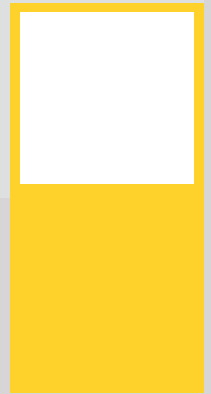




CLYDE TERMINAL CONVERSION PROJECT

APPENDIX G

ABORIGINAL CULTURAL HERITAGE ASSESSMENT



Aboriginal Cultural Heritage Assessment

Clyde Terminal Conversion Environmental Impact Statement

Aboriginal Cultural Heritage Assessment

Clyde Terminal Conversion Environmental Impact Statement

Client: The Shell Company of Australia Ltd

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Quality Information

Document Aboriginal Cultural Heritage Assessment

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Date 23-Aug-2013

Prepared by Geordie Oakes

Reviewed by Luke Kirkwood

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			Name/Position	Signature
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Executive Summary

AECOM Australia Pty Ltd (AECOM) was commissioned by the Shell Company of Australia Ltd (Shell) to undertake an Aboriginal cultural heritage assessment for the Clyde Terminal Conversion (the Project). The purpose of this assessment, which has been undertaken in accordance with the draft 2005 *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005), is to form part of an Environmental Impact Statement (EIS) being prepared by AECOM to support an application for State Significant Development Consent under Division 4.1 of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the conversion of the Clyde Terminal for use solely as a finished petroleum products terminal.

An inspection of proposed impact areas within the Clyde Terminal was undertaken on 2 October 2012 by a combined field team of one AECOM archaeologist 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 RAPs with an opportunity to visit proposed impact areas, to provide comment on the cultural value(s) of the Project area and to any raise any concerns they may have over the Project, cultural or otherwise.

No Aboriginal archaeological sites were identified during the field inspection. All proposed impact areas within the Project area can be classified as grossly disturbed, with all areas observed to consist of active or redundant components of the refinery operation (i.e., existing infrastructure areas). Most, if not all, are likely to have been built on, or cut into, and comprise introduced fill. Those portions of the southern boundary inspected on foot can similarly be classified as grossly disturbed. Both areas appear to have been heavily modified by earthworks associated with the construction of refinery infrastructure and tree planting.

AECOM considers it highly unlikely that any Aboriginal archaeological sites remain within the Project area, having been destroyed by the construction and development of the Clyde Refinery in the early 1900s and with subsequent expansion projects. More broadly, the scale of landscape modification that has occurred within the Project area is such that AECOM considers this area to have no remaining scientific research potential with respect to Aboriginal archaeology.

No specific cultural values or concerns pertaining to proposed impact areas within the Project area have been raised by the RAPs involved in this assessment. RAPs have, however, indicated that, regardless of levels of historic disturbance, the Project area remains a culturally significant and important part of Darug Country. RAPs have also indicated that 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.

No impacts to the identified Aboriginal cultural heritage values of the Project area are anticipated. Proposed impacts are to be conducted in areas that have been grossly modified by the construction and/or ongoing operation of the refinery and, by extension, are considered to retain no potential for the preservation of Aboriginal archaeological materials. In addition, none of the proposed impact areas within the Project area have been flagged by RAPs as culturally sensitive or valuable.

In light of the above, no further Aboriginal heritage investigations are deemed warranted for the Project. Although considered highly unlikely, should any suspected Aboriginal objects be uncovered during demolition works, all works in the vicinity should cease immediately to prevent any further impacts and a qualified archaeologist be brought on-site to make an assessment. Management action(s) will vary according to the type of evidence identified, its significance (both scientific and cultural) and the nature of potential impacts.

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) was commissioned by the Shell Company of Australia Ltd (Shell) to undertake an Aboriginal cultural heritage assessment for the Clyde Terminal Conversion (the Project). The purpose of this assessment is to form part of an Environmental Impact Statement (EIS) being prepared by AECOM to support an application for State Significant Development Consent under Division 4.1 of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the conversion of the Clyde Terminal for use solely as a finished petroleum products terminal.

This Aboriginal heritage assessment has been undertaken in accordance with the NSW Department of Environment and Conservation's (now OEH) draft 2005 *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (REF)* and with reference to the NSW Office of Environment and Heritage's (OEH) *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011) and *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010a).

1.1 Assessment Objectives

The overarching objectives of the Aboriginal heritage assessment undertaken for the Project were as follows:

- To identify, through background research, a site inspection and Aboriginal community consultation, the scientific and cultural values of the Project area; and
- To provide, on the basis of significance and impact assessments, appropriate management recommendations.

1.2 The Project Area

The Shell Clyde Terminal is located at the confluence of Parramatta and Ducks Rivers in Rosehill, New South Wales (NSW), approximately 16km west of Sydney's CBD (see **Figure 1**). The Terminal, which currently receives finished petroleum products from Shell's Gore Bay Terminal via 19 km of underground pipeline, is bounded to the north by Parramatta River, to the south and east by Duck River, and to the west by industrial complexes. The Project area falls wholly within the Parramatta Local Government Area (LGA) and is zoned *IN3 Heavy Industrial* under the Parramatta Local Environment Plan 2011 (Parramatta LEP 2011).

1.3 Project Description

Shell is seeking development consent for the following conversion works at the Clyde Terminal (see **Figure 2**):

- Demolition of redundant tanks and other infrastructure; and
- Upgrades and improvements to site infrastructure.

The key components of the conversion of the Project Area would comprise:

- Demolition of the existing Clyde Terminal processing units and other redundant infrastructure at the Project Area. Existing storage tanks to be retained would be reallocated into final grades of finished petroleum products. Storage tanks surplus to the ongoing operation of the Clyde Terminal would be demolished. This would reduce the capacity and quantity of storage for petroleum fuels at the Clyde Terminal from 638 ML to 264 ML of fuels; and
- Conversion of part of the existing Clyde Terminal assets to more efficiently receive, blend, store and distribute solely imported finished petroleum products. These products would continue to be supplied from the Clyde Terminal to Shell's existing Parramatta Terminal (which lies adjacent to the Clyde Terminal), and directly via existing pipelines from the Clyde Terminal to Sydney Airport and Newcastle.

The proposed Project would also include:

- Geodesmic domes would be installed over Jet fuel storage Tanks 34, 35 and 42, located in Tankfarm B2. These geodesmic domes would be designed so as to retain the majority of potential odours and emissions emitted from these Jet fuel storage tanks;
- Upgrades to tank instrumentation and tank control systems to enable remote and automated control;

- Upgrades to tank bunds where necessary;
- Reduction of the gas storage capacity of the Clyde Terminal from 10,851 cubic metres (m³) to 1,550 m³ metres to accommodate the continued receipt (by road tanker) and storage of Butane. Butane would continue to be blended with winter grades of Gasoline;
- Upgrades to the electrical supply, control and safeguarding systems;
- Increased automation of terminal systems;
- Installation of equipment to provide improved product quality segregation;
- Revised drainage and water treatment to suit reduced operations;
- Changes to the current fire system to provide articulated foam deployment and fire response for the converted Clyde Terminal arrangement;
- Revised internal facility pumping and piping arrangements;
- Associated works to increase the efficiency and effectiveness of the Clyde Terminal and to facilitate safe and efficient operations, such as lighting, safety shutdown systems, control room facilities and amenity upgrades; and
- An overall reduction in the operational footprint of the Clyde Terminal.

The Project would only involve minimal excavation activities, including grading works surrounding existing tankfarms, and foundation works for new substations and firewater tanks and the removal of some existing foundations. No other sub-surface disturbance is anticipated as part of the Project.

The Clyde Terminal would remain operational as a receipt (from the Gore Bay Terminal), storage and distribution facility for finished petroleum products during the proposed works. Once the Project is executed and implemented, the Clyde Terminal would continue to receive, store and distribute finished petroleum products.

1.4 Director General's Requirements

The Director General's environmental assessment requirements (DGRs) for the Project were issued on 16 March 2012. The DGRs stipulate the requirement for an Aboriginal cultural heritage assessment (including cultural and archaeological significance) which demonstrates effective consultation with Aboriginal community groups. The current report addresses this requirement. Attachment 1 of the DGRs Technical and Policy guidelines list the draft 2005 *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005) as the relevant guidelines for undertaking the Aboriginal heritage assessment. These guidelines have been utilised in the preparation of this assessment.

1.5 Methodology

The draft 2005 *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005) detail the relevant statutory requirements for Aboriginal cultural heritage assessments conducted under Division 4.1 of Part 4 of the EP&A Act. Key tasks have been:

- a) To conduct a search of OEH's Aboriginal Heritage Information Management System (AHIMS);
- b) To review the landscape (i.e. environmental) context of the Project area;
- c) To review relevant archaeological and ethnohistoric information for the Project area and environs;
- d) To undertake an inspection of proposed impact areas within the Project area;
- e) To identify, notify and register Aboriginal people who hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and/or places in the Project area;
- f) To provide registered Aboriginal parties with information about the scope of the proposed works and Aboriginal heritage assessment process;
- g) To facilitate a process whereby registered Aboriginal parties can:
 - Contribute culturally appropriate information to the proposed assessment methodology;

- Provide information that will enable the cultural significance of Aboriginal objects and/or places within the Project area to be determined; and
 - Have input into the development of any cultural heritage management options; and
- h) To provide registered Aboriginal parties with information about the scope of the proposed works and Aboriginal heritage assessment process; and
- i) To prepare and finalise an Aboriginal heritage impact assessment report with input from registered Aboriginal parties.

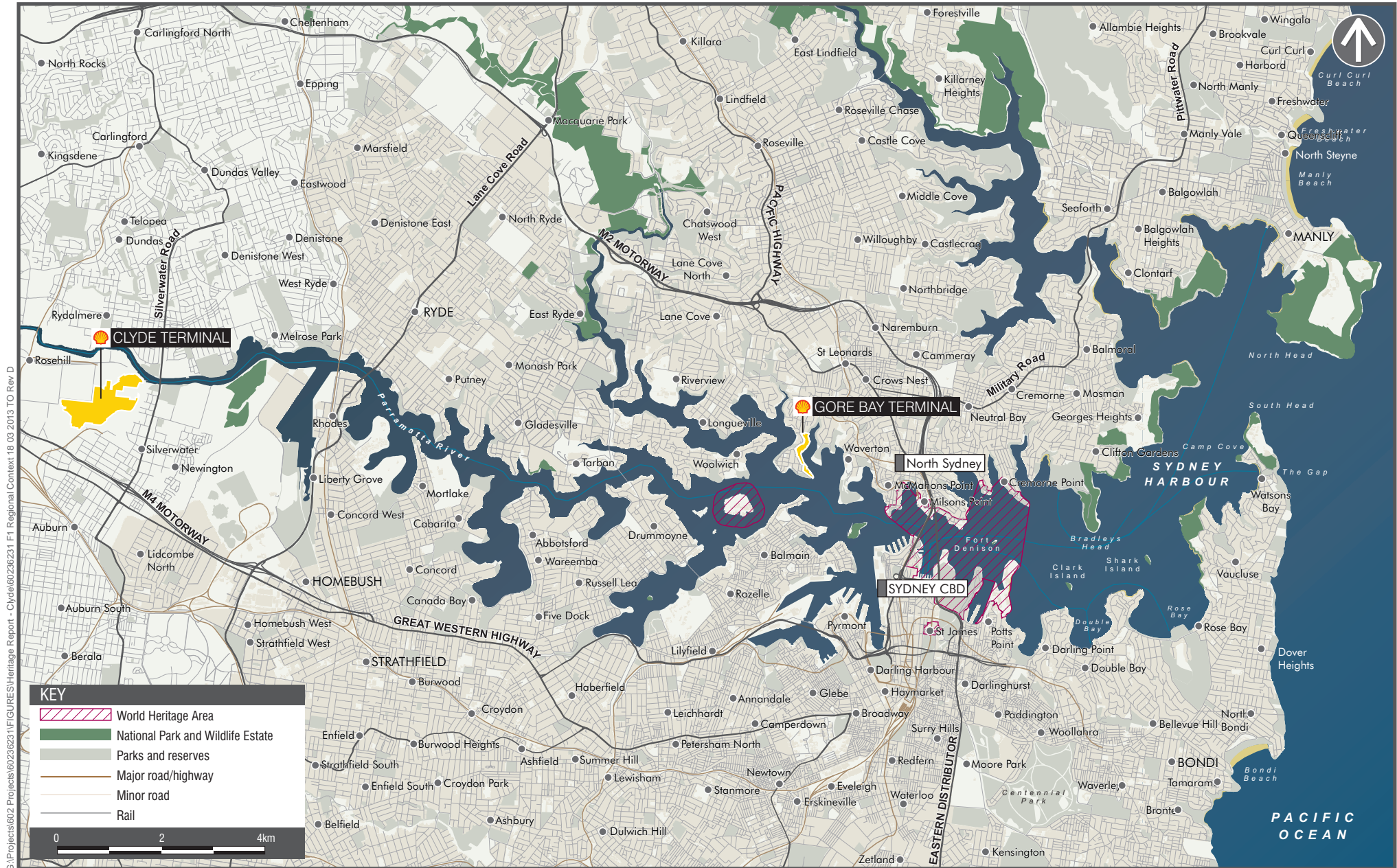
1.6 Project Team

The Aboriginal heritage assessment was co-managed by AECOM archaeologists Geordie Oakes (BA (Hons)) and Dr Andrew McLaren (BA (Hons); MCultHeritage; PhD). Geordie Oakes was the primary author of this report, with supplementary text provided by McLaren. McLaren undertook the site inspection. Luke Kirkwood (AECOM NSW Heritage Team Leader, BSc/BA (Hons)) reviewed this report for Quality Assurance (QA) purposes. Tim Osborne (Designer, AECOM) provided mapping and Jodie Glennan (IAP Team Secretary, AECOM) provided administrative support throughout the assessment.

1.7 Report Structure

This report contains eight sections. This section - **Section 1.0**- has provided background information on the Project and the assessment undertaken. The remainder of the report is structured as follows:

- **Section 2.0** outlines the statutory framework within which this investigation has been undertaken.
- **Section 3.0** provides a summary of Aboriginal community consultation undertaken for this assessment.
- **Section 4.0** describes the existing environment of the Project area and its associated archaeological implications.
- **Section 5.0** describes the archaeological and ethnohistoric context of the Project area. Predictions regarding the Aboriginal archaeological record of the Project area are also provided.
- **Section 6.0** describes the site inspection undertaken and its results, discusses the scientific (i.e. archaeological) and cultural values of the Project area, and provides an assessment of the potential impacts of the Project on identified Aboriginal cultural heritage values.
- **Section 7.0** outlines appropriate management recommendations.
- **Section 8.0** lists the references cited in text.

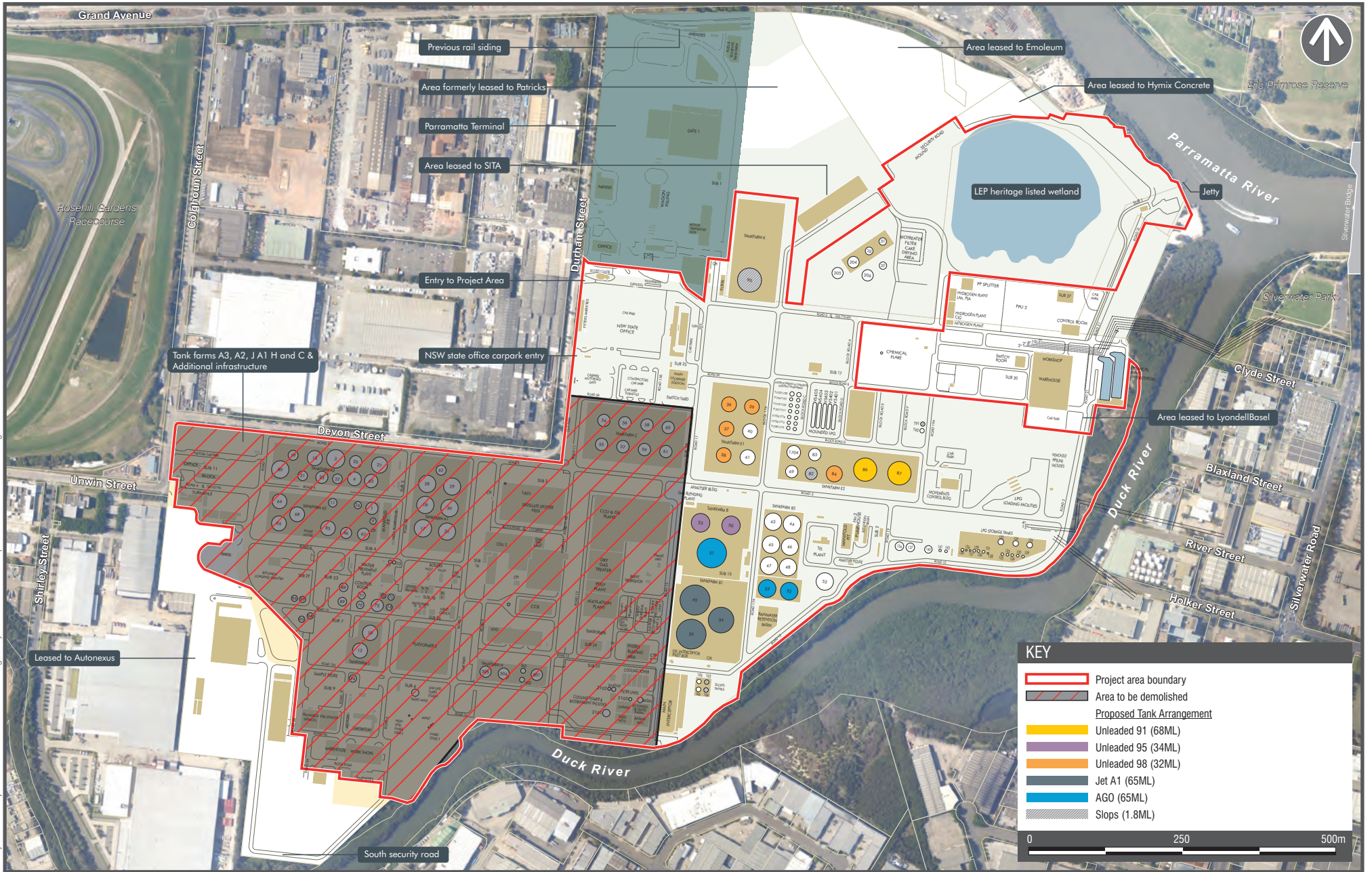


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REGIONAL CONTEXT
 Clyde Terminal Conversion Project
 Environmental Impact Statement

FIGURE 1



PROPOSED CONVERSION OF EXISTING INFRASTRUCTURE

Clyde Terminal Conversion Project
Environmental Impact Statement

FIGURE 2

2.0 Applicable Policy and Legislation

2.1 Commonwealth Legislation

2.1.1 *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 Act, an area or object is considered to be 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:
 - i) it is used or treated in a manner inconsistent with Aboriginal tradition.

No areas or objects within the Study Area have been declared ‘*significant Aboriginal areas*’ or ‘*significant Aboriginal objects*’ under the ATSIHP Act.

2.1.2 *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 Sustainability, Environment, Water, Population and Communities (SEWPAC). 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 and historic heritage items. 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). Although the RNE has been suspended and is no longer a statutory list, it remains an archive of over 13,000 heritage places throughout Australia.

The heritage registers mandated by the EPBC Act and the RNE have been consulted and **there are no Aboriginal heritage items located within the Project area.**

2.2 State Legislation

2.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act requires that consideration be given to environmental impacts as part of the land use planning process. In NSW, environmental impacts are interpreted as including impacts to cultural heritage.

Upon repeal of Part 3A of the EP&A Act on 1 October 2011, the *Environmental Planning and Assessment Amendment (Part 3A Repeal) Act 2011* inserted a new Division 4.1 into Part 4 of the EP&A Act.

Division 4.1 provides for a new planning assessment and 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 the new *State Environmental Planning Policy (State and Regional Development) 2011* (SEPP SRD).

Under Clause 8(1) of SEPP SRD, a development is declared to be State Significant Development if:

- a) the development on the land concerned is, by the operation of an environmental planning instrument, permissible with development consent under Part 4 of the EP&A Act; and
- b) the development is specified in Schedule 1 or 2 of SEPP SRD.

The Project is SSD as it meets both of these criteria, namely:

- it is permissible with development consent on the land on which it is located; and
- it is development that is specified in Schedule 1 of SEPP SRD.

An Aboriginal Heritage Impact Permit (AHIP) 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. However, *AHIPs are not required for projects approved under Division 4.1 of Part 4 of the EP&A Act (i.e., State Significant Development)* (see below).

89J Approvals etc legislation that does not apply

- (1) *The following authorisations are not required for State significant development that is authorised by a development consent granted after the commencement of this Division (and accordingly the provisions of any Act that prohibit an activity without such an authority do not apply):*

- (d) *an Aboriginal heritage impact permit under section 90 of the National Parks and Wildlife Act 1974,*

The Project was declared SSD by the Minister for Planning and Infrastructure on 16 March 2012.

2.2.2 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act), administered by OEH, is the primary legislation for the protection of Aboriginal cultural heritage in NSW. The NPW Act gives the Director General 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).
- 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. Following amendments introduced in October 2010, the NPW Act includes a 'strict liability offence' for harm to Aboriginal objects and places. 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' 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.

As discussed above, an AHIP 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. *AHIPs are not required for projects approved under Division 4.1 of Part 4 of the EP&A Act (i.e., State Significant Development)*. However, 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.

2.2.3 Sydney Harbour Catchment Regional Environmental Plan

Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (Harbour REP) covers all the waterways in the Harbour, the foreshores and entire catchment. It establishes a set of planning principles to be used by councils for the preparation of planning instruments, for the hydrological catchment of the Harbour. It also zones the waterways into nine different zones to suit the differing environmental characteristics and land uses of the harbour and its tributaries. Part 5, Division 4, Clause 59 of the Sydney Regional Environmental Plan 2005 provides the following with respect to heritage items:

Development in vicinity of heritage items

- 1) Before granting development consent to development in the vicinity of a heritage item, the consent authority must assess the impact of the proposed development on the heritage significance of the heritage item.
- 2) This clause extends to development:
 - a) that may have an impact on the setting of a heritage item, for example, by affecting a significant view to or from the item or by overshadowing, or
 - b) that may undermine or otherwise cause physical damage to a heritage item, or
 - c) that will otherwise have any adverse impact on the heritage significance of a heritage item.
- 3) The consent authority may refuse to grant development consent unless it has considered a heritage impact statement that will help it assess the impact of the proposed development on the heritage significance, visual curtilage and setting of the heritage item.
- 4) The heritage impact statement should include details of the size, shape and scale of, setbacks for, and the materials to be used in, any proposed buildings or works and details of any modification that would reduce the impact of the proposed development on the heritage significance of the heritage item.

2.3 Local Government

2.3.1 Sydney Harbour Catchment Regional Environmental Plan 2005 (Harbour REP)

The Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (Harbour REP) seeks to recognise, protect, enhance and maintain the catchment, foreshores, waterways and islands of Sydney Harbour both as an outstanding natural asset and as a public asset of national heritage significance. The plan applies to all land within the Sydney Harbour Catchment, including the current Project area.

Part 5 of the Harbour REP provides specific provisions for the protection of heritage items and places of potential heritage significance within Sydney Harbour Catchment, both Aboriginal and non-Aboriginal. Under Section 55 of Part 5 of the Harbour REP, development consent is required for any of the following:

- a) demolishing or moving a heritage item;
- b) altering a heritage item by making structural or non-structural changes to its exterior, including changes to its detail, fabric, finish or appearance;
- c) altering a heritage item by making structural changes to its interior,
- d) disturbing or damaging a place of Aboriginal heritage significance or an Aboriginal object,
- e) erecting a building on, or subdividing, land on which a heritage item is located.

Schedule 4 of the Harbour REP provides a list of heritage items protected under the Harbour REP. There are no Aboriginal heritage items listed in Schedule 4 that fall within the Project area.

2.3.2 Parramatta Development Control Plan 2011

The Parramatta Development Control Plan 2011 contains the general principles and controls that apply to development on and in the vicinity of heritage items and heritage conservation areas identified in the Parramatta LEP 2011. Aboriginal heritage is protected in Parramatta under the Parramatta LEP 2011. Planning controls of this LEP require the Council to consider the impact of development on known or potential Aboriginal archaeological sites or sites of cultural or historical significance to Aboriginal people. When development

applications are lodged for such sites, the Council must also consider an Aboriginal Heritage Assessment along with advice from the National Parks and Wildlife Service and local Aboriginal communities.

Objective

To ensure that appropriate consideration is given to the impact of development on known or potential Aboriginal archaeological sites or sites of cultural or historical significance to Aboriginal people in the Parramatta LGA.

Design Principles

- 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. Refer to Appendix 11 for the Aboriginal sensitivity map.
- 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 100m 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 50m 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.
- 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.

Mapping provided in Appendix 11 of the DCP indicates the Project area is an "Area of Aboriginal Association". Attempts to clarify the origin of the mapping and its meaning are currently being pursued.

3.0 Aboriginal Community Consultation

3.1 Introduction

Aboriginal consultation acknowledges the right of Aboriginal people to be involved, through direct participation, on matters that directly affect their heritage. Involving Aboriginal stakeholders in all facets of the assessment process ensures that they are given adequate opportunity to share information about cultural values, and to actively participate in the development of appropriate management and/or mitigation outcomes. The successful identification, assessment and management of Aboriginal cultural heritage values are dependent on an inclusive and transparent consultation process. Aboriginal community consultation for the current assessment has been undertaken in accordance with the draft 2005 *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005).

3.2 Notification and Registration

3.2.1 Correspondence

The following organisations were contacted to assist in the identification, notification and registration of Aboriginal people who may hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and/or places within the Project area:

- Office of Environment & Heritage (OEH);
- Office of the Registrar, *Aboriginal Land Rights Act 1983 (NSW)*;
- National Native Title Tribunal;
- NSW Native Title Services Corporation Limited (NTSCORP Limited);
- Sydney Metropolitan Catchment Management Authority (SMCMA);
- Parramatta City Council; and
- Deerrubin Local Aboriginal Land Council.

Each of the above organisations was contacted in writing on 25 July 2012. Responses were received from four organisations. These are attached as **Appendix A** and summarised in **Table 1** below.

Table 1 Agency responses

Organisation	Date of Response	Summary of Response
OEH	02 August 2012	Contact details for eight stakeholder groups provided: <ul style="list-style-type: none"> - Darug Custodial Aboriginal Corporation; - Darug Tribal Aboriginal Corporation; - Darug Aboriginal Cultural Heritage Assessments; - Darug Land Observations; - Darug Aboriginal Land Care Inc; - Gunjeewong Cultural Heritage Aboriginal Corporation; - Tocomwall; and - Deerrubin LALC – Blacktown LGA.
Office of the Registrar	27 July 2012	Search of the Register of Aboriginal Owners undertaken for the Project area. No Registered Aboriginal Owners pursuant to Division 3 of the <i>Aboriginal Land Rights Act 1983 (NSW)</i> .
Parramatta City Council	08 August 2012	Unable to provide contact details due to internal policies and protocols. Letter forwarded to Aboriginal members of Council's Aboriginal and Torres Strait Islander Advisory Committee as well as Darug Tribal Aboriginal Corporation and Dharug Custodian Aboriginal Corporation.
SMCMA	30 July 2012	Unable to provide list of stakeholders due to "the size and complexity of Sydney". Letter forwarded to SMCMA Aboriginal Advisory Committee (AAC) for their information.

3.2.2 Newspaper Advertisement

Notification of the Project was provided in the Parramatta Advertiser on 22 August 2012 (**Appendix B**). Aboriginal persons and organisations interested in being consulted as part of this Aboriginal cultural heritage assessment were requested to register their interest in writing to AECOM. No organisations or individuals responded to the newspaper advertisement placed in the Parramatta Advertiser.

3.2.3 Registration

A letter inviting expressions of interest was sent to all Aboriginal stakeholder organisations and persons identified by the regulatory agencies on 15 August 2012. A total of eight Aboriginal stakeholders were invited to register their interest in being consulted as part of this Aboriginal cultural heritage assessment. The closing date for expressions of interest was 30 August 2012. By COB on this date, a total of seven groups had registered their interest in being consulted, either in writing or by telephone (**Table 2**). Written expressions of interest received by AECOM are provided in **Appendix C**.

Table 2 Registered Aboriginal Parties (RAPs) for the Project

Organisation	Primary Contact
Darug Custodial Aboriginal Corporation (DCAC)	Leanne Watson
Darug Tribal Aboriginal Corporation (DTAC)	Sandra Lee
Darug Aboriginal Cultural Heritage Assessments (DACHA)	Gordon Morton
Darug Land Observations (DLO)	Gordon Workman
Darug Aboriginal Landcare Inc (DAL)	Des Dyer
Yarrowalk (a division of Tocomwall Pty Ltd)	Scott Franks
Deerrubin Local Aboriginal Land Council (Deerrubin LALC)	Steve Randall

3.3 Review of Assessment Methodology

A draft assessment methodology was sent to all Registered Aboriginal Parties (RAPs) on 11 September 2012 (**Appendix D**). Included in this methodology was a brief overview of the Project, a summary of the existing environmental and archaeological context of the Project area and AECOM's proposed assessment methodology. All RAPs were invited to provide comments and raise any concerns in relation to the draft methodology. RAPs were also invited to provide comment on the cultural value(s) of the Project area. Three RAPs provided a response to the draft methodology supporting AECOM's draft methodology. Responses are summarised in **Table 3** and attached as **Appendix E**.

Table 3 RAP Responses to Draft Assessment Methodology

Organisation	Summary of Response
DCAC	DCAC support the draft methodology. Project area identified as " <i>significant to the Darug</i> ". DCAC note that Parramatta and surrounding areas contain numerous intact Darug sites (including many contact sites) that need to further investigation.
DACHA	DACHA support the draft methodology and wish to be consulted at all times and to participate in all fieldwork. Project area identified as a " <i>very important food resource area for the Darug</i> ".
DLO	DLO support the draft methodology. DLO note that the Clyde Refinery is located " <i>on Darug Land which today is still very important</i> ". DLO wish to participate in all fieldwork.

3.4 Site Inspection

All RAPs were offered the opportunity to participate in an inspection of proposed impact areas within the Project area on 2 October 2012. Phone calls were made to all RAPs on 28 September 2012 to confirm availability and relevant fieldwork logistics (e.g., meeting place, PPE requirements). While all seven RAPs had registered their interest in being involved in the site inspection, only five RAPs were able to provide representatives on the day (**Table 4**). These comprised DACHA, DLO, DAL, Yarrowalk and DTAC. Prior to mandatory inductions on-site, Deerrubin LALC and DCAC were telephoned by AECOM archaeologist Dr Andrew McLaren to confirm their

attendance. Deerrubin LALC representative Steve Randall indicated that he would be unable to arrive on-site before 10 am due to other commitments. With a pre-arranged meeting time of 9 am, McLaren advised that the inspection would need to commence in his absence. DCAC representative Leanne Watson could not be reached by telephone prior to entering site.

Table 4 RAPs and Representatives Involved in Site Inspection

Organisation	Fieldwork representative(s)
DTAC	John Reilly
DACHA	Gordon Morton
DLO	Gordon Workman Paul Goddard
DAL	Des Dyer
Yarrowalk	Danny Franks

3.5 Review of Draft Aboriginal Heritage Assessment Report

A draft of this Aboriginal heritage assessment report was circulated to all RAPs on 17 October 2012. All stakeholders were encouraged to provide a response on the content of the draft report. The closing date for comments was 31 October 2012. However, opportunity to provide comment was provided until Close of Business (COB) on 6 November 2012.

Written reviews on the report were provided by five of the seven RAPs for the Project and are attached as **Appendix F**. In addition, one RAP (DTAC) provided feedback over the phone. A summary of RAP responses to the draft report is provided below in **Table 5**.

Table 5 RAP Responses to Draft Report

Organisation	Summary of Response
DTAC	DTAC are satisfied with the report and proposed management recommendations (John Reilly, DTAC Aboriginal Assessment Officer, pers. comm. 6 November 2012).
DACHA	DACHA supports the proposed management recommendations.
DCAC	DCAC have read the draft report and support its findings and recommendations. The significance of the Project area for Aboriginal cultural heritage is low. The site has had numerous land disturbances and is highly unlikely to contain intact cultural heritage.
DAL	DAL has no objections to the proposed development and supports the proposed management recommendations. The project area has been badly disturbed over many years and retains little to no potential for the presence of Aboriginal cultural heritage.
DLO	DLO has no concerns with the proposed management recommendations for this site.
Yarrowalk	Yarrowalk have indicated that they support the proposed management recommendations but would like to see Tocomwall field staff on-site when topsoil is being removed to recover any subsurface cultural materials. Any cultural material that is located should be returned to site once the Project has been completed. Yarrowalk also wish to highlight the fact that the Project area was used as a hunting / gathering and camping place.

As indicated, all RAPs who provided a response to the draft report have indicated that they agree with the management recommendations detailed in **Section 7.2**. Yarrowalk have requested that Tocomwall field staff be present on-site when topsoil is being removed to recover any subsurface cultural materials. However, AECOM believe that this is unwarranted given the extent of historic land use disturbances at the site, with construction of the refinery preceded by dredging of surface waters and artificial filling and levelling.

4.0 Landscape Context

The nature and distribution of Aboriginal archaeological sites are closely connected to the environments in which they occur. As mobile hunter-gatherers, environmental variables such as topography, geology, hydrology and vegetation will have played a critical role in influencing how Aboriginal people moved within, and utilised, their respective territories. These variables affected the availability of suitable campsites, potable water, edible and otherwise useful plant and animal resources, and raw materials for the production of stone and organic implements. Accordingly, any attempt to predict or interpret the character and/or distribution of Aboriginal sites in a given landscape must take such environmental factors into account. An assessment of past and current land use practises allows predictions to be made concerning the likely presence or absence of sites and, where appropriate, their archaeological integrity.

4.1 Climate

The present-day climate of the Sydney region can be characterised as temperate, with warm summers and mild winters. January is the hottest month of the year, with a mean high of 25.9°C and mean low of 18.7°C (Bureau of Meteorology 2012). July, conversely, is the coldest, with a mean high of 16.3°C and mean low of 8°C. Intra-regional temperatures are moderated principally by proximity to the sea. In summer, they are highest in the western or inland part of the region, with temperatures in coastal areas tempered by on-shore winds and sea breezes (Attenbrow 2010:40). In winter, temperatures inland are lower than those along the coast.

Mean monthly rainfall figures for the region attest to a degree of seasonal patterning in levels of rainfall (Bureau of Meteorology 2012). Spring has the lowest average rainfall (76.6 mm) whereas autumn has the highest (125.6 mm). Rainfall averages for winter and summer, meanwhile, are comparable (99.1 and 103.2 mm respectively). The region as a whole has an average annual rainfall of 1213 mm (Bureau of Meteorology 2012).

As in other parts of the country (e.g., Hall 1999; Hiscock 1999), the long-term climatic history of the Sydney region is of particular relevance to debates concerning the antiquity and nature of pre-colonial Aboriginal occupation within it. As Attenbrow (2010) and others (e.g., McDonald 2008) have highlighted, crucial to any such debates are the fluctuations in sea level that resulted from global climatic changes associated with the Last Glacial Period, which lasted from 115,000 to around 11,700 years ago. Amongst other things, these were responsible for a radical reformulation of the region's coastline, including the creation of present-day Port Jackson, Port Hacking, Botany Bay and Broken Bay, and brought about major changes in the nature and availability of terrestrial and aquatic resources within the region, both floral and faunal. At the same time, changing sea levels will have resulted in the destruction and/or concealment of a proportion of the region's earliest evidence of Aboriginal occupation.

Available climatic data indicate that around 60,000 years ago Sydney's coastline was located approximately 2 to 3 km east of its current position, with sea-levels some 30 to 35 m below that of today (Attenbrow 2010:152). During the pre-glacial period (c. 60,000 and 30,000 years ago), a period for which we have some, albeit limited, evidence for Aboriginal occupation of the Sydney region (e.g., JMCD CHM 2005; Nanson *et al.* 1987), sea levels decreased even further, reaching their lowest at the height of the Last Glacial Maximum around 21,300 years ago. At this time, Sydney's coastline was between six and 20 km east of its current position, with Port Jackson, Broken Bay and Port Hacking comprising deep sandstone valleys that gave way to the east to the gently sloping plain of the continental shelf (Attenbrow 2010:153). All rivers and creeks within these valleys were freshwater. Warmer and wetter conditions during the preceding post-glacial period (c.18,000 to 11,700 years ago) resulted in a rapid rise in sea levels, inundating the inner continental shelf and its adjacent river valleys. Sea levels continued to rise into the early Holocene period (c.11,700 to 5,000 years ago, after Attenbrow 2010:154), peaking around 7,000 years ago at a level between 1 and 2 m higher than that of today.

In addition to prompting a general westward retreat to higher ground, it has been suggested that the rising sea levels of the post-glacial and early Holocene periods may have necessitated the re-negotiation and/or re-alignment of clan and language group boundaries as well as settlement and subsistence patterns (Attenbrow 2010:153). Compared with the preceding mid- and late-Holocene periods, coastal productivity during the post-glacial and early Holocene periods is suggested to have been fairly low, a product of an immature coastal morphology characterised by no (or fewer) lagoons, less established tidal rock platforms and generally deeper waters (McDonald 2008: 13). Sea-level oscillations of ± 2 m are reported for the period between 7,000 and 2,000 years ago. Higher sea levels appear to have persisted until around 1,400 years ago, with levels reducing to those of the present day (Attenbrow 2010:38).

Alongside changes in sea level, mid-to-late Holocene climatic variability associated with the ENSO phenomenon has been highlighted as another important influence on pre-colonial Aboriginal subsistence and settlement patterns within the Sydney region, with scholars such as Hiscock (2006) and Attenbrow (2004) identifying a strong temporal correlation between the onset of an ENSO dominated climate of increased climatic variability and the start of a period of intensive backed artefact manufacture known as the 'backed artefact proliferation event'. Backed artefact production, it has been suggested, was one of number of strategies employed by Aboriginal people to reduce increased foraging risk precipitated by the onset an ENSO-dominated climatic pattern (Attenbrow 2004; Hiscock 1994, 2002, 2006; Hiscock and Attenbrow 2004, 2005).

4.2 Topography

A review of McLoughlin's (2000) comprehensive investigation into the extent and distribution of inter-tidal wetlands and riparian vegetation along the Parramatta River and its bays suggests that, prior to the construction of the Clyde Refinery, most, if not all, of the Project area comprised flat, low-lying wetland, consisting of mudflats, mangroves and salt marsh (**Figure 3**). Construction of the refinery was preceded by dredging of surface waters and artificial filling and levelling, processes that produced significant disturbances to natural, underlying land surfaces. A review of the Sydney 1:100,000 Geological Map Sheet, identifies that the Project area comprises dredged estuarine sand and mud, demolition rubble, industrial and household waste. Today, the topography of the Project area is largely the result of these processes and comprises flat modified terrain.

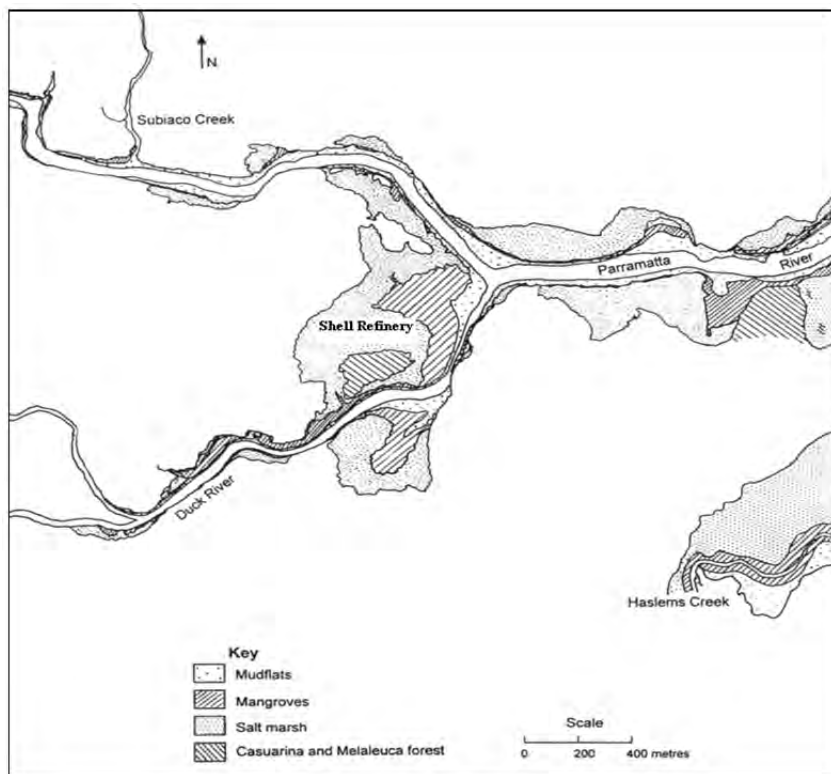


Figure 3 McLoughlin's (2000) Estuarine Mapping of Parramatta and Duck Rivers (from McLoughlin 2000: 598, Figure 3b)

4.3 Hydrology

The Parramatta and Duck Rivers, both tributaries of Sydney Harbour, dominate the hydrology of the Project area. Parramatta River, being the larger of the two rivers, commences at the confluence of Toongabbie and Darling Mills Creeks west of Parramatta and travels eastward to its junction with Lane Cover River at Greenwich. This large watercourse forms the northern boundary of the Project area where it is approximately 120 wide and bordered on both sides by remnant mangrove, eucalypts and casuarinas (*Casuarina glauca*). Urban development and high-density land uses have dramatically altered the original flow rates of the Parramatta River resulting in greater water volumes and an increase in flood events today than at the time of European settlement.

Duck River, a freshwater watercourse, commences as a modified concrete banked drain in Birrong, south of Parramatta. From this point, it flows in a north easterly direction for 11.5 km to where it joins the Parramatta River at the location of the Shell Clyde Terminal. Duck River forms a natural border at the southern and eastern extent of the Project area, where it is approximately 50 m wide and is bordered by a thin corridor of remnant mangrove.

It has been demonstrated through a large number of archaeological assessments in the Cumberland Plain and more broadly NSW, the nature and distribution of potable water will have played a significant role in Aboriginal use of the landscape. Consequently, archaeological assessments within NSW have consistently shown Aboriginal archaeological sites associated with rivers, creek lines and, to a lesser degree, ephemeral drainage lines. Typically larger, higher-order water bodies with more permanent availability of potable water and food resources are more commonly associated with larger and more complex Aboriginal sites, in both surface and subsurface contexts (see White and McDonald 2010).

Based on the size, permanency and the aquatic resources available at these rivers it is anticipated that Aboriginal archaeological sites, likely Aboriginal shell midden sites, will be associated with them, particularly on or adjacent to rock platforms in the littoral zone where marine resources were procurable (Attenbrow 1990). However, Attenbrow (2010: 64) notes that the results of the excavation of Aboriginal midden sites found that the upper and middle reaches of an estuary were preferred shell fishing areas due to a greater of marine resources available.

4.4 Geology

The Clyde Terminal is located within the physiographic region known as the Cumberland Lowlands at a point where it boards both the Sydney Foreshore and Hornsby Plateau regions. All three of these physiographic regions fall within Sydney Basin, a region of Permian and Triassic sediments bounded to the west by the Lachlan Fold Belt and to the northeast by the New England Fold Belt.

Within the Project area, the underlying geology comprises Hawkesbury Sandstone, into which the Parramatta River has cut and subsequently exposed sections, particularly along its northern bank (McDonald 1990; McLoughlin 2000). Overlaying Hawkesbury Sandstone are Wianamatta Group shales that have been stripped of sediment resulting in large deposits of Quaternary alluvium along both the Parramatta River and Duck Rivers that occur as inter-tidal mudflats. Examination of the geological map sheet available for the Project area indicates its surface geology consists of Quaternary alluviums with a lithology of silty to peaty sand, silt, clay and mud, which for the majority of the Project area have been dredged and overlain with demolition rubble, and industrial and household waste.

Stone suitable for the production of stone implements is available locally in the form of quartz nodules that occur within Hawkesbury Sandstone, though based on current available information, these do not occur within the Project area. Silcrete cobble outcrops are also known to outcrop on the Cumberland Lowlands as part of the St Marys Formation and along terraces on the Nepean Hawkesbury River, but do not occur locally in the vicinity of the Project area (Attenbrow 2010; McDonald 1990, 2007).

Of relevance, but located outside the Project area, is the existence of an alluvial terrace underlying sections of Parramatta City, on the southern bank of Parramatta River. The alluvial terrace, which comprises a large sand bank, is of archaeological importance as a result of archaeological excavation undertaken at George St, Parramatta by McDonald (2005). Radiocarbon dates obtained from a charcoal sample at Aboriginal site 45-6-2673, located within the alluvial terrace, returned a date of 30,735 ±407BP, making it one of the oldest recorded Aboriginal sites within NSW. According to McDonald the terrace probably extends east to the confluence of Clay Cliff Creek and Parramatta River near James Ruse Drive (McDonald 2005: 7), placing it approximately 1.7 km west of the Project area.

4.5 Soils

As discussed above, the Project area is located in the Central Lowlands topographic zone within the Sydney Basin geological province. According to Chapman and Murphy (1989), two soil landscapes are present within the Project area - Disturbed Terrain (xx) and the Ettalong (et) swamp landscape. Almost all of the Project area comprises Disturbed Terrain, with the exception of a small pocket of Ettalong soil landscape in the northeast corner (see **Figure 4**). Prior to historic landscape disturbances, most, if not all, of the soils presents within the Project area are likely to have belonged to the Ettalong swamp landscape. **Table 6** summarises the key characteristics of soils associated with Disturbed Terrain (xx) and the Ettalong (et) swamp landscape as well as their archaeological implications.

Table 6 Soil Landscapes within the Project Area

Soil Landscape	Soil Code	Dominant Soils	Surface Geology	Erosion Potential	Archaeological Implications
Disturbed Terrain	xx	Turf fill commonly capped with 40 – 60 cm of sandy loam over waste materials	Artificial fill	Dependent upon fill materials	No archaeological potential within fill. Underlying soils likely disturbed from dredging etc.
Ettalong	et	Deep (>150 cm) Organic Acid Peats, Peaty Podsoles	Unconsolidated Quaternary sandy peats, peats and mud	Erosion absent. Swamps are depositional sites	Potential for Aboriginal midden sites.



Figure 4 Soil Landscapes of the Project Area (from Chapman & Murphy 1989)

4.6 Flora and Fauna

Flora

Today, little vegetation remains within the Project area, making an assessment of pre-European vegetation difficult. Nonetheless, reference to Benson and Howell's (1994) natural vegetation of the Sydney 1:100,000 Map Sheet and the results of McLaughlin's (2000) wetlands investigation suggests that, prior to clearance, vegetation within the Project area will have consisted principally of mangroves and herbland. Benson and Howell (1994) list four potential zones of vegetation dependent upon duration of tidal inundation and salinity:

- 1) Open-scrub of grey mangrove (*Avicenna marina*) and black mangrove (*Aegiceras corniculatum*), confined to the seaward edge of the mudflat and consisting of mangrove;
- 2) Herbland of beaded samphire, bead weed, beaded glasswort or glasswort (*Sarcocornia quinqueflora*) and seablite (*Suaeda australis*) in saltmarsh zones;
- 3) Rush land of *Juncus kraussii*) and common reed (*Phragmites australis*) in areas of brackish water and infrequent tidal inundation; and

- 4) Low open forest of swamp oak (*Casuarina glauca*) and wetland grasses of *Baumea juncea* in areas with saline soils and period flooding.

Fauna

Extent of vegetation clearance precludes an accurate assessment of the pre-contact faunal landscape of the Project area. Nonetheless, consideration of pre-contact vegetation regimes and local archaeofaunal assemblages suggests that a range of marine and terrestrial faunal resources would have been present in the area. Locally occurring marine resources, for example, are likely to have consisted of a wide range of fish and shellfish, crustacea such as crabs and crayfish, and marine mammals such as seals. Attenbrow (2010: 64) notes that the results of the excavation of Aboriginal midden sites found that the upper and middle reaches of an estuary were preferred shell fishing areas due to a greater of marine resources available. Attenbrow (2010: 66) quotes Watkin Tench who states "Rosehill was said not to be a popular place because fish was seldom procured there". Freshwater faunal resources, meanwhile, are likely to have consisted of a variety of terrestrial mammals (e.g., kangaroos, wallabies, and possums), birds, bats, reptiles and amphibians.

4.7 Land Use & Disturbance

As discussed above, prior to the construction of the refinery, the Project area comprised of mudflats, mangrove and saltbush. According to the Parramatta Archaeological Management Unit (2966) an 1893 map shows the eastern extent of the Project area as mangrove swamp which was covered by water at high tide, and that the high water mark reached almost to Durham Street i.e. the majority of the site (www.environment.nsw.gov.au/heritage app). This being the case, in order to construct the refinery, the much of the site was reclaimed, using artificial fill (as discussed above).

A history of the development of the site is provided below.

4.7.1 Early Land Grants: Elizabeth Farm (1793-1918)

In 1793, John Macarthur (c.1767-1834) was granted 100 acres of land adjacent to the Parramatta River by Major Francis Grose, Commanding Officer of the New South Wales Corps. Macarthur named the property 'Elizabeth Farm' after his wife. The Macarthurs were very successful farmers and eventually became the biggest landholders in New South Wales. By 1800, Elizabeth Farm comprised nearly 300 acres, sustaining approximately fifty head of cattle, a dozen horses and 1000 sheep, and John Macarthur's total land-holdings amounted to nearly 1300 acres. It was during these early years of the nineteenth century that John Macarthur became interested in, and a pioneer of, the Australian wool industry, importing Merino sheep from Spain to Australia.

On the 8 October 1816, the Crown granted John Macarthur an additional 850 acres of land, which encompassed the area currently occupied by the Shell Clyde Terminal. The pre-1868 St Johns parish plan confirms that this land was initially granted as a parcel of 850 acres.

John Macarthur died in 1834 and Elizabeth Farm was passed on to his son, Edward Macarthur. Edward did not, however, immediately inherit the property, as Elizabeth Macarthur, John's widow, had use of the property until her death in 1850. From 1850 until Edward's death in 1872, Elizabeth Farm was managed by agents who may also have resided on the property in the Elizabeth Farm homestead. In the years 1869-1874, Thomas Icely, who was a pioneer pastoralist and member of the Legislative Council, is documented as a tenant of Elizabeth Farm on a five year lease. After Icely, the property was leased by William Whalen Billyard, the Civil Crown Solicitor for NSW. Billyard paid £1000 to terminate his lease. From the death of Edward in 1872 to the sale of the property in 1881, the Elizabeth Farm property was administered by trustees (Young & Burnett 1979: 3).

Elizabeth Farm was purchased in 1881 by Septimus Alfred Stephen for £50,000. Stephen and his brother, Arthur, subdivided and sold off the property. The first subdivision was auctioned on the 17 February 1883, and the second was sold on the 26 May 1883. The third subdivision known as the 'Granville Portion', was auctioned on the 13 October 1883. The fourth and final subdivision, comprising the remaining unsold lots from the second subdivision sale, was eventually sold on the 13 September 1884. Elizabeth Farm homestead was purchased by J.W Cliff (Young & Burnett 1979: 15).

Examination of the 1926 St Johns parish plan indicates that the northern portion of the Project Area had been resumed for a sewerage farm, but upon it was also noted on the plan that it was: "now sold", indicating that the works were never constructed.

4.7.2 Establishment of the Clyde Refinery: John Fell & Co. (1918-1927)

John Fell was born in 1862 in Scotland, the son of Scottish oil pioneer Alexander Morrison Fell. Alexander Morrison Fell later transferred his shale-oil refining operations to Australia. John Fell relocated to Australia with his family as a teenager, where he served in a number of positions with his father's company – AM Fell and Sons. John was eventually promoted to a managing partner of the company, however, in 1903 he decided to leave his father's company, and established his own, known as John Fell & Co Pty Ltd (Stanley et al 2009; Washington, n.d).

John Fell & Co Pty Ltd was established to refine, blend and distribute oil, and went on to become pioneers of the Australian oil industry (Macleod 2012). Fell established his refinery at Gore Bay, next door to the British Imperial Oil's Gore Bay terminal facilities, which had officially opened in 1901. By 1910, John Fell & Co Pty Ltd was buying their supplies of Tarakan crude oil from British Imperial Oil, who were a subsidiary of the Shell Transport & Trading Co. For several years, John Fell & Co was their largest Australian customer.

In 1913, John Fell & Co Pty Ltd acquired the assets of the Commonwealth Oil Company's shale oil mine at Newnes, and began shale oil refining in the Wolgan Valley. The Newnes mine operations had previously been suspended when the Scottish branch of the Commonwealth Oil Company encountered difficulties in 1912. These operations were initially quite successful, and increasing market-growth and demand for oil lead John Fell to further expand his company. In 1918, he supplemented his existing shale oil operations by establishing another shale oil refinery on 60 acres of land at Clyde, NSW. The land upon which Fell established his refinery had previously been part of Elizabeth Farm at Parramatta, before being transferred, as part of a parcel of 140 acres of land, to the Commonwealth Oil Corporation in 1908. The land on which the refinery was established comprised flat, unfenced scrublands and mangrove swamps at the confluence of Parramatta and Duck Rivers.

Facing fierce and increasing competition, falling international prices, and reductions on government import taxes, John Fell & Co were increasingly under pressure to keep their business profitable. In 1918, Fell offered the company's assets to Shell, however Shell did not accept as they were not considering moving their own operations into refining at the time. By 1922, the shale at Newnes was exhausted and unprofitable, and Fell's refining operations were suspended. The Newnes shale oil mine closed in 1924. In order to maintain their operations at Clyde, Fell began purchasing crude oil from Shell (Stanley et al 2009). In 1925, John Fell & Co consolidated their operations at Clyde. Work on a rail siding for the refinery commenced and the area was cleared for development. The 750 Dubbs cracking plant was installed, which was the first of its kind in the southern hemisphere. The remainder of the refinery's equipment was relocated from the disused shale oil refineries at Newnes (Murray 2001). John Fell & Co signed an agreement with Shell for the supply of 1,500 tonnes of crude oil per month, and refining commenced at Clyde in 1926. Initially, about 40 people were employed at the Clyde refinery, handling the refining and distribution operations. At this time access to the site was generally limited to the railway siding, and the refinery was producing Dux Motor Spirit, petroleum, coke, tractor distillate, gas oil, and Ajax Power Kerosene. In 1927, the Duck River Wharf opened, which enabled crude feedstock to be barged in along the river from Gore Bay.

Due to operational problems and poor economics together with John Fell's increasing age and deteriorating health, the refinery once again being offered to Shell. Shell accepted the offer, and John Fell & Co's Clyde and Gore Bay assets and facilities were sold together for £240,000, of which £40,000 was made in two annual instalments under the proviso that John Fell would operate the refinery for Shell for a period of not more than two years and that during this time he had to demonstrate that the refinery could be operated economically on good quality crude oil.

4.7.3 Shell as Owner/Operator of Clyde Refinery (1928-present)

On the 1 January 1928, Shell took over as the owner and operator of the Clyde refinery. Shell's ownership and operation of the refinery marked the commencement of the first stage of expansions to the refinery, with an additional 7 acres of land purchased on July 30, 1928. Subsequently, a further 150 acres were purchased from the Ford Motor Company in June 1930, which increased the total extent of the refinery to 217 acres.

During the period 1929 to 1939, the Clyde Refinery underwent its first major expansion. This expansion was complemented by the purchase and construction of new equipment and buildings, as summarised below. The first element to be upgraded was the Dubbs Cracking Unit, which was restarted as a topping plant processing crude oil on January 16 1928. Following this, the No. 2 boiler was built in 1929 and the refinery commenced manufacture of black oil residue lubricating oils. The No. 3 boiler still was also constructed in 1929 for the redistillation of heavy benzene from the topping plant. In 1930, 150 acres of land were purchased from the Ford Motor Company, which increased the total acreage of the refinery to 217. During these early years, there was no

fence around the perimeter of the refinery property. In 1931, following the decision of the Commonwealth Government to impose a four pence per gallon excise duty on refined gasoline, the refinery was temporarily closed to enable the rebuilding of the Dubbs furnace and undergo general maintenance. The refinery was closed from May to July. The special boiling unit was constructed in 1934, the same year in which the refinery ceased production of Shell Imperial, introducing in its place imported Super Shell Motor Spirit. In the period 1935 to 1939 the No 2 Coalinga heater was commissioned and the Dubbs heater decommissioned, a new laboratory, mess room and ablution block was erected, a Trumble fractioning unit was added to the distillation plant, and construction of a new topping plant, boilers, additional tankage, offices, and the development of the Parramatta wharf commenced. Upon the recommendation of Mr J.W Ernste from B.P.M Holland following a visit to the site, the capacity of the refinery was increased and a modern distillation unit was erected to eliminate the re-distilling of gasoline. In September 1938, a new topping plant/crude distillation unit was brought on stream at Clyde and the old Dubbs unit was subsequently shut down on the 8 October. The first overseas manager of the refinery, Mr Fred Mackley, was also appointed at this time. This first period of expansion concluded in 1939 with the construction of the drum and tin filling shed.

Following the outbreak of World War II, and in particular Japan's entry into the war in 1941, crude oil supplies were cut to the Clyde refinery and efforts were redirected to supplying and supporting the requirements of the Australian armed forces. With the exception of the No. 1 and 2 boiler stills, the refinery was closed on January 30, 1942, and the refinery adapted to become an essential wartime industry. For the duration of the war, the primary function of the refinery was as a storage terminal and drum filling area. The only products manufactured during this period were solvents from imported gasoline and wash (gas) oil made from diesel fuels. Following the resolution of the conflict in 1945, crude oil was once again available and refining operations at the site recommenced. The refinery was reopened on March 21 1946 by the Premier of NSW, Mr W.J McKell, and underwent its second phase of development and expansion. This phase of development commenced in 1947, with the construction of the bitumen plant and neutralised lubricated oil production facilities, which were officially opened in 1948. The expansion culminated with the commissioning of the LVI Lubricating Oil Plant and the official opening of new laboratories at the site in May 1953.

From 1958 – 1959, the Clyde refinery underwent its third major expansion and development. This cost approximately \$18 million and involved the erection of a platformer, significant modernisation and extension of existing ancillary facilities, and the erection of double-storey administration buildings on site. Another major expansion phase followed almost immediately, from 1960 – 1963, which totalled a capital expenditure of \$34 million. Major additions to the refinery during this expansion phase included the catalytic cracking complex, high vacuum unit, ethylene and epikote plants, and the construction of two pipelines.

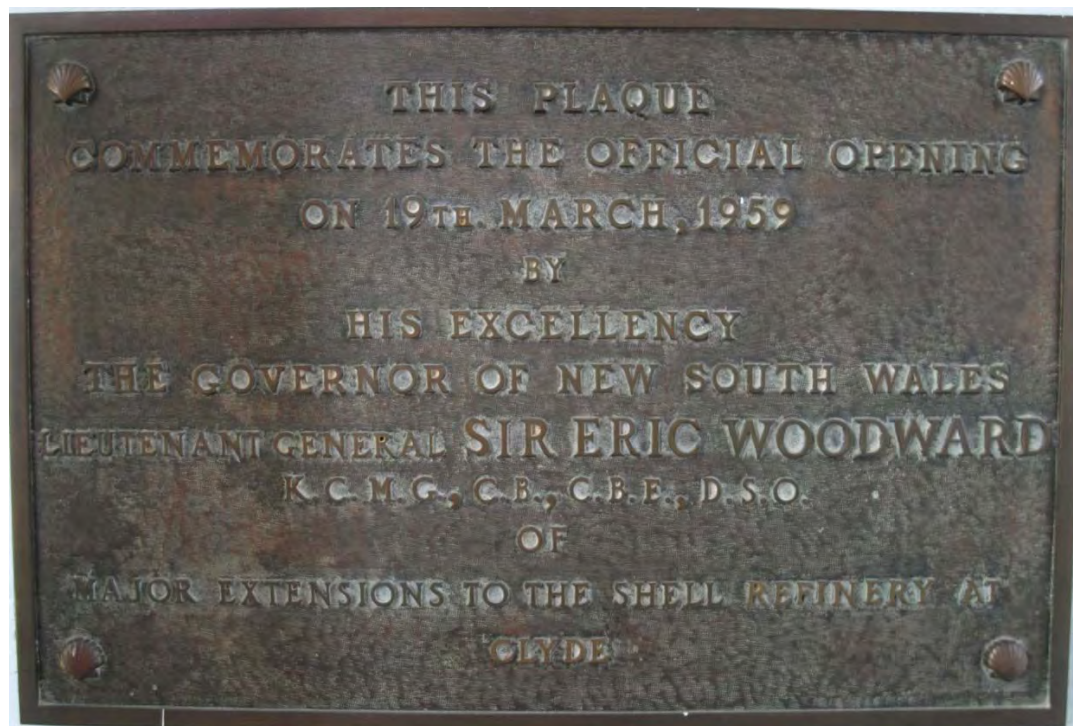


Figure 5 Commemoration Plaque Situated in the Foyer of the Shell Clyde Refinery Administration Building

In 1964, Shell completed construction of their Parramatta Terminal, which subsequently replaced the aged distribution facilities within Clyde refinery as Shell's primary distribution centre in NSW. All marketing distribution functions, with the exception of bitumen and bulk solvents, were transferred from Clyde across to the new Parramatta facility. Later that year, on the 10 June, the Clyde refinery commenced refining of the first shipment of Australian crude oil from the Moonie oil fields in Queensland. In the period 1966 – 1968, Clyde underwent another major overhaul and expansion, with a total capital expenditure of \$20 million. This phase included the erection of a splitter treater, the introduction of the No. 2 crude distiller, No. 7 steam boiler, turbo generator 1, and the chemical and hydrocarbon solvents plant, as well as extensions and additions to existing ancillary facilities.

The expansion and development of Clyde continued into the 1970s, with an additional 35 acres of land purchased from Mobil at a cost of \$1.2 million in 1970. Also, that year, a new polypropylene plant was erected for Shell Chemical at a capital cost of \$16 million. Following this, in 1972, the processing capabilities of the refinery experienced a significant development, with the addition of platformer 2 and turbo-generator 2 at a cost of \$6 million. Despite these additions, however, the overall capacity of the refinery's processing abilities was not affected. In 1974 -1975, at a cost of \$4 million, a water recovery treatment and re-use system was installed for refinery process cooling. This enabled the refinery to be isolated from the previous Parramatta River – Duck River system.

Following the conclusion of the major phases of expansion and development of the Clyde refinery in the mid-1970s, only minor additions and modifications were made. In c.1987 the Butane De-Asphalting Plant (BDA Plant) and oil interceptor were demolished. The site that these elements had occupied was redeveloped, with the central control room constructed at that location in 1988. In December 1993, work commenced on the Propylene Treatment Plant and in 1994, the mounded LPG Storage facility was built. In 1999, however, with Shell – and the oil industry as a whole - increasingly challenged by a combination of tight economics and environmental concerns, the Clyde refinery once again found itself facing the prospect of closure. In late 1999, the announcement was made that the closure of the refinery at some point in time after c. 2006 was a real possibility. The refinery continued to operate, along with six other Australian refineries, in the early years of the twenty-first century. As in 1996 and 1998, in 2008, the Clyde Refinery was temporarily closed down in November for maintenance works, and did not resume operations until July the following year during which time refined products were imported through Gore Bay and transferred to Clyde via the Gore Bay-to-Clyde pipeline for distribution from the Parramatta Terminal.

The Shell Clyde refinery has been the longest operating, and one of the most complex, oil refineries in Australia. In July 2011, however, Shell announced that the Clyde Refinery would permanently cease operations as it is not economically sustainable. The Clyde refinery can no longer compete with the larger Asian refineries which have emerged in recent years, and which are capable of producing up to one million barrels of refined oil products per day, an average of 921,000 more barrels per day than Clyde is capable of producing.

4.7.4 Physical Development of the Site

The 1930 aerial photograph of the area indicates that the Shell facility, shortly after it was purchased from John Fell & Co, was focussed on the corner of Devon and Unwin Streets, although at this time Devon Street had not been formed and was just a property boundary. At this time, the refinery consisted of a tank farm of approximately 18 tanks, which were located in the area now identified as Tank Farms A2 and A3. On the corner of Colquhoun and Devon Streets a residential house is indicated. This is known from aerials to have been the manager's residence. At the termination of Unwin Street, there appears to be some buildings of unknown function. The remainder of the facilities associated with the refinery are located along the southern boundary of the tank farm area. The quality of the aerial is not sufficient to allow identification of these structures. The remainder of the site is shown as saltmarsh, with no apparent development. Sometime between 1930 and 1951, a wharf was constructed on Duck Creek to the south of where the workshops now stand.

The 1951 aerial indicates there had been extensive development at the site. Tank Farm A1 had been constructed adjacent to Tank Farms A2 and A3, and two more houses had been constructed along Devon Street. Where the current administration office block stands, there was an L shaped building. There was also a building on the site of the former Shell Credit Union and contractors amenities building. The refinery is still consolidated to the south of the tank farms. The refinery appears to have been connected to the tramway to the north by a track and series of branch lines. Oriented NE-SW are two structures that appear to be rail loading facilities. The northernmost one sits to the north of a new Tank Farm area, which correlates with where Tanks 201, 203 – 207 stand today. The tank farm originally comprised nine tanks, and the six extant tanks in this area appear to be the same as from this period. Two further sheds were constructed along the Durham Street boundary, roughly north of where the NSW State office stands today. The wharf of the confluence of Parramatta River and Duck Creeks was in operation,

and there appears to be a pipeline connecting the wharf to the refinery. The southeast portion of the site remains undeveloped.

The 1961 aerial indicates that the residences on the corner of Devon and Colquhoun Street are still extant and have well developed gardens. The office blocks are now present on site. The Credit Union and contractors facilities, as they still stand, are evident, as is the Administration building for the bitumen rail loading facilities. Tank Farm B1 is under construction and Tank Farm B appears to be operational but has a different configuration to that extant now. Tank Farms C and E1 are complete and appear to be the same as those present on site today. Where the current distillate splitter stands a new facility has been constructed, and the current CCU and GS plant at the corner of Road 2 and Road 11 is under construction. A third facility appears to be nearing completion to the north of Tank Farm E. The area today covered by the CCR and HVU either is occupied by a series of sheds or is vacant. The area to the east of Tank Farm E1 is largely undeveloped, although it appears that a series of causeways have been built through the swamp. The facilities to the south of Tank Farms A1, 2 and 3 have been augmented, particularly noticeable from the aerial is the insertion of a number of smaller tanks, particularly along Road 12A.

The 1965 aerial indicates that Tank Farm B2 has been constructed, and the area to the east has been developed, with a series of smaller tanks evident at the current location of the LPG storage tanks. The area to the east of Tank Farm E1 remains largely undeveloped. The facility previously under construction to the south of Tank Farm C has been completed. The current CCU and GS plant is now completed. They flares were in place by 1965.

The 1970 aerial indicates that the distillate splitter unit is operational in its present location and the HVU is also in its current location. The collection of sheds that had stood on the current corner of platformer 3 have been demolished. Some tanks have been inserted and removed from Tank Farms A2 and A3, and sheds removed from also from the area where Tank Farm H now stands. Tank Farm B2 has been extended to the south and east, and Tank Farm E2 is under construction. Also, there was a Tank Farm on the current location and to the east of the mounded LPG facility. The houses on Devon Street are still extant.

As can be seen from the description above, there has been significant development and redevelopment on the site over many years.

4.8 Key Observations

Key observations to be drawn from a review of the existing environment of the Project area are as follows:

- Prior to historic land use disturbances, the Project area likely comprised a highly productive and by extension, attractive resource zone for Aboriginal people occupying or passing through the Rosehill area;
- The inferred pre-disturbance topography of the Project area (i.e., low lying wetland subject to regular inundation) is 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;
- No known source of stone suitable for the production of chipped and groundstone implements have been identified within the Project area. Nonetheless, quartz is known to occur locally as pebbles in Hawkesbury Sandstone and silcrete regionally from the St Marys Formation; and
- Native vegetation within the Project area has been extensively cleared as a result of the development of the Clyde Refinery. Aboriginal scarred trees are unlikely to occur within the Project area.

5.0 Archaeological and Ethnohistoric Context

5.1 Regional Archaeological Context

Available archaeological data indicate that Aboriginal people have occupied the Sydney Region for at least 30,000 years (McDonald 2005). Late Pleistocene/early Holocene occupation of the region is evidenced by radiocarbon determinations from both coastal and hinterland sites (Attenbrow 2010:18, Table 3.1). Material culture assemblages from this period indicate the exploitation of a diverse range of terrestrial and aquatic food resources by highly mobile groups of Aboriginal people (Attenbrow 2010:152-54; McDonald 2008: 39). Late Pleistocene/early Holocene chipped stone assemblages attest to a preference for silicified tuff sourced from secondary geological contexts such as the Hawkesbury/Nepean River gravels (McDonald 2008). However, they also indicate the opportunistic exploitation of other raw material types such as silcrete, quartzite and quartz. Miscellaneous retouched flakes dominate the retouched components of most assemblages though flaked pebble tools, dentated saws and thumbnail scrapers also occur. Chipped stone tools such as these will have been complemented by a range of organic implements such as wooden digging sticks, spears and boomerangs. However, these do not survive archaeologically (see 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; 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 suggest a marked increase in site usage and population density over time, as well as a concomitant growth in the size and complexity of social aggregation. Complex, long-distance exchange networks are also attested archaeologically as are major developments in artistic activities (McDonald 2008). Growing economic specialisation is indicated by the emergence and subsequent proliferation of complex fishing and stoneworking technologies, with the latter linked to increased foraging risk associated with greater climatic variability as well as other variables such as landscape colonisation, redefinition of social space, sea-level rise, reduction of resources and greater mobility (Hiscock 1994; 2002; see also Attenbrow *et al.* 2009).

With some modification, McCarthy's (1967) *Eastern Regional Sequence* (ERS) of stone artefact assemblages remains the dominant chronological framework for Aboriginal prehistory in the region. 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 chipped stone assemblages excavated at Lapstone Creek rockshelter (McCarthy 1948), on the lower slopes of the Blue Mountains eastern escarpment, and Capertee 3 rockshelter (McCarthy 1964), in the Capertee Valley. McCarthy's ESR is now routinely characterised as a four-phase sequence, with the term Capertian retained and Bondaian subdivided into three phases: Early Bondaian, Middle Bondaian and Late Bondaian¹ (**Table 7**). The tripartite division of the Bondaian is based principally on the introduction and subsequent decline of backed artefact manufacture. However, changes in the abundance of bipolar and quartz artefacts, and the presence/absence of edge-ground hatchets and other organic implements (e.g., bone points and shell fishhooks) are also relevant.

Stone artefact assemblages belonging to McCarthy's Capertian phase are described by archaeologists as belonging to the 'Large Core and Scraper tool Tradition', a term first used by Bowler *et al.* (1970) to describe the Pleistocene assemblages recovered from Lake Mungo in western New South Wales. Bowler *et al.* (1970) saw the main components of these assemblages - core tools, steep-edged scrapers and flat scrapers - as characteristic of early Australian Aboriginal assemblages and as being of a distinctly different character to those appearing in the mid-Holocene around 6,000 BP and persisting into the contact period (i.e., the last 200 years). In eastern Australia, these later assemblages are often referred to as 'Bondaian' assemblages. However, they also form part of what is known as the 'Australian small tool tradition', a term coined by Gould (1969) to signal the appearance, during the mid-to-late Holocene, of a new suite of chipped stone tool forms in the Aboriginal archaeological record of Australia, including Bondi points, geometric microliths, tula adzes and points, both unifacially and bifacially flaked. Tools of the 'Australian small tool tradition', it has been suggested, formed part of a portable tool kit aimed specifically at risk reduction (Attenbrow *et al.* 2009; Hiscock 1994, 2002, 2006).

¹ The Late Bondaian is equivalent to McCarthy's Eloueran phase.

Table 7 The Eastern Regional Sequence (after McDonald 2008: 39, Table 4.2)

Phase	Approximate date range	Description
Capertian	30,000-8,000 BP	Preference for silicified tuff evident. Quartz, chert and silcrete (unheated) also exploited. Cores and tools vary widely in size. Unifacial retouch predominates. Bipolar and backed artefacts absent. Edge-ground hatchets absent.
Early Bondaian	8,000-4,000 BP	Increasing use of local stone materials. Backed artefacts present but still rare. Bipolar artefacts relatively common. Bifacial retouch predominates.
Middle Bondaian	4,000-1,000 BP	Increased raw material variability. Main phase of backed artefact production. Smaller cores and tools. Increasing numbers of bipolar artefacts. Edge-ground hatchets appear.
Late Bondaian	1,000 BP to European contact	Backed artefacts rare or absent. Bipolar artefacts common. Edge-ground hatchets widespread.

5.2 Local Archaeological Context

5.2.1 Port Jackson Catchment

The Aboriginal archaeological record of Port Jackson catchment is well-researched, with formal investigations of this record having been undertaken since the late 19th century (e.g., Etheridge and David 1889a, 1989b, Etheridge and 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 an enormous body of archaeological data concerning pre-contact Aboriginal settlement and subsistence patterns, with thousands of sites having been identified and recorded in varying degrees of detail (Attenbrow 2010). 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 and maintenance, the production of rock art and the burial of the dead (Attenbrow 2010; Donlan 1995; McDonald 2008). 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 wide range of terrestrial and aquatic resources, with marine fauna (i.e., fish, shellfish, crustacea and marine mammals) 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, with less than 20 radiocarbon determinations currently available (see Attenbrow 2010:18, Table 3.1). Nonetheless, it has been suggested that the majority date to the mid-to-late Holocene, with dates inferred principally on the basis of the presence/absence of chronologically diagnostic stone tools such as backed artefacts and edge-ground hatchets (but see Attenbrow and Hiscock 1998 regarding the antiquity of backed artefact manufacture in the region). At present, the earliest date for Aboriginal occupation of Port Jackson's coastal zone stands at 5,840±50 BP, a determination obtained on a sample of midden shell from a large Aboriginal rockshelter site above Tunks Creek near Cammeray (Attenbrow 1994).

5.2.1.1 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. Still ongoing, the Project has generated a substantial body of data concerning pre-contact Aboriginal occupation of the catchment and remains the most comprehensive source 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 selected parts of the catchment with no to very few sites. Archaeological excavations have also been undertaken at several sites (e.g., Attenbrow 1994), with analysis of recovered cultural materials completed for some sites but not others (V. Attenbrow, pers. comm, July 2012). Of particular interest here are the results of Attenbrow's (1991) analysis of the distribution of then known shell middens and archaeological deposits within the catchment (n = 369, 335 middens and 34 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 6**). Key patterns to emerge from Attenbrow's analysis were as follows:

- Shell middens occur only in sub-catchments with estuarine and ocean zones. Shell is present in freshwater zone sites but in quantities insufficient for their classification as middens (see **Table 8**);
- 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 (likely due to a lack of development in those areas);
- 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;
- Most middens and deposits occur on landform elements within 10 m of high water level (i.e., in foreshore zones); and
- Ridgetop and ridgetop sites are comparatively poorly represented.

The patterning outlined above can be interpreted in a number of ways. Taken at face value, site distribution patterns are suggestive of an occupational emphasis, at the expense of hinterland/freshwater environments and areas underlain by Wianamatta shales, on coastal/estuarine environments and the Hawkesbury Sandstone. Greater numbers of people living in these areas can also be inferred. However, as Attenbrow (2010:51) has convincingly argued, 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 (Attenbrow 2010:52). 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, 1984) suggest that the general trends in site distribution outlined above 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 proposed, 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 8 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./sq km)
Middle Harbour	92.5	F; Est; O	171	7	1.9
Lane Cove River	96.5	F; Est	86	9	0.98
Vineyard Creek	41	F; Est	36	2	0.92
Darling Mills Creek	32.5	F	0	10	0.3
Upper Parramatta River	71	F	0	3	0.04
Duck River**	81	F; Est	0	3	0.04
Concord to Sydney Harbour Bridge	50	F; Est	20	0	0.4
Sydney Harbour Bridge to South Head	20.5	F; Est; O	22	0	1.1
Total	485	-	335	34	-

*F = Freshwater; Est = Estuarine; O = Ocean; ** Sub-catchment includes Shell's Clyde Refinery

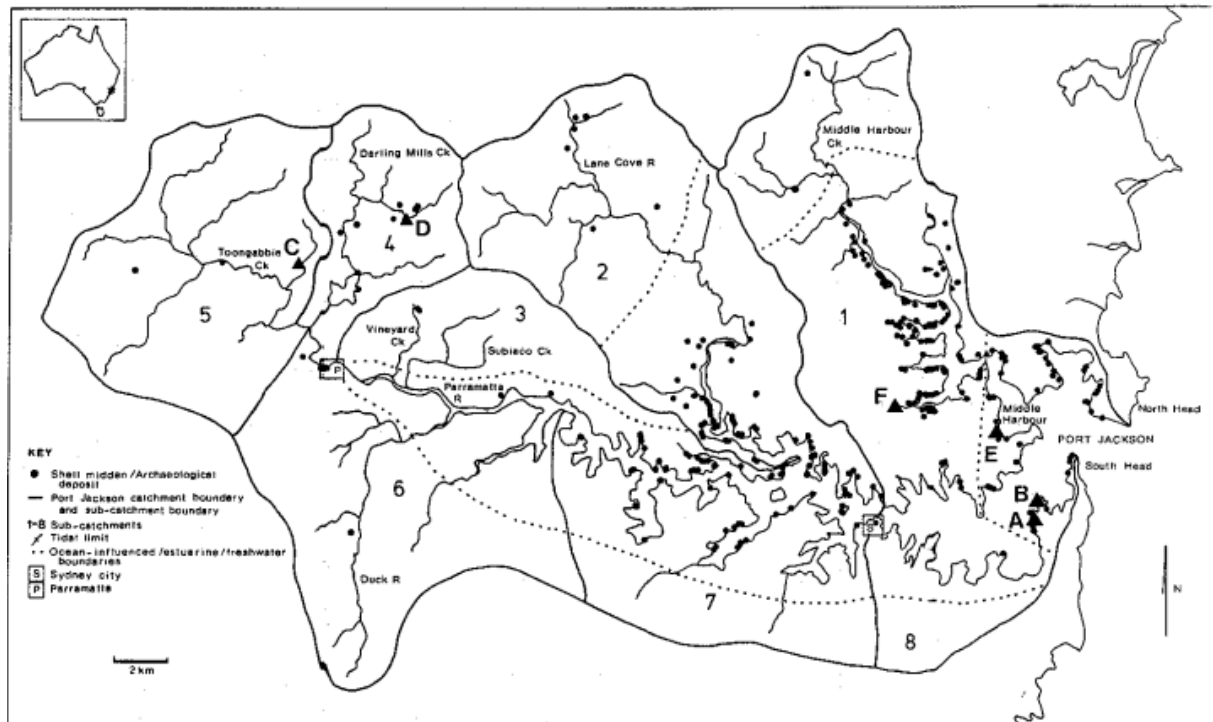


Figure 6 Map of the Port Jackson catchment showing sub-catchments and zones, previously recorded shell middens and archaeological deposits (as at 1994) and the location of excavated shelter sites (A = Mt Trefle, B = Hydrofoil; C = John Curtain Reserve; D = Darling Mills Creek; E = Balmoral Beach; and F = Cammeray) (after Attenbrow 1994: 3. Figure 1)

5.2.2 AHIMS Database Search

The AHIMS database, administered by OEH, contains records of all 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 was conducted on 23 July 2012. A total of 20 registered Aboriginal sites were identified within a 4 x 4 km area centred on the Project area, however none of these sites were recorded within the Project area. Of the sites identified locally, 11 are stone artefact sites (isolated artefacts and artefact scatters) and nine were Potential Archaeological Deposit (PAD) sites. The closest of these sites is a stone artefact site 45-6-2559 approximately 1.2 km northwest of the refinery. The majority of these sites have been recorded within Parramatta city (see **Figure 7**).

5.2.3 Previous Heritage Investigations in the Rosehill Area

McDonald (1990) Proposed Extension to Ferry Services Parramatta River West of Silverwater Bridge Archaeological Survey

McDonald (1990) undertook an archaeological assessment, including field survey, for a proposed extension to ferry services on the Parramatta River, west of Silverwater Bridge, which included seven potential ferry terminal sites at varying distances from the refinery. All seven proposed terminal sites, located along the Parramatta foreshore, were surveyed without identifying Aboriginal archaeological sites.

Koettig (1992) Assessment of Aboriginal Sites Rydalmere Hospital Parramatta Orphan School Project

Koettig (1992) undertook an archaeological assessment, including field survey, as part of a conservation plan prepared for Rydalmere Hospital, Parramatta. The hospital occupies a portion of land directly adjacent to the northern bank of Parramatta River approximately 2 km from the Shell Refinery. While background research and field survey did not identify surface artefacts, the assessment noted the 'high' potential for evidence of Aboriginal occupation to be found associated with Parramatta River, which in some instances may be 'beneath the current layers of European cultural material' (Koettig 1992:6).

Biosis (2008) *Rosehill Recycled Water Scheme: Aboriginal Archaeological and Cultural Heritage Assessment*

Biosis (2008) undertook an archaeological assessment, including fieldwork, for the Rosehill Recycled Water Scheme, a project that included the construction of a recycling plant, storage facility and pipeline distribution network. Of the planned works, a storage reservoir and associated pipeline were planned adjacent to the eastern boundary of the Shell Refinery. The assessment identified one previously recorded AHIMS site, PAD 45-5-3272, within proximity to the proposed works; however, the site is approximately 2 kilometres west of the current Project area.

5.3 Ethnographic Context

The Project area falls within the traditional country of the Darug (also spelt Dharuk, Dharruk, Dharug and Daruk) language group. Darug territory extended from the Hawkesbury River in the north, to Appin in the south, and west into the Blue Mountains, an area which incorporates some of the oldest archaeological sites in the Sydney region (Attenbrow 2010:18-19). Surrounding language groups comprised the Kuring-gai (to the north), Darkinjung (to the northwest) Dharawal (to the south), Gundungurra (to the southwest) and Wiradjuri (to the west).

Available sources indicate that two distinct dialects of Darug were spoken in Darug territory at the time of European contact. These comprised a 'coastal' dialect, spoken on the Sydney peninsula and the country to the north of Port Jackson, and a 'hinterland' dialect, spoken on the Cumberland Plain from Appin in the south to the Hawkesbury River in the north (Attenbrow 2010:34). This linguistic division is suggested to correspond to a broader economic division between 'coastal' and 'hinterland' Darug-speaking peoples, with the former relying heavily on marine resources and the latter, terrestrial game (McDonald 2008: 22). Early observations (e.g., Collins 1798, 1802; Tench 1793) suggest little contact between coastal and hinterland groups.

Some idea of population size for the coastal Darug at contact is provided by Attenbrow (2010), who suggests that the area around Port Jackson likely supported a minimum population density of 0.75 persons/ 1 sq. km (i.e. 1 person/1.3 sq. km). Population densities for the hinterland are generally believed to have been lower than along the coast. Kohen (1993), for example, has estimated a population of up to 1000 people within a 600 sq. km area, with a minimum overall density of c.0.5 persons/sq km. However, any statements concerning population size amongst the Darug - coastal or hinterland - must be tempered with a recognition of the fact that the April 1789 smallpox epidemic is widely believed to have decimated the Aboriginal population of the Sydney region (see, in particular, Attenbrow 2010:21-2 and Kohen 1993: 18).

The primary unit of social organisation amongst the Darug was the clan, with each clan - typically referred to by early European observers as 'tribes' - consisting of around 50 to 60 people and taking its name from the place where its members resided (Attenbrow 2010:2; Kohen 1993: 15). Unlike many Australian Aboriginal groups, social organisation amongst the Darug did not comprise a class system based on moieties or sections but rather was based on clan membership attained through patrilineal descent (Attenbrow 2010:57; Kohen 1993: 35). Totemic affiliations were inherited from a person's father and, along with clan membership, were the basis upon which marriages were arranged and initiations carried out. Kohen (1993: 15) equates the term 'clan' with 'band', defining both as "groups of people who lived together and hunted together". Attenbrow (2010:22), in contrast, draws a distinction between the two, characterising the former as 'local descent groups' and the latter as 'land-using groups' who, though not necessarily all of the same clan, "came together on a daily basis to hunt, fish and gather their food resources". The size of individual bands, Attenbrow (2010:29) suggests, will have varied considerably, being season and activity dependent and ranging from the immediate nuclear family to up to 50 people. Band size aside, it is widely accepted that, on occasion, much larger groups, consisting of up to several bands, came together for occasions such as initiations, funerals and ritual combats.

As to the names and distribution of clans across the Sydney region, very little information on this subject exists. Nonetheless, available ethnohistoric data suggest the presence of numerous clans, each of which distinguished itself from its neighbours by way of unique weapon/tool and body designs/decorations and, in some instances, hair styles as well (Attenbrow 2002: 2, 2010:22-29).

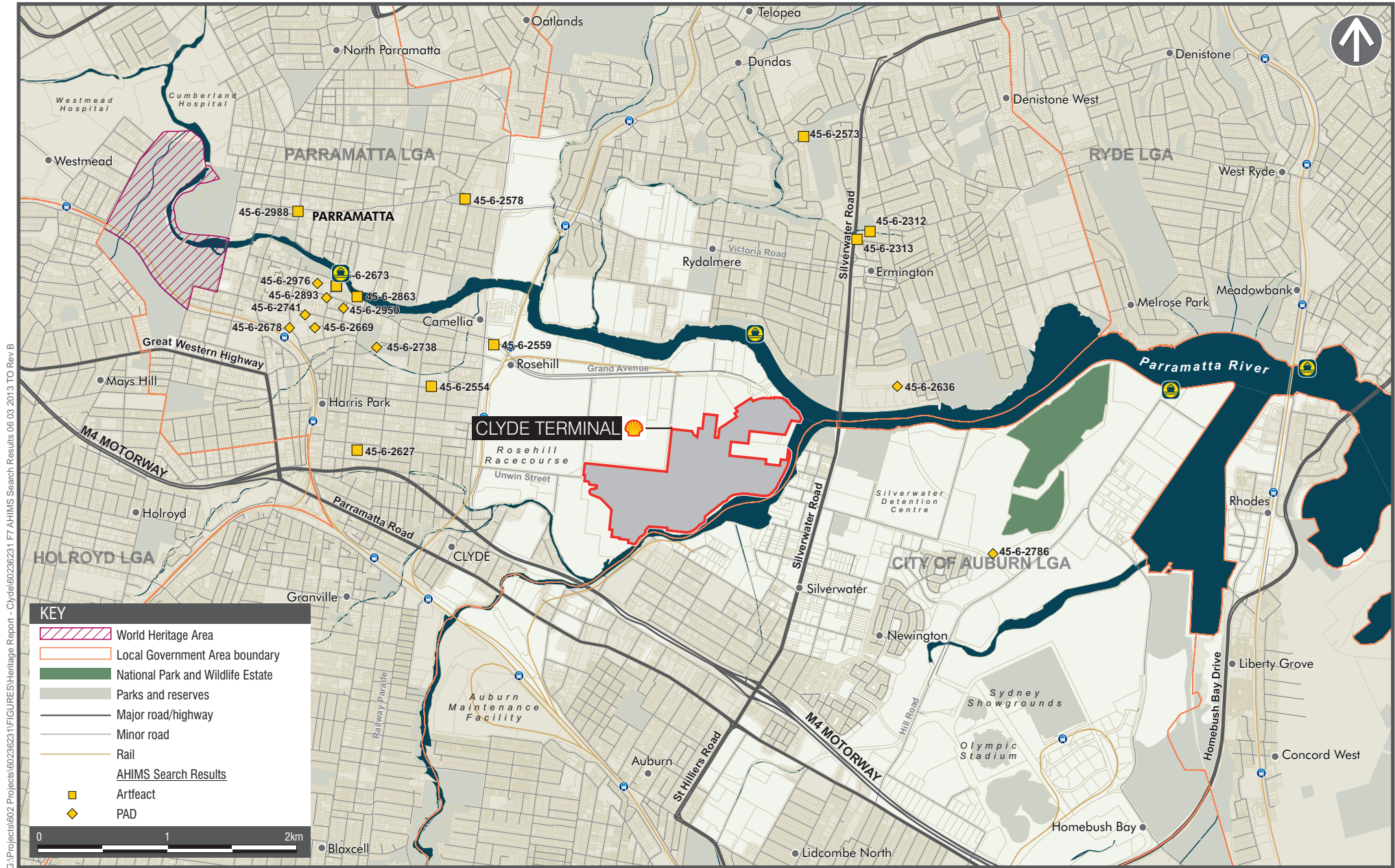
A wide range of aquatic, terrestrial, arboreal and avian fauna were exploited by Darug-speaking peoples for food. Coastal groups are reported to have exploited a wide range of fish and shellfish, as well as crustacea such as crabs and crayfish, and marine mammals such as seals and whales (Attenbrow 2010). Hinterland groups, on the other hand, relied heavily on land mammals such as kangaroos, wallabies, possums, fruit bats and echidnas, with freshwater fish, shellfish, crustacea and tortoises and mammals (e.g. platypus and water rats) also eaten. Complementing faunal resources in both areas, were a range of plant foods, some of which were also used for medicine and implement manufacture. As highlighted by Attenbrow (2010:41), although only about 20 plants in

the Sydney region can be confidently identified as sources of food or raw materials on the basis of colonial observations, the presence in the region of over 200 plant species known to have been consumed in other parts of south eastern Australia, suggests that the total number of plant foods exploited was likely much higher.

As in other parts of south eastern Australia, a wide range of hunting and gathering 'gear' was employed by Darug speaking peoples. Known tools and weapons include wooden fishing and hunting spears (variously barbed with shell, chipped stone tools, fish/shark teeth, sharpened fish or animal bone), wooden spear-throwers and boomerangs, fishing hooks (typically shell but also bird talons, bone and wood), lines and sinkers (small stones), ground stone hatchets, stone pounders and wedges, chipped stone tools such as 'bondi points' and scrapers, as well as wooden shields, clubs and digging sticks, bark baskets, net bags and wooden dishes (Attenbrow 2010:85). Bark canoes were also widely used.

Two major forms of shelter appear to have been utilised by Aboriginal groups in the Sydney region at the time of European contact: rockshelters and small huts built from sheets of bark, branches and bushes. In keeping with the linguistic division of the Darug language into coastal and hinterland dialects, differences in the nature of huts built along the coast and in the hinterland are attested in early colonial writings, with the former reportedly larger (see primary references in Attenbrow 2010:105). It is also worth noting that, unlike those living along the coast, Darug-speaking peoples living on the Cumberland Plain - with its complete lack of rockshelters – appear to have relied heavily on bark huts. With respect to settlement duration, as recently highlighted by Attenbrow (2010:54), "there is little direct historical evidence for the length of time people stayed at any one campsite (be it a rockshelter or bark hut), how often they moved, or what motivated them to move to another campsite". Kohen and Lampert (1987) have argued that "some bands probably lived at one campsite for months of each year and regularly returned to it". However, this argument is not universally accepted (see, in particular, Attenbrow 2010:55; McDonald 2008). These issues notwithstanding, what is clear from the available records is that Aboriginal groups in the Sydney region, Darug-speaking peoples included, moved frequently in the course of their day-to-day lives, if only as part of their daily subsistence routines (Attenbrow 2010:55).

Although almost no information on the subject exists (see Attenbrow 2010:128), spiritual authority amongst Aboriginal groups in the Sydney region, including the Darug, was likely vested in a number of supernatural beings, chief amongst which was Baiame or Baayama, the 'Great Shaper' or 'Thunder-God', variously imagined as a half-human, half-crystal being and/or as a giant in human form. Baiame formed the world by shaping the cosmos from a pre-existing primeval void.



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AHIMS SEARCH RESULTS
 Clyde Terminal Conversion Project
 Environmental Impact Statement

FIGURE 7

6.0 Results

6.1 Site Inspection

As proposed in the draft assessment methodology circulated to RAPs on 11 September 2012, an inspection of proposed impact areas within the Project area was undertaken on 2 October 2012. 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, therefore, were to confirm predicted levels of high disturbance and to provide RAPs with an opportunity to visit proposed impact areas, to provide comment on the cultural value(s) of the Project area and to any raise any concerns they may have regarding the Project, cultural or otherwise.

6.1.1 Field Team and Methods

The archaeological site inspection was undertaken by a combined field team of one AECOM archaeologist (Dr Andrew McLaren) and six RAP representatives. Shell representatives Erica Salazar (Environment Team Lead - Clyde Project) and Jacqueline Roberts (Clyde Environmental Team Leader) acted as escorts.

Owing to OH&S considerations due to the Project area still being an active industrial site, all but one of the proposed impact areas within the Project area was inspected from vehicles driven by escorting Shell personnel. Tanks to the immediate west of the Biotreated Filter Cake Drying Area in the northeast of the Project area were viewed on foot from this area, which was accessed via a short walk from parked cars c.50 m to the south.

Throughout the inspection, proposed project impacts were discussed informally amongst the field team, with Shell representative Erica Salazar explaining the nature and location of these impacts to everyone present. RAP representatives were encouraged throughout to raise any concerns about the Project. Comments on the cultural value(s) of proposed impact areas and the Project area more generally were also encouraged.

6.1.2 Inspection Results

No Aboriginal archaeological sites were identified during the field inspection.

As predicted prior to entering the field, all proposed impact areas within the Project area can be classified as grossly disturbed, with all observed to consist of active or redundant components of the Refinery operation (i.e., existing infrastructure areas). Most, if not all, are likely to have been built on, or cut into, introduced fill. Those portions of the southern boundary inspected on foot can similarly be classified as grossly disturbed. Both areas appear to have been heavily modified by earthworks associated with the construction of refinery infrastructure (e.g., South Security Road) and tree planting.

As to the cultural value(s) of proposed impact areas within the Project area, no specific cultural values or concerns pertaining to these areas were raised by RAP representatives during the field inspection. More broadly, however, RAP representatives Gordon Workman (DACHA), Gordon Morton (DLO) and Des Dyer (DLC) all commented on the pre-disturbance richness of the Clyde refinery site in terms of faunal resources.

6.2 Significance Assessment

6.2.1 Scientific Value(s)

As indicated in **Section 6.1.2**, no Aboriginal archaeological sites were identified during the field inspection. AECOM considers it highly unlikely that any sites remain within the Project area, having been destroyed by the construction and development of the Clyde refinery.

The scale of landscape modification that has occurred within the Project area is such that AECOM considers the Clyde Refinery site to have no remaining scientific research potential with respect to Aboriginal archaeology.

6.2.2 Social (Cultural) Value(s)

Only Aboriginal people can comment on the social or cultural value(s) of the Project area. As indicated above, throughout the assessment process, AECOM has actively sought the opinions of RAPs on this matter, both verbally and in writing. Opportunities for the provision of cultural information have been provided at all stages of the assessment process.

Verbal and written comments provided by RAPs have indicated that, regardless of levels of historic disturbance, the Project area remains a culturally significant and important part of Darug Country. RAPs have also indicated that 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.

No specific cultural values regarding proposed impact areas within the Project area have been raised by RAPs.

6.3 Impact Assessment

No impacts to the identified Aboriginal cultural heritage values of the Project area are anticipated. Proposed impacts are to be conducted in areas that have been grossly modified by the construction of the refinery and, by extension, are considered to retain no potential for the preservation Aboriginal archaeological materials. In addition, none of the proposed impact areas within the Project area have been flagged by RAPs as culturally sensitive or valuable.

7.0 Management Recommendations

7.1 Statutory Requirements

As indicated in **Section 1.0**, the Aboriginal heritage assessment detailed in this report forms part of an EIS being prepared by AECOM to support an application for State Significant Development Consent under Division 4.1 of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the conversion of the Clyde Terminal for use solely as a finished petroleum products terminal.

The 2005 draft *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005) detail the relevant statutory requirements for Aboriginal cultural heritage assessments conducted under Division 4.1 of Part 4 of the EP&A Act. Although not statutorily binding for Division 4.1 assessments, OEH's *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010a) and *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011) provide 'best practice' documents for Aboriginal Cultural Heritage Impact Assessments in NSW. Both documents have been used in the formulation of the management recommendations detailed below.

7.2 Recommendations

An assessment of the potential impacts of the Project on the identified Aboriginal heritage values of the Project area has found that no impacts to these values are anticipated. Accordingly, AECOM makes the following recommendations with respect to Aboriginal cultural heritage:

- 1) No further Aboriginal heritage investigations are deemed warranted for the Project;
- 2) Although considered highly unlikely, should any suspected Aboriginal objects be uncovered during demolition works, all works in the vicinity should cease immediately to prevent any further impacts and a qualified archaeologist be brought on-site to make an assessment. Management action(s) will vary according to the type of evidence identified, its significance (both scientific and cultural) and the nature of potential impacts. The NPW Act requires that, if a person finds an Aboriginal object on land and the object is not already recorded with AHIMS, they are legally bound under s.89A of the NPW Act to notify OEH as soon as possible of the object's location. This requirement applies to all people and to all situations, including when following the due diligence code.
- 3) In the event that possible human skeletal remains are identified, the following standard procedure should be followed:
 - 1) All construction work in the near vicinity of the find location should cease immediately.
 - 2) All land within a 20 m radius of the exposed remains should be cordoned off via temporary fencing. Construction work can continue outside of this area as long as there is no risk of interference to the remains or their assessment.
 - 3) The NSW Police and OEH should be contacted, the latter via OEH's Environment Line (131 555).
 - 4) A physical or forensic anthropologist will be commissioned by the Police to inspect the remains *in situ* (organised by the Police unless otherwise directed by the Police), and make a determination of ancestry (Aboriginal or non-Aboriginal) and antiquity (pre-contact, historic or modern).

Subsequent management actions will be dependent on the findings of the assessment undertaken under Point 4:

- If the remains are identified as modern and human, the area will become a crime scene under the jurisdiction of the Police.
- If the remains are identified as pre-contact or historic Aboriginal, the site will be secured and OEH and all RAPs notified in writing. Where impacts to exposed Aboriginal skeletal remains cannot be avoided, remains will be retrieved via controlled archaeological excavation and reburied outside of the Disturbance Boundary in a manner and location determined by RAPs.
- If the remains are identified as historic non-Aboriginal, the site is to be secured and the NSW Heritage Branch contacted.
- If the remains are identified as non-human, work can recommence immediately.

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Appendix A

Agency Responses



Office of
Environment
& Heritage

Our reference: DOC12/6120

Attn: Geordie Oakes
AECOM
Levl 8, 17 York Street
Sydney
NSW 2000

Dear Ms Oakes,

Thank you for your letter dated 25/7/2012 to the Office of Environment and Heritage (OEH) regarding obtaining a list of the Aboriginal stakeholders that may have an interest in projects for the area of the Shell Clyde Refinery, Rosehill (Parramatta LGA).

Before making an application for the issue of an Aboriginal Heritage Impact Permit, the applicant must carry out an Aboriginal community consultation process in accordance with the National Parks and Wildlife Regulation 2009 and completed to the stage described in subclause 80C.

Please find attached the list of Aboriginal stakeholders known to OEH that may have an interest in the project. OEH's list of regional stakeholders is a list of groups, organisations or individuals who may hold cultural knowledge relevant to a proposal in a region. Consultation with Aboriginal people should not be confused with employment. Inclusion on the OEH's list is not an automatic right to employment. It is the decision of a proponent on who they choose to engage to deliver services based on a range of considerations including skills, relevant experience, and OHS considerations. To be clear, the proponent is under no obligation to employ Aboriginal people registered for consultation.

Further, receipt of this information does not remove the requirement of a proponent/consultant to advertise in local print media and contact other bodies seeking interested Aboriginal parties. Consultation with Aboriginal stakeholders must be in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* which can be found on the Office of Environment and Heritage (OEH) public website by accessing the following link:

<http://www.environment.nsw.gov.au/resources/cultureheritage/commconsultation/09781ACHconsultreq.pdf>

Please note that these requirements replace the *Interim Community Consultation Requirements for Applicants, December 2004*.

If you wish to discuss any of the above matters further please contact Margrit Koettig, archaeologist, on (02) 9995 6866.

Yours sincerely

Handwritten signature of Lou Ewins and the date 2/8/12.

LOU EWINS
Manager Planning & Aboriginal Heritage
Office of Environment and Heritage
Department of Premier and Cabinet

Aboriginal Stakeholders that may have an interest in the Western Sydney area and surrounds

✓ Darug Custodial Aboriginal Corporation	Leanne Watson	02 4577 5181 / 0415 770 163	PO Box 81, Windsor NSW 2756
✓ Darug Tribal Aboriginal Corporation	Sandra Lee	02 9622 4081	PO Box 441, Blacktown NSW 2148
✓ Darug Aboriginal Cultural Heritage Assessments	Gordon Morton	02 4567 7421 or 0422 865 831	90 Hermitage Rd, Kurrajong Hills NSW 2758
✓ Darug Land Observations	Gordon Workman	0415 663 763/ fax 02 9831 8868	PO Box 571, Plumpton, NSW 2761
✓ Darug Aboriginal Land Care Inc	Des Dyer	0408 360 814	18a Perigee Close, Doonside 2767
✓ Gunjeewong Cultural Heritage Aboriginal Corporation	Cherie Carroll Turrise	(02) 6355 4110	1 Bellvue Place, Portland NSW, 2847 * Cherie is Ngunnawal Elder however lived in the Western Sydney area during her childhood. She recognises she is not from the area but has associations.
✓ Scott Franks		0404 171 544	PO Box 76, Caringbah NSW 1495
✓ Deerubbin LALC – Blacktown LGA	Kevin Cavanagh	(02) 4724 5600	2/9 Tindale St, Penrith NSW 2750

Liverpool and Surrounds

Darug Custodial Aboriginal Corporation	Leanne Watson	02 4577 5181 / 0415 770 163	PO Box 81, Windsor NSW 2756
Darug Tribal Aboriginal Corporation	Sandra Lee	02 9622 4081	PO Box 441, Blacktown NSW 2148
Darug Aboriginal Cultural Heritage Assessments	Gordon Morton	02 4567 7421 or 0422 865 831	90 Hermitage Rd, Kurrajong Hills NSW 2758
Darug Land Observations	Gordon Workman	0415 663 763/ fax 02 9831 8868	PO Box 571, Plumpton, NSW 2761
Darug Aboriginal Land Care Inc	Des Dyer	0408 360 814	18a Perigee Close, Doonside 2767
Cubbitch Barta	Glenda Chalker	0427 218 425	55 Nightingale Rd, Pheasants Nest NSW 2574
Gunjeewong Cultural Heritage Aboriginal Corporation	Cherie Carroll Turrise	(02) 6355 4110	1 Bellvue Place, Portland NSW, 2847 * Cherie is Ngunnawal Elder however lived in the Western Sydney area during her childhood. She recognises she is not from the area but has associations.
Scott Franks		0404 171 544	PO Box 76, Caringbah NSW 1495
Gandangara LALC	Mark (Jack) Johnson	(02) 96025280	PO Box 1038 Liverpool NSW 2170

Geordie Oakes
Archaeologist
AECOM
Level 21, 420 George Street
Sydney NSW 1230

27 July 2012

Dear Geordie

Re: Request - Search for Registered Aboriginal Owners

I refer to your letter dated 25 July 2012 regarding Aboriginal stakeholders within the Rosehill area in NSW.

I have searched the Register of Aboriginal Owners and the project area described does not have Registered Aboriginal Owners pursuant to Division 3 of the *Aboriginal Land Rights Act 1983* (NSW).

I suggest you contact the Derrubbin Local Aboriginal Land Council. They will be able to assist you in identifying other Aboriginal stakeholders for this project.

Yours sincerely



Tabatha Dantoine
Administrative Officer
Office of the Registrar, *Aboriginal Land Rights Act* (1983)

McLaren, Andrew

From: Maggie Kyle <mkyle@parracity.nsw.gov.au>
Sent: Wednesday, August 08, 2012 12:09 PM
To: Oakes, Geordie; McLaren, Andrew
Subject: your request re Indigenous Individuals, organisations re Shell Clyde Refinery Conversion

Good Morning,

I convene Parramatta City Council's Aboriginal and Torres Strait Islander Advisory Committee and received your letter requesting information regarding Indigenous individuals/ organisations who may hold cultural knowledge and want to be consulted regarding the refinery conversion.

I have forwarded your letter on to Aboriginal members of Council's Aboriginal and Torres Strait Islander Advisory Committee and asked them to contact you directly should they wish to be involved.

Due to Council's policies and protocols I am not able to send you on these individuals' contact details.

I have also forwarded your letter to other Aboriginal individuals and organisations not on Council's Advisory Committee but who have expressed the desire to be kept informed regarding relevant Council/ Parramatta LGA issues.

These organisations include the following, and if you have not already contacted them, I would urge you to as they concern the Traditional Owners of the land:

Darug Tribal Aboriginal Corporation
Dharug Custodian Aboriginal Corporation

The contact details of these organisations are available on the web.

Maggie

Maggie Kyle
Community Capacity Building Officer
Parramatta City Council

0414 190 262 02 9806 5082
f: 9806 5914

Visit <http://www.parracity.nsw.gov.au>

Attention: This e-mail is privileged and confidential. If you are not the intended recipient please delete the message and notify the sender. The use, copying or distribution of this message or any information it contains, by anyone other than the intended recipient is prohibited by Parramatta City Council. Any views or opinions presented are solely those of the individual sender, except where the sender specifically states them to be the views of the Council.

Think before you print - help save our environment!



**Catchment Management
Authority**
Sydney Metropolitan

ABN 93695453413

Ground Floor, Macquarie Tower,
10 Valentine Ave, Parramatta. NSW 2150
PO Box 3720, Parramatta. NSW 2124.
Tel:02 9895 7898 Fax: 02 9895 7330
Internet: www.cma.nsw.gov.au

File Ref: SM01718-1
Letter No: 0604525
Contact: Margaret Bottrell
Phone: 98957458
Email:margaret.bottrell@cma.nsw.gov.au

30 July 2012

AECOM Australia Pty Ltd
Level 8, 17 York St,
Sydney, NSW 2000

Dear Mr Oakes

Re: Shell Clyde Refinery Conversion – Request for Aboriginal Stakeholder Information

I refer to your letter of 25 July 2012 seeking Aboriginal Stakeholder Information for the subject: Shell Clyde Refinery Conversion.

Because of the size and complexity of Sydney, I regret to advise that the Sydney Metropolitan Catchment Management Authority (SMCMA) is unable to provide a list of all known local Aboriginal people who may be interested in being consulted on the project.

As per the Office of Environment and Heritage (OEH) Guidelines for Aboriginal Cultural Heritage Assessments 2010, we trust that you have sent a copy of this letter to:

- The relevant (OEH) EPRG regional office
- The relevant Local Aboriginal Land Council(s) (LALC)
- The Registrar, *Aboriginal Land Rights Act*
- The National Native Title Tribunal
- Native Title Services Corporation (NTSCorp)
- Relevant local council(s)

Your letter will be forwarded to the SMCMA Aboriginal Advisory Committee (AAC) for their information.

Please contact Margaret Bottrell at the SMCMA on the above contact numbers for further information.

Yours sincerely

John Carse
GENERAL MANAGER



National
Native Title
Tribunal



27/07/2012

Andrew McLaren
Archaeologist
AECOM
PO Box Q410
QVB Post Office NSW 1230

Sydney Office, Operations East

Level 16
Law Courts Building
Queens Square
Sydney NSW 2000
GPO Box 9973
Sydney NSW 2001
Telephone (02) 9227 4000
Facsimile (02) 9227 4030

Our Reference: 503612jd

Dear Mr McLaren

Native Title Search Results of Lane Cove and Parramatta Local Government Areas

Thank you for your search requests received on 26 July 2012 in relation to the above area.

Search Results

The results provided are based on the information you supplied and are derived from a search of the following Tribunal databases:

Lane Cove Local Government Area

Register Type	NNTT Reference Numbers
Schedule of Applications (unregistered claimant applications)	Nil
Register of Native Title Claims	Nil
National Native Title Register	Nil
Register of Indigenous Land Use Agreements	Nil
Notified Indigenous Land Use Agreements	Nil

Parramatta Local Government Area

Register Type	NNTT Reference Numbers
Schedule of Applications (unregistered claimant applications)	Nil
Register of Native Title Claims	Nil
National Native Title Register	Nil
Register of Indigenous Land Use Agreements	Nil
Notified Indigenous Land Use Agreements	Nil



At the time this search was carried out, there were **no relevant entries** in the above databases.

Please note: There may be a delay between a native title determination application being lodged in the Federal Court and its transfer to the Tribunal. As a result, some native title determination applications recently filed with the Federal Court may not appear on the Tribunal's databases.

Tribunal accepts no liability for reliance placed on enclosed information

The enclosed information has been provided in good faith. Use of this information is at your sole risk. The National Native Title Tribunal makes no representation, either express or implied, as to the accuracy or suitability of the information enclosed for any particular purpose and accepts no liability for use of the information or reliance placed on it.

If you have any further queries, please do not hesitate to contact me on the number below or on the free call number 1800 640 501.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'J. Di Blasio'.

Jessica Di Blasio | EXECUTIVE ASSISTANT/CLIENT SERVICES OFFICER

National Native Title Tribunal | Sydney office, Operations East

Level 16, Law Courts Building, Queens Square, Sydney, New South Wales 2000

Telephone (02) 9227 4000 | Facsimile (02) 9227 4030 | Email jessica.diblasio@nntt.gov.au

Freecall 1800 640 501 | www.nntt.gov.au

Facilitating timely and effective outcomes.



Searching the NNTT Registers in New South Wales

Search service

On request the National Native Title Tribunal will search its public registers for you. A search may assist you in finding out whether any native title applications (claims), determinations or agreements exist over a particular area of land or water.

In New South Wales native title cannot exist on privately owned land including family homes or farms.

What information can a search provide?

A search can confirm whether any applications, agreements or determinations are registered in a local government area. Relevant information, including register extracts and application summaries, will be provided.

In NSW because we cannot search the registers in relation to individual parcels of land we search by local government area.

Most native title applications do not identify each parcel of land claimed. They have an external boundary and then identify the areas not claimed within the boundary by reference to types of land tenure e.g., freehold, agricultural leasehold, public works.

What if the search shows no current applications?

If there is no application covering the local government area this only indicates that at the time of the search either the Federal Court had not received any claims in relation to the local government area or the Tribunal had not yet been notified of any new native title claims.

It does not mean that native title does not exist in the area.

Native title may exist over an area of land or waters whether or not a claim for native title has been made.

Where the information is found

The information you are seeking is held in three registers and on an applications database.

National Native Title Register

The National Native Title Register contains determinations of native title by the High Court, Federal Court and other courts.

Register of Native Title Claims

The Register of Native Title Claims contains applications for native title that have passed a registration test.

Registered claims attract rights, including the right to negotiate about some types of proposed developments.

Register of Indigenous Land Use Agreements

The Register of Indigenous Land Use Agreements contains agreements made with people who hold or assert native title in an area.

The register identifies development activities that have been agreed by the parties.

Application summaries

An application summary contains a description of the location, content and status of a native title claim.

This information may be different to the information on the Register of Native Title Claims, e.g., because an amendment has not yet been tested.

How do you request a search?

A search request form is available on the Tribunal's web site at:



<http://www.nntt.gov.au/registers/search.html>

Mail, fax or email your request to the

Tribunal's Sydney registry, identifying the local government area/s you want searched.

Email: SydneySearch@nntt.gov.au

Fax: (02) 9227 4030

Address: GPO Box 9973, Sydney NSW 2001

Phone: (02) 9227 4000

Appendix B

Newspaper Advertisement

Aboriginal Stakeholder Consultation

Aboriginal Cultural Heritage Assessment

Shell Clyde Refinery Conversion, Rosehill, Sydney, NSW

AECOM Australia Pty Ltd (AECOM), an affiliate of Shell, is seeking to identify Aboriginal persons or organisations who wish to be consulted in relation to the proposed Shell Clyde Refinery Conversion of Rosehill, Sydney, NSW.

Shell is seeking approval for the conversion of the Clyde Refinery to use solely as a finished fuels terminal, in order to identify potential heritage constraints to the development, an Aboriginal heritage assessment has been proposed for the terminal site.

Interested Aboriginal persons or stakeholders who hold cultural knowledge relevant to determining the significance of Aboriginal objects and places in the area of the proposed project are requested to register their interest in writing to:

Geordie Oakes
AECOM Australia Pty Ltd
PO Box 9210, QVB Post Office
Sydney, NSW 1230
Phone: +61 2 8934 0610 **Fax:** +61 2 8934 0001
Email: geordie.oakes@aecom.com

Expressions of interest should include current contact details.
The closing date for registration is **COB 30 August 2012**.

NB: Registration does not guarantee employment during fieldwork.

Appendix C

Expressions of Interest

Darug Aboriginal Cultural Heritage Assessments

ABN 51734106483

Gordon Morton & Associates

Mob: 0422 865 831

Fax: 45 677 421

Celestine Everingham

90 Hermitage Rd., Kurrajong Hills, 2758

Ph/Fax: 45677 421

Mob: 0432 528 896

17. 8. 12

Attention

Andrew McLaren

AFCOM

Dear Andrew,

re

1. Shell Gorge Bay Terminal Modification
Greenwich
2. Shell Clyde Refinery Conversion
Rosehill

DACTA wishes to register their interest in both of the above areas. We look forward to hearing from you.

Yours Sincerely,

C. Everingham

Darug Aboriginal Landcare Incorporated



**18 a Perigee Close
Doonside
NSW 2107**

Dr Andrew McLaren
AECOM Australia Pty Ltd
level 21, 420 George Street
~~Sydney 2000~~
NSW

Re: Shell Clyde Refinery:

Dear Andrew,

The Darug Aboriginal Landcare Incorporated Would like to register an interest to the proposed area of development .

We would like to register as a stakeholder and be involved in regards to the Aboriginal Cultural Heritage.

We would like to take part in the field survey and be in consultation in the development process.

Respectfully yours,

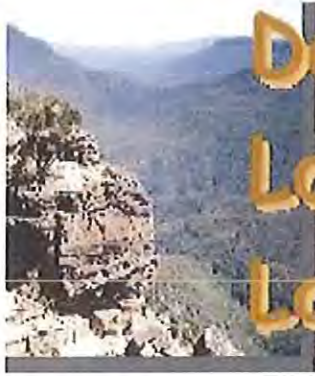
Des Dyer

Public Officer

Darug Aboriginal Land Care incorporation

Fax (02) 88 14 95 47

Mobile 0408 360 814



Deerubbin Local Aboriginal Land Council

Level 2, 9 Tindale Street
PENRITH NSW 2750

PO Box 40
Penrith BC
NSW 2751 AUSTRALIA

T: (02) 4724 5600
F: (02) 4722 9713
E: Staff@deerubbin.org.au
W: <http://www.deerubbin.org.au>

AECOM Australia Pty Ltd
Level 21, 420 George Street
SYDNEY. NSW. 2000

31 August 2012

Subject: Deerubbin Local Aboriginal Land Council,
Register of Interest to participate in this project.
Aboriginal Cultural Heritage Assessment
Shell Clyde Refinery Conversion
Rose Hill

Attention: Andrew P. McLaren,

I refer to your letter of 15 August 2012

Deerubbin Local Aboriginal Land Council ("Deerubbin LALC") wishes you to formally register our requirement to participate in the Aboriginal cultural heritage investigations for the proposed Conversion of the Shell Clyde Refinery at Rose Hill. NSW.

Should you require any further information please do not hesitate to contact me on (02) 4724 5600

Yours Faithfully

Kevin Cavanagh
(Chief Executive Officer)

21-8-12

Darug Land Observations

**Dr Andrew P McLaren
Archaeologist**

Re: Shell Clyde Refinery Conversion, Rosehill, Sydney, NSW

D.L.O's letter of interest in the Shell Clyde Refinery Conversion, Rosehill

**With Thanks
Uncle
Gordon Workman
Darug Elder.**



Tocomwall Pty Ltd

PO Box 76 Caringbah NSW 1495

Tel: 02 9542 7714 Fax: 02 9524 4146

Email: info@tocomwall.com.au www.tocomwall.com.au

ABN: 13 137 694 618

20 August 2012

Dr Andrew P McLaren & Rochelle Coxon
AECOM
Level 21, 420 George Street
SYDNEY NSW 200
Via email: andrew.mcclaren@aecom.com & rochelle.coxon@aecom.com

Dear Andrew & Rochelle,

RE: Registration of Interest – Aboriginal Cultural Heritage Assessment, Shell Clyde Refinery Conversion, Rosehill, Sydney NSW

Tocomwall is seeking *primary involvement* in all consultation meetings and field work for the above mentioned project.

Tocomwall represents traditional owners from this area and retains local and oral history on behalf of its membership. We do not accept or support any person or organisation that comments regarding the said area unless confirmed in writing by myself.

Please also be advised that this Aboriginal organisation does not do volunteer work or attend unpaid meetings.

All correspondence should be emailed to scott@tocomwall.com.au and sarah@tocomwall.com.au or to the above postal address.

Yours faithfully

Scott Franks
Director & Aboriginal Heritage Manager

Appendix D

Draft Assessment Methodology

11 September 2012

Dear Sir/Madam,

Re: Clyde Refinery Conversion: Aboriginal Cultural Heritage Assessment - Draft Methodology

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) has been commissioned by Shell Refining Australia (Shell) to undertake an Aboriginal cultural heritage assessment for the Clyde Refinery Conversion project (the Project). The Aboriginal heritage cultural assessment is to form part of an Environmental Impact Statement (EIS) being prepared by AECOM to support an application for State Significant Development Consent under Division 4.1 of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act)) for the conversion of the Clyde Refinery for use solely as a finished fuels terminal.

The overarching objectives of the Aboriginal cultural heritage assessment are to: a) identify, through background research, a site inspection and Aboriginal community consultation, the scientific and cultural values of land within the Site Boundary (hereafter referred to as the 'Project area'); and b) to provide, where appropriate, a management strategy for the known and potential Aboriginal cultural heritage resource of the Project area.

This draft methodology provides some background information about the Project area and describes the proposed assessment methodology. ***Aboriginal stakeholders are invited to comment on this draft. Comments from Aboriginal stakeholders will be reviewed and addressed in the final methodology. Aboriginal stakeholders are also invited to provide comments regarding the Aboriginal heritage cultural values of the Project Area.***

2.0 The Project Area

The Clyde Shell Refinery is located at the confluence of Parramatta and Ducks Rivers in Rosehill, New South Wales (NSW), approximately 16km west of Sydney's CBD. The refinery, which receives crude oil from Shell's Gore Bay Terminal via 19 km of underground pipeline, is bounded to the north by Parramatta River, to the south and east by Duck River, and to the west by industrial complexes. The Project area falls wholly within the Parramatta Local Government Area (LGA) and is zoned *IN3 Heavy Industrial* under the Parramatta Local Environment Plan 2011 (LEP 2011).

3.0 Project Overview

Shell is seeking approval under Division 4.1 of Part 4 of the EP&A Act for the conversion of the Clyde Refinery for use solely as a finished fuels terminal. The conversion of the Clyde Refinery would comprise:

- Conversion of part of the existing Clyde Refinery assets to receive, blend, store and distribute solely imported finished products to continue to be supplied to the existing Parramatta Terminal;
- Demolition of the existing refinery processing units (excluding the existing Basell polypropylene unit) and other redundant infrastructure at the site; and
- Current storage tank reallocation into final grades of fuel. Demolition of surplus storage tanks.

The major Project components include:

- Repair and preparation of current finished product and crude oil storage tanks to suit proposed terminal operation;
- Repair and improvements to tank bunding where necessary;
- Upgrades to tank instrumentation and tank control systems to enable remote and automated control;
- Installation of new inlet manifold systems and remote valves with segregated product distribution piping to respective tanks;
- Installation of a fixed fire system to replace the existing mobile fire service;
- Revised pumping and gantry supply piping systems;

- Revised site electrical systems;
- Revised site drainage and water treatment to suit reduced operation;
- Upgrades to safeguarding systems; and
- Other site infrastructure to facilitate safe and efficient operations, e.g. lighting, safety shutdown systems, control room facilities and amenities.

The eastern section of the Refinery site would be modified to contain the finished product tanks required for continuing terminal operations. This area currently contains some of the crude oil tanks, intermediate product tanks and finished product tanks used in the current refinery operations.

The western section of the Refinery site contains the crude oil processing and blending facilities, crude oil, intermediate product and finished product tanks. Assets and processing units no longer required following completion of the conversion work within this area will be decommissioned. The timeframe for the demolition and removal is still to be determined. The final use of the land in the western area is the subject of ongoing assessment and will be subject to a separate development application.

The conversion would reduce the number of tanks in use at Clyde from the current 36 tanks to the proposed 16 tanks. Products stored will include Unleaded Petrol 91, 95 and 98, Jet A1 fuel and Automotive Gas Oil (AGO) and the site will continue to store Butane in 2 above-ground spheres with associated the LPG gantry. Lyondell Basell Australia is anticipated to continue their existing operation at present and the mounded LPG tanks will be retained to support their operations. The current Gore Bay – Clyde pipeline would continue to be used to receive product and the existing Hunter, Silverwater and JUHI pipelines will continue to transfer product to Newcastle, Silverwater (if required) and Sydney Airport.

The Project does not include the works related to land restoration and possible redevelopment of the land that becomes surplus to requirements at the Clyde refinery site. This will be the subject of a separate application.

4.0 Background Information

4.1.1 AHIMS Database

The AHIMS database, administered by OEH, contains records of all 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 was conducted on 23 July 2012. A total of 20 registered Aboriginal sites were identified within a 4 x 4 km area centred on the Project area. However, none of these sites were recorded within the Project area. Of the sites identified locally, 11 are stone artefact sites and nine are areas of Potential Archaeological Deposit (PAD).

4.1.2 Coastal Research in Port Jackson

The Aboriginal archaeological record of Port Jackson's coastal zone - defined here as all land east of Parramatta, south of Broken Bay and north of Botany Bay - is well-researched, with formal investigations having been undertaken since the late 19th century (e.g., David and Etheridge 1889a, 1989b, Etheridge and Whitelegge 1907). Recent decades, in particular, have witnessed a dramatic increase in the number of Aboriginal archaeological investigations undertaken in this zone, both in developer-funded and academic research contexts (Attenbrow 2010). Investigations to date have generated an enormous body of archaeological data concerning pre-contact Aboriginal settlement and subsistence patterns, with thousands of sites having been identified and recorded in varying degrees of detail (Attenbrow 2010). Middens and rockshelter sites are particularly well represented in this zone, with the latter incorporating a variety of evidence of past Aboriginal activities including food preparation and consumption, organic and non-organic tool manufacture and maintenance, the production of rock art and the burial of the dead (Attenbrow 2010; Donlan 1995; McDonald 2008). However, a variety of other site types (e.g., grinding groove and rock engraving sites, open artefact sites) are also known.

Archaeological faunal assemblages from this zone indicate the exploitation, for food and other purposes, of wide range of terrestrial and aquatic resources, with marine fauna (i.e., fish, shellfish, crustacea and marine mammals) 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, with less than 20 radiocarbon determinations currently available (see Attenbrow 2010: 18, Table 3.1). Nonetheless, it has been suggested that the majority date to the mid-to-late Holocene, with dates inferred principally on the basis of the presence/absence of chronologically diagnostic stone tools such as backed artefacts and edge-ground hatchets (but see Attenbrow and Hiscock 1998 regarding the antiquity of backed artefact manufacture in the region). At present, the earliest date for Aboriginal occupation of Port Jackson's coastal zone stands at 5,840±50 BP, a determination obtained on a sample of midden shell from a large Aboriginal rockshelter site above Tunks Creek near Cammeray (Attenbrow 1994).

4.1.3 Local Aboriginal Archaeological Investigations

McDonald (1990) *Proposed Extension to Ferry Services Parramatta River West of Silverwater Bridge Archaeological Survey*

McDonald (1990) undertook an archaeological assessment, including field survey, for a proposed extension to ferry services on the Parramatta River, west of Silverwater Bridge, which included seven potential ferry terminal sites. All seven proposed terminal sites, located along the Parramatta foreshore, were surveyed without identifying Aboriginal archaeological sites.

Koettig (1992) *Assessment of Aboriginal Sites Rydalmere Hospital Parramatta Orphan School Project*

Koettig (1992) undertook an archaeological assessment, including field survey, as part of a conservation plan prepared Rydalmere Hospital, Parramatta. The hospital occupies a portion of land directly adjacent to the northern bank of Parramatta River approximately 2 km from the Shell Refinery. While background research and field survey did not identify surface artefacts, the assessment noted the 'high' potential for evidence of Aboriginal occupation to be found associated with Parramatta River, which in some instances may be 'beneath the current layers of European cultural material' (Koettig 1992: 6).

Biosis (2008) *Rosehill Recycled Water Scheme: Aboriginal Archaeological and Cultural Heritage Assessment*

Biosis (2008) undertook an archaeological assessment, including fieldwork, for the Rosehill Recycled Water Scheme, a project that included the construction of a recycling plant, storage facility and pipeline distribution network. Of the planned works, a storage reservoir and associated pipeline were planned adjacent to the eastern boundary of the Shell Refinery. The assessment identified one previously recorded AHIMS site, PAD 45-5-3272, within proximity to the proposed works; however, the site is some distance from the current Project area.

5.0 Environmental context

The nature and distribution of Aboriginal archaeological sites are closely connected to the environments in which they occur. As mobile hunter-gatherers, environmental variables such as topography, geology, hydrology and vegetation will have played a critical role in influencing how Aboriginal people moved within, and utilised, their respective Country. Amongst other things, these variables affected the availability of suitable campsites, potable water, edible and otherwise useful plant and animal resources, and raw materials for the production of stone and organic implements. Accordingly, any attempt to predict or interpret the character and/or distribution of Aboriginal sites in a given landscape must take such environmental factors into account. At the same time, an assessment of past and current land use practises allows predictions to be made concerning the likely presence or absence of sites and, where appropriate, their archaeological integrity.

5.1.1 Climate

The present-day climate of the Sydney region can be characterised as temperate, with warm summers and mild winters. January is the hottest month of the year, with a mean high of 25.9°C and mean low of 18.7°C (Bureau of Metrology 2012). July, conversely, is the coldest, with a mean high of 16.3°C and mean low of 8°C. Intra-regional temperatures are moderated principally by proximity to the sea. In summer, they are highest in the western or inland part of the region, with temperatures in coastal areas tempered by on-shore winds and sea breezes (Attenbrow 2010: 40). In winter, temperatures in the west are lower than those along the coast. Mean monthly rainfall figures for the region attest to a degree of seasonal patterning in levels of rainfall (Bureau of Metrology 2012). Spring has the lowest average rainfall (76.6 mm) whereas autumn has the highest (125.6 mm). Rainfall averages for winter and summer, meanwhile, are comparable (99.1 and 103.2 mm respectively). The region as a whole has an average annual rainfall of 1213 mm (Bureau of Metrology 2012).

5.1.2 Hydrology

The Parramatta and Duck Rivers, both tributaries of Sydney Harbour, dominate the hydrology of the Project area. Parramatta River, being the larger of the two rivers, commences at the confluence of Toongabbie and Darling Mills Creeks west of Parramatta and travels eastward to its junction with Lane Cover River at Greenwich. This large watercourse forms the northern boundary of the Project area where it is approximately 120 wide and bordered on both sides by remnant mangrove, eucalypts and casuarinas (*Casuarina glauca*). Urban development and high density land uses have dramatically altered the original flow rates of the Parramatta River resulting in greater water volumes and an increase in flood events today than at the time of European settlement.

Duck River, a freshwater watercourse, commences as a modified concrete banked drain in Birrong, south of Parramatta. From this point, it flows in a northeasterly direction for 11.5 km to where it joins the Parramatta River at the location of the Shell Refinery. Duck River forms a natural border at the southern and eastern extent of the Project area, where it is approximately 50 m wide and is boarded by a thin corridor of remnant mangrove.

5.1.3 Topography

The current topography of the Project area, as shown on the Sydney 9130 Mapsheet (Department of Lands 2007), consists of modified/disturbed flat terrain as a result of past and present European land-use practices. However, studies of the estuarine environment of Sydney Harbour and Parramatta River have indicated that at the time of European settlement extensive areas of wetland comprising saltmarsh, mangrove and mudflats occurred in the Parramatta and Duck River environments (see McLoughlin 2000 for a discussion). Mapping undertaken by McLoughlin of the confluence of the Parramatta and Duck Rivers, the area now occupied by the Shell Refinery, suggests that the area was once dominated by wetland comprising large patches of saltmarsh and mangrove, in addition to a narrow corridor of mudflat adjacent to the River's main channels. Examination of historic aerials available from the Department of Lands (accessed July 24 2012) dated to 1943 support these findings, indicating the Project area was an inter-tidal zone cut by narrow channels covered with what is likely thick communities of saltmarsh and mangrove.

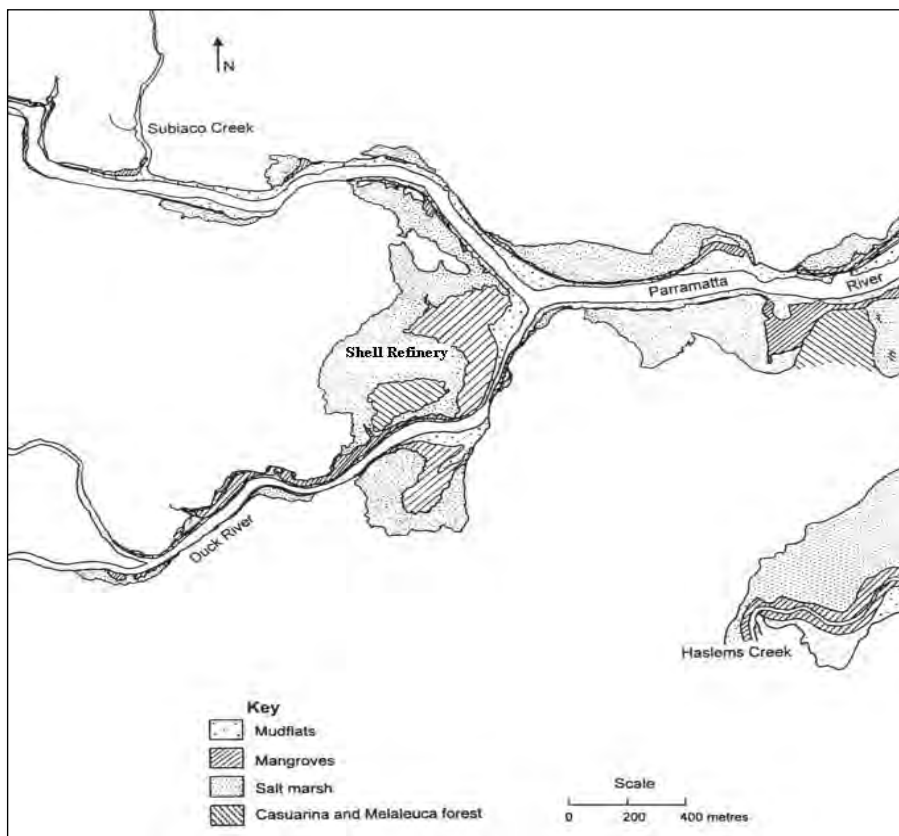


Figure 1 McLoughlan's (2000) estuarine mapping of Parramatta and Duck Creeks (from McLoughlin 2000: 598, Figure 3b)

As a result of this wetland environment, construction of the refinery was preceded by dredging of surface waters and artificial filling and levelling, processes that produce significant disturbances to the underlying land. According

to the Sydney 1:100,000 Geological map sheet, the Project area comprises dredged estuarine sand and mud, demolition rubble, industrial and household waste. Today, the topography of the Project area is largely the result of these processes and comprises of flat modified terrain over the majority of the site with the exception of remnant patches of wetland in the north-eastern corner and along the fringes of the Parramatta and Duck Rivers.

5.1.4 Geology and Soils

The Shell Clyde Refinery is located within the physiographic region known as the Cumberland Lowlands at a point where it borders both the Sydney Foreshore and Hornsby Plateau regions. All three of these physiographic regions fall within Sydney Basin, a region of Permian and Triassic sediments bounded to the west by the Lachlan Fold Belt and to the northeast by the New England Fold Belt. Within the Project area, the underlying geology comprises Hawkesbury Sandstone, into which the Parramatta River has cut and subsequently exposed sections, particularly along its northern bank (McDonald 1990; McLoughlin 2000). Overlaying Hawkesbury Sandstone are Wianamatta Group shales that have been stripped of sediment resulting in large deposits of Quaternary alluvium along both the Parramatta River and Duck Rivers that occur as inter-tidal mudflats. Examination of the geological map sheet available for the Project area indicates its surface geology consists of Quaternary alluviums with a lithology of silty to peaty sand, silt, clay and mud, which for the majority of the Project area have been dredged and overlain with demolition rubble, and industrial and household waste.

According to Chapman and Murphy (1989) two soil landscapes underpin the Project area: Disturbed Terrain (xx) and the Ettalong (et) swamp landscape. Almost all of the Project area comprises Disturbed Terrain, with the exception of a small pocket of Ettalong soil landscape in the northeast corner.

5.1.5 Flora and Fauna

Today, little vegetation remains within the Project area having been cleared prior to construction of the refinery. The extent of clearing and landscaping undergone within the Project area makes it difficult to assess the pre-European vegetation. However, reference to Benson and Howell's (1994) natural vegetation of the Sydney 1:100,000 map sheet suggests that prior to clearance vegetation within the Project area comprised estuarine complex. Benson and Howell (1994) list four potential zones of vegetation dependent upon duration of tidal inundation and salinity:

1. Open-scrub of *Avicenna marina* and *Aegiceras corniculatum*, confined to the seaward edge of the mudflat and consisting of mangrove;
2. Herbland of *Sarcocornia quinqueflora* and *Suaeda australis* in saltmarsh zones;
3. Rush land of *Juncus kraussii* and *Phragmites australis* in areas of brackish water and infrequent tidal inundation; and
4. Low open forest of *Casuarina glauca* and *Baumea juncea* in areas with saline soils and period flooding.

Considering McLoughlin's (2000) mapping of the Project area (see **Figure 1**), it can be concluded that vegetation within the Project area, prior to construction of the refinery, mostly comprised a combination of mangrove on mudflats and herbland in saltmarsh areas.

With the almost complete clearance of vegetation within the Project area, it is difficult to accurately assess the Project area's pre-contact faunal landscape. Nonetheless, consideration of pre-contact vegetation regimes and studies of archaeological sites, particularly middens, within similar estuarine environments (e.g., Attenbrow 1990; 1992) suggest that a range of marine and terrestrial faunal resources were present in the area. Locally occurring marine resources, for example, are likely to have consisted of a wide range of fish and shellfish, crustacea such as crabs and crayfish, and marine mammals such as seals and whales. Freshwater faunal resources, meanwhile, are likely to have consisted of a variety of terrestrial mammals (e.g., kangaroos, wallabies, possums), birds, reptiles and amphibians, as well as freshwater fish and shellfish.

5.1.6 Land Use Impacts / Disturbance

With the exception of c.8 ha parcel of mangrove swamp in the north-eastern portion of the Project area, the entire Project area can be classified as grossly disturbed, with the initial construction and ongoing development of the Clyde Refinery resulting in a radical reformulation of the natural landscape of the area. Aboriginal archaeological materials are highly unlikely to exist in grossly disturbed areas.

6.0 Approach

This section provides information on the approach AECOM intends to use for undertaking this Aboriginal cultural heritage assessment. The assessment process has been divided into three broad sets of tasks:

- Desktop study;
- A site inspection of proposed impact areas within the Project area; and
- Consultation with Aboriginal stakeholder groups in order to define the cultural heritage values of the Project area.

6.1.1 Desktop Study

The desktop survey methodology comprises:

- A search of OEH's AHIMS database prior to archaeological survey;
- A review of the landscape (i.e. environmental) context of the Project area, with particular emphasis on its archaeological implications; and
- A review of relevant archaeological and ethnohistoric information for the Project area.

6.1.2 Site Inspection

An inspection of proposed impact areas within the Project area will be conducted for the purposes of confirming levels of past disturbance and assessing archaeological potential. AECOM considers it highly unlikely that any Aboriginal archaeological materials will be present within proposed impact areas due to the scale of historic land use impacts within the Project area. The inspection is expected to take a few hours. Subject to operational health and safety considerations, impact areas will be inspected by a combined field team of two AECOM archaeologists and registered stakeholder representatives. Relevant safety inductions will be conducted on-site prior to the commencement of the inspection and these will be coordinated by Shell personnel.

7.0 Social/Cultural Values Assessment

Aboriginal stakeholders are in the best position to provide information on the Aboriginal social/cultural values of a given area. During the assessment process, AECOM will consult with Aboriginal stakeholders regarding the cultural heritage values of the Project area. This will include as a minimum:

- A request (in this draft methodology) for any initial comments regarding the Aboriginal cultural heritage values of the Project area;
- The provision of this draft assessment methodology to all registered stakeholders for comment prior to fieldwork;
- Discussion of cultural heritage values during the site inspection;
- The provision of a draft Aboriginal cultural heritage assessment to all registered stakeholders for comment prior to finalisation.

Consultation will be undertaken in accordance with DEC's *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005).

8.0 References cited

Attenbrow, V. 1990. *The Port Jackson Archaeological Project: report on Stage 1*. Unpublished report for the Australian Institute for Aboriginal and Torres Strait Islander Studies.

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Yours faithfully,



Geordie Oakes
Archaeologist
geordie.oakes@aecom.com

Direct Dial: +61 2 8934 0610
Direct Fax: +61 2 8934 0001

Appendix E

Responses to Draft Methodology

Darug Aboriginal Cultural Heritage Assessments

ABN 51734106483

Gordon Morton & Associates

Mob: 0422 865 831

Fax: 45 677 421

Celestine Everingham

90 Hermitage Rd., Kurrajong Hills, 2758

Ph/Fax: 45677 421

Mob: 0432 528 896

19. 9. 12

Attention

Geordie Oakes
AKCOM

re Clyde Refinery Conversion - Darug
Cultural Heritage Assessment.

DACHA have reviewed your report on the
project area which had been a very
important food measure area for the
Darug. We support your methodology and
we wish to be consulted at all times and to
participate in all field work.

Yours Sincerely
C. Everingham

Oakes, Geordie

From: mulgokiwi@bigpond.com
Sent: Friday, September 21, 2012 6:18 PM
To: Oakes, Geordie
Subject: Clyde Refinery Conversion

Dear Geordie,

The Darug Custodian Aboriginal Corporation have received and reviewed the draft methodology for the Clyde refinery conversion project.

We support the draft methodology.

This area is significant to the Darug Parramatta and the surrounding areas have numerous intact Darug sites and also many contact sites that need to be investigated and record the information for the Darug people.

Please contact us with all enquiries by email or phone 0415770163.

Regards
Leanne Watson

DARUG - LAND - OBSERVATIONS



ABN: 87239202455
E-MAIL: gordow51@bigpond.net.au
PO BOX: 571 Plumpton. NSW 2761
Phone: 029831 8868 or 0415 663 763



12-9-2012

Geordie Oakes
Archaeologist

Re: Draft methodology for the Clyde Refinery project

The Clyde Refinery is on Darug Land which today is still very important spritely and historically song and story lines are here still. D.L.O has no concerns with Methodology you have prepared for this the Clyde Refinery project

As always D.L.O would be involved in the monitoring of the top soil removal and all other form of works to be carried out on this Site.

Yours faithfully

Uncle
Gordon Workman
Darug Elder

Sites Officer

Appendix F

Responses to Draft Report

DARUG - LAND - OBSERVATIONS



ABN: 87239202455
E-MAIL: gordow51@bigpond.net.au
PO BOX: 571 Plumpton. NSW 2761
Phone: 029831 8868 or 0415 663 763



6-11-2012

Andrew McLaren

AECOM

Re: Clyde Refinery Conversion

D.L.O has no concerns with all of these Recommendations in your report only on this work site, any further work please contact D.L.O

Yours faithfully

**Uncle
Gordon Workman
Darug Elder**

Sites Officer

McLaren, Andrew

From: Scott Franks <scott@tocomwall.com.au>
Sent: Tuesday, November 06, 2012 3:40 PM
To: McLaren, Andrew
Subject: RE: Phone call follow-up

Andrew,

Sorry for the late reply,

I have read and understood the Clyde Refinery Conversion report and agree with your recommendation. I would also like to state the area in question was a place where our people did use as a hunting and gathering place with associated camp sites, therefore I am more than happy for the project to be approved and go ahead providing the following recommendations are followed.

- Tocomwall field staff are on site when the top soil is being removed to recover any cultural material that is located at the developer's expense.
- Any cultural material that is located will be returned on site once the project is completed.

Regards,

Scott Franks
Native Title & Environmental Services Manager

TOCOMWALL PTY LTD

Po Box 76
CARINGBAH NSW 1495
p: 02 9542 7714
f: 02 9524 4146
m: 0404 171544
e: scott@tocomwall.com.au
w: www.tocomwall.com.au

From: McLaren, Andrew [<mailto:Andrew.McLaren@aecom.com>]
Sent: Tuesday, 6 November 2012 3:32 PM
To: yarrowalk@tpg.com.au
Subject: Phone call follow-up

Hi Scott,

As discussed on the phone just now, the project in question is the Clyde Refinery Conversion.

The site inspection was held on 2 October 2012.

Cheers,

Andy

Dr Andrew McLaren
Archaeologist
D +61 2 8934 0547
Andrew.McLaren@aecom.com

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Darug Aboriginal Landcare Incorporated

18a Perigee Close
Doonside 2767

Geordie Oakes
Archaeologist
AECOM

Re: Clyde Refinery.

Dear Geordie,

The Darug Aboriginal Landcare has no objections to the proposed development to this area.

Our organization has read the report and agree with the recommendations and Methodology in the report.

We found the area was to badly disturber-ed over many years,that there would be little to non Aboriginal Cultural Heritage finding there.

Kind regards

Des Dyer
Public Officer
Darug Aboriginal Landcare Incorporated
Mobile 0408 360 814

Email desmond4552@hotmail.com

Darug Aboriginal Cultural Heritage Assessments

ABN 51734106483

Gordon Morton & Associates

Mob: 0422 865 831

Fax: 45 677 421

Celestine Everingham

90 Hermitage Rd., Kurrajong Hills, 2758

Ph/Fax: 45677 421

Mob: 0432 528 896

30. 10. 12

attention

Geordie Oakes
AFCOM

re Blythe Refinery conversion
Darug Cultural Heritage Assessment.

DACHA have reviewed your report on
the above and we support your
recommendations.

Yours Sincerely,

C. Everingham

DARUG CUSTODIAN ABORIGINAL
CORPORATION

PO BOX 1 WINDSOR 2756

PH: 45775181 FAX: 45775098 MOB: 0415770163

ABN: 81935722930

mulgokiwi@bigpond.com

25th October 2012.

Attention: Geordie Oaks

SUBJECT: Clyde Refinery Conversion Aboriginal Cultural Heritage Assessment- Draft Report.

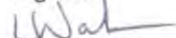
The Darug Custodian Aboriginal Corporation has consulted for this project we did not have a representative available to attend the site assessment, we have read the draft report and we support the findings and recommendations in the draft report.

This area as stated in the draft report is of low significance archaeologically, our group supports that, the site significance for Aboriginal Cultural Heritage is low also, this area has had numerous previous land disturbances and the possibility of having intact cultural heritage is highly unlikely.

We support the findings and recommendations set out in this report.

Please contact us with all further enquiries on mulgokiwi@bigpond.com or 0415770163.

Regards



Leanne Watson