Appendix D Indigenous Assessment

Hyland Road Substation Site, Holroyd NSW ABORIGINAL ARCHAEOLOGICAL & CULTURAL HERITAGE ASSESSMENT

FINAL REPORT

(Modified for Public Exhibition)

Prepared by
Austral Archaeology Pty Ltd
Archaeological & Cultural Heritage Consultants

For

Sinclair Knight Merz

On behalf of

TransGrid

December 2009
Job No: N9002

EXECUTIVE SUMMARY

TransGrid intends to construct an electricity substation and associated 330kV and 132kV turn-ins. The development is located in the suburb of Greystanes, within the City of Holroyd Local Government Area, approximately 27 km west-north-west of the Sydney CBD. It is 3 km south of the Great Western Highway, about 2 km east of the Prospect Reservoir dam wall, and directly north of Prospect Creek.

The proposed works involve the construction of the Holroyd substation buildings as well as associated 330kV & 132kV transmission line turn-in connections. These portions of the study area are henceforth described as the substation site and Transmission Lines 1, 2 and 3.

It is envisaged that the results of Aboriginal community consultation and archaeological field survey will allow TransGrid to address any archaeological concerns in the substation portion of the development. In addition the assessment aims to refine the proposed transmission line routes in order to minimise impact upon any archaeological or cultural heritage.

The consultation process for this project was conducted in accordance with the DECCW (NSW) Interim Community Consultation Guidelines for Applications (NP&W Act 1974: Part 6, Approvals). As a result, the Deerubbin Local Aboriginal Land Council (DLALC), Darug Custodian Aboriginal Corporation (DCAC), Darug Tribal Aboriginal Corporation (DTAC), and Darug Aboriginal Cultural Heritage Assessments (DACHA) registered as stakeholders and participated in the field assessment. The Aboriginal and Torres Strait Islander Consultative Committee to Holroyd City Council (ATSICC) also registered as a stakeholder organisation and was included in the review process of all relevant documentation.

Fieldwork was undertaken over two days, on Thursday the 5th and Tuesday the 10th of February 2009, with the participation of representatives from DTAC, DCAC, DACHA, DLALC, Austral, and TransGrid. The entire 4 ha site of the substation, and the proposed easements of the transmission line turn-ins as indicated to Austral in the field, were subjected to pedestrian field survey. The surveyed areas were anticipated to yield similar degrees of archaeological sensitivity based on their very similar landform and degree of past land disturbance.

As a result of the field assessment no new Aboriginal artefactual material was noted. However, two areas of PAD were recorded during the survey: the relocated PH 1 PAD, and the newly recorded HRP PAD. The first area of PAD, previously recorded as “Prospect Hill 1 PAD” (PH 1 PAD) by ERM (1998 in ERM 2006), has been reassessed by Austral in light of the current field assessment results. As a result, PH 1 PAD’s archaeological potential has been redefined as ***low***. In addition, Austral considers PH 1 PAD to cover a larger area than proposed by ERM (1998 in ERM 2006). PH 1 PAD has therefore been redefined to cover that land bounded by the Liverpool Parramatta Transitway on the north, the area of landfill to the east, and Prospect Creek to the south and west. Transmission Lines 1 and 2 cross over this extended area of PH 1 PAD. The second area of PAD covers the substation site itself, and was identified as PAD for the first time as part of the present survey. It has been named “Hyland Road Park PAD” (HRP PAD). A ***low*** level of potential has been ascribed for the substation site, and therefore to HRP PAD.

Those areas deemed to possess ***zero*** and ***low*** potential to yield intact Aboriginal archaeological deposit do not, in the consultant’s opinion, warrant further archaeological investigation.

The client should nonetheless be aware that all Aboriginal archaeological items and places are protected under Section 90 of the NP&W Act 1974 (amended). Although no recorded archaeological material is known for the study area, the extent of PH 1 PAD (AHIMS # 45-5-2447 / 45-5-2746), as redefined by Austral based on the results of the present study, lies within the easements of Transmission Lines 1 and 2. Previous archaeological assessments (ERM 1998 in ERM 2006) within PH 1, the site associated with PH 1 PAD, have revealed the presence of Aboriginal archaeological material. Although assessed previously as not warranting further archaeological investigation, a view supported by the results of the current assessment, PH 1 PAD nonetheless presents a potential Aboriginal archaeological constraint.

It is therefore recommended that TransGrid’s project planning attempt to minimise impact to PH 1 PAD. Impact is defined, in this case, as any disturbance to the ground’s surface that may result in the disturbance or destruction of potential subsurface material. Should Aboriginal archaeological

or cultural material be located during development, additional consultation as to appropriate management and mitigation of this material will need to take place. This may involve applications to the DECCW under Section 87 or Section 90 of the NP&W Act 1974 (amended). Consultation may be required and would involve input from the identified Aboriginal stakeholders consulted for this project. It is with this in mind that the following recommendations are made:

Recommendations

1. No further work for HRP PAD and PH 1 PAD

In the consultant's opinion, both areas have ***low*** potential for intact archaeological deposit. As these PADs have been assessed to be of low educational and research potential it is held that no further archaeological investigation of either of these PADs is warranted at this stage. In addition, no identifiable Aboriginal cultural issues or concerns were identified for these PADs and therefore the aesthetic value is low. Austral does not find that monitoring is justified on archaeological grounds. Undertaking of monitoring will be an arrangement between the Client and the Aboriginal stakeholders. See Recommendation 2 for specific comments on PH 1 PAD.

2. Minimise impact to PH 1 PAD

To reduce the chances of unacceptable impacts on potential subsurface archaeological material that will require further mitigation, ensure that actions that have the potential to impact are minimised if they cannot be avoided. Avoidance of the following is recommended:

- Wholesale vegetation clearance (for example, stump removal and removal of root systems);
- Turf or topsoil removal;
- Heavy or track vehicle traffic – rubber-tyred vehicles are preferred; and
- Excavation outside of the necessary footprint for transmission line towers.

If these impacts cannot be avoided, it is recommended that they be limited to as small an area as possible, in order to reduce the chance of encountering any archaeological constraints. It may be also possible to minimise impacts by placing towers up to 500 m apart and thereby spanning the area. Should Aboriginal archaeological material be uncovered, refer to Recommendation 4.

3. Preferred selection of Transmission Line 2 as the final 330kV transmission line turn-in route

It is recommended that this option be selected as the final 330kV turn-in route, as it will result in less ground disturbance within the part of PH 1 PAD identified between the northern bank of Prospect Creek and the LP Transitway.

4. Stop work provisions

All Aboriginal artefacts, known and unknown, are protected under Section 90 of the NP&W Act. In the event that any Aboriginal archaeological material is encountered, the following must occur:

- Works to cease immediately to allow an archaeologist to make an assessment of the finds. This may involve consultation with the NSW DECCW and local Aboriginal stakeholder groups.
- Previously unrecorded Aboriginal archaeological material to be reported to the NSW DECCW within a reasonable timeframe, as per Section 91 of the NP&W Act. An application under Section 87 or Section 90 of the Act may also be required in this event.

5. Distribution of finalised reports.

Copies of this report will be forwarded to DTAC, DCAC, DACHA, DLALC and ATSICC, and to the DECCW.

6. Restricted access to reports

It should be noted that the information pertaining to the location of Aboriginal sites or objects is restricted and cannot be put on public exhibition. In the event that this project is to go on public exhibition, consult with the archaeologists or the DECCW to confirm the level of appropriate public release. **This version of the report has been modified to be suitable for public display.**

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1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

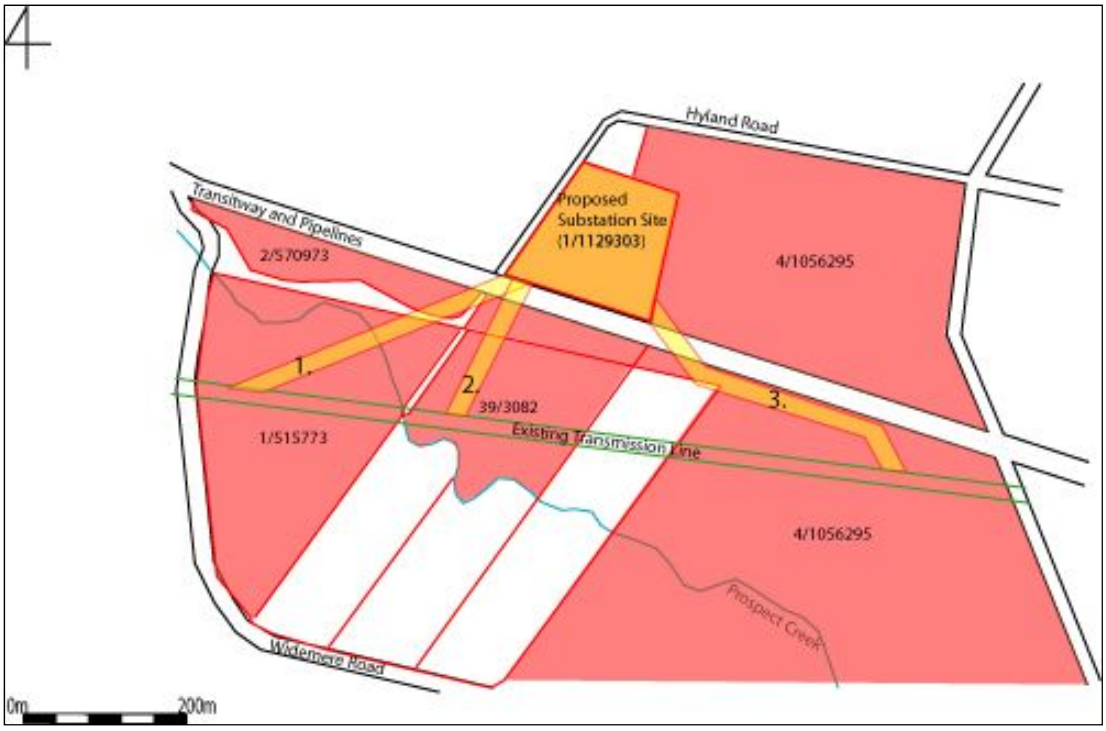
This report is a stand alone assessment of the area subject to TransGrid's proposed substation and transmission lines development, and details the aims, methodology and outcomes of the Aboriginal archaeological and cultural assessment undertaken by Austral Archaeology for Sinclair Knight Merz (SKM), on behalf of TransGrid.

TransGrid intends to construct an electricity substation at Holroyd, NSW. This proposal will involve the establishment of the Holroyd substation as well as associated 330kV & 132kV transmission line turn-in connections.

The proposed substation site is located in the suburb of Greystanes in the City of Holroyd Local Government Area (LGA), approximately 27 km west northwest of the Sydney CBD. It is 3 km south of the Great Western Highway, about 2 km east of the Prospect Reservoir dam wall and 300 m north of Prospect Creek.

The substation site (Lot 1 DP 1129303) is approximately 4 ha and includes that land at the south western corner of Hyland Road Parklands. It is bounded to the north by the Hyland Road Youth Centre (2 Hyland Road), to the west by Hyland Road, and to the south by the Liverpool to Parramatta Transitway (LP Transitway). At present, The Hyland Pk Road Small Bore Rifle Range and Pigeon Club share facilities located in the south west corner of the subject land. The transmission lines will cover ground to the south of the LP Transitway and on the banks of Prospect Creek.

The substation development will utilise the entirety of the 4 ha site as well as two 60 m easements for the 330kV turn-in options (of which only one will be chosen by the client) and one 45 m easement for the 132kV turn-in. These transmission line easements shall be referred to as Transmission Line 1, 2 and 3 hereafter (Figure 1.1).



1.1 Cadastral and Lot & DP information for the study area

Figure 1.2 Location of study area in NSW (in red)

Impacts within the 4 ha parcel of land for the substation, as shown in Figure 1.3, will include:

- the demolition of the existing Hyland Pk Road Small Bore Rifle Range and Pigeon Club buildings;
- establishment of a 330kV GIS building;
- establishment of 330kV MVA transformers;
- establishment of 330kV shunt and series reactors;
- initial connection of 330kV overhead circuits and 132kV high capacity overhead circuits and 330kV cables;
- general substation works including control cabling, fencing, runways, roadways, oil containment, landscaping, AC and DC distribution systems, fire protection, stormwater management and security systems and;
- minor modifications will be made to extant fencing and gates along the north-south stretch of Hyland Road.

1.2 BACKGROUND

Several changes were made to the proposed transmission line turn-ins by the client in the lead up to the field assessment. To avoid confusion, only the easements as described by the TransGrid representative in the field have been provided in the mapping throughout this report. The routes and extents of these easements were indicated to Austral by Matthew Hackett during the first site visit on Thursday the 5th of February 2009.

Figure 1.3 Layout of features within substation site. Image © TransGrid 2009.

1.3 REPORT OBJECTIVES

The main objectives of the assessment project as outlined in this report are to:

- perform an impact assessment;
- provide a review of published information on study area;
- identify and consult with the appropriate Aboriginal stakeholders in regards to the project;
- undertake field assessment of the entire study area;
- identify Aboriginal archaeological and cultural sites and issues, areas of potential archaeological deposit, and/or archaeologically sensitive landscapes, within the area covered by the proposed substation location and transmission line turn-ins; and
- to produce professional recommendations based on the results of the fieldwork and mapping to advise TransGrid on the Aboriginal archaeological and cultural values of the subject area.

The results of this assessment will be used to identify the level of archaeological and cultural potential and significance of the study area and offer mitigation and management recommendations in relation to any identified archaeological resource.

The results of this assessment may be used to inform the preparation of a Part 3A Application, which includes a public display component. In consideration of the sensitivity of site location information to the Aboriginal community, all detailed maps of site location have been included in Appendix C: Confidential Section. This confidential section is not to be included in any material provided for public display.

1.4 STAKEHOLDER CONSULTATION

The consultation process for this project was conducted in accordance with the *DECCW Interim Community Consultation Guidelines 2005* (*DECCW Guidelines*) (*NP&W Act 1974: Part 6, Approvals*). The relevant Guidelines and Acts are explained in more detail in Section 2.

As per the requirements of the *DECCW* Guidelines, stakeholders were invited to register their interest by advertisements in the Koori Mail and the Parramatta Advertiser. As a result, the key stakeholder groups identified for this assessment are the Deerubbin Local Aboriginal Land Council (DLALC), Darug Aboriginal Cultural Heritage Assessments (DACHA), Darug Tribal Aboriginal Corporation (DTAC), and Darug Custodian Aboriginal Corporation (DCAC). The DTAC are the registered Native Title Claimants in the area. The Aboriginal and Torres Strait Islander Consultative Committee to Holroyd City Council (ATSICC) also registered their interest and were invited to provide comment as part of the consultation process.

A draft copy of this report has been provided to the Aboriginal stakeholders for comment and review. Each has been requested to provide a written submission which has been attached to the final draft of this report. Received submissions can be viewed in Appendix A.

1.4.1 Summary of Stakeholder Recommendations

DTAC supports the conclusions and recommendations of the assessment.

DACHA supports the recommendations of the assessment.

DCAC supports the findings and recommendations of the assessment. They recommend that an Aboriginal site officer with experience in monitoring be present to identify Aboriginal archaeological materials if they are uncovered during the works. It is the opinion of DCAC that monitoring of the works is necessary to identify if any items are present which will trigger the stop work provisions in Recommendation 4 (see Executive Summary and Section 10).

DLALC provided two responses. In the first response, provided to SKM after fieldwork was undertaken, DLALC recommended that a representative of DLALC be present to monitor the works. In the second response, provided to Austral after DLALC had reviewed the draft report, it was indicated that DLALC had no objections to the recommendations of the assessment.

Austral does not find that monitoring is justified on archaeological grounds. Undertaking of monitoring will be an arrangement between the Client and the Aboriginal stakeholders.

1.5 PROJECT TEAM AND ACKNOWLEDGEMENTS

This project was overseen by Pamela Kottaras (NSW Manager, Austral Archaeology Pty Ltd) and Justin McCarthy (Managing Director, Austral Archaeology Pty Ltd). The assessment was coordinated and conducted by Krissy Moore (Archaeologist) and Pamela Kottaras (Senior Archaeologist). This report was written by Krissy Moore and Pamela Kottaras. Evan Raper (Senior Archaeologist) reviewed the draft report.

Austral Archaeology would like to acknowledge the participation of the following people who have contributed to the preparation of this report:

Jonas Ball	Sinclair Knight Merz (SKM)
Gordon Crombie	Hyland Park Road Small Bore Rifle Range member
Mark Evans	Holroyd City Council
Matthew Hackett	TransGrid
Alyce Mervin	Darug Custodian Aboriginal Corporation (DCAC)
Joe Nassif	Department of Commerce
Phil Khan	Deerubbin Local Aboriginal Land Council (DLALC)

John Reilly	Darug Tribal Aboriginal Corporation (DTAC)
Tim Wells	Darug Aboriginal Cultural Heritage Assessments (DACHA)

1.6 ABBREVIATIONS

AHD	Australian Height Datum
AHIP	Aboriginal Heritage Impact Permit
AHPI	Australian Heritage Places Inventory
ATSICC	The Aboriginal and Torres Strait Islander Consultative Committee to Holroyd City Council
Burra Charter, the	ICOMOS Australia Burra Charter 1999
DACHA	Darug Aboriginal Cultural Heritage Assessments
DCAC	Darug Custodian Aboriginal Corporation
DECCW	Department of Environment, Climate Change and Water (also NSW DECCW)
DECCW Guidelines	DECCW Interim Community Consultation Guidelines 2005
DLALC	Deerubbin Local Aboriginal Land Council
DoP	Department of Planning
DTAC	Darug Tribal Aboriginal Corporation
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act	Environmental Planning and Biodiversity Conservation Act 1979
GDA94	Geocentric Datum of Australia 1994
LGA	Local Government Area
LP Transitway	Liverpool to Parramatta Transitway
LEP	Local Environmental Plan
NP&W Act	National Parks and Wildlife Act 1974, amended 2001
NSW DECCW	New South Wales Department of Environment, Climate Change and Water
PAD	Potential Archaeological Deposit
Part 3A	Part 3A of the EP&A Act
Part 3A Guidelines	DECCW Part 3A Guidelines for Aboriginal Cultural Heritage Assessments 2005
RNE	Register of the National Estate
SHR	New South Wales Heritage Office State Heritage Register
S87	Section 87 of the NP&W Act
S90	Section 90 of the NP&W Act
S91	Section 91 of the NP&W Act

2.0 LEGISLATIVE FRAMEWORK

2.1 ABORIGINAL HERITAGE LEGISLATIVE FRAMEWORK

Aboriginal archaeological and cultural heritage assessments in NSW are carried out under the auspices of a range of state and Federal Acts and Guidelines. The Acts allow for the management and protection of Aboriginal places and objects, and the Guidelines set out best practice for community consultation in accordance with the requirements of the Acts.

2.1.1 Community Consultation Guidelines

The *DECCW Interim Community Consultation Guidelines 2005* (*DECCW Guidelines*), published in December 2004 and brought into action on 1 January 2005, set out a code of practise regarding community consultation. They detail timeframes, procedures and processes regarding how to consult widely with the Aboriginal community and other interested stakeholder groups.

2.1.2 Federal Acts

Aboriginal cultural heritage in Australia is protected and managed under the following Federal Acts:

- The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), which places the protection of items listed on the National Heritage List and the Register of the National Estate (RNE) as a new matter of National Environmental Significance, and;
- The *Aboriginal and Torres Strait Islander Heritage Protection Amendment Act 1987*, which provides blanket protection for Aboriginal heritage in circumstances where such protection is not available at a State level. The Act may also override state and territory provisions.

Principles for assessment and conservation management are provided by the non-statutory *ICOMOS Australia Burra Charter 1999* (the Burra Charter).

2.1.3 State Acts

In New South Wales, the following Acts also apply:

- The *National Parks and Wildlife Act 1974* amended 2001 (NP&W Act).
    - Part 6 (Approvals) of the Act lists the responsibilities and powers of the DECCW as the administrator of the Act.
    - Section 87 (S87) of the Act requires the application for an Aboriginal Heritage Impact Permit (AHIP) should the Proponent seek to disturb, move, and/or take possession of an Aboriginal object or disturb land for the purpose of discovering an Aboriginal object, as would occur during a programme of Aboriginal archaeological test excavation.
    - Section 90 (S90) of the Act provides blanket protection to all Aboriginal objects and places, known and unknown, and requires an application for an AHIP should the Proponent seek to destroy, damage or deface an Aboriginal object or Aboriginal place, as would apply when no additional archaeological investigation beyond the initial assessment is deemed necessary, or where test excavation is considered to have sufficiently characterised a site, or where Aboriginal objects are to be moved (relocation).
    - Section 91 (S91) requires that any person who locates an Aboriginal object or place must notify the DECCW within a reasonable time, as the DECCW also administers previously unknown or unrecorded objects and places as part of its Part 6 (Approvals) role.
- The *Environmental Planning and Assessment Act 1979* (EP&A Act).
    - The Act requires that impacts upon the environment and cultural heritage be considered prior to development approval being granted.

- Local Environmental Plans (LEPs) prepared in accordance with the Act provide guidance on the level of environmental assessment required. They determine the manner in which consent authorities may approve development applications by ensuring that consideration of potential impacts on the environment, inclusive of Aboriginal heritage, are addressed. This usually involves the preparation of a Review of Environmental Factors (REF) or an Environmental Impact Statement (EIS) including a full archaeological assessment.
- Under *Part 3A* of the Act, in the case of a Development Application constituting a 'Major Infrastructure' under the Act, the Proponent would not require the usual consents as per S87 and S90 of the NP&W Act. The Planning Minister is under no obligation to accept the DECCW's advice however an Aboriginal archaeological and cultural assessment would still be required and appropriate levels of stakeholder consultation undertaken as per the *Part 3A Guidelines*.

2.2 SECTION SUMMARY

Aboriginal Places and Objects, both known and unknown, are protected in New South Wales by State and Federal legislation. The present work is undertaken under the *DECCW Guidelines* under Part 6 of the NP&W Act in respects to the identification of Aboriginal stakeholders. As the work is not classified as a Major Infrastructure, the *Part 3A Guidelines* are inapplicable.

Searches of the Australian Heritage Places Inventory (AHPI), the Register of the National Estate (RNE), the National Heritage List and the NSW Heritage Office State Heritage Register (SHR) websites did not identify any recorded Aboriginal objects or places in or around the study area, and therefore the EPBC Act does not apply. All works fall under the protection of the *Aboriginal and Torres Strait Islander Heritage Protection Amendment Act 1987*

At the state level, the works are to be undertaken under the NP&W Act and the EP&A Act. The relevant sections of the NP&W Act are Section 87, Section 90 and Section 91. The Holroyd LEP 1991, produced in accordance with the EP&A Act, makes provision for the protection of Aboriginal heritage, archaeological sites and potential archaeological sites, but no places or objects are recorded.

Should Aboriginal objects be recorded during the course of the current assessment then Section 90 of the NP&W Act is enacted, ensuring the protection of said objects. Should the Client's proposed development not be able to avoid impacting upon Aboriginal objects then an AHIP under either Sections 87 or 90 of the NP&W Act would be required.

An AHIP under Section 87 would enable the disturbance or movement of Aboriginal objects. Such a permit typically would involve a programme of archaeological subsurface testing. A further permit under Section 90 of the NP&W Act may subsequently be required should additional subsurface investigation be required to salvage Aboriginal objects should testing demonstrate that further archaeological investigation is required.

An AHIP under Section 90 may be obtained should it be determined that an Aboriginal object does not warrant further testing following a programme of subsurface testing under a Section 87 AHIP. In addition a Section 90 AHIP can also be sought for an Aboriginal object that is not assessed to be of sufficient significance to warrant an AHIP under Section 87 of the Act. In such an instance, as all Aboriginal objects are afforded blanket protection under Section 90, a AHIP would be required to permit the destruction of the Aboriginal object. Such an AHIP would be required prior to development works that may impact upon said object.

3.0 ENVIRONMENTAL BACKGROUND

3.1 CLIMATE

Sydney has an oceanic climate with warm summers and cool winters. Using data extrapolated from the nearest weather station, the project area has an average annual maximum temperature of 28.0º C and an average annual minimum temperature of 4.7º C (Bureau of Meteorology 2009).

Rainfall is fairly evenly divided between summer and winter, but is slightly higher during the first half of the year, when easterly winds dominate. The Cumberland Plain is the driest area of the Sydney zone with an average annual rainfall of 800-860 mm.

3.2 GEOLOGICAL CONTEXT AND SOIL LANDSCAPES

Geologically speaking, the study area is located on the Cumberland lowlands, overlaying Wianamatta Group Ashfield Shale, Bringelly Shale and Minchinbury Sandstone. The land directly to the west side of the study area is located on Prospect Picrite, also known as the Prospect Intrusion (Humphreys 2006 in ERM 2006: 8). The formation is characterised by gently undulating rises, with local relief to 30 m, slopes usually less than 5%, with broad rounded crests and ridges with gently inclined slopes (Bannerman & Hazelton 1990: 28). Erosion is not prevalent, however sheet and gully erosion can occur in cleared areas (Bannerman & Hazelton 1990: 29).

The study area is located on the Blacktown soil landscape. The characteristics of lower side slopes in this landscape, such as where the study area is located, is that they are characterised by clearly defined layers of the following: up to 30 cm of a friable brownish black loam topsoil (A horizon); 10 to 30 cm of a hard-setting brown clay loam (A_2 horizon); 40 to 100 cm of a strongly pedal mottled light brown clay subsoil (B horizon); and >100 cm of a light grey plastic mottled clay (C horizon). Soil depth in general is greater than 200 cm (Bannerman & Hazelton 1990: 29). Bannerman and Hazelton (1990: 30) describe general fertility as low to moderate. The substation site itself has been described as lying on shale bedrock with possible thin cover of floodplain alluvium (probably silty clay derived from shale) (SKM 2008a Appendix E).

The substation site of the study area has an approximate 1:20 slope downhill from Hyland Road, with fairly flat ground to the north, with slope increasing again to the crest of Prospect Hill from the banks of Prospect Creek (TransGrid 2008: 11).

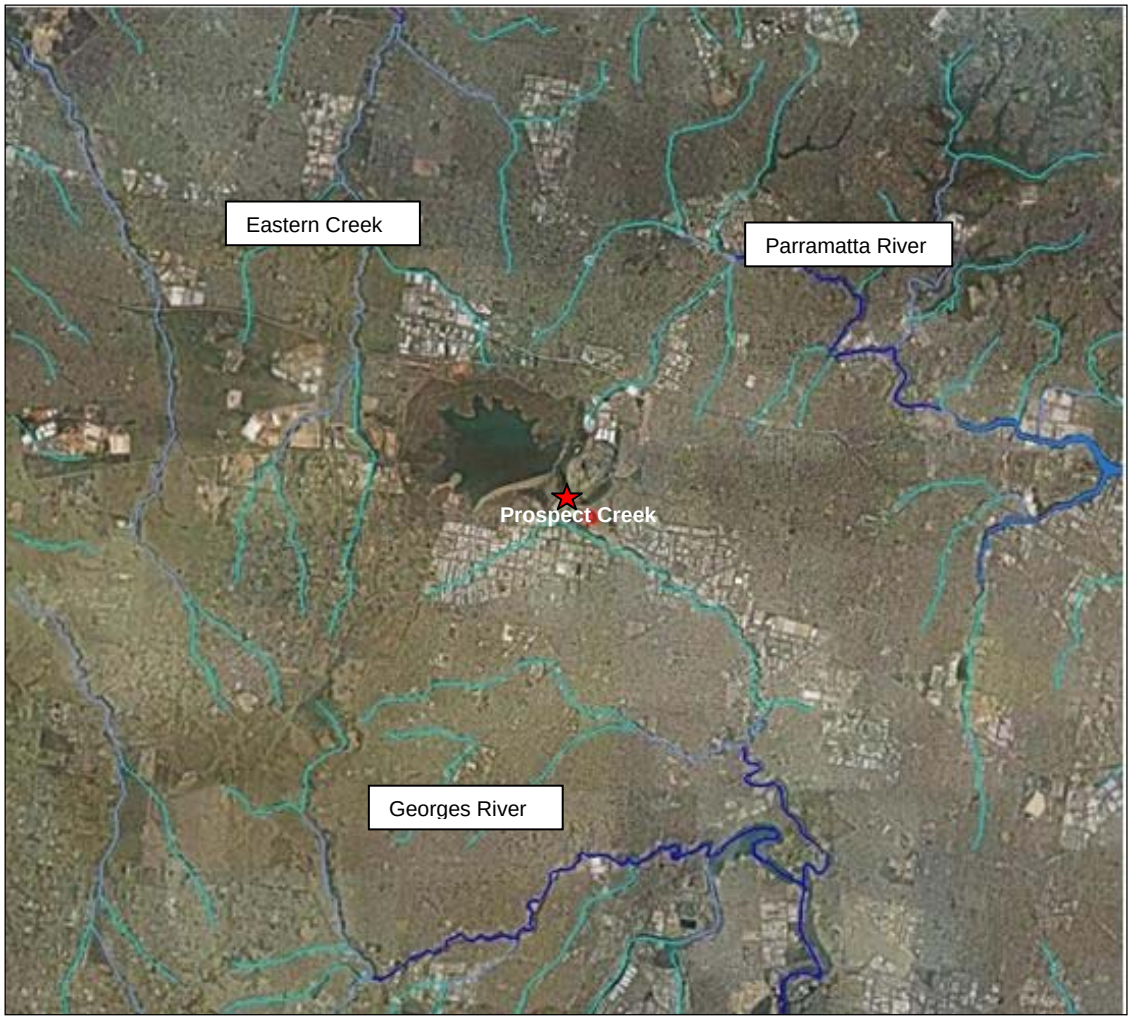
3.3 HYDROLOGY

The study area lies near the meeting point of Sydney's three major catchments: Hawkesbury (via Bungarribee and Eastern Creeks) to the north and west, Parramatta (via Blacktown Creek) to the northeast, and Georges River (via Prospect Creek) to the southeast) (TEC 2007: 4). The construction of the Prospect Reservoir, 2 km to the west, no doubt took advantage of this location.

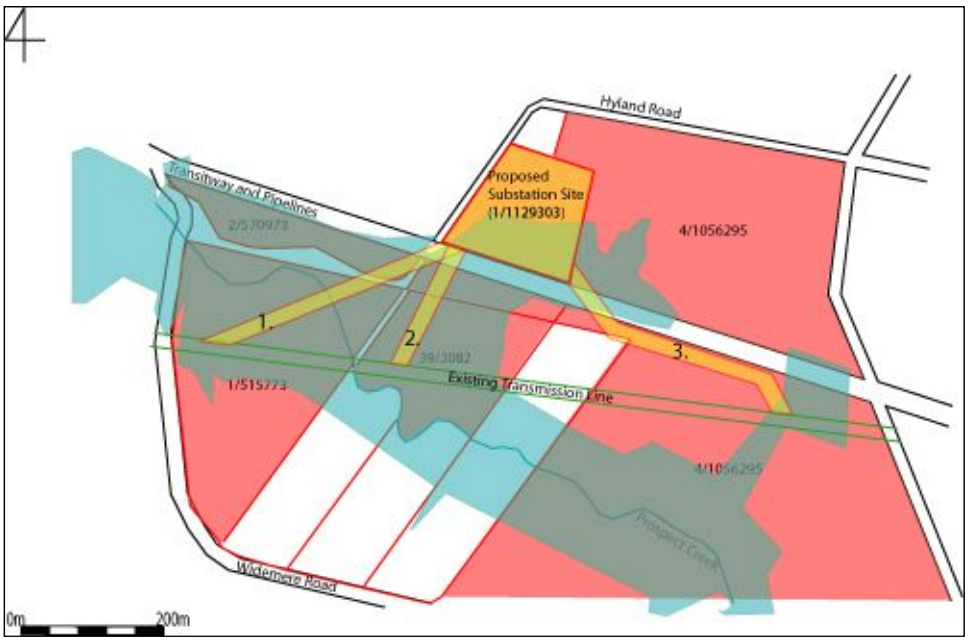
The main creek in the study area is Prospect Creek, which runs roughly north-west to south-east and eventually meets with the Georges River. Prospect Creek is approximately 300 m south of the substation site. Transmission Lines 1 and 2 will cross Prospect Creek as they connect the substation to the existing transmission line to the south of the creek. Where it passes through the study area, the creek can be described as "an ephemeral first order creek" (ERM 2006: 28). This description is based on the Strahler (1952) system of stream ordering, which defines stream size based on a hierarchy of stream tributaries, wherein a stream with no tributaries (also known as a headwater stream) is considered to be a first order stream. The description ephemeral indicates that the stream does not constantly contain water.

The gently sloped terrain of the study area itself leads down from the north-west to the south-east, towards Prospect Creek, which is approximately 250 – 300 m south of the southern boundary of the substation site (which is formed by the LP Transitway). About 40% of the substation site lies below the 1:100 year flood line, and the maximum probable flood level would appear to be about 0.5m higher (TransGrid 2008: 11).

Other creeks in the immediate vicinity include Girraween Creek to the north, Eastern Creek on the western bank of the Prospect Reservoir, Pendle Creek, Cooper's Creek, Finlayson's Creek and Toongabbie Creek to the east and northeast, and Orphan School Creek further to the south. Pendle Creek, Cooper's Creek, Finlayson's Creek and Toongabbie Creek flow into the Parramatta River, which is approximately 7 km to the east.



3.1 Stream ordering within 10 km² of the study area. The substation site is indicated by the red star. First order streams = pale blue, second order = medium blue, third order = dark blue. Base image © Google Earth 2009. Hydrology overlay © Geoscience Australia 2006, Scale 1:250 000.



3.2: 100 year Flood limits over entire study area (highlighted in yellow), as modified from Holroyd City Council (2008).

3.4 PLANT, ANIMAL AND LITHIC RESOURCES

European land-use practices over the last 160 years have severely impacted on the native vegetation. When European settlers arrived over 200 years ago, the Cumberland Plain was covered with iron and stringy barks, box, blue and other gums and thick grasslands (Benson & Howell 1990: 19). As a result of past land disturbance, discussion of pre-contact resource bases is limited to inference based on remnant vegetation and wildlife communities.

In the immediate vicinity of the study area, the earlier vegetation landscape included, but was not limited to, forest red gum *Eucalyptus tereticornis*, narrow-leaved iron bark *E. crebra*, grey box *E. moluccana* and spotted gum *E. maculata* (Benson 1981 in Bannerman & Hazelton 1990: 29). Additional species mentioned by Bannerman and Hazelton (1990: 29) in the area between Liverpool and St Marys, where the study area is located, include white stringybark *E. globoidea*, broad-leaved ironbark *E. fibrosa*, with woollybutt *E. longifolia* as an understory species and individual trees or small stands of mugga *E. sideroxylon* occasionally found on crests. In relatively undisturbed areas of the Plain today, native perennial grasses such as *Themeda australia*, *Eragrostis leptostachya, Aristida vegans* and *Aristida ramosa* occur. In cultivated and grazed areas, *Paspalum dilatatum* now predominates. It must also be remembered that these woodlands were exploited and modified for thousands of years by Aboriginal people before the arrival of European settlers. The flatter topography of the Cumberland Plain would have provided a considerable range of resources for Aboriginal people.

Kangaroos, wallabies, possums, wombats, koalas and echidnas, sugar and squirrel gliders, flying foxes as well as native rats and mice are known from the Cumberland Plain (Attenbrow 2002: 70). The mutton bird and brush turkey, other birds, and their eggs were also a food source (Attenbrow 2002: 74-76). Numerous amphibians and reptiles would have been found in the area. Frog species would have included a number of tree frogs (such as the eastern banjo, brown-striped, spotted grass, bleating, and broad-palmed tree frogs), as well as brown toadlets. Mullets and eels would have been a major resource found in the river systems along the Plain. Native bees would also have been present within the area providing honey and wax.

Rocks with particular flaking properties were used for stone tool production, such as silcrete, basalt, quartz, quartzite, tuff and chert. Attenbrow outlines that the main sources that these dominant raw materials come from are usually gravel beds, palaeo-channels associated with the Nepean-Hawkesbury and precursor tributaries, and conglomerate pebbles in the Hawkesbury sandstone (Attenbrow 2002: 43). More specifically Kohen found that the Nepean riverbed gravels were considered the principal source of igneous rock (such as basalt) and

siliceous rock (such as chert/tuff) and South and Eastern Creek the principal source of silcrete (Kohen 1988 cited in Attenbrow 2002: 50; Stockton *et al*. 1993: 23).

Silcrete was the most common raw material utilised by Aboriginal people for stone artefact production on the Cumberland Plain. Silcrete generally occurs as pebbles and cobbles, and infrequently as boulders. Attenbrow states that silcrete occurs in a formation called the St Mary's Formations. This formation has been mapped in the South and Eastern Creek systems (Attenbrow 2002: 44). Outcrops of shale do not occur naturally on the surface in the vicinity of the study area, except when the topsoil has been removed, though fine gravel-sized shale fragments are sometimes present in the black loam topsoil (Bannerman & Hazelton 1990: 28). Silcrete sources within the general vicinity of Eastern Creek, to the west, include Plumpton Ridge (AMBS 2005) and also St Mary's, Blacktown, Riverstone and Marsden Park, as well as the Rickaby's Creek gravel formations and the Cranebrook Formation outcrops (DSCA 2003). The Nepean River gravels are also a known source of raw stone material.

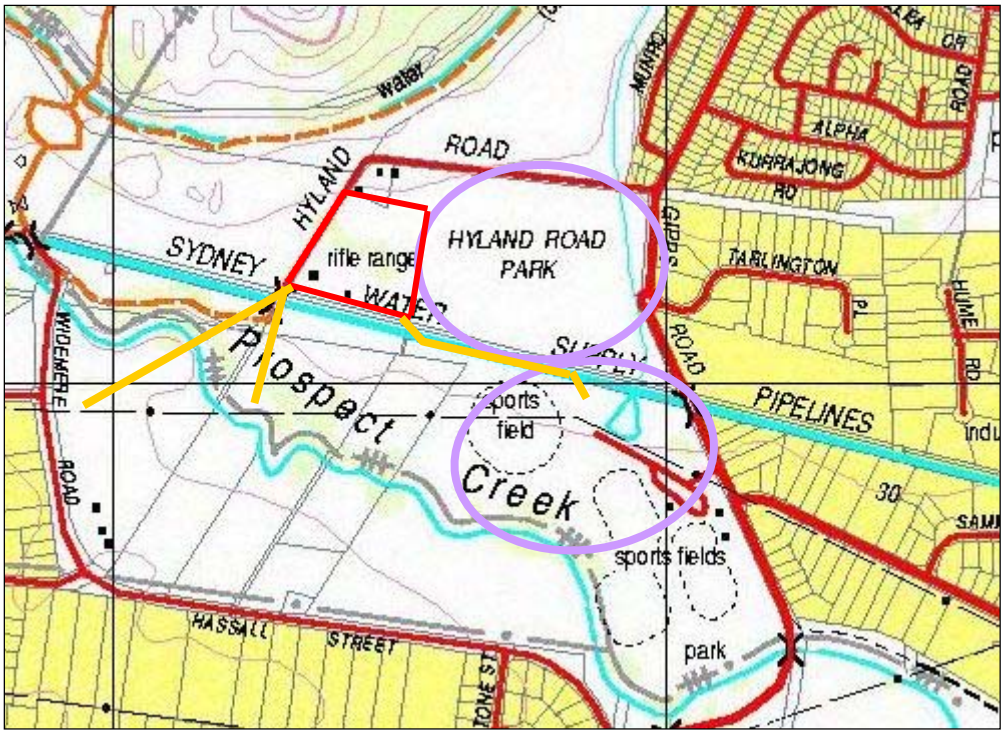
3.5 HISTORIC LAND USE

European settlement of the Cumberland Plain has devastated the native plant and animal species through vegetation clearance, cultivation and creekline modification (Benson & Howell 1990: 6). Grazing runs were being taken up in the Cumberland Plain woodlands in the 1790s with cattle reportedly escaping the coastal settlement and later found at "The Cowpastures" in 1795. Historic reports show that much of the County of Cumberland was being cleared for cultivation and grazing as early as 1820, thus changing the availability of the Cumberland Plain grasses upon which kangaroos and other marsupials fed (Benson & Howell 1990: 32). As a result much of the original Cumberland Plains Woodlands exist only as remnant pockets in the current semi-rural/urban environment.

As is discussed in detail in the historic assessment accompanying this report (Austral 2009), the study area and its immediate surrounds have also been subjected to intensive agricultural use since European settlement. The entirety of the substation site and transmission line easement areas had been cleared of native vegetation for farming from very early in the settlement (Austral 2009, as shown in Figure 3.3 below).

3.3: A view facing south over the substation site (outlined in red), in 1934, showing the extent of clearing (Image TM0034.JPG © Holroyd City Council 2009). The approximate locations of Transmission Lines 1, 2, and 3 are indicated in yellow. The existing transmission line is indicated in purple.

A large area of land to the east and southeast of the study area (comprising the land on the eastern border of the study area to the north of the LP Transitway, and the sports fields to the south of the Transitway) has been impacted by soil quarrying activities undertaken by Holroyd Council during the late 1960s, followed by the dumping of domestic and putrescible waste from 1970 to 1985 (SKM 2008a Appendix E).



3.4: Approximate location of landfill in relation to the study area. (Image: Prospect 90302N 1:25 000 Scale Topographic Map © Department of Lands 2006). The substation site is outlined in red and the approximate locations of Transmission Lines 1, 2 and 3 are indicated in yellow. The approximate location of the landfill (relative to the study area only) is indicated in purple.

Land-filling extends to within 40 m of the south-west corner of the Hyland Road parklands, where it is about 1.8 m deep. However, other pits (within the western half of the reserve but outside of the study area) have depths of filling greater than 5.6 m (the base could not be reached by the excavator used). At the time at which this report was written no physical geotechnical investigation had been carried out for the site. However, some preliminary advice in the form of a letter report had been obtained from a geologist (McNally, Internal Memo dated 3 April 2008, included in SKM 2008a: Appendix E). This advice consisted of desk-top observations about the site based on information from maps, aerial photographs and test pitting associated with the contaminated ground investigation report (SKM 2008b). It can be summarised as follows:

- According to a regional geology map the site should consist of shale bedrock with a possible thin cover of floodplain alluvium (probably stiff silty clay derived from the shale).
- Land-filling extends to within 40 m of the south-west corner of the reserve, where it is about 1.8 m deep. However, other test pits had depths of filling greater than 5.6.
- Depending upon the size of the substation footprint it may be on unfilled land, or partly on that and partly on filled land possibly 2-3 m thick.

The contaminated land investigation, on the other hand, only identified fill within the central part of the site's eastern boundary and in the rifle range embankments, although it did note that there was a small area of "reworked soil" within the vicinity of the main rifle club building. Given that the geotechnical letter report was largely based upon the test pitting undertaken during this contaminated land investigation it can only be assumed that the letter report was mistaken in its observation that land-filling extended to within 40m of the south-west corner of the site.

It is Austral Archaeology's opinion that the only parts of the Substation site (i.e. that part of the study area located within the Hyland Road Park) which have been subject to land-filling are the rifle-range embankments and a small area of land located hard against the central eastern boundary of the site. It should be noted, however, that some capping fill from the adjacent land-filled area to the east of the site does overflow onto the site along most of this boundary.

The southern part of the study area, consisting of the land between the LP Transitway and Prospect Creek, has also been modified. In 2005, works associated with the construction of the Transitway, and landscaping related to the extension of the Prospect Canal Cycleway took place. Other than building up the land beneath the Transitway itself, and installing a culvert to prevent flooding, no landscaping took place as part of the construction of the Transitway (Mark Evans pers. comm. 2009). The landscaping which took place for the Cycleway involved the construction of a large earth ramp running roughly west to east for one path of the cycle way; another path runs roughly northeast to southwest and lies on flat ground. These earthworks were not constructed to prevent flooding (Mark Evans pers. comm. 2009). The consultant attempted to determine the subsurface extent of these earthworks through contacting Holroyd City Council and the Office of Public Works and Services (Department of Commerce), however it was not possible to obtain this information.

The land immediately to the west of the site, owned by Boral, has been recently disturbed through the construction of a quarry. As recently as 2006, the eastern portion of this land closest to the study area, had undergone lesser disturbance in the form of ploughing – it was observed that the natural soil was present in the eastern portion of the land (ERM 2006: 7-8) – however it has since been severely impacted by the construction of a detention basin associated with the quarry.

3.6 SECTION SUMMARY

The subject area is located in a generally resource rich area, between the catchments of the Hawkesbury, Parramatta and Georges Rivers. Available plant and animal resources would have been sufficient for the needs of Aboriginal people. However, there are no significant sources of raw stone material either directly within the subject area or its immediate vicinity (within 10 km^2); good quality stone may have instead been obtained by trade. Therefore it appears that there are no particular resources to concentrate Aboriginal activity at specific locations within the study area itself. The rich soil and flat landform in the study area, however, led to the extensive clearing, agricultural and pastoral use of the area by Europeans. The implications of these factors for the archaeological potential of the study area are discussed in the following sections.

4.0 REGIONAL ABORIGINAL HISTORY

4.1 ABORIGINAL GROUPS

The linguistic and social links between pre-contact populations and present Aboriginal groups are obscured by gaps in written and oral histories. Although Aboriginal occupation of the Sydney region extends back to at least 20,000 years, the numbers and precise affiliations of Aboriginal groups in the area prior to European arrival are difficult to estimate as Aboriginal groups avoided the early settlers and lived highly mobile lives. It is also important to note that Aboriginal populations were devastated by newly introduced European diseases such as influenza and smallpox.

However, several distinct Aboriginal groups were recorded as occupying the Sydney region when the First Fleet arrived in 1788. The estimated Aboriginal population of the Sydney region at contact, including the Hawkesbury River and lower Blue Mountains, where occupation was focussed, was between 4,000 and 8,000 individuals, whilst the western Cumberland Plain supported five to eight clans, each with approximately fifty people (Kohen 1986). Boundaries between these groups were very blurred and difficult to record, but geological or natural landscape features usually defined boundaries.

It is thought that the traditional Aboriginal people of the present study area spoke a *Darug* language dialect at contact (Attenbrow 2002: 34). Specifically, the study area is located within the Darug (Hinterland) language zone as described by Attenbrow (2002: 23).

Ethnohistoric evidence, including the 1821 census and blanket return records, shows that the Warmuli (Weymali) clan of the Darug lived in the Prospect area (Kohen 1993: 21 in JMCHM Pty Ltd 2002: 14). Aboriginal conflict with convict settlers occurred soon after their convict settlement of the area after 18th July 1791 and may represent an early organised resistance in response to European incursions (JMCHM Pty Ltd 2002: 20). The conflict escalated, especially in the area between Prospect and Parramatta but also around Seven Hills, the Georges River and the Hawkesbury River, and included a series of raids against settlements led by the warrior Pemulwuy, of the Bediagal or Bidjigal clan, between 1791 and 1802 (Flynn 1997: 34-35 in JMCHM Pty Ltd 2002: 20). The regiment at Parramatta provided armed support to settlers, and by 1801 Governor King had ordered that "any Aborigines seen at Prospect … should be 'driven back by firing at them'" (Wiley 1979:173 in TEC 2007: 11). Armed conflict between settlers and Aboriginal people had ended by 1817. The distribution of the surviving Aboriginal inhabitants of Prospect is unclear, but they may have moved to La Perouse, Sackville, and / or Camden Farm, while some may have remained near Eastern Creek until as late as 1843 (TEC 2007: 11).

The Deerubbin Local Aboriginal Land Council (DLALC) has expressed concern that Aboriginal burials related to the armed conflict could be located in this area (JMCHM Pty Ltd 1996: 6, JMCHM Pty Ltd 2002: 21, Phil Khan pers. comm. 2008).

The Darug Custodian Aboriginal Corporation (DCAC) undertook a cultural and heritage analysis along Prospect Creek as part of the Warali Wali Project, which aimed "to identify, protect and improve the natural and cultural heritage values of Prospect Creek and it's environs through the design and installation of interpretive artworks along the Corridor cycleway" (DIPNR 2004a: 30). The study focussed on the "Darug walking path" along Prospect Creek, and considered that Aboriginal objects along the path and that any areas of PAD had been removed during site disturbance from landscaping works (DCAC 2003 in DIPNR 2004a: 30).

4.2 PAST RESOURCE USE

Section 3.5 has shown that the immediate vicinity of the study area contained a wide range of resources for use by Aboriginal people. This is supported by a range of historic and ethnographic accounts from explorers and early settlers in the Sydney region, near the present study area, as summarised by Attenbrow (2002).

These early European observations suggest that Aboriginal people used toolkits largely of organic materials such as wood, bark, palm leaves, shell and bone. The use of stone does not figure prominently in many of these early descriptions. However, this is more likely to

reflect the biases of these early observers, rather than the actual material culture of Aboriginal people. Hiscock (2008) has recently argued that even very early historical accounts may not be a suitable basis for analogy: as Aboriginal groups in the historic period had to change their economic, cultural and political practices in order to cope with the social impacts of disease after the arrival of Europeans, he argues that it is likely that similar drastic changes happened in the past in response to "altered cultural and environmental circumstances" (Hiscock 2008: 17).

Attempting a reconstruction of pre-contact Aboriginal life based on purely economic factors such as resource availability is also not without limitations. For example, David *et. al*. (2006: 11, making reference to Lourandos 1980b), highlight the limitations of direct analogy based solely on perceived economic imperatives: demographic change, with associated changes in subsistence methods and ecological relations, could have been undertaken for social reasons unrelated to environmental or economic pressures. David *et al* (2006: 9-11) use the example of historic Aboriginal groups increasing the food yield of their environment to support large occasional gatherings as opposed to permanent maximum population density. An example of this would be the corroborees and large gatherings for ritual fights or contests such as were recorded to the northeast of the study area, in Parramatta in 1804 (Attenbrow 2002: 137).

4.3 MATERIAL CULTURE

With an awareness of the limitations of analogy in mind, investigation of the resources available in an area can be a starting point for discussion of past material culture. The flatter topography of the Cumberland Plain would have provided a different range of resources for Aboriginal people than the coastline. These resources, as described in Section 3.5, provided suitable plant materials for bark shelters and containers; wooden, reed or grass-stalk spears, digging sticks, and weaponry; as well as resin for use as an adhesive. Aboriginal people in the past utilised the local plants for food and medicine. Attenbrow has noted that "Sydney vegetation communities include over 200 species that have edible parts, such as seeds, fruits, tubers/roots/rhizomes, leaves, flowers and nectar (Attenbrow 2002: 76). Observations from the earliest European settlers describe Aboriginal people in the wider Sydney region roasting fern-roots, eating small fruits the size of a cherry as well as a type of nut and the root of "a species of the orchid" amongst other types of plant food. As Attenbrow points out, however, the settlers' lack of knowledge of the local plant species make identification of the various plants used difficult (Attenbrow 2002: 76-79).

In addition to being a mainstay of the diet in historic times, smaller mammals, reptiles and birds may have also provided skins and sinew for apparel, and bone, teeth and feathers for tools and ornaments.

Aboriginal people also made good use of local stone raw materials sourced from the known quarries on the Cumberland Plain and from the Nepean River gravels. Knowledge of source locations for raw materials such as silcrete, basalt, quartz, tuff and chert is of great importance in determining movements, trade and exchange patterns of the people who inhabited the area (Attenbrow 2002). No naturally occurring geological materials suitable for the manufacture of stone artefacts were observed within the study area. However, it would not have been a long journey to South Creek, Eastern Creek or the Nepean River to source these materials.

There is evidence, in the form of stone artefacts and axes from inland sources (possibly the Nepean River gravels) for trade between the inland Daruk or Darug people with the coastal Guringai (Ross 1976, 1988 in Smith 1990: 20). Early European observers noted that Darug speaking people travelled to the coast for trade and ceremonial purposes (Morris 1978, Ross 1976: 72-73 in Smith 1990: 20).

Another use of mineral resources is seen in rock art and body decoration, where ochre pigments were used. No sources of ochre are known in the immediate vicinity of the study area.

An intangible but presumably vital component of material culture and past land management, according to ethnographic accounts, was the use of fire. Regular burning promoted the growth and flowering of tuberous plants, such as orchids and lilies, which were abundant on the Cumberland Plain. It is likely that these would have been frequently burnt by Aboriginal people as part of a land management strategy to manipulate plant populations (Benson & Howell 1990: 14).

4.4 Section Summary

Although the language and tribal affiliations of prehistoric Aboriginal populations in the area cannot be determined, the Aboriginal group known from this region at the time of contact is the Warmuli (Weymali) clan of the Darug. In addition, the historical figure Pemulwuy of the Bediagal (Bidjigal) clan, is known to have led an organised resistance against European settlement, with armed conflict taking place in the general vicinity of the study area. The study area is located between the catchments of major river systems the Hawkesbury, Parramatta and Georges River, and is on the northern banks of Prospect Creek, at this point a first order stream. The study area would have provided a range of plant and animal resources for Aboriginal people, however no stone sources are known from within the study area or its immediate surrounds. Aboriginal people certainly made use of the area. However, there is no known resource, such as a stone or ochre quarry, which would have concentrated their activities into the study area specifically. That is, people may just have been passing through the area on their way to more attractive locations nearby, such as the confluences of major streams, quarries, or for large ceremonial or military gatherings.

5.0 ARCHAEOLOGICAL BACKGROUND

5.1 HERITAGE DATABASE SEARCH RESULTS

A search of National, State and local heritage databases was undertaken to establish the archaeological context surrounding the Hyland Road parklands study area. A summary of these results is presented below.

5.1.1 Aboriginal Heritage Information Management System Search Results

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

5.1.2 Other Heritage Register Search Results

Searches of the Australian Heritage Places Inventory (AHPI), the Register of the National Estate (RNE), the National Heritage List and the State Heritage Register (SHR) on the Heritage Branch website did not identify any recorded Aboriginal objects or places in or around the study area. The Holroyd LEP 1991 has provision for the preservation of identified heritage items but there are currently no listings for Aboriginal sites on the register. The study area is just outside of the boundaries of SREP 31 (Sydney Regional Environmental Plan No 31 - Regional Parklands) which encloses the Prospect Reservoir catchment to the west (DIPNR 2004b).

5.2 THE CUMBERLAND PLAIN ARCHAEOLOGICAL CONTEXT

Archaeological investigation of the Cumberland Plain is predominantly the result of the spread of urban development. The majority of investigations have been conducted within the framework of the *EP & A Act (1979)* but most have been restricted by limited development briefs. A comprehensive Cumberland Plain archaeological model is yet to be produced; however previous studies provide a broad picture of the archaeological context of the region. A number of site location and artefact type models have been proposed for the Cumberland Plain. Models have also been developed for the vicinity of Eastern Creek in particular (within 5 km of the study area). Environmental factors such as the access to drinking water and raw stone materials have been put forward as influences on the locations of sites. These large scale models are discussed below.

Kohen has argued that availability of water was the most important factor influencing the distribution of sites across the landscape (Kohen 1986: 292). A predictive site location model was developed by Smith (1989a) for the southern Cumberland Plain based the results of her study which focused on the Rickaby's Creek and Londonderry areas. This included the theory that sites would be most commonly found along permanent creeks and around swamp

margins, with creek flats and banks considered to be focal topographical features for site location (Smith 1989a: 2).

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5.1: Sites recorded in previous archaeological investigations within 10km² of the study area. Base image © Department of Lands (2006). Scale: 1:25 000 (1 grid square = 1 km). A more detailed version of this map is included in Appendix C: Confidential Section.

Initial assessment of the ADI site allowed McDonald to undertake a more detailed analysis of site types and their distribution over the Cumberland Plain. McDonald (JMCHM Pty Ltd 1997a) noted that archaeological visibility was a significant issue however 666 Aboriginal cultural sites had been recorded with the DEC (formerly NPWS, now DECCW) in 1997 on the Cumberland Plain. McDonald's investigation identified open artefact scatters/open camp sites

to be the dominant site type (composing 89%) of all sites) followed by isolated finds and combination open/other site types (3.5%) and scarred trees (totalling 2.1% of all recorded features). Furthermore, this analysis emphasised the obvious disparity between surface and sub-surface artefact numbers. This investigation revealed the fact that virtually none of the sites which had been excavated on the Cumberland Plain could be characterised on the basis of surface evidence alone. In addition, McDonald noted that open sites were found in all landscape units and that the high proportion of sites located on creek banks reflected variables such as surface visibility and taphonomy rather than being indicative of cultural artefact distribution across the landscape (JMCHM Pty Ltd 1997a: 36).

Existing predictive models which relied heavily on surface evidence were inadequate. It was assumed that sub-surface results would provide the necessary data on which a model could be based that could predict site location and/or site variability (McDonald 1996).

After extensive salvage and test excavations carried out for the Rouse Hill Test Excavation Programme (Brayshaw McDonald Pty Ltd 1993, McDonald *et. al.* 1994) and the Rouse Hill (Stage 2) Infrastructure Project (McDonald 1999), several important characteristics relating to the Cumberland Plain were noted:

- Most areas – even those with sparse or no surface manifestations – contain sub-surface archaeological deposits
- Where open sites are found in aggrading and stable landscapes, some are intact and have the potential for internal structural integrity. Sites in alluvium possess potential for stratification.
- While ploughing occurs in many areas of the plain, this only affects the deposit up to 30 cm deep, and even then ploughed knapping floors have been located which are still relatively intact.
- Contrary to earlier models for open sites, many sites contain extremely high artefact densities, with variability appearing to depend on the range of activity areas and site types present.
- The complexity of the archaeological record is also far greater than was previously identified on the basis of surface recording and more limited test excavation. Intact knapping floors, backed blade manufacturing sites, heat treatment locations, a number of apparently specialised tool types, and generalised camp sites were all found.
- Two Early Bondian dates (between 5,000 – 3,000 BP) provide a context for some backed blade manufacture.
- Gross site patterning is identifiable on the basis of environmental factors: sites on permanent water are more complex (i.e. they represent foci for larger groups or are used repeatedly by smaller groups over a long period of time) than sites on ephemeral or temporary water lines (McDonald 1996: 115).

McDonald also argued environmental factors, such as stream order, were integral to developing a predictive model for the Cumberland Plain. Stream order modelling, as a predictive tool, could be utilised to anticipate the potential for Aboriginal camp site locations in the landscape based on the order of water permanence. McDonald (JMCHM Pty Ltd 1997a, 1997b; McDonald 1999; JMCHM Pty Ltd 2000) in particular has drawn on stream order modelling in order to forecast the potential nature and complexity of sites. These models can also be used to predict site distribution, the possible range of activities carried out at a particular site, as well as the frequency and/or duration of occupation.

Analysing stream order can allow researchers to locate areas of past water permanence, which would have been vital for Aboriginal people. Abundant food and other resources are more likely to occur in areas of water permanence which would in turn attract Aboriginal occupation. McDonald's excavations of open artefact scatter sites at the ADI site in St Marys provided evidence of such a correlation (JMCHM Pty Ltd 1997b: 133).

According to McDonald, the range of lithic activities and the complexity of the resulting stone assemblage observed at a location of permanent water differ depending on stream order. Overall, artefact scatters in the vicinity of a high order raking stream reflect a greater range of activities (e.g. tool use, manufacture and maintenance, food processing and quarrying) than those located on lower order streams. Temporary or casual occupations of a site, reflected by

an isolated knapping floor or tool discard, are more likely to occur on smaller, more temporary water courses (JMCHM Pty Ltd 1997a: 134-135).

It is therefore possible, McDonald concluded, to use stream order to make general predictions about the location and nature of Aboriginal sites on the Cumberland Plain. Water permanence (i.e. stream order), landscape unit (i.e. hill top, creek flat) as well as the proximity to artefact raw materials can result in variations in the density and complexity of an Aboriginal archaeological feature (JMCHM Pty Ltd 1997a, 2000: 19). Site location and duration of occupation predictions therefore relate to stream order in the following ways:

- In the headwaters of upper tributaries (i.e. first order creeks) archaeological evidence will be sparse and represent little more than a background scatter;
- In the middle reaches of minor tributaries (second order creeks) archaeological evidence will be sparse but indicate focussed activity (e.g. one-off camp locations, single episode knapping floors);
- In the lower reaches of tributary creeks (third order creeks) will be archaeological evidence for more frequent occupation. This will include repeated occupation by small groups, knapping floors (perhaps used and re-used), and evidence of more concentrated activities;
- On major creeklines and rivers (fourth order) archaeological evidence will indicate more permanent or repeated occupation. Sites will be complex, with a range of lithic activities represented, and may even be stratified;
- Creek junctions may provide foci for site activity; the size of the confluence (in terms of stream ranking nodes) could be expected to influence the size of the site;
- Ridgetop locations between drainage lines will usually contain limited archaeological evidence although isolated knapping floors or other forms of one-off occupation may be in evidence in such a location (JMCHM Pty Ltd 2000: 19).

As the archaeological resource of the Cumberland Plain is dominated by stone artefacts, the raw material and extent of modification have also been subject to analysis and predictive modelling. Dallas & Witter (1981 in Ozark 2004: 10) have put forward the distance decay model, which suggests that artefacts generally get smaller with increasing distance from the raw material source, and also that the amount of cortex decreases. Observations made by Smith (1988: 108-109) tentatively suggested that there is a tendency for larger percentages of cortex to be found near raw material sources, while there is also a tendency for sites with lower to no surviving cortex to be concentrated away from raw material sources. She also found however that site size – that is, the number of artefacts in a site – does not necessarily correlate with distance from the material source: not all large sites on the Plain are associated with raw material extraction (Smith 1988: 106). Benton and Levy (OzArk 2004: 10) state, however, that the increasing number of new stone sources, particularly of silcrete, found on the Plain has made testing the distance decay model more difficult, and suggest that this model is a poor mechanism for explaining raw material preference. AMBS also highlights other variables relating to raw material procurement and suggests that "simple proportional differences in raw material might not be a good archaeological indicator of quarrying behaviour" (AMBS 2002: 31).

In addition, AMBS (2005: 4) has also suggested that broad predictive models for the Cumberland Plain such as those of McDonald can be calibrated for the Eastern Creek area with the use of "less holistic but more localised assessments", as shall be attempted in below.

5.3 PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS IN THE REGION

5.3.1 Introduction

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

5.3.2 Studies relating to the Prospect Reservoir

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

Table 5.3 Summary of sites recorded to the south of Prospect Reservoir

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

Table 5.4 Sites in the immediate vicinity of the study area

The contents of this table are not for public distribution.
It has been included in Appendix C: Confidential Section
(Maps, Detailed Site Description Tables, and Site Cards)

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Prospect Reservoir Contact Sites

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

Prospect Reservoir Site Complex

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

5.3.3 Previous Archaeological Investigations in the immediate vicinity of the Study Area

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

Not appropriate for public display for reasons of Aboriginal cultural sensitivity

Figure 5.2: Archaeological sites recorded to the south of the Prospect Reservoir. Base Image © Department of Lands (2006). Scale 1:25 000. A more detailed version of this map is included in Appendix C: Confidential Section.

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

Figure 5.3: Sites in the immediate vicinity of the study area. Base image © Department of Lands (2006). Scale 1:25 000. A more detailed version of this map is included in Appendix C: Confidential Section.

Table 5.5 Summary of sites in the immediate vicinity of the study area

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

Table 5.6 Sites in the immediate vicinity of the study area

The contents of this table are not for public distribution. *It has been included in Appendix C: Confidential Section* *(Maps, Detailed Site Description Tables and Site Cards)*

The CSIRO Former Animal Research LaboratoryThe Holroyd Substation Site, Long Street

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

The Holroyd Substation Site, Long Street

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

The Boral Widemere Lands

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

5.4 SECTION SUMMARY

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

Figure 5.4: The outline of ERM's (1998) land unit one, Aboriginal site PH 1 (in blue) and PH 1 PAD (in red) – Redrawn from ERM 2006: Figure 2.2. Base image © Department of Lands (2006). Scale 1:25 000. A more detailed version of this map is included in Appendix C: Confidential Section.

6.0 PREDICTIVE STATEMENT

6.1 DEGREE OF DISTURBANCE

The historic land use activities described in Section 3.5 have impact on the surface and subsurface archaeological potential for the area. In general, lower levels of disturbance correlate to higher potential for Aboriginal archaeological resources. This process is described in Table 6.1 below.

Particularly relevant to the study area is the issue of soil disturbance as a result of past land use for landfill. A large landfill which runs north-south on the eastern border of the substation site, encroaching approximately 2 m into the site, and Transmission Line 3 also passes through this landfill area.

Table 6.1 Categories of Ground Disturbance

Degree of Disturbance	Impact Description	Impact on Archaeological Resource
Undisturbed	No apparent disturbance to original land surface.	*In situ* archaeological deposits may be present. Dependent on characteristics of original land surface: deep cracking clays recorded in study area can prevent *in situ* survival of deposits due to artefacts dropping through cracking soil.
Low	Non-mechanical vegetation clearance and stock grazing. Cattle grazing took place in the area.	Archaeological material will retain some spatial integrity although localised displacement is expected. Removal of tree stumps has subsurface impact. Cattle grazing on wet soil can seriously churn the ground surface, as observed by ERM (1998).
Moderate	Mechanical vegetation clearance and cultivation (ploughing) sheet/gully erosion, fluvial disturbance.	Archaeological materials may be present, although localised spatial displacement and artefact damage is likely; *in situ* deposits may remain beyond plough zone (usually between 100 – 150 mm).
Severe	Removal of topsoil via excavation for residential development, road and infrastructure construction, landscaped gardens, sheer erosion through natural causes and development, capping of landfill.	While archaeological sites may be destroyed, remnant dispersed archaeological material may survive. The context of such material may be unknown.

6.2 PREDICTIVE STATEMENT

Predictive modelling for the Cumberland Plain region is able to draw on a wide range of past studies. The predictive statement for Cumberland Plain as proposed by McDonald (1997, 1999 & 2000) has been outlined in Section 5.2 above. Locational data for sites is based on the existing archaeological record, local topography, access to and distance from permanent water, and degree of previous land disturbance. With this in mind a general predictive model for Aboriginal site type, site preservation, and site preservation may be proposed.

6.2.1 Site Location

The current study area, as described in Section 3.0, has the following landscape features:

- It is located on the very gently sloping alluvial flat on the northern banks of Prospect Creek;
- Prospect Creek, at the point where it passes through the study area, is an ephemeral first order stream;
- The terrain slopes gently up towards Prospect Hill in the northwest; and

- No quarries, confluences of streams, or other known significant resources lie either within the study area or its immediate vicinity (excepting the caches of historic glass bottles 2 km to the west).

Predictive models for the Cumberland Plain, as summarised in Section 5.2, have suggested that while Aboriginal sites may be found on all landforms:

- Gently undulating topography is preferred over steep slopes;
- High ground or ridge crests may be used for vantage points or travel routes, and
- More permanent water sources, as well as raw material sources like quarries, are more likely to attract repeat visits of longer duration in a concentrated area.

The flat to gently sloped landscape of the study area may have been seen as preferable to more steeply sloped ground near Prospect Hill to the northwest. People would have stopped for water, fishing and plant gathering at any point along Prospect Creek. The lack of foci for activity means that it is unlikely that activities would have clustered in one specific part of the study area. Sites may therefore be found at any point within the study area, though their number would be low, with greater likelihood of sites being located at any point along the banks of Prospect Creek.

6.2.2 Site Types

The archaeological record of the study area, as described in Section 5.0, shows the following trends:

- The main site types are open camp sites (86.99%), isolated finds (5.69%), scarred trees (3.25%), contact period open artefact scatters (1.63%), open artefact scatters associated with scarred trees (1.63%), and one historic place (0.81%);
- Attractive areas in the landscape, such as permanent water, rises overlooking stream confluences, and raw material sources, attract repeat visits of longer duration. This results in a wider range of activities, producing more diverse archaeological remains;
- Other areas may show the results of one-off tool making or repair, known as dinnertime camps, produced as people move through the landscape as part of a highly mobile lifestyle;
- Historical land clearance has greatly reduced the potential that scarred trees may survive in the study area.

Other than Prospect Creek, there are no places within the study area which would have encouraged repeat visits. Activities taking place at Prospect Creek would have included getting water, fishing, plant gathering, and camping. These activities would mostly likely persist in the archaeological record as open artefact scatters or isolated finds. No scarred trees are expected to survive.

6.2.3 Artefact Characteristics

It has been stated that “predictive models tell us where sites are likely to be but not what they contain (AMBS 2005: 4). However, it has been suggested that the site’s proximity to raw materials may have potential to influence the size of artefacts. It has been suggested that the reuse and conservation of materials would increase proportional to the distance from the source (Dallas & Witter 1983, see also Smith 1989b & 1990; DSCA 2003). This would result in the following:

- Close to the material source (such as a quarry), artefacts would be discarded with minimal retouch, and a large percentage of cortex would survive;
- Further from the material source, artefacts would be discarded only after further retouch and repair became impractical, and so only a small percentage of cortex (if any) would survive.

Flaked glass artefacts may also occur based on the presence of such sites in the near vicinity. Smith (1989b) has suggested that there may have been a preference for working glass artefacts on higher ground. It is possible that the same rules of raw material conservation would apply to glass artefacts. However, at present there is only very limited locational data for glass artefacts, as such finds are relatively rare.

As the study area is a considerable distance from the major raw stone material sources, any stone artefacts observed may reflect these characteristics. Flaked glass artefacts may also occur.

6.2.4 Site Preservation

A range of natural and human-induced taphonomic factors acts upon site preservation. The considerable disparity between surface findings and subsurface materials in the Cumberland Plain identified by McDonald (1997) means that the potential for subsurface deposit should be considered for open artefact scatters and isolated finds. Factors acting on site preservation and the potential for subsurface deposit in the study area are considered below:

- Past excavations in the vicinity of the present study area have been characterised by a low density of subsurface artefacts (e.g.: ERM 2006: 27).
- Soil profiles taken on the neighbouring Boral Widemere land recorded only a thin layer of topsoil over a deep layer of clay, with very little alluvial or colluvial soil present (ERM 2006).
- Similarly, the substation site itself has been described as lying on shale bedrock with possible thin cover of floodplain alluvium (probably silty clay derived from shale) (SKM 2008a Appendix E).
- Areas unsuitable for clearing and ploughing are considered to be areas of *zero to low* disturbance. It is unlikely that there are such areas within the study area. Even in such areas, natural taphonomic processes such as the vertical redistribution of subsurface archaeological deposits through cracking clay (as recorded in the study area) can impact the archaeological record.
- Clearance, ploughing, embankment construction (with imported rubble and fill), cycle path construction and landscaping has caused *low to moderate* disturbance throughout the easements of Transmission Lines 1 and 2.
- It is possible that flooding has caused *moderate* disturbance to any surface material. In the headwaters of Eastern Creek, to the northwest, fluvial action has been suggested as a taphonomic factor leading to the redistribution of artefacts into non-systematic concentrations with less focus than expected for even transient or dinnertime camps (AMBS 2005: 21-22).
- Soil quarrying and landfill along the eastern edge, and the construction of the LP Transitway and its culvert, club buildings, driveways and shooting range embankments in the substation site area, and the capped landfill beneath Transmission Line 3, has resulted in *moderate to severe* disturbance.
- McNally (SKM 2008a Appendix E) identified an unfilled area in the southwest corner of the Hyland Road Parklands. It is considered likely that this unfilled area corresponds with the majority of the substation site, excepting the area of landfill contamination along the eastern border. This unfilled area would have undergone clearing, ploughing and grazing, followed by impact from construction of the club buildings, fences and driveway, leading to either *low to moderate* or *moderate to severe* disturbance.
- PH 1 PAD (AHIMS # 45-5-2447 & 45-5-2746), which falls within the easement of Transmission Lines 1 and 2, would have undergone *low to moderate* disturbance as a result of vegetation clearance, stock grazing, ploughing and fluvial disturbance.
- As mentioned in Section 4.1, DCAC (2003) considered that any Aboriginal objects and areas of PAD along the “Darug Walking Path”, which ran alongside Prospect Creek, had been removed during disturbance from landscaping works.

With these factors in mind, it is possible to suggest probable levels of site preservation in different parts of the study area:

- The likelihood of surface material deposits being discovered in the substation site is *low*. The likelihood that any such material will be either stratified or *in situ* is *low*.

- The likelihood of surface material being discovered in Transmission Lines 1 or 2 is ***low***. The likelihood of subsurface material being discovered is ***low***, and the possibility that this material will be either stratified or *in situ* is ***low***.
- The likelihood of subsurface deposits being discovered in PH 1 PAD (AHIMS # 45-5-2447 & 45-5-2746) is assessed as ***low***. The likelihood that any such material will be either stratified or *in situ* is ***low***.
- The likelihood of surface material or subsurface deposits being discovered in Transmission Line 3 is ***zero to very low***. If the landfill was not dug into culturally-sterile deposits, it is possible that very early deposits may be preserved below the deepest extent of the landfill. Depth of landfill varies from 1.2 – 2.6 m, to over 5.6 m in places (SKM 2008a Appendix E).

6.2.5 Site Type Descriptions

The following information relates to the site types that are commonly identified across the Cumberland Plain:

- Open camp sites

These are surface sites commonly referred to as open artefact scatters. They may include archaeological remains such as stone artefacts, faunal and shell remains, charcoal and baked clay. Occasionally, such sites contain hearths. Surface scatters are usually exposed by erosion, agricultural events and vehicle and animal tracks in areas where surface visibility is increased due to lack of vegetation. Surface sites can also be indicators of associated subsurface archaeological deposits which may remain intact dependant on the degree of land disturbance which has occurred in the past.

- Isolated finds

Single artefacts are commonly found across the landscape as individual pieces which have no associated archaeological context. Isolated finds may be the result of either opportunistic resource use/discard or represent the 'background scatter' of Aboriginal archaeological material that can be seen across much of the Cumberland Plain.

- Scarred Trees

These are the result of the removal of bark and/or wood for the purpose of manufacturing shelters, canoes and shields and/or for designs carved into wood for a range of aesthetic, functional and ceremonial reasons which are currently not fully understood. Evidence for tree scarification is more likely to be observed on large and mature trees (depending upon the species). As a general rule, unless the tree is at least 100 years old, scarring is unlikely to be of Aboriginal origin.

- Potential Archaeological Deposit (PAD)

This represents an area of subsurface archaeological sensitivity that has not undergone mechanical destruction in historical times. Excavation of PAD is considered likely to yield intact subsurface Aboriginal artefacts and/or artefact scatters. The identification of PAD is based on landscape and environmental factors such as topography, hydrology and proximity to local resources. PADs can either be identified in association with identifiable surface artefacts or on the basis of landscape and environmental factors alone.

- Background Scatter

This refers to be low density presence of Aboriginal archaeological material across most landforms on the Cumberland Plain. Often isolated finds or artefacts out of context, Aboriginal archaeological material is present across much of the region as a result of the time depth in which Aboriginal people have been present and utilising resources on the Cumberland Plain (in excess of 20,000 years). This time depth when related to variables such as: changes in past Aboriginal populations; landuse regimes, artefact reduction methods and the longevity of Aboriginal stone artefacts in the archaeological record and combined with natural erosion processes have served to create what archaeologists call a 'background scatter' of archaeological material in which whole and in situ Aboriginal archaeological sites are identified and studied.

6.3 SECTION SUMMARY

Patterns of past Aboriginal land use, inferred from site type and distribution observed on the Cumberland Plain, suggest that the most likely site location within the study area is at any point along the banks of Prospect Creek, and that the most likely site types are open artefact scatters and/or isolated finds of stone tools, with a low possibility for glass artefacts. Historical land use activities and natural taphonomic processes have impacted the potential for intact surface or subsurface archaeological deposit to remain in the study area. Based on consideration of the known impacts on the study area, the substation site is seen as having undergone *low to moderate* impact, resulting in a *low* potential for artefacts; Transmission Lines 1 and 2 have undergone *low to moderate* impact, resulting in a *low* potential for artefacts; PH PAD 1 (AHIMS # 45-5-2447 & 45-5-2746) has undergone *low to moderate* impact, resulting in a *low* potential for subsurface deposits; and Transmission Line 3 is *severely* impacted with a *zero to very low* potential for artefacts.

7.0 FIELD ASSESSMENT METHODOLOGY

7.1. PROPOSED METHODOLOGY

A field methodology was provided to Aboriginal stakeholders and Transgrid via SKM. The methodology was developed in accordance with the *NSW National Parks and Wildlife Service Aboriginal Cultural Heritage Standards & Guidelines Kit* (NSW NPWS 1997). It was proposed that, conditions allowing, the entire proposed substation site and Transmission Lines 1, 2 and 3 be subjected to a pedestrian field assessment.

The aims of the field assessment are to:

- identify Aboriginal archaeological and cultural sites and issues;
- consult with the Aboriginal stakeholders in the field in relation to the inherent archaeological and cultural values of the subject property;
- identify areas of potential archaeological deposit, and/or archaeologically sensitive landscapes, within the area covered by the proposed substation location and transmission line turn-ins, and;
- produce recommendations based on the results of the fieldwork and mapping to advise TransGrid on the Aboriginal archaeological and cultural values of the subject area.

The results of the field assessment will be used to identify the level of archaeological and cultural potential and significance of the study area and offer impact assessments, mitigation and management recommendations in relation to any identified archaeological resource.

It was expected that there would be a minimum of five field workers present on the day. As such it was proposed that spacing surveyors every 10 m to 15 m would ensure maximum ground surface coverage of the search transects. The area that is to be subject to the Aboriginal archaeological and cultural heritage assessment (that is the *study area*) is the entirety of the substation site as well as options for the two transmission line turn-ins.

7.1.1 Survey Units

The rough dimensions of the proposed substation site are 225 m x 190 m x 136 m x 202 m. It was proposed that the substation site be divided into five overlapping north-south transects approximately 50 m wide. As the easements for Transmission Lines 1 and 2 are 60 m wide, and the easement for Transmission Line 3 is 45 m wide, each option shall be assessed as a single transect.

7.1.2 Recording

Each of the transects was to have its own pro forma field recording sheet, to enable all finds and survey unit specifics to be recorded. This would ensure that all terrain, land disturbance, resource location and Aboriginal site distribution information for each survey unit was comparable with data recorded for the others. Exposure and ground surface visibility was to be recorded following the system outlined in Table 7.1, below, and levels of disturbance were to be assessed according to a similar scale (refer to Table 6.1).

Likewise, a pro forma sheet for each artefact find recorded during assessment was to be kept. Recordable artefact attributes for field assessment included: type, length, breadth, width, material, cortex, and evidence of any diagnostic traits, as well as evidence of use wear and/or retouch. Artefacts were photographed in the field with visible scale reference. GPS co-ordinates (in GDA94) were kept for each artefact find.

Artefacts were to be recorded singularly unless a major artefact scatter was observed. Estimates of scatter size based on the number of artefacts per square meter over the estimated size of the area were to be employed. Site maps and sketches were also to be made where appropriate.

Table 7.1 Categories of Ground Surface Visibility

Ground Surface Visibility	Percentage Rating
Very Poor – heavy vegetation, scrub, foliage or debris cover, dense tree or scrub cover. Soil surface of the ground difficult to see.	0-9% ground surface visible.
Poor – moderate level of vegetation, scrub, and/or tree cover. Some small patches of soil surface visible in the form of animal tracks, erosion, scalds, blowouts etc, in isolated patches. Soil surface visible in random patches.	10-29% ground surface visible.
Fair – moderate levels of vegetation, scrub and/or tree cover. Moderate sized patches of soil surface visible, possibly associated with animal /stock tracks, unsealed walking tracks, erosion, blowouts etc. Soil surface visible as moderate to small patches, across a larger section of the study area.	30-49% ground surface visible.
Good – moderate to low level of vegetation, tree or scrub cover. Greater amount of areas of soil surface visible in the form of erosion, scalds, blowouts, recent ploughing, grading or clearing.	50-69% ground surface visible.
Very Good – low levels of vegetation/scrub cover. Higher incidence of soil surface visible due to past or recent land-use practices such as ploughing, grading, mining etc.	70-89% ground surface visible.
Excellent – very low to non-existent levels of vegetation/scrub cover. High incidence of soil surface visible due to past or recent land use practices, such as ploughing, grading, mining etc.	90-100% ground surface visible.

7.2 SECTION SUMMARY

Austral has proposed a field assessment methodology which would cover the entire 4 ha substation site and associated transmission line turn-ins by pedestrian survey. The survey methodology attempted to provide flexibility in response to onsite conditions and stakeholder and Client requirements, as well as to provide uniformity in recording to allow Austral to produce sound recommendations based on discussion of the results. The field assessment results are outlined in the following section.

8.0 FIELD ASSESSMENT RESULTS

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

8.1 RESULTS

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

8.1: Study areas and search transects. The survey units are numbered and outlined in blue. The extent of PH 1 PAD as described by ERM (1998 in ERM 2006) is outlined in yellow. Base image © Google Earth (2009).

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

8.2: Annotated aerial photograph of study area showing areas of PAD identified during field visit. Image © Google Earth 2009.

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

8.3: Annotated aerial photograph of entire substation site showing additional ground disturbance observed during field visit. Image © Google Earth 2009.

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

8.4: Annotated aerial photograph of Hyland Pk Road Small Bore Rifle Club and Pigeon Club grounds, Survey Unit 5. Image © Google Earth 2009.

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

8.5. Annotated aerial photograph of Transmission Lines 1 and 2. Image © Google Earth 2009. Areas of PAD are shaded in yellow and areas of imported rubble and fill earthworks are shaded in pink.

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

8.2 SECTION SUMMARY

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

9.0 DISCUSSION AND SIGNIFICANCE ASSESSMENT

9.1 DISCUSSION OF FIELD ASSESSMENT FINDINGS

9.1.1 Introduction to the Discussion

As described in the previous section, no surface archaeological sites were recorded. However, areas of potential were identified based on the survival of the original soil surface, proximity to Prospect Creek and historically low ground disturbance. The identification of potential for PH PAD 1 (AHIMS # 45-5-2447 & 45-5-2746) (ERM 1998 in ERM 2006) was also retained, and modified in light of the results of the present survey.

Previous archaeological assessments have established that Aboriginal people frequented the study area. These add to historical accounts of European contact and conflict with the Aboriginal inhabitants. The lack of surface archaeological material recorded in this current assessment does not mean that Aboriginal people did not pass through the current study area. Rather, it can be explained in light of the past land use practices of Aboriginal and European people, and the predictive model generated from these.

Specifically, the lack of surface finds recorded in the study area could suggest either or both of the following: that Aboriginal people preferred gentle elevated slopes over alluvial flats for tool making, cooking, and camping; and/or that any activities which took place on the alluvial flat and creek banks did not leave a physical record. In addition, there was generally very poor ground surface visibility over the entire study area, due either to the thick lawn growing throughout, or through leaf litter and thick vegetation in areas of regrowth forest.

9.1.2 Discussion of Subsurface Archaeological Potential

However the presence of subsurface deposit cannot be discounted, as McDonald (1997) has shown. Sites cannot be characterised on the basis of surface evidence alone, open sites are located on all landscape units, and variables such as surface visibility and taphonomy must also be taken into account. Therefore it is also possible that the lack of surface sites recorded in the study area is a result of taphonomic processes such as the removal or burial of surface artefacts through cattle grazing, land clearance and the import of fill material for landscaping, and/or flooding either removing, burying or redistributing artefacts. As noted in Section 6, *in situ* archaeological deposits have been recorded below the plough zone in sites through New South Wales.

The study area lacks any particularly attractive landscape features from an archaeological perspective, such as a quarry or a gentle rise overlooking the confluence of two streams, which would have caused people to repeatedly visit a particular spot or stay there for long stretches at a time. Therefore it is most likely that, as people passed through the area repeatedly over a long period of time and availed themselves of drinking water, fish, and water plants, they would have left behind an unfocused background scatter of artefacts representing a limited range of one-off or short-term activities. The idea of people passing through *en route* to richer areas seems likely in light of the study area's location between the major watercourse systems of Eastern Creek, the Georges River and the Parramatta River.

Therefore a sparse background scatter of artefacts may be expected to survive in subsurface deposits. As a result, PH 1 PAD was reassessed, and HRP PAD was identified, based on the visibility of the original soil surface, proximity to Prospect Creek, and historically low ground disturbance. Based on the predictive modelling outlined in Section 6, and supported by the results of the field assessment, the potential for HRP PAD (within the substation site) is *low*.

Survey unit 5 (the Rifle and Pigeon Club grounds) is not considered to be part of HRP PAD. Due to extensive ground surface modification related to the construction of the shooting range embankments, club buildings and buried septic tank system, the archaeological potential in this area is considered *zero to very low*.

PH 1 PAD was reassessed to include the land from the south of the LP Transitway to the banks of Prospect Creek. The entire PAD is assessed as having *low* potential. This includes the easements of Transmission Lines 1 and 2.

The route of Transmission Line 3 (survey unit 8), which passes over the capped landfill area, is not considered part of PH 1 PAD. The landfill area has *zero to very low* archaeological potential. This assessment also may change dependent on clarification of the depth of landfill. Specifically, if the landfill was not dug into culturally-sterile deposits, it is possible that very early deposits may be preserved below the deepest extent of the landfill.

9.2 INTRODUCTION TO THE HERITAGE ASSESSMENT PROCESS

An assessment of significance seeks to determine and establish the importance or value that an object or site may have to the community at large. The concept of cultural significance is intrinsically connected to the object or place, its location, setting and relationship with other items in its surrounds. The assessment of cultural significance is ideally a holistic approach that draws upon the response these factors evoke from the Aboriginal community.

Archaeological sites require a different approach to significance assessment because the extent of the heritage resource, and the degree to which it can contribute to our understanding of history, is not fully known at the outset. Also of significance is the type of information that can be revealed by potential archaeological deposits, especially where the information is not available through any other source, and the contribution it can make to our understanding of a place, which may also be of cultural heritage significance.

9.3 BASIS FOR ASSESSMENT OF ABORIGINAL SITES

The NSW National Parks and Wildlife Service assessment criteria for archaeological significance (NSW NPWS 1997) have been developed to deal specifically with archaeological resources and cover:

A) Research Potential. This criterion is designed to qualify the significance of potential research which may be carried out at a site. Significance is apportioned according to the amount of new information which might be contained in the deposit, rather than the potential to yield a large number of artefacts. A site may have high significance under this criterion if it has an intact stratigraphic sequence and good integrity, the potential to provide a chronology extending into the past, or if it is connected to other sites within the region. Within this criterion are the subsets of representativeness and rarity. Representativeness is the ability of the site to demonstrate a type of site or deposit. This is important to maintain a contingency sample of all site types. Rarity is often described within the framework of representativeness as it relates to the distinctive features of a site which set it apart from similar sites.

B) Educational Potential. This criterion allows the educational value of a site to be considered as a component of significance. Under this criterion, an archaeologist may assess the potential of a site to educate the general public. DECCW has acknowledged that this criterion is open to misinterpretation by archaeologists who have the ability to convey the value of a site to other archaeologists. DECCW recommends that, in cases where significance is determined on educational potential, the onus is on the archaeologist to go to the public for an assessment of this value.

C) Aesthetic Significance. Aesthetic significance is not inherent in a place, but arises from the response that people have to it. It is pertinent to remember that this response can vary dramatically between cultures and social groups, therefore an assessment of significance based on aesthetic value should incorporate the views of different cultures.

For a full description of assessment procedures refer to the *Aboriginal Cultural Heritage: Standards and Guidelines Kit* (NSW NPWS 1997). These criteria have been designed to deal specifically with the archaeological resource; however they do not provide a framework for the assessment of social significance to the Aboriginal community. For this reason, the criteria for assessment provided in the *Australia ICOMOS charter for the conservation of places of cultural significance* (the Burra Charter) are sometimes also used to assess significance as they provide a framework for a more holistic assessment of significance. Should objects or land of particular cultural significance to Aboriginal people have required assessment those elements of the Burra Charter that provide guidance on social significance may have been implemented. However these criteria have not been utilised in this instance as the assessment procedures and criteria as reproduced in Section 9.3 are considered sufficient for the current study.

9.4 ASSESSMENT OF AREAS OF POTENTIAL IN THE HYLAND ROAD SUBSTATION STUDY AREA.

Each of the criteria of assessment outlined in the previous section will now be considered in the sub-sections below.

9.4.1 Research Potential

The research potential and significance of the areas surveyed for the Hyland Road substation site project depends entirely on what new information can be learnt through further archaeological investigation.

As discussed in detail in Section 6, ground disturbance has impacted the entire study area to varying degrees. No surface sites were recovered. It has been demonstrated that subsurface deposit cannot be characterised on the basis of surface material alone. However, the extent and type of ground disturbance is considered to have reduced the archaeological potential in the least disturbed portions of the study area (namely PH 1 PAD and HRP PAD) to *low*.

This assessment of archaeological potential is translated to an assessment of research potential in light of the concepts of representativeness and rarity. In other words, it is necessary to assess whether the type of subsurface deposit most likely to be recovered is would be a good representative example of the most common archaeological deposit in the area, or, whether the deposit most likely to be recovered is rare for the area.

Predictive modelling and the analysis of the regional archaeological context suggest that the most likely finds would consist of low density background scatter. Such an assemblage would not be able to provide new information regarding the archaeological record of the wider region. The exception would be if glass artefacts were located, as at present there is only a small sample of sites with glass known from the region, and locating glass artefacts on an alluvial flat would provide useful data for the discussion regarding contact period site location. When representativeness and rarity are considered, the research potential of the study area is assessed as *low*.

9.4.2 Educational Potential

The educational potential of a study area is best considered in light of its value to the general public, the Aboriginal stakeholders, and other researchers: those people whom the archaeologist has a duty to inform. Therefore the educational potential of the current study area is tied up with its research potential: what can be learnt from further archaeological investigation, and whom will that knowledge benefit?

The educational value of a site to the public is the most important criterion. The educational potential must be linked to something that can add to the public's knowledge of the Aboriginal past of a particular area. In this instance, based on absence of surface physical archaeological evidence, the educational value of the current study area is limited. No artefactual material was observed during assessment. Further, it is unlikely that any subsurface material would differ substantially from the archaeological assemblage already known for the region: it would be neither rare nor representative. In addition, the concept of 'archaeological potential' is neither tangible nor accessible to a public audience. As a result, the educational potential in terms of the public is considered to be *low*.

The perspective of Aboriginal stakeholders is likely to differ from that of the archaeologist and that of the general public: the archaeological record is a component of Aboriginal oral history and prehistory. As a non Aboriginal person, the consultant is unable to offer such a valuation as has been provided in consideration of the general public or other researchers.

What can be offered in terms of considering educational value and Aboriginal stakeholders is that which has been offered before in this consideration of overall potential. That is, that the information from the current study area is unlikely to shed new light on Aboriginal people's use of landscape in times past, and may also be assessed as *low*. However it is appreciated that perspectives do differ and unlike the general public or other researchers, Aboriginal stakeholders may see the compilation of further archaeological data of the same type as a confirmation of their story, which may be of high educational value to them.

Lastly, although the consultant acknowledges that in consideration of a study area's educational potential that its value in educating other archaeologists and researchers is not

paramount, it is still of importance. Sufficient data currently exists to satisfy questions of site distribution on this landform type, and therefore the educational value of the current study area for other researchers is considered to be ***low***.

The overall educational value of the current study area is therefore **low**. The educational value would increase should excavation be necessary and glass artefacts be uncovered (as per discussion above).

9.4.3 Aesthetic Significance

As noted in section 9.3 aesthetic significance deals with the response that people have to a particular place. This criterion differs from the other two in that it is not so readily quantifiable but takes into account a subjective or emotive response to a place as opposed to providing comment upon a tangible item (such as an Aboriginal artefact) or an issue of research relevance (such as an area of PAD).

The criteria that deal with research and educational significance are almost wholly concerned with the archaeological or 'scientific' significance. These are values that are determined by archaeologists, as has been included in subsections 9.4.1 & 9.4.2. However this report must also take into account the Aboriginal *cultural* heritage value of a site or study area. It is this criterion that is utilised to such an end.

The consultant posits that, as this document constitutes an Aboriginal archaeological and *cultural* assessment the appropriate community or culture to be approached to ascertain such a response is that of the local Aboriginal community. To canvass any other aspect of the wider community to gives a response to aesthetic qualities from the viewpoint of Aboriginal cultural heritage would be inappropriate and outside the purview of the current study.

Specifically the consultant has approached and consulted with the Aboriginal stakeholders identified for this study. This is in keeping the DECCW Aboriginal community consultation guidelines and ethical consultative practice. Each stakeholder organisation was asked to consider the study area from the perspective of the Aboriginal cultural heritage (a view on which the consultant is unqualified to give not being an Aboriginal person) and offer any insights and/or knowledge they may have specific to the current study area.

All of the Aboriginal groups consulted for this project (DTAC, DCAC, DLALC and DACHA) expressed a contemporary link with the local area and the archaeological record identified within. However no specific Aboriginal cultural sites or issues that may prove an identifiable constraint to the current study area were raised by the stakeholders. All were asked to provide written comment on the current report and given a chance to highlight matters of cultural heritage that they felt may be impacted by the development. Received comments are summarised in Section 1.4.1 and presented in Appendix A.

Given the lack of identifiable Aboriginal cultural issues or concerns the overall aesthetic value of the current study area is therefore **low**.

9.5 IMPACT ASSESSMENT

As described earlier in the report, the proposed works involve the construction of the Holroyd substation buildings as well as a total of three associated 330kV & 132kV transmission line turn-in connections.

According to information provided in the field, development impact within the substation site will be total and therefore it will not be possible to avoid impacting on HRP PAD. However, as HRP PAD has been assessed as having *low* potential for intact archaeological deposit, *low* educational and research potential, and no Aboriginal cultural or heritage values identified by stakeholders, no mitigation will be required for the substation site.

It is understood that impacts for the construction of the three transmission line turn-ins will include the installation of transmission line towers. Each tower footprint would have a severe impact on any archaeological resource within the footprint.

PH 1 PAD as redefined by Austral lies within the easements of both Transmission Line 1 and Transmission Line 2. Although PH 1 PAD is considered to have *low* research potential, *low* educational potential, and no Aboriginal cultural or heritage values identified by stakeholders, it is recommended that attempts be made to mitigate impacts on the area of PH 1 PAD and thereby reduce the potential to encounter Aboriginal archaeological material.

The following is therefore recommended: avoidance of wholesale vegetation clearance (for example, stump removal and removal of root systems); avoidance of turf or topsoil removal; avoidance of heavy or track vehicle traffic – rubber-tyred vehicles are preferred; and avoidance of excavation outside of the necessary footprint for transmission line towers. If possible, it is recommended that impacts to the area be minimised by placing the towers far apart – it has been indicated to Austral that towers may be spaced up to 500 m apart. Spanning the area by placing towers at sufficient distance could therefore possible minimise or avoid impact to PH 1 PAD.

If these impacts cannot be avoided, it is recommended that they be limited to as small an area as possible.

10.0 CONCLUSION & MANAGEMENT RECOMMENDATIONS

10.1 CONCLUSIONS

No surface archaeological sites were recorded as a result of this assessment. However this does not mean that Aboriginal people did not make use of the study area. Rather this supports the idea that Aboriginal people may have preferred other landforms or undertaken activities that left no archaeological trace. It may also indicate taphonomic factors acting against site preservation on the creek banks and in the flood zone.

Two areas of PAD were recorded during the survey: the relocated PH 1 PAD, and the newly recorded HRP PAD.

Regarding the first area of PAD, the identification of archaeological potential by ERM (1998 & 2006) for PH 1 PAD has been upheld, and reassessed as *low* in light of Austral's field assessment results. In addition, the extent of PH 1 PAD has been reassessed. The PAD is now held to cover that land bounded by the LP Transitway to the north, the landfill to the east, and Prospect Creek to the south and west. Transmission Lines 1 and 2 pass over the extended area of PH 1 PAD. Tower installation within Transmission Lines 1, 2, and 3 will require ground disturbance to prepare the footings. These activities have the capacity to damage or destroy the context of any Aboriginal archaeological subsurface deposit via soil removal. Development within the Transmission Line 1 and 2 easements is likely to be restricted to the installation of transmission line towers and associated vegetation clearance. Transmission Line 1 covers a longer stretch of ground and a therefore a greater part of PH 1 PAD, Prospect Creek, and the tributary/drainage line than does Transmission Line 2. Therefore it is predicted that Transmission Line 1 has potential to have a higher number of archaeological (and possibly cultural) constraints than will Transmission Line 2.

Regarding the second area of PAD, an area of potential archaeological deposit, "Hyland Road Park PAD" (HRP PAD) has been recorded in the substation site. HRP PAD has been ascribed a *low* level of potential. Development will impact the entirety of the substation site (see Figure 1.3), including HRP PAD.

Furthermore, development within the easement of Transmission Line 3 will involve the same impacts as in the easements for Transmission Lines 1 and 2. However, as almost the entire easement runs over the former landfill, the potential for impact on archaeological deposits is considered to be *zero to very low*. Therefore it is unlikely that there would be any archaeological constraints on the proposed Transmission Line 3 route. The exception would be if the tower footings extended below the maximum depth of the landfill and into undisturbed natural deposit, which would have the same archaeological potential as the rest of the banks of Prospect Creek.

Those areas, including PH 1 PAD and HRP PAD, deemed to possess *zero* and *low* potential to yield intact Aboriginal archaeological deposit do not, in the consultant's opinion, warrant further archaeological investigation.

The client should be nonetheless be aware that all Aboriginal archaeological items and places are protected under Section 90 of the NP&W Act 1974 (amended). Although no recorded archaeological material is known for the study area, the extent of PH 1 PAD (AHIMS # 45-5-2447 / 45-5-2746), as redefined by Austral based on the results of the present study, lies within the easements of Transmission Lines 1 and 2. Previous archaeological assessments (ERM 1998 & 2006) within PH 1, the site associated with PH 1 PAD, have revealed the presence of Aboriginal archaeological material. Although assessed previously as not warranting further archaeological investigation, a view supported by the results of the current assessment, PH 1 PAD nonetheless presents a potential Aboriginal archaeological constraint.

It is therefore recommended that TransGrid's project planning attempt to minimise impact to PH 1 PAD. Impact is defined, in this case, as any disturbance to the ground's surface that may result in the disturbance or destruction of potential subsurface material. Should Aboriginal archaeological or cultural material be located during development, additional consultation as to appropriate management and mitigation of this material will need to take place. This may involve applications to the DECCW under Section 87 or Section 90 of the NP&W Act 1974 (amended). Consultation may be required and would involve input from the identified Aboriginal stakeholders consulted for this project.

It is with this in mind that the following recommendations are made:

10.2 RECOMMENDATIONS

1. No further work for HRP PAD and PH 1 PAD

In the consultant's opinion, both areas have *low* potential for intact archaeological deposit. As these PADs have been assessed to be of low educational and research potential it is held that no further archaeological investigation of either of these PADs is warranted at this stage. In addition, no identifiable Aboriginal cultural issues or concerns were identified for these PADs and therefore the aesthetic value is low. Austral does not find that monitoring is justified on archaeological grounds. Undertaking of monitoring will be an arrangement between the Client and the Aboriginal stakeholders. See Recommendation 2 for specific comments on PH 1 PAD.

2. Minimise impact to PH 1 PAD

To reduce the chances of unacceptable impacts on potential subsurface archaeological material that will require further mitigation, ensure that actions that have the potential to impact are minimised if they cannot be avoided. Avoidance of the following is recommended:

- Wholesale vegetation clearance (for example, stump removal and removal of root systems);
- Turf or topsoil removal;
- Heavy or track vehicle traffic – rubber-tyred vehicles are preferred; and
- Excavation outside of the necessary footprint for transmission line towers.

If these impacts cannot be avoided, it is recommended that they be limited to as small an area as possible, in order to reduce the chance of encountering any archaeological constraints. It may be also possible to minimise impacts by placing towers up to 500 m apart and thereby spanning the area. Should Aboriginal archaeological material be uncovered, refer to Recommendation 4.

3. Preferred selection of Transmission Line 2 as the final 330kV transmission line turn-in route

It is recommended that this option be selected as the final 330kV turn-in route, as it will result in less ground disturbance within the part of PH 1 PAD identified between the northern bank of Prospect Creek and the LP Transitway.

4. Stop work provisions

All Aboriginal artefacts, known and unknown, are protected under Section 90 of the NP&W Act. In the event that any Aboriginal archaeological material is encountered, the following must occur:

- Works to cease immediately to allow an archaeologist to make an assessment of the finds. This may involve consultation with the NSW DECCW and local Aboriginal stakeholder groups.
- Previously unrecorded Aboriginal archaeological material to be reported to the NSW DECCW within a reasonable timeframe, as per Section 91 of the NP&W Act. An application under Section 87 or Section 90 of the Act may also be required in this event.

5. Distribution of finalised reports.

Copies of this report will be forwarded to DTAC, DCAC, DACHA, DLALC and ATSICC, and to the DECCW.

6. Restricted access to reports

It should be noted that the information pertaining to the location of Aboriginal sites or objects is restricted and cannot be put on public exhibition. In the event that this project is to go on public exhibition, consult with the archaeologists or the DECCW to confirm the level of

appropriate public release. **This version of the report has been modified to be suitable for public display.**

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APPENDIX A ABORIGINAL COMMUNITY STAKE-HOLDER RESPONSES TO REPORT

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

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APPENDIX B SURVEY UNITS FIELD RECORDING

The following tables summarise the field recording of each Survey Unit in order of recording. Please refer to Figure 6.1 in Section 6 of this assessment report for a map of these areas.

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Survey Unit 1

Survey Unit 2

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

Survey Unit 3

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

Survey Unit 4

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Survey Unit 5

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

Survey Unit 6

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Survey Unit 7

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Survey Unit 8

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Survey Unit 9

Not appropriate for public display for reasons of Aboriginal cultural sensitivity.

APPENDIX C CONFIDENTIAL SECTION

APPENDIX C.1 MAPS

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5.1: Sites recorded in previous archaeological investigations within 10km² of the study area. Base image © Department of Lands (2006). Scale: 1:25 000 (1 grid square = 1 km)

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5.2: Archaeological sites recorded to the south of the Prospect Reservoir. Base Image © Department of Lands (2006). Scale 1:25 000

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5.3: Sites in the immediate vicinity of the study area. Base image © Department of Lands (2006). Scale 1:25 000.

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5.4: The outline of ERM's (1998) land unit one, Aboriginal site PH 1 (in blue) and PH 1 PAD (in red) – Redrawn from ERM 2006: Figure 2.2. Base image © Department of Lands (2006). Scale 1:25 000.

APPENDIX C.2 TABLES

Table 5.4 Sites in the immediate vicinity of the study area

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Table 5.6 Sites in the immediate vicinity of the study area

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APPENDIX C.3 SITE CARDS FOR PH 1 PAD

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APPENDIX D CONSULTATION LOG

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