Appendix K

Technical report: Aboriginal heritage

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Energy Clyde Western Area Remediation Project

Viva Energy Australia

03-Dec-2018

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Appendix K Technical report: Aboriginal heritage

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Viva Energy Clyde Western Area Remediation Project

Document Environmental Impact Statement
Appendix K Technical report: Aboriginal heritage

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Prepared by Andrew McLaren

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Glossary and abbreviations

Glossary

Term	Definition
Aboriginal archaeological site	The present spatial extend of visibility Aboriginal archaeological material(s) at a given location
Aboriginal cultural heritage	The tangible (objects) and intangible (dreaming stories, song lines and places) cultural practices and traditions associated with past and present day Aboriginal communities
Aboriginal object	Any deposit, object or material evidence (not being a handicraft made for sale), including Aboriginal remains, relating to the Aboriginal habitation of NSW
Aboriginal place	Any place declared to be an Aboriginal place under section 94 of the National Parks and Wildlife Act 1974 (NSW)
Archaeological potential	The likelihood of undetected surface and/or subsurface archaeological materials existing at a location
Artefact	Any object which has been physically modified by humans
the Clyde Terminal	A part of the Site currently operating as an import, storage and distribution terminal for finished petroleum products including diesel, jet and gasoline fuels. The Clyde Terminal makes up the majority of the central part of Site and operates under EPL 570.
Exposure	An area of land surface where the ground surface is visible, usually as the result of thinner vegetation cover, erosive forces or human-caused disturbance. In archaeological surveys, the percentage of ground surface that is visible is recorded. These percentages of exposure are then used to calculate effective coverage
Heritage item	A place, building, work, relic, moveable object or precinct listed on a statutory heritage register
Impact	Influence of effect exerted by a project or other activity on the natural, built and community environment
the Parramatta Terminal	A part of the Site currently used for distribution activities involving bulk road transport. The Parramatta Terminal is located in the north western part of the Site and operates under EPL 660.
the Project	The proposal to remediate the contaminated soils in the Western Area to a commercial / industrial standard alongside associated infrastructure removal, waste management, soil and groundwater management, landforming and stormwater management activities.
the Project Area	The Project Area is the land within the Western Area where the Project would occur. The extent of the Project Area, within the Western Area is provided in **Figure 1-1**.
the Site	Viva Energy owned land on the Camellia peninsula consisting of the following lots: Lot 398 DP 41324, Lots 100 and 101 of DP1168951, Lot 101 DP809340, Lot 2 DP224288, and Lot 1 DP383675. It includes the Clyde Terminal, the Parramatta Terminal, the Wetland, the Western Area and other land that is either currently vacant or leased to third parties.
Stone artefact	Any piece of rock modified by human agency
the Western Area	A largely vacant area of land, approximately 40 ha in size, located in the south western part of the Site. This land previously contained a variety of refinery assets that have now been removed.

Term	Definition
the Wetland	A large undeveloped wetland area in the north eastern part of the Site close to the confluence of the Parramatta and Duck rivers.

Abbreviations

Acronym	Definition
ABN	Australian Business Number
ACHMPs	Aboriginal Cultural Heritage Management Plans
AFT	Stone artefact
AHIMS	Aboriginal Heritage Information Management System
AHIPs	Aboriginal Heritage Impact Permits
ARG	Aboriginal resource and gathering
ART	Aboriginal art
AS/NZS	Australian / New Zealand Standard
ATSHIP Act	Aboriginal and Torres Strait Islander Heritage Protection Act 1984
CBD	Central Business District
DECCW	NSW Department of Environment and Climate Change and Water
DPE	Department of Planning and Environment
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EPBC Act	Environment Protection and Biodiversity Conservation Act 2000 (Commonwealth)
EPL	Environment Protection Licence
EPIs	Environmental Planning Instruments
ERS	Eastern Regional Sequence
GI	Ground Integrity
GRD	Grinding groove(s)
GSV	Ground Surface Visibility. A term used to describe the area of the ground's surface that is visible during archaeological field surveys
HTH	Hearth
ILUA	Indigenous Land Use Agreements
km	kilometres
LEP	Local Environment Plan
LGA	Local Government Area
LNAPL	Light Non-Aqueous Phase Liquid
m	metres
m^2	metres squared
m^3	metres cubed
mbgs	metres below ground surface
NTA	Native Title Act 1993 (NSW)
NPW Act	National Parks and Wildlife Act 1974 (NSW)

Acronym	Definition
NPW Regulation	National Parks and Wildlife Amendment Regulation 2010
NSW	New South Wales
OEH	Office of Environment and Heritage
Parramatta DCP	Parramatta Development Control Plan 2011
Parramatta LEP	Parramatta Local Environmental Plan 2011
PAD	Potential Archaeological Deposit
PJAP	Port Jackson Archaeological Project (PJAP)
PSS	Parramatta Sand Sheet
RAP	Registered Aboriginal Party
RNE	Register of the National Estate
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SEPP SRD	State Environment Planning Policy (State and Regional Development) 2011
SHL	Shell
SSD	State Significant Development
SSD 5147	Clyde Terminal Conversion Project (SSD 5147)
TRE	Modified tree
Viva Energy	Viva Energy Australia Pty Ltd

1.0 Introduction

Viva Energy Australia Pty Ltd (Viva Energy) owns the land associated with the former Clyde Refinery (the 'Site') located at Durham Street, Rosehill on the Camellia Peninsula. Viva Energy currently operates the Clyde Terminal on part of the Site; however, a large part of the former refinery land in the south-western part of the Site (the 'Western Area') is no longer required for operational purposes. As such, Viva Energy is proposing to remediate the contaminated soils in the Western Area (the 'Project') to facilitate future development of the land for other purposes permissible under the existing land use zoning.

Viva Energy Australia Pty Ltd (Viva Energy) commissioned AECOM to undertake an Aboriginal heritage assessment for the Project, which is summarised in this technical report. The current Aboriginal heritage assessment relies in part upon the Aboriginal Cultural Heritage Assessment (ACHAR) that was undertaken for the Clyde Terminal Conversion Project (SSD 5147) but has also been informed by an updated review of existing environmental and archaeological data sources for the Project, as well as a standalone visual inspection of the Project Area.

1.1 Overview of the Project

Investigations completed within the Western Area have shown that not all of the soil and groundwater within this area requires remediation or management. As such, the Project would involve the remediation of impacted soils and the management of impacted groundwater within a number of targeted areas within the Western Area. The area where the Project would mainly take place within the Western Area is referred to as the Project Area. The Site, Western Area and Project Area are shown on **Figure 1-1**.

To support the Environmental Impact Statement (EIS), a Conceptual Remedial Action Plan (RAP) has been developed (refer to Appendix C of the EIS). This document, which includes the conceptual design for the Project, estimates that the volume of soil that would require remediation is approximately 105,000 cubic metres (m^3).

In addition to the remediation activities, a number of associated works would also be completed as part of the Project. These activities have been split into the following stages:

- Stage 1 – preparation works;
- Stage 2 – removal of redundant infrastructure and waste;
- Stage 3 – remediation;
- Stage 4 – landforming; and
- Stage 5 – completion works and demobilisation.

Apart from preparation works, the activities listed above would be completed in an iterative approach across the Project Area. Where possible, excavation, remediation and backfilling would be completed on one part of the Project Area prior to moving onto the next area.

To create the final landform in the Western Area during Stage 4, additional fill would be required. This would include remediating and/or beneficially reusing soils from other sites in accordance with the *Waste Avoidance and Resource Recovery Act 2001.*

Following completion of the remediation works, the Western Area in its post remediation works landform would continue to be managed by Viva Energy.

The remainder of the Site would remain operational as the Clyde and Parramatta Terminals and associate land uses during and after the Project.

1.2 Project location

The Site is located approximately 16 kilometres (km) west of the Sydney Central Business District (CBD), within the Parramatta Local Government Area (LGA), on the Camellia peninsula. The Site is surrounded by a mixture of land uses but is primarily in an industrial setting. To the west is the Rosehill

Gardens Racecourse and a mix of industrial and commercial development. To the south is Duck River, beyond which there is the industrial and commercial development of Silverwater. Industrial development within the suburb of Rosehill is adjacent to the north and west of the Site. Duck River runs along the south-east boundary and eventually joins the Parramatta River at the eastern most point of the Site (refer to **Figure 1-1**).

The Site is owned by Viva Energy and consists of the following lots:

- Lot 398 DP41324;
- Lots 100 and 101 of DP1168951;
- Lot 101 DP809340;
- Lot 2 DP224288; and
- Lot 1 DP383675.

All of these lots are located within the Parramatta City Council LGA. The whole Site is zoned as IN3 Heavy Industrial under the *Parramatta Local Environmental Plan 2011* (Parramatta LEP, 2011).

The Site includes the Clyde Terminal, the Parramatta Terminal, the Wetland, the Western Area and the Project Area, as shown on **Figure 1-1**.

The Western Area is located within the Site, to the south-west of the Clyde Terminal. The Western Area is approximately 40 hectare (ha) in size, located on Lot 100 DP1168951, and previously included a variety of refinery assets but is now largely vacant.

The Project Area is the land within the Western Area where the Project would occur. The Project Area consists of the majority of land within the Western Area, excluding vegetation within protected areas and portions of the Western Area which do not require remediation.

FIGURE 1-1 PROJECT LOCATION

KEY

- Site boundary
- Project Area boundary
- Western Area boundary
- State road
- Local road

Note: Project Area boundary along the southern border is indicative only and will be refined during detailed design to exclude the tree management zone.

AECOM

0 250 500 m

1.3 Purpose of this report

The purpose of this Aboriginal heritage assessment is to identify potential impacts to Aboriginal heritage as a result of the Project and to provide Viva Energy with appropriate management advice.

An Aboriginal Cultural Heritage Assessment (ACHAR) was undertaken for the Clyde Terminal Conversion Project (SSD 5147). The contents of this report have been compiled with reference to this assessment and a consistency check with this assessment has been completed.

1.4 Secretary's Environmental Assessment Requirements

Table 1-1 sets out the SEARs relevant to this Technical report: Aboriginal heritage and identifies where the requirements have been addressed in this Technical report.

Table 1-1 SEARs - Project description

SEARs	Where addressed in this Technical report
Heritage: • identify and assess potential impacts on Aboriginal cultural heritage values along the Duck River frontage and describe measures to avoid, mitigate and manage any impacts	• Aboriginal cultural heritage values are identified in **Section 4.0**. • Impacts are assessed as a summary of key findings in **Section 6.0**. • Measures are recommended in **Section 6.0**.

The NSW Office of Environment and Heritage (OEH) also provided input to the SEARs. Where applicable to this chapter, these requirements have also been addressed. These are discussed further in the SEARs cross reference table provided in Appendix A of the EIS.

1.5 Structure of this technical report

The structure of this report is as follows:

- **Section 1.0:** provides an overview of the Project and the purpose of this assessment;
- **Section 2.0**: contains the assessment methodology and legislative requirements;
- **Section 3.0** and **4.0**: provides an overview of the existing environment in terms of landscape and archaeological context;
- **Section 5.0**: summarises the observations made during the visual inspection
- **Section 6.0**: summarises the key findings of the assessment and outlines recommended management and mitigation measures; and
- **Section 7.0**: contains the references relevant to this Technical report.

2.0 Assessment methodology

2.1 Overview

This assessment has been informed through:

- a review of the Aboriginal Cultural Heritage Assessment Report (ACHAR) undertaken for the Clyde Terminal Conversion Project (SSD 5147);
- a review of legislation relevant to the Project Area;
- a review of landscape context of the Project Area with particular consideration to its Aboriginal archaeological implications;
- a review of the archaeological context of the Project Area, based on published resources, previous reports written for the Site and government databases; and
- visual inspection of the Project Area.

This information, alongside the SEARs presented in **Table 1-1**, informed the methodology for this technical report.

2.2 Assessment approach

Section 4.2.2 provides an overview of the assessment undertaken in 2012 for the Shell Company of Australia Ltd (Shell) for an Aboriginal cultural heritage assessment for the Clyde Terminal Conversion Project (SSD 5147).

AECOM considers the key findings of the ACHAR undertaken for SSD 5147, including those of its full Aboriginal community consultation program, are of relevance to the Project. This point notwithstanding, in order to identify potential impacts to Aboriginal cultural heritage values as a result of the Project, AECOM has undertaken a updated review of existing environmental and archaeological data sources for the Project and complimented this with a standalone visual inspection of the Project Area, as outlined in **Section 5.0**.

This approach is justified based on the conclusions of the ACHAR which included:

- no new or previously recorded Aboriginal archaeological sites were identified during the field inspection component of the assessment;
- the inferred pre-disturbance topography of the Project Area was unlikely to have encouraged sustained Aboriginal activity or occupation. Aboriginal use of the Project Area is likely to have taken the form of visits for resource collection;
- disturbances resulting from the construction of the Clyde Refinery, including dredging, filling and native vegetation clearance, are likely to have destroyed any evidence of past Aboriginal activity within the Project Area (both surface and subsurface);
- all proposed impact areas within the Project Area were assessed as grossly disturbed, consisting of active or redundant components of the refinery operation (i.e., existing infrastructure areas);
- a full program of Aboriginal community consultation was carried out as part of the ACHAR for SSD 5147. While noting its cultural significance in general terms (i.e., as an important resource zone and cultural landscape component), the RAPs involved in SSD 5147 identified no specific cultural values or concerns for the Project Area; and
- on the basis of the above, AECOM recommended that no further Aboriginal heritage investigations were warranted for SSD 5147. However, contingency management measures for any Aboriginal objects uncovered during the Clyde Terminal Conversion Project were provided.

The Project Area has been refined so that the vegetation along the Duck River and the Western border of the Project Area are excluded from the Project Area and would not be disturbed. However, it should be noted that excluding extant mangrove and saltmarsh vegetation communities along and

directly adjacent to the Duck River, linear strips of vegetation along the southern and western margins (outside) of the remediation Project Area were also observed to consist of historically planted trees.

2.3 Legislation and policy

2.3.1 Commonwealth legislation

2.3.1.1 Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (the ATSIHP Act) provides for the preservation and protection of places, areas and objects of particular significance to Indigenous Australians. The stated purpose of the ATSIHP Act is the *"preservation and protection from injury or desecration of areas and objects in Australia and in Australian waters, being areas and objects that are of particular significance to Aboriginals in accordance with Aboriginal tradition"* (Part I, Section 4).

Under the Act, 'Aboriginal tradition' is defined as *"the body of traditions, observances, customs and beliefs of Aboriginals generally or of a particular community or group of Aboriginals, and includes any such traditions, observances, customs or beliefs relating to particular persons, areas, objects or relationships"* (Part I, Section 3). A 'significant Aboriginal area' is an area of land or water in Australia that is of *"particular significance to Aboriginals in accordance with Aboriginal tradition"* (Part I, Section 3). A 'significant Aboriginal object', on the other hand, refers to an object (including Aboriginal remains) of like significance.

For the purposes of the ATSIHP Act, an area or object is considered to have been injured or desecrated if:

a. In the case of an area:
    i. it is used or treated in a manner inconsistent with Aboriginal tradition;
    ii. the use or significance of the area in accordance with Aboriginal tradition is adversely affected; and
    iii. passage through, or over, or entry upon, the area by any person occurs in a manner inconsistent with Aboriginal tradition;
b. in the case of an object:
    iv. it is used or treated in a manner inconsistent with Aboriginal tradition.

The ATSIHP Act can override state and territory laws in situations where a state or territory has approved an activity, but the Commonwealth Minister prevents the activity from occurring by making a declaration to protect an area or object. However, the Minister can only make a decision after receiving a legally valid application under the ATSIHP Act and, in the case of long term protection, after considering a report on the matter. Before making a declaration to protect an area or object in a state or territory, the Commonwealth Minister must consult the appropriate Minister of that state or territory (Part 2, Section 13).

No declarations relevant to the Project Area have been made under the ATSIHP Act.

2.3.1.2 Native Title Act 1993

The *Native Title Act 1993* (NTA) provides for the recognition and protection of native title for Aboriginal peoples and Torres Strait Islanders. The NTA recognises native title for land over which native title has not been extinguished and where persons able to establish native title are able to prove continuous use, occupation or other classes of behaviour and actions consistent with a traditional cultural possession of those lands. It also makes provision for Indigenous Land Use Agreements (ILUA) to be formed as well as a framework for notification of Native Title Stakeholders for certain future acts on land where Native Title has not been extinguished.

Searches of the *Schedule of Applications (unregistered claimant applications*), *Register of Native Title Claims*, *National Native Title Register*, *Register of Indigenous Land Use Agreements* and *Notified Indigenous Land Use Agreements* were undertaken in November 2018, with no relevant listings identified for the Project Area.

2.3.1.3 Environment Protection and Biodiversity Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) took effect on 16 July 2000. Under Part 9 of the EPBC Act, any action that is likely to have a significant impact on a matter of National Environmental Significance may only progress with approval of the Commonwealth Minister for the Environment. An action is defined as a project, development, undertaking, activity, series of activities, or alteration. An action will also require approval if:

- it is undertaken on Commonwealth land and will have or is likely to have a significant impact;
- it is undertaken outside Commonwealth land and will have or is likely to have a significant impact on the environment on Commonwealth land; and
- it is undertaken by the Commonwealth and will have or is likely to have a significant impact.

The EPBC Act defines 'environment' as incorporating both natural and cultural environments and therefore includes Aboriginal heritage. Under the Act, protected heritage items are listed on the National Heritage List (items of significance to the nation) or the Commonwealth Heritage List (items belonging to the Commonwealth or its agencies). These two lists replaced the Register of the National Estate (RNE), which was closed in 2007 and is no longer a statutory list. Statutory references to the RNE in the EPBC Act were removed on 19 February 2012. However, the RNE remains an archive of over 13,000 heritage places throughout Australia.

Searches of the National Heritage List, Commonwealth Heritage List and RNE were undertaken in August 2018, with no relevant listings identified for the Project Area.

2.3.2 State legislation

2.3.2.1 Environmental Planning and Assessment Act 1979 (NSW)

The *Environmental Planning and Assessment Act 1979 (NSW)* (EP&A Act), administered by Department of Planning and Environment (DPE), requires that consideration be given to environmental impacts as part of the land use planning process in NSW. In NSW, environmental impacts are interpreted as including impacts to Aboriginal and non-Aboriginal cultural heritage.

Division 4.1 of Part 4 of the EP&A Act provides a determination regime for State Significant Development (SSD). Section 89C of the EP&A Act stipulates that a development will be considered SSD if it declared to be such by *State Environmental Planning Policy (State and Regional Development) 2011 (NSW)* (SEPP SRD). The Project does not meet the criteria under the SEPP SRD and is not considered SSD under this EPI. As the Project did not meet all of the requirements of the SEPP SRD, a 'Call-In Request' was submitted to DPE that requested that the Project be declared SSD by the Minister under section 4.36(3) of the EP&A Act.

Pursuant to Section 4.41 of the EP&A Act, Aboriginal Heritage Impact Permits (AHIPs) are not required for State significant development that is authorised by a development consent. Potential impacts to Aboriginal heritage values associated with SSD projects are typically managed under Aboriginal Cultural Heritage Management Plans (ACHMPs). ACHMPs are statutorily binding once approved by DPE.

2.3.2.2 National Parks and Wildlife Act 1974 (NSW)

The *National Parks and Wildlife Act 1974 (NSW)* (NPW Act), administered by OEH, is the primary legislation for the protection of Aboriginal cultural heritage in NSW. The NPW Act gives the Secretary of OEH responsibility for the proper care, preservation and protection of 'Aboriginal objects' and 'Aboriginal places', defined under the Act as follows:

- an *Aboriginal object* is any deposit, object or material evidence (that is not a handicraft made for sale) relating to Aboriginal habitation of NSW, before or during the occupation of that area by persons of non-Aboriginal extraction (and includes Aboriginal remains); and
- an *Aboriginal place* is a place declared so by the Minister administering the NPW Act because the place is or was of special significance to Aboriginal culture. It may or may not contain Aboriginal objects.

Part 6 of the NPW Act provides specific protection for Aboriginal objects and places by making it an offence to harm them and includes a 'strict liability offence' for such harm. A 'strict liability offence'

does not require someone to know that it is an Aboriginal object or place they are causing harm to in order to be prosecuted. Defences against the 'strict liability offence' in the NPW Act include the carrying out of certain 'Low Impact Activities', prescribed in Clause 80B of the *National Parks and Wildlife Amendment Regulation 2010* (NPW Regulation), and the demonstration of due diligence.

An AHIP issued under Section 90 of the NPW Act is required if impacts to Aboriginal objects and/or places cannot be avoided. An AHIP is a defence to a prosecution for harming Aboriginal objects and places if the harm was authorised by the AHIP and the conditions of that AHIP were not contravened. Consultation with Aboriginal communities is required under OEH policy when an application for an AHIP is considered and is an integral part of the process. AHIPs may be issued in relation to a specified Aboriginal object, Aboriginal place, land, activity or person or specified types or classes of Aboriginal objects, Aboriginal places, land, activities or persons.

As indicated in **Section 2.3.2.1**, pursuant to Section 4.41 of the EP&A Act, Aboriginal Heritage Impact Permits (AHIPs) are not required for State significant development that is authorised by a development consent. Impacts to Aboriginal heritage values associated with approved SSD projects are typically managed under ACHMPs. ACHMPs are statutorily binding once approved by DPE.

Section 89A of the NPW Act requires notification of the location of Aboriginal sites within a reasonable time, with penalties for non-notification. Section 89A is binding in all instances, including Division 4.1 projects.

2.3.3 Local government

2.3.3.1 Parramatta Local Environmental Plan 2011

Clause 5.10 of the *Parramatta Local Environmental Plan 2011* (Parramatta LEP) provides specific provisions for the protection of heritage items, heritage conservation areas, archaeological relics, Aboriginal objects and Aboriginal places of heritage significance within the Parramatta LGA, defined in the LEP as follows:

- a 'heritage item' means a building, work, place, relic, tree, object or archaeological site, the location and nature of which is described in Schedule 5 of the Parramatta LEP;
- a 'heritage conservation area' means an area of land of heritage significance:
  - shown on the Heritage Map as a heritage conservation area;
  - the location and nature of which is described in Schedule 5 of the Parramatta LEP; and,
  - includes any heritage items situated on or within that area.
- an 'Aboriginal object' means any deposit, object or other material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of an area of NSW, 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 of heritage significance' means an area of land, the general location of which is identified in an Aboriginal heritage study adopted by the Council after public exhibition and that may be shown on the Heritage Map, that is:
  - the site of one or more Aboriginal objects or a place that has the physical remains of pre-European occupation by, or is of contemporary significance to, the Aboriginal people. It may (but need not) include items and remnants of the occupation of the land by Aboriginal people, such as burial places, engraving sites, rock art, midden deposits, scarred and sacred trees and sharpening grooves; or
  - a natural Aboriginal sacred site or other sacred feature. It includes natural features such as creeks or mountains of long-standing cultural significance, as well as initiation, ceremonial or story places or areas of more contemporary cultural significance.
- 'archaeological site' means a place that contains one or more relics.

Under Section 2 of Clause 5.10 of the Parramatta LEP, development consent is required for any of the following:

a. demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):
    i. a heritage item;
    ii. an Aboriginal object; or
    iii. a building, work, relic or tree within a heritage conservation area;
b. altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item;
c. disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed;
d. disturbing or excavating an Aboriginal place of heritage significance;
e. erecting a building on land:
    i. on which a heritage item is located or that is within a heritage conservation area; or
    ii. on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance;
f. subdividing land:
    i. on which a heritage item is located or that is within a heritage conservation area; or
    ii. on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.

Schedule 5 of the Parramatta LEP provides a list of heritage items, conservation areas and archaeological sites within the Parramatta LGA. There are no relevant Aboriginal heritage listings for the Project Area.

2.3.3.2 Parramatta Development Control Plan 2011

The *Parramatta Development Control Plan 2011* (Parramatta DCP) provides detailed planning controls for development in the Parramatta LGA and came into effect on 12 October 2011. Section 3.5.3 of Part 3 of the Parramatta DCP pertains specifically to Aboriginal heritage and contains a series of development controls for protecting and managing the known and potential Aboriginal heritage values of Parramatta LGA. These controls are as follows:

1. before lodging a development application for development that may have an impact on known or potential Aboriginal sites, Council's information on known Aboriginal sites and potential heritage sensitivity should be consulted;
2. for properties identified with No Sensitivity no Aboriginal Heritage Assessment is required;
3. for properties identified with Low Sensitivity no Aboriginal Heritage Assessment is required unless land is within 100 metres (m) of a creek or river foreshore and contains uncleared bushland, sandstone outcrops or exposed sandstone platforms;
4. for properties identified as Medium Sensitivity or High Sensitivity an Aboriginal Heritage Assessment is required;
5. for properties within 50 m of a known Aboriginal site the National Parks and Wildlife Service Site Register should be consulted to determine whether the Aboriginal site is located on the property. If the known Aboriginal site is located on the property, the development becomes Integrated Development; and
6. properties within an area of Aboriginal social/historical association will require an Aboriginal Heritage Assessment that investigates the impact of a development proposal in relation to the social/historical association.

Areas of Aboriginal archaeological sensitivity within the Parramatta LGA are shown on the Aboriginal Sensitivity Map appended to the Parramatta DCP. The Project Area is depicted in this map as an area of Low Aboriginal Heritage Sensitivity, but also as an area of Aboriginal association.

Subject to SSD development consent, the planning controls required by the Parramatta DCP will not apply to the Project.

3.0 Landscape context

Consideration of the landscape context of the Project Area is predicated on the well-established proposition that the nature and distribution of Aboriginal archaeological materials are closely connected to the environments in which they occur. Environmental variables such as topography, geology, hydrology and the composition of local floral and faunal communities will have played an important role in influencing how Aboriginal people moved within and utilised their respective Country. Amongst other things, these variables would have affected the availability of suitable campsites, drinking water, economic[1] plant and animal resources, and raw materials for the production of stone and organic implements. At the same time, an assessment of historical and contemporary land use activities, as well as geomorphic processes such as soil erosion and aggradation, is critical to understanding the formation and integrity of archaeological deposits, as well as assessments of subsurface archaeological potential.

3.1 Topography and hydrology

The natural topography of the Site, including the Project Area, has been grossly modified through the development of the Clyde Refinery. Nonetheless, consideration of available historical reference materials suggests that, in pre- and early-post European settlement times, the Project Area would have been characterised by relatively flat, low-lying terrain subject to both permanent and episodic inundation. The Site, as shown on **Figure 1-1**, is located at the confluence of the Parramatta and Duck rivers. Formed by the confluence of Toongabbie Creek and Darling Mills Creek, approximately 5 kilometres (km) upstream of the Site, the Parramatta River is the main tributary of Sydney Harbour and can be classified as an intermediate, tide-dominated drowned valley estuary (Roy et al. 2001). From Parramatta, the river flows in an easterly direction along the southern edge of the Hornsby Plateau, and enters Sydney Harbour between Manns and Yurulbin Points, some 20 km downstream. A major tributary of the Parramatta River, the Duck River rises in the suburb of Birrong, about 6 km to the south of the Site. Both Duck and Parramatta Rivers are tidal streams, with the tidal limits of both watercourses occurring upstream of the Site.

Formation of the Port Jackson - Parramatta River Estuary can be traced to warmer and wetter climatic conditions during the post-glacial (*c*.18,000 to 11,700 years ago) and early Holocene (*c*.11, 700 to 5,000 years ago) periods, which resulted in a dramatic rise in sea levels and the inundation of both the inner continental shelf and its adjacent river valleys (Attenbrow 2010: 153-154). Prior to this time, the present-day estuaries of Port Jackson, Broken Bay and Port Hacking comprised deep sandstone river valleys whose constituent rivers, including the Parramatta River, were entirely freshwater. Rising sea levels during the post-glacial and early Holocene periods, which peaked in the early Holocene around 7,000 years ago at a level +1 to +2 m higher than today, are of significance not only for the creation of the above-mentioned estuaries, but also their implications for Aboriginal people occupying the Sydney region during these periods, with diminishing land areas and associated environmental changes likely necessitating the re-negotiation and/or re-alignment of clan and language group boundaries, as well as modifications to traditional settlement and subsistence patterns (Attenbrow 2010: 153). Sea-level oscillations of ± 2 m are reported for the period between 7,000 and 2,000 years ago, with higher sea levels persisting until around 1,400 years ago, when levels reduced to those of the present day (Attenbrow 2010: 38).

3.2 Geology and soils

Existing geological and geotechnical data indicate that the geology and associated soils of the Site, including the Project Area, can be subdivided into four units (ERM, 2012). These comprise:

- Unit 1 (Fill material): Poorly compacted mixture of silt, clay and gravel, with localised areas of slag, furnace ash and concrete. Typical thickness of about 1 m to 1.5 m, with maximum reported thickness of 3 m. Used to raise the level of the surface of the low lying tidal swamp/mangrove area along the Parramatta and Duck rivers;

[1] i.e. edible and/or otherwise useful (e.g. medicine, clothing)

- Unit 2 (Estuarine sediments): Silty clay-clayey silt, with occasional sandy lenses and shell fragments to a thickness of approximately 4 m. Generally thickens toward Parramatta River. Represents the natural profile prior to development and filling;
- Unit 3 (Alluvial sediments): Tertiary alluvial sediments up to 20 m thick, including clay with sandy lenses; and
- Unit 4 (Residual clay) - residual Ashfield Shale.

On the basis of the above, it is concluded that stones suitable for flaked and/or edge-ground stone tool manufacture would not have been available within or immediately surrounding the Project Area. Excavated stone artefact assemblages from sites in the Parramatta LGA attest to an emphasis on the procurement and reduction of two rock types, namely silcrete and silicified tuff, with a range of other lithic materials (e.g. quartz, silicified wood, quartzite, Fine Grained Siliceous, ironstone and various volcanic rocks) also exploited, albeit comparatively non-intensively. Reference to Corkill (1999) and Attenbrow et al. (2008) indicates that the nearest known source of silcrete, silicified tuff, silicified wood and other fine-grained siliceous rocks to the Site occurs at Sydney Olympic Park, approximately 3 km to the southeast of the Project Area. Here, silcrete, silicified tuff, silicified wood and unidentified fine-grained siliceous materials were identified in a Tertiary palaeochannel remnant (Attenbrow et al. 2008: 113). Closer to the Site, ironstone, sandstone and quartz could have been sourced from locally-occurring fluvial and/or colluvial gravel sources (Jo McDonald CHM, 2005c: 9). Other fine-grained siliceous rocks, such as silcrete and silicified tuff, may also have been available in the bedloads of the Parramatta and Duck rivers. However, this remains to be confirmed.

Further afield, other well-known sources of flakeable stones on the western Cumberland Plain include the Tertiary St Marys (Ts) and Rickabys Creek Gravel (Tr) formations, as well as the Holocene gravel banks of the Hawkesbury-Nepean River. Volcanic diatremes, dykes and intrusions of Cretaceous to Jurassic antiquity, which are widely distributed across the western Cumberland Plain, have also been identified as potential sources of flakeable rocks, both volcanic/igneous and fine-grained siliceous.

Alluvial in origin, the St Marys formation consists of channel remnants cut into shales of the Wianamatta Group, and contains, amongst other rocks, abundant quantities of silcrete, as well as silicified wood, quartzite and quartz (Corkill, 1999: 56). Recorded deposits, which occur on ridge flanks and crests across the northern Cumberland Plain, vary in thickness from approximately 1 m to 10 m (Smith and Clark, 1991: 30). Silcrete from the St Marys formation is typically light red or yellowish brown in colour, with a bleached weathering rind, and occurs in the form of complete and fragmentary[2] pebbles, cobbles and boulders (Byrnes, 1982; Corkill, 1999; Jo McDonald, CHM 2006b). In terms of its geographic extent, the St Marys formation has been mapped at various localities in the Mulgoa, South and Eastern Creek catchments, with the best known surface and near surface expressions of the formation occurring along the upper parts of Plumpton Ridge, a low but locally prominent ridgeline separating the floodplains of Bells and Eastern Creeks, about 20 km to the northwest of the Site (Dallas, 1983; Jo McDonald CHM, 2006b). However, the formation is known to be more widely distributed than currently mapped. Observations of the distribution of silcrete pebbles/cobbles and associated ironstone fragments on and adjacent to Plumpton Ridge, for example, have indicated a formation width three to four times that depicted on the Penrith 1:100 000 Geological Map (Mitchell, 2002, 2005). Attention is also drawn to the identification, in various archaeological contexts off Plumpton Ridge proper (e.g. AECOM, 2010, 2015a; Austral Archaeology Pty Ltd, 2005; Darwala-Lia, 1999; ENSR AECOM, 2008; Mills, 1999), of surface and/or subsurface deposits of St Marys formation gravels[3].

The Rickabys Creek Gravel (Tr) consists of a poorly sorted, polymictic gravel deposit, with rounded to well-rounded, pebble to boulder-sized (up to 0.5 m in diameter) clasts of quartz, quartzite, silcrete, silicified tuff, porphyry, granite, hornfels and sandstone set within a sandy clay matrix. The formation, which varies in thickness from 2 m to 12 m, occurs extensively across the north-western portion of the Cumberland Plain, with scattered exposures also present on the Blue Mountains and Hornsby Plateaux (Smith, 1979: 41; Fergusson et al., 2011: 8). The unit fines upwards and exhibits a gradational boundary with the overlying Londonderry Clay (Carter, 2011). The nearest mapped

[2] Broken by heat (i.e, bushfires)
[3] It is acknowledged that silcrete found in areas outside of those mapped geologically as St Marys formation may derive from other formations (e.g., Rickabys Creek Gravel).

outcrops of Rickabys Creek gravels to the Site occur in association with South Creek approximately 25 km northwest of the Project Area.

Existing archaeological and geological data for the Cumberland Plain preclude detailed comment on the utility, in terms of raw material availability (*sensu* Andrefsky 1994), of the volcanic diatremes, dykes and intrusions that occur across it. Quartz and other knappable rock types are known to occur in the vicinity of such features, having been brought to the surface from intruded strata below (Corkill 1999: 55). However, with few exceptions, the presence of flakeable rocks in the vicinity of mapped examples cannot be confirmed. As for the diatremes, dykes and intrusions themselves, Attenbrow's (2010: 44) general observation that many of these features are deeply weathered and contain rock that would not have been suitable for making edge-ground hatchet heads, may be applicable. However, exceptions are known (e.g., Jo McDonald CHM 2005c).

3.3 Flora and fauna

Native vegetation within and directly adjacent to the Project Area has been extensively modified as a result of historical land use activities. Today, vegetation is limited to linear strips of planted and remnant vegetation, with the latter restricted to estuarine mangrove and saltmarsh communities directly adjacent to the Duck River. Mapped vegetation communities within and directly adjacent to the Project Area include estuarine mangrove, fringe forest (Swamp Oak Floodplain Forest) and saltmarsh (AECOM, 2013).

Regarding the pre- and early-post-European settlement native vegetation regime of the Site, McLoughlin's (2000) investigation of the extent and distribution of inter-tidal wetlands and riparian vegetation along the Parramatta River and its bays from 1788 to about1940 suggests that this comprised an estuarine 'complex' of mangroves, salt marsh and Casuarina/Melaleuca forest (**Figure 3-1**).

While available historical records provide only limited insight into Aboriginal exploitation of plants across the Cumberland Plain, and Sydney Region more broadly (see, in particular, Attenbrow, 2010: 76-78 and Kohen, 1986: 36-52), it can be confidently asserted that the original vegetation communities of the Site and its environs would have supplied Aboriginal people camping within or travelling through this area with a range of edible and otherwise useful plant species. Recorded native vegetation communities and locally occurring watercourses would likewise have supported a large and diverse range of economic terrestrial, aquatic and avian fauna.

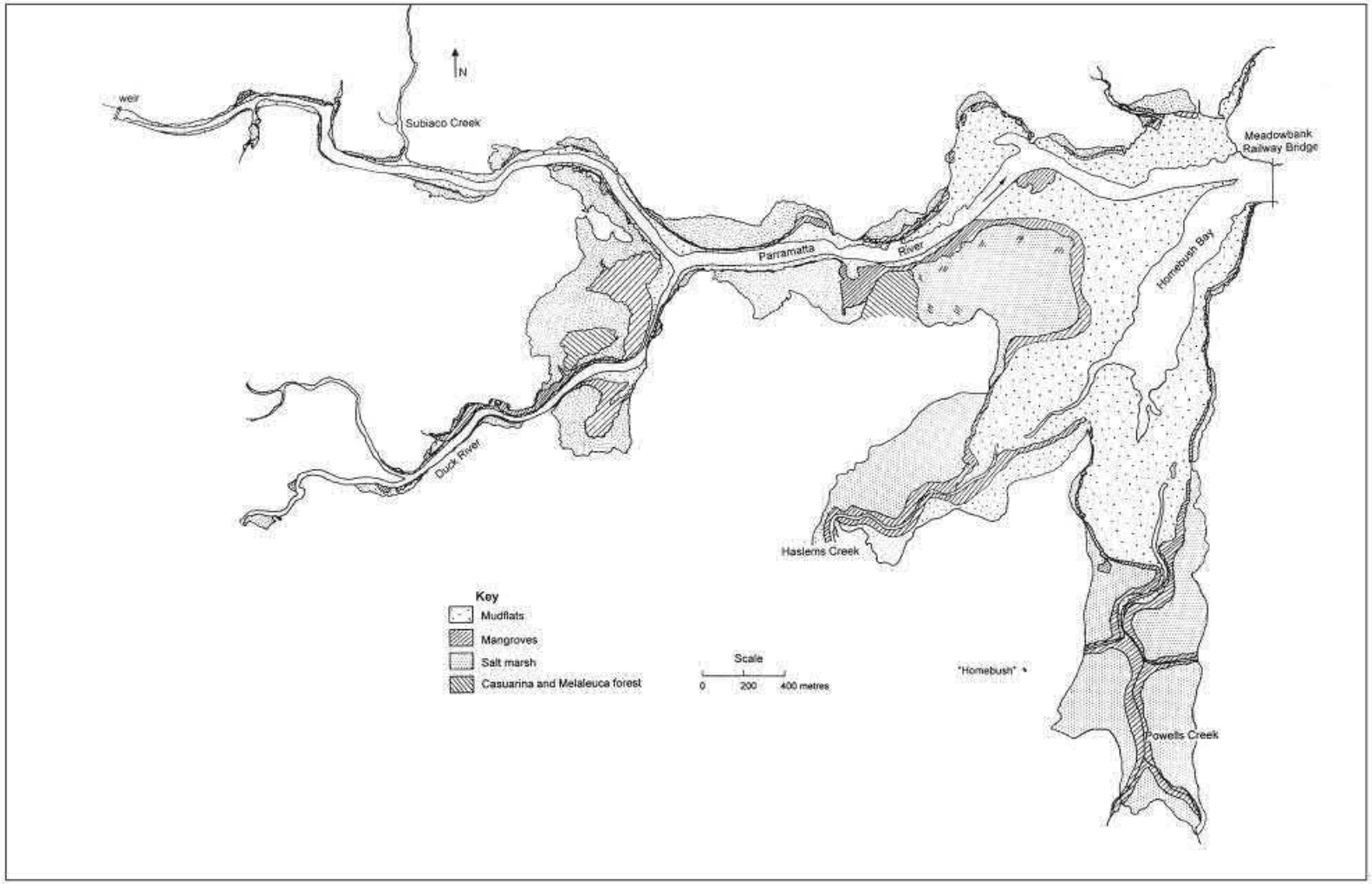

Figure 3-1 McLoughlin's (2000) reconstruction of the historical distribution of inter-tidal wetlands and shoreline vegetation between Homebush Bay and the Duck River

3.4 Land disturbance

Consistent with available historical reference materials, field observations made during the visual inspection component of this assessment indicate that land within the Project Area has been grossly modified as a result of historical land use activities; principally, the development of the Clyde Refinery complex but also more recent land uses (e.g. car storage).

3.5 Key observations

Key observations to be drawn from a review of the landscape context of the Project Area are as follows:

- prior to historical land use disturbances, this area likely comprised a highly productive and attractive resource zone for Aboriginal people occupying or travelling through the Rosehill area;
- the inferred pre- and early-post-European settlement topography of the Project Area is unlikely to have encouraged sustained Aboriginal activity or occupation. Aboriginal use of the Project Area is likely to have taken the form of short stay visits for resource collection;
- disturbances resulting from the construction of the Clyde Refinery, including dredging, filling and native vegetation clearance, as well as adjoining light industrial land uses, are likely to have destroyed any evidence of past Aboriginal activity across the Project Area;
- stones suitable for the production of flaked and/or edge-ground stone tools would not have been available within the Project Area; and
- native vegetation within the Project Area has been extensively modified as a result of the development of the Clyde Refinery and adjoining light industrial land uses. Accordingly, Aboriginal scarred trees are unlikely to occur within this area.

4.0 Archaeological context

This section describes the archaeological context of the Project Area on a regional and local scale. Archaeological data of relevance to this area, including the results of AECOM's (2013a) Aboriginal Cultural Heritage Assessment for the Shell Terminal Conversion Project, were reviewed in order to contextualise the results of the current assessment.

4.1 Regional context

4.1.1 The Sydney region

Available archaeological data indicate that Aboriginal people have occupied the Sydney region[4] for at least 36,000 years (Jo McDonald CHM 2005b; Williams *et al.* 2014). Late Pleistocene/early Holocene occupation of the region is evidenced by radiometric dates from both coastal and hinterland sites (see Attenbrow, 2010:18, Table 3.1). Excavated material culture assemblages from these periods have been interpreted as evidence of relatively small populations of Aboriginal people employing settlement patterns of high residential and low logistical mobility (Attenbrow 2010:152-154; McDonald 2008: 39). Late Pleistocene/early Holocene chipped stone assemblages attest to a preference for silicified tuff sourced from secondary geological sources such as the Hawkesbury-Nepean River gravels (McDonald 2008; Williams *et al.* 2014). However, they also indicate the exploitation of other raw material types such as silcrete, quartzite, petrified wood and quartz. Direct freehand percussion appears to have been the dominant reduction technique employed by Late Pleistocene/early Holocene Aboriginals knappers, with bipolar flaking comparatively poorly represented in available assemblages. Retouched 'tools' include unifacially-flaked pebble implements, dentated saws, burins and a variety of scrapers, with unmodified utilised flakes also well represented (Kohen *et al*. 1984; Williams *et al.* 2014). Stone tools such as these would have been complemented by a range of organic implements such as wooden digging sticks, spears and boomerangs. However, these do not survive archaeologically (Attenbrow 2010:154).

Compared with the late Pleistocene/early Holocene, archaeological evidence for mid-to-late Holocene Aboriginal occupation of the Sydney region abounds (for recent syntheses see Attenbrow 2010; McDonald 2008). In keeping with broader Australian developments (e.g. Allen and O'Connell 1995; Beaton 1985; Brumm and Moore 2005; Attenbrow *et al.* 2009; Lourandos 1983, 1997; Lourandos and Ross 1994), the social and economic systems of Aboriginal groups living in the region during this period appear to have become increasingly complex. Available archaeological data, for example, suggest a significant increase in site establishment and population densities over time, as well as a concomitant growth in the size and complexity of social aggregation (but see Attenbrow (2012) and Hiscock (2008) for cautionary notes on the interpretive significance of radiometric date graphs). Growing economic specialisation is indicated by the emergence and/or proliferation of complex fishing and stoneworking technologies, with the latter linked variously to increased foraging risk associated with greater climatic variability as well as other variables such as redefinition of social space and reduction of resources (Attenbrow *et al.* 2009; McDonald 2008: 40). Complex, long-distance exchange networks are also attested archaeologically (e.g. Attenbrow *et al.* 2012; Grave *et al.* 2012) as are important developments in artistic activities (McDonald 2008). Higher levels of stylistic heterogeneity in pigment and engraved art across the region, for example, have been linked to increasing territoriality (McDonald 2008: 42).

With some modification, McCarthy's (1967) *Eastern Regional Sequence* (ERS) of stone artefact assemblages remains the dominant chronological framework for Aboriginal occupation of the region. Based on appreciable changes in the composition of chipped stone artefact assemblages over time, the ERS hypothesises a three phase sequence of 'Capertian' (earliest), 'Bondaian' and 'Eloueran' (most recent) assemblages and was developed on the basis of McCarthy's (1948, 1964) pioneering analyses of stratified flaked stone assemblages from Lapstone Creek rockshelter, on the lower slopes of the Blue Mountains eastern escarpment, and Capertee 3 rockshelter in the Capertee Valley north of Lithgow. At present, the most widely cited characterisation of the ERS in the Sydney region is that of a four-phase sequence beginning with the *Pre-Bondaian* (McCarthy's *Capertian*) and moving successively through the Early, Middle and Late phases of the *Bondaian*, the last of which equates to

[4] Following Attenbrow (2012a), the land bounded by the coast on the east, by the Hawkesbury-Nepean River on the north and west, and by a line running east-west through Picton and Stanwell Park in the south.

McCarthy's (1967) *Eloueran* phase (**Table 4-1**). The tripartite division of the Bondaian is based principally on the presence/absence and relative abundance of backed artefacts (Attenbrow 2010: 101). However, other factors, such as changes in the abundance of bipolar artefacts and different stone materials, as well as the presence/absence of edge-ground hatchet-heads are also relevant.

Table 4-1 MCarthy's (1967) Eastern Regional Sequence (ERS) of stone artefact assemblages

Current phasing	McCarthy's (1967) Phasing	Approximate date range	Backed artefact frequency	Bipolar artefacts	Edge-ground hatchet heads
Pre-Bondaian	Capertian	36,000-8,000 BP	Absent	Rare	Absent
Early Bondaian	Bondaian	8,000-4,000 BP	Very low	Rare	Absent
Middle Bondaian		4,000-1,000 BP	Very high	Increasingly common	Present
Late Bondaian	Eloueran	1,000 BP to European contact	Low	Very common	Present

4.1.2 Port Jackson catchment

The Aboriginal archaeological record of Port Jackson catchment, shown on **Figure 4-1**,is well-researched, with formal investigations of this record having been undertaken since the late 19th century (e.g. David & Etheridge, 1889a, 1889b; Etheridge & Whitelegge, 1907). Recent decades, in particular, have witnessed a dramatic increase in the number of Aboriginal archaeological investigations undertaken in the catchment, both in developer-funded and academic research contexts (Attenbrow, 2010). Investigations to date have generated a large body of archaeological data concerning pre-contact Aboriginal settlement and subsistence patterns, with hundreds of sites having been identified and recorded in varying degrees of detail. Middens and rockshelter sites are particularly well represented, with the latter incorporating a variety of evidence of past Aboriginal activities including food preparation and consumption, organic and non-organic tool manufacture, the production of rock art and the burial of the dead (Attenbrow, 2010; McDonald, 2008; Donlan, 1995). However, a variety of other site types (e.g. grinding groove and rock engraving sites, open artefact sites) are also known.

Archaeofaunal assemblages from the catchment indicate the exploitation, for food and other purposes, of a wide range of terrestrial and aquatic resources, with marine fauna (e.g., fish, shellfish and crustacea) forming a particularly important part of the diet of people living along the coast and estuaries. Excavated stone, bone and shell artefact assemblages, meanwhile, attest to the production of a variety of implements for use in day-to-day subsistence activities such as fishing and hunting. Common excavated types include shell fish hooks and 'scrapers', bone points and backed stone artefacts (Attenbrow, 2010: 98-101). As in other parts of the region and state, most sites identified within this zone remain undated (Attenbrow, 2010:18, Table 3.1). Nonetheless, it has been suggested that the majority date to the mid-to-late Holocene.

4.1.2.1 The Port Jackson Archaeological Project

The Port Jackson Archaeological Project (PJAP) was initiated by Val Attenbrow (Senior Fellow, Australian Museum) as a vehicle for investigating pre-colonial Aboriginal land and resource use patterns in the Port Jackson catchment (Attenbrow 1990, 1991, 1992a, 1992b, 1994). Still ongoing, the PJAP has generated a substantial body of data concerning pre-contact Aboriginal occupation of the catchment and remains one of the comprehensive sources of data on Aboriginal archaeological site distribution within it. Alongside desktop analyses of AHIMS and privately-held site data, the PJAP has involved the relocation and re-recording of numerous previously identified (but poorly described) sites as well as targeted survey in parts of the catchment with few, if any, sites. Archaeological excavations have also been undertaken at several sites (e.g. Attenbrow *et al*. 2008; Attenbrow 1992a), with analysis of recovered cultural materials completed for some sites but not others. Of particular interest here are the results of Attenbrow's (1990, 1991) analysis of the distribution of then known shell middens and open archaeological deposits within the catchment (369, with 335 middens and 34 open

deposits respectively), with eight sub-catchments recognised on the basis of major rivers and creeks and further subdivided into freshwater, estuarine and ocean zones (**Figure 4-1**).

Key patterns to emerge from Attenbrow's analysis were as follows:

- shell middens occur only in sub-catchments with estuarine and/or ocean zones. Shell is present in freshwater zone sites but in quantities insufficient for their classification as middens;
- archaeological deposits tend to occur in freshwater zones;
- the majority of sites are located in areas underlain by Hawkesbury sandstone, with comparatively few sites located in areas underlain by Wianamatta Shale;
- most sites occur within council reserves or on undeveloped Crown Land;
- middens and deposits occur in higher densities in sub-catchments that include estuary mouths;
- most middens and deposits occur in rockshelters as opposed to 'open' contexts; and
- most middens and deposits occur on landform elements within 10 m of high water level (i.e. in foreshore zones); and
- ridgetops and ridge-side sites are comparatively poorly represented.

The distributional patterning revealed by Attenbrow's (1991) analysis can be interpreted in a number of ways. Taken at face value, site distribution patterns suggest an occupational emphasis on coastal/estuarine environments and the Hawkesbury Sandstone, with hinterland/freshwater environments and areas underlain by Wianamatta shales less intensively utilised. Greater numbers of people living in these areas can also be inferred. However, as Attenbrow (2010: 51) has cautioned, equating larger numbers of sites with increased activity and/or populations without taking into consideration the size and contents of these sites, as well as the effects of natural and anthropogenic processes is, at best, problematic. Variations in the numbers and densities of Aboriginal sites between aquatic zones and geological formations must be interpreted with due reference to such variables. Key issues for the Port Jackson catchment include marked differences in levels of archaeological site visibility and preservation potential between areas, variable urban and industrial development pressures and archaeological sampling bias (Attenbrow 2010: 52). Whilst recognising the distributional biases introduced by such variables, reference to the results of large scale surveys in comparatively undisturbed estuarine areas to the north of the Hawkesbury River (e.g. Vinnicombe 1980) suggest that the general trends in site distribution revealed by the PJAP may, at least in part, reflect the original distribution of these sites (i.e., more sites and deposits along shores compared with slopes and very few sites on ridgetops). As Attenbrow (2010: 53) has suggested, it seems reasonable to conclude that *"many activities, including those relating to tool-making which probably happened at base campsites, took place close to the estuarine and freshwater waterways as well as the marine shorelines"*.

Table 4-2 Port Jackson catchment: number of shell middens and archaeological deposits in each sub-catchment (after Attenbrow 2010: 51, Table 5.1)

Sub-catchment	Area (km^2)	Aquatic zone(s)	No. of middens	No. of arch. deposits	Density (no./km^2)
1. Middle Harbour	92.5	F; Est; O	171	7	1.9
2. Lane Cove River	96.5	F; Est	86	9	0.98
3. Vineyard Creek	41	F; Est	36	2	0.92
4. Darling Mills Creek	32.5	F	0	10	0.3
5. Upper Parramatta River	71	F	0	3	0.04
6. Duck River	81	F; Est	0	3	0.04
7. Concord to Sydney Harbour Bridge	50	F; Est	20	0	0.4
8. Sydney Harbour Bridge to South Head	20.5	F; Est; O	22	0	1.1
Total	485	-	335	34	-

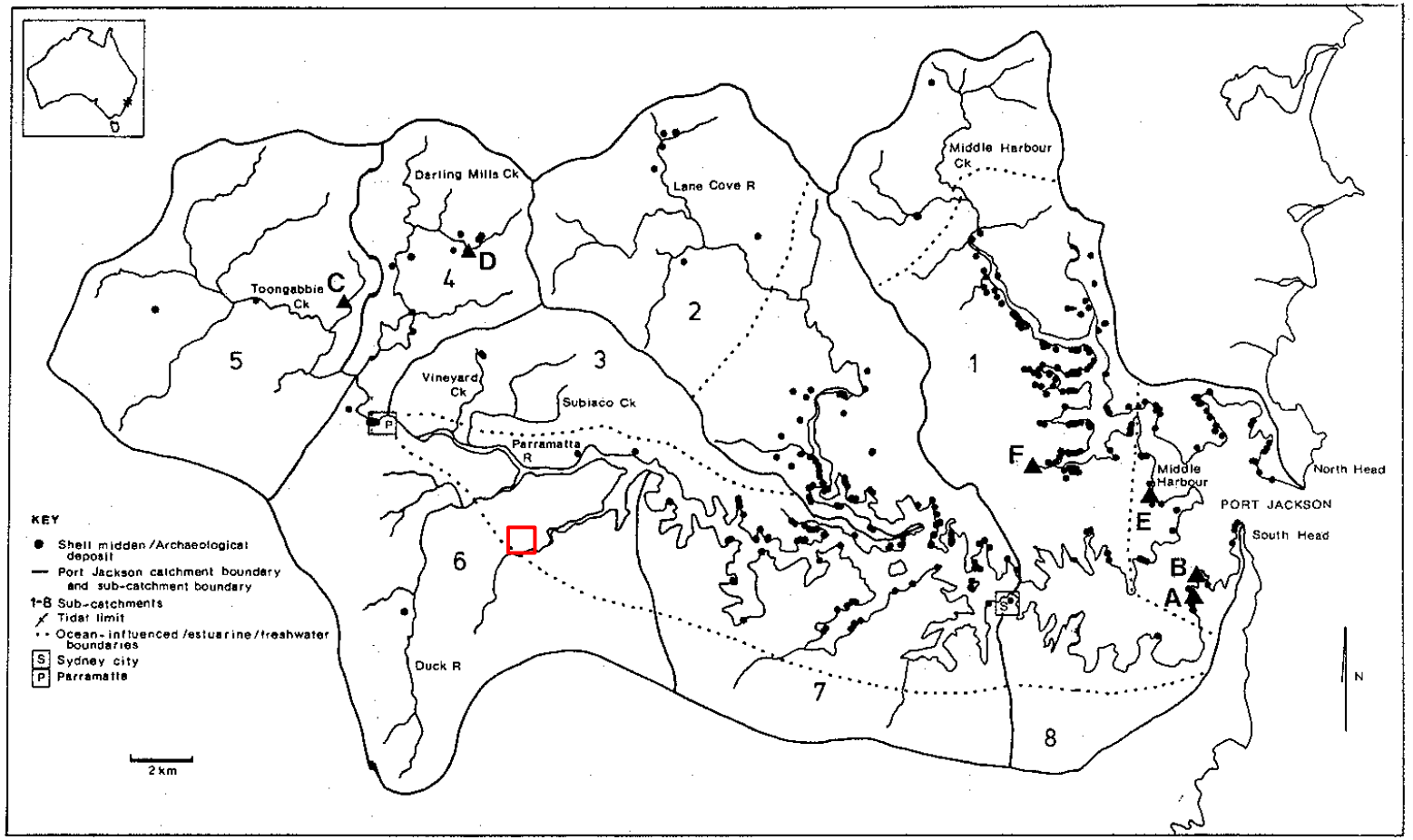

Figure 4-1 Map of the Port Jackson catchment showing Attenbrow's (1991) sub-catchments and zones, previously recorded shell middens and archaeological deposits (as at 1994) and the location of excavated rockshelter sites. Approximate position of Project Area in red.

(A = Mt Trefle; B = Hydrofoil; C = John Curtain Reserve; D = Darling Mills Creek; E = Balmoral Beach; and F = Cammeray) (after Attenbrow 1994: 3, Fig. 1)

4.2 Local context

4.2.1 Parramatta LGA

Existing AHIMS data indicate that a large number of Aboriginal archaeological investigations incorporating survey and/or test/salvage excavation programs have been undertaken within the Parramatta LGA over the last few decades. In common with the Cumberland Plain as a whole, existing archaeological data for this area identify the open artefact site as the most common site type, with the majority of previously recorded open artefact sites identified as a result of subsurface archaeological investigations in heavily-developed urban contexts and yielding finds assemblages dominated by, or consisting exclusively, of flaked stone artefacts. Despite over 200 years of European settlement, previous Aboriginal heritage investigations within the Parramatta CBD attest to the survival of Aboriginal archaeological objects and sites in subsurface contexts, albeit with variable integrity depending on the nature and extent of localised historical disturbance activities.

By virtue of its widespread distribution across the Parramatta CBD, and associated development pressures, the Parramatta Sand Sheet[5] (PSS) and its associated Aboriginal archaeological record has been a topic of particular research interest for archaeologists working in the Parramatta LGA. Previous archaeological investigations of the PSS within the Parramatta CBD have identified this fluvial sand body as a geomorphic feature of high scientific and cultural significance, with subsurface investigations in some contexts (e.g., Jo McDonald CHM 2005b, 2005c, 2006b) intercepting stratified deposits with Late Pleistocene/Early Holocene components. Consistent with broader regional patterning, flaked stone assemblages from these contexts have revealed diachronic changes in raw material use and associated stone artefact technologies, changes linked to the shifting settlement and subsistence patterns of Aboriginal people occupying the greater Parramatta area from the Late Pleistocene onward. More broadly, the results of previous investigations of the PSS attest to considerable intra-unit variability in the nature of the sand body's archaeological resource, with observed variability explicable in terms of varying levels of historical disturbance, as well as Aboriginal peoples' differential use of the terraces bordering the Parramatta River.

4.2.2 Clyde Terminal Conversion Project

As outlined in **Section 2.2**, in 2012, AECOM was commissioned by the Shell Company of Australia Ltd (Shell) to undertake an Aboriginal cultural heritage assessment for the Clyde Terminal Conversion Project (SSD 5147). The SSD 5147 project area for this assessment, shown on **Figure 4-2**, encompassed the majority of the Project Area, with the unassessed portion of the Project Area comprising land currently vacant and formerly leased to AutoNexus Pty Ltd in the west of the Project Area.

An inspection of the Clyde Terminal project area was undertaken on 2 October 2012 by a combined field team of one AECOM archaeologist (Dr Andrew McLaren) and six Registered Aboriginal Party (RAP) representatives. Formal archaeological survey of these areas was deemed unwarranted on the basis of known levels of past disturbance and their corresponding lack of archaeological potential. Primary inspection objectives were to confirm predicted levels of high disturbance and to provide RAP representatives with an opportunity to visit proposed impact areas, to provide comment on the cultural value(s) of the SSD 5147 project area and to any raise any concerns they may have over the SSD 5147 project, cultural or otherwise.

No Aboriginal archaeological sites were identified during the field inspection. Consistent with the results of a desktop review of available historical reference materials, all proposed impact areas within the SSD 5147 project area, including the examined portion of the Project Area, were assessed in the field as grossly disturbed and assigned 'nil' Aboriginal archaeological potential. All were observed to consist of active or redundant components of the refinery operation. Those portions of the southern boundary inspected on foot were similarly assessed as grossly disturbed.

[5] The Parramatta Sand Sheet is an informal stratigraphic name for an extensive fluvial sand body present along both sides of the Parramatta River within the Parramatta LGA.

No specific cultural values or concerns pertaining to proposed impact areas within the SSD 5147 project area were raised by the RAP representatives involved in the assessment. The RAP representatives did, however, indicate that, regardless of levels of historical disturbance, the SSD 5147 project area remains a culturally significant and important part of Darug Country. RAPs also indicated that SSD 5147 project area would have formed an important resource area for Darug people, with the waters of the bordering Parramatta and Duck rivers, in particular, containing a wide range of edible fauna.

On the basis of the above, AECOM (2013a) recommended that no further Aboriginal heritage investigations were warranted for the SSD 5147 project. Nevertheless contingency management measures for any Aboriginal objects uncovered during the SSD 5147 project were provided.

4.2.3 AHIMS database

The AHIMS database, administered by OEH, contains records of Aboriginal objects reported to the Director General of the Department of Premier and Cabinet in accordance with Section 89A of the NPW Act. It also contains information about Aboriginal places, which have been declared by the Minister to have special significance with respect to Aboriginal culture. Previously recorded Aboriginal objects and declared Aboriginal places are known as 'Aboriginal sites'.

A search of the AHIMS database on 20 October 2017 for a 16 km^2 area centred on the Project Area (AHIMS search area) returned 93 site entries (**Table 2**). Removal of entries listed as 'Deleted' (one site) and 'Not a Site' (three sites) provides a revised total of 89 Aboriginal sites. As is typical for the Cumberland Plain, open artefact sites with and without other forms of archaeological evidence are the most common site type represented within the AHIMS search area, accounting for 57.3% of known sites. Areas of Potential Archaeological Deposit (PAD) are likewise well represented, with 31 examples accounting for 34.8% of the total. Other, comparatively poorly represented types include three rockshelters, two scarred trees, one shell midden and one grinding groove site.

Centroid coordinates for AHIMS registered Aboriginal sites within the AHIMS search area place none within or immediately adjacent to the Project Area, with the nearest site, an open artefact site 'Sydney Turf Club Carpark' (45-6-2559), located approximately 1.1 km to the north-west.

Table 4-3 AHIMS search results

Site type	AHIMS feature(s)	Number	%
Open artefact site	AFT; HTH; PAD	51	57.3
Potential Archaeological Deposit	PAD; ARG	31	34.8
Rockshelter	AFT; ART	3	3.4
Scarred tree	TRE	2	2.2
Shell midden	SHL	1	1.1
Grinding groove(s)	GRD	1	1.1
Total		**89**	**100**

5.0 Visual inspection

A visual inspection of the Project Area was undertaken on 20 November 2017 by AECOM archaeologist Dr Andrew McLaren. The primary purpose of this inspection was to help establish whether the Project would, or would be likely to, harm any Aboriginal objects. The visual inspection was undertaken using a combination of pedestrian and vehicle survey and focused on the vegetated southern and western margins of the Project Area. During the visual inspection, notes were taken regarding Ground Surface Visibility (GSV), Ground Integrity (GI, i.e. land condition), Aboriginal archaeological sensitivity and impact risk. Impact risk was determined on the basis of archaeological sensitivity, as well as the nature of the proposed activity.

Consistent with available historical reference materials and the findings of AECOM's (2013a) previous Aboriginal heritage assessment, visual inspection confirmed that the overwhelming majority of land within the Project Area has been grossly modified as a result of historical land activities; principally, the development of the Clyde Refinery but also adjoining light industrial land uses (e.g., car storage). Field observations indicate that the Project Area currently consists principally of former refinery infrastructure areas, now cleared following demolition works. A complex of interconnecting roads and drainage features separates these areas. Active and decommissioned tanks are also present in the north-western and north-eastern portions of the Project Area. The westernmost portion of the Project Area was, until recently, occupied by the AutoNexus car storage facility. Prior to being used by AutoNexus this part of the Site was also part of the refinery. These tanks, pipework and the AutoNexus facility (completed) will be removed prior to the commencement of the Project.

Excluding extant mangrove and saltmarsh vegetation communities along and directly adjacent to the Duck River, linear strips of vegetation outside the southern and western margins of the Project Area do not comprise remnant vegetation but rather historically planted trees. GSV in these areas was, in general, very poor due to grass cover and/or fallen tree matter.

No evidence of past Aboriginal occupation was observed during the visual inspection nor were any lithic materials suitable for flaked and/or edge-ground stone tool manufacture. Taking into account the nature and extent of past ground disturbances within it, as well as its pre and early-post European settlement landscape context, the Aboriginal archaeological sensitivity of land within the Project Area was assessed in the field as negligible. The potential for impacts to Aboriginal objects within this area was likewise assessed as negligible.

6.0 Key findings and recommendations

6.1 Key findings

The key findings of this Aboriginal heritage assessment are as follows:

- there are no registered Aboriginal sites within or immediately adjacent to the Project Area;
- visual inspection indicates that land within the Project Area has been extensively disturbed through historical and contemporary land use activities and retains little to no integrity;
- no Aboriginal objects were identified during the visual inspection component of this assessment;
- taking into account the nature and extent of past ground disturbances across the Project Area, as well as the pre- and early-post European settlement landscape context of this area, the Aboriginal archaeological sensitivity of land within the Project Area is assessed as negligible; and
- the potential for impacts to Aboriginal objects within the Project Area as a result of the Project is considered to be negligible.

The Project Area has been refined so that the vegetation along the Duck River and the Western border of the Project Area are excluded from the Project Area and would not be disturbed. The potential for impacts to Aboriginal cultural heritage within the Project Area as a result of the Project (both during and after completion of the remediation works) is therefore considered to be negligible.

Impacts to Aboriginal heritage values associated with approved SSD projects are typically managed under ACHMPs. ACHMPs are statutorily binding once approved by DPE. Based on the findings above, and ACHMP is not deemed to be required for the Project.

6.2 Recommendations

On the basis of the above findings, the following recommendations are made:

1. no further Aboriginal heritage investigations are considered warranted for the Project; and
2. in the unlikely event that Aboriginal objects, including possible human skeletal materials (remains), are identified at any point during the life of the Project, the procedure outlined in **Annexure A** should be followed.

7.0 References

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Annexure A

Management of previously unrecorded Aboriginal objects

Annexure A Management of previously unrecorded Aboriginal objects

Should a suspected Aboriginal object be identified at any point throughout the life of the Project, the following standard procedure should be adopted:

1. all works must cease immediately in the area to prevent any further impacts to the object;
2. notify Environmental Representative;
3. engage a suitably qualified archaeologist to determine the nature, extent and significance of the find and provide appropriate management advice. Management action(s) will vary according to the type of evidence identified, its significance (both scientific and cultural) and the nature of potential impacts; and
4. prepare and submit an AHIMS site card for the site.

Human skeletal remains

In the event that potential human skeletal remains are identified at any point during the life of the Project, the following standard procedure (New South Wales Police Force, 2015; NSW Health, 2008) should be followed:

1. all work in the vicinity of the remains should cease immediately;
2. the location should be cordoned off and the NSW Police notified; and
3. if the Police suspect the remains are Aboriginal, they will contact the Office of Environment and Heritage and arrange for a forensic anthropologist or archaeological expert to examine the site.

Subsequent management actions will be dependent on the findings of the inspection undertaken under Point 3:

- if the remains are identified as modern and human, the area will become a crime scene under the jurisdiction of the NSW Police;
- if the remains are identified as pre-contact or historic Aboriginal, OEH and all RAPs are to be formally notified in writing. Where impacts to exposed Aboriginal skeletal remains cannot be avoided an appropriate management mitigation strategy will be developed in consultation with OEH and RAPs;
- if the remains are identified as historic non-Aboriginal, the site is to be secured and the NSW Heritage Division contacted; and
- if the remains are identified as non-human, work can recommence immediately.