

Appendix I

ABORIGINAL CULTURAL HERITAGE ASSESSMENT REPORT

Potts Hill to Alexandria transmission cable project

Aboriginal Cultural Heritage Assessment Report

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Client: TransGrid

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Glossary, acronyms and abbreviations

Glossary

Term	Definition
Aboriginal archaeological site	The present spatial extent of visible Aboriginal archaeological material(s) at a given location.
Aboriginal cultural heritage	The tangible (objects) and intangible (dreaming stories, song lines and places) cultural practices and traditions associated with past and present-day Aboriginal communities.
Aboriginal Heritage Impact Permit (AHIP)	Under the <i>National Parks and Wildlife Act 1974</i> (NSW) (NPW Act), a person can apply for an AHIP as defence to prosecution for harming Aboriginal objects or Aboriginal places. AHIPs are issued under Part 6 of the NPW Act.
Aboriginal Heritage Information Management System (AHIMS)	A register of New South Wales (NSW) Aboriginal heritage information maintained by the NSW Department of Premier and Cabinet (formerly Office of Environment and Heritage).
Aboriginal object	Any deposit, object or material evidence (not being a handicraft made for sale), including Aboriginal remains, relating to the Aboriginal habitation of NSW.
Aboriginal place	Any place declared to be an Aboriginal place under section 94 of the <i>National Parks and Wildlife Act 1974</i> (NSW).
Alignment	The geometric layout (e.g. of a road) in plan (horizontal) and elevation (vertical).
Archaeological potential	The likelihood of undetected surface and/or subsurface archaeological materials existing at a location.
Artefact	Any object which has been physically modified by humans.
Community	A group of people living in a specific geographical area or with mutual interests that could be affected by the project.
Construction	Includes all physical work required to construct the project and also includes construction planning such as the development of construction management plans.
Construction laydown areas	Areas required for temporarily storing materials, plant and equipment and providing space for other ancillary facilities, such as project offices, during construction. Some construction laydown areas would be used for stockpiling.
Detailed design	The stage of the project following concept design where the design is refined, and plans, specifications and estimates are produced, suitable for construction.
Earthworks	All operations involved in loosening, excavating, placing, shaping and compacting soil or rock.
Exposure	An area of land surface where the ground surface is visible, usually as the result of thinner vegetation cover, erosive forces or human-caused disturbance. In archaeological surveys, the percentage of ground surface that is visible is recorded. These percentages of exposure are then used to calculate effective coverage.
Ground Surface Integrity (GSI)	A term used to assess the level of disturbance to the ground's surface.
Ground Surface Visibility (GSV)	A term used to describe the area of the ground's surface that is visible during archaeological field surveys.

Term	Definition
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment.
inner Sydney	Includes the Sydney Central Business District (CBD) and eastern suburbs.
Methodology	The method for analysis and evaluation of the relevant subject matter.
Potential Archaeological Deposit (PAD)	The hypothesised presence of archaeological deposit where there is uncertainty due to a lack of visibly eroding artefacts, lack of test excavation either locally or in analogous landforms in the region.
Pre-construction	All work prior to, and in respect of the state significant infrastructure, that is excluded from the definition of construction.
Project area	<p>The project area comprises the overall potential area of direct disturbance by the project, which may be temporary (for construction) or permanent (for operational infrastructure) and extend below the ground surface. The project area includes the location of operational infrastructure and construction work sites for:</p> <ul style="list-style-type: none"> the transmission cable route (including the entire road reserve of roads traversed); special crossings of major or waterbodies; substation sites requiring upgrades (noting that all works would be contained within the existing site boundaries); and construction laydown areas.
Proponent	The person or organisation that proposes to carry out the project or activity. For the purpose of the project, the proponent is TransGrid.
Feasible and reasonable	Consideration of best practice, taking into account the benefit of proposed measures and their technological and associated operational application in the NSW and Australian context 'Feasible' relates to engineering considerations and what is practical to build. 'Reasonable' relates to the application of judgement in arriving at a decision, taking into account mitigation benefits and cost of mitigation versus benefits provided, community expectations and nature and extent of potential improvements.
Road reserve	The area comprising roads, footpaths, nature strips and public transport infrastructure (including indented bus bays, bus shelters and bus stop signage).
Secretary's Environmental Assessment Requirements (SEARs)	Requirements and specifications for an environmental assessment prepared by the Secretary of the Department of Planning and Environment under section 5.16 of the <i>Environmental Planning and Assessment Act 1979</i> (NSW).
Sediment	Material, both mineral and organic, that is being or has been moved from its site of origin by the action of wind, water or gravity and comes to rest either above or below water level.
state significant infrastructure (SSI)	Infrastructure projects for which approval is required under Division 5.2 of the NSW <i>Environmental Planning and Assessment Act 1979</i> .
Stone/lithic artefact	Any rock materials modified by human agency.
Study area	The study area for this assessment comprises the project area plus a one kilometre buffer around the project area.
Switch bay	Part of a substation within which the switch and control equipment relating to a given circuit are contained.
Transmission cable	An insulated wire that conducts an electrical current at voltages greater than 132 kilovolts (kV).

Term	Definition
Underboring	This is a trenchless method for installing cables involving passing the conduits under infrastructure (such as a road or railway corridor) or a watercourse. Underboring could be via thrust boring (also known as micro tunnelling) or horizontal directional drilling.
Warning tape	Tape that is buried directly above underground services to provide visual warning during subsequent excavation.
Waterway	Any flowing stream of water, whether natural or artificially regulated (not necessarily permanent).
Work site	A specific section of the project area for carrying out project construction activities such as trenching and excavation, establishment of a joint bay, underboring or installing a cable bridge. The work site would be fenced off from public access and may include associated activities such as traffic management measures.

Abbreviations and acronyms

Abbreviation/ Acronym	Definition
ACHAR	Aboriginal Cultural Heritage Assessment Report
ACHMP	Aboriginal Cultural Heritage Management Plan
ACT	Australian Capital Territory
ADI	Australian Defence Industries
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
ATSIHP Act	Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Commonwealth)
BP	Before Present
CBD	Central Business District
CHL	Commonwealth Heritage List
CRA	Colebee Release Area
DECCW	Department of Environment, Climate Change and Water (replaced in 2011 by the NSW Office of Environment and Heritage)
DPC	NSW Department of Premier and Cabinet
EIS	Environmental Impact Statement
EOI	Expression of Interest
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
ERS	Eastern Regional Sequence
GLALC	Gandangara Local Aboriginal Land Council
GPS	Global Positioning System
GSV	Ground Surface Visibility
kV	kilovolt
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
MLALC	Metropolitan Local Aboriginal Land Council

Abbreviation/ Acronym	Definition
NHL	National Heritage List
NPW Act	National Parks and Wildlife Act 1974 (NSW)
NPW Regulation	National Parks and Wildlife Regulation 2009
NSW	New South Wales
OEH	NSW Office of Environment and Heritage (now assumed by Department of Planning, Industry and Environment)
OSL	Optically-Stimulated Luminescence
PAD	Potential Archaeological Deposit
RAP	Registered Aboriginal Parties
RHDA	Rouse Hill Development Area
RNE	Register of the National Estate
SEARs	Secretary's Environmental Assessment Requirements
SSI	state significant infrastructure

Executive summary

TransGrid is the manager and operator of the major high-voltage electricity transmission network in New South Wales (NSW) and the Australian Capital Territory (ACT). TransGrid is seeking approval under Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the construction and operation of a new 330 kilovolt (kV) underground transmission cable circuit between the existing Rookwood Road substation in Potts Hill and the Beaconsfield West substation in Alexandria (the project).

The project has been identified as a solution to address existing issues in the electricity supply network for inner Sydney, which is characterised by ageing and deteriorating electricity infrastructure and forecast increases in consumer demand.

As the project is State significant infrastructure (SSI) under section 5.12 of the EP&A Act, an Environmental Impact Statement (EIS) has been prepared to assess the impacts of the project. This Aboriginal Cultural Heritage Assessment Report (ACHAR) has been developed in support of the EIS.

The transmission cable circuit would be about 20 kilometres long and would generally be located within existing road reserves, at existing electrical infrastructure sites, within public open space and on previously disturbed areas across three local government areas (LGAs). The project would comprise the following key components:

- cable works connecting Rookwood Road substation with the Beaconsfield West substation;
- special crossings of infrastructure or watercourses;
- upgrade works at the Rookwood Road and Beaconsfield West substations;
- conversion works at the Beaconsfield West and Sydney South substations; and
- temporary construction laydown areas to facilitate construction of the project.

Based on background research, register searches, Aboriginal community consultation and archaeological survey, it has been concluded that no known Aboriginal sites will be subject to direct or indirect impacts as a result of the project. Notwithstanding, an area of Aboriginal archaeological sensitivity was identified within the project area which may be subject to impact from trenching and/or underboring activities (near Mildura Reserve). Following the assessment of project route options for the transmission cable route and special crossings in the vicinity of the Cooks River at Mildura Reserve, the project may proceed subject to the following recommendations:

- Option 1: Excavation within area of archaeological sensitivity can be avoided - TransGrid may proceed without further archaeological investigation; or
- Options 2 or 3: Excavation within area of archaeological sensitivity cannot be avoided - TransGrid would be required to prepare an ACHMP for the project which would provide protocols for investigating and managing Aboriginal heritage values within the project area.

1.0 Introduction

TransGrid is the manager and operator of the major high-voltage electricity transmission network in New South Wales (NSW) and the Australian Capital Territory (ACT). TransGrid is seeking approval under Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the construction and operation of a new 330 kilovolt (kV) underground transmission cable circuit between the existing Rookwood Road substation in Potts Hill and the Beaconsfield West substation in Alexandria (the project).

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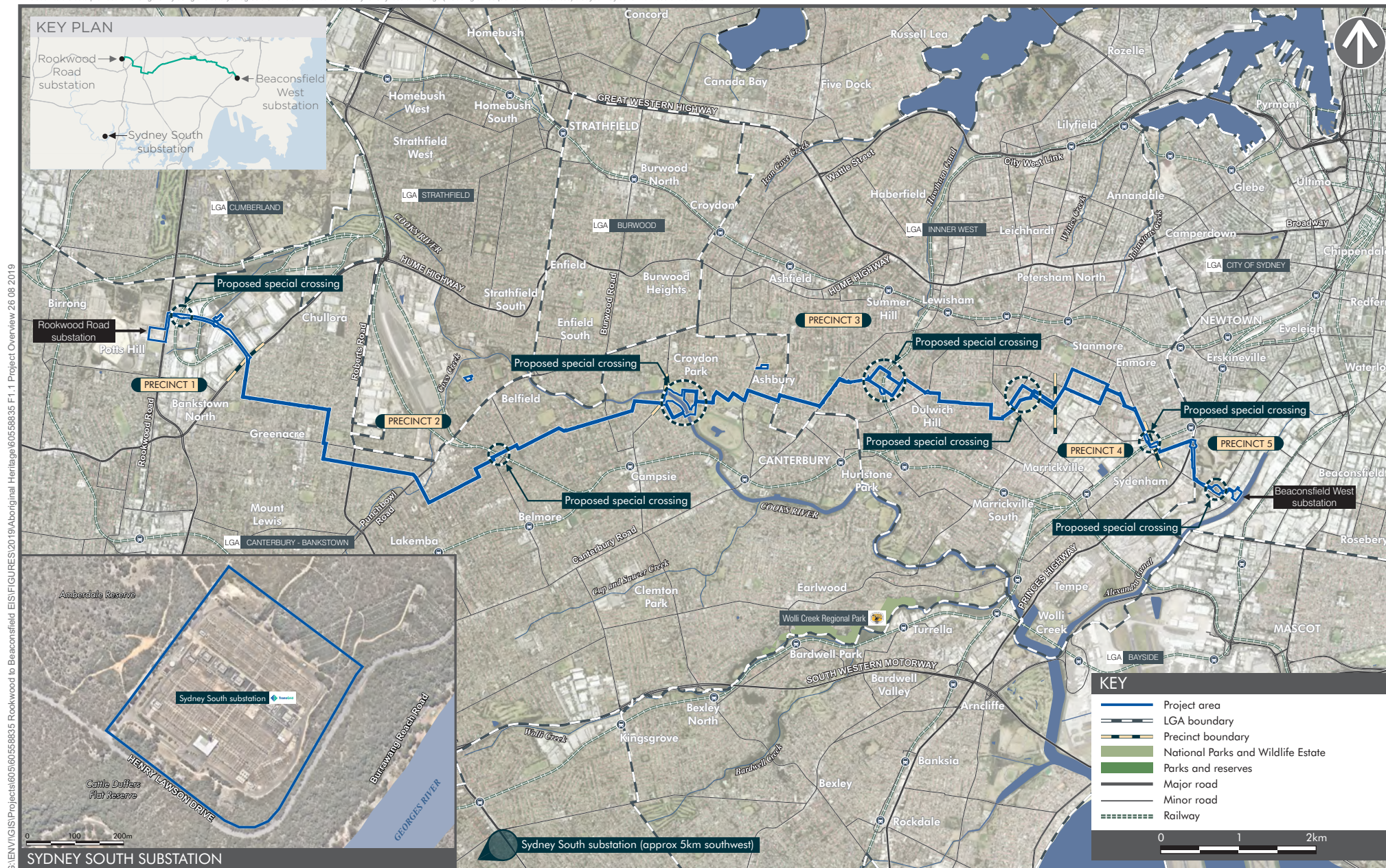
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1.1 Project overview

The transmission cable circuit would be about 20 kilometres long and would generally be located within existing road reserves, at existing electrical infrastructure sites, within public open space and on previously disturbed areas as shown in **Figure 1-1**. The project would comprise the following key components:

- cable works connecting Rookwood Road substation with the Beaconsfield West substation;
- special crossings of infrastructure or watercourses;
- upgrade works at the Rookwood Road and Beaconsfield West substations;
- conversion works at the Beaconsfield West and Sydney South substations; and
- temporary construction laydown areas to facilitate construction of the project.

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1.2 Purpose of this technical report

This ACHAR has been prepared in accordance with the revised Secretary's Environmental Assessment Requirements (SEARs) issued for the project on 20 August 2019 by the Planning Secretary of the NSW Department of Planning, Industry and Environment (DPIE).

The relevant SEARs to this technical assessment are presented in **Table 1-1**.

Table 1-1 SEARs

SEARs		Section addressed
Heritage	<ul style="list-style-type: none"> an assessment of the impact on Aboriginal cultural heritage (archaeological and cultural) in accordance with the <i>Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW</i> (OEH) and the Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (OEH); 	Section 9.0. Please note that historic heritage is assessed in a separate report (refer to Appendix J (Historical heritage impact assessment) of the EIS)
	<ul style="list-style-type: none"> adequate consultation with Aboriginal stakeholders having regard to the <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents</i> (DECCW, 2010). 	Aboriginal stakeholder consultation undertaken for the project is discussed in Section 6.0

Details of where to locate the report content stipulated by DPC (formerly OEH) in the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011) are provided in **Table 1-2**.

Table 1-2 DPC requirements reference table

DPC Requirement	Refer to
How the requirements for consultation with Aboriginal people have been met (as specified in clause 80C of the National Parks and Wildlife Regulation 2009 (NPW Regulation)).	Section 6.0
A description of the Aboriginal objects and declared Aboriginal places located within the area of the Study.	Section 5.0
A description of the cultural heritage values, including the significance of the Aboriginal objects and declared Aboriginal places that exist across the whole area that will be affected by the Study and the significance of these values for the Aboriginal people who have a cultural association with the land.	Section 6.0
The views of those Aboriginal people regarding the likely impact of the Study on their cultural heritage (if any submissions have been received as a part of the consultation requirements, the report must include a copy of each submission and your response).	Section 6.0
Actual or likely harm posed to the Aboriginal objects or declared Aboriginal places from the Study, with reference to the cultural heritage values identified.	Section 9.0
Any practical measures that may be taken to protect and conserve those Aboriginal objects or declared Aboriginal places.	Section 10.0
Any practical measures that may be taken to avoid or mitigate any actual or likely harm, alternatives to harm or, if this is not possible, to manage (minimise) harm.	Section 10.0

1.3 Previous Aboriginal Heritage Impact Permits

No known Aboriginal Heritage Impact Permits (AHIPs) have been previously issued, or applied for, for land within the project area.

1.4 Project team

Luke Atkinson (Senior Heritage Specialist, AECOM) is the primary author of this report. Dr Darran Jordan (Principal Archaeologist, AECOM) undertook quality assurance review of this report.

1.5 Acknowledgements

AECOM would like to thank and acknowledge the assistance of all Aboriginal community members who participated in the assessment.

2.0 Description of the project

2.1 Project components

Key components of the project are listed below. A detailed description of the project is provided in **Chapter 4 Project description** of the EIS:

- cable works connecting Rookwood Road substation with the Beaconsfield West substation comprising:
 - a 330 kV underground transmission cable circuit comprising three cables installed in three conduits;
 - another set of three conduits for a possible future 330 kV transmission cable circuit if it is required;
 - four smaller conduits for carrying optical fibres;
 - around 26-30 joint bays, per circuit, where sections of cable would be joined together, located approximately every 600-800 metres along the transmission cable route;
 - link boxes and sensor boxes associated with each joint bay to allow cable testing and maintenance;
 - optical fibre cable pits for optical fibre cable maintenance;
- seven special crossings of infrastructure or watercourses including two rail lines (at Chullora and St Peters), one freight line (Enfield Intermodal rail line at Belfield), one light rail line (at Dulwich Hill), the Cooks River and its associated cycleway (at Campsie/Croydon Park), a playground (at Marrickville) and the southern wetland at Sydney Park (at Alexandria);
- upgrade works at the Rookwood Road and Beaconsfield West substations to facilitate the new 330 kV transmission cable circuit;
- conversion works at the Beaconsfield West and Sydney South substations to transition the existing Cable 41 from a 330 kV connection to a 132 kV connection; and
- five temporary construction laydown areas to facilitate construction of the project.

Associated works required to facilitate the construction of the project, such as potential utility relocations, have been considered. No major relocations are anticipated and where smaller services may need to be moved to accommodate the transmission cable circuit, this relocation would be restricted to within the project area assessed in this EIS.

The project does not include the cable pulling and jointing works for the possible future second transmission cable circuit. This activity, should it be required, would be subject to separate assessment and approval as per the requirements of the EP&A Act.

Several route options and alternative construction methods are being considered as part of the project. These are described further in **Section 2.4**.

2.2 Project location

The project would be located in the suburbs of Potts Hill, Yagoona, Chullora, Greenacre, Lakemba, Belmore, Belfield, Campsie, Croydon Park, Ashbury, Ashfield, Dulwich Hill, Marrickville, Newtown, St Peters, Alexandria and Picnic Point in the following local government areas (LGAs):

- City of Canterbury-Bankstown;
- Strathfield;
- Inner West; and
- City of Sydney.

The location of the project is shown on **Figure 1-1**.

The project would be located primarily within road reserves, at existing electrical infrastructure sites, within public open space and on previously disturbed areas. The project has been and would continue to be designed to avoid impacts to private property and open spaces where possible; however, there would be a need for both the use of public open space and easements over some private commercial properties due to significant existing constraints within the road reserve. Land uses adjacent to the road reserves in which the project would be located are mainly residential, with relatively short sections of commercial and mixed uses in the suburbs of Dulwich Hill and Petersham. The project would be located close to industrial areas at the western and eastern ends of the project around Potts Hill, Chullora, Greenacre, Marrickville, St Peters and Alexandria. The existing Sydney South substation at Picnic Point is surrounded by the Georges River National Park.

The location of the proposed special crossings is provided in **Table 2-1**.

Table 2-1 Location of proposed special crossings

Location	Suburb	Infrastructure or waterbody crossed
Muir Road, Chullora	Cable bridge	Rail line
Enfield Intermodal, Belfield	Underbore	Freight rail line
Cooks River, Campsie/Croydon Park/Ashbury	Cable bridge or underbore (preferred)	Cooks River and cycleway
Arlington Light Rail Station, Dulwich Hill	Underbore	Dulwich Hill light rail line or station
Amy Street, Marrickville	Underbore	Playground near Henson Park
Bedwin Road, St Peters	Cable bridge	Rail line
Sydney Park, Alexandria	Underbore	Wetland

2.3 The project area

The project area comprises the overall potential area of direct disturbance by the project, which may be temporary (for construction) or permanent (for operational infrastructure) and extend below the ground surface. It includes all options under consideration for the project, as described in **Section 2.4**.

The project area includes the location of operational infrastructure and construction work sites for:

- the transmission cable route (including the entire road reserve¹ of roads traversed);
- special crossings of infrastructure or watercourses;
- substation sites requiring upgrades (noting that all works would be contained within the existing site boundaries); and
- construction laydown areas.

While the boundaries of the project area represent the physical extent of where project infrastructure may be located, or construction works undertaken, it does not mean that this entire area would be physically disturbed or that indirect impacts would not be experienced beyond this area. Should the project be approved, the detailed design would aim to refine the location of project infrastructure and work sites within the boundaries of the project area assessed in this EIS.

There is a possibility that to minimise impacts on other utilities or transport corridors (roads and rail), that deviations from the assessed project area may be required. In this event, specific impacts of this approach would be assessed further. Future changes to the project may require additional assessment and approval as described in more detail in **Chapter 5 Statutory planning and approval process** of the EIS.

The location of joint bays and the location of the transmission cable circuit within the road reserve (e.g. kerbside or non-kerbside) is yet to be determined and is subject to detailed design.

¹ Road reserve is defined as the area comprising roads, footpaths, nature strips and public transport infrastructure (including indented bus bays, bus shelters and bus stop signage).

2.4 Options under consideration

The project includes route options and alternative construction methods in locations as outlined below and shown in Figure 4-6 in **Chapter 4 Project description** of the EIS. As the project design develops, a preferred option would be selected for each location. However, approval may be sought for some options where further design and engineering information is required before a preferred option can be selected.

The project options are discussed below by geographical area, from west to east.

2.4.1.1 Cooks River

There are three options for the transmission cable route in the vicinity of the Cooks River at Campsie/Croydon Park and two options for special crossing methods, including:

- Option 1: the transmission cable route travels in a south-easterly direction along Cowper Street from the intersection with Brighton Avenue, Campsie and then east on Lindsay Street. At the cul-de-sac at the end of Lindsay Street, there are two special crossing options of the Cooks River into Lees Park before the transmission cable route continues on to Harmony Street, Ashbury:
 - Option 1a: construct a cable bridge parallel to and to the north of the existing Lindsay Street pedestrian bridge; or
 - Option 1b: install the conduits under the Cooks River via underboring (this is the preferred option); or
- Option 2: the transmission cable route travels in a north-easterly direction from Byron Street at the intersection with Brighton Avenue, Campsie, through Mildura Reserve. From this parkland, the conduits would be underbored beneath the Cooks River, surfacing in Croydon Park near the cul-de-sac of Croydon Avenue in Croydon Park. The transmission cable route then travels north along Croydon Avenue, east along Dunstan Street, and south along Hay Street, before continuing east along Harmony Street; or
- Option 3: the transmission cable route travels in an easterly direction from Byron Street at the intersection with Brighton Avenue, Campsie, then in a south-easterly direction through Mildura Reserve, between residences and the Cooks River until the cul-de-sac at Lindsay Street. From here, there are two special crossing options of the Cooks River into Lees Park before the transmission cable route continues on to Harmony Street, Ashbury, which are the same for Option 1:
 - Option 3a: construct a cable bridge parallel to and to the north of the existing Lindsay Street pedestrian bridge; or
 - Option 3b: install the conduits under the Cooks River via underboring.

A description of the cable bridge and underboring methods is provided in **Section 2.5**, with further detail in **Chapter 4 Project description** of the EIS.

2.4.1.2 Dulwich Hill light rail corridor

There are two options for the transmission cable route crossing of the Dulwich Hill Light Rail corridor in the vicinity of the Arlington Light Rail station, Dulwich Hill. This includes:

- Option 4a: the transmission cable route travels northeast along Windsor Road from the intersection with Arlington Street, then east on Terry Road. At the Terry Road cul-de-sac, the conduits would be underbored beneath the rail corridor, surfacing at the Hill Street cul-de-sac. From here the transmission cable route continues along Hill Street to Denison Road; or
- Option 4b: the transmission cable route travels southeast along Constitution Road from the intersection with Arlington Street, before crossing into the southern end of Johnson Park. From here, the conduits would be underbored beneath the rail corridor near the Arlington light rail station. The transmission cable route then continues along Constitution Road and then north on Denison Road.

2.4.1.3 Henson Park

There are two options for the transmission cable route crossing in the vicinity of Henson Park, Marrickville including:

- Option 5a: the transmission cable route continues northeast on Centennial Street to a car park. From here it travels in an easterly direction through a grassed verge between the tennis courts and Henson Park oval to near the Amy Street playground. The conduits would be underbored beneath the playground, surfacing at Amy Street. The transmission cable route then turns east on to Horton Street; or
- Option 5b: the transmission cable route travels north on Sydenham Road from Centennial Street, turning northeast on to Neville Street, then southeast on Surrey Street to Amy Street before continuing along Charles Street.

2.4.1.4 Marrickville

There are two options for the transmission cable route in the vicinity of Addison Road, Marrickville. Note that the project may include one or both options at this location including:

- Option 6a: the transmission cable route travels north along Agar Street from the intersection with Illawarra Road, then east on to Newington Road and south down Enmore Road to the intersection with Scouller Street; and/or
- Option 6b: splitting the two circuits as there is insufficient space along Addison Road to accommodate both circuits. One circuit would travel along Newington Road (as for Option 6a) and one circuit would travel east on Addison Road from the intersection with Illawarra Road, then north on Enmore Road to the intersection with Scouller Street.

2.5 Construction works

Construction activities would be limited to the identified project area and include the activities summarised in **Table 2-2**. A substantial portion of the transmission cables would be installed using pre-laid conduits. The conduits would only require the excavation of short sections of trench at a time (an average of 20 metres at any one location), with backfilling occurring as soon as each section of the conduits has been installed. Depending on the overall construction program and associated number of work crews required, it is expected that trenching and excavation would occur concurrently at multiple work sites along the transmission cable route.

The project would involve the construction of seven special crossings that would involve either the installation of a cable bridge or underboring (i.e. an underground crossing). Works for these crossings would be undertaken in coordination with the relevant asset owner (e.g. road or rail authorities).

The construction of the project would require a number of work sites along the transmission cable route and at special crossings. Each work site represents an area of disturbance required to undertake the construction activity (e.g. trenching, cable bridge installation, underboring) and would be located within the project area.

Table 2-2 Summary of construction activities

Construction activity	Description
Site preparation	<ul style="list-style-type: none"> • implementation of traffic management changes (such as safety barriers and road signage) to facilitate access and egress to/from the work sites; • installation of environmental control measures (such as sediment barriers); • vegetation clearing and tree removal, where required; • establishing construction laydown areas and ancillary facilities including temporary offices and worker amenities, site fencing and provision of power/services; and • delivery and storage of plant and equipment at construction laydown areas and work sites.

Construction activity	Description
Trenching and excavation	<ul style="list-style-type: none"> clearing of surface vegetation along excavation area if required; saw cutting of the road surface/pavement and lifting this material using a backhoe/front end loader. If rock is encountered, a rock breaker may be used to loosen the material; removal of material down to the base of the trench using an excavator and placement of spoil directly onto trucks to be transported to a licensed facility. The trench would typically be around three metres wide and 1.2 metres deep but could be deeper or shallower depending on the presence of utilities; and installation of shoring as a precaution against slump or collapse where necessary, particularly where deeper sections of trench are required (i.e. deeper than 1.4 metres).
Relocation of minor utilities/services	<ul style="list-style-type: none"> use of non-destructive digging methods to expose buried services to guide the excavator; and minor relocations, if required, would occur within the road reserve and be subject to consultation with the relevant asset owner/operator.
Conduit installation and backfilling	<ul style="list-style-type: none"> laying the transmission cable conduits on plastic spacers to provide the required clearance from the side walls and bottom of the trench; placing the optic fibre communication cable conduits into position; backfilling the trench with engineered backfill; laying of polymeric covers and warning tape, marked with appropriate warnings in case of accidental excavation; and installation of the road base and temporary restoration of the road surface to allow vehicles and other road users to travel across the area.
Excavation and establishment of joint bays	<ul style="list-style-type: none"> excavation of joint bays via open trenching; installation of erosion and stormwater flow controls and barriers; erecting fencing or hard barriers as required; provision for vehicle access, worker amenities and equipment storage; temporary covering with steel plates to provide access to adjacent properties where required; and excavation of nearby pits to facilitate the installation of link and sensor boxes.
Cable pulling and jointing	<ul style="list-style-type: none"> installation of a tent or demountable building over the joint bay to provide a controlled work environment and dry work site; pulling cables through the conduits which is fed from large drums holding 600-800 metres of cable; and connecting sections of cables at the joint bay.
Permanent road restoration	<ul style="list-style-type: none"> removing the temporary road surface; backfilling with road base up to surface level, where required; reinstating pavement; and reinstating the remaining areas that were excavated with spoil or other fill material to pre-construction levels and final finishing to match existing as appropriate (e.g. footpath and/or kerb and gutter) or as otherwise agreed with the relevant roads authority.

Construction activity	Description
Cable markers	<ul style="list-style-type: none"> once restoration activities have been completed, cable markers would be installed along the transmission cable route to give warning of the presence of the cables and the need to make enquiries before digging; markers may include: <ul style="list-style-type: none"> small signs attached to road kerbs; concrete marker posts (between 800-900 millimetres tall) along the transmission cable route in vegetated areas where surface markers would be difficult to see; or flush-markers constructed of concrete that are around 50-100 millimetres thick.
Cable bridges	<ul style="list-style-type: none"> establishment of the work site and access including vegetation clearing (where required); boring and earthworks for the bridge piers; installation of the pre-cast cable bridge and steel cage (where required) by crane; integration with the conduits in the road reserve; and reinstatement of the work site.
Underboring	<ul style="list-style-type: none"> underboring around four to 10 metres below the ground surface by either thrust boring or horizontal directional drilling (HDD); thrust boring would require a launch pit (at least four metres deep) and associated work site of up to around 800 square metres and a receive pit and work site of about 100 square metres; HDD would require a work site at the drill launch area of up to around 800 square metres and a receive pit for the drill exit of around 1.5 metres deep; and work sites would be restricted to the road reserve and public open space areas where feasible and reasonable to limit the need for vegetation removal.
Substation upgrades	<ul style="list-style-type: none"> site establishment; earthworks and excavations needed for cable entries and footings for new equipment; installation of new infrastructure (such as switchbays and busbars); removal of redundant infrastructure; installation and connection of new cables; commissioning of cables; and demobilisation.

2.5.1 Staging and timing of construction activities

An indicative duration of construction activities is provided in **Table 2-3**. The timing is subject to the detailed design and the final construction approach. For example, some works, such as trenching and excavation, would be undertaken by multiple work crews working along the transmission cable route. Staging of activities outside of certain hours would also influence the construction approach.

Should the project be approved, construction is planned to occur over 24 months, commencing in 2020. It is estimated that around 15 months would be required for civil construction works and conduit installation and about nine months for cable pulling and jointing, testing and commissioning. The transmission cable circuit is expected to be completed and commissioned in 2022/23.

Table 2-3 Indicative timing of typical construction activities

Construction activity	Indicative duration
Excavation, conduit (pipe) installation and trench backfilling	Conduits for each 600-800 metre cable section would take up to eight weeks to install (with most properties exposed to around two weeks of trench excavation activity).

Construction activity	Indicative duration
Joint bay construction	Each individual joint bay would take up to three weeks to establish (in addition to trenching works). Each joint bay contains one cable circuit.
Cable pulling	Cable pulling at each joint bay for each 600-800 metre cable section would typically take up to two weeks to complete.
Cable jointing	Cable jointing would typically take up to three weeks to complete at each joint bay.
Cable bridges	Each cable bridge crossing is expected to take around 10 weeks to complete in total, however works would be staged and not continuous over the 10 week period.
Underboring	Each underboring crossing is expected to take around eight to 10 weeks to complete in total, however works would be staged and not continuous over this period.
Substation works	Construction work at the Rookwood Road substation is expected to take around four to six months, while works at the Beaconsfield West and Sydney South substations are expected to take around six to nine months at each site.

2.5.1.1 Construction hours

Construction works would be undertaken during standard daytime construction hours as specified in the *Interim Construction Noise Guideline* (DECC, 2009) where reasonable and feasible to do so. However, it is expected that works outside standard construction hours would also be required, as described below.

Standard construction hours are:

- Monday to Friday 7am to 6pm;
- Saturday 8am to 1pm; and
- No work on Sundays and public holidays.

It is likely that construction works would be required at night time (after 10pm) due to the requirements of relevant road and rail authorities. These works could include, but are not limited to, works within major road reserves (i.e. on State and regional roads such as Rookwood Road and Old Canterbury Road), through signalised intersections, or at special crossings. Work outside standard construction hours may be required for safety reasons and/or to limit disruption to road traffic and rail services.

Cable jointing works at each joint bay would need to be undertaken continuously i.e. 24 hours. Some works at the substation sites may also need to be undertaken outside of standard construction hours due to outage constraints on the existing infrastructure (i.e. the need to maintain power supply to customers).

Cable bridges and underboring at rail corridors would be timed with other rail works to limit disruption to freight and/or passenger rail services. These works could be undertaken outside of standard construction hours including at night time or over weekends, subject to approval of the relevant rail authority.

Scheduled construction activities, work hours and duration would be further refined through consultation with relevant government agencies and would be outlined in the CEMP for the project.

2.5.2 Construction precincts

The transmission cable route has been divided into five construction precincts to aid the characterisation of the existing environment and assessment of project impacts. These precincts broadly align with similar land uses. A description of each precinct follows:

- **Precinct 1** includes the areas between the Rookwood Road substation and the Hume Highway, including the industrial area of Chullora along Muir Road;

- **Precinct 2** includes the areas between the Hume Highway and Brighton Avenue near the Cooks River including the residential areas of Greenacre, Lakemba, Belmore, Belfield and Campsie;
- **Precinct 3** includes the areas from the Cooks River to Illawarra Road including the residential areas of Croydon Park, Ashbury, Ashfield, Dulwich Hill and Marrickville;
- **Precinct 4** includes the area between Illawarra Road and the Bankstown rail line including the residential areas of Marrickville, Enmore and Newtown; and
- **Precinct 5** includes the areas between the Bankstown rail line and the Beaconsfield West substation including the residential areas of St Peters and the recreational area of Sydney Park in Alexandria.

2.5.3 Construction laydown areas

As part of the construction of the project, temporary construction laydown areas would be required to store materials, equipment, excavated spoil and provide space for other ancillary facilities such as site offices. Five locations have been investigated as potential construction laydown areas. The final number and location is subject to ongoing consultation with the relevant landowners and would be determined during detailed design.

Stockpiling of excavated spoil at the construction laydown areas would be ongoing for the duration of the civil works (around 15 months). Stockpiling would be managed by erosion and sediment controls in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004) (The Blue Book).

While it is expected that construction would require the use of transportable roadside facilities for individual work sites, provision for temporary site offices would be located within construction laydown areas for the duration of construction (up to two years).

Construction laydown areas would be fenced and would have lighting for security and to facilitate night works.

Driveways may need to be created from gravel or similar material to enable heavy vehicles to enter/exit the site. At construction laydown areas at Cooke Park and Peace Park, extended driveways would be required to access the laydown area. The construction of these driveways would require ground disturbance and potentially tree removal.

Temporary infrastructure at the construction laydown areas, including noise mitigation controls (such as hoardings), driveways and stockpile areas, would involve minimal subsurface ground disturbance (i.e. excavation) and would be removed once construction is complete.

For works at the Rookwood Road and Sydney South substation sites, sufficient space exists at each location to store materials and equipment; therefore, no additional laydown areas would be required.

The proposed locations and area required for the five potential construction laydown areas are listed in **Table 2-4**.

Table 2-4 Potential construction laydown areas

Potential construction laydown area	LGA	Potential area (hectares)
12 Muir Road, Chullora	City of Canterbury-Bankstown	0.48
Cooke Park, Belfield	Strathfield	0.37
Peace Park, Ashbury	Inner West Council	0.45
Camdenville Park, St Peters	Inner West Council	0.18
Beaconsfield West substation, Alexandria	City of Sydney	0.85

2.6 Cable operation and maintenance

Once the transmission cables have been installed, generally only visual inspections would be required. This would involve regularly driving along the transmission cable route to check for hazards or

activities (such as excavation works in the vicinity) that could impact the underground cables or cable bridges. Ongoing physical access to the transmission cables is not required however ongoing monitoring of the cable for damage (missing/worn cable markers) and outages would occur. This would be through access to the link boxes and sensor boxes located near the joint bays. Optical fibre cables installed alongside the transmission cables would be monitored at the optical fibre cable pits.

Pits for link and sensor boxes and optical fibre cables would generally be located in the footpath/road verge but in some cases where there is insufficient space, they may be required in the roadway. Roadway access would be managed with standard traffic controls.

Regular checks of the pits would ensure they are accessible and that the pit does not contain water or tree roots. Cable bridge structures would be inspected to ensure structural integrity and aesthetics are being maintained.

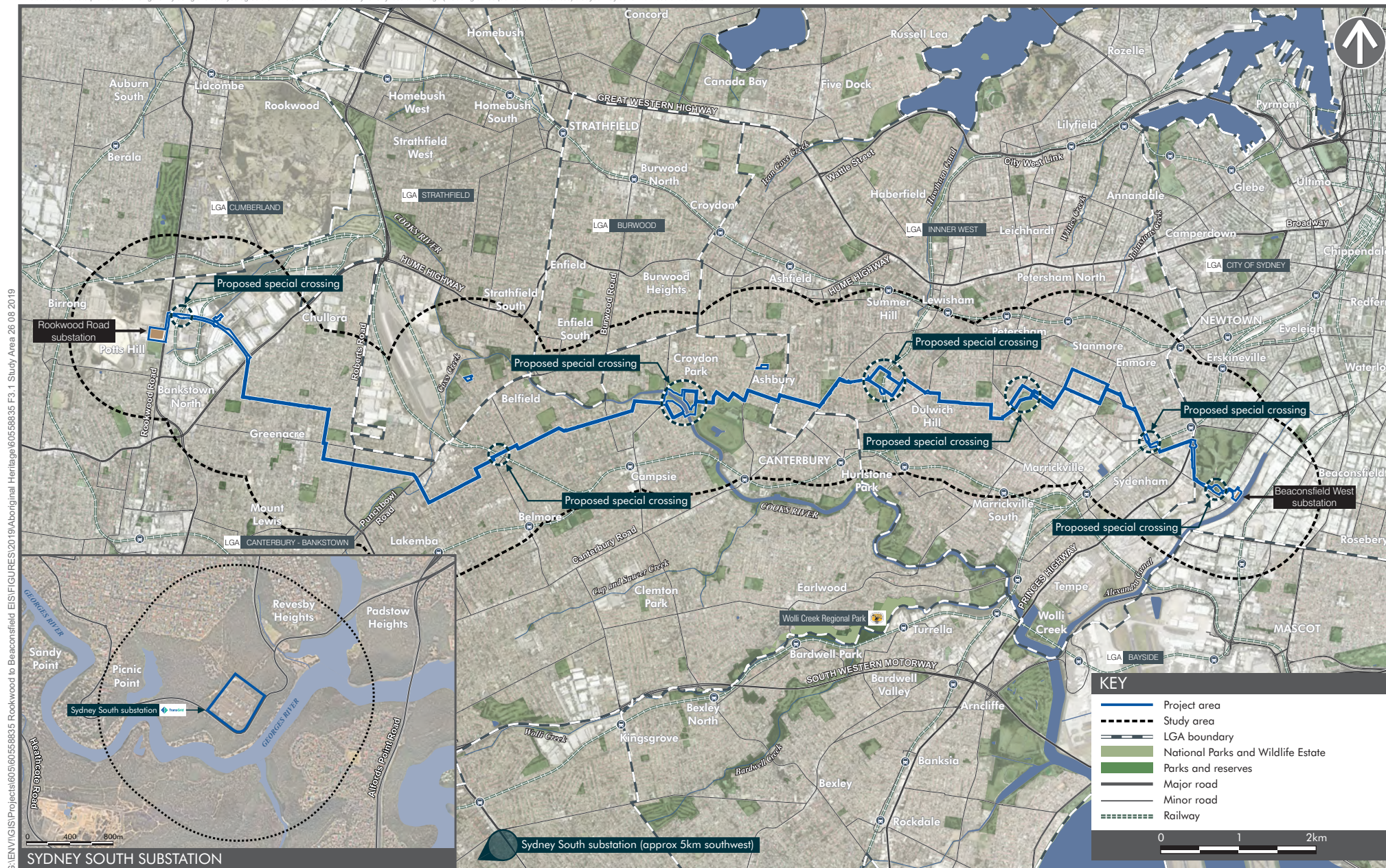
3.0 Assessment methodology

3.1 Study area

The study area for this ACHAR, as shown in **Figure 3-1**, includes a one kilometre buffer around the project area. This buffer was applied to provide regional environmental and archaeological context. The route has been divided into five construction precincts for assessment purposes, comprising:

- Precinct 1: Rookwood Road substation to Hume Highway;
- Precinct 2: Hume Highway to just before Cooks River (Brighton Avenue);
- Precinct 3: Brighton Avenue (near Mildura Reserve) to just past Henson Park (Illawarra Road);
- Precinct 4: Illawarra Road to Camdenville Park; and
- Precinct 5: Camdenville Park to Beaconsfield West substation.

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3.2 Statutory context, policy and guidelines

A number of planning and legislative documents govern how Aboriginal objects and places are managed in NSW. The following section provides an overview of the requirements of each as they apply to the project. The relevant legislation, policies and guidelines for the protection of Aboriginal sites, places and objects in NSW that have been considered during the preparation of this report include:

- Commonwealth legislation under the *Environment Protection and Biodiversity Conservation Act 1999* and *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*;
- NSW state-based legislation include the *Environmental Planning and Assessment Act 1979* and the *National Parks and Wildlife Act 1974*; and
- Local Environmental Plans (LEPs) for each LGA within the study area.

3.2.1 Commonwealth legislation

3.2.1.1 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act) defines 'environment' as both natural and cultural environments and therefore includes Aboriginal and non-Aboriginal historic cultural heritage items. Under the EPBC Act, protected heritage items are listed on the National Heritage List (NHL) (items of significance to the nation) or the Commonwealth Heritage List (CHL) (items belonging to the Commonwealth or its agencies). These two lists replaced the Register of the National Estate (RNE), which has been suspended and therefore is no longer a statutory list; however, it remains as an archive.

No relevant listings were identified within the study area for these registers.

3.2.1.2 Aboriginal and Torres Strait Islander Heritage Protection Act 1984

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

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

No declarations relevant to the study area have been made under the ATSIHP Act.

3.2.2 State legislation

3.2.2.1 Environmental Planning and Assessment Act 1979

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

TransGrid is seeking approval for the project under Division 5.2 of the EP&A Act. The project has been declared to be SSI. Pursuant to Division 5.2, Subdivision 4, section 5.23(1)(d) of the EP&A Act, approval under Part 4 of the NSW *National Parks and Wildlife Act 1974* (NPW Act), or an Aboriginal Heritage Impact Permit (AHIP), are not required for approved SSI projects. Impacts to Aboriginal heritage values associated with approved SSI projects are typically managed under *Aboriginal Cultural Heritage Management Plans* (ACHMPs). ACHMPs are statutorily binding once approved by DPIE. The

requirement to undertake Aboriginal heritage assessments is determined in the preparation of the SEARs as specified under Division 5.2, Subdivision 2, section 5.16 of the EP&A Act.

3.2.2.2 National Parks and Wildlife Act 1974

The NPW Act, administered by DPIE, is the primary legislation for the protection of Aboriginal cultural heritage in NSW. The NPW Act gives the Director General of DPIE responsibility for the proper care, preservation and protection of 'Aboriginal objects' and 'Aboriginal places', defined under the Act as follows:

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

Part 6 of the NPW Act provides specific protection for Aboriginal objects and places by making it an offence to harm them and includes a 'strict liability offence' for such harm. A 'strict liability offence' does not require someone to know that it is an Aboriginal object or place they are causing harm to in order to be prosecuted. Defences against the 'strict liability offence' in the NPW Act include the carrying out of certain 'Low Impact Activities', prescribed in clause 80B of the National Parks and Wildlife Regulation 2009 (NPW Regulation), and the demonstration of due diligence.

Generally, an AHIP issued under section 90 of the NPW Act is required if impacts to Aboriginal objects and/or places cannot be avoided. An AHIP is a defence to a prosecution for harming Aboriginal objects and places if the harm was authorised by the AHIP and the conditions of that AHIP were not contravened. However, as discussed in **Section 3.2.2.1**, pursuant to Division 5.2, Subdivision 4, section 5.23(1)(d) of the EP&A Act, AHIPs are not required for approved SSI projects. Impacts to Aboriginal heritage values associated with approved SSI projects are typically managed under ACHMPs, which are statutorily binding once approved by DPIE.

3.2.3 Local government

The study area spans a number of LGAs. As the project is being undertaken as an SSI project the heritage provisions of the LEPs associated with these LGAs do not strictly apply. However, as part of identifying known Aboriginal heritage items within the study area, Schedule 5 of the relevant LEPs (i.e. Canterbury-Bankstown, Strathfield, Inner West and City of Sydney councils) was searched for previously listed Aboriginal heritage items. No listings for any Aboriginal place, object or site are currently listed on any of the LEPs relevant to the project.

3.3 Approach and methodology

The methodology adopted for this assessment was developed in accordance with the requirements of *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (Office of Environment & Heritage (OEH), 2011), *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b) and *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010a). Key components of the assessment methodology included:

1. desktop assessment;
2. archaeological survey of the project area involving vehicle survey of the proposed transmission cable route and targeted pedestrian survey of areas of Aboriginal archaeological sensitivity;
3. consultation with Registered Aboriginal Parties (RAPs); and
4. preparation of an ACHAR (this report).

3.3.1 Desktop assessment

The desktop assessment comprised:

- a search of DPC's Aboriginal Heritage Information Management System (AHIMS) database, review of associated site cards and reports to clarify site contents, extents and statuses;
- a review of the landscape context of the study area, with a particular emphasis on its implications for the nature and distribution of Aboriginal archaeological materials;
- a review of relevant archaeological and ethno-historic information for the study area; and
- generation of a model of past Aboriginal occupation to assist in understanding the Aboriginal archaeological values of the study area.

3.3.2 Aboriginal community consultation

Aboriginal community consultation acknowledges the right of Aboriginal people to be involved, through direct participation, on matters that directly affect their heritage. Involving Aboriginal people in all facets of the assessment process ensures that they are given adequate opportunity to share information about cultural values, and to actively participate in the development of appropriate management and/or mitigation measures. The successful identification, assessment and management of Aboriginal cultural heritage values are dependent on an inclusive and transparent consultation process.

Aboriginal community consultation for the assessment was undertaken in accordance with DPC's *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a) (Consultation Requirements). Full details of the consultation process undertaken for the assessment are provided in **Section 6.0**. A consultation log is provided as **Annexure A**.

3.3.3 Archaeological survey

The aims of the archaeological survey were to identify and record any existing surface evidence of past Aboriginal activity within the study area as well as areas with subsurface archaeological potential. This was completed in order to develop strategies for avoiding and/or mitigating potential harm to Aboriginal heritage values. To achieve these aims, targeted archaeological survey of the study area was undertaken by AECOM heritage specialists Luke Atkinson and Julia Atkinson accompanied by the Metropolitan Local Aboriginal Land Council (MLALC) Aboriginal sites officer Mr Kevin Telford on 15 July 2019.

Areas of archaeological potential (for example intact or remnant watercourses, areas of rock exposures, etc.) were targeted for pedestrian survey on the basis of preliminary desktop review, including spatial mapping and a review of aerial photography. Remaining trafficable portions of the transmission cable route were traversed by vehicle to confirm the findings of the desktop assessment and ground-truth the preliminary mapping. Survey of the study area was undertaken on foot and by vehicle, during which notes regarding Ground Surface Visibility (GSV), integrity (land condition) and archaeological sensitivity were taken. The results of the archaeological survey are discussed in **Section 7.0**.

4.0 Description of the existing environment

This section describes the environmental context of the study area as a basis for interpreting the results of the archaeological survey detailed in **Section 7.0**, both in terms of past-Aboriginal behaviour and the environmental processes that have acted upon the Aboriginal archaeological record of the study area. Consideration of the landscape context of the study area is predicated on the now well-established proposition that the nature and distribution of Aboriginal archaeological materials are closely connected to the environments in which they occur.

Environmental variables such as topography, geology, hydrology and the composition of local floral and faunal communities have played an important role in influencing how Aboriginal people moved within and utilised their respective Country. Amongst other things, these variables would have affected the availability of suitable camp sites, drinking water, economic² plant and animal resources, and raw materials for the production of stone (lithic) and organic implements. At the same time, an assessment of historical and contemporary land-use activities, as well as geomorphic processes such as soil erosion and aggradation, is critical to understanding the formation and integrity of archaeological deposits, as well as levels of Aboriginal archaeological sensitivity.

4.1 Topography

Topographically, the study area falls within Bannerman & Hazelton's (2011) Cumberland Lowlands physiographic region, broadly characterised by low lying, gently undulating plains and low hills formed on Wianamatta Group shales and sandstones. Areas of steeply dissected terrain occur within sandstone-dominated alluvial valleys and are characterised by sandstone cliff lines descending to creek and river flats. Elevations within the study area range from four to 50 metres Australian Height Datum (AHD) providing a total local relief of up to 46 metres. Elevations are highest in the eastern most portion of the project area and lowest within the Georges and Cooks River alluvial zones. Slopes are predominantly very gently to gently inclined (1-10°) with isolated moderately inclined slopes trending towards alluvial valleys.

4.2 Hydrology

The study area largely falls within the Cooks River catchment, the dominant watercourse being the Cooks River itself. The Cooks River is a 23 kilometre long, partially tidal estuary, beginning at Yagoona in western Sydney and flowing eastward before entering Botany Bay. The river is fresh water as far as the suburb of Canterbury, becoming tidal towards its drainage to Botany Bay. Only a small portion of the river is located within the study area (refer to **Figure 3-1**). Coxs Creek, a tributary of the Cooks River, passes through the western portion of the study area in Belfield.

Beaconsfield West substation is located adjacent to the Alexandra Canal (formerly Sheas Creek), a highly modified waterway which also drains to the Cooks River.

The existing Sydney South substation at Picnic Point is surrounded by the Georges River National Park north of Georges River. As such, it falls within the Georges River catchment, which occupies a total catchment area approximately 960 square kilometres. At its nearest proximity to Sydney South substation, Georges River is a largely intact drainage line with an approximately 150 metre-wide channel zone.

Generally, all watercourses within the study area in proximity to where ground disturbance is proposed are highly modified urban systems with a history of anthropogenic disturbance (Roberts, 2003). The Cooks River and its tributaries mainly take the form of concrete lined channels within the western portion of the study area with areas of peripheral former mangrove swamp reclaimed with fill material. These channels serve as part of the local urban stormwater network. Within the eastern portion of the study area, the Cooks River widens and exhibits more natural stream characteristics including rehabilitated portions of riparian vegetation. The occurrence of recorded Aboriginal archaeological sites along these watercourses indicates their use by Aboriginal people in the past.

² i.e. edible and/or otherwise useful (e.g. medicine, clothing).

4.3 Geology

Reference to the *1:100,000 Geological Map Sheet for Sydney (9130)* indicates that the surface geology of the study area is dominated by the Triassic-aged Wianamatta Group with areas of Quaternary-aged alluvium mapped within the floodplains of the Cooks River and Georges River. Comprising three formations, the Ashfield Shale, Minchinbury Sandstone and Bringelly Shale, the Wianamatta Group lies conformably over the Mittagong Formation and the Hawkesbury Sandstone. The Ashfield Shale is described as a black to dark grey siltstone and laminite. The Bringelly Shale comprises shale (claystone and siltstone), carbonaceous claystone, laminite and fine to medium-grained lithic sandstone. Quaternary valley fill (alluvium) comprising a superficial cover of unconsolidated sediments deposited over the Wianamatta Group shales, forms the contemporary floodplains of several of the Cumberland Plain's major drainage systems, including the Cooks River, Georges River and their tributaries.

Tertiary alluvial units known to contain rocks suitable for flaked and/or ground stone artefact manufacture (e.g. the Rickabys Creek Gravel and St Marys formations) are not mapped within or surrounding the study area. Igneous intrusions, including instances of dykes, are mapped within the study area and may have provided localised sources of raw material used in the manufacture of edge-ground implements or grinding tools (i.e. hatchets, mortars and pestles).

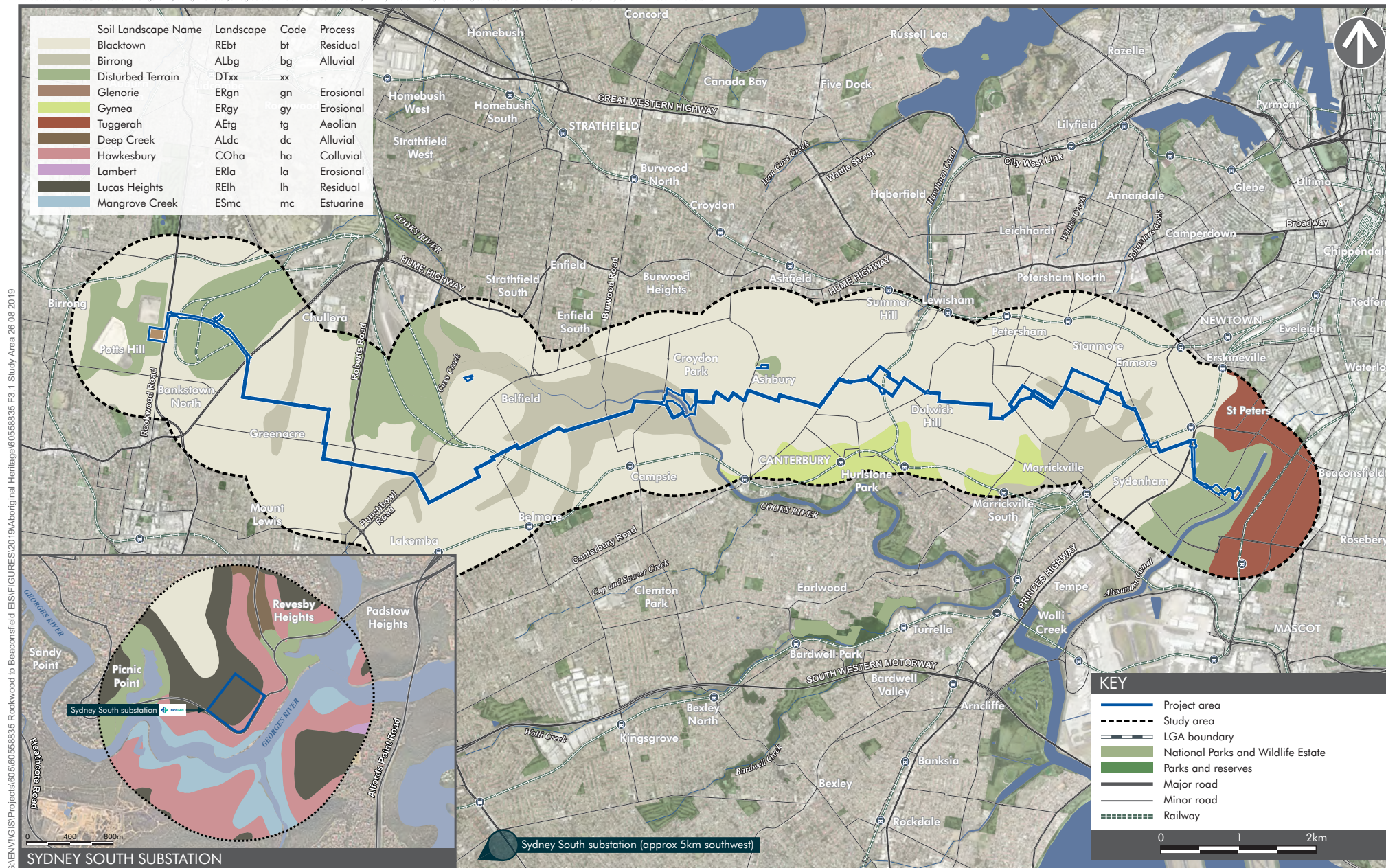
4.4 Soils and geomorphology

Reference to the *Soil Landscapes of the Sydney 1:100 000 Sheet* (Chapman & Murphy, 1989) indicates dominant soils within the study area have been mapped as belonging to the Blacktown (*bt*), Birrong (*bg*), Hawkesbury (*ha*) and Lucas Heights (*lh*) soil landscapes. Areas of Disturbed Terrain (DTxx) are also mapped within the study area, usually associated with heavily industrialised land uses and areas of fill material. The soil landscapes within the study area are summarised in **Table 4-1** and shown in **Figure 4-1**.

Table 4-1 Soil landscapes in the study area (Chapman & Murphy, 1989)

Soil landscape	Stratigraphic description	Surface geology	Erosion potential	Landscape integrity and Archaeological potential
Blacktown (bt)	Shallow moderately deep (<100 centimetres) podzolic soils on crests, upper slopes and well drained areas. Deep (150-300 cm) podzolic soils and soloths on lower slopes and in areas of poor drainage.	Wianamatta Group Ashfield shale consisting of dark grey siltstone, and Bringelly shale consisting of shale, claystone, laminite and coal.	High	Moderate potential for intact archaeological deposit across all landforms.
Birrong (bg)	Deep (>250 centimetres) podzolic and solodic soils on older alluvial terraces. Deep (>250 centimetres) solodic soils and solonetzic soils on current floodplain.	Wianamatta Group silt and clay alluvial materials.	High	Moderate potential for intact archaeological deposit across all landforms but may be limited due to erosion.
Disturbed Terrain (xx)	Landfill including dredged estuarine sand and mud, demolition rubble and household waste.	Artificial fill.	Dependent on fill materials	Low archaeological potential within fill. Underlying soils potentially disturbed during fill activities.
Hawkesbury (ha)	Shallow (>50 cm), discontinuous siliceous sands associated with rock outcrop; localised podzolic soils associated with shale lenses; siliceous sands and yellow earths along drainage lines.	Hawkesbury Sandstone comprising medium to coarse-grained quartz sandstone with minor shale and laminite lenses.	High	Moderate potential for intact archaeological deposit but may be disturbed or displaced in areas impacted by erosion.
Lucas Heights (lh)	Moderately deep (50–150 cm), hardsetting podzolic soils and soloths.	Interbedded shale, laminite and fine to medium grained quartz sandstone of the Mittagong Formation.	Low	Moderate potential for intact archaeological deposit in undisturbed landforms. Low potential in urbanised or developed areas.

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4.5 Flora and fauna

Native vegetation within the study area has been extensively modified as a result of widespread urbanisation. According to Benson (1981), there remains very little of the original native vegetation which once covered the Cumberland Lowlands, including the study area. The Cumberland Basin, or Cumberland Plain as it is more commonly known, is a c.2750 square kilometre physiographic region located to the west of Sydney's Central Business District (CBD) in NSW. Historical clearance notwithstanding, native vegetation mapping for the Cumberland Plain suggests that the study area was likely vegetated with various open woodland communities, with two distinct vegetation communities likely occurring: Alluvial Woodland and Shale Plains Woodland.

Alluvial Woodland appears to have been restricted to alluvial valley floors in association with drainage lines. This community is most often dominated by Cabbage Gum (*Eucalyptus amplifolia*) and Forest Red Gum (*E. tereticornis*), with Apple Box (*Angophora floribunda*) occurring less frequently (Tozer, 2003). Parramatta Green Wattle (*Acacia parramattensis*), Swamp Oak (*Casuarina glauca*) and Flax-leaved Paperbark (*Melaleuca linariifolia*) can also occur. A shrub stratum is usually evident though is often sparse and dominated by Blackthorn (*Bursaria spinosa*). A dense ground cover of grasses such as Basket-grass (*Oplismenus aemulus*), Weeping grass (*Microlaena stipoides*), Bordered Panic (*Entolasia marginata*) and Forest Hedgehog Grass (*Echinopogon ovatus*) is also typical as is the presence of herb species such as Forest Nightshade (*Solanum prinophyllum*), Whiteroot (*Pratia purpurascens*) and Native Wandering Jew (*Commelina cyanea*).

Shale Plains Woodland seems to have been represented in both creek flat (floodplain) and elevated topographic contexts (e.g. slopes, crests). The most widely distributed native vegetation community on the Cumberland Plain, Shale Plains Woodland is typically dominated by Grey Box (*E. moluccana*) and Forest Red Gum (*E. tereticornis*), with Narrow-leaved Ironbark (*E. crebra*), Thin-leaved Stringybark (*E. eugenioides*) and Spotted Gum (*Corymbia maculata*) also occurring, though less frequently. A shrub stratum dominated by Blackthorn (*Bursaria spinosa*) is usually also present. Common ground stratum species for this vegetation community include Kidney Weed (*Dichondra repens*), Threeawn Speargrass (*Aristida vagans*), Weeping Grass (*Microlaena stipoides*), Kangaroo Grass (*Themeda australis*), Brunoniella (*Brunoniella australis*), Tender Tick-trefoil (*Desmodium varians*), Thin Leaf Stink Weed (*Opercularia diphylla*), Blue Bell (*Wahlenbergia gracilis*) and Shorthair Plumegrass (*Dichelachnemicrantha*).

Although available historical records provide only limited insight into Aboriginal peoples' use of plants across the Cumberland Plain, it can be confidently asserted that the original vegetation communities of the study area and its environs would have supplied Aboriginal people camping within or travelling through the area with an extensive array of edible and otherwise useful plant species. Native vegetation communities and locally occurring watercourses would likewise have supported a large and diverse range of terrestrial, aquatic and avian fauna. Available ethnographic literature (e.g. Bradley, 1792 [1969: 133]; Collins, 1798 [1975: 456, 461, 495]; Phillip 1788 in Attenbrow, 2010: 63; Tench, 1793: 125, 195 [1979]: 233, 287) suggests that a wide range of marine and freshwater fauna were exploited by Darug-speaking peoples within the Cumberland Plain. In coastal areas, marine resources were the dominant food source, including fish and shellfish. Historical records suggest an emphasis on the procurement of land mammals including macropods, possums, gliders, fruit bats (i.e. flying foxes), dingos, koalas and wombats within inland areas of the Cumberland Plain. Freshwater fish, shellfish and eels, as well as platypus and birdlife, are also known to have been exploited by inland groups.

4.6 Land use and disturbance

Land use across the study area is generally dominated by residential development with dispersed green spaces. Areas of light to heavy industrial and commercial land uses are located within the eastern peripheral portions of the study area and the Sydney South substation environs. Areas of reclaimed land are located around the central and lower reaches of the Cooks River and Sheas Creek (now Alexandra Canal).

The archaeological implications of the land uses discussed in this section include the potential disturbance or destruction of Aboriginal sites in areas of significant residential, industrial and commercial development. Conversely, in areas of remnant landscape, Aboriginal sites, where present, may be relatively undisturbed. Historical aerial photographs for the study area provide a framework for assessing the nature and extent of post-European occupation land use activities and ground disturbance across it. Findings of the historical aerial photograph review are presented in **Table 4-2**.

Table 4-2 Historical aerial photograph review

Precinct	Area	Summary
1	Rookwood Road substation to Hume Highway	The 1943 aerial photograph indicates that Rookwood Road is visible at this time towards the western portion of the study area with railway infrastructure intersecting Muir Road. At this time, the eastern portion of Muir Road remains undeveloped, although commercial and industrial buildings are visible on the Hume Highway to the north of Muir Road at this time. Railway infrastructure is present in 1955 and additional industrial and commercial structures have been built between this time and 1961. No other significant changes occur between 1945 and 1961, with only minor areas of bulk earthworks evident towards the northern and southern portions of the study area, as visible in the 1965 aerial photograph. Between 1970 and 1991, commercial and industrial buildings have been constructed on the eastern side of Rookwood Road, which itself has been widened. Although no other significant changes occur in the 1970s, the southern portion of Muir Road has been constructed in the early 1980s with residential and commercial buildings evident. Increased commercial and industrial development has occurred between c. 2009 and 2015 on the northern side of Muir Road, in previously undeveloped areas.
2	Hume Highway to just before Cooks River (Brighton Avenue)	<p>Most urban roads are present in their current alignment in 1943. The portion of Rawson Road between Waterloo Road and Maiden Street is absent and appears to remain as undeveloped bushland. Roads in the area appear to be unsealed with the area dominated by minor agricultural properties and undeveloped scrubland with localised residential development evident. Post 1943, the area has seen increased residential development and establishment of green spaces, with localised commercial land uses also present. Punchbowl Road is visible in its current alignment in 1943 with residential properties to the south and a commercial/industrial building to the north of this portion of Punchbowl Road. Coxs Creek has been channelised and concreted where crossed by Punchbowl Road and the railway line. Between 1943 and 1955, increased commercial/industrial development occurred north of Punchbowl Road. Post 1955, the area has experienced a further increase in residential and commercial/industrial development.</p> <p>By 1943, the Cooks River in this area has been channelised with all riparian vegetation removed from its periphery. Notwithstanding, no major earthworks or gross ground disturbances are visible on the southern bank of the Cooks River. An existing pedestrian bridge connects Lindsay Street to the northern bank of the Cooks River. The areas occupied by Lees Park, Croydon Park and Mildura Reserve remain vacant with little remnant vegetation. Residential development dominates the surrounding area. No significant changes between 1943 and 1970 to the vacant areas, residential development continues to increase. Vegetation growth is evident on the northern bank of Cooks River by 1982 with parks appearing to be formalised. Established vegetation is evident along both banks by 2009.</p>
3	Brighton Avenue (near Mildura Reserve) to just past	The 1943 aerial photograph indicates Old Canterbury Road largely in its present-day alignment. New Canterbury Road is also visible in its present-day alignment surrounded by commercial properties to the north and

Precinct	Area	Summary
	Henson Park (Illawarra Road);	residential properties beyond. Residential properties dominate the surrounding area with instances of commercial structures to the north adjacent to Old Canterbury Road and near the railway line. No significant developments occur between 1943 and 1955, with only limited commercial development occurring south of Old Canterbury Road between 1955 and 1961. Industrial structures to the north of Old Canterbury Road have been demolished c. 1960. The 1991 aerial photograph indicates that residential and commercial properties north of New Canterbury Road have been demolished and replaced by open green space. Minor commercial development has also occurred in the area south of New Canterbury Road, with little changes visible to the area post 1990s.
4	Illawarra Road to Camdenville Park	Major roads of the Marrickville area including Addison Road, Enmore Road and Edinburgh Road are present in 1943 in their present-day alignments. Enmore Park is also present at this time. Commercial and/industrial land use dominates the area to south and west with a combination of commercial/industrial and residential properties to the north and east. The area remains largely consistent with the 1943 aerial photograph throughout the 1950s to 1960s, with localised commercial development occurring northeast of Edinburgh Road in the 1990s. The area continues in this distribution of land use to the present-day.
5	Camdenville Park to Beaconsfield West substation.	The 1943 aerial photograph indicates Bedwin Road and May Street in its present-day alignment with railway infrastructure passing under a railway bridge at Bedwin Road to the west of the present-day Camdenville Park, which at this time appears to be an open excavation (possible brick pit). The area of the present-day Sydney Park is also dominated by a series of large excavations. The surrounding area is a combination of residential and commercial and light industrial land uses. By 1955, the excavation in Camdenville Park has been filled. Between the 1950s and 1961, former residential properties to the north of Edinburgh Road have been replaced with light commercial buildings. Camdenville Park is now visible in its present-day use in 1961. No significant changes occur between the 1950s and 1980s. The former brick pits at Sydney Park have been filled in the early 1990s and by 2002 this is an open green space. Minor localised residential and light commercial development continues throughout the 2000s.

4.7 Key environmental observations

Key observations drawn from a review of the existing environment of the study area are as follows:

- Existing archaeological data for the region indicates that flats and lower portions of simple slopes adjacent to drainage lines are archaeologically sensitive. However, archaeological sensitivity will vary depending on environmental effects such as flooding and erosion, processes which can result in the displacement of artefactual material, as well as historical land use activities and associated ground surface impacts (White & McDonald 2010: 33);
- The topography of the study area is typical of Bannerman and Hazelton's (1990) Cumberland Lowlands physiographic region and can be broadly characterised as gently inclined and undulating topography. Areas of reclaimed land associated with the Cooks River and the lower reaches of Sheas Creek (now Alexandria Canal) would have originally comprised mangrove, marshland and swampland, which would have offered Aboriginal people occupying these areas a diverse range of floral and faunal resources;
- Four major watercourses traverse the study area (Cooks River, Sheas Creek (now Alexandria Canal), Georges River and Cocks Creek) which comprise freshwater in their upper reaches and in the case of the Cooks River and Sheas Creek, tidal estuaries in the lower reaches. Prior to European occupation, these waterways likely comprised focal resource features for Aboriginal peoples occupying within or passing through the study area. While portions of the Cooks River have been significantly modified in the 19th and 20th centuries, analysis of historical aerial photography suggests that the southern bank near Mildura Reserve which lies within the project area is largely intact. Where modification works have occurred (e.g. reclamation works, earthworks and filling activities), it is likely that these activities would have resulted in the potential disturbance and destruction of evidence of past-Aboriginal use and occupation of the Cooks River area. The Georges River near its interface with the Sydney South substation is largely intact, exhibiting a wide riparian corridor;
- Stone suitable for the manufacture of flaked and/or edge-ground stone artefacts does not, on the basis of available documentary evidence, appear to be available within the study area;
- Prior to European settlement, the floral and faunal resources of the study area and environs would have been sufficient to facilitate intensive and/or repeated occupation by Aboriginal peoples;
- Native vegetation within the study area has been extensively modified as a result of historic land use activities and contemporary urbanisation;
- Examination of historic aerial imagery for the study area indicates a range of historic land use activities and associated ground surface impacts. Key archaeological implications of these impacts include:
 - destruction of Aboriginal sites in areas of grossly modified terrain;
 - the disturbance of pre-existing sites and deposit(s) through both direct (e.g. residential and urban construction, roads and infrastructure, excavations and brick pits) and indirect (erosion) means, resulting in a loss of archaeological integrity;
 - increased archaeological site visibility in eroded areas; and
 - the removal of any culturally modified (scarred or carved) trees that may once have existed within the study area.

5.0 Ethnographic context

The following sections summarise the Aboriginal archaeological context of the study area on both a regional and local scale. As in other parts of NSW and Australia more broadly, non-Aboriginal people occupying the Sydney region began to document Aboriginal culture from first contact, with explorers, missionaries, settlers and the like recording their observations of Aboriginal people and/or their material culture in letters, journals and official reports. Many of these accounts are overtly Eurocentric in tone and the content and veracity of some is, at best, questionable. Nonetheless, taken together, they form an important source of information on Aboriginal lifeways at the time of British colonisation and can, in conjunction with available archaeological data, be used to generate working predictive models of prehistoric Aboriginal land use.

5.1 The Darug languages and peoples

Available sources indicate that the study area falls wholly within the traditional country of the Darug peoples, who spoke the Darug (also spelt Dhaŕ-rook, Dharrook, Dhaŕook, Dharruk and Dharug) languages. Darug is believed to have been spoken from the Hawkesbury River in the north, to Appin in the south, and from the coast west across the Cumberland Plain into the Blue Mountains. Early sources (e.g. Collins 1798 [1975]; 1802 [1971]; Tench 1793 [1961]; Dawes 1790a, 1790b; Phillip in Hunter 1793 [1961]) and more recent linguistic research (e.g. Troy 1994) indicate that two distinct dialects of Darug were spoken at the time of European contact, a coastal dialect, spoken on the Sydney peninsula and the country to the north of Port Jackson, and a hinterland dialect, spoken on the Cumberland Plain from Appin in the south to the Hawkesbury River in the north (Attenbrow, 2010: 34). This linguistic division is thought to correspond to a broader economic division between 'coastal' and 'hinterland' Darug-speaking peoples, with the accounts of several early observers (e.g. Bradley 1792 [1961]; Collins 1798 [1975], 1802 [1971]; Phillip 1788 in Attenbrow 2010: 63; Tench 1793 [1979]) suggestive of a 'coastal', marine-oriented subsistence economy³ and contrasting 'inland' economy focused on the exploitation of land mammals, plant foods and freshwater faunal resources. Notably, early sources (e.g. Barrallier 1802 [1975]; Collins 1798 [1975]; Tench 1793 [1961]) suggest that there was little contact between coastal and hinterland groups.

Some idea of population size for the coastal Darug at contact is provided by Attenbrow (2010), who suggests that the area around Port Jackson likely supported a minimum population density of 0.75 persons/1 square kilometre (i.e. 1 person/1.3 square kilometres). Attenbrow's estimate is based on Governor Phillip's own estimate of the Aboriginal population of this area, made in 1788. Phillip, reporting to Lord Sydney on 15 May 1788, estimated a total population of not "less than one thousand five hundred" (Phillip 1788 in Attenbrow, 2010: 17). Attenbrow (2010: 17), citing Hunter (1793 [1968]: 62), notes that "population densities for the hinterland (west of Parramatta) were initially assessed by the colonists as being less than those along the coast" but urges interpretive caution given the deleterious effects of 1789 smallpox epidemic, which "had killed many people living to the west of Rose Hill before Phillip's 1791 expedition crossed the Cumberland Plain to the Hawkesbury-Nepean River". More recently, Kohen (1995) has estimated a minimum overall density of around 0.5 persons per square kilometre for the hinterland zone.

In common with other regions of NSW (e.g. Attenbrow, 2010) and Australia more broadly (Peterson, 1976), available historical records suggest that the primary units of social organisation amongst the Darug were the clan and band. Kohen and Lampert (1987) equate the term 'clan' with 'band'. However, Attenbrow (2010) draws a distinction between the two, with clans comprising local descent groups and bands, land-using groups who, though not necessarily all of the same clan⁴, camped together and cooperated daily in hunting, fishing and gathering activities. Individual bands will have habitually occupied and exploited the resources of particular tracts of land. However, the territorial boundaries of each band will have been permeable or elastic in the sense of complex kinship ties facilitating inter-band territorial movements and the reciprocal use and/or exchange of resources. Early

³ Note that available archaeological evidence suggests that the historically documented seafood bias in the diets of coastal Darug speaking peoples has been overemphasised, with excavated bone assemblages from coastal rockshelter sites (e.g. Balmoral Beach, Angophora Reserve) attesting to the importance of terrestrial and avian fauna in coastal diets.

⁴ Some individuals may have been related through marriage.

accounts (e.g. Collins 1798 [1975: 453]; Tench 1793 [1979: 292]) indicate that clan names were derived from the country on which the members of the clan lived.

As to the name of the Darug clan occupying Western Sydney at contact, Kohen (1988: 242; 244, Fig.2- see **Figure 5-1**), drawing on the 'Dawes manuscript' (1790a, 1790b), as well as "later accounts and linguistic studies" has tentatively suggested that this may have been the Gomerrigal (alternative spellings: Gomerigal, Gommerigal-tongara, Gommerigal-leon). However, as highlighted by Attenbrow (2010: 25), early historical records (e.g. Phillip, 1790 [1892: 309]; Dawes, 1790-92: 365 and King in Hunter 1793 [1968: 411], cited in Attenbrow, 2010: 25) in fact provide no indication of the territory of this historically-named group. Later historical accounts, such as the "Returns of Natives", taken between 1834 and 1843, contain references to the 'South Creek Tribe', which likely included remnants of the original clans of the Cumberland Plain.

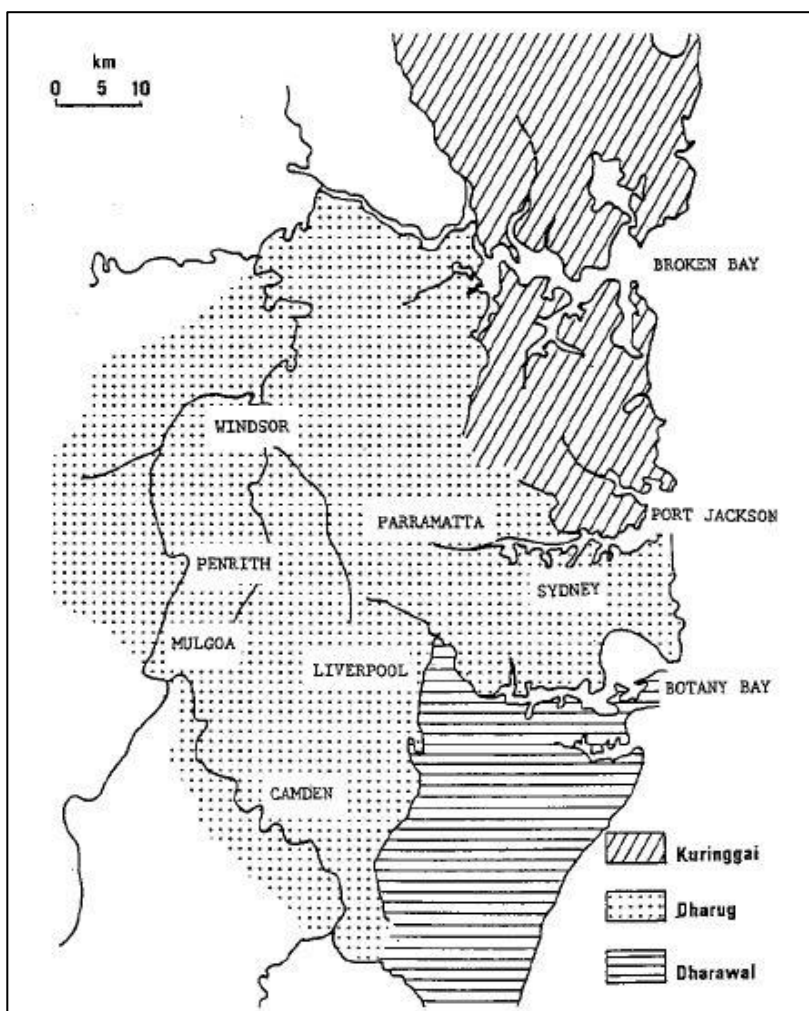


Figure 5-1 Aboriginal language group boundaries in the Sydney Region (from Kohen 1993: 241, Fig. 1)

The size of the individual bands occupying the Cumberland Plain at contact was no doubt activity and season dependent. However, an upper limit of around 50 individuals, consisting of several nuclear families, has been suggested (Kohen, 1988: 239). Individual band sizes notwithstanding, much larger groups of Aboriginal people, numbering in the hundreds, are known to have come together for events such as corroborees, ritual combats and feasts (Attenbrow 2010; Kohen et al. 1999). Unlike many Australian Aboriginal groups, social organisation amongst the Darug did not comprise a class system based on moieties or sections but rather was based on clan membership attained through patrilineal descent (Attenbrow, 2010: 57; Kohen, 1993: 35). Totemic affiliations were inherited from a person's father and, along with clan membership, were the basis upon which marriages were arranged and initiations carried out.

Available historical records indicate that a wide range of marine and freshwater fauna were exploited by Darug-speaking peoples for food and other resources (for a detailed discussion see Attenbrow, 2010: 62-84). Along the coast, an emphasis on the exploitation of marine resources, principally fish and shellfish, is attested in the writings of several early observers (e.g. Bradley, 1792 [1969: 133]; Collins, 1798 [1975: 456, 461, 495]; Phillip 1788 in Attenbrow, 2010: 63; Tench, 1793: 125, 195 [1979: 233, 287]). Further inland, historical records suggest an emphasis on the hunting of land mammals (e.g. Barrallier, 1802 [1975: 2 n4]; Collins 1798 [1975: 456]; Tench 1793: 121 [1979: 230]), with kangaroos, wallabies, possums, gliders, fruit bats (i.e. flying foxes), dingos, koalas and wombats variously reported as having been either hunted and/or eaten (Attenbrow, 2010: 71). Possums, in particular, appear to have been a major food source in the hinterland, with a number of early observers remarking on the tree climbing skills of the 'woods people' and detailing procurement techniques (e.g. Hunter, 1793 [1968]; Tench, 1793 [1979]; Collins, 1798 [1975]; Barrallier, 1802 [1975]). Freshwater fish, shellfish and eels, as well as platypus, are also known to have been exploited by hinterland groups (e.g. Barrallier, 1802 [1975: 2]; Collins, 1798 [1975: 461-63], 1802 [1971: 321-22]; Phillip in Hunter, 1793 [1968: 523]; Tench, 1793 [1979: 230]), as were various types of birds.

Compared with their faunal counterparts, the plant food resources of coastal and hinterland Darug-speaking peoples are poorly represented in the writings of early colonial observers. Nonetheless, available descriptions do suggest that plants formed a regular part of the diets of groups in both areas (see Attenbrow, 2010: 77-8). Along the coast, a "vegetable catalogue" consisting of "a few berries, the yam and fern root, the flowers of the different Banksia, and at times some honey" is reported by Collins (1798 [1975: 462-63]). Further inland, along the Hawkesbury-Nepean River, yams appear to have been a particularly important food item (see, for example, Hunter 1793 [1968: 153]).

A wide range of hunting and gathering 'gear' was employed by Darug speaking peoples, with distinctive repertoires for men and women (McDonald, 2008: 24). Men's gear included several different forms of spears (variously barbed), spear throwers, clubs, 'swords', boomerangs, shields and hafted stone hatchets known as mogo. Women's toolkits, in contrast, included fishing hooks, lines and sinkers, digging sticks and various containers (shell and wood). Net bags made from plaited wood fibre appear to have been used by both men and women (see Attenbrow, 2010: 91). Bark canoes were also widely used (Attenbrow, 2010: 87).

Two principal forms of shelter appear to have been utilised by Darug speaking peoples at the time of European contact: rockshelters and small huts built from sheets of bark, branches and bushes. In keeping with the linguistic division of the Darug language into coastal and hinterland dialects, differences in the nature of huts built along the coast and in the hinterland are attested in early colonial writings, with the former reportedly larger and "formed of pieces of bark from several trees put together in the form of an oven with an entrance, and large enough to hold six or eight people" (Collins 1798 [1975: 460]). Unlike those living along the coast, Darug-speaking peoples occupying the Cumberland Plain appear to have relied heavily on bark huts (Hunter 1793 [1968]: 60-61). Regarding settlement duration, as Attenbrow (2010: 54) has observed, "there is little direct historical evidence for the length of time people stayed at any one campsite (be it a rockshelter or bark hut), how often they moved, or what motivated them to move to another campsite". Kohen and Lampert (1987), for their part, have argued that "some bands probably lived at one campsite for months of each year and regularly returned to it". However, this argument is not universally accepted (e.g. Attenbrow, 2010: 55; McDonald, 2008).

Evidence for ceremonial or ritual behaviour amongst Darug-speaking peoples can be found in the writings of a number early observers, with documented 'ceremonial' activities including corroborees, male initiation ceremonies, ritual combats and various burial, body adornment and personal decoration practices (Attenbrow 2010: 126-42). While available colonial records provide only scant information on the belief systems of Darug-speaking peoples, reference to the 19th Century writings of people such as L.E Threlkeld, A.W Howitt, R.H Matthews, W. Ridley and W.J Enright, suggests that spiritual authority amongst Darug clans was likely vested in a number of ancestral beings, with Baiame or Daramulan the supreme creative being a central figure (Attenbrow 2010: 127).

5.2 Post-contact history

In common with other parts of NSW and Australia more generally, the post-contact history of the Darug-speaking peoples of the Sydney region is primarily one of dispossession and loss, with groups

alienated from their traditional hunting, gathering and camping grounds, populations massively reduced by a combination of introduced diseases⁵ and frontier violence (Attenbrow 2010: 14-15, 21-22) and surviving groups subject to various colonial initiatives aimed at assimilating them into an ostensibly superior European way of life. Nonetheless, active resistance and friendly relations are also attested in available records.

While the Darug clans of the Cumberland Plain were undoubtedly observing them, most of the early colonial expeditions away from the coast, including Governor Phillip's Expedition to Belle Vue (Prospect Hill) in April 1788, did not encounter any Aboriginal people. Traces of their presence, however, including huts, camp fires, burning trees and partially-eaten food, were encountered "at every step" (Tench 1791 [1979: 154]; see also Phillip 1789 [1970: 55]). That Aboriginal people were clearly occupying the "inland" came as a surprise to the exploring colonists, as the prevailing opinion at the time was that this area was uninhabited or, at best, had a very low Aboriginal population density. Once made, initial contacts between Aboriginal people and the exploring colonists appear to have been friendly in nature, "with exchange of gifts and a general atmosphere of co-operation" (Kohen, 1985).

Establishment of the settlement at Rose Hill (Parramatta) in November 1788 did not, at least initially, result in the loss of the goodwill that characterised the region's earliest Aboriginal-European contacts, with Collins 1798 [1975: 137], for example, reporting the existence at Parramatta of a barter system in which local Aboriginal people (including Bolloderree (Ballederry)) and resident military officers exchanged fish for small amounts of bread and salt beef. Relations, however, appear to have soured quickly, with the aforementioned barter system at Parramatta ending abruptly in mid-1791 as a result of the unprovoked destruction of Bolloderree's canoe, an act that led to the retaliatory spearing (by Bolloderree) of a settler at 'The Flats' (near Kissing Point) and his subsequent banishment from Parramatta by Governor Phillip.

Together with the growth of Parramatta Township itself, the early (1791) establishment of "out-settlements" at Prospect and Toongabbie, and subsequent establishment of farms along the Hawkesbury River, restricted Aboriginal peoples' access to their traditional lands and food resources and precipitated what Kohen (1993) has referred to as the "First Australian War". Along the Hawkesbury River, the widespread destruction⁶ of traditional yam beds, which provided a dietary staple for inland Darug clans, has been identified as a significant contributing factor to the particularly violent conflict that characterised Aboriginal-settler relations in this part of the Sydney region from the mid-1790s to early-1800s (Kohen 1993: 63). Here, as in other parts of the Sydney region, loss of access to traditional hunting and gathering grounds was one of a number of sources of Aboriginal settler-conflict, with unprovoked murders, the kidnapping and rape of Aboriginal women and unfair work conditions on farms also contributing to poor relations and/or directly resulting in armed conflict (Kohen, 1993: 62-67).

While numerous acts of Aboriginal resistance to the spread of European settlement across the Sydney region can be identified in available historical records, the guerrilla war waged by Pemulwuy, a Bidjigal man from the George's River area, is undoubtedly the best known. Between 1791 and his death in 1802, Pemulwuy, who first came to the attention of Europeans in December 1790 when he speared Governor Phillip's gamekeeper McIntire, is believed to have organised numerous raids on settler farms around present-day Parramatta, Toongabbie, Prospect and Ryde, and to have speared many travellers around Botany Bay and the Georges River (Flynn, 1995b: 135). In March 1797, Pemulwuy was involved in an armed confrontation on the streets of Parramatta, which resulted in him being severely wounded and taken to Parramatta hospital, where he was chained by his ankle. Despite his wounds and ankle chain, Pemulwuy managed to escape from hospital and was soon after observed at the mouth of the Georges River "...having perfectly recovered from his wounds" (Collins, 1798 [1975: 70]). Widely known and respected in his community due to his various acts of resistance and evasion, many Aboriginal people believed Pemulwuy to be invincible. Nonetheless, on 2 June 1802, while still at large, Pemulwuy was shot dead and decapitated, his head subsequently preserved in spirits and sent to England. After his death, Governor King acknowledged Pemulwuy as "an active, daring leader

⁵ As highlighted by Attenbrow (2010: 21-22), a major initial cause of depopulation amongst the Darug was the April 1789 smallpox epidemic, which "hit the local [Aboriginal] population horrific effect" and is estimated to have killed "well over half" of Sydney's Aboriginal population (Attenbrow 2010: 21).

⁶ I.e., as a result of vegetation clearance and the planting of crops.

of his people" and "brave and independent character" (King to Hobart, 30 October 1802; King to Banks 5 June 1802). Pemulwuy's resistance activities in the greater Parramatta area were continued by his son Tedbury, who was arrested in 1805 and 1809 for robberies and was shot (non-fatally) by Edward Luttrell at Parramatta in February 1810 (Flynn, 1995b: 63).

Aboriginal-European relations across the Cumberland Plain are reported to have "entered a new phase" from 1816 onward, with the massacre of 14 Aboriginal men, women and children at Appin in April of that year, undertaken as part of a government sanctioned 'punitive expedition', all but putting an end to regional hostilities (Kohen, 1993: 68). With populations massively reduced by introduced diseases and frontier violence, and many clans alienated from their traditional country, Aboriginal people increasingly turned to Europeans to meet their basic needs (Kohen, 1993: 68). While traditional practices continued in many areas, many survivors began to congregate on the estates of Europeans sympathetic to their plight, with the 'Mulgoa Tribe', for example, congregating on the estate of William Cox in the Mulgoa Valley, and the 'South Creek Tribe' typically residing on Charles Marsden's estate close to the junction of South and Eastern Creeks.

Governmental initiatives to 'civilise' the Cumberland Plain's remaining Aboriginal population can also be traced to this period, with Governor Macquarie, the fifth and last autocratic Governor of NSW (1810-1821), pursuing a policy of assimilation aimed at encouraging Aboriginal people "to become regular Settlers" and conciliating "them as much as possible to our Government and Manners" (Macquarie 1816 in Brook & Kohen, 1991: 44; Macquarie 1811 in Kohen et al., 1999: 78). Macquarie's key initiatives to this end were the Parramatta Native Institution, established in December 1814, and the annual Native "Conference" or "Feast", with the latter serving the "dual purpose of "conciliating the Aboriginal people of the settled areas and encouraging them to give up their children for placement in the Institution" (Flynn, 1995b: 90). Held annually⁷ until 1833, when judged ineffective by then Governor, Sir Richard Bourke, the Native Feasts were also "designed to facilitate the imposition of administrative structures on the surviving clans" (Flynn, 1995b: 96), namely, the division of attendees into their respective "tribes" and the election, amongst each "tribe", of a "chief" that could be held responsible for the behaviour of the members of his group and act as a "conduit for any grievances they had" (Flynn, 1995b: 96). Post-1833, it was Governor Bourke⁸ who initiated the distribution of blankets through local magistrates, with the resulting "Returns of Natives", taken between 1834 and 1843, providing "a kind of Aboriginal census for these years" (Flynn, 1995b: 107) and confirming the presence of several hundred Aboriginal people within the Sydney region into the 1840s.

Established in the context of a series of frontier skirmishes in mid-1814, the Parramatta Native Institution, which was in operation from 1814 to 1822, functioned as a school for teaching Aboriginal children reading, writing, arithmetic and Christian religion, as well as manual labour and agriculture (boys only) and needlework, knitting and spinning (girls only) (Brook & Kohen, 1991). Fluctuating pupil numbers over the life of the institution have been attributed to a range of factors, with many Aboriginal children, for example, running away from the school to re-join their families (Brook & Kohen, 1991: 70; Kohen et al., 1999: 83). In 1823, the Native Institution was moved by Governor Brisbane to a parcel of land adjoining what was then known as the 'Black Town', a community of Aboriginal people living on and around Governor Macquarie's 30 acre land grant to Colebee and Nurragingy.

5.3 Regional archaeological context

5.3.1 The Sydney region

Available archaeological data indicate that Aboriginal people have occupied the Sydney region⁹ for at least 36,000 years (Jo McDonald CHM, 2005b; Williams *et al.* 2014). Late Pleistocene/early Holocene occupation of the region is evidenced by radiometric dates from both coastal and hinterland sites (see Attenbrow, 2010: 18, Table 3.1). Excavated material culture assemblages from these periods have been interpreted as evidence of relatively small populations of Aboriginal people employing settlement patterns of high residential and low logistical mobility (Attenbrow, 2010: 152-154; McDonald 2008: 39). Late Pleistocene/early Holocene chipped stone assemblages attest to a preference for silicified tuff

⁷ No feast was held in 1815 due to drought.

⁸ Bourke was in office from 1831-37.

⁹ Following Attenbrow (2012a), the land bounded by the coast on the east, by the Hawkesbury-Nepean River on the north and west, and by a line running east-west through Picton and Stanwell Park in the south.

sourced from secondary geological sources such as the Hawkesbury-Nepean River gravels (McDonald, 2008; Williams *et al.* 2014). However, they also indicate the exploitation of other raw material types such as silcrete, quartzite and quartz. Direct freehand percussion (use of hard hammerstone for lithic production) appears to have been the dominant reduction technique employed by Late Pleistocene/early Holocene Aboriginal knappers, with bipolar flaking comparatively poorly represented in available assemblages. Retouched 'tools' include unifacially-flaked pebble implements, dentated saws, burins and a variety of scrapers, with unmodified utilised flakes also well represented (Kohen *et al.* 1984; Williams *et al.* 2014). Stone tools such as these will have been complemented by a range of organic implements such as wooden digging sticks, spears and boomerangs. However, these do not survive archaeologically (Attenbrow, 2010: 154).

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

With some modification, McCarthy's (1967) *Eastern Regional Sequence* (ERS) of stone artefact assemblages remains the dominant chronological framework for Aboriginal occupation of the region. Based on appreciable changes in the composition of chipped stone artefact assemblages over time, the ERS hypothesises a three phase sequence of 'Capertian' (earliest), 'Bondaian' and 'Eloueran' (most recent) assemblages and was developed on the basis of McCarthy's (1948, 1964) pioneering analyses of stratified flaked stone assemblages from Lapstone Creek rockshelter, on the lower slopes of the Blue Mountains eastern escarpment, and Capertee 3 rockshelter in the Capertee Valley north of Lithgow. At present, the most widely cited characterisation of the ERS in the Sydney region is that of a four-phase sequence beginning with the *Pre-Bondaian* (McCarthy's *Capertian*) and moving successively through the Early, Middle and Late phases of the *Bondaian*, the last of which equates to McCarthy's (1967) *Eloueran* phase (**Table 5-1**). The tripartite division of the Bondaian is based principally on the presence/absence and relative abundance of backed artefacts (Attenbrow, 2010: 101). However, other factors, such as changes in the abundance of bipolar artefacts and different stone materials, as well as the presence/absence of edge-ground hatchet-heads are also relevant.

Table 5-1 McCarthy's (1967) Eastern Regional Sequence (ESR) of stone artefact assemblages

Current phasing	McCarthy's (1967) Phasing	Approximate date range	Backed artefact frequency	Bipolar artefacts	Edge-ground hatchet heads
Pre-Bondaian	Capertian	40,000-8,000 Before Present (BP)	Absent	Rare	Absent
Early Bondaian	Bondaian	8,000-4,000 BP	Very low	Rare	Absent
Middle Bondaian		4,000-1,000 BP	Very high	Increasingly common	Present
Late Bondaian	Eloueran	1,000 BP to European contact	Low	Very common	Present

5.3.2 The Cumberland Plain

Concentrated archaeological investigation of the Aboriginal archaeological record of Sydney's Cumberland Plain can be traced to the early-to-mid 1980s, a period marked by a rapid growth in residential and other forms of development across the plain. Intensive development activities since this time have secured the Cumberland Plain's place as one of the most intensively investigated archaeological regions in Australia, with hundreds, if not thousands, of Aboriginal archaeological investigations involving survey and/or excavation having now been undertaken, the majority as part of larger Environmental Impact Assessments associated with residential development and affiliated infrastructure projects. Unsurprisingly, these investigations have varied significantly in scale and scope, ranging from targeted small-scale surveys to complex, multi-phase survey and excavation projects over large areas. Nonetheless, together, they have revealed a rich and diverse record of past Aboriginal occupation, with thousands of Aboriginal archaeological sites registered on DPC's AHIMS database. To date, useful syntheses of this record have been compiled by Attenbrow (2010), Jo McDonald CHM (1997b), McDonald (2008) and Przywolnik (2007). Key investigation themes are briefly detailed in the sections below.

5.3.2.1 Open artefact sites: distribution, contents and definition

Surface and subsurface distributions of stone artefacts, variously referred to as open artefact sites, open sites and open camp sites are the most common and widely distributed form of Aboriginal archaeological site on the Cumberland Plain (see Attenbrow, 2010: Plate 12; Przywolnik, 2007: 46, Table 4.2). Other site types, such as scarred trees, quarries, grinding grooves and rock shelters with deposit and/or art or PAD, have also been identified but are comparatively rare. Accordingly, open artefact sites remain the most intensively investigated component of the Aboriginal archaeological record of the Cumberland Plain, with site distribution and the technology of associated flaked stone artefact assemblages, in particular, comprising key research topics (e.g. AMBS, 2000; Craib et al. 1999; Jo McDonald CHM 2001, 2003, 2005a, 2006a, 2006b, 2007, 2009a, 2009b; Kohen 1986; White and McDonald, 2010).

Existing archaeological survey data for the Cumberland Plain indicate a strong trend for the presence of open artefact sites along watercourses, specifically, on creek banks and 'flats' (i.e. flood/drainage plains), terraces and bordering lower slopes (Kohen 1986;). Although this distribution pattern can be attributed in part to geomorphic dynamics and archaeological sampling bias, with extensive fluvial erosion activity along watercourses resulting in higher levels of surface visibility and, by extension, concentrated survey effort, an occupational emphasis on watercourses is supported by the results of numerous subsurface investigations (e.g. AECOM, 2013b, 2015; AMBS, 2000; Craib et al. 1999; GML, 2012; Jo McDonald CHM, 2001, 2003, 2005a, 2006a, 2006b, 2007, 2009a, 2009b). Collectively, these investigations have demonstrated that assemblage size and complexity tend to vary significantly in relation to stream order and landform, with larger, more complex¹⁰ assemblages concentrated on elevated, low gradient landform elements adjacent to higher order watercourses. Outside of these contexts, surface and subsurface artefact distributions have typically been found to be sparse and discontinuous and are often referred to as 'background scatter'.

Flaked stone artefacts dominate archaeological finds assemblages from recorded open artefact sites on the Cumberland Plain, with heat shattered rock also well represented. Items such as complete and broken grindstones, hammerstones and edge-ground hatchet heads have also been recorded though comparatively infrequently. With the notable exception of 'knapping floors' (areas of concentrated lithic debris), a relatively common component of the Aboriginal archaeological record of the Cumberland Plain, associated archaeological features (e.g. hearths and heat treatment pits) have likewise proven elusive (but see McDonald and Rich, 1994; Jo McDonald CHM, 2009a for examples). Investigated knapping floors across the Plain have varied considerably in size and complexity, with the largest and most complex examples identified through excavation as opposed to surface survey (e.g. Jo McDonald CHM, 2001, 2005a, 2006b, 2007). Backed artefacts (i.e. Bondi points, geometric microliths and elouera) are a common feature of knapping floors and most of these features were likely specifically associated with their production. As in other NSW contexts, most notably the Hunter Valley

¹⁰ Those containing a wider variety of raw materials and technological types and/or higher mean artefact densities and features such as knapping floors.

(e.g. Hiscock, 1993; Moore, 2000), available evidence supports the suggestion that backed artefact manufacture on the Cumberland Plain was a highly structured or systematic activity.

Although relevant to a variety of site types, geomorphic processes such as soil erosion and colluvial/fluvial aggradation are of particular relevance to the identification and definition of open artefact sites. As in other archaeological contexts (e.g. Dean-Jones and Mitchell, 1993; Fanning and Holdaway, 2004; Fanning *et al.* 2009; Holdaway *et al.* 2000), it is now widely accepted by archaeologists working on the Cumberland Plain that the visibility of open artefact sites across the Plain can, for the most part, be attributed to contemporary and historical geomorphic processes which have variously exposed and obscured them. As demonstrated by numerous large scale salvage projects across the Cumberland Plain, surface artefacts invariably represent only a fraction of the total number of artefacts present within recorded surface open artefact sites, with a typical surface to subsurface artefact ratio of 1:25 (Jo McDonald CHM, 2005b: 35). Artefact exposure, unsurprisingly, is highest on erosional surfaces and lowest on depositional ones. At the same time, in many areas, surface artefacts have been shown through dispersed testing to form part of more-or-less continuous subsurface distributions of artefacts, albeit with highly variable artefact densities linked to environmental variables such as distance to water, stream order and landform (e.g. White and McDonald, 2010). Critically, the presence or absence of surface artefacts on the Cumberland Plain is not a reliable indicator of Aboriginal archaeological sensitivity.

5.3.2.2 Flaked stone artefact technology

Virtually indestructible, flaked stone artefacts are a ubiquitous element of the Aboriginal archaeological record of the Cumberland Plain and have assumed a prominent position in archaeological reconstructions of past Aboriginal land use across the region. To date, hundreds, if not thousands, of surface-collected and excavated flaked stone assemblages from across the Cumberland Plain have been analysed, with individual assemblage sizes, research questions, aims, analytical methodologies and terminological schemes varying significantly between researchers and projects. Studies to date have ranged from basic descriptive accounts of assemblage composition in typological terms to detailed reconstructions of past stone reduction and quarrying behaviours through rigorous technological analyses. Particularly informative analyses in the context of the Cumberland Plain include those conducted by Jo McDonald CHM (2001, 2003, 2005a, 2006a, 2006b, 2007, 2009a, 2009b) as part of archaeological salvage projects associated with development activities within the Rouse Hill Development Area (RHDA), the former Australian Defence Industries (ADI) site at St Marys and the Colebee Release Area (CRA).

Available technological and typological data for surface collected and excavated chipped stone artefact assemblages from the Cumberland Plain suggest that the majority of these assemblages belong to what is known as the 'Australian small-tool tradition', a term coined by Gould (1969) to describe what was then thought to be the first appearance, in the mid-Holocene¹¹, of a new suite of flaked stone tool forms in the Aboriginal archaeological record of Australia, including backed artefacts (i.e. Bondi points and geometric microliths), adzes and points, both unifacially and bifacially flaked. Complex, hierarchically-organised reduction sequences associated with the production of these tools contrast markedly with the simple sequences of earlier periods (Moore, 2011).

Hiscock (e.g. 1994, 2002, 2006) suggests that Aboriginal people employed a portable and multifunctional selection of stone tools as a form of resource management. Stone artefact assemblages from late Pleistocene and early Holocene contexts, in contrast, are described by archaeologists as belonging to the 'Australian core tool and scraper tradition', a term first used by Bowler *et al.* (1970) to describe the Pleistocene assemblages recovered from Lake Mungo in western NSW. Bowler *et al.* (1970) saw the main components of these assemblages (core tools, steep-edged scrapers and flat scrapers) as characteristic of early Australian Aboriginal assemblages and as being of a distinctly different character to those associated with the proceeding small-tool tradition. In south-eastern Australia, including the Cumberland Plain, the Australian 'small-tool' and 'core tool and scraper' traditions are most commonly described in terms of McCarthy's (1967) ERS, with 'Capertian' assemblages assigned to the latter tradition and 'Bondaian' assemblages, the former.

¹¹ More recent research into the chronology of backed artefacts and points in Australia (e.g. Hiscock & Attenbrow, 1998, 2004; Hiscock, 1993b) has demonstrated a long history of production and use for these implement types, with both types now known to have been produced, albeit in small numbers, in the early Holocene and likely in the late Pleistocene as well.

Flaked stone artefact assemblages from excavated and surface collected open artefact sites on the Cumberland Plain attest to the exploitation of a diverse range of lithic raw materials (Corkill, 1999, 2005). However, two rock types, being silcrete and silicified tuff (also known as indurated mudstone), dominate the region's existing stone artefact record. Other, less commonly exploited raw materials represented in excavated and surface collected assemblages include quartz, quartzite, petrified wood, chert and various fine-grained volcanics. Alongside silcrete and silicified tuff, these materials occur variously in a number of geological formations and units across the Cumberland Plain (for a detailed review see Corkill 1999). Oft-cited sources, for example, include the Tertiary St Marys (Ts) and Rickabys Creek Gravel (Tr) formations, as well as the various unconsolidated Pleistocene units that line as terraces the present day and abandoned channels of the Nepean/Hawkesbury River (e.g. Agnes Bank Sand (Qpa) and Cranebrook Formation (Qpc)).

In common with the Sydney region as a whole (Attenbrow, 2010), various excavated assemblages from the body and peripheries of the Cumberland Plain (e.g. Jo McDonald CHM 2001a, 2005a; Williams *et al.* 2012; Williams *et al.* 2014) attest to a shift, over time, in the relative significance of particular raw materials for flaked stone artefact manufacture, principally silcrete and silicified tuff but also quartz. An 'early' (i.e. Pre-Bondaian) emphasis on the procurement and reduction of silicified tuff, for example, appears to have given way to a 'later' (i.e. Bondaian) emphasis on silcrete. Quartz use, meanwhile, appears to have peaked in the late Holocene. For the Cumberland Plain, these changes have been linked, in particular, to broader changes in settlement organisation, with a decline in levels of residential mobility over time prompting more intensive use of locally available stone (Jo McDonald CHM 2005a).

In the northwestern portion of the Cumberland Plain, the Tertiary-aged St Marys Formation has been singled out as a particularly important source of silcrete for stone artefact manufacture. Mapped at various localities across the Mulgoa Creek, South Creek and Eastern Creek catchments, the best known and most intensively investigated outcrops of this formation occur on Plumpton Ridge, a low but prominent ridgeline separating the floodplains of Eastern and Bells Creek between the suburbs of Plumpton and Riverstone. The subject of numerous archaeological investigations since the early-1980s (e.g. AMBS, 2002b; Baker, 1996; McDonald, 1986), recent large-scale archaeological salvage works across what is now Stonecutters Ridge Golf Club have unequivocally identified Plumpton Ridge as a major Aboriginal quarry site (Jo McDonald CHM, 2006b). At the same time, they have highlighted a number of important trends in relation to the procurement and reduction of silcrete obtained from this source. Trends in the relative frequencies of raw material types, artefact types and the size of silcrete artefacts in local excavated assemblages, for example, have been attributed to a process of 'distance-decay'. As one of only three systematically investigated Aboriginal quarry sites on the Cumberland Plain, the other two being the ADI-EPI and ADI-FF22 sites within the former ADI site at St Marys (Jo McDonald CHM, 2006a, 2008a), Plumpton Ridge is widely regarded as a feature of high scientific and cultural significance.

Backed artefacts dominate the retouched components of the majority of dated and undated Bondaian assemblages from the Cumberland Plain and, as such, the technology of their manufacture has received considerable analytical and interpretive attention. Studies by Jo McDonald CHM (2001, 2003, 2005a, 2006a, 2006b, 2007, 2009a, 2009b), in particular, have demonstrated that backed artefact manufacture on the Cumberland Plain was a highly structured or systematic activity involving a complex system of raw material procurement, transportation, preparation and reduction. Differences in the technological character of recovered cores across the region attest to a significant degree of variability in the methods used by Aboriginal knappers to produce flakes for backed artefact manufacture. However, certain techniques (e.g. asymmetric alternating flaking and Hiscock's (1993) 'tranchet technique') are particularly well represented. Evidence for the deliberate heat treatment of silcrete blanks, both as part of systematic backed artefact manufacture activities and other reduction activities, is abundant and widespread, with excavated and surface collected assemblages attesting to the use of heat at various points in the reduction process. As in other contexts (e.g. Hiscock, 1993), the thermal alteration of Cumberland Plain silcrete appears to have significantly improved the flaking quality of the stone, increasing the lustre and smoothness of fracture surfaces.

5.3.2.3 Chronology

In common with the Sydney region as a whole, evidence for late Pleistocene/early Holocene (i.e. Pre-Bondaian/Early Bondaian) Aboriginal occupation of the Cumberland Plain is relatively sparse, with dated and undated evidence from these periods obtained from only twelve sites:

- Rouse Hill sites RH/CC2 (Jo McDonald CHM, 2001), RH/SC5 (Jo McDonald CHM, 2002b), RH/CD12 (Jo McDonald CHM, 2002a) and RHCD7 (Jo McDonald CHM, 2007);
- Richmond site RMI (Jo McDonald CHM, 1997a);
- SA23 in the Colebee Release Area (Jo McDonald CHM, 2006b);
- PT12 near Pitt Town (Williams *et al.* 2012; Williams *et al.* 2014);
- Jamisons Creek, Emu Plains (Kohen *et al.* 1984);
- Power Street Bridge 2, Doonside (McDonald, 1993);
- Regentville RS1, Regentville (Koettig and Hughes, 1995; McDonald *et al.* 1996);
- RTA-GI at Parramatta (Jo McDonald CHM, 2005b); and
- the Windsor Museum site (Austral Archaeology, 2011; Williams *et al.* 2012; Williams *et al.* 2014).

Claims of a c.40,000ka year old date for five 'flaked pebbles' recovered from a gravel pit associated with the Cranebrook Terrace near Penrith (Nanson *et al.* 1987) have been widely rejected, with legitimate concerns raised over the artefactual status of these pebbles, their provenance and association with available dates. For most sites, late Pleistocene/early Holocene occupation has been inferred on the basis of the technological and typological characteristics of recovered flaked stone artefact assemblages as opposed to radiometric dates.

At present, the oldest securely dated archaeological site on the Cumberland Plain is the PT12 site at Pitt Town, with compliance-based archaeological excavations across a source-bordering dune at this site, which overlooks the Hawkesbury River, producing a suite of Optically-Stimulated Luminescence (OSL) dates suggestive of Aboriginal occupation from at least 36,000 years ago (and potentially earlier) (Williams *et al.* 2012; Williams *et al.* 2014). Closer to the coast, Late Pleistocene/early Holocene occupation of a sandy fluvial terrace adjacent to the Parramatta River, excavated in three separate development contexts as sites 'RTA-GI', 'CGI' and 'GG3', has been proposed by Jo McDonald CHM (2005b) and seems likely on the basis of available radiometric dates and assemblage characteristics.

In stark contrast to the late Pleistocene/early Holocene, evidence for mid-to-late Holocene (i.e. Middle to Late Bondaian) Aboriginal occupation of the Cumberland Plain abounds, with numerous excavated sites producing assemblages that can be confidently assigned to these periods on the basis of radiometric dates and/or their typological/technological profiles. Available radiometric dates indicate a steady increase in the number of sites occupied over the course of the Holocene, with a peak in the 2nd millennium BP (see, for example, Przywolnik, 2007: 53, Fig. 4.6). Taken at face value, these data suggest a progressive increase in the Aboriginal population of the Cumberland Plain over the course of the Holocene. However, as argued by Hiscock (2008), albeit on a national scale, it seems likely that the directional population growth suggested by such data is, to a certain extent at least, a product of differential site preservation, with younger sites better preserved than older ones. Other factors, such as the burial of older sites through sediment deposition and bias in the location of archaeological surveys and excavations, may also be relevant.

5.3.2.4 Site distribution and occupation models

A number of Aboriginal site distribution and occupations models have been proposed for the Cumberland Plain over the past four decades, with early models (e.g. Kohen, 1986; Smith, 1989) based almost exclusively on surface evidence and more recent models (e.g. AMBS 2000; Jo McDonald CHM, 1997b) taking into account both surface and excavated evidence. As indicated in **Table 5-2** Aboriginal site distribution on the Cumberland Plain has been linked to a variety of environmental factors, with proximity to water, stream order, landform and geology (including proximity to known stone sources) variously highlighted as key determinants.

Table 5-2 Aboriginal site distribution and occupation models for the Cumberland Plain

Researcher(s)	Year	Summary of model
Dallas and Witter	1983	<ul style="list-style-type: none"> • sites closer to silcrete and other raw material sources will tend to contain more cores and waste chips and less utilised material than sites which are located further away. They will also contain more block fractured pieces, a higher frequency of cortex, and the artefacts will generally be larger than those at sites not associated with raw material sources; • in areas of raw material abundance, artefacts will be discarded earlier in the reduction sequence and will generally be larger and occur in a variety of forms; • raw material abundance, quality and size will influence assemblage variability; and • sites located away from raw material sources will exhibit a wider variety of activities and a higher number of utilised pieces than those closer to them.
Kohen	1986	<ul style="list-style-type: none"> • proximity to water and geological context are key determinants for site location; • sites can be categorised as one of three types according to their function: • camping sites, which have a wide range of activities represented in the archaeological record; • woodworking sites, where there is a high proportion of stone tools to debitage (lithic debris) present; • hunting sites, which contain a relatively small number of unworked flakes and are sometimes associated with backed blades; • greatest proportion of sites are located on Wianamatta Shale substrates; • number of artefacts found at a site and site size is more closely correlated to the nature and degree of disturbance at a site than any behavioural factors. The more disturbed the site, the greater the visibility and hence the greater quantity of artefacts recorded; and • sites with high artefact densities tend to be found within 100 metres of permanent water sources.
Smith	1989	<ul style="list-style-type: none"> • sites are most likely to occur in association with water sources. Permanency of the water source, however, is not a determining factor for site location, with a significant quantity of sites found along temporary creek lines; • sites on the Londonderry Clay/Rickabys Creek Formation are likely to be found in association with gravel exposures; • sites dominated by silcrete are less likely to be found west of Marsden Park and South Creek than east of those areas. Isolated finds in these areas are also less likely to be made from silcrete; • sites east of South Creek are likely to be principally stone tool and silcrete manufacturing and processing sites; • sites in the northern Cumberland Plain are expected to have a lower frequency of implements than those in the south; • woodland areas will typically contain sites at lower densities than open forest areas; • surface sites appear to be more common than subsurface sites, and undisturbed stratified sites are rare due to the degree of disturbance; • sites with over 50 artefacts are rare, although very large sites (500+ artefacts) do occur. There is no apparent patterning to the occurrence of these large sites. The pattern of distribution of site size appears to be determined predominantly by visibility; and

Researcher(s)	Year	Summary of model
		<ul style="list-style-type: none"> sites cannot be divided neatly into 'single use' categories, as most sites were the location of numerous activities.
Jo McDonald CHM	1997b	<ul style="list-style-type: none"> open sites with subsurface archaeological deposits are the most commonly occurring sites; sites cannot be adequately characterised on the basis of surface evidence alone; where open sites are found in stable and aggrading landscapes, many will be intact and have the potential for internal structural integrity, with sites in alluvium and other depositional environments containing the best potential for intact archaeological remains and stratification; many sites contain extremely high artefact densities, with variability depending on the range of activity areas and site types present; artefacts are not evenly distributed across the landscape. Site patterning can be related to gross environmental factors, with sites on permanent water being more complex than those situated on ephemeral or temporary water lines. However, there is not always a direct correlation between site location and the environment; major confluences, particularly along major creeks, are prime site locations; proximity to water and underlying geological units are key factors in site distribution. However, distribution can be further measured according to stream order, with sites located in close proximity to established, permanent, and resource rich drainage channels (e.g. 3rd and 4th order creeks) are more likely to have higher artefact densities and a greater diversity of tools than sites associated with lower order water courses; temporary water sources and minor gullies tend to have single use or occasionally repeated visits and hence lower density sites; locations between creeks, such as ridge-tops and spurs, may possibly contain archaeological evidence, which may vary according to proximity to water sources; and sites in close proximity to an identified stone source will contain a range of size and cortex characteristics in their assemblages. As distance increases from the source, artefact size and percentage of cortex in the assemblage will decrease.
AMBS	2000	<ul style="list-style-type: none"> spatial patterning in chipped stone artefact distributions adjacent to major creek lines can, in certain instances, be accommodated under a three-tiered model of 'Activity Overprint Zones' incorporating 'complex', 'dispersed' and 'sparse' zones; complex zones will exhibit overlapping knapping floors and high density concentrations of artefacts indicative of repeated, long-term occupation events; dispersed zones may include knapping floors. However, these are typically spatially discrete due to less frequent occupation; sparse zones will exhibit consistently low frequencies/densities of artefacts. Artefact discard in these zones is likely to have resulted from discard in the context of use or loss rather than manufacture; and chipped stone artefact production and maintenance will leave a more obtrusive archaeological signature than resource extraction (e.g. food collection and processing). These activities will also occur closer to the residential core while resource extraction will typically occur away from it.

White and McDonald's (2010) analysis of lithic artefact distribution in the RHDA, located approximately 35 kilometres northwest of the study area, provides a suitably robust dataset for assessing the validity of some of the key predictions of the models outlined above. Based on the results of over a decade of intensive test excavation in the RHDA, this study remains the most comprehensive of its type currently available for the Cumberland Plain. As indicated, Aboriginal site distribution on the Cumberland Plain has been linked to a variety of environmental factors, with distance to water, stream order, landform and geology (including proximity to known stone sources) variously highlighted as important influences. White and McDonald's (2010) analysis both supports and negates various aspects of the postulated relationships between these factors and Aboriginal site patterning on the Cumberland Plain. Key findings can be summarised as follows:

- artefact distributions do not, as implied by the models of Kohen (1986) and Smith (1989), form bounded 'sites' but rather 'landscapes';
- artefact distribution does, as variably expressed by AMBS (2000), Kohen (1986), Jo McDonald CHM (1997b) and Smith (1989), appear to vary with proximity to water, albeit to different extents based on stream order;
- artefact density does, as suggested by Jo McDonald CHM (1997b), appear to vary significantly with stream order and with landform;
- Aboriginal archaeological sites on the Cumberland Plain cannot, as proposed by Jo McDonald CHM (1997b), be adequately characterised on the basis of surface evidence alone. Most areas, regardless of surface indications, contain subsurface archaeological deposit(s);
- the orientation of open land surfaces appears to have influenced the selection of artefact discard locations in the lower portions of valleys, with generally higher densities on lower slopes facing north and northeast;
- distance from known silcrete sources does not, on present evidence at least, appear to have influenced intensity of artefact discard (cf. Dallas and Witter, 1983);
- trends in artefact density and distribution indicate long-term, large scale patterns. Short term models of settlement organization are insufficient to account for these artefact distributions; and
- social and/or symbolic factors may have influenced site selection along with the distributions of economic and other resources.

5.4 Local archaeological context

5.4.1 AHIMS database

The AHIMS database, administered by DPC, contains records of all Aboriginal objects reported to the Chief Executive of DPIE in accordance with section 89A of the NSW *National Parks and Wildlife Act 1974* (NPW Act). It also contains information about Aboriginal places, which have been declared by the Minister to have special significance with respect to Aboriginal culture. Previously recorded Aboriginal objects and declared Aboriginal places are known as 'Aboriginal sites'.

Searches of the AHIMS database were undertaken on 2 May 2019 (AHIMS search #418101). A one kilometre buffer was applied to the transmission cable route ('the transmission cable route search area') and an additional one kilometre search area applied to the Sydney South substation ('the Sydney South substation search area'). Collectively, the AHIMS search area reported a total 35 Aboriginal sites within the respective AHIMS search areas (refer to **Annexure G**). Of these, a single Aboriginal resource and gathering site (45-6-0751, Shea's Creek Dugong) was listed as 'Destroyed'. A duplicate of the aforementioned identified as an open artefact site containing shell material, 'Shea's Creek' (45-6-1496), is listed as 'Not a Site'. Discounting these two sites from the AHIMS search, a total of 33 'Valid' entries remain. A summary of the valid site entries within the AHIMS search is provided in **Table 5-3**. Details for all identified sites within the AHIMS search area are provided in **Table 5-4**.

Table 5-3 AHIMS search results for valid sites

Site type	Count (n)	% (by count)
Modified Tree (Carved or Scarred)	1	3%
Burial	1	3%
Midden	1	3%
Aboriginal Resource and Gathering	1	3%
Open Artefact Site	5	15%
PAD	6	18%
Rockshelter	18	55%
Total	33	100%

Table 5-4 AHIMS search summary

Site ID	Site Name	Site Status	Site Features	Site Type	Distance from project area
52-3-0478	Georges River-	Valid	Shell, Artefact(s)	Rockshelter	880
45-6-0536	Alford's Point A; Precinct 9 Alford's Point;	Valid	Artefact(s), Art (Pigment or Engraved)	Rockshelter	597
45-6-2016	Georges R.S.R.A.;	Valid	Art (Pigment or Engraved)	Rockshelter	420
45-6-1790	GKW - St George SRA	Valid	Shell, Artefact(s)	Rockshelter	661
45-6-1791	GW35 - Mill Creek, Split Level Shelter	Valid	Shell, Artefact(s), Art (Pigment or Engraved)	Rockshelter	690
45-6-1797	ST George S.R.A.;	Valid	Art (Pigment or Engraved)	Rockshelter	396
45-6-1798	ST George S.R.A.;	Valid	Art (Pigment or Engraved)	Rockshelter	436
45-6-1799	ST George S.R.A.;	Valid	Artefact(s)	Rockshelter	526
45-6-0962	Georges River; Falling Rock Cave;	Valid	Art (Pigment or Engraved), Shell, Artefact(s)	Rockshelter	448
45-6-1655	Georges River; M3;	Valid	Shell, Artefact(s)	Rockshelter	597
45-6-1656	Georges River; M6;	Valid	Art (Pigment or Engraved)	Rockshelter	617
45-6-1657	Georges River; M5;	Valid	Shell, Artefact(s)	Rockshelter	526
45-6-1842	Blackwall Rock;	Valid	Shell, Artefact(s)	Midden	586
45-6-1843	Anvill Rock;	Valid	Art (Pigment or Engraved)	Rockshelter	700
45-6-1009	Georges River; Plundered Cave;	Valid	Art (Pigment or Engraved), Shell, Artefact(s)	Rockshelter	421
45-6-1010	Georges River; Henry Lawson Cave;	Valid	Shell, Artefact(s)	Rockshelter	571
45-6-0961	Georges River; Welk Shells Cave;	Valid	Shell, Artefact(s)	Rockshelter	795
45-6-0959	Georges River; Two Caves Overhang;	Valid	Art (Pigment or Engraved)	Rockshelter	933
45-6-2874	MPO6	Valid	Potential Archaeological Deposit (PAD)	Potential Archaeological Deposit (PAD)	956
45-6-2875	MPO7	Valid	Potential Archaeological Deposit (PAD)	Potential Archaeological Deposit (PAD)	573

Site ID	Site Name	Site Status	Site Features	Site Type	Distance from project area
45-6-2876	MPO8	Valid	Potential Archaeological Deposit (PAD)	Potential Archaeological Deposit (PAD)	491
45-6-2877	MPO9	Valid	Potential Archaeological Deposit (PAD)	Potential Archaeological Deposit (PAD)	888
45-6-2884	West Menai PAD18	Valid	Potential Archaeological Deposit (PAD)	Potential Archaeological Deposit (PAD)	946
45-6-2900	GKW32 (Lomandra Crescent) Botany Bay	Valid	Artefact(s)	Open Artefact Site	869
45-6-2901	GKW35 (Mill Creek Split Level Shelter) Botany Bay	Valid	Art (Pigment or Engraved), Artefact(s), Shell	Rockshelter	690
45-6-2902	GKW39 (Moonah Rd Talus) Botany Bay	Valid	Shell, Artefact(s)	Open Artefact Site	430
45-6-2986	HR PAD 11	Valid	Potential Archaeological Deposit (PAD)	Potential Archaeological Deposit (PAD)	940
45-6-3237	Crystal stone site	Valid	Artefact(s)	Open Artefact Site	643
45-6-3230	Gandangarra Repat Site	Valid	Burial	Burial	721
45-6-3231	Gandangarra Repat/Scar Tree	Valid	Modified Tree (Carved or Scarred)	Modified Tree (Carved or Scarred)	733
45-6-3545	Elliot Reserve 1 (STRA-001)	Valid	Artefact(s)	Open Artefact Site	601
45-6-3546	Maria Reserve 1 (STRA-002)	Valid	Artefact(s)	Open Artefact Site	380
45-6-3547	St Annes Reserve 1 (STRA-003)	Valid	Aboriginal Resource and Gathering	Aboriginal Resource and Gathering	896

Within the transmission cable route search area, AHIMS spatial data indicates that Aboriginal site Shea's Creek Dugong (#45-6-0751) is located approximately 700 metres southwest from Beaconsfield West substation, near the Alexandra Canal. Background research indicates that the site, now destroyed, was identified during construction of the canal in 1896 and comprised dugong bones and edge-ground hatchet heads within a layer of dark bluish grey sandy clay with marine shells, approximately five metres below the current ground surface. The bones of a dugong were considered significant at the time as they showed evidence of transverse and oblique curved cuts and scars that appeared to have been produced by a blunt-edged instrument. The axe heads were located around 500 metres from the dugong bones within the same stratigraphic layer (Etheridge, 1905). The excavated material was collected and retained by the Australian Museum and in 2009 the dugong bones were radiocarbon dated, producing a date of $5,520 \pm 70$ years BP (Lindbergh, 2009). The AHIMS database currently lists the site as 'Destroyed', noting that the site was salvaged during construction of the canal.

Aboriginal site 'Shea's Creek' (#45-6-1496) is understood to be a superseded record of the Shea's Creek Dugong (#45-6-0751) site, incorrectly located approximately 250 metres northeast of the aforementioned. The AHIMS database currently lists #45-6-1496 as 'Not a Site'.

Additional sites located within the study area include 'Elliott Reserve 1 (STRA-001)' (#45-6-3545; 750 metres east of Cooke Park), 'Maria Reserve 1 (STRA-002)' (#45-6-3546; 500 metres northeast of Cooke Park) and 'St Annes Reserve 1 (STRA-003)' (#45-6-3547; 1.3 kilometres north of Cooke Park), all located in the central northern portion of the study area. Both 'Elliott Reserve 1 (STRA-001)' and 'Maria Reserve 1 (STRA-002)' are listed as Open Artefact sites, comprising dispersed Aboriginal artefacts and areas of PAD. Aboriginal site 'St Annes Reserve' is identified as an Aboriginal Resource and Gathering area with a likely association with the nearby Cooks River. All three sites are currently listed as valid.

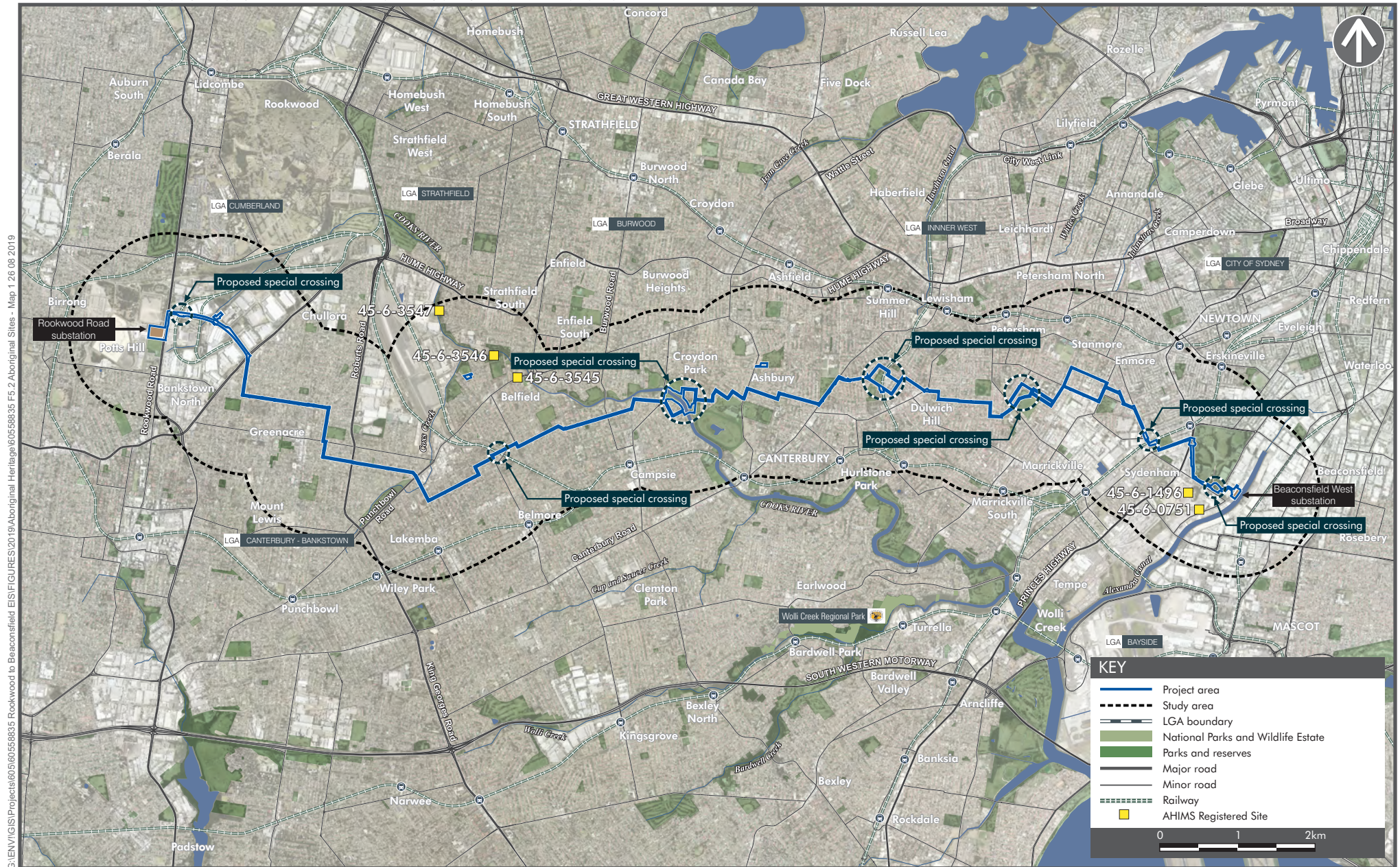
Within the Sydney South substation search area, AHIMS contained thirty Aboriginal sites, twenty-seven of which lie on the southern bank of the Georges River. The remaining three sites all lie in excess of 400 metres from the Sydney South substation.

No Aboriginal sites currently listed within the AHIMS search are located within the project area (refer to **Figure 5-2** and **Figure 5-3**).

5.4.2 Native title

A search of the National Native Title Register and Register of Native Title Claims administered by the National Native Title Tribunal was undertaken for all relevant LGAs, inclusive of land within and surrounding the study area. No current Native Title listings or claims were identified.

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5.5 Previous Aboriginal heritage investigations

Existing AHIMS data indicate that a number of Aboriginal archaeological investigations have been carried out in the vicinity of the study area. A summary of the key findings of relevant investigations is provided in **Table 5-5**.

Table 5-5 Previous Aboriginal archaeological investigations within the study area

Author (year)	Year	Summary of results	Nearest construction precinct
Attenbrow	1984	An inspection was undertaken of potential Aboriginal midden site #45-6-1496 located at the St Peters Brickworks, Canal Road (within Precinct 5). During the inspection it was determined that the shell deposit was not an Aboriginal midden. Its location was interpreted to be indicative of a former Botany Bay shoreline prior to its post c.6,000 BP present level. The assessment provides evidence for the existence of massive natural shell beds throughout the local area and note that prior to the construction of the Alexandria Canal and land reclamation, the local area was salt water swamp.	5
Attenbrow	1990 1994a, 1994b	<p>Attenbrow undertook an analysis of the distribution of then known shell middens and archaeological deposits within the Port Jackson catchment (n = 369, with 335 and 34 middens and deposits respectively), with eight sub-catchments recognised on the basis of major rivers and creeks and further subdivided into freshwater, estuarine and ocean zones. For the purposes of this study the Port Jackson catchment was defined as following Parramatta River from Sydney Cove to Parramatta, and Middle Harbour Creek from Sydney Cove to Davidson, incorporating the associated bays, harbours and tributaries along these extents.</p> <p>Key patterns to emerge from Attenbrow's analysis were as follows:</p> <ul style="list-style-type: none"> • shell middens occur only in sub-catchments with estuarine and ocean zones. Shell is present in freshwater zone sites but in quantities insufficient for their classification as middens; • archaeological deposits tend to occur in freshwater zones; • the majority of sites are located in areas underlain by Hawkesbury sandstone, with comparatively few sites located in areas underlain by Wianamatta Shale; • most sites occur within council reserves or on undeveloped Crown Land; • middens and deposits occur in higher densities in subcatchments that include estuary mouths; • most middens and deposits occur in rockshelters as opposed to 'open' contexts; • most middens and deposits occur on landform elements within 10 metres of high water level (that is, in foreshore zones); and • ridgetops and ridgetside sites are comparatively poorly represented. 	1-5
Susan McIntyre-Tamwoy	2003	Archaeological excavation by machine along the proposed underground service alignment within Fraser Park, Marrickville. The investigation identified layers of fill material overlying natural swamp deposits, including naturally deposited shell material. On the basis of the silty materials and shell beds, McIntyre-Tamwoy suggested Fraser Park area had previously been a low-lying swamp prior to European occupation.	4

Author (year)	Year	Summary of results	Nearest construction precinct
AMBS	2003	Archaeological excavation was undertaken of a portion of Aboriginal shell midden site #45-6-2198 located on a sandstone outcrop at the back of Kendrick Park, Tempe. Three animal bone fragments, six stone artefacts and locally available estuarine shell material were identified. Two radiocarbon dates were obtained from an intact layer of the midden and returned dates of 4328 \pm 50 years BP and 3901 \pm 53 years BP.	3
Jo McDonald Cultural Heritage Management Pty Ltd	2005	Salvage excavation, commencing with dispersed mechanical testing followed by controlled hand excavation, was undertaken at AHIMS site #45-6-2737 located at Discovery Point, directly north of Tempe House. Despite considerable levels of ground disturbance in the area, 389 stone artefacts and an Aboriginal hearth was identified within a sand body (possibly part of earlier Pleistocene aged dune) and subsequently radiocarbon dated to 9,376 \pm 61 years BP. Artefact densities were considered generally low, with the exception of one knapping floor with silcrete the dominant material. Due to historic levels of disturbance it was uncertain whether the identified material was part of a continuous scatter or a series of discrete, low density clusters. Nonetheless, it is suggested that the excavated site continues around the grounds of Tempe House. Following excavation, the site was destroyed by development.	5
Navin Officer Heritage Consultants	2005	Aboriginal heritage assessment of the Enfield Intermodal Logistics Centre as part of the EIS. The assessment noted that surface soils had been extensively disturbed as a result of the industrial land use of the area. The visual inspection did not identify any Aboriginal objects or areas of archaeological potential, attributing the absence to the removal of topsoil from the historical industrial land use.	5
AECOM	2015	Archaeological survey of proposed road link between the existing M5 East Motorway, east of King Georges Road, and St Peters. During the survey, five sandstone rock overhangs were identified as potential archaeological deposits (PADs) based on habitation area size and presence of potential deposit (SR-OVRH-1, WC-OVRH-1, WC-OVRH-2, WC-OVRH-3, and WC-OVRH-4). Although no direct evidence of Aboriginal usage was identified, the sandstone overhangs were registered with AHIMS as a precaution.	3-5
Artefact Heritage	2017	Archaeological assessment and survey of a proposed rail corridor. Survey identified two areas of PAD (S2B PAD01 in Belmore and S2B PAD02 in Punchbowl) on the basis of low past disturbance. No Aboriginal objects were identified.	2

5.6 Key archaeological observations

Key observations to be drawn from a review of the regional and local archaeological context of the study area are as follows:

- available radiometric dates indicate that Aboriginal people have occupied the Cumberland Plain for at least 36,000 years;
- compared with that available for the Late Pleistocene/early Holocene, evidence for mid-to-late Holocene Aboriginal occupation of the Plain abounds, with the majority of previously recorded sites likely dating to these periods;
- Aboriginal site distribution on the Cumberland Plain has been linked to a variety of environmental factors, with proximity to water, stream order, landform and geology variously highlighted as key determinants;
- most surface sites will occur on landform elements within 200 metres of watercourses, with larger, more complex artefact assemblages associated with higher order streams;
- existing AHIMS data for the area surrounding the study area suggest that open artefact sites (i.e. artefact scatters and isolated artefacts) are the dominant site type for this area;
- most areas, irrespective of the presence or absence of associated surface evidence, will contain subsurface archaeological deposits, albeit of highly variable character and extent;
- local stone artefact assemblages attest to an emphasis on the procurement and reduction of silcrete. Other, less commonly exploited raw materials include chert, tuff, quartz, quartzite, petrified wood and igneous materials; and
- inter-site variation in the composition of stone artefact assemblages across the Cumberland Plain area can be attributed to factors such as the frequency, intensity and duration of settlement events, distance to lithic raw material sources and differing reduction strategies (e.g. specialised versus non-specialised manufacture).

5.7 Archaeological predictions

A review of the existing archaeological and environmental context of the study area facilitates the development of a series of predictions regarding the nature of the study area's Aboriginal archaeological record. Key predictions for the current assessment include:

- where present, Aboriginal sites will generally be located in proximity to major water resources (generally within 200 metres);
- residential and industrial/commercial development, roads and urban infrastructure have likely impacted the integrity of Aboriginal sites within the study area;
- observed flaked stone artefact densities (where present) will be consistent with "background scatter", being "artefactual material which is insufficient in number or in association with other material to suggest focussed activity in a particular location" (Douglas and McDonald, 1993);
- flaked stone artefact assemblages will be dominated by flake and non-flake debitage items (sensu Andrefsky, 2005), with formed objects (i.e. cores and retouched implements) comparatively poorly represented; and
- tool types of demonstrated chronological significance will be restricted to backed artefacts and/or edge-ground hatchet heads.

6.0 Aboriginal community consultation

Aboriginal community consultation acknowledges the right of Aboriginal people to be involved, through direct participation, on matters that directly affect their heritage. Involving Aboriginal people in all facets of the assessment process ensures that they are given adequate opportunity to share information about cultural values, and to actively participate in the development of appropriate management and/or mitigation measures. The successful identification, assessment and management of Aboriginal cultural heritage values are dependent on an inclusive and transparent consultation process.

Aboriginal community consultation for the project was undertaken in accordance with OEH's *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a) (*Consultation Requirements*). The results of the consultation process undertaken are detailed below. A consultation log is provided as **Annexure A**.

6.1 Stage 1 - notification and registration

The aim of Stage 1 of the *Consultation Requirements* (DECCW, 2010a) is to identify, notify and register Aboriginal people who hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and/or places in the study area.

6.1.1 Agency notifications and newspaper advertisement

In accordance with Section 4.1.2 of the *Consultation Requirements* (DECCW, 2010a), the names of Aboriginal people and/or organisations that may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places within the study area were identified by writing to the following agencies and organisations on 7 May 2019:

- DPC;
- Office of the Registrar, *Aboriginal Land Rights Act* 1983;
- National Native Title Tribunal;
- Native Title Services Corporation Limited (NTSCORP Limited);
- City of Sydney Council;
- Canterbury-Bankstown Council;
- Strathfield Council;
- Inner West Council;
- Local Land Services;
- GLALC; and
- MLALC.

Written responses to notification letters/emails were received from Local Land Services (Greater Sydney), City of Sydney Council, Inner West Council, Office of The Registrar and DPC. Aboriginal individuals/groups identified from the DPC response to AECOM are presented in **Table 6-1**.

Table 6-1 Identified Aboriginal organisations/individuals

Organisation	Organisation
A1 Indigenous Services	Kawul Cultural Services
Amanda Hickey Cultural Services	Metropolitan Local Aboriginal Land Council
B.H. Heritage Consultants	Munyunga
Barking Owl Aboriginal Corporation	Munyunga Cultural Heritage Technical Services
Barraby Cultural Services	Mura Indigenous Corporation
Biamanga	Murra Bidgee Mullangari Aboriginal Corporation
Bilinga	Murrarnarang
Bilinga Cultural Heritage Technical Services	Murrumbul
Butucarbin Aboriginal Corporation	Murrumbul Cultural Heritage Technical Services
Callendulla	Nerrigundah
Corroboree Aboriginal Corporation	Ngambaa Cultural Connections
Darug Boorooberongal Elders Aboriginal Corporation	Nundagurri
Darug Custodian Aboriginal Corporation	Pemulwuy CHTS
Darug Land Observations	Phil Kahn
Dharugv	Rane Consulting
Dhinawan-Dhigaraa Culture & Heritage Pty Ltd	Thauaira
Didge Ngunawal Clan	Thoorga Nura
DJMD Consultancy	Tocomwall
Duncan Falk Consultancy	Wailwan Aboriginal Group
Gandangara Local Aboriginal Land Council	Walbunja
Garrara Aboriginal Corporation	Walgalu
Ginninderra Aboriginal Corporation	Warragil Cultural Services
Goodradigbee Cultural & Heritage Aboriginal Corporation	Widescope Indigenous Group
Goohah Developments	Wingikara
Gulaga	Wingikara Cultural Heritage Technical Services
Gunjeewong Cultural Heritage Aboriginal Corporation	Wurrumay Consultancy
Guntawang Aboriginal Resources Incorporated	Yerramurra
Gunyuu	Yulay Cultural Services
Gunyuu Cultural Heritage Technical Services	Yurrandaali Cultural Services
Jerringong	

As per Section 4.1.3 of the *Consultation Requirements* (DECCW, 2010a), an expression of interest letter was subsequently sent to each of the above-named individuals/groups on 18 May 2019, the primary purpose of which was to notify them about the assessment and to request that they formally register their interest in being involved in the consultation process.

In accordance with Section 4.1.2 of the *Consultation Requirements* (DECCW, 2010a), an advertisement was placed in the general notices section of both the Inner West Courier and Canterbury - Bankstown Express newspapers on 14 May 2019. No responses were received following the newspaper advertisements. A copy of the newspaper advertisement is presented in **Annexure D**.

The Aboriginal organisations and individuals presented in **Table 6-2** registered for consultation as a result of the newspaper advertisement or Expression of Interest (EOI) letters.

Table 6-2 Registered Aboriginal Parties (RAPs)

Organisation	Contact person
A1 Indigenous Services	Carolyn Hickey
Barking Owl Aboriginal Corporation	Jody Kulakowski
Barraby Cultural Services	Lee Field
Butucarbin Cultural Heritage Assessments	Lowanna Gibson
Corroboree Aboriginal Corporation	Marilyn Carroll-Johnson
Darug Aboriginal Landcare	Des Dyer
Didge Ngunawal Clan	Paul Boyd & Lilly Carroll
Kamilaroi Yankuntjatjara Working group's	Philip Khan
Murra Bidgee Mullangari	Ryan Johnson
Tocomwall Pty Ltd	Danny Franks
Widescope Indigenous Group	Steven Hickey
Yerramurra	Robert Parson
Yulay Cultural Services	Arika Jalomaki
Yurrandaali Cultural Services	Bo Field
-	Wendy Morgan

6.1.2 Notification of RAPs

Section 4.1.6 of the *Consultation Requirements* (DECCW, 2010a) requires that the proponent make a record of the names of each Aboriginal person who registered an interest and provide evidence of that record, along with a copy of the EOI letter forwarded to the Aboriginal parties, to the relevant Department of Premier and Cabinet (DPC) regional office and LALC. Section 4.1.5 of the *Consultation Requirements* (DECCW, 2010a) provides the opportunity for Aboriginal persons to withhold their details from being forwarded to these parties.

In accordance with these requirements, AECOM forwarded the information in writing, to DPC Gandangara LALC (GLALC) and MLALC on 8 July 2019.

6.2 Stage 2 - presentation of information about the project

The aim of Stage 2 of the *Consultation Requirements* (DECCW, 2010a) is to provide RAPs with information about the scope of the proposed project and the proposed cultural heritage assessment process.

For the current assessment, presentation of information about the study area and proposed development was provided to RAPs as part of the registration of interest process detailed in **Section 6.1.1**. Basic information on the proponent, the project and known Aboriginal archaeological resources of the study area was included in the registration of interest letter mailed to all RAPs.

6.3 Stage 3 - gathering information about cultural significance

The aim of Stage 3 of the *Consultation Requirements* is to facilitate a process whereby RAPs can:

- contribute to culturally appropriate information gathering and the assessment methodology;
- provide information that will enable the cultural significance of Aboriginal objects and/or places on the study area to be determined; and
- have input into the development of any cultural heritage management measures.

For the assessment, consultation with RAPs regarding the cultural heritage values of the study area included:

- a request with the draft assessment methodology for any initial comments regarding the Aboriginal cultural heritage values of the study area;
- discussion of cultural heritage values during fieldwork; and
- RAP review of draft ACHAR.

6.3.1 Assessment methodology

Sections 4.3.1 and 4.3.2 of the *Consultation Requirements* require that the proponent present and/or provide the proposed methodology for the cultural heritage assessment to RAPs and that RAPs be given a minimum of 28 days to review and provide feedback on this methodology.

In accordance with these requirements, on 16 June 2019, all RAPs were sent a draft of AECOM's proposed methodology for the assessment. A request for any initial comments regarding the cultural values of the study area was also made in the cover letter accompanying the methodology.

Written responses to the draft methodology were received from six RAPs, which are summarised in **Table 6-3**.

Table 6-3 RAP comments on draft assessment methodology

Individual/Organisation	Comment
Arika Jalomaki/Yulay Cultural Services	<i>I on behalf of Yulay Cultural Services supports the methodology for this project</i>
Bo Field/Yurrandaali Cultural Services	<i>Yurrandaali Cultural Services supports the methodology for this project</i>
Lee Field/Barraby Cultural Services	<i>I on behalf of Barraby Cultural Services has read and supports the methodology for this project</i>
Ryan Johnson/Murra Bidgee Mullangari	<i>I have read the assessment methodology for the above project, I endorse the recommendations made by Aecom [sic]</i>
Jesse Carroll Johnson	<i>I have read the project information and draft assessment methodology for the above project, I agree with the recommendations made by Aecom [sic]</i>
Carolyn Hickey/A1 Indigenous Services	<i>A1 supports the methodology</i>

6.3.2 Archaeological field assessment

RAPs were offered the opportunity to participate in the field survey component of the archaeological investigation. EOI notifications for the proposed field assessment were provided in writing (email). RAP field representatives are listed by in **Table 6-4**.

Table 6-4 RAP field representatives by organisation

Organisation	Field representative(s)
MLALC	Kevin Telford

MLALC representative Kevin Telford identified the following social or cultural values for the study area in conversations with AECOM field staff:

- prior to European occupation, creeks and rivers would have been important resources for Aboriginal people occupying the study area. As such, they are considered of high cultural significance (pers.comm Kevin Telford 2019).

6.4 Stage 4 – review of draft report

The aim of Stage 4 of the *Consultation Requirements* is to prepare and finalise an ACHAR with input from RAPs.

In accordance with Section 4.4.2 of the *Consultation Requirements*, all RAPs for the project were sent a draft of this ACHAR for review and comment. Following the required 28 day review period, follow-up phone calls were made to RAPs. No comments were received on the draft report.

7.0 Archaeological survey

7.1 Archaeological survey

7.1.1 Objectives and methods

Archaeological survey of key locations within the study area was undertaken in a single day (15 July 2019) by a combined field team of AECOM Heritage Specialists Luke Atkinson and Julia Atkinson accompanied by MLALC Aboriginal sites officer Kevin Telford and TransGrid Community Engagement Specialist Kliia Stratigos. The primary aim of the survey was to identify and record any existing surface evidence of past Aboriginal occupation within the study area, with specific objectives including the ground-truthing of existing Aboriginal sites, land disturbances visible in examined historical aerial photographs and an assessment of the subsurface archaeological potential of landforms.

Areas of archaeological potential (including for example intact or remnant watercourses and areas of rock exposures) were targeted for pedestrian survey on the basis of preliminary desktop review including spatial mapping and review of aerial photography. Remaining trafficable portions of the transmission cable route were traversed by vehicle to confirm the findings of the desktop assessment and ground-truth the preliminary mapping. Survey of the study area was undertaken on foot and by vehicle, during which notes regarding GSV, integrity (land condition) and archaeological sensitivity were taken. All data was recorded on a hand-held Global Positioning System (GPS) and photographs taken. All Aboriginal archaeological objects identified during the survey were recorded to a standard required by the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b) with individual site boundaries captured by GPS.

7.1.2 Site definition

The definition, in spatial terms, of Aboriginal archaeological sites is a topic of considerable importance to modern cultural heritage management and one that has generated significant discussion in Australian archaeology (e.g. Doleman, 2008; Holdaway, 1993; Holdaway et al. 1998, 2000; MacDonald and Davidson, 1998; McNiven, 1992; Robins, 1997; Shiner 2008). Aboriginal archaeological sites can be broadly defined as places in the landscape that retain physical evidence of past Aboriginal activity. Such evidence can assume a range of forms, depending on the nature of the activity or activities that produced it, and can vary dramatically in quantity and extent. Some Aboriginal archaeological sites are, by their very nature, easy to define in spatial terms, with scarred trees, for example, readily distinguishable from their surrounding landscapes. Difficulties arise, however, for sites whose present-day physical extent is, more often than not, a product of geomorphic processes, as opposed to the actions of Aboriginal people in the past.

Although relevant to a variety of site types, geomorphic processes such as soil erosion and deposition, are of particular relevance to identification and definition of surface scatters of stone artefacts, commonly referred to as 'open camp sites' or 'artefact scatters'. It is, for example, now widely accepted that the archaeological visibility of such sites is, in most instances at least, entirely dependent on the variable operation of such processes, which will have acted variously to expose, conceal or remove completely associated archaeological materials (Dean-Jones and Mitchell, 1993; Fanning et al. 2008, 2009; Shiner, 2008). As demonstrated by a multitude large-scale excavations projects in southeastern Australia, surface artefacts invariably represent only a fraction of the total number of artefacts present within these sites, with the majority occurring in subsurface contexts. Artefact exposure, unsurprisingly, is highest on erosional surfaces and lowest on depositional ones. At the same time, in many areas, surface artefacts have been shown to form part of more-or-less continuous subsurface distributions of artefacts, albeit with highly variable artefact densities linked to environmental variables such as stream order and landform.

Defining sites on the basis of surface artefacts alone is problematic however, with modern site boundaries invariably reflecting the size and distribution of surface exposures as opposed to the actions of Aboriginal people in the past. Nonetheless, for pragmatic reasons, this is the most commonly used approach, with 'distance' and 'density-based' definitions dominating. In NSW, two of the most commonly employed distance-definitions are '*two artefacts within 50 metres of each other*' and '*two artefacts within 100 metres of each other*'. Neither definition is derived from a particular theoretical approach or body of empirical research, they are simply pragmatic devices for site definition. Definitions based on artefact density also vary in their particulars. However, one of most

commonly used definitions is that which isolates, within an arbitrarily defined 'background scatter' of one artefact per 100 square metres, higher density clusters that are subsequently defined as 'sites'.

Non-site or distributional archaeology offers an alternative approach to distance and density-based site definitions (Ebert, 1992; Foley, 1981), with individual artefacts, not sites, treated as the basic units of analysis (for published Australian examples see Doelman, 2008; Holdaway et al. 2000; McNiven, 1992; Robins, 1997; Shiner, 2008). While recognising the interpretive potential of non-site approaches with respect to data analysis and discussion, their implementation in the context of cultural heritage management studies is difficult. Here, the identification of 'sites' is required for reasons of recording (i.e. their entry into site databases such as AHIMS) as well as ease of relocation, protection, and ongoing management. The identification of spatially-discrete 'sites', therefore, offers the most pragmatic approach to Aboriginal heritage management in impact assessment contexts (but see McDonald, 1996 for a different approach).

7.1.3 Discussion of survey results

Effective coverage data for the current survey indicated that generally poor GSV conditions across the study area significantly reduced its effectiveness with regards to the identification of surface evidence of past-Aboriginal occupation. Notwithstanding, inspected survey coverage within the study area was generally assessed as having low to nil archaeological potential due to significant ground disturbance from urban and commercial land uses (current and historical), particularly where the study area passed within road and rail corridors and buildings (former and extant). Construction laydown areas inspected during the survey were likewise found to be located in areas of low or nil archaeological sensitivity, either due to existing ground disturbance or absence of archaeologically sensitive landforms.

Lands within the southern alluvial corridor of the Cooks River in the vicinity of Mildura Reserve (between Brighton Avenue and Lindsay Street) was assessed as having a moderate archaeological potential. The survey confirmed the desktop assessment which suggested that, despite being channelised, the alignment of the Cooks River in this portion of the study area appears to generally follow its natural course. While no surface Aboriginal objects were identified during the survey, the area was noted for its proximity to the Cooks River (within 200 metres), the presence of elevated landforms (rises and terraces) and retaining an inferred moderate ground integrity (on the basis of field observations and the preliminary desktop assessment). These field observations were reiterated by RAP field representative Mr Kevin Telford who noted elevated landforms similar to those retaining Aboriginal sites elsewhere along the Cooks River. When contextualised with the regional archaeological model presented in **Section 5.7**, the area of identified sensitivity has the potential to primarily contain flaked stone objects and shell material (middens) in subsurface contexts.

Localised areas of ground disturbance were inferred along the northern alluvial corridor of the Cooks River on the basis of observed underground services (e.g. high pressure oil and gas pipeline). Surface evidence of a sewer alignment running along the southern bank of the Cooks River suggests a narrow corridor of disturbance in that portion of the study area. Where such underground services are present, the likely result has been the disturbance of potential archaeological deposits in those areas. Areas of archaeological sensitivity are indicated in **Figure 7-1**.



7.2 Reassessment of archaeological predictions

In **Section 5.7**, a series of predictions were made regarding the Aboriginal archaeological record of the study area. Although hampered by the paucity of identified Aboriginal sites within the study area, the validity of these predictions is assessed (where possible) against the results detailed in **Table 7-1**.

Table 7-1 Evaluation of archaeological predictions

Prediction	Evaluation
Residential and industrial/commercial development, roads and urban infrastructure have likely impacted the integrity of Aboriginal sites within the study area.	The paucity of identified Aboriginal sites within the study area and surrounds is an indication of the gross disturbance development has had on the landscape. Where they are present, Aboriginal sites are likely contained within isolated pockets of intact bushland or greenspace adjacent to waterways.
Observed flaked stone artefact densities will be consistent with “background scatter”, being “artefactual material which is insufficient in number or in association with other material to suggest focussed activity in a particular location” (Douglas and McDonald, 1993).	The absence of flaked stone objects from the survey program does not contribute to supporting this prediction.
Flaked stone artefact assemblages will be dominated by flake and non-flake debitage items (sensu Andrefsky, 2005), with formed objects (i.e. cores and retouched implements) comparatively poorly represented.	The absence of inspected flaked stone objects from the survey program does not contribute to supporting this prediction.
Tool types of demonstrated chronological significance will be restricted to backed artefacts and/or edge-ground hatchet heads.	No tools were identified.

8.0 Cultural heritage values and statement of significance

8.1 Principles of assessment

Heritage sites hold value for different communities in a variety of different ways. All sites are not equally significant in context and thus not equally worthy of conservation and management (Pearson and Sullivan, 1995: 17). One of the primary responsibilities of heritage practitioners, therefore, is to determine which sites are worthy of preservation and management (and why) and, conversely, which are not (and why) (Smith and Burke, 2007: 227). This process is known as *the assessment of cultural significance* and, as highlighted by Pearson and Sullivan (1995: 127), incorporates two interrelated and interdependent components. The first involves identifying, through documentary, physical or oral evidence, the elements that make a heritage site significant, as well as the type(s) of significance it manifests. The second involves determining the degree of value that the site holds for society (i.e. its cultural significance) (Pearson and Sullivan, 1995: 126).

In Australia, the primary guide to the assessment of cultural significance is the *Australian ICOMOS Charter for Places of Cultural Significance* (1999), informally known as *The Burra Charter*, which defines cultural significance as the “aesthetic, historic, scientific, social or spiritual value for past, present or future generations” of a site or place (refer to **Table 8-1**). Under the Burra Charter model, the cultural significance of a heritage site or place is assessed in terms of its aesthetic, historic, scientific and social values, none of which are mutually exclusive. Establishing cultural significance under the Burra Charter model involves assessing all information relevant to an understanding of the site and its fabric (i.e. its *physical* make-up) (ICOMOS, 1999: 12). The assessment of cultural significance and the preparation of a statement of cultural significance are critical prerequisites to making decisions about the management of any heritage site or place (ICOMOS, 1999: 11).

With respect to Aboriginal sites and places, it is possible to identify two major streams in the overall significance assessment process: the assessment of *scientific value(s)* by archaeologists and the assessment of *social (or cultural) value(s)* by Aboriginal people.

Table 8-1 Values relevant to determining cultural significance, as defined by The Burra Charter (1999)

Value	Definition
Aesthetic	“Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria may include consideration of the form, scale, colour, texture and material of the fabric; the smells and sounds associated with the place and its use” (ICOMOS, 1999: 12).
Historic	“Historic value encompasses the history of aesthetics, science and society...[a] place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase or activity. It may have historic value as the site of an important event” (ICOMOS, 1999: 12).
Scientific	“The scientific or research value of a place will depend on the importance of the data involved, on its rarity, quality or representativeness, and on the degree to which the place may contribute further substantial information” (ICOMOS, 1999: 12).
Social	“Social value embraces the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a majority or minority group” (ICOMOS, 1999: 12).

8.2 Scientific value

The scientific values of a place has direct association to any Aboriginal sites that have been identified within its bounds. As no existing Aboriginal sites were reported in the AHIMS search (**Section 5.4.1**), nor were any new or existing Aboriginal sites identified within the project area during the archaeological survey (**Section 7.1**), a robust analysis of scientific significance is not possible. The review of existing Aboriginal sites within the study area (presented in **Section 5.4**) however, indicates a range of site types that would contribute to the scientific study of Aboriginal occupation of the study area. In addition, the identification of an area of Aboriginal archaeological sensitivity within the project

area (refer to **Section 7.1.3**) has the potential to yield information about the past Aboriginal occupation of the project area.

8.3 Social value

Social or cultural value refers to the spiritual, traditional, historic and contemporary associations and attachments a place or area has for Aboriginal people and can only be identified through consultation with Aboriginal people (OEH, 2011: 8). To date, verbal information received from RAPs involved in this assessment have identified the following social or cultural values for the study area:

Prior to European occupation, creeks and rivers would have been an important resource feature for Aboriginal people occupying the study area. As such, they are considered to be highly valuable cultural elements (pers.comm. Kevin Telford T- Metropolitan LALC, 2019).

8.4 Historic value

Historic value refers to the associations that a place has with a historically important person, event, phase or activity in an Aboriginal community (OEH, 2011: 9). Historic values can but will not necessarily be represented by physical evidence.

The study area is assessed as overall having a low historical significance due to the heavily modified nature of the landscape. Notwithstanding, it is noted that Aboriginal peoples have continuously occupied the Sydney regions which, conceptually, would retain historical significance to Aboriginal peoples living in the Sydney region today. Watkin Tench's observations in 1788 attest to the occupation of Cooks River by Aboriginal peoples, noting in his diary '*...on the northwest arm of Botany Bay [the Cooks River] stands a village, which contains more than a dozen houses, and perhaps five times that number of people*'.

8.5 Aesthetic value

Aesthetic value refers to the sensory, scenic, architectural and creative aspects of a place and is manifested through a range of physical and non-physical attributes (OEH, 2011: 9). The study area is assessed as having low aesthetic significance on the basis of its highly urbanised character.

8.6 Statement of significance

This assessment finds that the Aboriginal heritage values of the project area rest principally with its association with the Cooks River and associated landforms, which had a demonstrated cultural significance in terms of past-Aboriginal occupation of the Sydney area. Alongside local and regional Aboriginal archaeological datasets, verbal advice from the RAPs involved in this assessment indicate that the Cooks River and its tributaries functioned as a major resource gathering zones for Aboriginal peoples occupying the area.

Culturally, both the project area and study area have significance for the association with both past Aboriginal peoples and those Aboriginal peoples occupying the study area and project area today.

9.0 Assessment of potential impacts

The project area comprises the overall potential area of direct disturbance by the project. This includes the location of operational infrastructure and construction work sites for:

- the transmission cable route (including the entire road reserve of roads traversed);
- special crossings of infrastructure or watercourses;
- substation sites requiring upgrades (noting that all works would be contained within the existing site boundaries); and
- construction laydown areas.

The majority of the ground disturbance works would be located within the road reserves, with some sections outside of the road reserve and located in public open space or on private property. It is anticipated that all previously discussed works would take place only in areas that have been subject to major ground disturbance within the project area (including works within all three substations) and confirmed by the archaeological survey component of this assessment.

The aforementioned notwithstanding, lands within the Mildura Reserve (southern bank of the Cooks River in Campsie) portion of the project area (comprising approximately 1.3 hectares between the Cooks River, Brighton Avenue and Lindsay Street) were assessed as having a moderate potential for subsurface Aboriginal archaeological deposits (refer to **Section 7.1.3** and **Figure 7-1**). **Section 2.4** identifies three options for progressing the transmission cable route and special crossings in the vicinity of the Cooks River at Campsie/Croydon Park. Where proposed ground disturbing activities (i.e. Options 2 and 3) propose excavations for trenching and underboring, including launch and receive pits where they are within this mapped area of Aboriginal archaeological sensitivity, there is a risk that subsurface archaeological deposits may be impacted (should they be present).

Remaining lands within the project area were assessed as having low to nil archaeological potential and are therefore unlikely to impact Aboriginal sites.

As part of the construction of the project, construction laydown areas would be required to store materials and equipment and provide space for other ancillary facilities such as temporary site offices. It is anticipated that minimal subsurface ground disturbing activities would occur at all construction laydown areas, including disturbance associated with the erection of noise mitigation such as hoardings or associated with the construction of driveways or placement of soil stockpiles. As indicated in **Table 9-1**, the survey results of the current assessment concluded that all proposed construction laydown areas are not located in areas of Aboriginal archaeological sensitivity, and therefore the potential ground disturbing activities are unlikely to impact Aboriginal sites.

Table 9-1 Constraints assessment and assessed archaeological sensitivity of construction laydown areas

Construction laydown area	Cause of historical disturbance	Archaeological sensitivity	Constraints
12 Muir Road, Chullora	Land clearance, industrial development	Low	None
Cooke Park, Belfield	Land clearance, earthworks	Low	None
Peace Park, Ashbury	Land clearance, earthworks	Low	None
Camdenville Park, St Peters	Land clearance, major excavations and earthworks	Low	None
Beaconsfield West substation, Alexandria	Land clearance, earthworks, stockpiling	Low	None

It is not anticipated that any operational activities would result in ongoing or additional impacts to Aboriginal heritage.

10.0 Environmental management and mitigation measures

10.1 Management objectives

The following section outlines the main objectives of the management approach relating to Aboriginal heritage for the project. This includes avoidance and protection measures for a known site, as well as preventative measures through site inductions and procedures to be followed should unexpected finds be identified during works.

10.2 Environmental management and mitigation measures

The management of Aboriginal cultural heritage is determined in accordance with the cultural significance of Aboriginal sites, places or resources. This assessment identified an area of Aboriginal archaeological sensitivity within the project area, i.e. the southern parkland areas of the Cooks River, between Brighton Avenue and Lindsay Street.

The management measures recommended below are based on the following:

- the results of the archaeological survey described in **Section 7.0**;
- the results of previous archaeological investigations within and surrounding the study area;
- the impact assessment detailed in **Section 9.0**;
- consultation with RAPs; and
- TransGrid's legal responsibilities under Part 6 of the NPW Act.

Management and mitigation measures relating to Aboriginal heritage are presented in **Table 10-1**.

Table 10-1 Aboriginal cultural heritage management and mitigation measures

No.	Impact/issue	Environmental management and mitigation measures	Timing
AH1	Impacts to areas of Aboriginal archaeological sensitivity and/or impacts to Aboriginal sites	If impacts to the area of potential Aboriginal archaeological sensitivity at Mildura Reserve, Campsie cannot be avoided (refer to Figure 7-1), a program of archaeological test excavation will be required to determine the presence or absence of subsurface Aboriginal objects. The methodology for investigating and managing areas of Aboriginal archaeological sensitivity and known Aboriginal sites/objects will be detailed in an Aboriginal Cultural Heritage Management Plan (ACHMP) for the project. The ACHMP will be prepared in consultation with Registered Aboriginal Parties (RAPs) and the Department of Planning, Industry and Environment (DPIE) prior to any archaeological test excavation proceeding. Subject to ACHMP approval by DPIE, this document will guide the management of Aboriginal cultural heritage within the project area throughout the life of the project.	Detailed design, construction, operation
AH2	Site inductions	Prior to the commencement of works, all construction personnel will undergo an Aboriginal heritage induction which identifies the general nature of Aboriginal sites and objects, the location of areas of archaeological sensitivity, requirements of the ACHMP (if relevant), procedure for unexpected finds, personnel responsibilities, and safeguards to be implemented to protect and avoid impacts to Aboriginal sites, if discovered.	Construction

No.	Impact/issue	Environmental management and mitigation measures	Timing
AH3	Unexpected Aboriginal objects or human remains	<p>If unexpected Aboriginal objects or human remains are uncovered in the project area during construction, TransGrid's Unexpected Finds Protocol will be initiated. This includes¹²:</p> <ol style="list-style-type: none"> 1. All ground surface disturbance in the area of the finds will cease immediately when the finds are uncovered, and relevant personnel will be notified. 2. If the find is suspected to be human skeletal material, the NSW Police will be contacted immediately. 3. If there is substantial doubt regarding an Aboriginal origin for the finds, then a qualified opinion from an archaeologist will be sought as soon as possible. 4. If a qualified opinion cannot be gained or the identification is positive, immediately notify the following authorities or personnel of the discovery: <ol style="list-style-type: none"> a) DPC (Environment Line:131 555); and b) Relevant Aboriginal Community Representatives. 5. Facilitate, in co-operation with the appropriate authorities and relevant Aboriginal community representatives: <ol style="list-style-type: none"> a) the recording and assessment of the finds; b) fulfilling any legal constraints arising from the find(s). This will include complying with DPC directions; c) the development and conduct of appropriate management strategies. Strategies will depend on consultation with stakeholders and the assessment of the significance of the find(s); and d) Where the find(s) are determined to be Aboriginal Objects, any re-commencement of construction related ground surface disturbance will only resume in the area of the find(s) following the preparation of an ACHMP for the project, if one does not already exist. 	Construction

¹² As per Appendix E - Unexpected Finds Protocol, TransGrid Aboriginal Heritage Due Diligence Assessment (Document ref: D2018/05672)

11.0 Conclusion

Based on background research, register searches, Aboriginal community consultation and archaeological survey, it has been concluded that no known Aboriginal sites will be subject to direct or indirect impacts as a result of the project. Notwithstanding, an area of Aboriginal archaeological sensitivity was identified within the project area which may be subject to impact from trenching and underboring activities. Following the assessment of the three options for the transmission cable route and special crossings in the vicinity of the Cooks River at Campsie/Croydon Park presented in **Section 2.4**, the project may proceed subject to the following recommendations for the specific options:

- Option 1: Excavation within area of archaeological sensitivity can be avoided - TransGrid may proceed without further archaeological investigation; or
- Options 2 or 3: Excavation within area of archaeological sensitivity cannot be avoided - TransGrid would be required to prepare an ACHMP for the project which would, in the first instance, provide protocols for managing Aboriginal heritage values within the vicinity of the Cooks River and more broadly, the project area.

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Annexure A

Consultation log

Date	To/From AECOM	Organisation/Contact Person	Method of contact	AECOM representative	Summary
7-May-19	From AECOM	Various agencies	Email	L.Atkinson	In accordance with Section 4.1.2 of the Consultation Requirements, email sent to various agencies requesting names of Aboriginal people and/or organisations that may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places within the study area
17-May-19	To AECOM	Yurrandaali Cultural Services	Email	L.Atkinson	Provision of EOI and Insurances
17-May-19	To AECOM	Yulay Cultural Services	Email	L.Atkinson	Provision of EOI and Insurances
17-May-19	To AECOM	Barraby Cultural Services	Email	L.Atkinson	Provision of EOI and Insurances
18-May-19	From AECOM	A1 Indigenous Services	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Amanda Hickey Cultural Services	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	B.H. Heritage Consultants	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Barking Owl Aboriginal Corporation	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Barraby Cultural Services	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Biamanga	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Bilinga	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Bilinga Cultural Heritage Technical Services	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Butucarbin Aboriginal Corporation	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Callendulla	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Corroboree Aboriginal Corporation	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Darug Boorooberongal Elders Aboriginal Corporation	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Darug Custodian Aboriginal Corporation	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Darug Land Observations	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Dharugv	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Dhinawan-Dhigaraa Culture & Heritage Pty Ltd	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Didge Ngunawal Clan	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	DJMD Consultancy	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Duncan Falk Consultancy	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Gandangara Local Aboriginal Land Council	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Garrara Aboriginal Corporation	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Ginninderra Aboriginal Corporation	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Goodradigbee Cultural & Heritage Aboriginal Corporation	Email	L.Atkinson	Invitation to Register Interest letter sent

Date	To/From AECOM	Organisation/Contact Person	Method of contact	AECOM representative	Summary
18-May-19	From AECOM	Goohah Developments	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Gulaga	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Gunjeewong Cultural Heritage Aboriginal Corporation	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Guntawang Aboriginal Resources Incorporated	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Gunyu	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Gunyu Cultural Heritage Technical Services	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Jerringong	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Kawul Cultural Services	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Metropolitan Local Aboriginal Land Council	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Munyunga	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Munyunga Cultural Heritage Technical Services	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Mura Indigenous Corporation	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Murra Bidgee Mullangari Aboriginal Corporation	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Murrarnarang	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Murrumbul	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Murrumbul Cultural Heritage Technical Services	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Nerrigundah	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Ngambaa Cultural Connections	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Nundagurri	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Pemulwuy CHTS	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Phil Kahn	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Rane Consulting	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Thauaira	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Thoorga Nura	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Tocomwall	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Wailwan Aboriginal Group	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Walbunja	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Walgau	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Warragil Cultural Services	Email	L.Atkinson	Invitation to Register Interest letter sent

Date	To/From AECOM	Organisation/Contact Person	Method of contact	AECOM representative	Summary
18-May-19	From AECOM	Widescope Indigenous Group	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Wingikara	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Wingikara Cultural Heritage Technical Services	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Wurrumay Consultancy	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Yerramurra	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Yulay Cultural Services	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	From AECOM	Yurrandaali Cultural Services	Email	L.Atkinson	Invitation to Register Interest letter sent
18-May-19	To AECOM	Corroboree Aboriginal Corporation	Email	L.Atkinson	Registration of interest in being consulted on project
18-May-19	To AECOM	Didge Ngunawal Clan	Email	L.Atkinson	Registration of interest in being consulted on project
19-May-19	To AECOM	A1 Indigenous Services	Email	L.Atkinson	Registration of interest in being consulted on project
19-May-19	To AECOM	Barking Owl Aboriginal Corporation	Email	L.Atkinson	Registration of interest in being consulted on project
20-May-19	To AECOM	Wendy Morgan	Email	L.Atkinson	Registration of interest in being consulted on project
20-May-19	To AECOM	Kamilaroi Yankuntjatjara Working Group	Email	L.Atkinson	Registration of interest in being consulted on project
20-May-19	To AECOM	Murra Bidgee Mullangari Aboriginal Corporation	Email	L.Atkinson	Registration of interest in being consulted on project
20-May-19	To AECOM	Muragadi	Email	L.Atkinson	Registration of interest in being consulted on project
20-May-19	To AECOM	Didge Ngunawal Clan	Email	L.Atkinson	Registration of interest in being consulted on project
21-May-19	To AECOM	Yerramurra	Email	L.Atkinson	Request for map of project area
23-May-19	To AECOM	Barraby Cultural Services	Email	L.Atkinson	Registration of interest in being consulted on project
23-May-19	To AECOM	Yulay Cultural Services	Email	L.Atkinson	Registration of interest in being consulted on project
21-May-19	From AECOM	Yerramurra	Email	L.Atkinson	Reponse directing to map of the proposed alignment on the website
24-May-19	To AECOM	Tocomwall	Email	L.Atkinson	Reponse to invitation and confirmation of interest in being consulted. Noted that the project is State Significant which falls under the APIC policy
24-May-19	From AECOM	Tocomwall	Email	L.Atkinson	response to Danny Franks noting that AECOM is the consultant, not the proponent and that matters relating to the APIC policy would need to be taken up with TransGrid directly
24-May-19	To AECOM	Widescope Indigenous Group	Email	L.Atkinson	Registration of interest in being consulted on project
3-Jun-19	To AECOM	Butucarbin Aboriginal Corporation	Email	L.Atkinson	Registration of interest in being consulted on project
16-Jun-19	From AECOM	A1 Indigenous Services	Email	L.Atkinson	Methodology sent to RAPs
16-Jun-19	From AECOM	Barking Owl Aboriginal Corporation	Email	L.Atkinson	Methodology sent to RAPs

Date	To/From AECOM	Organisation/Contact Person	Method of contact	AECOM representative	Summary
16-Jun-19	From AECOM	Barraby Cultural Services	Email	L.Atkinson	Methodology sent to RAPs
16-Jun-19	From AECOM	Butucarbin Cultural Heritage Assessments	Email	L.Atkinson	Methodology sent to RAPs
16-Jun-19	From AECOM	Corroboree Aboriginal Corporation	Email	L.Atkinson	Methodology sent to RAPs
16-Jun-19	From AECOM	Darug Aboriginal Landcare	Email	L.Atkinson	Methodology sent to RAPs
16-Jun-19	From AECOM	Didge Ngunawal Clan	Email	L.Atkinson	Methodology sent to RAPs
16-Jun-19	From AECOM	Kamilaroi Yankuntjatjara Working group's	Email	L.Atkinson	Methodology sent to RAPs
16-Jun-19	From AECOM	Murra Bidgee Mullangari	Email	L.Atkinson	Methodology sent to RAPs
16-Jun-19	From AECOM	Tocomwall Pty Ltd	Email	L.Atkinson	Methodology sent to RAPs
16-Jun-19	From AECOM	Widescope Indigenous Group	Email	L.Atkinson	Methodology sent to RAPs
16-Jun-19	From AECOM	Yerramurra	Email	L.Atkinson	Methodology sent to RAPs
16-Jun-19	From AECOM	Yulay Cultural Services	Email	L.Atkinson	Methodology sent to RAPs
16-Jun-19	From AECOM	Yurrandaali Cultural Services	Email	L.Atkinson	Methodology sent to RAPs
16-Jun-19	From AECOM	Wendy Morgan	Email	L.Atkinson	Methodology sent to RAPs
16-Jun-19	To AECOM	Barraby Cultural Services	Email	L.Atkinson	Acknowledgement of receipt of methodology
17-Jun-19	To AECOM	A1 Indigenous Services	Email	L.Atkinson	Support of AECOM's methodology
17-Jun-19	To AECOM	Muragadi	Email	L.Atkinson	Support of AECOM's methodology
17-Jun-19	To AECOM	Murra Bidgee Mullangari Aboriginal Corporation	Email	L.Atkinson	Support of AECOM's methodology
19-Jun-19	To AECOM	Darug Aboriginal Landcare	Email	L.Atkinson	Response from Des Dyer requesting late registration for project
20-Jun-19	From AECOM	Kamilaroi Yankuntjatjara Working group's	Email	L.Atkinson	Request for hard copy of methodology
21-Jun-19	From AECOM	Kamilaroi Yankuntjatjara Working group's	Email	L.Atkinson	Response to request for hard copy of methodology
21-Jun-19	From AECOM	Kamilaroi Yankuntjatjara Working group's	Mail	L.Atkinson	Hard copy of methodology sent
21-Jun-19	To AECOM	Barraby Cultural Services	Email	L.Atkinson	Support of AECOM's methodology
23-Jun-19	To AECOM	Yulay Cultural Services	Email	L.Atkinson	Support of AECOM's methodology

Annexure B

Agency and council responses

Atkinson, Luke

From: Tony Smith <tsmith@cityofsydney.nsw.gov.au>
Sent: Wednesday, 12 June 2019 5:49 PM
To: Atkinson, Luke
Subject: RE: Aboriginal stakeholder consultation – Powering Sydney's Future - Potts Hill to Alexandria transmission cable project

Dear Luke,

Re: Request for Information on Aboriginal Stakeholders for Powering Sydney's Future – Potts Hill to Alexandria.

I write in response to your enquiry dated 7 May 2019.

The City of Sydney defers to the [Metropolitan Local Aboriginal Land Council](#) as the cultural stakeholder for these matters.

Contact details:

Street Address:
36-38 George Street,
Redfern NSW 2016

Postal Address:
PO Box 1103,
Strawberry Hills
NSW 2012

Business Hours:
Mon - Fri / 9am to 5pm
Phone: (02) 8394 9666
Fax: (02) 8394 9733
Email: bookings@metrolalc.org.au
Web: <http://www.metrolalc.org.au>

I hope that this information is useful. If you want to speak to a City of Sydney heritage specialist on this matter, please contact John Poulton on 9246 7725.

Yours sincerely,

Tony Smith
Urban Design & Heritage Mgr
Planning Assessments



Telephone: +612 9265 9461
cityofsydney.nsw.gov.au

Atkinson, Luke

From: Inner West Council <inner.west.council@innerwest.nsw.gov.au>
Sent: Tuesday, 7 May 2019 11:00 AM
To: Atkinson, Luke
Subject: RE: Aboriginal stakeholder consultation – Powering Sydney's Future - Potts Hill to Alexandria transmission cable project

Thank you for contacting Inner West Council.

Your email has been received and will be referred to the appropriate Service Unit for action.

Meanwhile please visit www.innerwest.nsw.gov.au for further information regarding Council activities.

Thank you

Inner West Council |
Inner West Council
P: | **E:** inner.west.council@innerwest.nsw.gov.au

Ashfield Service Centre: 260 Liverpool Road, Ashfield NSW 2131
Leichhardt Service Centre: 7-15 Wetherill Street, Leichhardt NSW 2040
Petersham Service Centre: 2-14 Fisher Street, Petersham NSW 2049
PO Box 14, Petersham NSW 2049



Council acknowledges the Traditional Custodians of these lands, the Gadigal-Wangal people of the Eora Nation.

Atkinson, Luke

From: Barry Gunther <Barry.Gunther@environment.nsw.gov.au>
Sent: Thursday, 9 May 2019 11:23 AM
To: Atkinson, Luke
Subject: OEH Aboriginal Stakeholder list -
Attachments: 20190509110935557.pdf

Hi Luke,

Thank you for your letter dated 18th May 2019 requesting the OEH Aboriginal Stakeholder list for consultation.

Please find attached the OEH Aboriginal Stakeholder list for the proposed development to the Powering Sydney's Future, Potts Hill to Alexandria NSW.

If you have any questions please contact me on the details below.

Regards

Barry Gunther
Aboriginal Heritage Planning Officer
www.environment.nsw.gov.au



Office of
Environment
& Heritage

Greater Sydney Branch
Communities and Greater
Sydney Division

10 Valentine Avenue, Parramatta 2150
PO Box 644, Parramatta 2124
T 02 88376394

The Greater Sydney ACH Team has a group email address: gs_ach@environment.nsw.gov.au. Please address all further email correspondence in relation to Aboriginal cultural heritage regulation matters in the Greater Sydney region to this address. If appropriate, emails can be marked to the attention of your usual contact in the Team.

Atkinson, Luke

From: Margaret Bottrell <margaret.bottrell@lls.nsw.gov.au>
Sent: Thursday, 9 May 2019 12:47 PM
To: Atkinson, Luke
Subject: Aboriginal stakeholder consultation – Powering Sydney's Future - Potts Hill to Alexandria transmission cable project

To Luke Atkinson,

RE: Aboriginal stakeholder consultation – Powering Sydney's Future - Potts Hill to Alexandria transmission cable project

Thank you for your email dated 7 May 2019, requesting assistance with identifying Aboriginal stakeholder groups or persons who may have an interest in your project area.

Greater Sydney Local Land Services (GS LLS) acknowledges that Local Land Services have been listed in *Section 4.1.2 (g) of the Aboriginal cultural heritage consultation requirements for proponents 2010*, under *Part 6, National Parks and Wildlife Act 1974* as a source of information to obtain the “names of Aboriginal people who may hold cultural knowledge relevant to determining the significance of *Aboriginal objects and/or places*”.

GS LLS is a partner with many Aboriginal communities in the region on many natural resource management (NRM) projects. However, GS LLS is not the primary source for contacting or managing contact lists for Aboriginal communities or persons that may inform or provide comment on planning issues. GS LLS considers cultural heritage issues that relate to land-use planning in general and only considers culture and heritage issues in the context of NRM.

We strongly recommend that you make contact with the Office of Environment and Heritage (OEH), Cultural Heritage Division, for all-inclusive contact lists of persons and organisations that may assist with your investigation.

Note: Hawkesbury Nepean Catchment Management Authority (HNCMA) no longer exists. All work previously carried out by HNCMA is now delivered by Greater Sydney Local Land Services (GS LLS).

Regards,

--

Margaret Bottrell Senior Strategic Land Services Officer
(Aboriginal Communities)
Greater Sydney Local Land Service
Level 4, 2-6 Station Street Penrith
PO Box 4515 Penrith Westfields NSW 2750
T: 02 47242111
E: margaret.bottrell@lls.nsw.gov.au
W: <http://www.lls.nsw.gov.au>



27 May 2019

By email: Luke.Atkinson@aecom.com

Luke Atkinson
Senior Heritage Specialist
AECOM Australia Pty Ltd
PO Box Q410
QVB POST OFFICE NSW 1230

Dear Mr Atkinson,

Request - Search for Registered Aboriginal Owners

We refer to your letter dated 7 May 2019 regarding an Aboriginal Cultural Heritage Assessment for the proposed transmission project from Potts Hill NSW to Alexandria NSW.

Under Section 170 of the *Aboriginal Land Rights Act 1983* the Office of the Registrar is required to maintain the Register of Aboriginal Owners (RAO). A search of the RAO has shown that there are not currently any Registered Aboriginal Owners in the project area.

We suggest you contact Gandangara Local Aboriginal Land Council on 02 9602 5280 and Metropolitan Local Aboriginal Land Council on 02 8394 9666 as they may be able to assist you in identifying Aboriginal stakeholders who wish to participate.

Yours sincerely

Elizabeth Loane
Project Officer, Aboriginal Owners
Office of the Registrar, ALRA

Annexure C

Expression of interest
letter



AECOM Australia Pty Ltd
Level 21, 420 George Street
Sydney NSW 2000
PO Box Q410
QVB Post Office, NSW 1230

T: +61 2 8934 0000
F: +61 2 8934 0001
aecom.com

ABN 20 093 846 925

18 May 2019

Hello XXX

I am writing to inform you that AECOM Australia Pty Ltd (AECOM) has been commissioned by TransGrid to undertake an Aboriginal Cultural Heritage for the proposed Powering Sydney's Future - Rookwood Road to Beaconsfield West Transmission Cable Project. Further information on the project can be obtained by visiting www.transgrid.com.au/psf or calling 1800 222 537.

This assessment will form part of an Environmental Impact Statement (EIS) being prepared to support a State Significant Infrastructure approval for Development Consent under Part 5, Division 5.2 of the Environmental Planning and Assessment Act 1979 (EP&A Act) for the project. It is anticipated that the project will require a combination of excavation and underboring works between Rookwood Road, Potts Hill and Beaconsfield West, Alexandria, NSW. In 2018, you may have received an expression of interest from AECOM regarding an earlier iteration of the project. In 2019, TransGrid revised the proposed cable route and engaged AECOM to prepare a revised EIS for the project.

You have been identified as someone who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places in the surrounds of the Proposed Activity area. In accordance with OEH's Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW 2010), AECOM invites you to register your interest in being involved in the assessment process. Should you wish to register your interest, it would be greatly appreciated if you could please provide written and/or verbal confirmation by 3 June 2019. We would also like to take this opportunity to request from you any initial comments regarding the cultural values of the Proposed Activity area.

Please note that in accordance with Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW 2010) AECOM is required to provide a record of all registered Aboriginal parties to OEH and to the Local Aboriginal Land Council. Should you not wish your details to be released to either OEH or the Metropolitan and Gandangara Local Aboriginal Land Councils, please notify us of this as part of your registration of interest in this project.

Kind Regards,

Luke Atkinson
Senior Heritage Specialist
AECOM Australia Pty Ltd

Annexure D

Newspaper
advertisement

Annexure D Newspaper Advertisement

**Aboriginal Stakeholder Consultation –
Expressions of Interest
Powering Sydney's Future
Potts Hill to Alexandria
transmission cable project**

AECOM (on behalf of TransGrid) is seeking to identify Aboriginal persons or organisations who wish to be consulted in relation to the proposed Powering Sydney's Future - Potts Hill to Alexandria transmission cable project. An Aboriginal Cultural Heritage Assessment will be undertaken for an underground cable route which is proposed between Potts Hill and Alexandria.


This assessment will form part of an Environmental Impact Statement (EIS) being prepared to support a State Significant Infrastructure approval under Part 5, Division 5.2 of the Environmental Planning and Assessment Act 1979 (EP&A Act) for the project. Further information on the project can be obtained by visiting www.transgrid.com.au/psf or calling 1800 222 537.

Interested Aboriginal persons and/or organisations are invited to register their interest in writing to:

Luke Atkinson
c/- AECOM Australia Pty Ltd
PO Box Q410, QVB Post Office,
Sydney, NSW 1230
Ph: +61 2 8934 0047
Fax: +61 2 8934 0001
Email: luke.atkinson@aecom.com

Expressions of interest should include current contact details.
The closing date for registration is the 28th May 2019.

Email: psf@transgrid.com.au
Phone: 1800 222 537
www.transgrid.com.au/psf



Annexure E

Draft assessment
methodology

AECOM Imagine it.
Delivered.

Powering Sydney's Future
TransGrid

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Potts Hill to Alexandria transmission cable project

Aboriginal Cultural Heritage Assessment - Assessment

AECOM

Powering Sydney's Future
Potts Hill to Alexandria transmission cable project**DRAFT**

Potts Hill to Alexandria transmission cable project

Aboriginal Cultural Heritage Assessment - Assessment Methodology

Client: TransGrid

Co No.: 609169959

Prepared by

AECOM Australia Pty Ltd
Level 21, 420 George Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
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01-Oct-2019

Job No.: 60558835

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OH&AS18001.

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Prepared for – TransGrid – Co No.: 609169959

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Powering Sydney's Future
Potts Hill to Alexandria transmission cable project**DRAFT****Quality Information**

Document Potts Hill to Alexandria transmission cable project

Ref 60558835

Date 01-Oct-2019

Prepared by Luke Atkinson

Reviewed by Dr Andrew McLaren

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A		Tech Review	Dr Andrew McLaren	
B		Draft for Issue	Luke Atkinson	

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Powering Sydney's Future
Potts Hill to Alexandria transmission cable project**DRAFT****Table of Contents**

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Powering Sydney's Future
Potts Hill to Alexandria transmission cable project

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1.0 Introduction

1.1 Background

AECOM Australia Pty Ltd (AECOM) has been engaged by TransGrid to undertake an Aboriginal Cultural Heritage assessment for the proposed Powering Sydney's Future – Potts Hill to Alexandria transmission cable project (hereafter the 'Proposed Activity'). Further information can be obtained by visiting www.transgrid.com.au/psf or calling 1800 222 537.

This assessment will form part of an Environmental Impact Statement (EIS) being prepared in accordance with the requirements of Division 5.2 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) for the Proposed Activity. It is anticipated that the Proposed Activity will require a combination of excavation and underboring works to place cable along the proposed route.

This draft assessment methodology details AECOM's proposed approach to the Aboriginal Cultural Heritage Assessment and is being provided to all Registered Aboriginal Parties (RAPs) in accordance with Sections 4.3.1 and 4.3.2 of the NSW Office of Environment and Heritage's Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010a). A brief review of existing environmental and archaeological data for the Study area is also provided to give context to AECOM's proposed assessment methodology.

1.2 Assessment Objectives

The overarching objectives of the Aboriginal Cultural Heritage Assessment are as follows:

- to identify the Aboriginal cultural heritage values of the Study area by way of background research, targeted archaeological survey and consultation with RAPs;
- to assess the potential impact of the Proposed Activity on the identified Aboriginal cultural heritage values of the Study area;
- to provide an appropriate management strategy to avoid or minimise potential harm to Aboriginal cultural values identified within the Study area; and
- to compile an Aboriginal Cultural Heritage Assessment Report (ACHAR) to support TransGrid's application for approval under Division 5.2 of the EP&A Act.

1.3 The Proposed Activity

Inner Sydney is one of the most critical parts of the NSW electricity network. However, parts of the transmission and distribution networks which supply electricity to the inner Sydney area were built in the 1960s and 1970s. Some of these assets are ageing and approaching the end of their serviceable lives. To address this concern, TransGrid and Ausgrid initiated the Powering Sydney's Future program to work together to secure an ongoing reliable electricity supply to the inner Sydney area. The program would deliver solutions that are economically viable, minimise community and environmental impacts, and consider engineering and program constraints.

The key drivers for the Powering Sydney's Future program are:

- The deteriorating condition of ageing fluid-filled underground cables in the existing network, resulting in the derating¹ of the 330 kV Cable 41 operated by TransGrid, and the derating of a number of existing 132 kV cables operated by Ausgrid;
- Impending retirement of three 132 kV fluid-filled underground cables in inner Sydney;
- The age related deteriorating condition of a further eight 132 kV fluid-filled Ausgrid underground cables in inner Sydney; and
- Forecast increases in consumer demand due to renewed economic activity within inner Sydney.

As part of the Powering Sydney's Future program, TransGrid identified this project as a solution to address these issues in the electricity supply network.

¹ Derating refers to operating the cables at less than their optimum capacity

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1.4 Environmental Context

The study area for this assessment, as shown on Figure 1.

Topographically, the study area falls within Bannerman & Hazelton's (2011) Cumberland Lowlands physiographic region, broadly characterised by low lying, gently undulating plains and low hills formed on Wianamatta Group shales and sandstones. Areas of steeply dissected terrain occur within sandstone-dominated alluvial valleys and are characterised by sandstone cliff lines descending to creek and river flats. Elevations within the study area range from four to 50 metres Australian Height Datum (AHD) providing a total local relief of up to 46 metres. Elevations are highest in the eastern most portion of the project area and lowest within the Georges and Cooks River alluvial zones. Slopes are predominantly very gently to gently inclined (1-10°) with isolated moderately inclined slopes trending towards alluvial valleys.

Four major watercourses traverse the study area (Cooks River, Sheas Creek (now Alexandria Canal), Georges River and Coxs Creek) which comprise freshwater in their upper reaches and in the case of the Cooks River and Sheas Creek, tidal estuaries in the lower reaches. Prior to European occupation, these waterways likely comprised focal resource features for Aboriginal peoples occupying within or passing through the study area. While portions of the Cooks River have been significantly modified in the 19th and 20th centuries, analysis of historical aerial photography suggests that the southern bank near Mildura Reserve which lies within the project area is largely intact. Where modification works have occurred (e.g. reclamation works, earthworks and filling activities), it is likely that these activities would have resulted in the potential disturbance and destruction of evidence of past-Aboriginal use and occupation of the Cooks River area. The Georges River near its interface with the Sydney South substation is largely intact, exhibiting a wide riparian corridor.

Reference to the 1:100,000 Geological Map Sheet for Sydney (9130) indicates that the surface geology of the study area is dominated by the Triassic-aged Wianamatta Group with areas of Quaternary-aged alluvium mapped within the floodplains of the Cooks River and Georges River. Comprising three formations, the Ashfield Shale, Minchinbury Sandstone and Bringelly Shale, the Wianamatta Group lies conformably over the Mittagong Formation and the Hawkesbury Sandstone. The Ashfield Shale is described as a black to dark grey siltstone and laminite. The Bringelly Shale comprises shale (claystone and siltstone), carbonaceous claystone, laminite and fine to medium-grained lithic sandstone. Quaternary valley fill (alluvium) comprising a superficial cover of unconsolidated sediments deposited over the Wianamatta Group shales, forms the contemporary floodplains of several of the Cumberland Plain's major drainage systems, including the Cooks River, Georges River and their tributaries.

Tertiary alluvial units known to contain rocks suitable for flaked and/or ground stone artefact manufacture (e.g. the Rickabys Creek Gravel and St Marys formations) are not mapped within or surrounding the study area. Igneous intrusions, including instances of dykes, are mapped within the study area and may have provided localised sources of raw material used in the manufacture of edge-ground implements or grinding tools (i.e. hatchets, mortars and pestles).

Reference to the Soil Landscapes of the Sydney 1:100 000 Sheet (Chapman & Murphy, 1989) indicates dominant soils within the study area have been mapped as belonging to the Blacktown (bt), Berrong (bg), Hawkesbury (ha) and Lucas Heights (lh) soil landscapes. Areas of Disturbed Terrain (DTxx) are also mapped within the study area, usually associated with heavily industrialised land uses and areas of fill material.

Native vegetation within the study area has been extensively modified as a result of widespread urbanisation. According to Benson (1981), there remains very little of the original native vegetation which once covered the Cumberland Lowlands, including the study area. The Cumberland Basin, or Cumberland Plain as it is more commonly known, is a c.2750 square kilometre physiographic region located to the west of Sydney's Central Business District (CBD) in NSW. Historical clearance notwithstanding, native vegetation mapping for the Cumberland Plain suggests that the study area was likely vegetated with various open woodland communities, with two distinct vegetation communities likely occurring: Alluvial Woodland and Shale Plains Woodland.

Land use across the study area is generally dominated by residential development with dispersed green spaces. Areas of light to heavy industrial and commercial land uses are located within the eastern peripheral portions of the study area and the Sydney South substation environs. Areas of reclaimed land are located around the central and lower reaches of the Cooks River and Sheas Creek (now Alexandria Canal).

Disclaimer: AECOM makes no representations or warranties of any kind, either expressed or implied, about the accuracy, reliability, completeness or suitability, including (without limitation) any warranty of merchantability or fitness for purpose in relation to the data provided on this figure. By using this data you agree that AECOM is under no liability for any loss or damage (including consequential or indirect loss) that you may suffer from use of the data.



STUDY AREA
Powering Sydney's Future
Potts Hill to Alexandria Transmission Cable Project

Note: The project area is confined to the roadway reserve with the exception of parks and existing substations
Source: Department of Finance, Services and Innovation - Spatial Services (2018), Nearmap (2018)

FIGURE 1

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Potts Hill to Alexandria transmission cable project

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The AHIMS database, administered by DPC, contains records of all Aboriginal objects reported to the Chief Executive of DPIE in accordance with section 89A of the NSW National Parks and Wildlife Act 1974 (NPW Act). It also contains information about Aboriginal places, which have been declared by the Minister to have special significance with respect to Aboriginal culture. Previously recorded Aboriginal objects and declared Aboriginal places are known as 'Aboriginal sites'.

Searches of the AHIMS database were undertaken on 2 May 2019 (AHIMS search #418101). A one kilometre buffer was applied to the transmission cable route ('the transmission cable route search area') and an additional one kilometre search area applied to the Sydney South substation ('the Sydney South substation search area'). Collectively, the AHIMS search area reported a total 35 Aboriginal sites within the respective AHIMS search areas. Of these, a single Aboriginal resource and gathering site (45-8-0751, Shea's Creek Dugong) was listed as 'Destroyed'. A duplicate of the aforementioned identified as an open artefact site containing shell material, 'Shea's Creek' (45-8-1496), is listed as 'Not a Site'. Discounting these two sites from the AHIMS search, a total of 33 'Valid' entries remain. A summary of the valid site entries within the AHIMS search is provided in Table 1.

Table 1 AHIMS data for Aboriginal sites near the study area

Site type	Count (n)	% (by count)
Modified Tree (Carved or Scarred)	1	3%
Burial	1	3%
Midden	1	3%
Aboriginal Resource and Gathering	1	3%
Open Artefact Site	5	15%
PAD	6	18%
Rockshelter	18	55%
Total	33	100%

1.6 Proposed Assessment Approach

The approach that AECOM intends to adopt for undertaking the Aboriginal Cultural Heritage Assessment includes the following:

- desktop assessment;
- archaeological survey of the project area involving vehicle survey of the proposed transmission cable route and targeted pedestrian survey of areas of Aboriginal archaeological sensitivity;
- consultation with Registered Aboriginal Parties (RAPs); and
- preparation of an Aboriginal Cultural Heritage Assessment Report (ACHAR).

The proposed methodology for each of these tasks is set out in the following sections.

1.6.1 Desktop assessment

The following tasks will be undertaken for the desktop component of the assessment:

- a search of DPC's Aboriginal Heritage Information Management System (AHIMS) database, review of associated site cards and reports to clarify site contents, extents and statuses;
- a review of the landscape context of the study area, with a particular emphasis on its implications for the nature and distribution of Aboriginal archaeological materials;
- a review of relevant archaeological and ethno-historic information for the study area; and
- generation of a model of past Aboriginal occupation to assist in understanding the Aboriginal archaeological values of the study area.

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Potts Hill to Alexandria transmission cable project

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1.6.2 Archaeological survey

The aims of the archaeological survey were to identify and record any existing surface evidence of past Aboriginal activity within the study area as well as areas with subsurface archaeological potential. This was completed in order to develop strategies for avoiding and/or mitigating potential harm to Aboriginal heritage values. To achieve these aims, targeted archaeological survey of the study area was undertaken by AECOM heritage specialists Luke Atkinson and Julia Atkinson accompanied by the Metropolitan Local Aboriginal Land Council (MLALC) Aboriginal sites officer Mr Kevin Telford on 15 July 2019.

Areas of archaeological potential (for example intact or remnant watercourses, areas of rock exposures, etc.) were targeted for pedestrian survey on the basis of preliminary desktop review, including spatial mapping and a review of aerial photography. Remaining trafficable portions of the transmission cable route were traversed by vehicle to confirm the findings of the desktop assessment and ground-truth the preliminary mapping. Survey of the study area was undertaken on foot and by vehicle, during which notes regarding Ground Surface Visibility (GSV), integrity (land condition) and archaeological sensitivity were taken.

1.6.3 Aboriginal community consultation

Aboriginal community consultation acknowledges the right of Aboriginal people to be involved, through direct participation, on matters that directly affect their heritage. Involving Aboriginal people in all facets of the assessment process ensures that they are given adequate opportunity to share information about cultural values, and to actively participate in the development of appropriate management and/or mitigation measures. The successful identification, assessment and management of Aboriginal cultural heritage values are dependent on an inclusive and transparent consultation process.

Aboriginal community consultation for the assessment was undertaken in accordance with DPC's Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010a) (Consultation Requirements).

1.6.4 Aboriginal Cultural Heritage Assessment Report

An Aboriginal Cultural Heritage Assessment Report will be prepared for submission along with the EIS. The ACHAR will be prepared in accordance with the following statutory guidelines:

- OEH's *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (Office of Environment & Heritage, 2011);
- OEH's *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b); and
- OEH's *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010a).

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Powering Sydney's Future
Potts Hill to Alexandria transmission cable project

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1.7 References Cited

Bannerman, S. M., & Hazelton, P. A. (2011). *Soil Landscapes of the Penrith 1:100 000 Sheet*. Soil Conservation Service of NSW.

Benson, D. (1981). *Explanatory notes for the Vegetation of the Penrith 1:100 000 Map Sheet*. Sydney.

Chapman, G. A., & Murphy, C. L. (1989). *Soil Landscapes of the Sydney 1:100 000 Sheet*. Book, Soil Conservation Service of N.S.W., Sydney.

NSW Department of Environment Climate Change & Water. (2010a). *Aboriginal Cultural Heritage Consultation Requirements for Proponents*. Department of Environment, Climate Change and Water.

NSW Department of Environment Climate Change & Water. (2010b). *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*. Department of Environment, Climate Change and Water.

NSW Office of Environment & Heritage. (2011). *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*. Office of Environment and Heritage.

Annexure F

DPC notification

Atkinson, Luke

From: Atkinson, Luke
Sent: Monday, 8 July 2019 7:20 PM
To: gs.ach@environment.nsw.gov.au
Subject: FW: RAP notification - Lot 6 DP 599338 (part), Williamtown, NSW
Attachments: EOI Letter P2A project.pdf

Hello,

In accordance with Section 4.1.6 of OEH's *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, please find below for your records, a list of the Aboriginal organisations and individuals who have registered an interest in being consulted for an Aboriginal Cultural Heritage Assessment being undertaken by AECOM Australia Pty Ltd (AECOM) on behalf of TransGrid for the proposed Powering Sydney's Future - Rookwood Road to Beaconsfield West Transmission Cable Project. As was stated in the letters of invitation issued to Aboriginal organisations and individuals requesting registrations of interest, the official registration period for this project closed on 3 June 2019.

A total of fifteen (15) registrations of interest were been received regarding consultation for this project (Table 1). Please note that in accordance with Section 4.1.5 of the *Consultation Requirements*, AECOM provides the opportunity for Registered Aboriginal Parties (RAPs) to withhold their details from being forwarded on to the applicable Local Aboriginal Land Council and/or OEH, and respects the wishes of RAPs to withhold their details at their discretion. No RAPs requested that their details be withheld in regard to this project. This list has also been forwarded to Metropolitan Local Aboriginal Land Council and Gandangara Local Aboriginal Land Council for their records.

Table 1 - List of Registered Aboriginal Parties

No.	Organisation	Contact Person	Date of registration
1	Yulay Cultural Services	Arika Jalomaki	17 May 2019
2	Yurrandaali Cultural Services	Bo Field	17 May 2019
3	Barraby Cultural Services	Lee Field	17 May 2019
4	Corroboree Aboriginal Corporation	Marilyn Carroll-Johnson	18 May 2019
5	Didge Ngunawal Clan	Paul Boyd & Lilly Carroll	18 May 2019
6	A1 Indigenous Services	Carolyn Hickey	19 May 2019
7	Barking Owl Aboriginal Corporation	Jody Kulakowski	19 May 2019
8	-	Wendy Morgan	20 May 2019
9	Kamilaroi Yankuntjatjara Working group's	Philip Khan	20 May 2019
10	Murra Bidgee Mullangari	Ryan Johnson	20 May 2019
11	Yerramurra	Robert Parson	21 May 2019
12	Tocomwall Pty Ltd	Danny Franks	24 May 2019
13	Widescope Indigenous Group	Steven Hickey	24 May 2019
14	Butucabin Cultural Heritage Assessments	Lowanna Gibson	3 June 2019
15	-	Des Dyer	19 June 2019

In accordance with Section 4.1.3 of the *Consultation Requirements*, I have also attached an example of the letter of invitation/notification for your records.

Kind regards,

Luke Atkinson
 Senior Heritage Specialist
 D +61 2 8934 0047 M +61 448 577 310
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Annexure G

AHIMS search results



AHIMS Web Services (AWS) Search Result

Purchase Order/Reference : 60558835

Client Service ID : 418101

AECOM Australia Pty Ltd (previously HLA-Envirosciences)

Date: 02 May 2019

Level 21 420 George Street
SYDNEY New South Wales 2000

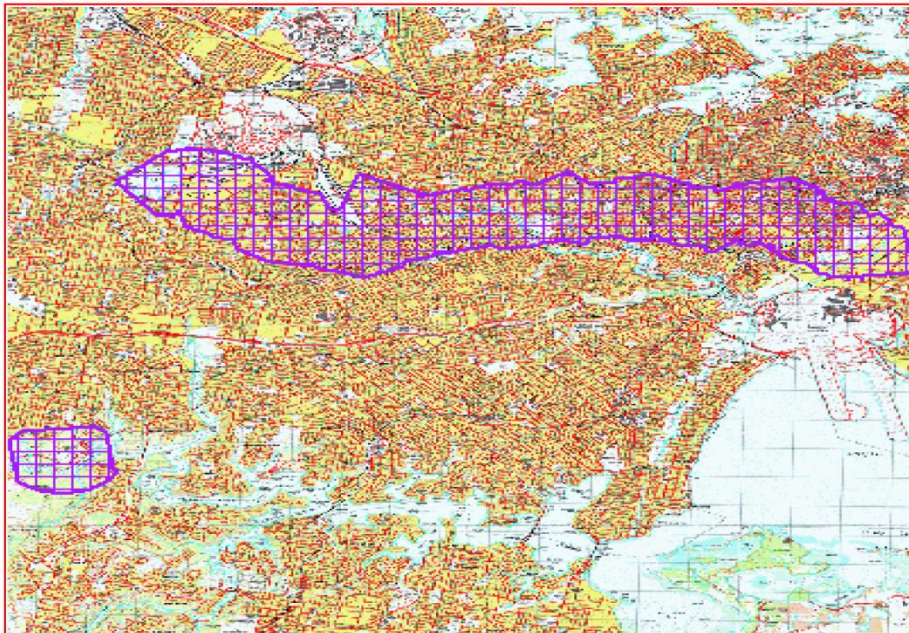
Attention: Luke Atkinson

Email: luke.atkinson@aecom.com

Dear Sir or Madam:

AHIMS Web Service search for the following area at Search using shape-file AHIMS search 1km.SHP with a buffer of 0 meters. Additional Info : reporting, conducted by Luke Atkinson on 02 May 2019.

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



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

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



AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 60558835

Client Service ID : 418101

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-3-0478	Georges River-	AGD	56	315490	6237530	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	1333
Contact		Recorders		Warren Bluff,Mary Dallas Consulting Archaeologists				Permits		
45-6-0536	Alford's Point A;Precinct 9 Alfords Point;	GDA	56	317198	6238149	Closed site	Valid	Artefact : -, Art (Pigment or Engraved) : -	Shelter with Art,Shelter with Deposit	
Contact		Recorders		Elizabeth Rich,Doctor.Susan McIntyre-Tamwoy				Permits		
45-6-2016	Georges R.S.R.A.;	AGD	56	315707	6238003	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	1333
Contact		Recorders		Warren Bluff				Permits		
45-6-0751	Shea's Creek Dugong	GDA	56	331839	6245378	Open site	Destroyed	Artefact : -, Aboriginal Resource and Gathering : -, Non-Human Bone and Organic Material : -	Open Camp Site	
Contact		Recorders		ASRSYS,AECOM Australia Pty Ltd (previously HLA-Envirosciences),Mr.Luke Kirkwa				Permits		
45-6-1790	GKW - St George SRA	GDA	56	316939	6237669	Open site	Valid	Shell : -, Artefact : -	Shelter with Midden	1333
Contact		Recorders		Warren Bluff,Sutherland Shire Council,Mr.Graham Avery				Permits		
45-6-1791	GW35 - Mill Creek, Split Level Shelter	GDA	56	316936	6237631	Open site	Valid	Shell : -, Artefact : -, Art (Pigment or Engraved) : -	Shelter with Midden	1333
Contact		Recorders		Warren Bluff,Sutherland Shire Council,Mr.Graham Avery				Permits		
45-6-1797	ST George S.R.A.;	AGD	56	316766	6237790	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
Contact		Recorders		Warren Bluff,P Price				Permits		
45-6-1798	ST George S.R. A.;	AGD	56	317049	6238299	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
Contact		Recorders		Warren Bluff,P Price				Permits		
45-6-1799	ST George S.R.A.;	AGD	56	317130	6238220	Closed site	Valid	Artefact : -	Shelter with Deposit	1333
Contact		Recorders		Warren Bluff,P Price				Permits		
45-6-1496	Shea's Creek	AGD	56	331697	6245597	Open site	Not a Site	Shell : -, Artefact : -	Midden	30,591,940
Contact		Recorders		ASRSYS				Permits		
45-6-0962	Georges River;Falling Rock Cave;	AGD	56	316336	6237540	Closed site	Valid	Art (Pigment or Engraved) : -, Shell : -, Artefact : -	Shelter with Art,Shelter with Midden	2005
Contact		Recorders		ASRSYS				Permits		

Report generated by AHIMS Web Service on 02/05/2019 for Luke Atkinson for the following area at Search using shape-file AHIMS search_1km.SHP with a buffer of 0 meters. Additional Info : reporting. Number of Aboriginal sites and Aboriginal objects found is 35

This information is not guaranteed to be free from error omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.



AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 60558835

Client Service ID : 418101

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-6-1655	Georges River;M3;	AGD	56	316406	6237390	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	2005
	Contact	Recorders	ASRSYS							
45-6-1656	Georges River;M6;	AGD	56	315756	6237660	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	2005
	Contact	Recorders	Helen Brayshaw							
45-6-1657	Georges River;M5;	AGD	56	316166	6237500	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	2005
	Contact	Recorders	S Geer							
45-6-1842	Blackwall Rock;	AGD	56	315516	6238050	Open site	Valid	Shell : -, Artefact : -	Midden	1333
	Contact	Recorders	Warren Bluff							
45-6-1843	Anvill Rock;	AGD	56	315696	6237600	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	1333
	Contact	Recorders	Warren Bluff							
45-6-1009	Georges River;Plundered Cave;	AGD	56	316792	6238710	Closed site	Valid	Art (Pigment or Engraved) : -, Shell : -, Artefact : -	Shelter with Art,Shelter with Midden	
	Contact	Recorders	ASRSYS							
45-6-1010	Georges River;Henry Lawson Cave;	AGD	56	316870	6238840	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	
	Contact	Recorders	ASRSYS							
45-6-0961	Georges River;Welk Shells Cave;	AGD	56	316696	6237250	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	2005
	Contact	Recorders	ASRSYS							
45-6-0959	Georges River;Two Caves Overhang;	AGD	56	316822	6237155	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	Contact	Recorders	ASRSYS							
45-6-2874	MPO6	GDA	56	316274	6237240	Closed site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Helen Brayshaw,Mr.Paul Irish							
45-6-2875	MPO7	AGD	56	316166	6237450	Closed site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Helen Brayshaw							
45-6-2876	MPO8	AGD	56	316186	6237530	Closed site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Helen Brayshaw							

Report generated by AHIMS Web Service on 02/05/2019 for Luke Atkinson for the following area at Search using shape-file AHIMS search_1km.SHP with a buffer of 0 meters. Additional Info : reporting. Number of Aboriginal sites and Aboriginal objects found is 35

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 60558835

Client Service ID : 418101

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-6-2877	MPO9	GDA	56	315835	6237540	Closed site	Valid	Potential Archaeological Deposit (PAD) : -		
	<u>Contact</u> Searle	<u>Recorders</u>	Helen Brayshaw, Mr. Paul Irish							
45-6-2884	West Menai PAD18	AGD	56	316586	6237060	Closed site	Valid	Potential Archaeological Deposit (PAD) : -		
	<u>Contact</u> Searle	<u>Recorders</u>	Jo McDonald Cultural Heritage Management see GML							
45-6-2900	GKW32 (Lomandra Crescent) Botany Bay	GDA	56	316966	6237437	Closed site	Valid	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>	Kelleher Nightingale Consulting Pty Ltd							
45-6-2901	GKW35 (Mill Creek Split Level Shelter) Botany Bay	GDA	56	316936	6237631	Closed site	Valid	Art (Pigment or Engraved) : -, Artefact : -, Shell : -		
	<u>Contact</u>	<u>Recorders</u>	Kelleher Nightingale Consulting Pty Ltd, Kelleher Nightingale Consulting Pty Ltd, Mi							
45-6-2902	GKW39 (Moonah Rd Talus) Botany Bay	GDA	56	316956	6238067	Closed site	Valid	Artefact : -, Shell : -		
	<u>Contact</u>	<u>Recorders</u>	Kelleher Nightingale Consulting Pty Ltd, Kelleher Nightingale Consulting Pty Ltd, Mi							
45-6-2986	HR PAD 11	GDA	56	316058	6237330	Closed site	Valid	Potential Archaeological Deposit (PAD) : 1		
	<u>Contact</u>	<u>Recorders</u>	Mary Dallas Consulting Archaeologists, Mr. Paul Irish							
45-6-3237	Crystal stone site	GDA	56	316947	6237699	Open site	Valid	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>	Sutherland Shire Council, Mr. Graham Avery							
45-6-3230	Gandangarra Repat Site	GDA	56	315668	6237874	Open site	Valid	Burial : 1		
	<u>Contact</u>	<u>Recorders</u>	Mr. Colin Davison, OEH-Hurstville							
45-6-3231	Gandangarra Repat/Scar Tree	GDA	56	315655	6237871	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Mr. Colin Davison, OEH-Hurstville							
45-6-3545	Elliot Reserve 1 (STRA-001)	GDA	56	323155	6247290	Open site	Valid	Artefact : 150		
	<u>Contact</u>	<u>Recorders</u>	Mr. Phil Hunt, Aboriginal Housing Office							
45-6-3546	Maria Reserve 1 (STRA-002)	GDA	56	322850	6247555	Open site	Valid	Artefact : 1		
	<u>Contact</u>	<u>Recorders</u>	Mr. Phil Hunt, Aboriginal Housing Office							
45-6-3547	St Annes Reserve 1 (STRA-003)	GDA	56	322145	6248135	Open site	Valid	Aboriginal Resource and Gathering : 150		
	<u>Contact</u>	<u>Recorders</u>	Mr. Phil Hunt, Aboriginal Heritage Office							

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reporting. Number of Aboriginal sites and Aboriginal objects found is 35

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