Appendix 3

ABORIGINAL DUE DILIGENCE ASSESSMENT

BERNERA ROAD, YATO ROAD AND YARRUNGA STREET, INTERSECTION UPGRADE, PRESTONS, NSW

ABORIGINAL DUE DILIGENCE ASSESSMENT

Report to Liverpool City Council

March 2023

APEX ARCHAEOLOGY

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ABN 56 625 618 993

Executive Summary

Apex Archaeology has been engaged to assist Liverpool City Council in the Aboriginal due diligence assessment for the proposed Bernera Road, Yato Road and Yarrunga Street intersection upgrade, along with the reconstruction of an approximate 400m section of Bernera Road. This assessment has been prepared to support the Review of Environmental Factors (REF) for the proposed upgrades.

This report has been produced in accordance with the 2010 *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (the Due Diligence Code of Practice).

The study area is located within the suburb of Prestons and consists of the intersection of Bernera Road, Yato Road and Yarrunga Street, along with a 400m section north of the intersection along Bernera Road. The study area is located 32 km south west of Sydney. It is located within the Liverpool Local Government Area (LGA). The study area comprises approximately a 400m section of Bernera Road along with the intersection of Bernera, Yato Road and Yarrunga Street and includes the entirety of the road easement from fenceline to fenceline.

A site visit was conducted in March of 2023. No previously registered archaeological sites were located within the study area. No newly identified archaeological material was identified during the survey.

Ground surface visibility (GSV) was low throughout the study area. GSV was rated at <5% overall. No raw material sources were identified within the study area.

Ground disturbance was high throughout the study area due to historic vegetation clearance, landscape modification and current landuse of the area. The study area is situated on a modified landscape within an existing road easement and retains no archaeological value whatsoever.

The level of disturbance from prior land clearing activities, current land use and landscape modification is evident throughout the study area. Landscape modification has reduced the potential for any intact archaeological sub-surface deposits within the study area to nil.

It is recommended that:

- No further Aboriginal archaeological assessment is required prior to the commencement of works as described in this report.
- This due diligence assessment must be kept by Liverpool City Council so that it can be presented, if needed, as a defence from prosecution under Section 86(2) of the *National Parks and Wildlife Act* 1974.
- The results of this assessment fulfil the requirement for archaeological assessment in accordance with the OEH 2010 *Guide to Investigation,*

assessing and reporting on Aboriginal cultural heritage in NSW and the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (Code of Practice). Works may proceed with caution.

- The proposed works must be contained to the area assessed during this archaeological assessment, as shown on Figure 1. If the proposed location is amended, further archaeological assessment may be necessary to determine if the proposed works will impact any Aboriginal objects or archaeological deposits.
- Should unanticipated archaeological material be encountered during site works, all work must cease and an archaeologist contacted to make an assessment of the find. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.

Apex Archaeology would like to acknowledge the Aboriginal people who are the traditional custodians of the land in which this project is located. Apex Archaeology would also like to pay respect to Elders both past and present.

Document Control

The following register documents the development and issue of the document entitled 'Bernera Road, Yato Road and Yarrunga Street intersection upgrade, Prestons, NSW – Aboriginal Due Diligence Assessment', prepared by Apex Archaeology in accordance with its quality management system.

Revision	Prepared by	Reviewed by	Comment	Issue Date
1 – Draft	Leigh Bate	Jenni Bate	Issue for client review	9 March 2023
2 – Final	Leigh Bate	Mahavir Arya	Final issued to client	21 March 2023

GLOSSARY OF TERMS

Aboriginal Object	An object relating to the Aboriginal habitation of NSW (as defined in the NPW Act), which may comprise a deposit, object or material evidence, including Aboriginal human remains.
AHIMS	Aboriginal Heritage Information Management System maintained by Heritage NSW, detailing known and registered Aboriginal archaeological sites within NSW
AHIP	Aboriginal Heritage Impact Permit
BP	Before Present, defined as before 1 January 1950.
Code of Practice	The DECCW September 2010 *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*
Consultation	Aboriginal community consultation in accordance with the DECCW April 2010 *Aboriginal cultural heritage consultation requirements for proponents 2010.* Consultation is not a required step in a due diligence assessment; however, it is strongly encouraged to consult with the relevant Local Aboriginal Land Council and to determine if there are any Aboriginal owners, registered native title claimants or holders, or any registered Indigenous Land Use Agreements in place for the subject land
DA	Development Application
DCP	Development Control Plan
DECCW	The Department of Environment, Climate Change and Water – now Heritage NSW
Disturbed Land	If land has been subject to previous human activity which has changed the land's surface and are clear and observable, then that land is considered to be disturbed
Due Diligence	Taking reasonable and practical steps to determine the potential for an activity to harm Aboriginal objects under the *National Parks and Wildlife Act 1974* and whether an application for an AHIP is required prior to commencement of any site works, and determining the steps to be taken to avoid harm
Due Diligence Code of Practice	The DECCW Sept 2010 *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*
GCP	Growth Centres Precinct
GIS	Geographical Information Systems
GSV	Ground Surface Visibility
Harm	To destroy, deface or damage an Aboriginal object; to move an object from land on which it is situated, or to cause or permit an object to be harmed
Heritage NSW	Heritage NSW in the Department of Premier and Cabinet – responsible for heritage matters in NSW
LALC	Local Aboriginal Land Council
LGA	Local Government Area
NPW Act	NSW *National Parks and Wildlife Act* 1974
OEH	The Office of Environment and Heritage of the NSW Department of Premier and Cabinet – now Heritage NSW
RAPs	Registered Aboriginal Parties

CONTENTS

FIGURES

PLATES

1.0 Introduction

Apex Archaeology has been engaged to assist Liverpool City Council in the Aboriginal due diligence assessment for the proposed Bernera Road, Yato Road and Yarrunga Street intersection upgrade, along with the reconstruction of an approximate 400m section of Bernera Road located within Prestons, NSW (Figure 1). This assessment has been prepared to support the Review of Environmental Factors (REF) for the proposed upgrades.

This report has been produced in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (the Due Diligence Code of Practice).

1.1 Study Area

The study area is located within the suburb of Prestons and consists of the intersection of Bernera Road, Yato Road and Yarrunga Street along with a 400m section north of the intersection along Bernera Road. The study area is located 32 km south west of Sydney. It is located within the Liverpool Local Government Area (LGA). The study area comprises approximately a 400m section of Bernera Road along with the intersection of Bernera, Yato Road and Yarrunga Street, and includes the entire road alignment from fenceline to fenceline.

1.2 Investigators and Contributors

This report has been prepared by Leigh Bate, Director and Archaeologist with Apex Archaeology, and Jenni Bate, Director and Archaeologist with Apex Archaeology. Both have over sixteen years of consulting experience within NSW.

Name	Role	Qualifications
Leigh Bate	Primary Report Author, GIS, Field inspection	B.Archaeology; Grad. Dip. Arch; Dip. GIS
Jenni Bate	Project Manager, Review	B.Archaeology; Grad. Dip. CHM

1.3 Statutory Context

Heritage in Australia, including both Aboriginal and non-Aboriginal heritage, is protected and managed under several different Acts. The following section presents a summary of relevant Acts which provide protection to cultural heritage within NSW.

1.3.1 Commonwealth Native Title Act 1993

The *Native Title Act 1993*, as amended, provides protection and recognition for native title. Native title recognises the traditional rights of Aboriginal and Torres Strait Islanders to land and waters.

The National Native Title Tribunal (NNTT) was established to mediate native title claims made under this Act. Three registers are maintained by the NNTT, as follows:

- National Native Title Register
- Register of Native Title Claims
- Register of Indigenous Land Use Agreements

A search of the above registers did not identify any applicable Native Title claims, registrations, or applications, for the study area or surrounds.

1.3.2 NSW National Parks and Wildlife Act 1974

Protection for Aboriginal heritage in NSW is provided primarily under the *National Parks and Wildlife Act* 1974 (NPW Act). Although cultural heritage is protected by other Acts, the NPW Act is the relevant Act for undertaking due diligence assessments. Protection for Aboriginal sites, places and objects is overseen by Heritage NSW, of the Department of Premier and Cabinet.

Changes to the NPW Act with the adoption of the *NPW Amendment (Aboriginal Objects and Places) Regulation* 2010 in October 2010 led to the introduction of new offences regarding causing harm to Aboriginal objects or declared Aboriginal places. These offences include destruction, defacement or movement of an Aboriginal object or place. Other changes to the NPW Act include:

- Increased penalties for offences relating to Aboriginal heritage for individuals and companies who do not comply with the legislation;
- Introduction of the strict liability offences, meaning companies or individuals cannot claim 'no knowledge' if harm is caused to Aboriginal objects or places; and
- Changes to the permitting process for AHIPs – preliminary archaeological excavations can be undertaken without the need for an AHIP, providing the excavations follow the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*.

A strict liability offence was introduced, meaning a person who destroys, defaces or moves an Aboriginal object without an Aboriginal Heritage Impact Permit (AHIP) is guilty of an offence, whether they knew it was an Aboriginal object or not. Exercising due diligence (as described in Section 1.4) provides a defence against the strict liability offence.

1.3.3 NSW National Parks and Wildlife Regulation 2019

Part 5, Division 2 of the *National Parks and Wildlife Regulation 2019* addresses Aboriginal objects and places in relation to the NPW Act 1974, and outlines how compliance with relevant codes of practice can be met, including with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*. Clause 57 states:

> *For the purposes of section 87(3) of the Act, compliance with any of the following codes of practice and documents (when undertaking an activity to*

which the code of document applies) is taken for the purposes of section (87(2) of the Act to constitute due diligence in determining whether the act or omission constituting the alleged offence would harm an Aboriginal object.

Clause 58(1) outlines the defence of low impact acts or omissions to the offence of harming Aboriginal objects, which includes maintenance works on existing roads and fire trails, farming and land management work, grazing of animals, activities on land that has been disturbed that is exempt or complying development, mining exploration work, removal of vegetation (aside from Aboriginal culturally modified trees), seismic surveying or groundwater monitoring bores on disturbed ground, environmental rehabilitation work (aside from erosion control or soil conservation works such as contour banks) or geological mapping, surface geophysical surveys, or sub-surface geophysical surveys.

Clause 58(4) outlines the definition of 'disturbed land', as land that "has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable".

'Disturbance' is further defined in a note to the above clause as follows:

Examples of activities that may have disturbed land include the following—

(a) soil ploughing,
(b) construction of rural infrastructure (such as dams and fences),
(c) construction of roads, trails and tracks (including fire trails and tracks and walking tracks),
(d) clearing of vegetation,
(e) construction of buildings and the erection of other structures,
(f) construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure),
(g) substantial grazing involving the construction of rural infrastructure,
(h) construction of earthworks associated with any thing referred to in paragraphs (a)–(g).

1.4 NSW Due Diligence Code of Practice

The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (Code of Practice) was introduced in September 2010. It outlines a method to undertake 'reasonable and practical' steps to determine whether a proposed activity has the potential to harm Aboriginal objects within the subject area, and thereby determine whether an application for an Aboriginal Heritage Impact Permit (AHIP) is required. When due diligence has been correctly exercised, it provides a defence against prosecution under the NPW Act under the strict liability clause if Aboriginal objects are unknowingly harmed without an AHIP.

The Code of Practice provides the 'reasonable and practicable' steps to be followed when determining the potential impact of a proposed activity on Aboriginal objects. Due diligence has been defined by Heritage NSW as "taking reasonable and practical steps to determine whether a person's actions will harm an Aboriginal object and, if so, what measures can be taken to avoid that harm" (DECCW 2010:18).

These steps include:

- Identification of whether Aboriginal objects are, or are likely to be, present within the subject area, through completing a search of the Aboriginal Heritage Information Management System (AHIMS);
- Determine whether the proposed activity is likely to cause harm to any Aboriginal objects; and
- Determine the requirement for an AHIP.

Should the conclusion of a due diligence assessment be that an AHIP is required, further assessment must be undertaken, with reference to the following guidelines:

- DECCW, April 2010, *Aboriginal cultural heritage consultation requirements for proponents 2010.* Part 6 National Parks and Wildlife Act 1974;
- DECCW, Sept 2010, *Code of Practice for Archaeological Investigation of Aboriginal Objects In New South Wales*;
- OEH, April 2011, *Guide to Investigation, assessing and reporting on Aboriginal cultural heritage in NSW*; and
- OEH, May 2011, *Applying for an Aboriginal Heritage Impact Permit: Guide for Applicants*.

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NOWRA
NEW SOUTH WALES 2541

0 125 250
meters

Projection:
MGA Zone 56 (GDA 94)
Base Map:
Near Maps 2023
18/01/2023
Final - Version 1

Figure 1: General location of the study area in its local context.

N

2.0 The Due Diligence Code of Practice Process

The Due Diligence Code of Practice provides a specific framework to guide the assessment of Aboriginal cultural heritage. The following section presents the results of this process.

2.1 Step 1: Will the Activity Disturb the Ground Surface?

Earthworks would include clearing, grubbing, stripping and moving topsoil along the side of the road in windrows within the road easement, excavation of soil and backfilling, replacing old culverts with new ones as well as laying of road base and resealing the entire study area. All proposed works would have an impact to some extent on the ground surface.

2.2 Step 2a: AHIMS and Available Literature Search

Heritage NSW is required to maintain a register of Aboriginal sites recorded during archaeological assessments and other activities within NSW. This is known as the Aboriginal Heritage Information Management System (AHIMS). This register provides information about site types, their geographical location, and their current status. It is the requirement for the recorder of a newly identified site to register this site with Heritage NSW to be placed onto the AHIMS register. It is a requirement of the Code of Practice to undertake a search of this register as part of undertaking a due diligence assessment.

Heritage NSW also maintains a register of archaeological reports relating to archaeological investigations throughout NSW. These reports are a valuable source of information regarding investigations previously completed and their findings, and can inform the assessment process regarding the potential for Aboriginal cultural material and archaeological potential within a study area.

2.2.1 AHIMS Results

A search box of the study area was using a 200m x 500m box did not identify any registered sites within the proposed upgrade area. A copy of the Basic Search is attached in Appendix A.

2.2.2 Literature Review

An analysis of previous archaeological work within the study area assists in the preparation of predictive models for the area, through understanding what has been found previously. By compiling, analysing and synthesising the previous archaeological work, an indication of the nature and range of the material traces of Aboriginal land use is developed. An understanding of the context in which the archaeological assessment is vital, as development does not occur within a vacuum, but within a wider cultural landscape, and this must be considered during any archaeological assessment in order to develop appropriate mitigation and management recommendations.

MARY DALLAS CONSULTING 1988

Mary Dallas Consulting undertook an archaeological survey for the Department of Housing to identify and record sites or areas of archaeological and Aboriginal significance which would be affected by the proposed housing development. Prior to Dallas's investigation no previous archaeological investigations had been conducted and no Aboriginal heritage or archaeological sites had been recorded.

Dallas's study area was bound to the west by the Hume Highway, to the east by Leacocks Lane and to the south by Glenfield Road. The field inspection was conducted with a representative of the Western Metropolitan Regional Aboriginal Land Council and five Aboriginal sites were recorded approximately 1km to the east of the current study area. They comprised of two stone artefact scatters in open areas within a disturbed context, and three trees that were assessed as being culturally modified (scarred trees).

In consultation with the Regional Aboriginal Land Council, it was determined that no further archaeological investigation was warranted for the two stone artefact sites due to the disturbed nature in which they were found. The three Aboriginal scarred trees however were considered extremely rare in the region. The scars were well preserved and defined. It was recommended that they be treated with antifungal and/or insecticide spray to help preserve them, and that they be preserved in situ.

Aside from the recommendations concerning the five sites discussed above no further archaeological survey, site recording or investigations were recommended for the study area.

AMBS 2003

Australian Museum Business Services (AMBS) prepared an Aboriginal Heritage Management Plan (AHMP) for the Edmondson Park Composite Site (EPCS), approximately 5km east of the current study area. This was undertaken in order to guide the future planning policies of both Campbelltown and Liverpool City Councils relating to future development of the EPCS through identification of any Aboriginal heritage constraints applicable to the site.

The dominant water sources within the area were identified as the Cabramatta and Maxwells Creek catchments, and a number of Aboriginal sites were previously recorded along these watercourses. Overall, much of the study area for the EPCS was identified as having been subject to some level of ground disturbance through past land use practices.

A total of 18 Aboriginal sites had been previously registered within the EPCS study area, including 13 artefact scatters and five isolated finds, with a total of 276 artefacts. An additional 15 sites were recorded by AMBS as part of the assessment.

Navin Officer 2007

Navin Officer completed an archaeological subsurface testing program within an area in Edmondson Park. This area was designated Locality LB and located on a rise overlooking Cabramatta Creek to the west of the current study area. Sixty-eight test pits were excavated, from which 33 lithics were recovered. The archaeological deposits were assessed as having a low archaeological significance. A section 90 Aboriginal heritage impact permit (AHIP) was recommended for the identified sites, associated archaeological deposits, and any other previously unidentified relics within Locality LB.

Austral Archaeology 2008

In 2008 Austral Archaeology undertook test excavations at Horningsea Park Archaeological Deposit 1 (#45-5-3285). Thirty stone artefacts were recovered from shallow deposits (c.30cm deep) on the west bank of Cabramatta Creek. Silcrete was the most common raw material (representing 69.7%) followed by silicified tuff (22.2%) and quartz (9.1%). It was concluded that the west bank of Cabramatta Creek was used intermittently by Aboriginal people as a temporary camp site, and that the low density of artefacts represented 'background scatter' resulting from casual use, tool repair and material discard.

AMBS 2010a

AMBS prepared an Aboriginal Heritage Assessment in advance of the proposed South West Rail Link (SWRL) Glenfield to Leppington Rail Line, approximately 2km south of the current study area. Five previously recorded Aboriginal sites were identified within the study area, and an additional ten new sites were recorded as past of the assessment. All of these were either isolated stone artefacts or scatters of stone artefacts made from a variety of material such as silcrete, mudstone and quartz. Twelve areas of archaeological sensitivity were defined within the study area as well, and appropriate recommendations were made in order to manage the Aboriginal heritage resource within the study area.

AMBS 2010b

In 2010 AMBS conducted preliminary Aboriginal heritage test excavations along the SWRL route to mitigate against possible impacts to subsurface archaeological deposits associated with geotechnical testing within the rail corridor. Twenty-five of these test pits were excavated within the Edmondson Park precinct. The excavations resulted in one artefact being recovered from TP29 and six artefacts from TP03 which were located within the Edmondson Park area.

Kelleher Nightingale 2010

In 2010 Kelleher Nightingale Consulting (KNC) undertook an assessment for the Edmondson Park South Part 3A Stage 1 Project Application Environmental Assessment, producing an Aboriginal Cultural Heritage Assessment Report. The study assessed the proposed development of Edmondson Park South, a 40 ha area

south of the current study area between the Zouch Road and the Hume Highway intersection. This study was undertaken as part of the application process to have the site designated as a Part 3A major project. Five Aboriginal heritage sites were identified within the Edmondson Park South area, three of which were determined to be of low archaeological significance.

AMBS 2011

AMBS completed an archaeological assessment for the proposed Edmondson Park Servicing Scheme in 2011. An Aboriginal heritage impact assessment considered the area bounded by Camden Valley Way to the north, Zouch Road to the west and the Hume Highway to the south-east. Five Aboriginal sites were located, including four artefact scatters and one isolated find. The survey also verified the locations of five previously recorded Aboriginal sites. Thirty-four areas within the proposed impact area were identified as having varying levels of archaeological sensitivity, as determined by both the survey results and by predictions based on the level of disturbance and the landform types present.

Kelleher Nightingale 2011

Stage One of the Edmondson Park Servicing Scheme: Aboriginal Heritage Due Diligence Assessment was completed by KNC in 2011. This study aimed to integrate the results of previous Aboriginal heritage assessments undertaken by Sydney Water. An AHIMS database search identified 46 registered sites within or adjacent to the study area. Of the 46 identified sites, none were found to be within the proposed pipeline alignments. However, the AHIMS search did identify five sites within landforms which adjoin the pipeline. Management measures were therefore required to protect adjacent sites during construction.

AMBS 2012

AMBS prepared an Aboriginal heritage assessment for the Austral and Leppington North Precincts, as part of the South West Growth Centres and to inform the development of the project footprint. Survey of approximately 28% of the study area was completed, although it was noted that there was an extreme lack of visibility throughout the area due to high levels of vegetation. One previously recorded site was relocated, and six new sites were recorded. Thirty four previously recorded sites were not relocated during the survey. A number of areas of archaeological sensitivity were identified, primarily along creeklines and ridges, particularly where minimal disturbance had occurred. Recommendations for the conservation of areas with archaeological sensitivity were made, as well as for sites within the study area.

The assessment was located immediately east of the current study area, and while it did not cover the study area specifically, it established area of archaeological potential within the Austral and Leppington North precinct, as well as contributing to predictive modelling for the distribution of artefacts within the area. This

modelling relied on proximity to watercourses as well as an assessment of ground disturbance present, and recommended mitigation measures depending on the level of disturbance present within the site.

GML 2012

Godden Mackay Logan (GML) undertook an Aboriginal Cultural Heritage Assessment for a residential development within the East Leppington Precinct of the South West Growth Centre. Survey identified sixty Aboriginal sites and test excavation was undertaken, identifying a distinct archaeological pattern across the site and assisting in refining predictive modelling for the region.

A total of 471 artefacts and 47 heat shatter and indeterminate lithic items were recovered during the test excavations, which assisted in making the following statements:

- Artefact sites are generally located within 100m of water sources;
- Archaeological excavations in the region have had varied results, with few resulting in the identification of high density deposits and the majority yielding low density artefact deposits; and
- Artefacts are generally the only physical evidence of Aboriginal occupation of the region to remain in the archaeological record.

Artefact 2013

Artefact Heritage were engaged by Roads and Maritime Services (RMS) for the proposed upgrade of 5.4 kilometres (km) of Campbelltown Road between Camden Valley Way, Casula and Brooks Road, Denham Court. The investigation found 14 Aboriginal sites and one site complex located within the study area. Six of these sites were previously recorded, with eight new sites and one site complex being located during the site survey conducted for the Stage 2 PACHCI element of this assessment. Two of these sites and the site complex are within the proposal area and would be directly impacted by the proposal (CR01, CR02, and CRSC1).

Mary Dallas 2014

Mary Dallas Consulting Archaeologists conducted an Aboriginal Due Diligence assessment for a residential sub-division at 210-220 Jardine Drive, Edmondson Park. No archaeological materials or potential for its existence were identified within the study area. The area was assessed as having undergone abundant land modification and was subsequently determined that it was unlikely to have retained much of its original surface or subsurface features. Extensive clearing, channelisation of the creek, cut and fill earthworks related to the construction of the residence and associated features, and erosion caused by animal grazing would have disturbed the original landform extensively.

AMBS 2014

AMBS were engaged to undertake an Aboriginal Due Diligence assessment for a small property located at 5 Rynan Avenue, Edmondson Park. No archaeological surface sites were identified during the site survey. The eastern portion of the study area was determined to have no sub-surface archaeological potential however the western portion was assessed as having a low to moderate potential for intact archaeological deposits. Further assessment for the western portion of the study area was advised should this area wish to be developed in the future.

ELA Australia 2019A

ELA Australia (ELA) prepared an ACHA for a proposed residential subdivision on Denham Court Road, Leppington. Two previously registered sites were located within the study area and varying levels of disturbance were identified within the properties, generally related to the construction of residential dwellings and associated infrastructure, as well as past agricultural practices.

Test excavation of three locations within the study area were undertaken, with a total of nineteen test pits excavated. A total of 35 lithic artefacts were recovered and confirmed low density subsurface assemblages associated with the previously registered sites within the study area.

It was noted that artefact density reduced considerably in association with distance to the second order watercourse (Bonds Creek) located to the north. The least disturbed area within the study area, close to Bonds Creek, yielded the highest number of subsurface artefacts. The results were considered to support the predictive modelling for the region, which posits that third order and above watercourses were more likely to be the location of repeated and sustained occupation sites, and lower density artefact assemblages located over 200m from higher order watercourses were more likely to represent brief or single occupation events.

ELA Australia 2019B

ELA prepared an Aboriginal due diligence assessment in advance of the proposed expansion of a mosque on Camden Valley Way. No previously recorded Aboriginal sites were located within the study area, and the area was considered to be highly disturbed by previous land use practices, and no further assessment was recommended.

Extent Heritage Advisors 2020

Extent undertook an Aboriginal heritage assessment for the proposed rezoning and future development of the Glenfield Planned Precinct which lies on the Glenfield to Macarthur Urban Renewal Corridor. The Report was commissioned by the Department of Planning and Environment and its aim was to identify Aboriginal cultural heritage opportunities and constraints across the precinct, and to

maximise conservation outcomes. The assessment covered a 6km^2 area directly south to the current study and included land on the south side of Glenfield Road.

A total of 63 sites were identified. Over 76% were had one or more stone artefacts, 11% were areas or potential archaeological deposit, 8% were cultural modified trees and 5% were rock shelters with art.

The assessment concluded that corridors along Georges River and Bunbury Creek are areas of high sensitivity that were likely focal points for long-term and/or repeated Aboriginal occupation in the past. They have a deep sandy-soil landscape profile known as the South Creek soil landscape that is likely to preserve deeper intact archaeological remains. The Georges River corridor was also considered to be of high scientific significance because of its potential to contain archaeological deposits of deep antiquity. However, most of the other identified Aboriginal sites were considered to be of low scientific significance as only limited information could be derived from them. Areas of Aboriginal archaeological sensitivity (very low – high) were mapped, as well as artefact sites and potential archaeological deposit sites. An area directly opposite (but not within) the current area on the south side of Glenfield Road as assessed as having 'moderate archaeological sensitivity'. The current study area does not fall within the area assessed by Extent.

KAYANDEL ARCHAEOLOGICAL SERVICES 2021

A due diligence assessment of 40 Old Glenfield Road, Casula undertaken by KAS in 2021 in relation to 'the potential for Aboriginal objects to be present within the area'. Their investigation included a desk-top review of Aboriginal archaeological assessments, a review of geological maps, and a search of the AHIMS data base based on a 5km square centred on the study area. However, their assessment does not include a review of the Mary Dallas 1988 report that had included an assessment of the KAS study area, and it appears a pedestrian survey was not undertaken. A pedestrian survey would have enabled further examination of the topography and level of ground-surface impacts documented in their aerial imagery. It would also have provided the opportunity to inspect the ground surface for possible stone artefacts and inspect the trees featured in historical imagery.

KAS's assessment also included a review of a broader Aboriginal cultural heritage assessment undertaken by Extent Heritage Advisors in 2020. Extent Heritage Advisors had assessed an area opposite the study area, but on the south side of Glenfield Road and *outside* their current study, as having 'moderate potential to contain archaeological deposits'. Based on this assessment, KAS (2021:23) proposed that as the current area has a similar landform it therefore holds the same 'moderate potential to contain Aboriginal archaeological deposit'.

They identified three areas of potential archaeological deposits within the current study and recommended that prior to development work, further archaeological

investigation that includes archaeological test excavation and an Aboriginal cultural heritage assessment report with full Aboriginal community consultation be undertaken.

APEX ARCHAEOLOGY 2021

Apex Archaeology were engaged to undertake an Aboriginal due diligence assessment for 225 Croatia Avenue, Edmondson Park. No archaeological surface sites were identified during the site survey. The study area was determined to have no sub-surface archaeological potential. No Aboriginal cultural heritage constraints were identified for this project.

APEX ARCHAEOLOGY 2022A

Apex Archaeology were engaged to assist D+R Architects in the Aboriginal due diligence assessment of a site located at 694-696 Hume Highway, Casula, NSW. No Aboriginal heritage constraints were identified for the project.

APEX ARCHAEOLOGY 2022B

Apex Archaeology were engaged by The Bathla Group to complete an Aboriginal Cultural Heritage Assessment for 40 Old Glenfield Road, Casula based on the KAS 2021 ADD of the site. The ACHA completed for this project determined that KAS did not provide accurate advice regarding Aboriginal archaeological potential within this study area and as such the site did not warrant the level of investigation necessary to complete an ACHA. Had an appropriate Aboriginal due diligence assessment including a site survey been undertaken to begin with, no further assessment would have been recommended for the site. As such, there were no Aboriginal heritage constraints identified for this study area.

2.3 STEP 2B: LANDSCAPE FEATURES

An assessment of landscape features is required to determine whether Aboriginal objects are likely to be present within the proposed activity area. Certain landscape features are more likely to have been utilised by Aboriginal people in the past and therefore are more likely to have retained archaeological evidence of this use. Focal areas of activity for Aboriginal people include rock shelters, sand dunes, water courses, waterholes and wetlands, as well as ridge lines for travel routes.

The presence of specific raw materials for artefact manufacture, as well as soil fertility levels to support vegetation resources, are also factors to be considered in the assessment of the environmental context of a study area. Geomorphological factors, such as erosion and accretion of soils, affect the preservation of potential archaeological deposits and therefore need to be considered when making an assessment of the potential for archaeological material to be present within a study area. This assessment is predominantly a desktop exercise.

2.3.1 EXISTING ENVIRONMENT

The study area is situated on a modified land surface within an industrial estate located in Prestons, NSW. The entire study area has been modified to some extent by previous land use practices and subsequent industrial construction and road construction across the area.

The study area falls within the Sydney Basin, which is roughly bounded by the Great Dividing Range to the west, the coast to the east, Newcastle to the north and Wollongong to the south. It is the geographic extent of the Hawkesbury sandstone (McDonald 2008). The Cumberland Plain is located within the Sydney Basin, and is formed on shale geology with open plain woodlands, and is surrounded by the Hornsby Plateau to the north, the Woronora Plateau to the south, and the Blue Mountains Plateaux to the west (McDonald 2008). The Cumberland Plain is comprised of generally low gradient, rolling topography, located on shale-dominated Triassic formations, including Tertiary and later alluvial based sediments.

HYDROLOGY

The nearest major permanent water source is Cabramatta Creek located approximately 413m north west at its closest point. Cabramatta Creek is a 3rd order water source which connect to the Georges River approximately 8km norther east of the northern extent of the study area. The Georges River is a fourth order watercourse as defined by the Strahler stream ordering system as used by DPI Water and the Georges River is classified as a fourth order watercourse (Figure 4). Watercourse classification ranges from first order through to fourth order (and above) with first order being the lowest, ie a minor creek or ephemeral watercourse.

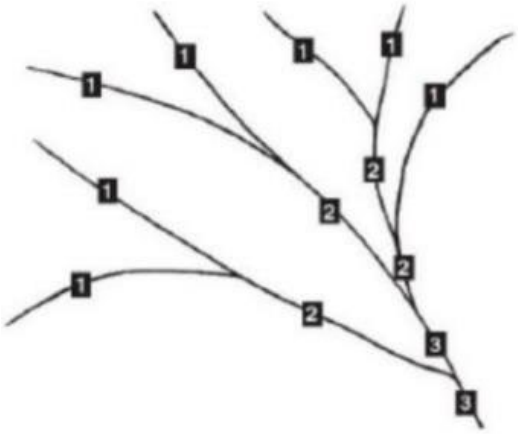

Figure 2: The Strahler system (Source: Department of Planning and Environment 2016).

SOILS, GEOLOGY AND TOPOGRAPHY

The study area falls wholly within the Blacktown soil landscape. The Blacktown soil landscape is a shallow to moderately deep soil found across the Wianamatta

Group shales. This soil landscape is a residual landscape in which the soils form *in situ.* There is limited erosion within this landscape which means bedrock exposures are also rare.

VEGETATION

Prior to the arrival of European settlers, the vegetation of the area would have comprised woodlands characterised by Grey Box (*Eucalyptus moluccana*), Forest Red Gum (*Eucalyptus tereticornis*) and Narrow-leaved Ironbark (*Eucalyptus crebra*). A grassy understorey with shrubby patches would have been present (Benson & Howell 1990). Blackthorn (*Bursaria spinosa*) and paperbark trees (*Melaleuca spp*) were also present. Along creeklines, species such as Swamp Oak (*Casuarina glauca*) would have grown. Remnant vegetation areas are present within the wider area, and comprise Cumberland Plain Woodland and Sydney Coastal River Flat Forest.

Most of the original vegetation in the residential areas has been cleared except for some of the lager trees. Aerial photography shows much of the area has been cleared and is now a built-up commercial/industrial environment. Many of the flora and fauna species that would have been present within the area would have provided resources for Aboriginal people in the past.

2.4 ETHNOHISTORY

The original Aboriginal inhabitants of the Prestons region were tribes of the Darug (Daruk) language group (Tindale 1974). The Darug language group originally extended from the eastern suburbs of Sydney as far south as Botany Bay, west as far as Bathurst and north as far as the Hawkesbury River (Eades 1976). RH Mathews describes the extent of the tribal boundaries as "adjoin[ing] the Thurrawal on the north, extending along the coast to the Hawkesbury River, and inland to what are now Windsor, Penrith, Campbelltown, and intervening towns" (Mathews 1901 in Attenbrow 2010). The name Darug was not identified in the literature until the late 19th century, when it was used to refer to the language and words previously recorded (Attenbrow 2010).

The arrival of Europeans in Australia wreaked havoc on the Aboriginal people, and decimated their populations through a combination of illness and aggravated interactions. The writings of early colonists allow a limited reconstruction of elements of traditional Aboriginal society.

The traditional lifestyles of Aboriginal groups such as the Darug depended largely on the environment in which they lived. Their economy and subsistence were based on a hunter gatherer society. Whilst coastal groups utilised marine and estuarine resources, hinterland groups relied on freshwater and terrestrial animals and plants. Animals such as kangaroos, wallabies, possums, gliders, bandicoots, wombats, quolls, fruit bats, echidnas, native rats and mice, emus, ducks, tortoises,

snakes and goannas (Attenbrow, 2010) played a major role in the subsistence of hinterland groups.

2.4.1 Raw Materials

A wide range of raw materials were selected by Aboriginal people for flaking to create stone implements. Material types ranged from high quality to poor quality for flaking purposes, depending on the geology of the area and readily available material types. The following is a description of a range of raw material types known to have been utilised by Aboriginal people for the creation of stone artefacts.

Breccia

Breccias are coarse, angular volcanic fragments cemented together by a finer grained tuffaceous matrix.

Chalcedony

Chalcedony is a microcrystalline, siliceous rock which is very smooth and can be glossy. Introduction of impurities can produce different coloured versions of chalcedony, including yellow/brown (referred to as carnelian), brown (sard), jasper (red/burgundy) and multicoloured agate. It flakes with a sharp edge and was a prized material type for the creation of stone artefacts in parts of Australia (Kuskie & Kamminga 2000: 186).

Chert

Chert is a highly siliceous sedimentary rock, formed in marine sediments and also found within nodules of limestone. Accumulation of substances such as iron oxide during the formation process often results in banded materials with strong colours. Chert is found in the Illawarra Coal Measures and also as pebbles and colluvial gravels. It flakes with durable, sharp edges and can range in colour from cream to red to brown and grey.

Petrified Wood

Petrified wood is formed following burial of dead wood by sediment and the original wood being replaced by silica. Petrified wood is a type of chert and is a brown and grey banded rock and fractures irregularly along the original grain.

Quartz

Pure quartz is formed of silicon dioxide, and has a glossy texture and is translucent. Introduction of traces of minerals can lead to colouration of the quartz, such as pink, grey or yellow. The crystalline nature of quartz allows for minute vacuoles to fill with gas or liquid, giving the material a milky appearance. Often quartz exhibits internal flaws which can affect the flaking quality of the material, meaning that in general it is a low-quality flaking material (Kuskie & Kamminga 2000: 186). However, quartz is an abundant and widely available material type and therefore is one of the most common raw materials used for artefact manufacture in

Australia. Flaking of quartz can produce small, very sharp flakes which can be used for activities such as cutting plant materials, butchering and skinning.

Quartzite

Formed from sandstone, quartzite is a metamorphic stone high in silica that has been heated or had silica infiltrate the voids found between the sand grains. Quartzite ranges in colour from grey to yellow and brown.

Silcrete

Silcrete is a siliceous material formed by the cementing of quartz clasts with a matrix. These clasts may be very fine grained to quite large. It ranges in colour from grey to white, brown, red or yellow. Silcrete flakes with sharp edges and is quite durable, making silcrete suitable for use in heavy duty woodworking activities and also for spear barbs (Kuskie & Kamminga 2000:184).

Tuff/Indurated Mudstone

There is some disagreement relating to the identification of lithic materials as tuff or indurated mudstone. The material is a finely textured, very hard yellow/orange/reddish-brown or grey rock. Kuskie and Kamminga (2000: 6, 180) describe that identification of lithic materials followed the classification developed by Hughes (1984), with indurated mudstone described as a common stone material in the area. However, Kuskie and Kamminga's analysis, which included x-ray diffraction, identified that lithics identified as 'indurated mudstone' was actually rhyolitic tuff, with significant differences in mineral composition and fracture mechanics between the stone types. They define mudstone as rocks formed from more than 50% clay and silt with very fine grain sizes and then hardened.

The lithification of these mudstones results in shale (Kuskie & Kamminga 2000: 181) and thus 'indurated mudstone', in the opinion of Kuskie and Kamminga, do not produce stones with the properties required for lithic manufacture.

In 2011, Hughes, Hiscock and Watchman undertook an assessment of the different types of stones to determine whether tuff or indurated mudstone is the most appropriate terminology for describing this lithic material. The authors undertook thin section studies of a number of rocks and determined that the term 'indurated mudstone' is appropriate, with an acknowledgment that some of this material may have been volcanic in origin. They also acknowledge that precise interpretation of the differences between material types is difficult without detailed petrological examination, and suggest that artefacts produced on this material are labelled as 'IMT' or 'indurated mudstone/tuff'.

Basalt

Basalt, which is commonly referred to as 'blue metal', is solidified lava that was produced by now extinct volcanoes and diatremes that are spread-out within the Sydney Basin. If the lava cools quickly it results in fine-grained basalt that is easily

flaked or ground to make tools, implements or weapons. Tuff forms from the tiny ash particles that are also released during volcanic explosions. When it cools it hardens into a fine-grained rock called 'tuff', as discussed above.

Basalt would have been either collected from the primary deposits formed during the eruption, which would require pieces to be broken off (quarried) or it was collected in cobble-form from a creek bed or shoreline. Cobbles are referred to as secondary sources as they are formed from pieces of rock that have been dislodged from their primary source and end up in creeks and/or river systems (Petrequin 2016; Attenbrow et al. 2017). The flow of water moves them around and smooths them into water-rolled cobbles that can be transported considerable distance from the original source. Basalt was often used to make axes which were either flaked into the desired shape from quarried stone, or from cobbles which quite often only required only one end to be ground into a sharp working edge.

Basalt cobbles can be found along the banks of rivers, and in bedrock quarries within the Hunter Region. Recent research undertaken by the Australian Museum and University of New England using portable XRF technology demonstrated that a number of stone axes held at the Australian Museum from the Hunter Valley area have been traced to these sources (Attenbrow et al. 2017).

2.4.2 Procurement

Assemblage characteristics are related to and dependent on the distance of the knapping site from raw materials for artefact manufacture, and different material types were better suited for certain tasks than other material types. Considerations such as social or territorial limitations or restrictions on access to raw material sources, movement of groups across the landscape and knowledge of source locations can influence the procurement behaviour of Aboriginal people. Raw materials may also have been used for trade or special exchange between different tribes.

2.4.3 Manufacture

A range of methodologies were used in the manufacture of stone artefacts and tools, through the reduction of a stone source. Stone may have been sourced from river gravels, rock outcrops, or opportunistic cobble selection. Hiscock (1988:36-40) suggests artefact manufacture comprises six stages, as follows:

1. The initial reduction of a selected stone material may have occurred at the initial source location, or once the stone had been transported to the site.
2. The initial reduction phase produced large flakes which were relatively thick and contained high percentages of cortex. Generally, the blows were struck by direct percussion and would often take advantage of prominent natural ridges in the source material.

3. Some of these initial flakes would be selected for further reduction. Generally, only larger flakes with a weight greater than 13-15 grams would be selected for further flaking activities.
4. Beginning of 'tranchet reduction', whereby the ventral surface of a larger flake was struck to remove smaller flakes from the dorsal surface, with this retouch applied to the lateral margins to create potential platforms, and to the distal and proximal ends to create ridges and remove any unwanted mass. These steps were alternated during further reduction of the flake.
5. Flakes were selected for further working in the form of backing.
6. Suitable flakes such as microblades were retouched along a thick margin opposite the chord to create a backed blade.

Hiscock (1986) proposed that working of stone materials followed a production line style of working, with initial reduction of cores to produce large flakes, followed by heat treatment of suitable flakes before the commencement of tranchet reduction. These steps did not necessarily have to occur at the same physical location, but instead may have been undertaken as the opportunity presented.

2.5 Regional Context

The study area is located within the Cumberland Plain. Many archaeological assessments have been completed across the Plain, including a range of academic assessments, resource management studies and development impact assessments. All of these help to inform the archaeological assessment of sites within the region.

Generally, the arrival of humans within Australia is considered to have occurred around 43-45 ka (O'Connell & Allen 2004; McDonald 2008). However, recent work at the Madjedbebe site in Arnhem Land in the Northern Territory revealed archaeological evidence confidently dated to the period before 45-46 ka and possibly up to 50-55 ka (Clarkson et al 2015). In NSW, there is strong evidence available to support Aboriginal occupation of the Cumberland Plain region in the Pleistocene period (approximately 10 ka) and possibly earlier. Work in Cranebrook Terrace was dated to 41,700 years BCE by Stockton and Holland (1974), and a site in Parramatta within deep sandy deposits was dated to 25-30 ka (JMcDCHM 2005). Kohen's 1984 assessment of Shaws Creek in the Blue Mountain foothills yielded ages of 13 ka, while Loggers Shelter at Mangrove Creek was dated to 11 ka by Attenbrow 1987. These ages are obtained from both radiocarbon and optically stimulated luminescence (OSL) dating.

Some experts have cast doubt onto the assessment of the items from Cranebrook Terrace as artefactual (Mulvaney & Kamminga 1999; McDonald 2008), although they do not doubt the results of the radiocarbon dates – it is the association of the artefacts with the dated deposits is problematic, and Mulvaney and Kamminga (1999) consider that there are better examples of sites with more robust

identification of age available. There has certainly been a great deal of research undertaken within the Sydney region in the intervening years.

Several of the oldest dated sites in the Sydney region have been located within rockshelter deposits or deep alluvial deposits such as those located on the banks of large rivers including the Parramatta River and the Hawkesbury-Nepean. Archaeological work within the Parramatta sand sheet, which is considered to be a Pleistocene sand body (McDonald 2008) revealed the oldest secure date for the Cumberland Plain, dating to approximately 30.7 ka. McDonald considers that initial occupation of the sand body occurred during the Late Pleistocene, and artefact assemblages of the time comprised mostly silicified tuff artefacts, with the upper limits of this assemblage considered to be 6-8 ka. Overlying these assemblages were heat treated silcrete artefacts, and backed artefacts which were dated to before 2-3 ka. The work completed within the Parramatta sands demonstrated a "distinct and clear change in the archaeological record through time", based on a typological analysis of the assemblages (McDonald 2008).

Additionally, McDonald argues that the early occupation of the Sydney region was focussed on these large river systems and the resources they supply, with 'high residential mobility' resulting in considerable distances being travelled between base camps (McDonald 2008). Camps were made near to resource zones, and the population moved on as resource availability altered over time, due to the change of seasons. Due to the large distances travelled, large cores of silicified tuff from the Nepean River gravels were carried and flaked sparingly with minimal discard occurring (McDonald 2008), with large flakes produced. Backed or retouched artefacts were considered rare.

During the Holocene period around 6.5ka, sea levels increased and stabilised, which led to those groups on the coastal fringes turning inland (McDonald 2008). Around 5 ka a change in archaeological assemblages can be seen, with an emphasis on the use of locally available stone for artefact production. Around 4,000 years ago people began to decrease their residential mobility and inhabit certain biogeographic zone on a permanent basis, with some movement between the Cumberland Plain and the surrounding sandstone country (McDonald 2008).

Most sites dated using radiocarbon or OSL methods within the Sydney region have dated to within the last 10,000 years (Attenbrow 2010). This may support evidence of population growth over time, and an intensification of cultural activity within the Cumberland Plain. Attenbrow's 2006 work at the Upper Mangrove Creek catchment north of Sydney identified changes in site patterning occurring during the Holocene period. She argued that the use of sites changed, whilst population levels remained relatively stable, in contrast to others who have interpreted this as evidence of increasing population rather than increasing site use and archaeological evidence thereof (Attenbrow 2006).

In contrast, Williams et al (2014) and Smith et al (2008) argued that the population density was far greater in the last 2,000 years than they had been previously, with their justification being that the use of sites across all locations increased at the same time, which suggested increased population using the landscape more intensively rather than increased movement of people across the landscape. No definitive answer has been found to date, but it can be seen that late Holocene sites dominate the archaeological record of the Cumberland Plain and wider Sydney Basin.

2.6 Regional Site Patterning

In general, the dominant site types identified within the Sydney region include rock shelters with archaeological deposit (including middens), rock shelters with art, pictographs (rock engravings), artefact concentrations in open contexts, grinding grooves and open middens (Attenbrow 2010). The nature and extent of individual sites is closely related to the environmental context in which they are found – for example, rockshelters are found within sandstone escarpments, while middens are generally located close to water bodies including marine, estuarine and freshwater contexts, and grinding grooves are found on flat sandstone platforms in close proximity to water sources.

In 1986, Kohen developed site location patterning predictions based on a study of archaeological investigations undertaken to date on the Cumberland Plain. Proximity to water was an important consideration in site patterning, with 65% of open artefact scatters located within 100m of permanent fresh water sources (Kohen 1986), and only 8% of sites located more than 500m from a permanent water source. He argued that sites increased in size, in complexity and in density with increasing proximity to water, especially permanent waterways such as creeks and rivers.

Further investigations within the Cumberland Plain have identified that Kohen's work was limited by his reliance on available surface evidence. McDonald (1997) undertook further investigations within the Cumberland Plain and identified that 28% of sites excavated had no surface expressions of artefacts prior to their excavation, with the ratio of surface to excavated artefacts being 1:25, and the nature and extent of the excavated sites could not be determined on the basis of surface expressions of artefacts alone. In summary, she found that a lack of surface evidence does not constitute a reliable estimate for subsurface archaeological potential (McDonald 1997).

These results demonstrate how test excavations can assist in the identification of the nature and extent of subsurface archaeological deposits within the Cumberland Plain.

2.7 PREDICTIVE MODEL

Based on the results of previous archaeological investigations within the wider area, a number of predictions regarding Aboriginal use of the area can be made. These predictions focus on the nature, extent and integrity of the remaining evidence.

The landscape characteristics of the area influence the prediction of the nature of potential sites within the landscape itself. Isolated finds and small artefact scatters are the most common site type identified within the wider area, and are predicted to be the most likely site type to be identified in future.

Site types associated with sandstone country, such as grinding grooves, rock art sites, petroglyph (rock engravings) and sandstone rockshelters with art/and or archaeological deposit are not considered likely to occur within the study area. Scarred trees are also not considered likely within the study area due to the high levels of historical clearing which have occurred within the landscape.

Distribution of sites is related to the landforms on which sites are known to be located. Generally, sites are focused on elevated landforms and reduce with increasing distance from water sources. This includes both artefact (isolated finds and artefact scatters) and areas of PAD. However, there is some evidence that artefact density within this landscape was not related to proximity to water, with evidence of a more uniform distribution of artefacts across much of the landscape.

Site disturbance and post-depositional processes heavily influence the integrity of archaeological sites. An assessment of these impacts must be considered when predicting the likelihood of Aboriginal sites being present within an area. Consideration of both natural and cultural ground disturbance must be made, and past land use must also be considered. Results of this assessment assist in the prediction of the integrity of potential sites within the study area.

Surface sites are likely to have been impacted by agricultural processes within the area over the historic period. Natural actions such as bioturbation are likely to have impacted at least the upper levels of archaeological deposits, as are cultural activities such as excavation, construction, ploughing, clearing and planting. Whilst these actions may impact the integrity of stratigraphy within the deposit, this does not necessarily mean associated archaeological objects will also be disturbed.

In general, Aboriginal use of an area is based on a number of factors, such as:

- Proximity to permanent water sources – generally permanent or areas of repeat habitation are located within approximately 200m of permanent water;
- Proximity to ephemeral water sources – generally sites near ephemeral water sources were utilised for one-off occupation;

- Ease of travel – ridgelines were often utilised for travel during subsistence activities; and
- The local relief – flatter areas were more likely to be utilised for long term or repeat habitation sites than areas of greater relief, especially if the slopes are at a distance from water.

In terms of the study area, sites are considered more likely to comprise:

- Isolated finds, which may occur anywhere across a landscape; and
- Open sites, in areas of high relief in close proximity to ephemeral or permanent water sources.

2.8 Step 3: Avoid Harm

A visual inspection of the study area was necessary to identify any surface objects or landforms with potential archaeological deposits (PAD). This inspection would allow conclusions to be made regarding the probability of archaeological objects occurring within the proposed development area. This would assist in determining if there was any archaeological potential within the study area which could potentially be harmed by the proposed works, and in turn, assist in determining if harm to the archaeological resource could be avoided.

The proposed upgrade would impact the entirety of the study area. It would not be possible to avoid impact to Aboriginal cultural values within the study area, should such exist. As such, a visual inspection of the site was undertaken to confirm if any such values exist within the study area.

2.9 Step 4: Visual Inspection

A visual pedestrian inspection of the study area was undertaken in March of 2023 by Leigh Bate, Archaeologist with Apex Archaeology.

2.9.1 Survey Coverage

Given the small size of the study area, the entire area was inspected by pedestrian survey to identify any surface artefacts or any areas with potential for intact subsurface deposits to be present.

2.9.2 Results

No previously registered archaeological sites on the AHIMS database were located within the study area. A thorough inspection of the area was undertaken. No newly identified archaeological material or sites were identified during the survey. Ground surface visibility (GSV) was low throughout the study area. GSV was rated at <5% overall. No raw material sources were identified within the lot.

Ground disturbance was high throughout the study area due to historic vegetation clearance, landscape modification and ongoing landuse of the area. The study area is situated on level area along Bernera Road. The area has been completely

disturbed by road construction/infrastructure activities and does not retain any archaeological potential.

Plate 1: Looking north east across the proposed intersection upgrade area.

Plate 2: Looking east along the southern road verge of Yarrunga Street.

Plate 3: Looking south down Bernera Road from the intersection.

Plate 4: Looking east along Yato Road from the intersection

Plate 5: Looking north along Bernera Road.

Plate 6: Looking north along the eastern road verge of the widening section along Bernera Road.

Plate 7: Looking south from the northern end of the Bernera Road upgrade section.

Plate 8: Looking south along the western road verge of Bernera Road towards the intersection upgrade area.

Plate 9: Looking east across the intersection upgrade area from the northern road verge of Yarrunga Street.

2.9.3 Discussion

In accordance with the Due Diligence Code of Practice, land is considered disturbed if human activities within the area have left clear and observable changes on the landscape.

In this instance the level of disturbance from prior land clearing activities (historic), landscape modification (industrial/commercial estate) and road construction is evident throughout the study area. Additionally, subsurface services are present through much of the proposed impact area, as evidenced by access pits shown in several of the plates. The construction of subsurface surfaces would have resulted in significant disturbance to the area. Landscape modification has reduced the potential for any intact archaeological sub-surface deposits within the study area to nil.

3.0 Conclusions and Recommendations

3.1 Conclusions

- No previously registered Aboriginal sites are located within the study area.
- No archaeological material was identified on the ground surface of the study area.
- The study area was assessed as having no sub-surface archaeological potential, based on the results of the visual pedestrian inspection.
- This assessment was based on identification of landform elements, previous archaeological work undertaken within the wider region, and a visual inspection of the study area.
- The study area is highly disturbed by past land use practices and does not retain any archaeological potential.

3.2 Recommendations

- No further Aboriginal archaeological assessment is required prior to the commencement of works as described in this report.
- This due diligence assessment must be kept by Liverpool City Council so that it can be presented, if needed, as a defence from prosecution under Section 86(2) of the *National Parks and Wildlife Act* 1974.
- The results of this assessment fulfil the requirement for archaeological assessment in accordance with the OEH 2010 *Guide to Investigation, assessing and reporting on Aboriginal cultural heritage in NSW* and the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (Code of Practice). Works may proceed with caution.
- The proposed works must be contained to the area assessed during this archaeological assessment, as shown on Figure 1. If the proposed location is amended, further archaeological assessment may be necessary to determine if the proposed works will impact any Aboriginal objects or archaeological deposits.
- Should unanticipated archaeological material be encountered during site works, all work must cease and an archaeologist contacted to make an assessment of the find. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.

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Appendix A: AHIMS Search Results

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : 23101b

Client Service ID : 747049

Apex Archaeology

PO BOX 236

Nowra New South Wales 2541

Attention: Leigh Bate

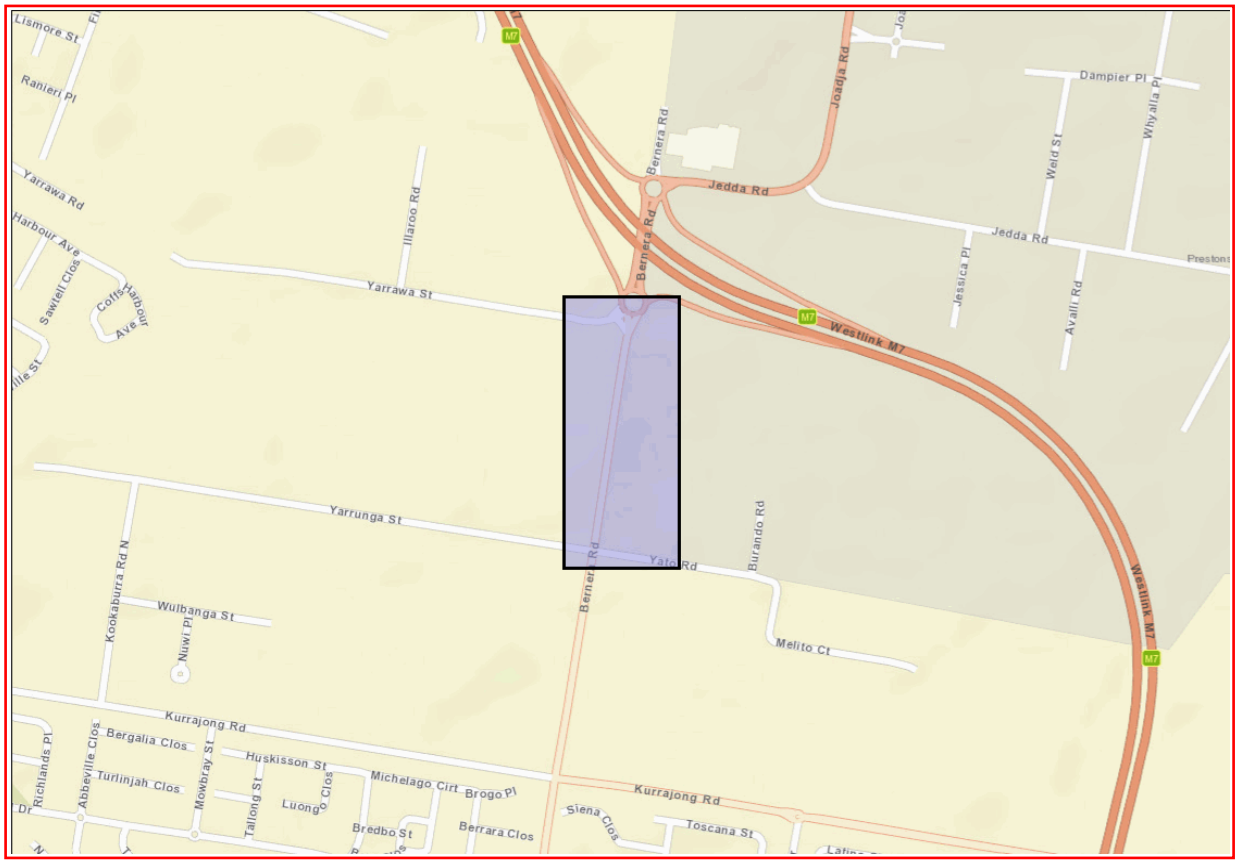
Email: leigh@apexarchaeology.com.au

Date: 20 January 2023

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 302912.0 - 303112.0, Northings : 6242592.0 - 6243091.0 with a Buffer of 0 meters, conducted by Leigh Bate on 20 January 2023.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	**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 (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW 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 Heritage NSW 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.

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