Horsley Park Brickworks

Plant 2 Upgrade Works: Aboriginal Due Diligence Assessment

Prepared for Austral Brick Co Pty Ltd

22 January 2020

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- Austral Brick Co Pty Ltd: Megan Kublins.
- Willowtree Planning: Travis Lythall.

Biosis staff involved in this project were:

- Anne Murray and Jason Prasad for mapping.

Contents

Tables

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Plates

Glossary

AHIMS	Aboriginal Heritage Information Management System
DPIE	Department of Planning, Industry and Environment
Due diligence code	*Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*
EES	NSW Environment, Energy and Science Group
EP&A Act	*Environmental Planning and Assessment Act 1979*
GSV	Ground Surface Visibility
ICOMOS	International Council on Monuments and Sites
LEP	Local Environment Plan
LGA	Local Government Area
NPW Act	*National Parks and Wildlife Act 1974*
NSW	New South Wales
PAD	Potential Archaeological Deposit
Study area	Part Lot 7 DP 1059698
The Code	The *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*

Summary

Biosis Pty Ltd (Biosis) has been commissioned by Willowtree Planning on behalf of Austral Brick Co Pty Ltd to undertake an Aboriginal Due Diligence Assessment (ADDA) for the proposed upgrades to Plant 2 at 780 Wallgrove Road, Horsley Park, New South Wales (NSW) (the study area). The project involves the following upgrades to the eastern portion of the site:

- New production building of around 13,250m^2 to provide extended kiln car storage area and relocated extruder and dehacker.
- Existing production building to be re-roofed.
- Demolish two existing kilns and replacement with one new kiln (of same overall capacity), to be provided to the existing production building.
- New footings for relocated clay bins and for the scrubber.
- Construction of a new fire access road.
- Provision of an onsite detention basin.
- Supporting ancillary works.
- Minor demolition works.

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) register was completed on 16 December 2019, identifying 120 Aboriginal sites within a three kilometre buffer of the study area, and no Aboriginal sites located within the study area. The study area was identified as being in the vicinity of Eastern Creek, a major water course in the local area, and contained within the South Creek and Blacktown soil landscapes. Predictive modelling completed by Biosis suggests that locally there is a correlation between the presence of reliable sources of water and the presence of Aboriginal sites.

Research into the land use history of the study area indicates that since the 1960s it has been used as a brickworks, and is likely to have undergone extensive disturbance through activities associated with the construction and subsequent use of the brickworks. Disturbances identified within the study area include bulk excavation associated with quarrying activities, establishment of informal tracks and roads throughout the study area, establishment of stockpiles, and construction of factory and warehouse buildings associated with the brickworks.

An archaeological survey of the study area was completed on 18 December 2019, attended by Biosis and Deerubbin Local Aboriginal Land Council (LALC). The purpose of the survey was to identify whether Aboriginal sites are present or are likely to be present within the study area, and to identify whether there are any known Aboriginal cultural associations with the study area. The archaeological survey assessed the two areas which would be impacted by the proposed works: to the east, the area surrounding the existing Plant 2 buildings, and to the west, and area currently used for stockpiling.

Observations made during the survey indicated that the impact areas have been subject to extensive disturbance associated with the use of the site as a brickworks since the 1960s. Within the area used for stockpiling, there has been extensive landscape modification, while surrounding Plant 2, disturbance associated with the construction of the existing buildings and establishment of access roads was observed, as well as areas of deep excavation.

Based on the results of the background research and archaeological survey, it is considered that the proposed works have low potential to impact on Aboriginal heritage. Discussions held with Steven Randall of Deerubbin LALC on site agree with this conclusion. It is recommended that no further archaeological assessment is required in advance of works, and that an unexpected finds protocol be established as a contingency should any Aboriginal objects be identified during works.

The following management recommendations have been developed relevant to the study area and influenced by:

- Predicted impacts to Aboriginal cultural heritage.
- The planning approvals framework.
- Current best conservation practise, widely considered to include:
  - Ethos of the Australia ICOMOS Burra Charter (2013).
  - The Code.

Prior to any impacts occurring within the study area, the following is recommended:

Recommendation 1: No further archaeological assessment is required within the impact areas

No further archaeological work is required in the impact areas, as these areas have been assessed as holding low archaeological potential. Should additional works occur outside of the identified impact areas, further assessment in the form of an archaeological survey will be required.

Recommendation 2: Provide a copy of the final report to Deerubbin LALC for comment

A copy of this final assessment should be provided to Deerubbin LALC for their records.

Recommendation 3: Discovery of Unanticipated Aboriginal Objects

All Aboriginal objects and Places are protected under the *National Parks and Wildlife Act 1974* (NPW Act). It is an offence to harm an Aboriginal object without a consent permit issued by the Environment, Energy and Science group (EES) of the Department of Planning, Industry and Environment (DPIE). Should any suspected Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object the archaeologist will provide further recommendations. These may include notifying EES and Aboriginal stakeholders.

Recommendation 4: Discovery of Aboriginal Ancestral Remains

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and EES' Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by EES.

1 Introduction

1.1 Project background

Biosis has been commissioned by Willowtree Planning on behalf of Austral Brick Co Pty Ltd to undertake an ADDA for the proposed upgrades to Plant 2 at 780 Wallgrove Road, Horsley Park, NSW (Figure 1, Figure 2). The project involves the following upgrades to the eastern portion of the site:

- New production building of around 13,250m^2 to provide extended kiln car storage area and relocated extruder and dehacker.
- Existing production building to be re-roofed.
- Demolish two existing kilns and replacement with one new kiln (of same overall capacity), to be provided to the existing production building.
- New footings for relocated clay bins and for the scrubber.
- Construction of a new fire access road.
- Provision of an onsite detention basin.
- Supporting ancillary works.
- Minor demolition works (Figure 3).

An assessment in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW 2010a) (the Due Diligence Code) has been undertaken for the study area in order to inform responsibilities with regards to Aboriginal cultural heritage in the area. In addition to the basic tasks required for an ADDA, an extended background review, as well as an archaeological survey in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b) (the Code) was conducted, in order adequately map areas of high, moderate and low archaeological sensitivity.

1.2 Location of the study area

The study area is located within the Fairfield Local Government Area (LGA), Parish of Melville, County of Cumberland (Figure 1). The study area comprises part of Lot 7 DP 1059698 and is bounded by the SUEZ Eastern Creek Organic Resource Recovery Facility to the north, rural landholdings to the south, Ferrers Road, bushland areas and Prospect Reservoir to the east and Westlink M7 and Wallgrove Road to the west (Figure 2).

Within the study area, the proposed works will be occurring within two impact areas, identified in Figure 3. The eastern impact areas surrounds the existing Plant 2 structures, and the western impact areas is associated with an existing stockpile in the vicinity of Eastern Creek.

1.3 Planning approvals

The proposed development will be assessed against Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* NSW (EP&A Act). Other relevant legislation and planning instruments that will inform the assessment include:

- NPW Act.

- *National Parks and Wildlife Amendment Act 2010* (NSW).
- *Fairfield Local Environmental Plan 2013* (LEP).
- *Fairfield Development Control Plan 2013* (DCP).

1.4 Scope of the assessment

The following is a summary of the major objectives of the assessment:

- Conduct background research in order to recognise any identifiable trends in site distribution and location, including a search of the AHIMS database.
- Undertake archaeological survey as per requirement 5 of the Code, with particular focus on landforms with high potential for heritage places within the study area, as identified through background research.
- Record and assess sites identified during the survey in compliance with the Code.
- Determine levels of archaeological and cultural significance of the study area.
- Make recommendations to mitigate and manage any cultural heritage values identified within the study area.

1.5 Aboriginal consultation

Aboriginal consultation in line with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010b), has not been conducted as part of this assessment. However, in order to provide an opportunity for the cultural values of the study area to be assessed as a part of this archaeological assessment, Deerubbin LALC was contacted and invited to participate in the archaeological survey. Steven Randall represented the LALC on the survey, which was completed on 18 December 2019. Discussions held with Steven on site indicate that the LALC was not aware of any areas of cultural significance which would be impacted by the proposed works, and that he generally considered that the areas which were surveyed held low archaeological potential.

The draft assessment was provided to Deerubbin LALC for review on 14 January 2020. On 22 January 2020, the LALC responded, noting that no Aboriginal objects were identified during the field assessment, and that the surveyed areas had been subject to excavation and landscaping to suit quarrying purposes. The LALC did not raise any issues with the proposed development, and stated that it had no objections to the proposed works. The full text of the LALC reply is available in Appendix 2.

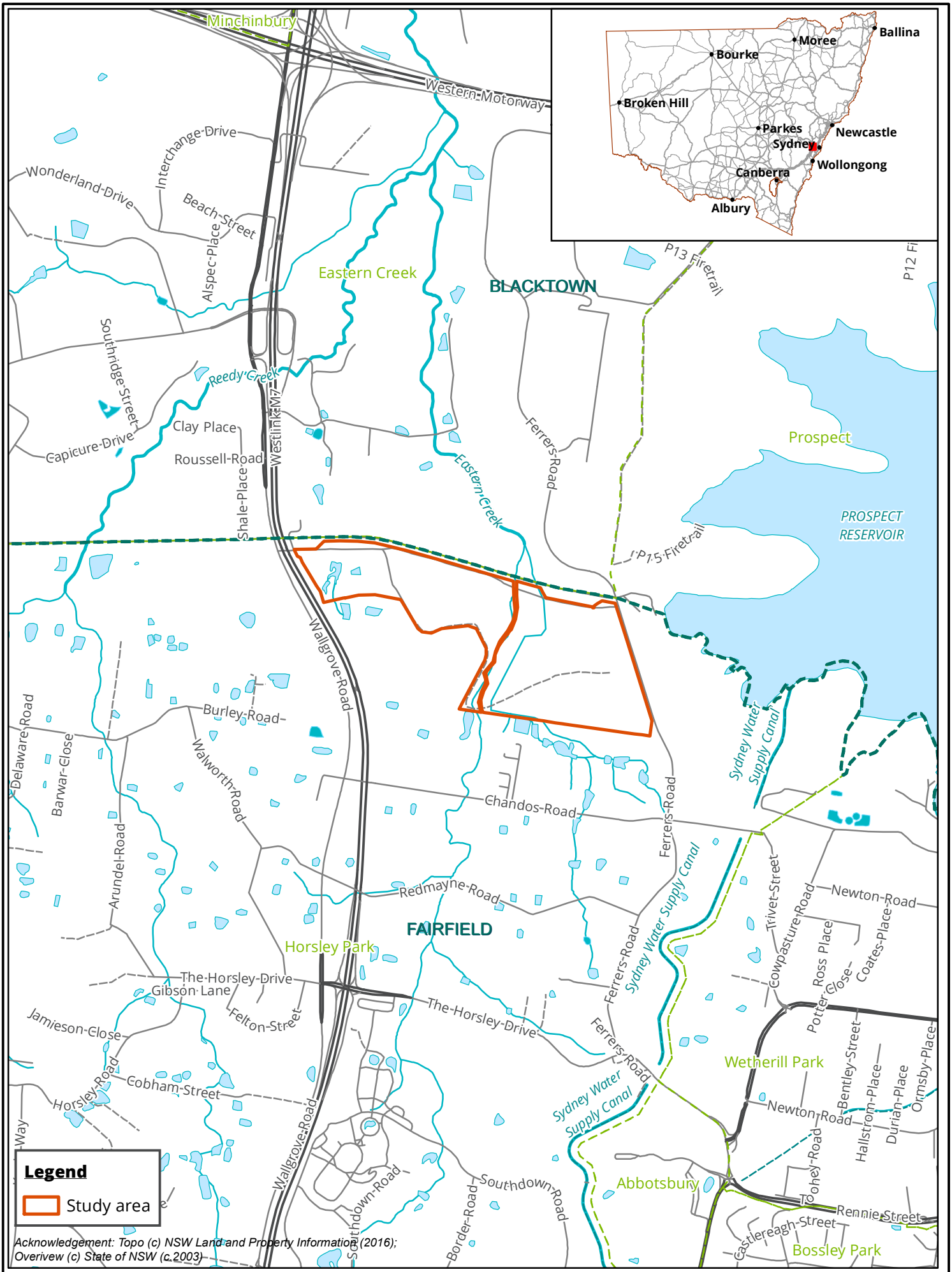

Figure 1 Location of the study area

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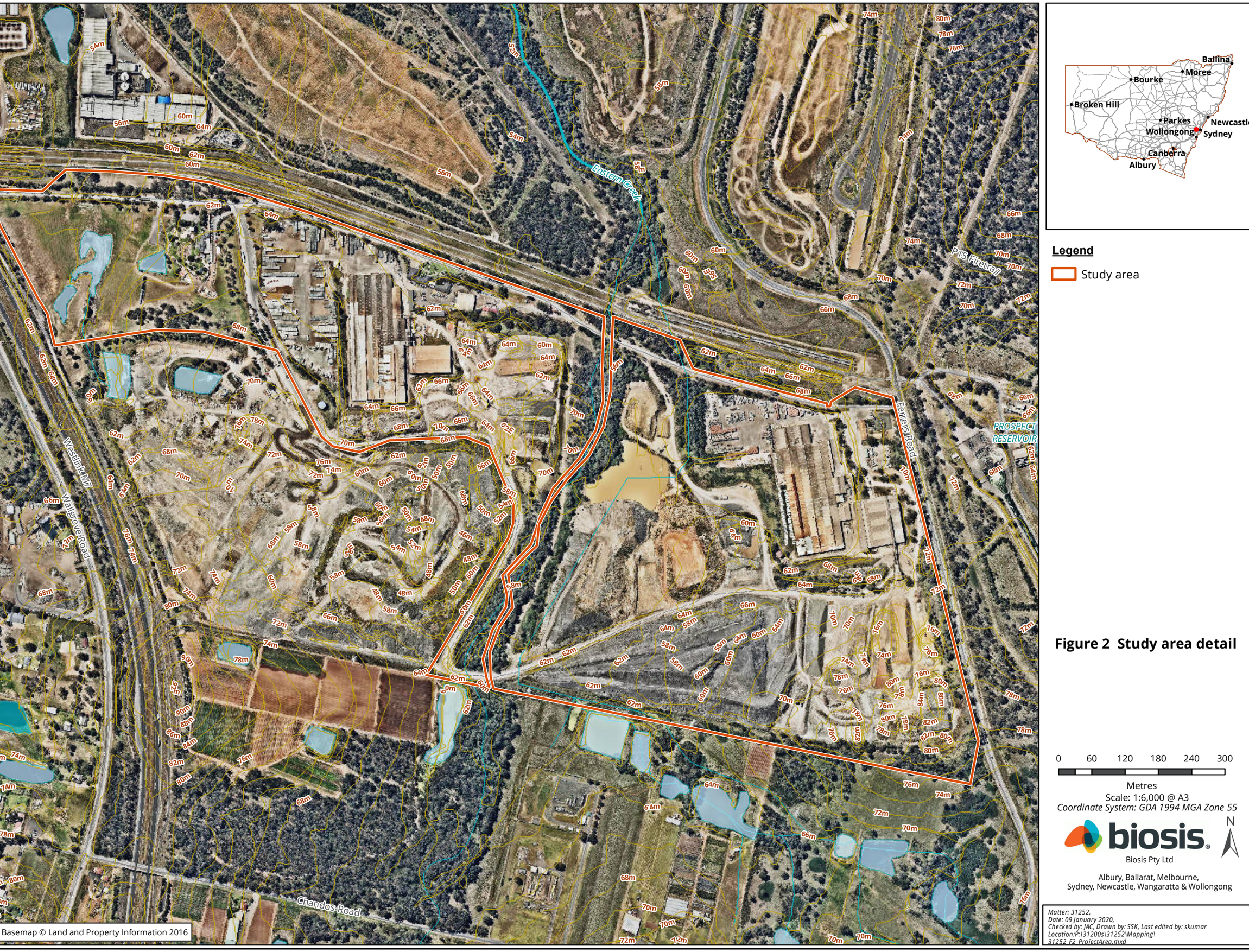

Legend

Study area

Figure 2 Study area detail

0 60 120 180 240 300

Metres

Scale: 1:6,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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Study area

Proposed development footprint

Figure 3 Proposed development

0 60 120 180 240 300

Metres

Scale: 1:6,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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2 Desktop assessment

A brief desktop assessment has been undertaken to review existing archaeological studies for the study area and surrounding region. This information has been synthesised to develop some Aboriginal site predictive statements for the study area and identify known Aboriginal sites and/or places recorded in the study area. This desktop assessment has been prepared in accordance with requirements 1 to 4 of the Code.

2.1 Landscape context

It is important to consider the local environment of the study area in any heritage assessment. The local environmental characteristics can influence human occupation and associated land use and consequently the distribution and character of cultural material. Environmental characteristics and geomorphological processes can affect the preservation of cultural heritage materials to varying degrees or even destroy them completely. Lastly landscape features can contribute to the cultural significance that places can have for people. The study area is located within a highly disturbed environment used predominately for quarrying and the manufacture of bricks. It is located approximately 19 kilometres west of the Parramatta CBD, adjacent to the western side of the Prospect Reservoir.

2.2 Geology, soils and landforms

The study area is located within Cumberland Lowlands physiographic region that consists of low lying, gently undulating plains and low hills atop Wianamatta Group shales and sandstones with a dense drainage net of predominantly northward flowing channels (Bannerman & Hazelton 1990, p.2) (Figure 4). The Wianamatta geological group is Middle Triassic in age (245-235 mya) and it overlays Mittagong Formation and Hawkesbury Sandstone. It is divided into two formations, the Ashfield Shale and the overlying Bringelly Shale. These are separated by Michinbury Sandstone. The Ashfield Shale consists of black to dark grey siltstone and laminite and is located on ridgetops. The upper part of Winamatta Group is Bringelly Shale that occurs extensively throughout the Cumberland Lowlands. It consists of a shale (claystone and siltstone), carbonaceous claystone, laminate and fine to medium-grained lithic sandstone (Bannerman & Hazelton 1990, p.3).

Stream order is recognised as a factor which helps the development of predictive modelling in Aboriginal archaeology in NSW. Predictive models which have been developed for the region have a tendency to favour permanent water courses as the locations of campsites as they would have been more likely to provide a stable source of water and by extension other resources which would have been used by Aboriginal groups.

The stream order system used for this assessment was originally developed by Strahler (1952). It functions by adding two streams of equal order at their confluence to form a higher order stream, as shown in Plate 1. As stream order increases, so does the likelihood that the stream would be a perennial source of water.

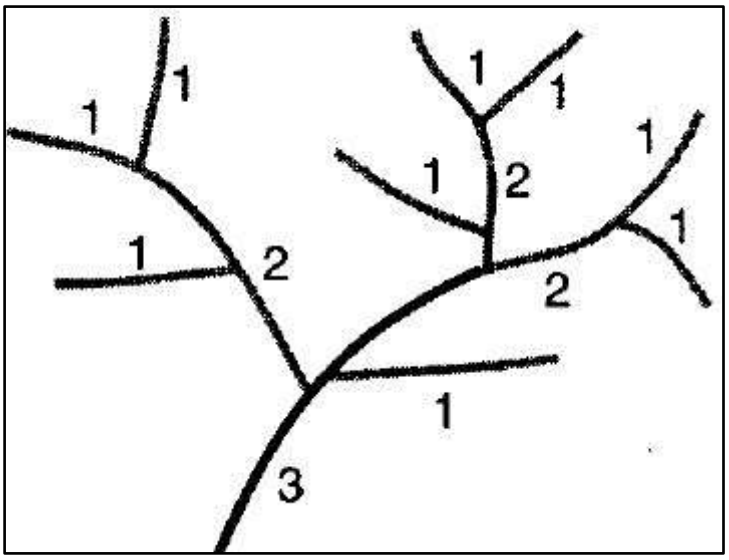


Plate 1 Diagram showing Strahler stream order (Ritter et al, 1995, p. 151)

Eastern Creek, one of the major drainage channels on the Cumberland Plain and a non-perennial, second Strahler order stream, runs directly adjacent to the western boundary of the study area (Figure 5). Approximately 250 metres north-west of the study area, Eastern Creek becomes a permanent water source, before ultimately draining into the Hawkesbury River 24 kilometres to the north north-west. Prospect Reservoir is located 380 metres east of the study area and is a manmade water reservoir, which connects to the Sydney Water Supply Channel. An unnamed, non-perennial second order tributary runs along the southern boundary of the study area, with another unnamed, non-perennial second order tributary located just outside of the this boundary. It should be noted that mapping illustrates that an unnamed, non-perennial third order tributary runs through the western portion of the study area, north to south. Due to the extensive disturbance that has occurred throughout the site, it is likely that this is a mapping inconsistency or a creek line that no longer exists due to this development.

Soil landscapes have distinct morphological and topological characteristics that result in specific archaeological potential. They are defined by a combination of soils, topography, vegetation and weathering conditions. Soil landscapes are essentially terrain units that provide a useful way to summarise archaeological potential and exposure. The study area is contained within the Blacktown soil landscape and South Creek soil landscape (Figure 6).

The Blacktown soil landscape is characterised as a residual landscape consisting of gently undulating rises throughout broad rounded crests, ridges and gently inclined slopes (Bannerman & Hazelton 1990, p.28). Local relief is between 10 to 30 metres, with slopes usually greater than 5% (Bannerman & Hazelton 1990, p.28). Crests and ridges range between 200 to 600 metres and are rounded with convex upper slopes grading into concave lower slopes. The Blacktown soil landscape has been extensively cleared, however it once consisted of tall open-forest and open-woodland. Soil depths within this landscape range from low to moderate (>100 centimetres), with moderate erodability throughout (Bannerman & Hazelton 1990, p.28). Details of the different deposits within the Blacktown soil landscape are summarised in Table 1.

Due to their age and slow accumulation, residual soil landscapes have reasonable potential to contain archaeological deposits in an open context, such as stone artefacts derived from occupation sites. Other occupational evidence might include scarred trees where remnant vegetation occurs. However, the slow accumulation and high impact of extensive land clearing within this soil landscape (usually associated with pastoral and civic development) often results in poor preservation of archaeological material. Although the northern portion of the study area is contained within this landscape, the area has been highly disturbed over

the last 50 years due to the existing brickworks site. This would have drastically reduced the likelihood of archaeological deposits still existing throughout the study area.

Table 1 Blacktown soil landscape characteristics

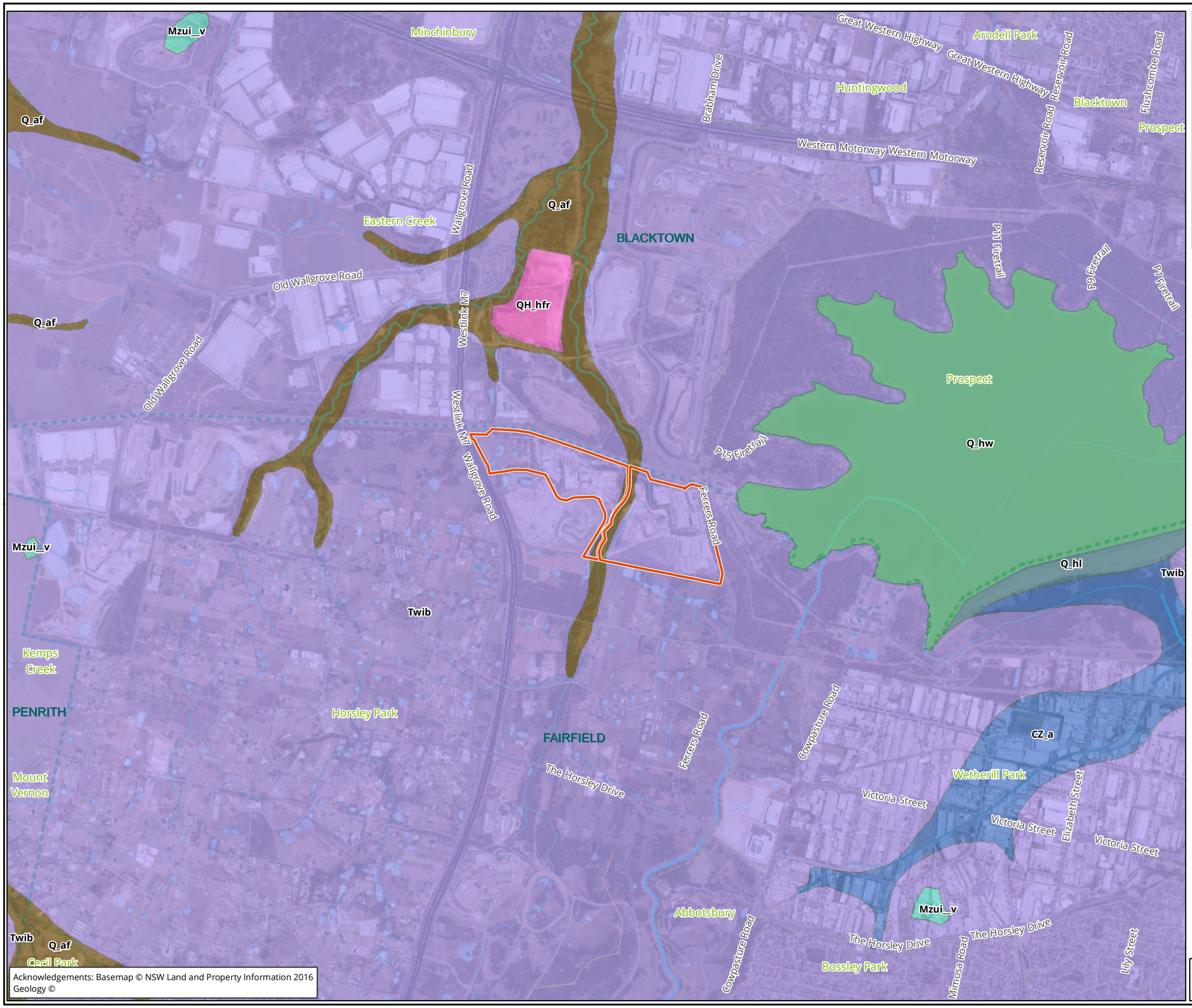
Soil material	Description
Blacktown 1 (bt1)	A brownish black loam or clay loam with a moderately pedal subangular blocky structure and porous rough-faced ped fabric, which occurs as topsoil (A Horizon). Peds are generally subangular blocky, 2 – 10 millimetres in size. Surface condition is friable. Colour is commonly brownish black (10YR 2/2) but can range from dark reddish brown (5YR 3/2) to dark yellowish brown (10YR 3/4). The pH varies from moderately acid (pH 5.5) to neutral (pH 7.0). Roots are common, while charcoal and rounded iron indurated fine gravel-sized shale fragments occasionally occur.
Blacktown 2 (bt2)	A hard setting brown clay loam to silt clay loam, that becomes hard setting when dried out. It occurs as an A2 horizon and has an apedal massive to weakly pedal structure and porous earthy fabric. Peds are weakly developed and have a subangular blocky and porous rough-faced structure, 20 – 5 millimetres in size. Colour is dark brown (7.5YR 4/3) but can range from dark reddish brown (2.5 YR 3/3) to dark brown (10YR 3/3). The pH varies from moderately acid (pH 5.0) to slightly acid (pH 6.5). Gravel-sized platy, iron indurated shale fragments are common, while charcoal and roots rarely occur.
Blacktown 3 (bt3)	A mottled light to medium brown clay with a strongly pedal polyhedral or subangular-blocky structure, and smooth-faced dense ped fabric 5 – 20 millimetres in size. Material generally occurs as subsoil (B Horizon) and texture increases with depth. Colour is brown (7.5 YR 4/6) but can range between reddish brown (2.5 YR 4/6) to brown (10 YR 4/6), with red, yellow or grey mottles increasing with depth. The pH varies from strongly acid (pH 4.5) to slightly acid (pH 6.5). Fine to coarse gravel-sized shale fragments occur in stratified bands and are common, while charcoal and roots are rare.
Blacktown 4 (bt4)	A plastic light grey silty to heavy clay with a moderate pedal polyhedral to subangular blocky structure and dense smooth-faced ped fabric 20 – 20 millimetres in size, and occur as deep subsoil above shale bed rock (B3 or C horizon). Colour is usually light grey (10 YR 7/1) or occasionally greyish yellow (2.5 YR 6/2), with red, yellow or grey mottles. The pH varies between strongly acid (pH 4.0) and moderately acid (pH 5.5). Weathered ironstone concretions and rock fragments commonly occur, and gravel-sized shale fragments and roots occasionally occur, while charcoal fragments are rare.

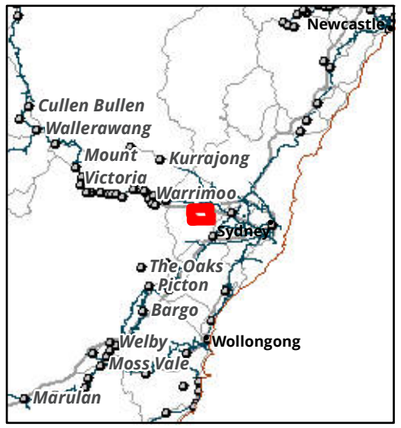
The western boundary of the study area is contained within the South Creek soil landscape. The South Creek soil landscape is characterised as a fluvial landscape consisting of floodplains, valley flats and drainage depressions, with incised channels throughout (Bannerman & Hazelton 1990, p.68). Local relief is greater than 10 metres, with slopes usually greater than 5% (Bannerman & Hazelton 1990, p.68). Details of the different deposits within the South Creek soil landscape are summarised in Table 2.

Although fluvial landscapes are likely to contain very deep, layered sediments atop of bedrock or relict soils and have the potential to contain archaeological deposits such as stone artefacts in subsurface soils, the South Creek soil landscape is typically located in close proximity to a variety of water courses, drainage depressions and incised channels, with large areas contained within active floodplains. This creates a high to extreme erosional hazard, which in turn reduces the stability of any subsurface deposits remaining in situ. The proximity of the study area to a second order water course, in addition to the extensive land clearing and development over the last 50 years due to the existing brickworks site, illustrates that it is unlikely any Aboriginal deposits remain intact within the impact areas.

Table 2 South Creek soil landscape characteristics

Soil material	Description
South Creek 1 (sc1)	Brown apedal single grained loam. This is a brown sandy loam with generally apedal single grained structure and porous earthy fabric. It commonly occurs as topsoil (A horizon). Colours range from dull reddish brown (5YR 4/3) to dull yellowish brown (10YR 4/3). This material is usually moderately acidic (pH 5.5) but varies from strongly acidic (pH 4.5) to slightly acidic (pH 6.5). Small (2-6 millimetres) angular or rounded gravels may occur. Roots are abundant in surface layers, charcoal and other inclusions do not occur.
South Creek 2 (sc2)	This is a hard setting dull brown clay loam to fine sandy clay loam, usually with a pedal massive structure and porous earthy fabric. It occurs as topsoil (A horizon). Occasionally, weak structure occurs with small (2-5 millimetres) rough faced sub angular blocky peds. Colour is usually dull brown (7.3YR 5/4) but has a range from greyish brown (5YR 4/2) to yellowish brown (10YR 5/6). pH varies from moderately acidic (pH 5.0) to neutral (pH 7.0). Stones and other inclusions do not occur, and roots are rarely found.
South Creek 3 (sc3)	This is a bright brown light to medium clay with strongly pedal structure and dense smooth-faced ped fabric. This material usually occurs as subsoil (B horizon). Occasionally this material contains sufficient fine sand to reach the texture grade of sandy clay. Peds are smooth-faced angular blocky or polyhedral and 20 millimetres to 50 millimetres in size. This material is generally whole-coloured ranging from reddish brown (5YR 4/8) to bright yellowish brown (10YR 5/1). Mottles, when they do occur, are yellow or grey and occupy up to 15% of the volume of the material. pH is highly variable, ranging from extremely acidic (pH 3.0) to neutral (pH 7.0). Roots are only present where this material occurs as topsoil. There is no charcoal but small (2-20 millimetres) subrounded or subangular gravels may make up to 50% of the volume.





Legend

Study Area

Geological units

- Alluvial floodplain deposits
- Alluvium
- Anthropogenic breakwaters, embankments and artificial levees
- Anthropogenic deposits-Fill on Quaternary deposits
- Anthropogenic stored water, pondage, reservoirs, canals
- Bringelly Shale
- Unnamed Mesozoic igneous units - breccia

Figure 4 Geological units near the study area

0 250 500 750 1,000 1,250

Metres

Scale: 1:25,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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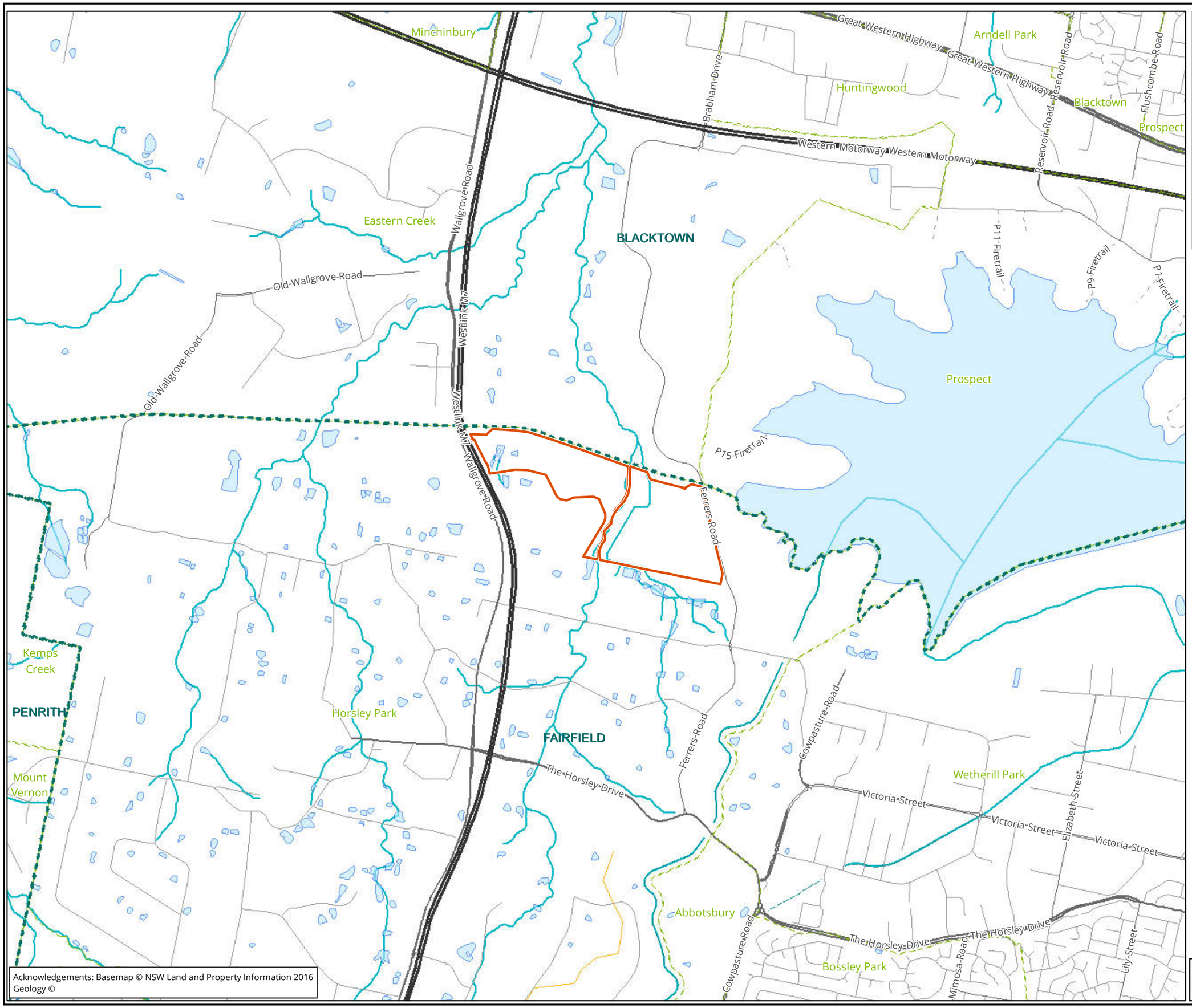

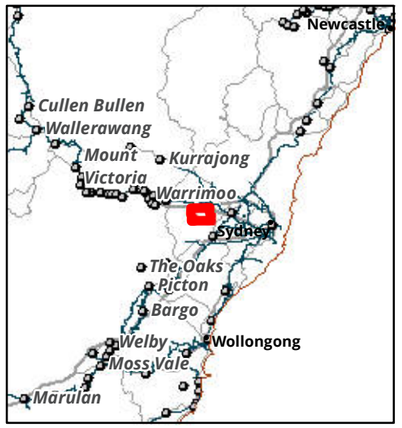

Legend

- Study Area
- Hydroarea
- HydroLine

Figure 5 Hydrology near the study area

0 250 500 750 1,000 1,250

Metres

Scale: 1:25,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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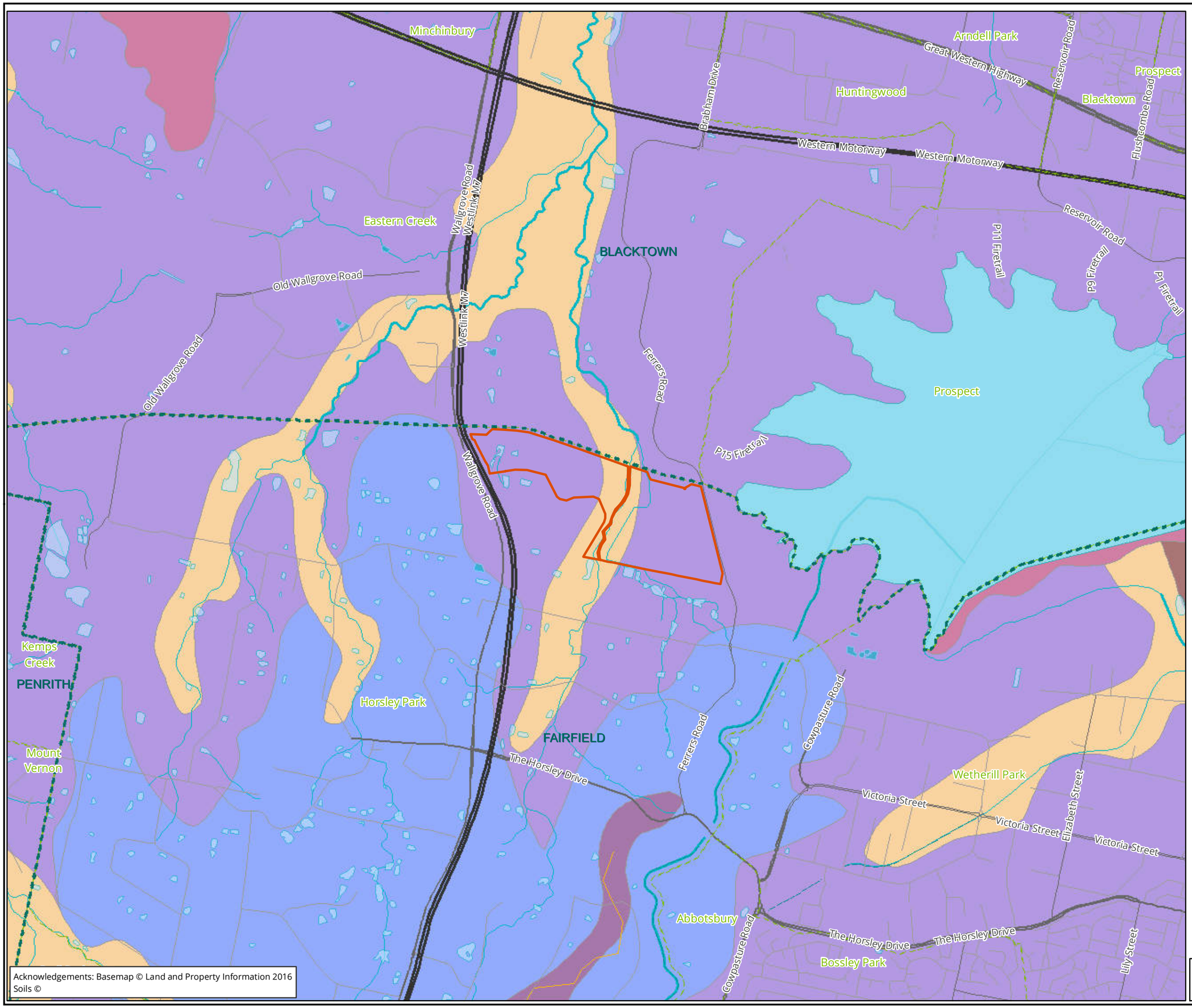

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Legend

- Study area

Soil landscape units

- BLACKTOWN
- DISTURBED TERRAIN
- LUDDENHAM
- PICTON
- SOUTH CREEK
- VOLCANIC
- WATER

Figure 4 Soil landscapes near the study area

0 260 520 780 1,040 1,300

Metres
Scale: 1:25,000 @ A3
Coordinate System: GDA 1994 MGA Zone 55

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2.3 Flora and fauna

The Horsley Park region would have provided an abundance of natural resources able to be utilised in a variety of ways by Aboriginal people. The Blacktown Soil Landscape typically supports a dry sclerophyll forest, which predominantly includes species of eucalypt, including Forest red gum *Eucalyptus tereticornis*, Narrow-leaved ironbark *E. crebra*, and Grey box *E. moluccana* (Bannerman & Hazelton 1990, p.29). Broad-leaved ironbark *E. fibrosa* and White stringybark *E. globoidea* are also occasionally present (NPWS 2003, p.193).

As the South Creek soil landscape is a fluvial landscape, the vegetation present has the ability to withstand frequent inundation of water. It typically supports Broad leaved apple *Angophora subvelutina,* Cabbage gum *Eucalyptus amplifolia*, and Swamp Oak *Casuarina glauca* (Bannerman & Hazelton 1990, pp.68–69).

Many flora species would have been accessible as resources for Aboriginal people of the area. Vegetation communities of the greater Sydney area have over 200 species with edible parts (Attenbrow 2002). A variety of plant species were also useful for manufacturing tools. Wood from trees was used to manufacture canoe poles, weapons, woomeras, boomerangs and for use in fire. Resins from trees and grasses were used as a fixative in tool making. Bark and fibres were used for carrying vessels, canoes and decorations. Fibres were used to make ropes and nets for trapping fish and birds. In addition, many plants provided sources of both food and medicine. Food, tools, shelter and ceremonial items were derived from floral resources, with the locations of many campsites predicated on the seasonal availability of resources. Plant fibres were twisted into string, which was used for many purposes, including the weaving of nets, baskets and fishing lines. String was also used for personal adornment. Bark was also used in the provision of shelter; a large sheet of bark being propped against a stick to form a gunyah (Attenbrow 2002, pp.113–114).

These vegetation communities also supported a range of faunal resources that would have been utilised by Aboriginal peoples. A variety of land mammals would have been available to the Indigenous inhabitants of the study area, with most Australian land mammals being non-migratory, therefore would have been available all year round (Attenbrow 2002). Birds, lizards, freshwater fish and shellfish would also have been available resources in or nearby the study area. Terrestrial and avian resources were not only used for food, but also provided a significant contribution to the social and ceremonial aspects of Aboriginal life. The native fauna that would have been present within the vicinity of the study area include: the Noisy Miner *Manorina melanocephala*, Rainbow Lorikeet *Trichoglossus moluccanus*, Eastern Grey Kangaroo *Macropus giganteus*, Red-bellied Black Snake *Pseudechis porphyriacus*, Pale-flecked Sunskink *Lampropholis guichenoti* and Common Froglet *Crinia signifera*(*Atlas of Living Australia* 2019).

2.4 Land use history

Since 1960, the study area has been utilised as a brickworks. Aerial images from 1970 to 2000 demonstrate the progressive expansion of works throughout the study area over the second half of the twentieth century. By 1970 (Plate 2) the buildings associated with Plant 2 are already established within the study area, and do not appear to have changed significantly between 1970 and the present day. Around the western impact area, some land clearance and potential excavation is noted. This remains relatively consistent in the 1979 aerial image (Plate 3), which demonstrates some revegetation in the vicinity of Eastern Creek.

By 1989 (Plate 4), construction associated with Plant 2 has expanded to the west, and revegetation in the vicinity of the western impact area associated with the current stockpile has largely covered over evidence of previous disturbance. By 1998 (Plate 5), works in the southern portion of the study area had expanded west. These historic aerials demonstrate that impacts associated with stockpiling activities in the western impact area are likely to have occurred after 1998, however that within the study area more broadly, there has been heavy disturbance associated with the site's use as a brickworks.

Plate 2 1970 aerial image of the study area

Plate 3 1979 aerial image of the study area

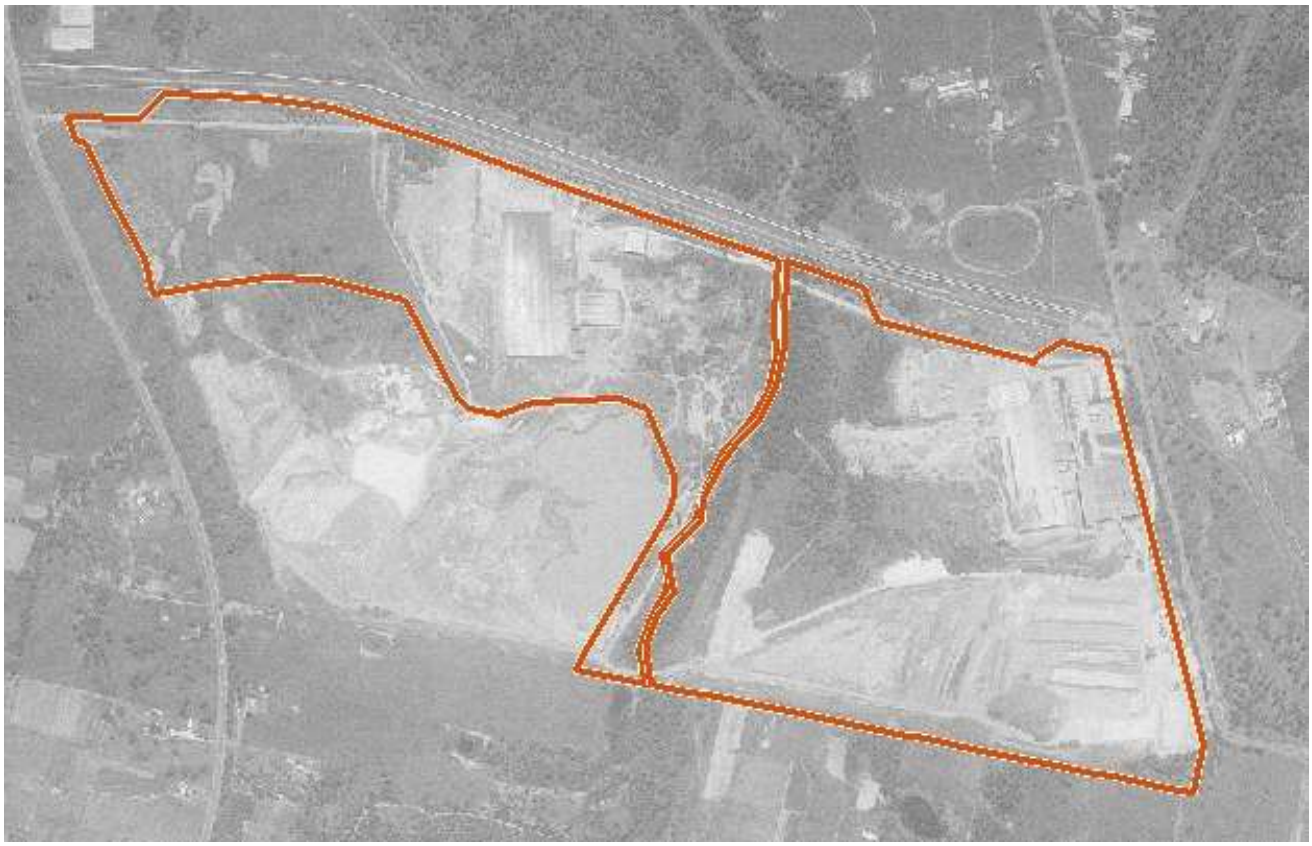


Plate 4 1989 aerial image of the study area

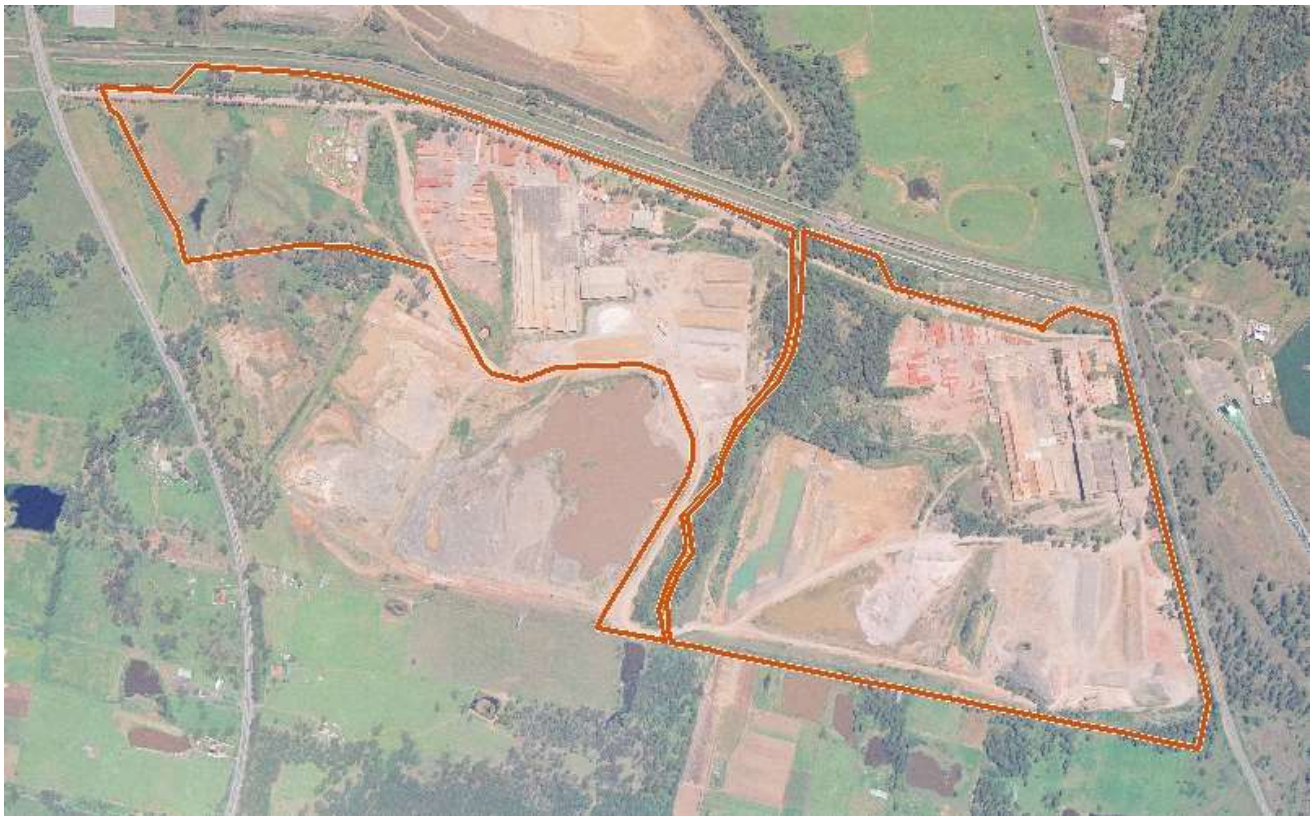


Plate 5 1998 aerial image of the study area

3 Aboriginal context

3.1 Ethnohistory and contact history

Archaeological evidence suggests that Aboriginal peoples have inhabited Australia for at least 50,000 years (Allen & O'Connell 2003, Cooper et al. 2018). Dates of the earliest occupation of the continent by Aboriginal people are subject to continued revision as more research is undertaken. The timing for the human occupation of the Sydney Basin is still uncertain. However, possible evidence suggests an occupation of the region by 40,000 years. The majority of excavated shelter and open sites in the region however yield much younger dates of around 3,000 years BP (Attenbrow 1987, Keotigg 1985, McDonald 1985).

There is some confusion relating to group names, which can be explained by the use of differing terminologies in early historical references. Language groups were not the main political or social units in Aboriginal life. Instead, land custodianship and ownership centred on the smaller named groups that comprised the broader language grouping. There is some variation in the terminology used to categorise these smaller groups; the terms used by Attenbrow (2002) will be used here.

The study area is in the vicinity of three language groups, Dharawal, Gundungurra and the hinterland Darug. Attenbrow (2002, p.34) suggests:

- The Gundungurra covered "the southern rim of the Cumberland Plain west of the Georges River, as well as the southern Blue Mountains"
- The Dharawal covered "the south side of Botany Bay, extending as far as the Shoalhaven River; from the coast to the Georges River and Appin, possibly as far west as Camden"
- The hinterland Darug covered the area "from Appin in the south to the Hawkesbury River in the north; west of the Georges River, Parramatta, the Lane Cove River and Berowra Creek".

These areas are considered to be indicative only and would have changed through time.

Our knowledge of Aboriginal people and their land-use patterns and lifestyles prior to European contact is mainly reliant on documents written by non-Aboriginal people. It is for this reason the boundaries of Aboriginal groups in the region cannot be easily defined. These documents are affected by the inherent bias of the class and cultures of their authors, who were also often describing a culture that they did not fully understand - a culture that was in a heightened state of disruption given the arrival of settlers and disease. Early written records can however be used in conjunction with archaeological information and surviving oral histories from members of the Aboriginal community in order to gain a picture of Aboriginal life in the region.

Despite a proliferation of Aboriginal heritage sites there is considerable ongoing debate about the nature, territory and range of pre-contact Aboriginal language groups in the greater Sydney region. These debates have arisen largely because, by the time colonial diarists, missionaries and proto-anthropologists began making detailed records of Aboriginal people in the late 19th century, pre-European Aboriginal groups had been broken up and reconfigured by European settlement activity.

Early interactions between local Aboriginal groups in the Sydney region and European colonists varied in nature between peaceful and hostile. It was not long before the effects of colonisation proved detrimental to local groups, with farming practices employed by the settlers removing land that had until that point been used for subsistence (Attenbrow 2002).

3.2 Regional context

The archaeology of the Cumberland Plain region has been well documented through a large number of academic and impact assessment investigations over the past 30 years (e.g. Kohen, J. 1986, Haglund, L. 1980, Smith 1989, McDonald & Rich 1993). This is largely a result of archaeological studies related to rapid urban development across the area. These studies have enabled a comprehensive model of archaeological site distribution to be developed for the Cumberland Plain, including the Horsley Park area.

Jo McDonald Cultural Heritage Management Pty Ltd (2000) (JMCHM) undertook a survey in advance of a proposed light industrial subdivision, within Erskine Park. The predictive modelling undertaken primarily identified the potential for sites to be present in association with water sources, with the size and density increasing with stream order. It was also noted that creek junctions provide a focus for activity. Other locations such as ridgetops between drainage lines may provide evidence of occupation (Jo McDonald Cultural Heritage Management Pty Ltd 2000, p.19). The area surveyed contained first and second order creeks, and so it was predicted that background scatters of artefacts may be associated with first order creeks, and that higher density sites may be identified in association with the second order creek.

The survey identified nine sites, including six artefact scatters and three isolated finds. Six of the identified sites were located on lower hillslopes, two on creek bank/lower hillslopes, and one on a creek bank/floodplain. The majority of sites were identified between 50 and 200 metres from water sources. Subsequently, sensitivity mapping was developed and it was recommended that subsurface investigation take place in areas of higher sensitivity within the study area.

Australian Museum Business Services (2008) (AMBS) was commissioned by Parsons Brinckerhoff Australia Pty Ltd, on behalf of Alinta Asset Management Pty Ltd to undertake a preliminary Aboriginal and historic archaeological and cultural heritage assessment of the proposed pipeline route for the Rosehill Recycled Water Scheme between Fairfield and Camellia, located approximately 15 kilometres east of the current study area. The study identified areas of potential Aboriginal cultural heritage sensitivity that warranted further assessment. The pipeline route crossed parklands and creeklines, which have the potential to contain physical evidence of Aboriginal activity and occupation. AMBS argued that although some areas are likely to have been affected by landscaping and other modifications, they still have the potential to contain sites and objects of archaeological significance and areas of Aboriginal cultural significance.

White & McDonald (2010) undertook a review of previous work in the Rouse Hill development area, discussing lithic artefact distribution in previous excavations carried out by JMCHM. The study considered a number of factors including stream order, distance from water, landform, aspect, and distance to silcrete sources. As a result of the assessment, the following statements were made:

- Stream Order: water supply was a significant factor influencing Aboriginal land use and habitation in the area. There was a correlation between increasing stream order and larger numbers and higher densities of artefacts (from a comparison of first, second, and fourth order streams).
- Distance from water: the results showed that an assumption that sites would be clustered within 50 metres of water sources was not entirely correct from the data available. In first order stream landscapes, there was no significant correlation between artefact distribution and distance to water. In second order landscapes, artefact density was highest within 50 metres of water, and then declined with increasing distance. In fourth order landscapes, density was highest between 51-100 metres from water.
- Landform: Artefact density was considered to be lowest on upper slopes and ridgetops, with density increasing on mid and lower slopes. Density was highest in terrace landforms, and lower on creek flats, likely due to repeated flooding events and the erosion the caused.

- Distance to silcrete sources: the results of the study showed no significant difference between sites located closer to or further away from silcrete sources. However, 6 kilometres was the maximum tested distance from silcrete sources, so the sample is only representative of a limited area.
- Aspect: only appeared to have an influence on sites in the lower parts of valleys may have been sited to take advantage of steady factors such as the rising/setting sun and wind direction. Sites in higher parts of valleys may have been influenced by weather and other factors.

The study concluded that landform and distance from water had an impact on site distribution, with artefacts becoming more numerous closer to creeks, and along higher order creeks. It also found that although artefacts are found on all landforms, landform type influences artefact distribution, with the preference being for slightly elevated, well-drained areas in the lower parts of valleys.

3.3 Local context

A number of Aboriginal cultural heritage investigations have been conducted within an approximately 10 kilometre buffer of the study area. These investigations are briefly summarised below. Most of these investigations were development driven and include surface and sub-surface investigations.

Dominic Steele Consulting Archaeology (2003) undertook test excavations at Wallgrove Road, Eastern Creek; approximately 200 metres north-west of the current study area. The predictive modelling employed by Steele is of relevance to the Cumberland Plain generally, drawing on assessments made by JMCHM and AMBS in the Rouse Hill Area. The assessment built on a number of previous surveys conducted between 1980 and 2002 within the study area. Steele noted a JMCHM study from 1997, which had stated that surface artefacts were not an effective way to characterise archaeological sites, and that at the time of writing:

- 17 out of the 61 excavated sites on the Cumberland Plain had no artefacts present on the surface prior to excavation. However, most areas with sparse or no surface manifestations contained considerable archaeological deposits.
- The ratio of recorded surface to excavated artefacts is 1:25 across the Plain.
- None of the excavated sites could be properly characterised on the basis of their surface artefacts alone.
- Open campsites are located in all landscapes on the Cumberland Plain. The predominance of sites recorded along creek banks is likely to be indicative of surface visibility conditions and taphonomic factors, rather than the human distribution of artefacts across the landscape (Dominic Steele Consulting Archaeology 2003, pp.19–20).

This statement notes a number of issues with predictive models that base their assessment of subsurface potential based entirely on the presence or absence of surface artefacts. There may be a correlation between artefact density and site function.

A total of 20 1 x 1 metre squares were excavated using a backhoe, and sieved through nested 5 and 2.5 millimetre sieves. The deposit encountered tended to be relatively shallow, with most pits not exceeding 20 centimetres. A total of 38 artefacts were identified by surface survey and excavation, with a density characterised by Steele as extremely low, and the area was interpreted as being visited sporadically, and not the site of any sort of knapping or camping, but rather a general background scatter.

The deposit consisted primarily of silcrete, with quartz, tuff, and volcanic rock present in much lesser quantity. The vast majority of the deposit was identified as manuport, with some flake and core fragments present, and one potential broken axe.

Navin Officer Heritage Consultants Pty Ltd (2005) conducted machine testing at the CSR lands, Erskine Park approximately 8 kilometres west of the current study area. A total of 256 test pits were excavated, with 285 artefacts being identified across 88 of these pits. It is noted in JMCHM (2008, p.14) that only a sample of the excavated deposit was sieved, and that this may be a contributing factor to the relatively low number of artefacts identified at the site relative to other excavations in the area.

The assemblage was primarily comprised of silcrete and silicified tuff, making up about 81% of the total assemblage, and contained a range of artefact types, including microblades, bondi points, and backed artefacts. Based on the results of this testing, Navin Officer characterised the site as having been used as a transient camp, or for peripheral activities in relation to a larger camping area, and stated that it had been subject to low intensity occupation (Navin Officer Heritage Consultants Pty Ltd 2005, p.ii).

Haglund and Associates (2007) were commissioned by the NSW Roads and Traffic Authority to undertake an archaeological assessment of the planned widening and upgrading of Horsley Park drive, south of the current study area. During the assessment six PADs were identified for further investigation. The heritage potential was assessed as particularly high in the western part, on either side of Eastern Creek. The aim of the test excavations were to ascertain the archaeological potential of the areas to be affected by the proposed development and to assess the character or significance of any subsurface cultural material. All six PADs tested contained Aboriginal cultural material. The most dominant raw material recorded was silcrete, followed by silicified tuff and then quartz.

JMCHM (2008) undertook salvage excavations at the proposed light industrial subdivision, within Erskine Park, located approximately 8 kilometres west of the current study area. The salvage excavations retrieved a total of 8,867 lithics from 298 square metres, indicating a density of 29.8 artefacts per square metre. It was identified that the pattern of artefact distribution within the site was typical for the Cumberland Plain and was likely higher due to the presence of second and third order streams (which indicates a permanent or semi-permanent water source).

Analysis of the artefacts conducted shows that the dominant artefact types recovered from excavations were flake fragments/flaked piece debitage followed by platform debitage. It is notable that there are a large number of cores and other retouched and backed artefacts.

It was concluded that the site patterning in the area was typical of the Cumberland Plain, however artefact density was influenced by a number of landscape and resource features in the area, with it being noted that artefact density decreases with stream order and use of silcrete as a raw material decreases with increasing distance from silcrete sources. As a whole, the site displayed a higher than average artefact density, likely due to the presence of nearby sources of silcrete (Jo McDonald Cultural Heritage Management Pty Ltd 2008, p.i).

Biosis Research (2010) conducted test excavations approximately 6 kilometres north-west of the current study area in advance of the construction of a link road between Erskine Park Road and Old Wallgrove Road, Erskine Park. A total of 113 1 x 1 metre pits were excavated across four sites. Two of these sites were the locations of surface finds, while the other two were identified PADs.

- RCIF 1 (45-5-3843) was originally recorded as an isolated artefact site, as one silcrete artefact was found on the edge of a dam during field survey. During test excavations, 16 pits were excavated in a U shape around the dam, recovering eight artefacts from four of the pits. It was noted that the land had undergone some disturbance as a result of past land use activities.
- EPLR 1 (45-5-3842) was originally recorded as a low density artefact scatter consisting of two silcrete artefacts located on the northern and southern bank of a shallow tributary creek line. A total of 19 pits were excavated at this site, recovering three artefacts across two pits. Again, the land had seen disturbance from ploughing, stock movement, vehicle movement and fence construction.

- EP PAD 1 east was the portion of EP PAD 1 located on the east side of Ropes Creek. Sub-surface testing was carried out on the floodplain and a slight rise overlooking the floodplain. 27 test pits were excavated in this area, and a total of 52 artefacts were recovered from 10 pits. As with the other excavation units discussed here, it had seen disturbance from past land use activities such as grazing and vehicle movement.
- EP PAD 1 west was the portion of EP PAD 1 located on the west side of Ropes Creek, on the banks and floodplain of the creek. 51 test pits were excavated, with a total of 289 artefacts were found in 29 pits, almost all within the top 20 centimetres. Two pits contained artefacts between 20 and 30 centimetres.

A total of 352 artefacts were recovered during excavations, with the majority being comprised of silcrete, along with a number of quartz artefacts. It was noted during excavation that sources of silcrete are naturally occurring within 3 kilometres of the study area.

Dominic Steele Consulting Archaeology (2012) carried out an archaeological assessment including survey over an approximately 21.4 hectare area immediately to the south of the current study area. This was completed on behalf of the Western Sydney Parks Trust to meet the requirements of an Aboriginal and non-Aboriginal Archaeological and Cultural Heritage Assessment for the construction of the initial stage of the Horsley Drive Business Park. They identified "attractive" areas, such as permanent water sources, rises and raw material sources as likely locations for long duration visits, marked by more diverse assemblages. Areas which are not in close proximity to these resources are more likely to yield one off finds.

No aboriginal archaeological constraints were identified, with no Aboriginal sites located during the survey. This was attributed to the lack of major water or raw material resources, suggesting the area would have only been occupied sporadically, as well as poor visibility and widespread disturbance from agricultural impacts across the study area. The study area was assessed as having low scientific archaeological significance due to the level of disturbance and as a result it was stated "any finds that would be recovered would likely be largely unexceptional in nature with minimal research potential" (Dominic Steele Consulting Archaeology 2012, p.96).

Australian Museum Consulting (2014) was commissioned by Creative Planning Solutions to prepare an Aboriginal Cultural Heritage Assessment for the Sydney International Equestrian Centre (SIEC), Horsley Park. An Aboriginal archaeological survey of the study area was undertaken, with 16 silcrete and chert artefacts recorded on ground surface exposures over an area of approximately 31 metres by 15 metres on the lower slope and flat adjacent to Eastern Creek. Due to the recovery of surface artefacts, it was determined that prior to any works proceeding, an Aboriginal Heritage Impact Permit would need to be obtained.

Biosis (2014) undertook an Aboriginal due diligence assessment for Jemena Limited at the Horsley Park Meter Station approximately 160 metres south of the study area. Jemena Limited proposed to upgrade to the existing natural gas facility at Horsley Park, NSW. No Aboriginal objects were located within the study area and it was recommended that the works proceed with caution.

Biosis (2016) was commissioned by Western Sydney Parklands Trust to undertake an Aboriginal archaeological investigation in advance of the proposed Horsley Drive Business Park Stage 2 development, located approximately 1 kilometre south-east of the current study area. The archaeological survey did not identify any Aboriginal sites or objects within the site. Due to the widespread disturbance throughout the study area as a result of land use practices including pastoralism, farming, and residential development, and the lack of any reliable water sources in close proximity to it, it was considered that there was a low potential for any potential archaeological deposits to be present within the area. It was recommended that any works proceed with caution.

3.3.1 Identified Aboriginal archaeological sites

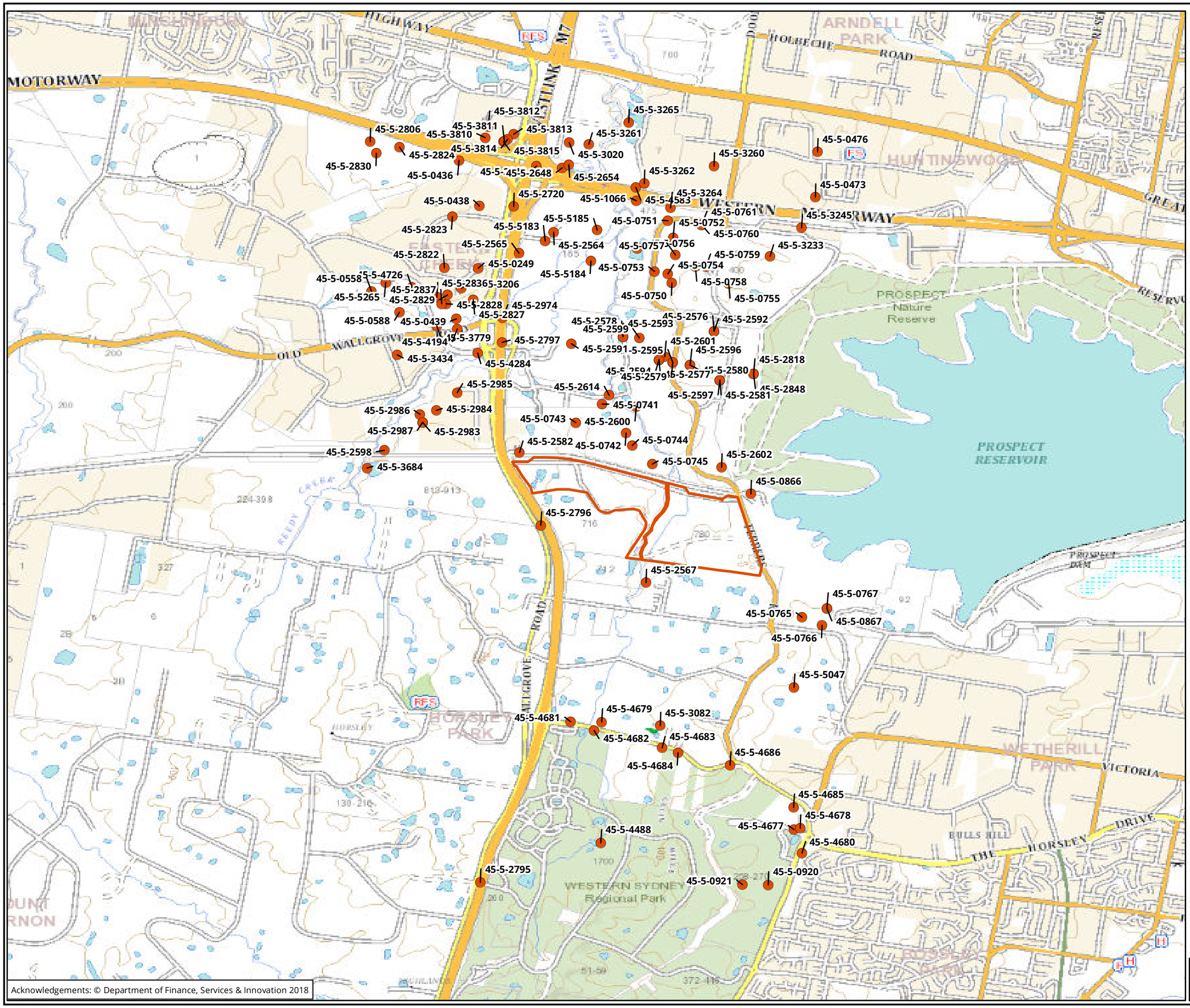
An extensive search of the AHIMS database was conducted on 16 December 2019 (Client service ID: 473023). The search identified 120 Aboriginal archaeological sites within a 3 kilometre search area, centred on the study area (Table 3). None of these registered sites are located *within* the study area, with four sites located within the vicinity of the study area, between 100 and 250 metres away (Figure 7). The mapping coordinates recorded for these sites were checked for consistency with their descriptions and location on maps from Aboriginal heritage reports where available. These descriptions and maps were relied where notable discrepancies occurred.

It should be noted that the AHIMS database reflects Aboriginal sites that have been officially recorded and included on the list. Large areas of NSW have not been subject to systematic, archaeological survey; hence AHIMS listings may reflect previous survey patterns and should not be considered a complete list of Aboriginal sites within a given area.

Table 3 AHIMS sites within the study area

Site type	Occurrences	Frequency (%)
Artefact	63	52.50
Open camp site, with artefact	35	29.20
Potential archaeological deposit (PAD)	8	6.70
Isolated find, artefact	5	4.20
Scarred tree	4	3.30
Aboriginal Ceremony and Dreaming	2	1.70
Scarred tree, artefacts	1	0.83
Potential archaeological deposit (PAD), artefact	1	0.83
Art, pigment or engraved	1	0.83
Total	**120**	**100**

A simple analysis of the Aboriginal cultural heritage sites registered within 3 kilometres of the study area indicates that the dominant site type is artefact sites, representing three of the top four most commonly identified sites, including artefact {n=63) open camp sites (n=35) and isolated finds (n=5). Together these represent 103 of the 120 results (85.83%). Following this, PAD sites are the next most common site type (n=8, 6.70%).other site types identified in the vicinity of the study area include culturally modified trees and art sites, although these are comparatively less common. The results of the AHIMS search suggests that Aboriginal sites within the study area, if present, are most likely to comprise stone artefact scatters or PADs. Given extensive tree clearance in the impact areas, it is not anticipated that culturally modified trees will be identified.



Acknowledgements: © Department of Finance, Services & Innovation 2018

Legend

- Study area
- AHIMS record

Figure 7 AHIMS records near the study area

NOT TO BE MADE PUBLIC

0 310 620 930 1,240 1,550

Metres
Scale: 1:31,000 @ A3
Coordinate System: GCS GDA 1994

Biosis Pty Ltd

Ballarat, Brisbane, Canberra, Melbourne, Sydney,Wangaratta & Wollongong

Matter: 31252
Date: 17 December 2019,
Checked by: jshepherd, Generated by: jshepherd
Location:P:\31200s\31252\Mapping\ 31252_F7_AHIMS.mxd

3.3.2 Predictive statements

A series of statements been formulated to broadly predict the type and character of Aboriginal cultural heritage sites likely to exist throughout the study area and where they are more likely to be located.

These statements are based on:

- Local and regional site distribution in relation to landform features identified within the study area.
- Consideration of site type, raw material types and site densities likely to be present within the study area.
- Findings of the ethnohistorical research on the potential for material traces to present within the study area.
- Potential Aboriginal use of natural resources present or once present within the study area.
- Consideration of the temporal and spatial relationships of sites within the study area and surrounding region.

Table 4 below indicates the site types most likely to be encountered across the study area. The definition of each site type is described firstly, followed by the predicted likelihood of this site type occurring within the study area.

Table 4 Aboriginal site prediction statements

Site type	Site description	Potential
Flaked stone artefact scatters and isolated artefacts	Artefact scatter sites can range from high-density concentrations of flaked stone and ground stone artefacts to sparse, low-density 'background' scatters and isolated finds.	Low: Stone artefact sites have been previously recorded in the region on level, well-drained topographies in close proximity to reliable sources of fresh water. Although the study area is located in close proximity to permanent fresh water resources, the high levels of disturbance throughout the study area suggest that the potential for artefacts to be present is low.
Shell middens	Deposits of shells accumulated over either singular large resource gathering events or over longer periods of time.	Low: Shell midden sites have not been recorded within the vicinity of the study area. There is a very low potential for shell middens to be located in the study area as the water course is not a permanent water source.
Quarries	Raw stone material procurement sites.	Low: There is no record of any quarries being within or surrounding the study area.
Potential Archaeological Deposits (PADs)	Potential sub surface deposits of cultural material.	Low: PADs have been previously recorded in the region across a wide range of landforms. Due to the high levels of previous disturbance within the study area, PADs are not likely to be present.

Site type	Site description	Potential
Modified trees	Trees with cultural modifications	Low: Scarred trees have been recorded in the vicinity of the study area, however due to the disturbance visible, extensive vegetation clearance has occurred throughout the area, with only a small number of mature native trees surviving along Eastern Creek.
Grinding grooves	Grooves created in stone platforms through ground stone tool manufacture.	Low: There are no suitable horizontal sandstone rock outcrops that could occur along drainage lines.
Burials	Aboriginal burial sites.	Low: Aboriginal burial sites are generally situated within deep, soft sediments, caves or hollow trees. Areas of deep sandy deposits will have the potential for Aboriginal burials. The soil profiles associated with the study area are not commonly associated with burials.
Rock shelters with art and / or deposit	Rock shelter sites include rock overhangs, shelters or caves, and generally occur on, or next to, moderate to steeply sloping ground characterised by cliff lines and escarpments. These naturally formed features may contain rock art, stone artefacts or midden deposits and may also be associated with grinding grooves.	Low: The sites will only occur where suitable sandstone exposures or overhangs possessing sufficient sheltered space exist, which are not present throughout the study area.
Aboriginal Ceremony and Dreaming sites	Such sites are often intangible places and features and are identified through oral histories, ethnohistoric data, or Aboriginal informants.	Low: There are currently no recorded mythological stories for the study area, however there are two previously recorded Dreaming sites approximately 600 metres south-east of the study area. These sites are recorded as containing both stone and flaked glass artefacts, and exist in areas with a good outlook over Prospect Reservoir.
Post-contact sites	These are sites relating to the shared history of Aboriginal and non-Aboriginal people of an area and may include places such as missions, massacre sites, post-contact camp sites and buildings associated with post-contact Aboriginal use.	Low: There are no post-contact sites previously recorded in the study area and historical sources do not identify one.

Site type	Site description	Potential
Aboriginal places	Aboriginal places may not contain any 'archaeological' indicators of a site, but are nonetheless important to Aboriginal people. They may be places of cultural, spiritual or historic significance. Often they are places tied to community history and may include natural features (such as swimming and fishing holes), places where Aboriginal political events commenced or particular buildings.	Low: There are currently no recorded Aboriginal historical associations for the study area.

4 Archaeological investigation

An archaeological investigation of the impact areas was undertaken on 18 December 2019, attended by James Cole (Consultant Archaeologist, Biosis) and Steven Randall (Senior Aboriginal Cultural Heritage Officer, Deerubbin LALC). The survey sampling strategy, methodology and a discussion of results are provided below.

4.1 Archaeological survey aims

The principle aims of the survey were to:

- Undertake a systematic survey of the impact areas targeting areas with the potential for Aboriginal heritage.
- Identify and record Aboriginal archaeological sites visible on the ground surface.
- Identify and record areas of Aboriginal archaeological and cultural sensitivity.

4.2 Survey methods

The survey was conducted on foot, and was restricted to proposed impact areas only. Recording during the survey followed the archaeological survey requirements of the Code and industry best practice methodology. Information that recorded during the survey included:

- Aboriginal objects or sites present in the study area during the survey.
- Survey coverage.
- Any resources that may have potentially have been exploited by Aboriginal people.
- Landform elements, distinguishable areas of land approximately 40 metres across or with a 20 metres radius (CSIRO 2009).
- Photographs of the site indicating landform.
- Ground surface visibility (GSV) and areas of exposure.
- Observable past or present disturbances to the landscape from human or animal activities.
- Aboriginal artefacts, culturally modified trees or any other Aboriginal sites.

Where possible, the identification of natural soil deposits within the study area was undertaken. Photographs and recording techniques were incorporated into the survey including representative photographs of survey units, landform, vegetation coverage, GSV and the recording of soil information for each survey unit were possible. Any potential Aboriginal objects observed during the survey were documented and photographed. The location of Aboriginal cultural heritage and points marking the boundary of the landform elements were recorded using a hand-held Global Positioning System and the Map Grid of Australia (94) coordinate system.

4.3 Constraints to the survey

With any archaeological survey there are several factors that influence the effectiveness (the likelihood of finding sites) of the survey. The factors that contributed most to the effectiveness of the survey within the

study area were heavy disturbance within the study area, including areas which had been grossly disturbed by the movement of heavy vehicles and the construction of buildings associated with the brickworks.

4.4 Visibility

In most archaeological reports and guidelines visibility refers to GSV, and is usually a percentage estimate of the ground surface that is visible and allowing for the detection of (usually stone) artefacts that may be present on the ground surface (DECCW 2010b). Overall visibility was highly variable in the survey areas, ranging from 0-10% in areas which had been subject to construction, or which were vegetated (Plate 6, Plate 7), to 100% in cleared areas currently used as haul roads (Plate 8).

Plate 6 Variable visibility in a vegetated portion of the study area, view north (1 metre scale)

Plate 7 **Area of disturbance associated with construction, view west**

Plate 8 **Area of high visibility in the eastern portion of the study area, view south-east (1 metre scale)**

4.5 Exposure

Exposure refers to the geomorphic conditions of the local landform being surveyed, and attempts to describe the relationship between those conditions and the likelihood the prevailing conditions provide for the exposure of (buried) archaeological materials. Whilst also usually expressed as a percentage estimate, exposure is different to visibility in that it is in part a summation of geomorphic processes, rather than a simple observation of the ground surface (Burke & Smith 2004, p.79, DECCW 2010b). Overall, the study area displayed areas of exposure around locations currently in use for the manufacture of bricks, which forms the vast majority of the study area. These areas of exposure were generally associated with current haul roads and tracks (Plate 9, Plate 10).

Plate 9 **Area of exposure associated with a disused access track in the eastern portion of the study area, view east (1 metre scale)**

Plate 10 Area of exposure associated with an access road in the western portion of the study area, view south

4.6 Disturbances

Disturbance in the study area is associated with natural and human agents. Natural agents generally affect small areas and include the burrowing and scratching in soil by animals, such as wombats, foxes, rabbits and wallabies, and sometimes exposure from slumping or scouring. Disturbances associated with recent human action are prevalent in the study area and cover large sections of the land surface. The agents include residential development such as landscaping and construction of residential buildings; farming practices, such as initial vegetation clearance for creation of paddocks, fencing and stock grazing; agricultural practices such as fruit orchards; light industrial practices such as nursery and creation of artificial dams

The study area has been subject to heavy disturbance since the 1960s, when the existing brickworks were established. The eastern portion of the study area has been extensively developed (Plate 11), and subject to varying levels of bulk excavation. The level of disturbance made it extremely difficult to determine where, if at all, the natural ground surface was present within the study area. The western portion of the study area has also been subject to extensive disturbance, and is now used as a stockpile (Plate 12).

Plate 11 **Existing development in the eastern portion of the study area, view north**

Plate 12 **Existing stockpiling in western portion of the study area, view south-west**

4.7 Investigation results and discussion

The survey consisted of a total of three transects walked across the two impact or survey areas identified in Figure 3 and Figure 8. The first, in the eastern portion of the study area, is associated with the existing complex of buildings which form Plant 2 of the brickworks, and the second to the west, associated with a stockpiling area. Both areas displayed heavy disturbance from their use as a brickworks. These disturbances include cut and fill actions as well as construction associated with warehouses and factories.

The two areas which will be impacted by the proposed works are in the vicinity of Eastern Creek, which flows north along the boundary of the western survey area, associated with a current stockpiling area, and located approximately 400 metres west of the eastern survey area, associated with the existing Plant 2 structures. The western survey area is contained within the South Creek Soil Landscape, likely due to its proximity to Eastern Creek, while the eastern area is associated with the Blacktown Soil Landscape. The South Creek Soil landscape has the potential to contain moderately deep alluvial soil profiles (typically up to 65 centimetres of topsoil overlying clay), while the Blacktown Soil Landscape tends to retain shallower soil profiles, and as a residual soil landscape is at a high risk of disturbance from modern land use activities, such as the extensive construction associated with the eastern survey area.

Given the history of land disturbance within the study area, it was difficult to discern whether the landforms present within the survey areas could be considered natural, as the entirety of the area has been subject to landscape modification. Within the eastern survey area surrounding the existing Plant 2 buildings, the study area sloped gently toward the west, while in the western survey area, the extensive disturbance associated with excavation and stockpiling activities obscured the natural landform, however given its setting adjacent to Eastern Creek, it would be likely to consist of a flat of gently sloping landform. While within the Cumberland Plain, proximity to sources of water is generally considered to be an indicator of archaeological potential, the extensive disturbance associated with stockpiling, excavation, and construction is likely to have removed the potential for intact archaeological deposits to be present.

No aboriginal objects or areas of archaeological potential were identified during the survey. Background research completed by Biosis indicated that owing to the levels of existing disturbance within the impact areas, there was a low potential for Aboriginal sites to be present within it, and no cultural associations were identified in the background research. On site discussions held with Deerubbin LALC confirmed this. It is noted that the area along the margins of Eastern Creek, outside of the proposed impact areas, appears to have been subject to comparatively less disturbance.

Legend

- Study area
- Proposed development footprint
- Low Archaeological Potential

Figure 8 Survey Results

0 60 120 180 240 300

Metres

Scale: 1:6,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis®

Biosis Pty Ltd

Albury, Ballarat, Melbourne,
Sydney, Newcastle, Wangaratta & Wollongong

Matter: 31252,
Date: 10 January 2020,
Checked by: JAC, Drawn by: SSK, Last edited by: skumar
Location:P:\31200s\31252\Mapping
31252_F8_SurveyResults.mxd

5 Conclusions and recommendations

5.1 Conclusions

Based on the results of the background research and archaeological survey, the proposed impact areas have been assessed as holding low potential to contain Aboriginal sites. Discussions held with the LALC on site agree with this conclusion. It is recommended that no further archaeological assessment is required in advance of works within the impact areas, and that an unexpected finds protocol be established should be established as a contingency should any Aboriginal objects be identified during works.

It is noted that the area along the margins of Eastern Creek, and the western most portion of the study area outside of the proposed impact areas, appears to have been subject to comparatively less disturbance. If future works are proposed within these areas further works in the form of a field investigation are recommended.

5.2 Recommendations

The following management recommendations have been developed relevant to the study area and influenced by:

- Predicted impacts to Aboriginal cultural heritage.
- The planning approvals framework.
- Current best conservation practise, widely considered to include:
  - Ethos of the Australia ICOMOS Burra Charter (2013).
  - The Code.

Prior to any impacts occurring within the study area, the following is recommended:

Recommendation 1: No further archaeological assessment is required within the impact areas

No further archaeological work is required in the impact areas, as these areas have been assessed as holding low archaeological potential. Should additional works occur outside of the identified impact areas, further assessment in the form of an archaeological survey will be required.

Recommendation 2: Provide a copy of the final report to Deerubbin LALC for comment

A copy of this final assessment should be provided to Deerubbin LALC for their records.

Recommendation 3: Discovery of Unanticipated Aboriginal Objects

All Aboriginal objects and Places are protected under the NPW Act. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by EES. Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object the archaeologist will provide further recommendations. These may include notifying EES and Aboriginal stakeholders.

Recommendation 4: Discovery of Aboriginal Ancestral Remains

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and EES' Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by EES.

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Appendices

Appendix 1 AHIMS search results

This Appendix is not to be made public.

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 31252 - ALB

Client Service ID : 473023

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-5-2795	WSO-IF-1	AGD	56	301030	6251680	Open site	Destroyed	Artefact : -		103366
Contact		Recorders	Mrs.Robynne Mills					Permits	1398	
45-5-2796	WSO-IF-2	AGD	56	301410	6254840	Open site	Valid	Artefact : -		
Contact		Recorders	Mrs.Robynne Mills					Permits		
45-5-2797	WSO-OS-8	AGD	56	301090	6256450	Open site	Valid	Artefact : -		
Contact		Recorders	Mrs.Robynne Mills					Permits	1398	
45-5-2836	IF:7	AGD	56	300600	6256840	Open site	Valid	Artefact : -		4599,98444,100449
Contact		Recorders	Dominic Steele Archaeological Consulting					Permits	1573,1609,2470	
45-5-2837	IF:8	AGD	56	300640	6256780	Open site	Valid	Artefact : -		4599,100449
Contact		Recorders	Dominic Steele Archaeological Consulting					Permits	2470	
45-5-2818	ECD1	AGD	56	302950	6256210	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
Contact		Recorders	Navin Officer Heritage Consultants Pty Ltd					Permits	1445,1584	
45-5-2806	AWL 5	AGD	56	300080	6258200	Open site	Valid	Artefact : -		
Contact		Recorders	Dominic Steele Archaeological Consulting					Permits		
45-5-2654	PL-05-1	AGD	56	301550	6258030	Open site	Destroyed	Artefact : -		
Contact		Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
45-5-2848	ECD/1	AGD	56	302950	6256210	Open site	Valid	Artefact : -		98343
Contact		Recorders	Navin Officer Heritage Consultants Pty Ltd					Permits		
45-5-2822	WBP 1	AGD	56	300650	6257100	Open site	Valid	Modified Tree (Carved or Scarred) : -		98444
Contact		Recorders	Dominic Steele Archaeological Consulting					Permits	1573,1609	
45-5-2823	AWL 8	AGD	56	300700	6257550	Open site	Valid	Art (Pigment or Engraved) : -		98444
Contact		Recorders	Dominic Steele Archaeological Consulting					Permits	1573,1609	
45-5-2824	AWL 1	AGD	56	300300	6258160	Open site	Valid	Artefact : -		4599
Contact		Recorders	Dominic Steele Archaeological Consulting					Permits		
45-5-2827	AWL 4	AGD	56	300870	6256820	Open site	Valid	Artefact : -		4599,98444
Contact		Recorders	Dominic Steele Archaeological Consulting					Permits	1573,1609	
45-5-2828	AWL 6	AGD	56	300670	6256780	Open site	Valid	Artefact : -		4599,98444,100449
Contact		Recorders	Dominic Steele Archaeological Consulting					Permits	1573,1609,2470	
45-5-2829	AWL 7	AGD	56	300680	6256860	Open site	Valid	Artefact : -		4599,98444,100449

Report generated by AHIMS Web Service on 16/12/2019 for Samantha Keats for the following area at Datum :GDA, Zone : 56, Eastings : 300163 - 304282, Northings : 6251617 - 6258624 with a Buffer of 0 meters. Additional Info : ADDA. Number of Aboriginal sites and Aboriginal objects found is 120

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	**Recorders**	Dominic Steele Archaeological Consulting					**Permits**	1573,1609,2470	
45-5-2830	IF:1	AGD	56	300130	6258100	Open site	Valid	Artefact : -		4599
	Contact	**Recorders**	Dominic Steele Archaeological Consulting					**Permits**	2470	
45-5-2974	Lucan Park PAD	AGD	56	301090	6256666	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Megan Mebberson					**Permits**	1941	
45-5-2720	PAD-OS-8	AGD	56	301150	6257650	Open site	Destroyed	Artefact : -		
	Contact	**Recorders**	Mrs.Robynne Mills					**Permits**		
45-5-2579	EC5	AGD	56	302350	6256300	Open site	Valid	Artefact : -	Isolated Find	98435
	Contact	**Recorders**	Mr.Kelvin Officer					**Permits**		
45-5-0761	EC1 (Eastern Creek)	AGD	56	302540	6257520	Open site	Valid	Artefact : -	Open Camp Site	1644,98435
	Contact	**Recorders**	Elizabeth Rich,S Lalor,Mr.David Crew					**Permits**	131	
45-5-0765	GPR 1 (Prospect Reservoir)	AGD	56	303350	6254070	Open site	Valid	Artefact : -	Open Camp Site	1723,1857,103366
	Contact	**Recorders**	Elizabeth Rich,Laura-Jane Smith,Miss.Lisa Smith					**Permits**		
45-5-2600	WSRA 2	AGD	56	302090	6255900	Open site	Valid	Artefact : -		
	Contact Colin Gale	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**		
45-5-4726	Lot 40 PAD	GDA	56	300521	6257112	Open site	Valid	Potential Archaeological Deposit (PAD) : -, Artefact : -		
	Contact	**Recorders**	GML Heritage Pty Ltd + Context - Surry Hills,Doctor.Tim Owen,Doctor.Tim Owen					**Permits**	4136	
45-5-4677	The Horsley Drive IF 1	GDA	56	303433	6252382	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Tyler Beebe					**Permits**		
45-5-4678	The Horsley Drive IF 2	GDA	56	303479	6252394	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Tyler Beebe					**Permits**		
45-5-4679	The Horsely Drive AFT 7	GDA	56	301999	6253303	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Tyler Beebe					**Permits**		
45-5-4680	The Horsley Drive AFT 8	GDA	56	303498	6252176	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Tyler Beebe					**Permits**		
45-5-4681	The Horsley Drive AFT 1	GDA	56	301769	6253302	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Benjamin Anderson					**Permits**		
45-5-4682	The Horsley Drive AFT 2	GDA	56	301943	6253227	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Benjamin Anderson					**Permits**		
45-5-4683	The Horsley Drive AFT 3	GDA	56	302447	6253086	Open site	Valid	Artefact : -		

Report generated by AHIMS Web Service on 16/12/2019 for Samantha Keats for the following area at Datum :GDA, Zone : 56, Eastings : 300163 - 304282, Northings : 6251617 - 6258624 with a Buffer of 0 meters. Additional Info : ADDA. Number of Aboriginal sites and Aboriginal objects found is 120

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Benjamin Anderson					**Permits**		
45-5-4684	The Horsley Drive AFT 4	GDA	56	302566	6253042	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Benjamin Anderson					**Permits**		
45-5-4685	The Horsley Drive AFT 6	GDA	56	303428	6252579	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Benjamin Anderson					**Permits**		
45-5-4686	The Horsley Drive AFT 5	GDA	56	302952	6252940	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Kelleher Nightingale Consulting Pty Ltd,Mr.Benjamin Anderson					**Permits**		
45-5-5265	Eastern Creek Lot 40 Artefact Reburial	GDA	56	300327	6257149	Closed site	Valid	Artefact : -		
	Contact	**Recorders**	GML Heritage Pty Ltd + Context - Surry Hills,Ms.Hannah Morris					**Permits**		
45-5-2576	EC2	AGD	56	302650	6256580	Open site	Valid	Artefact : -	Open Camp Site	98435
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**	1382	
45-5-2577	EC4	AGD	56	302250	6256320	Open site	Valid	Artefact : -	Open Camp Site	98435
	Contact	**Recorders**	Mr.Kelvin Officer					**Permits**		
45-5-2578	EC3	AGD	56	301980	6256520	Open site	Valid	Artefact : -	Open Camp Site	98435
	Contact	**Recorders**	Mr.Kelvin Officer					**Permits**		
45-5-2580	EC6	AGD	56	302480	6256280	Open site	Valid	Artefact : -	Isolated Find	98435
	Contact	**Recorders**	Mr.Kelvin Officer					**Permits**	1444	
45-5-2581	EC7	AGD	56	302700	6256150	Open site	Valid	Artefact : -	Open Camp Site	98435
	Contact	**Recorders**	Mr.Kelvin Officer					**Permits**	1382	
45-5-2582	EC8,	AGD	56	301240	6255480	Open site	Valid	Artefact : -	Isolated Find	98435
	Contact	**Recorders**	Mr.Kelvin Officer					**Permits**	1444	
45-5-2564	IF1	AGD	56	301450	6257430	Open site	Valid	Artefact : -	Isolated Find	98435
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**		
45-5-2565	IF2	AGD	56	301200	6257240	Open site	Valid	Artefact : -	Isolated Find	98435
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer					**Permits**		
45-5-2567	DLC1	AGD	56	302194	6254349	Open site	Valid	Artefact : -	Open Camp Site	98435,103366
	Contact	**Recorders**	Annie Nicholson					**Permits**		
45-5-0473	South Blacktown 1 Blacktown	AGD	56	303370	6257780	Open site	Valid	Artefact : -	Open Camp Site	1018
	Contact	**Recorders**	Jim Kohen					**Permits**		
45-5-0476	South Blacktown 2 Blacktown	AGD	56	303380	6258180	Open site	Valid	Artefact : -	Open Camp Site	1018
	Contact	**Recorders**	Jim Kohen					**Permits**		
45-5-1066	Eastern Creek 1 EC 1	GDA	56	302157	6257912	Open site	Destroyed	Artefact : -	Open Camp Site	3694,98435
	Contact	**Recorders**	Helen Brayshaw,Ms.Laila Haglund,Kelleher Nightingale Consulting Pty Ltd,Miss.Kri					**Permits**	4001	
45-5-0920	Abbotsbury 1;	AGD	56	303150	6251700	Open site	Valid	Artefact : -	Open Camp Site	103366

Report generated by AHIMS Web Service on 16/12/2019 for Samantha Keats for the following area at Datum :GDA, Zone : 56, Eastings : 300163 - 304282, Northings : 6251617 - 6258624 with a Buffer of 0 meters. Additional Info : ADDA. Number of Aboriginal sites and Aboriginal objects found is 120

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Kerry Navin					Permits	461	
45-5-0921	Abbotsbury 2;	AGD	56	302960	6251700	Open site	Valid	Artefact : -	Open Camp Site	98435,103366
	Contact	Recorders	Kerry Navin					Permits		
45-5-0866	TPP 1;Prospect Reservoir;	AGD	56	302950	6255150	Open site	Valid	Artefact : -	Open Camp Site	2246,98435
	Contact	Recorders	Denise Donlon					Permits		
45-5-0867	TPP2;Prospect Reservoir;	AGD	56	303530	6254150	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	2246,103366
	Contact	Recorders	Denise Donlon					Permits		
45-5-0436	Eastern Creek W3	AGD	56	300740	6258050	Open site	Valid	Artefact : -	Open Camp Site	1018,98435
	Contact	Recorders	Doctor.Susan Mcintyre-Tamwoy					Permits		
45-5-0438	Eastern Creek W2	AGD	56	300900	6257650	Open site	Valid	Artefact : -	Open Camp Site	1018,98435
	Contact	Recorders	Doctor.Susan Mcintyre-Tamwoy					Permits	2569	
45-5-0439	Eastern Creek W1	AGD	56	300750	6256650	Open site	Valid	Artefact : -	Open Camp Site	1018,98435
	Contact	Recorders	Doctor.Susan Mcintyre-Tamwoy					Permits		
45-5-0249	Wallgrove Wallgrove Road	AGD	56	300900	6257100	Open site	Valid	Artefact : -	Open Camp Site	367,1018,98435,98444,98677
	Contact	Recorders	Ms.Laila Haglund					Permits	1573,1609	
45-5-0741	WDD1	AGD	56	301840	6255920	Open site	Valid	Artefact : -	Open Camp Site	98435
	Contact	Recorders	Margrit Koettig					Permits		
45-5-0742	WDD 2	AGD	56	302020	6255670	Open site	Valid	Artefact : -	Open Camp Site	1501,1530,1935,98435
	Contact	Recorders	Margrit Koettig					Permits		
45-5-0743	WDD3	AGD	56	301650	6255750	Open site	Valid	Artefact : -	Open Camp Site	1501,1530,98435
	Contact	Recorders	Margrit Koettig					Permits		
45-5-0744	WDD5	AGD	56	302070	6255560	Open site	Valid	Artefact : -	Open Camp Site	98435
	Contact	Recorders	Margrit Koettig					Permits		
45-5-0745	WDD 6	AGD	56	302220	6255400	Open site	Valid	Artefact : -	Open Camp Site	1530,1935,98435
	Contact	Recorders	Margrit Koettig					Permits		
45-5-0750	EC12 (Eastern Creek)	AGD	56	302330	6257000	Open site	Valid	Artefact : -	Open Camp Site	1644,1646,1814,98435
	Contact	Recorders	Elizabeth Rich,Laura-Jane Smith					Permits	131	
45-5-0751	EC11 (Eastern Creek)	AGD	56	302290	6257550	Open site	Destroyed	Artefact : -	Open Camp Site	1644,1646,1814,98435
	Contact	Recorders	Elizabeth Rich,Laura-Jane Smith					Permits	131	

Report generated by AHIMS Web Service on 16/12/2019 for Samantha Keats for the following area at Datum :GDA, Zone : 56, Eastings : 300163 - 304282, Northings : 6251617 - 6258624 with a Buffer of 0 meters. Additional Info : ADDA. Number of Aboriginal sites and Aboriginal objects found is 120

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-5-0752	EC10 (Eastern Creek)	AGD	56	302330	6257400	Open site	Valid	Artefact : -	Open Camp Site	1644,1646,1814,98435
Contact	Recorders	Elizabeth Rich,Laura-Jane Smith						Permits	131	
45-5-0753	EC9 (Eastern Creek)	AGD	56	302200	6257100	Open site	Valid	Artefact : -	Open Camp Site	1644,1814,98435
Contact	Recorders	Elizabeth Rich,Mr.David Crew						Permits		
45-5-0756	EC6 (Eastern Creek)	AGD	56	302070	6257300	Open site	Valid	Artefact : -	Open Camp Site	1644,98435
Contact	Recorders	Elizabeth Rich,S Lalor,Mr.David Crew						Permits		
45-5-0757	EC5 (Eastern Creek)	AGD	56	302350	6257250	Open site	Valid	Artefact : -	Open Camp Site	1644,98435
Contact	Recorders	Elizabeth Rich,S Lalor,Mr.David Crew						Permits		
45-5-0758	EC4 (Eastern Creek)	AGD	56	302500	6257150	Open site	Valid	Artefact : -	Open Camp Site	1644,98435
Contact	Recorders	Elizabeth Rich,S Lalor,Mr.David Crew						Permits		
45-5-0558	Blacktown Southwest 5 Eastern Creek	AGD	56	300120	6256880	Open site	Valid	Artefact : -	Open Camp Site	1007,1050,98435
Contact	Recorders	Jim Kohen						Permits	2610,4218	
45-5-0588	Blacktown Southwest 1 Eastern Creek	AGD	56	300330	6256700	Open site	Valid	Artefact : -	Open Camp Site	98435
Contact	Recorders	Jim Kohen						Permits	4218	
45-5-0759	EC3 (Eastern Creek)	AGD	56	302580	6257150	Open site	Valid	Artefact : -	Open Camp Site	1644,98435
Contact	Recorders	Elizabeth Rich,S Lalor,Mr.David Crew						Permits		
45-5-0760	EC2 (Eastern Creek)	AGD	56	302540	6257520	Open site	Valid	Artefact : -	Open Camp Site	1644,98435
Contact	Recorders	D Drew,Elizabeth Rich,S Lalor						Permits		
45-5-0766	PR 2 (Prospect Reservoir)	AGD	56	303500	6254000	Open site	Valid	Artefact : -, Aboriginal Ceremony and Dreaming : -		1723,1857,98283,103366
Contact	Recorders	Elizabeth Rich						Permits		
45-5-0767	PR 3 (Prospect Reservoir)	AGD	56	303530	6254150	Open site	Valid	Artefact : -, Aboriginal Ceremony and Dreaming : -		1723,1857,98283,103366
Contact	Recorders	Elizabeth Rich						Permits		
45-5-2849	SO-ST 2 (A, B, C, D & E)	AGD	56	301310	6258010	Open site	Destroyed	Modified Tree (Carved or Scarred) : -		4015,98084
Contact	Recorders	Australian Museum Consulting (AM Consulting),Megan Mebberson						Permits	1597	
45-5-2987	AUS 1	AGD	56	300520	6255730	Open site	Valid	Modified Tree (Carved or Scarred) : -		
Contact	Recorders	Doctor.Jo McDonald						Permits		

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SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-5-2983	Austral 1	AGD	56	300520	6255730	Open site	Valid	Modified Tree (Carved or Scarred) : -, Artefact : 6		
	Contact	**Recorders**	Doctor.Jo McDonald					**Permits**		
45-5-2984	Austral 2	AGD	56	300620	6255840	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Doctor.Jo McDonald					**Permits**	1994	
45-5-2985	Austral 3	AGD	56	300770	6256000	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Doctor.Jo McDonald					**Permits**	1994	
45-5-2986	Austral PAD 1	AGD	56	300500	6255800	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Doctor.Jo McDonald					**Permits**	1994	
45-5-3020	EC_AMBS_04	GDA	56	301654	6258414	Open site	Destroyed	Artefact : -		
	Contact	**Recorders**	Matthew Kelleher,Niche Environment and Heritage,Miss.Layne Holloway					**Permits**	2150	
45-5-3434	Parramatta SWC PAD	AGD	56	300320	6256325	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	**Recorders**	Heritage Concepts					**Permits**	2965,2966	
45-5-3684	WR1 (Prospect)	AGD	56	300120	6255319	Open site	Valid	Artefact : 4		103004
	Contact	**Recorders**	Australian Building Certification					**Permits**		
45-5-0754	EC8 (Eastern Creek)	AGD	56	302300	6257080	Open site	Valid	Artefact : -	Open Camp Site	1644,1814,98435
	Contact	**Recorders**	Elizabeth Rich,S Lalor,Mr.David Crew					**Permits**		
45-5-0755	EC7 (Eastern Creek)	AGD	56	302750	6257000	Open site	Valid	Artefact : -	Open Camp Site	1644,98435
	Contact	**Recorders**	Elizabeth Rich,S Lalor,Mr.David Crew					**Permits**		
45-5-4284	Erskine Park Link Road 2	GDA	56	301017	6256543	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Doctor.Alan Williams					**Permits**	3625	
45-5-4194	CONSERVATION AREA PAD	GDA	56	300863	6256750	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	**Recorders**	Doctor.Alan Williams					**Permits**	3625	
45-5-4583	M4-02 Eastern Creek	GDA	56	302152	6258029	Open site	Destroyed	Artefact : -		
	Contact	**Recorders**	Helen Brayshaw,Kelleher Nightingale Consulting Pty Ltd,Miss.Kristen Taylor					**Permits**	4001	
45-5-4488	Site within Steeplechase Track	GDA	56	302015	6252237	Open site	Valid	Artefact : -		103366
	Contact	**Recorders**	Ms.Ngaire Richards					**Permits**	3776	
45-5-5047	UC IA 17	GDA	56	303410	6253638	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Extent Heritage Pty Ltd - Pyrmont,Ms.Fenella Atkinson					**Permits**	4303	

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SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-5-5183	LIBH AS1	GDA	56	301494	6257538	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Extent Heritage Pty Ltd - Pyrmont,Mrs.Laressa Barry					**Permits**		
45-5-5184	LIBH AS3	GDA	56	301834	6257369	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Extent Heritage Pty Ltd - Pyrmont,Mrs.Laressa Barry					**Permits**		
45-5-5185	LIBH AS2	GDA	56	301876	6257644	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Extent Heritage Pty Ltd - Pyrmont,Mrs.Laressa Barry					**Permits**		
45-5-2614	Eastern Creek 9	AGD	56	301890	6256000	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**		
45-5-2648	Eastern Creek PAD 20	AGD	56	301500	6258000	Open site	Destroyed	Potential Archaeological Deposit (PAD) : -		103782
	Contact	**Recorders**	Australian Museum Consulting (AM Consulting)					**Permits**	1317,1566	
45-5-2591	EC1	AGD	56	301600	6256450	Open site	Valid	Artefact : -		
	Contact John Gallard	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**		
45-5-2592	EC2 (Duplicate copy see 45-5-2576)	AGD	56	302650	6256580	Open site	Valid	Artefact : -		
	Contact Colin Gale	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**		
45-5-2593	EC3 (Duplicate copy of 45-5-2578)	AGD	56	301980	6256520	Open site	Valid	Artefact : -		
	Contact Colin Gale	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**		
45-5-2594	EC4 (Duplicate copy of 45-5-2577)	AGD	56	302250	6256320	Open site	Valid	Artefact : -		
	Contact John Gallard	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**		
45-5-2595	EC5 (Duplicate copy of 45-5-2579)	AGD	56	302350	6256300	Open site	Valid	Artefact : -		
	Contact John Gallard	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**	1444	
45-5-2596	EC6 (Duplicate copy of 45-5-2580)	AGD	56	302480	6256280	Open site	Valid	Artefact : -		
	Contact John Gallard	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**		
45-5-2597	EC7 (Duplicate copy of 45-5-2581)	AGD	56	302700	6256150	Open site	Valid	Artefact : -		
	Contact Colin Gale	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**		
45-5-2598	EC8 (Duplicate copy of 45-5-2582)	AGD	56	300245	6255480	Open site	Valid	Artefact : -		
	Contact John Gallard	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**		
45-5-2599	WSRA 1	AGD	56	302100	6256510	Open site	Valid	Artefact : -		
	Contact John Gallard	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**		
45-5-2601	IF1	AGD	56	302290	6256350	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**		
45-5-2602	IF2	AGD	56	302730	6255380	Open site	Valid	Artefact : -		
	Contact John Gallard	**Recorders**	Navin Officer Heritage Consultants Pty Ltd					**Permits**	1444	

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SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-5-3082	Horsley Dr PAD	AGD	56	302325	6253090	Open site	Valid	Potential Archaeological Deposit (PAD) : -		100557,103366
	Contact Searle	**Recorders**	Ms.Laila Haglund					**Permits**	2328	
45-5-3206	ISF11	AGD	56	300780	6256920	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Jo McDonald Cultural Heritage Management see GML					**Permits**		
45-5-3233	Site A - Precinct A at Eastern Creek	AGD	56	303050	6257250	Open site	Valid	Artefact : 3		
	Contact S Scanlon	**Recorders**	Andrew Knight					**Permits**		
45-5-3245	PA-1 (Site A)	GDA	56	303381	6257697	Open site	Valid	Artefact : -		103760
	Contact	**Recorders**	Andrew Knight,Kelleher Nightingale Consulting Pty Ltd,Miss.Kristen Taylor					**Permits**	2552	
45-5-3260	WSP 13	GDA	56	302724	6258228	Open site	Valid	Artefact : 1		100103
	Contact S Scanlon	**Recorders**	Jo McDonald Cultural Heritage Management see GML					**Permits**		
45-5-3261	WSP 14	GDA	56	301798	6258400	Open site	Valid	Artefact : 1		100103
	Contact S Scanlon	**Recorders**	Jo McDonald Cultural Heritage Management see GML					**Permits**		
45-5-3262	WSP 15	GDA	56	302212	6258063	Open site	Valid	Artefact : -		100103
	Contact S Scanlon	**Recorders**	Jo McDonald Cultural Heritage Management see GML					**Permits**		
45-5-3264	WSP 17	GDA	56	302412	6257853	Open site	Valid	Artefact : 1		100103
	Contact S Scanlon	**Recorders**	Jo McDonald Cultural Heritage Management see GML					**Permits**		
45-5-3265	WSP 18	GDA	56	302087	6258599	Open site	Valid	Artefact : 1		100103
	Contact S Scanlon	**Recorders**	Jo McDonald Cultural Heritage Management see GML					**Permits**		
45-5-3779	Link Road PAD	GDA	56	300711	6256775	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Mr.Oliver Brown					**Permits**	3206	
45-5-3810	Q1 (Prospect)	GDA	56	301032	6258446	Open site	Valid	Artefact : 1		101797
	Contact	**Recorders**	Jo McDonald Cultural Heritage Management see GML					**Permits**		
45-5-3811	Q2 (Prospect)	GDA	56	301173	6258417	Open site	Valid	Artefact : 1		101797
	Contact	**Recorders**	Jo McDonald Cultural Heritage Management see GML					**Permits**		
45-5-3812	Q3 (Prospect)	GDA	56	301053	6258543	Open site	Valid	Artefact : 1		101797
	Contact	**Recorders**	Jo McDonald Cultural Heritage Management see GML					**Permits**		
45-5-3813	Q4 (Prospect)	GDA	56	301243	6258480	Open site	Valid	Artefact : 1		101797
	Contact	**Recorders**	Jo McDonald Cultural Heritage Management see GML,Kelleher Nightingale Consulti					**Permits**		
45-5-3814	Q5 (Prospect)	GDA	56	301198	6258432	Open site	Valid	Artefact : 1		101797
	Contact	**Recorders**	Jo McDonald Cultural Heritage Management see GML,Kelleher Nightingale Consulti					**Permits**		
45-5-3815	Q6 (Prospect)	GDA	56	301168	6258410	Open site	Valid	Artefact : 1		101797
	Contact	**Recorders**	Jo McDonald Cultural Heritage Management see GML,Kelleher Nightingale Consulti					**Permits**		

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AHIMS Web Services (AWS)

Extensive search - Site list report

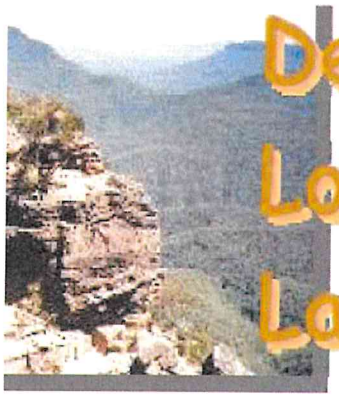
Your Ref/PO Number : 31252 - ALB

Client Service ID : 473023

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports

Report generated by AHIMS Web Service on 16/12/2019 for Samantha Keats for the following area at Datum :GDA, Zone : 56, Eastings : 300163 - 304282, Northings : 6251617 - 6258624 with a Buffer of 0 meters. Additional Info : ADDA. Number of Aboriginal sites and Aboriginal objects found is 120

Appendix 2 Aboriginal stakeholder comments



Deerubbin Local Aboriginal Land Council

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Biosis Pty Ltd

Unit 4, 17-27 Power Avenue

ALEXANDRIA NSW 2015

Our Ref: 3131

22 January 2020

PROTECTION OF ABORIGINAL CULTURAL HERITAGE

Future Development of Austral Bricks

738 -780 Wallgrove Road, Horsley Park

Attention: – James Cole

A representative of Deerubbin Local Aboriginal Land Council inspected Austral Bricks 738- 780 Wallgrove Road, Horsley Park on Wednesday, 18th December 2019. An Aboriginal cultural heritage assessment was undertaken to evaluate the likely impact the proposed development has on the cultural heritage of the land.

This section of Austral Bricks has been excavated & landscape to suit quarrying purposes. No Aboriginal cultural materials (in the form of stone artefacts, for example) were found during the walkover.

Deerubbin Local Aboriginal Land Council therefore has no objections for future development of Austral Bricks 738-780 Wallgrove Road, Horsley Park.

Yours Faithfully,

SRandall

Steven Randall

(Senior Aboriginal Cultural Heritage Officer)

Barry Gunther – Department of Planning Industry and Environment