW across the site)

Vegetation has been cleared across the entire subject area, with some modern plantings present on the margins of the land as illustrated on an aerial photograph of the subject area shown on **Figure 15** overleaf. The aerial photo also shows the land is divided between a cleared paddock, currently used as open space (to the south) and industrial facilities (to the north).

This division is also reflected in historical photographs of the subject land. A 1947 aerial photograph shows the northern portion of the site was used for market gardening, whilst the southern portion was undeveloped with grass cover and scattered trees. Subsequent aerial photographs taken in 1961, 1978 and 1986 show the northern portion was subject to industrial development in the form of large factory and warehouse facilities, car parks and hard surfaces, whilst the southern portion remained essentially an undeveloped paddock (Geotechnique, 2005).

Figure 15. Oblique aerial photograph of the subject area (outlined red). This shows the division between the southern undeveloped portion (to the left) and the northern developed portion (to the right). (Source: Parkview Penrith).

Taking the above information about past land-uses into consideration, landscape and soil disturbances across the subject land can be broadly divided into:

- **Moderate/High Disturbance** – areas where original topsoils have either been removed or heavily disturbed by past land uses. For the purposes of this assessment, the high disturbance zone includes areas used for market gardening, areas occupied by factory buildings and hard-surfaces.

- **Low Disturbance** – areas where past land-use disturbance has been minimal. This zone includes areas where upper storey vegetation has been cleared, but no cultivation or development appears to have occurred.

Based on our field assessment, review of historic aerial photographs and geotechnical data, the subject land has been divided according to the land use disturbance categories described above. The results are presented on **Figure 16** overleaf and discussed below.

Low Disturbance areas (marked green on **Figure 16**) cover the southern portion of the subject area. This area contains an unmodified landform with no physical evidence for cut and fill (refer to **Figure 17**). Although original vegetation has been cleared, this area remains un-developed and historical photographs indicate the area was probably not used for cultivation. Cattle agistment and grazing may have taken place, however these activities are likely to have only superficially disturbed surface soils. Although the depth and intactness of original A horizon soils could not be assessed due to a lack of exposed cuttings or profiles, it is likely that the A horizon is substantially intact in this area. This is supported by the results of the geotechnical investigation, which indicate that silty clay topsoil 200 – 300 mm thick survives across this area. The geotechnical data indicates intact sandy-clay alluvium of the Cranebrook terrace underlies the A-horizon topsoil.

Moderate to highly disturbed areas (marked blue of **Figure 16**) include the majority of the northern portion of the subject land. This area corresponds with industrial facilities that include factory and warehouse buildings, loading docks, car-parks, landscaped (filled) areas and roads (refer to **Figure 18**). The geotechnical assessment found these areas are underlain by introduced topsoil and imported fills ranging between 200mm and 1.3 metres depth below current ground levels. Although the depth of fill and prior disturbance was variable, even in areas that contained the greatest depth of fill, sandy-clay alluvial deposits of the Cranebrook terrace survived intact underneath. However, it is unlikely that any intact original A-horizon topsoil survives across this area.

Figure 16. Aerial photo of subject area, showing areas of low disturbance (marked green) and moderate to high disturbance (blue). Following this assessment, the area highlighted in green has been identified as the Nepean Green PAD (Source: Google Maps 2006).

Figure 17. Southern portion of subject area (low disturbance area).

Figure 18. Northern portion of the subject area (moderate to high disturbance area).

6.3 This Assessment

During the current Aboriginal consultation process (see **Section 3**), a further inspection of the subject area will be undertaken with the Registered Aboriginal Parties (RAP).

A site inspection was undertaken by Alan Williams (AHMS), Celestine Eveningham (DACHA), Justine Coplin (DCAC), Scott Franks (Tocomwall), Gordon and Ron Workman (DLO), and Steve Randall (Deerubbin LALC) on the 17 July 2012.

The site visit demonstrated that there have been no changes since the 2006 assessment investigation. Specifically, the northern portion of the subject area still has extensive industrial structures and activities, while the southern portion is undeveloped. Visibility was similarly poor due to dense ground cover and/or developed surfaces (such as paths, car-parking, etc).

While the site inspection provided an opportunity for the RAPs to observe the site, it provides no alternative results or findings to those developed as part of the 2006 assessment.

6.4 Results

6.4.1 Archaeological Potential

General

Archaeologists use the term 'Potential Archaeological Deposit (PAD)' to describe areas that have potential to contain intact sub-surface Aboriginal objects or sites. Surface survey results, predictive modelling and assessment of past site formation processes are commonly used to identify PAD.

The concept of PAD was developed during the 1980's, primarily as a response to mechanisms and procedure for protection of Aboriginal cultural heritage enshrined in the NSW National Parks & Wildlife (NPW) Act 1974. While *Section 90* of the NP & W Act 1974 provides protection for known physical evidence of Aboriginal occupation (such as stone artefacts that may be identified on modern ground surfaces), areas that contained sub-surface archaeological deposits not visible on ground surfaces were often overlooked in consulting reports produced during the 1980's. This potentially exposed development proponents to breaching the NP & W Act by disturbing and/or destroying sub-surface Aboriginal deposits during site development works.

As a result, the concept of PAD was developed to identify potential sub-surface deposits. NPWS allowed for PADs to be recorded and registered on the NSW Aboriginal Sites Register. Even though PADs do not have any legally protected status under the NP & W Act, they provide DEC (as the statutory authority) with information that Aboriginal

deposits may be present in an area and provide development proponents with due warning that development works in areas of identified PAD may disturb Aboriginal deposits. PADs have therefore evolved to become an important and useful heritage management tool during the assessment process, particularly across landscapes that have little or no ground surface visibility.

Archaeological Potential in the Subject Area

The subject area had a very low level of ground surface visibility. As discussed above, the extremely low effective survey coverage indicates the investigation was ineffective in identifying whether or not surface sites and/or objects are present. Therefore, in the absence of effective surface survey data, our assessment of archaeological potential within the subject land is based on:

- Our understanding of archaeological patterns on the Cranebrook Terrace formation; and
- Our assessment of landscape and soil disturbance.

Previous investigations by Nanson, Stockton, Young and Mitchell indicate that the Cranebrook terrace alluvial deposits have potential to contain Aboriginal objects of considerable antiquity. Stockton and Nanson's (2004) most recent paper on dating of Cranebrook deposits suggests the formation consists of two different stratigraphic units, only one of which (Richmond Unit) is likely to contain Aboriginal objects. The other sandy clay unit (Penrith Unit) dates in the range of 50,000 to 100,000 years before present. It is unclear, based on data available, whether the subject site is situated on the Richmond or Penrith Unit, although given the sites distance from the Nepean River, it is more likely to be on the Penrith Unit. Any Aboriginal cultural material within the sandy clay unit beneath the site may date to the earliest phase of human colonisation of the continent and be of exceptional rarity and research significance (refer to **Section 5**). Geotechnical investigation of the subject area demonstrates that even areas that have been disturbed and contain imported fills to a depth greater than 1 metre below current ground, retain thick deposits of the sandy-clay alluvial unit underneath the fills. In the low disturbance area across the southern portion of the subject land, the sandy-clay unit survives intact.

Our assessment of landscape disturbance also indicates that portions of original A-horizon topsoils may or are indicated to survive across the majority of the subject land (in the area marked green on **Figure 16**). These topsoils may contain evidence of more recent Aboriginal occupation and use of the landscape. Regional predictive modelling indicates the frequency, density and complexity of Aboriginal sites generally increases with proximity to water sources (particularly within 100m of water). The Nepean River, a major resource zone for Aboriginal people who lived in the area before European settlement, is in close proximity to the subject area. There are also numerous lower order creeks that flow into the Nepean adjacent to the subject area. This indicates a potential for relatively recent (Holocene) Aboriginal sites within the subject area associated with use of resources of the Nepean River and nearby creeks.

Taking the above into consideration, we make the following conclusion about PADs:

- The entire subject area has potential to contain cultural deposits within the sandy clay unit that variously underlies natural topsoils and imported fills. The degree of potential is considered low, however the potential antiquity and significance of any cultural deposits within the sandy-clay unit indicates that the sandy-clay unit should be considered to have high sensitivity.

- The area marked green on **Figure 16** has a moderate to high potential to contain more recent Holocene Aboriginal sites within remnant original A-horizon soils.

Based on these findings, areas highlighted in green in **Figure 16** have been identified as a potential archaeological deposit (PAD).

7. SCIENTIFIC VALUES AND SIGNIFICANCE ASSESSMENT

The heritage significance of Aboriginal archaeological sites can be assessed using the four criteria outlined in the *Burra Charter*; aesthetic, historic, scientific, and social or spiritual (Australia ICOMOS, 1999). The present assessment is confined to the scientific (archaeological) significance of the subject area. The aesthetic, historic and social or spiritual values are addressed in the Aboriginal Cultural Heritage Assessment.

7.1 General

Scientific value is assessed according to the research potential of a site. Rarity and representativeness of the site are also related concepts taken into account in making this assessment. The research potential of a site is assessed by considering the value of information about the past that a heritage site possesses and the extent to which that information may contribute to a better understanding of human society and the human past, if the site was the subject of archaeological analysis. Heritage sites, objects or places of high scientific significance are those which, for example, provide an uncommon opportunity to inform us about the specific age of human occupation in an area, or provide a rare glimpse of artistic endeavour or provide a rare chronological record of changing life through deep archaeological stratigraphy.

The comparative rarity of a site is a consideration in assessing scientific significance. A certain site type may be assessed as "one of a kind" in one region, but be very common in another. Artefacts of a particular type may be common in one region, but outside the known distribution in another.

The integrity of a site is also a consideration in determining scientific significance. While disturbance of a topsoil deposit containing Aboriginal artefacts does not entirely diminish the research value of those objects, it may limit the range and value of the information about the past that might be derived from archaeological or other related forms of investigation of the objects and the site. A heavily cultivated paddock may be unsuited to addressing research questions of small-scale site structure, but it may still be a suitable location for archaeological investigation of general questions regarding Aboriginal stone tool distribution in a region and the logistics of obtaining and processing raw stone material.

The capacity of a site to address research questions is predicated upon regional research issues. In this region the key research issues pertain to the chronology of Aboriginal occupation and variability in stone artefact manufacturing technology. Sites with certain backed implements from the Holocene are very common, but sites with definite Pleistocene evidence are extremely rare, and hence they are considered to be highly significant.

Our assessment of the scientific significance of Aboriginal objects found during the archaeological investigation of the subject area is set out below.

7.2 Public Significance

This category concerns a site's potential to educate people about the past. It also relates to the heritage value of particular sites as being representative examples of past lifestyles, why they are important, and why they should be preserved.

At present no Aboriginal sites have been identified within the subject land. An assessment of public significance would in part consider the ability of any archaeological deposits found during excavation to demonstrate aspects of past Aboriginal life, therefore a whole range of issues need to be considered including rarity (ie. are there other resources that can demonstrate these aspects of Aboriginal life ?), aesthetics, potential for conservation and potential for interpretation.

If any sites are present within the subject area, they are likely to comprise stone artefact deposits. Such sites are very difficult (from an interpretation and logistical viewpoint) to use in communicating aspects of past Aboriginal life. The most common approaches include presentation of artefacts in an interpretive display and use of latex peels to show excavation trench sections in profile.

If any Aboriginal sites are present within the subject area, they will have public significance as a demonstration of Aboriginal occupation and life prior to European colonisation. As such they show that a vibrant Aboriginal life existed in the area prior to dispossession.

If evidence of Pleistocene occupation is found within the Cranebrook terrace sandy-clay deposit that underlies the site, the findings would have considerable public interest because of their rarity and their implications for the antiquity of Aboriginal occupation and use of the Cumberland Plain.

7.3 Scientific Significance

The objective of undertaking scientific significance assessment for a site is to determine its research potential in terms of contribution to knowledge about the past. Criteria used to evaluate scientific potential include condition/integrity, representativeness and rarity.

At present, no stone artefact scatters or isolated finds have been identified within the subject area. An assessment of scientific significance would take into account the condition, integrity, representativeness and rarity of such finds. In short, the scientific significance would be based on archaeological research potential.

Assessment of the significance of sub-surface deposits – the Nepean Green PAD - would require controlled archaeological excavation. This assessment found there is potential for archaeological deposits below current ground surfaces across the subject area.

If any Aboriginal cultural material is found within the sandy-clay unit of the Cranebrook terrace, it is likely to have high archaeological significance as a result of its rarity and antiquity. The research value and level of significance of any such deposits would ultimately depend on their integrity, particularly in regard to whether it could be demonstrated that the cultural material is *in-situ*.

8. IMPACT ASSESSMENT

8.1 Proposed Development

Parkview Penrith proposes mixed residential and commercial development of the subject area (**Figure 2**). The project is seeking approval under Part 3A of the *Environmental Planning and Assessment Act 1979*. However, it is understood that consent to proceed with specific phases of development will be applied for under Part 4 of the *Environmental Planning and Assessment Act 1979*. The first stage will included the proposed development of three main structures:

1. A Masters Hardware retail store (13,603 m^2 in size) with up to 380 car park spaces.

2. Several buildings between 4 and 8 stories high and containing approximately 570 apartments, and 995 m^2 of retail space

3. A tavern of approximately 1,800 m^2 in size.

Implementation of the proposal will require excavation for establishment of footings and underground car-parking, up to 3 metres below current ground levels directly underneath the proposed buildings. More generally, the degree of excavation work required for footings, roads/paths, establishment of services and general re-grading are likely to remove original topsoils (the upper 200 – 300 mm of soil) across the entire development area.

8.2 Potential Impact

The assessment of archaeological potential concluded that:

- The areas marked green on **Figure 16** may contain remnant A-horizon topsoils with a moderate-high potential to contain Aboriginal sites and objects. They have been identified as a potential archaeological deposit (PAD). The area also contains sandy-clay deposits beneath the topsoil, to approximately 6 metres below current ground. The sandy-clay unit has a low potential to contain highly significant archaeological deposits.

- The areas marked blue on **Figure 16** contain sandy-clay deposits beneath imported fills, to a depth of approximately 3.5 metres below current ground. The sandy-clay unit has a low potential to contain highly significant archaeological deposits.

A comparison of archaeological potential with our analysis of the development proposal indicates that sub-ground works within the development footprint are likely to remove and/or disturb remnant A-horizon topsoils with potential to contain Aboriginal sites and objects. The impact on extant topsoils is likely to extend across the area marked green on **Figure 16** and **Table 3**.

In addition, excavation work for footings and car-parking directly beneath buildings will remove the sandy-clay unit to a depth up to 3 metres below current ground levels. Any Aboriginal objects within these excavation areas will be either destroyed or removed.

Table 3. Summary of the potential impact of the proposed development.

Site No.	Type of harm (direct/indirect/none)	Degree of harm (total/partial/none)	Consequence of harm (total/partial/no loss of value)
Nepean Green PAD	Direct	Partial	Unknown

9. MANAGEMENT & IMPACT MITIGATION

9.1 General

A detailed review of the archaeological landscape of the Penrith shows that the banks of the Nepean River were heavily utilised by Aboriginal people in the past. Some data show that the Cranebrook Terrace (immediately north of Penrith) may have been occupied/ visited by Aboriginal people as early as 40,000 years ago, although most research suggests a date of 15,000 years BP is more likely. It should be noted, however, that sites with basal dates of 15 ka, such as PT 12 and KII Shaws Creek, are still some of the earliest in the archaeological sites in the Sydney Basin.

In close proximity to the subject area, archaeological research has focussed on the Cranebrook Terrace (Formation) through its ongoing development by the Penrith Lakes Development Company. Historical and recent research shows that the Cranebrook Formation is composed of two adjacent units (**Figure 3**), the Richmond Unit and the Penrith Unit. Both of these units appear similar, and are characterised by sandy clays (some 6 m deep) overlying cemented gravels (some 5 m thick). Dating suggests that the Penrith Unit is generally too old (>50 ka) to contain Aboriginal objects, but the Richmond Unit is within the known colonisation of Australia, and is the likely unit within which the 40,000 year old Aboriginal objects outlined above were recovered from. The mapping of these two units is currently poor, although the Richmond Unit is generally closer to the Nepean River, with the Penrith Unit further away. Archaeological research does suggest that the *surface* deposits of both units have the potential for Aboriginal objects to occur.

The site inspection of the subject area proved relatively ineffective. However, geotechnical investigation showed that the entire subject area was situated on sandy clays overlying cemented gravels – the Cranebrook Formation. The geotechnical information indicated that the northern portion of the subject site was heavily impacted with up to 1.5 m of modern fill before the natural (presumably truncated) soil profile was reached. Conversely, the southern portion of the subject area reveals limited previous activity, and has an intact soil profile.

The assessment concludes that the subject area is situated on the Cranebrook Formation, and has the potential to contain buried Aboriginal objects. Given the distance from the Nepean River, it is considered that the underlying deposits are probably from the Penrith Unit (and therefore archaeologically sterile), but there is currently no evidence to confirm this. It is therefore concluded that the sandy clays beneath the entire subject site have at least a low potential to contain Aboriginal objects, although those areas heavily impacted to the north of the subject area could be considered 'disturbed' in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010) and require no further consideration. Of greater likelihood, is the presence of Aboriginal objects occurring in the upper soil profile within the relatively

undisturbed southern portion of the site. Consequently, this area has been identified as a potential archaeological deposit (PAD).

The significance of the subject area cannot be adequately defined until test excavations are undertaken to determine the presence/absence of Aboriginal objects within it. It is considered that Aboriginal objects near the surface are likely to be of low – moderate scientific significance. However, any Aboriginal objects recovered from the sandy clay deposits could be of significant age and would be of high scientific significance on these criteria.

Based on a review of the proposed development, impacts to both the PAD and the wider under-lying sandy clay soil units is considered likely. The level of impact to any Aboriginal objects is currently unknown; although it is unlikely to be total destruction based on the proposed design plan – several park areas and other undisturbed (or low impact development such as footpaths) areas being proposed.

It is understood that the principles of the project are being sought through a Concept Approval under Part 3A of the *Environmental Planning and Assessment Act 1979,* with subsequent development being assessed under Part 4 of the EP&A act by Penrith City Council. While the Part 3A process switches off a number of legislative instruments in relation to Aboriginal heritage, Part 4 does not. Under Part 4 processes, management of Aboriginal heritage under the *National Parks & Wildlife Act 1974* and associated guidelines would be required. This includes the need to characterise Aboriginal objects within a subject area using the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010) and the requirement to obtain Aboriginal Heritage Impact Permits from OEH if harm to Aboriginal objects is proposed.

The findings of this assessment indicate that there are no reasons to object to the proposed Concept Approval application under Part 3A of the *Environmental Planning and Assessment Act 1979*. This is because none of the Aboriginal objects/sites are considered of conservation potential at this stage, although further investigation of the PAD and under-lying soil deposits is required to firmly identify their scientific and cultural values as part of development planning.

Should ground disturbance be proposed within the subject area, further assessment would be required to characterise and assess the presence, and significance of any Aboriginal objects that may be present, and determine the potential harm to them from the development. It is likely that any sub-surface assessment of the subject site would require excavations to significant depths. Should there prove to be Aboriginal objects/sites present and at risk of harm, Aboriginal Heritage Impact Permits (AHIP) and associated documentation would need to be lodged with Office of Environment & Heritage for consideration prior to any development.

In the case of the northern portion of the subject area (highlighted in blue in **Figure 16**), the upper 1.3 m of the soil profile are composed of modern fill, and can be considered 'disturbed' under the *Due Diligence Code of Practice for the Protection of Aboriginal*

Objects in New South Wales (DECCW, 2010). No further assessment is, therefore, required. For deposits below 1.3 m below surface, there is low potential for Aboriginal objects to occur. However, given the existing high disturbance, it is recommended that any sub-surface assessment and/or characterisation of the deposits under-lying the site are focussed within the Nepean Green PAD. The findings of any study here, should be extrapolated across the subject site and include the areas highlighted in blue in **Figure 16** (beneath existing fill units only). The management of the areas highlighted in blue in **Figure 16** with regards to AHIPs and other approvals should also be concluded from the findings of any works in the Nepean Green PAD.

It should be noted that the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010) only permits archaeological investigation in small (0.25 m^2) test pits by hand. Any deviations from this approach require an AHIP (for test excavations outside the procedures of the Code) to be obtained from OEH. Given the potential depth of deposits of archaeological interest in the subject area will exceed several metres below the surface, it is unlikely that excavation under the Code of Practice would be feasible, and more likely an AHIP for test excavation would need to be sought. This process may have time delays on the project and should be implemented as soon as possible.

9.2 Basis for Recommendations

The following recommendations are based upon:

- Requirements of the *National Parks and Wildlife Act of 1974 (as amended 2001).*
- Results of the archaeological assessment documented in this report.
- Views and recommendations of the local Aboriginal community.

9.3 Recommendations

9.3.1 General Recommendations

- Consultation between Parkview Penrith Pty Ltd and the Registered Aboriginal Parties should be maintained as appropriate throughout the design and construction stages of the proposed development.
- If the boundaries of the proposed development are revised to include areas not investigated during this archaeological assessment and the overall ACHA, assessment of these additional areas should be undertaken in order to identify and appropriately manage Aboriginal objects, sites and/or places that may exist in these areas.

- Parkview Penrith Pty Ltd should ensure that the removal of any Aboriginal object or the disturbance or destruction of any Aboriginal site or place is undertaken professionally, in consultation with relevant Registered Aboriginal Parties, according to applicable heritage statutory requirements and is documented, as appropriate to the level of significance of the object, site or place.
- Parkview Penrith Pty Ltd should ensure that any project-related Aboriginal heritage reports or documents are prepared in accordance with and/or comply with applicable statutory requirements and best practice professional standards. Where appropriate, findings of this assessment are provided to OEH AHIMS Registrar and the relevant Registered Aboriginal Parties.
- Parkview Penrith Pty Ltd should advise all relevant personnel and contractors involved in the design, construction and operation of the proposed development, of the relevant heritage issues, legislative requirements and recommendations identified in the present ACHA.
- In the event that previously undiscovered Aboriginal objects, sites or places (or potential Aboriginal objects, sites or places) are discovered during construction, all works in the vicinity of the find should cease and Parkview Penrith Pty Ltd should determine the subsequent course of action in consultation with a heritage professional, relevant Registered Aboriginal Parties and/or the relevant State government agency.
- Should any skeletal material be identified that may be Aboriginal, the Coroner's Act 1980 requires that all works should cease and the NSW Police and the NSW Coroner's office should be contacted. Should the burial prove to contain Aboriginal ancestral remains, consultation with a heritage professional, relevant Registered Aboriginal Parties and/or the relevant State government agency, should be undertaken by Parkview Penrith Pty Ltd.

9.3.2 Specific Recommendations

- Should potential impacts be proposed to the Nepean Green PAD (Figure 16), further sub-surface investigation and characterisation of these deposits is required prior to any development. This assessment has been developed in accordance with relevant guidelines to allow any sub-surface excavations to be undertaken in accordance with methods outlined in Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010). However, please note that the potential depth of some of these deposits may require the use of alternative methods to those set out in the Code. This would necessitate the requirement for an application to be made for an Aboriginal Heritage Impact Permit (for archaeological testing) from the Office of Environment & Heritage prior to being implemented. Should Aboriginal objects be identified through this process, an AHIP for their destruction would need to be obtained from the Office of Environment and Heritage prior to development. Consideration of conservation and/or other

mitigation measures, and the long term management of the recovered Aboriginal objects would also be required.

- Areas highlighted in blue in Figure 16 are considered to have low potential to contain Aboriginal objects in deposits >1.3 m below the surface. Where impacts below this level would ensue, further assessment to determine the presence/absence of Aboriginal objects would be required. Given the extent of disturbance to the soil profile caused by historical development and land use in this area, it is recommended that sub-surface investigations should be undertaken within the Nepean Green PAD and that the results of those investigations should then be used to extrapolate the extent of potential Aboriginal heritage constraints within the area highlighted in blue. Any management requirements and/or other approvals identified through works in the Nepean Green PAD, should similarly be applied to the areas highlighted in blue in Figure 16 (if below the upper fill layers).
- Three copies of this report should be forwarded to the NSW Office of Environment and Heritage - Planning and Aboriginal Heritage Section, Metropolitan Branch, Environment Protection and Regulation Group (PO Box 668, Parramatta, NSW 2124).
- One copy of the report should be forwarded to each of the following Aboriginal stakeholders: Deerubbin LALC, Darug Custodian Aboriginal Corporation, Darug Tribal Aboriginal Corporation, Darug Aboriginal Cultural Heritage Assessments, Darug Aboriginal Landcare, Darug Land Observations and Tocomwall..

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APPENDIX 1: AHIMS SEARCH RESULTS

AHIMS Web Services (AWS)
Search Result

Your Ref Number : 120522-1

Client Service ID : 72449

Archaeological & Heritage Management Solutions Pty Ltd (AHMS)
349 Annandale Street
Annandale New South Wales 2038

Attention: Alan Williams

Email: alanw@arksolutions.com.au

Date: 14 June 2012

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 285000 - 286900, Northings : 6261500 - 6263000 with a Buffer of 0 meters. conducted by Alan Williams on 14 June 2012

A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

3	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 120522-1

Client Service ID : 72449

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-5-0539	RP3 Peach Tree Creek	AGD	56	284920	6262050	Open site	Valid	Artefact : -	Open Camp Site	1018
	Contact	**Recorders**	Elizabeth Rich					**Permits**		
45-5-0540	RP4 Peach Tree Creek	AGD	56	284960	6262120	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Elizabeth Rich					**Permits**		
45-5-0541	RP5 Penrith Leagues Club	AGD	56	285350	6262560	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Elizabeth Rich					**Permits**		

Report generated by AHIMS Web Service on 14/06/2012 for Alan Williams for the following area at Datum :GDA, Zone : 56, Eastings : 285000 - 286900, Northings : 6261500 - 6263000 with a Buffer of 0 meters.Additional Info : Using it as part of an archaeological assessment of 164 Station St, Penrith. Number of Aboriginal sites and Aboriginal objects found is 3

APPENDIX 2: AHIMS SITE CARD FOR REGISTERED SITE

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☒ Additional information ☐

SITE IDENTIFICATION					
Site name	164 Station Street PAD			**NPWS Site Number**	
Owner/manager	Parkview Group (ATTN: Jon Lindsay)				
Owner Address	Lot 1, Pier 8/9, 23 Hickson Road, Walsh Bay, NSW, 2000.				
LOCATION					
Location	164 Station Street Penrith				
How to get to the site	Off Station Street Penrith, between Jamison Road to the south, Woodriff Street to the east and Station Street to the west				
1:250,000 map name				**NPWS map code**	
AMG Zone	56	**AMG Easting**	285900	**AMG Northing**	6262000
Method for grid reference	Topographic map	**Map scale (if method = map)**	1:25,000	**Map name**	Penrith
NPWS District				**NPWS Zone**	Sydney Zone
Portion no.				**Parish**	
SITE DESCRIPTION					
Site type(s)	Potential Archaeological Deposit			**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	PAD only. Potential for early cultural material within the Cranebrook Terrace deposits and some potential for evidence of more recent occupation within portions of remnant A horizon topsoil in the low disturbance area of the site (comprising the southern half of the site). Refer to assessment report for detailed discussion of sub-surface archaeological potential				

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

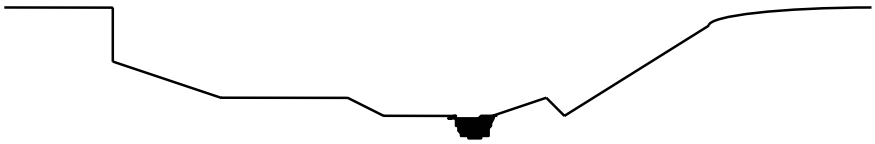
	Attach photographs and sketches, eg. plan & section of shelter. **Do NOT dig, disturb or damage site or contents.**

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

Land form	River terrace	**Aspect**	flat	**Slope**	flat
Mark position of the site					
Local rock type	Alluvial parent material	**Land use/effect**	Cleared, grazing and industrial facilities in the northern half of the site		
Distance from drinking water	50 m	**Source**	Unnamed ephemeral water course channelised underneath Jamison St to the south		
Resource zone (eg. estuarine, river, forest)	riverine	**Vegetation**	cleared		
Edible plants	none - original veg cleared	**Faunal resources** (include shellfish)			
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	

SITE MANAGEMENT

Site condition	Partially disturbed	Refer to assessment report for description of site disturbance	
Management recommendations	Refer to management recommendations made in Wheeler, J (2006) "164 Station Street, Penrith NSW, Aboriginal Heritage Impact Assessment" Archaeological & Heritage Management Solutions Pty Ltd on behalf of Parkview Group.		
Have artefacts been removed from site	No	**When**	
By whom		**Deposited at**	
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	

SITE INSPECTION AND RECORDING

Reason for investigation	Aboriginal heritage impact assessment for proposed rezoning and masterplanning		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	**Deerubbin Local Aboriginal Land Council** Attn: Phil Khan (Sites Officer) PO BOX 3184 MT DRUIT VILLAGE NSW 2770 PH: 02-9832 2457 FAX: 02-9832 2496 **Darug Custodian Aboriginal Corporation** Attn: Leanne Watson PO BOX 36 KELLYVILLE NSW 2155 PH: 4577 5181 FAX: 4577 5098 **Darug Tribal Aboriginal Corporation** Attn: Des Dyer (Secretary) PO BOX 441 BLACKTOWN, NSW, 2148

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

Is the site important to local Aborigines	Refer to correspondence received from the Aboriginal community groups included in assessment report		
Verbal/written reference sources		**ASR report number(s)**	C- C-
Photographs taken	Yes	**No of Photos attached**	None
Site recorded by	Jim Wheeler	**Date of recording**	June 2006
Address/institution	Archaeological & Heritage Management Solutions P/L 349 Annandale St ANNANDALE, NSW 2038.		