5 November 2021

Paul Solomon
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Frasers Property Industrial
Level 2, 1C Homebush Bay Drive,
Rhodes NSW 2138 Australia

Dear Paul,

Re: Letter of Advice Addendum for Warehouse and Office Facility at 657-769 Mamre Road, Kemps Creek, New South Wales

Our Ref: Matter 35475

Biosis Pty Ltd has been commissioned by Frasers Property Australia Pty Ltd (Frasers) to provide a Letter of Advice (LoA) addendum for the proposed manufacturing facility and associated warehouse facility at 657-769 Mamre Road, Kemps Creek (proposed Lot 12) (the study area) (Figure 1 and Figure 2) which will be occupied and operated by Ardex. This LOA comprises an addendum to the Aboriginal Cultural Heritage Assessment report (ACHA), *Mamre South Precinct State Significant Development: Aboriginal Cultural Heritage Assessment. Report for Altis Property Partners and Frasers Property Industrial Construction* (Biosis 2020a).

Background

The Department of Planning, Industry and Environment (DIPE) has previously granted State Significant Development (SSD) approval SSD9522 for the Kemps Creek Warehouse, Logistics and Industrial Facilities Hub, of which Lot 10 is a portion.

A Secretary's Environmental Assessment Requirements (SEARs) for the Ardex SSD application was issued on 3 September 2021 (SSD-25725029), covering the proposed Ardex development on Lot 10. The SEARs requested an addendum to the ACHA (Biosis 2020a), addressing issues related to the test and salvage excavation programs and their impact upon the original predictive model described within the archaeological report, *Mamre South Precinct State Significant Development: Archaeological Report. Report for Altis Property Partners and Frasers Property Industrial Construction* (AR) (Biosis 2020b). Consequently, this LoA addendum has been prepared to address the SEARs' requirements, as well as to support an Environmental Impact Statement (EIS) required for the SSD application pertaining to the development of Lot 10. The EIS and SSD application will be assessed by DIPE under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of this LoA addendum is to inform Frasers Property Industrial of their responsibilities with regard to developing the study area in accordance with the SSD9522 approval, the Minister's Conditions of Consent relating to SSD9522, the SEARs, and the *Mamre South Precinct State Significant Development - Proposed Warehouse, Logistics and Industrial Facilities Hub: Cultural Heritage Management Plan* (Biosis 2020c).

The information in this LoA addendum has been prepared in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010a), and the *NSW Heritage Manual 1996* (Heritage Office 2006).

Response to SEARs

The SEARs was issued on 3 September 2021 (SSD-25725029). The SEARs requests an addendum to the ACHA (Biosis 2020a), addressing issues related to the test and salvage excavation programs, and the predictive model described within the AR. DPIE has also published a number of industry-specific SEARs guidelines, and the document, *Planning Secretary's Environmental Assessment Requirements – Warehouses and Distribution Centres* (DPIE 2021) has also been taken into consideration here.

Table 1 Response to SEARs

SEARS Item	Details	Report Section Responding to SEARS
Aboriginal Cultural Heritage	An addendum to the existing Aboriginal Cultural Heritage Assessment Report (ACHAR) Mamre South Precinct State Significant Development – Proposed Warehouse, Logistics and Industrial Facilities Hub: ACHAR prepared by Biosis and dated 31 July 2020. The addendum must summarise the test and salvage excavations undertaken to date and detail whether the test and salvage excavation results require a refinement of the predictive model. If the predictive model has substantially changed, then a new ACHAR and additional Aboriginal consultation with the existing Registered Aboriginal Parties (RAPs) must be undertaken.	2 Background research 3 Aboriginal heritage constraints
Environmental Heritage	Where there is potential for direct or indirect impacts on the heritage significance of items of environmental heritage, provide a Statement of Heritage Impact and Archaeological Assessment (if potential impacts to archaeological resources are identified), prepared in accordance with the relevant guidelines, which assesses any impacts and outlines measures to ensure they are minimised and mitigated.	2 Background research 4 Historical heritage constraints

1. Proposed development

Frasers are proposing to construct, fit out and operate a manufacturing facility and associated warehouse facility at 657-769 Mamre Road, Kemps Creek (proposed Lot 12) which will be occupied and operated by Ardex.

The proposed development is located within the Kemps Creek Warehouse, Logistics and Industrial Facilities Hub (the Yards), a regional warehouse and distribution complex located at Kemps Creek, within the Penrith local government area (LGA), Western Sydney Employment Area (WSEA) (Figure 3).

Frasers and Altis Bulky Retail Pty Ltd (Altis) jointly identified as 'the Proponent' obtained Development Consent SSD (State Significant Development) 9522 on 21 December 2020 from the Department of Planning, Industry and Environment (DPIE) for the '*Kemps Creek Warehouse, Logistics and Industrial Facilities Hub*'. The project comprises the construction of eight warehouse buildings over eight lots as the first stage of development, with estate works across the broader site inclusive of bulk earthworks to create building pads for future development, stormwater infrastructure and an internal road network including a north south distributor road connecting to the adjacent property, intersection upgrades and the widening of Mamre Road.

Specifically, SSD9522 permits the following kinds of development:

- Minor earthworks involving cut and fill works, site preparation works and the establishment of a building pad.
- Infrastructure comprising civil works and augmentation of utilities servicing;
- Construction, internal fit out and operation of a manufacturing facility and warehouse (27,470 metres squared (m2)), comprising:
  - Manufacturing areas and associated warehouse (24,970 m2).
  - Ancillary office areas (2,500 m2).
  - 163 car parking spaces and 12 bicycle spaces.
  - Powder silo tower.
  - Liquid silo tower.
  - Associated business identification signage.
  - Site Landscaping (4,348 m2).
  - 13 loading docks.
  - Three (3) vehicle crossovers.
- Production capacity up to approximately 48,000 tonnes per annum (tpa) of powder products, resulting in an indicative weekly maximum of 932.0 tonnes and daily maximum of 131.5 tonnes.
- Production capacity up to approximately 25,000 kilolitres (KL) per annum of liquid products, resulting in an indicative weekly maximum of 480.7 KL and daily maximum of 68.5 KL.
- Storage of dangerous goods, comprising:
  - Class 2.1 – LPG.
  - Class 3 – Flammable Liquid.
  - Clause 4.1 – Flammable Solids.
  - Clause 5.1 – Oxidising Substances.
  - Clause 6.1 – Sub-risk Toxic Substances.
  - Class 8 – Corrosive Substances.
- Hours of operation being on a 24 hours per day, 7 days per week, basis; and

- Torrens Title subdivision to create the subject allotment (proposed Lot 12) measuring approximately 4.3 hectares.

2. Location

The study area is located within Lot X DP 421633 and a small portion of Lot 1 DP 1018318 within The Yards (Figure 2 and Figure 3). The Yards is located at 657-769 Mamre Road, Kemps Creek and covers Lot 34 DP 1118173, Lot X DP 421633, Lot 1 DP 1018318, Lot Y DP 421633 & Lot 22 DP 258414. It is located within the Penrith Local Government Area (LGA).

The overall Yards area has historically been used for low intensity agriculture and is primarily covered with pasture grass and limited stands of vegetation. The site has several dams in the central area and has a gradual fall from east to west towards South Creek.

3. Background research

Heritage database searches

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted on 13/07/2021 (Client Service ID: 605975). The search identified five Aboriginal archaeological sites within a 200 metre search area, centred on the study area, including MSP-01(AHIMS 45-5-5187), MSP-06 (AHIMS 45-5-5341), MSP-07 (AHIMS 45-5-5342), MSP-08 (AHIMS 45-5-5343) and EPTA3 (AHIMS 45-5-3028) (Figure 4). It should be noted that none of these sites are located *within* the current study area.

A previous extensive search of the AHIMS database was conducted on 14 October 2020 (Client service ID: 542421). This search identified 38 Aboriginal archaeological sites within a 1 kilometre search area, centred on the SSD9522 study area (Table 2). Thirteen of these registered sites are located within 200 metres of the study area. In addition to those listed above, these sites include: MSP-02 (AHIMS 45-5-5188), MSP-03 (AHIMS 45-5-5189), MSP-05 (AHIMS 45-5-5340), MSP-09 (AHIMS 45-5-5344), MSP-10 (AHIMS 45-5-5345), MSP-11 (AHIMS 45-5-5346), EPTA10 (AHIMS 45-5-3032), and EPTA11 (AHIMS 45-5-3033) (Figure 4). A description of all sites in included in Table 2below.

A review of the site cards for EPTA3 (AHIMS 45-5-3028), EPTA10 (AHIMS 45-5-3032), EPTA11 (AHIMS 45-5-3033) identified their locations to be incorrect. These are not included in Table 1 below; however, they are discussed in detail in *Mamre South Precinct State Significant Development: Archaeological Report* (Biosis 2020b). *Report for Altis Property Partners and Frasers Property Industrial Construction*.

A simple analysis of the Aboriginal cultural heritage sites registered within one kilometre of the study area indicates that the dominant site type is artefact sites. Artefact sites and potential archaeological deposits (PAD) have also been recorded within the wider vicinity of the study area.

Table 2 Aboriginal heritage sites in the vicinity of the study area

AHIMS No.	Site	Description	Significance
45-5-5187	MSP-01	Artefact	Low
45-5-5188	MSP-02	High density subsurface artefact scatter	High
45-5-5189	MSP-03	Low density subsurface artefact scatter	Low

45-5-5340	MSP-05	Low density subsurface artefact scatter	Low
45-5-5341	MSP-06	Low density subsurface artefact scatter	Low
45-5-5342	MSP-07	Artefact	Low
45-5-5343	MSP-08	Artefact	Low
45-5-5344	MSP-09	Low density subsurface artefact scatter	Low
45-5-5345	MSP-10	Low density subsurface artefact scatter	Low
45-5-5346	MSP-11	Low density subsurface artefact scatter	Low

A review of the Penrith Local Environmental Plan (LEP) 2010 indicated that no locally listed historical heritage items are located within or adjacent to the study area. A search of the NSW State Heritage Register and NSW Heritage Database, Commonwealth Heritage List, Register of National Estate and National Trust Heritage Register did not identify any items of historical significance within or adjacent to the study area.

The Penrith Development Control Plan 2014

The Penrith Development Control Plan 2014 (PDCP) outlines built form controls to guide development. The PDCP supplements the provisions of the Penrith LEP 2010. The study area neither contains nor is closely located to any listed heritage items or conservation areas listed within the PDCP.

The Draft Mamre Road Development Control Plan 2020

The *Mamre Road Precinct Draft Development Control Plan 2020* (Mamre DCP) aims to ensure that Aboriginal and historical heritage values are managed appropriately in order to produce conservation outcomes. This includes archaeological and culturally significant areas or items of historical significance.

The Mamre DCP contains a list of controls for completing assessments for Aboriginal and historical heritage, and includes mapped areas of high and moderate Aboriginal archaeological potential as well as heritage items of significance. A review of the Mamre DCP did not identify any historical items of significance or areas of high or moderate archaeological potential within the study area. Several areas of high and moderate archaeological potential, however, are adjacent to the study area.

As outlined in Section 2.4, Control 5 of the draft Mamre DCP, if impacts to areas of high and moderate archaeological potential, further assessment in accordance with the *National Parks and Wildlife Act 1974* (NPW Act) is required.

The study area falls within the Kemps Creek Industrial Estate SSD area, over which development consent SSD9522 has been issued by DPIE. Prior to development consent being granted, the following heritage assessments were undertaken inclusive of the study area:

- *Mamre South State Significant Development Application Archaeological Survey Report* (Biosis 2018). *Report for Frasers Property Industrial Constructions Pty Ltd and Altis Property Partners Pty Ltd.*
- *Mamre South Precinct State Significant Development: Aboriginal Cultural Heritage Assessment* (Biosis 2020a). *Report for Altis Property Partners and Frasers Property Industrial Construction*.
- *Mamre South Precinct State Significant Development: Archaeological Report* (Biosis 2020b). *Report for Altis Property Partners and Frasers Property Industrial Construction*.

- *Mamre South State Significant Development Application Statement of Heritage Impact.*(Biosis 2020d) *Report for Frasers Property Industrial Constructions Pty Ltd and Altis Property Partners Pty Ltd.*

These assessments identified eleven Aboriginal heritage sites adjacent to the current study area (listed in Table 2), and made recommendations for their management and protection during works associated with the project. No Aboriginal or historic heritage items were identified within the current study area by these assessments.

Mamre South Precinct State Significant Development - Proposed Warehouse, Logistics and Industrial Facilities Hub: Cultural Heritage Management Plan

Under the Conditions of the Development Consent SSD9522 (CoC), the Yards development was required to have a cultural heritage management plan (CHMP) in place for the operational life of the project. The CHMP describes how Aboriginal and non-Aboriginal heritage will be protected and managed during the project, and forms part of the project's Construction and Environmental Management Plan (CEMP). The resulting CHMP (Biosis 2020c) did not identify any historic or Aboriginal heritage item or sites within the study area.

In relation to the main portion of the study area, Lot X DP 421633, Condition B61 stated the following:

- *Following the removal of vegetation on Lot X DP 421633, the Applicant must conduct an archaeological re-survey with Registered Aboriginal Parties of Lot X DP 421633 to confirm the findings of the Aboriginal Cultural Heritage Assessment Report prepared by Biosis dated 31 July 2020.*

An additional re-survey of Lot X DP 421633 was undertaken by Biosis on 17 November 2020. During the survey, no Aboriginal heritage sites or objects were identified. The lot's archaeological potential was again assessed as low, and no further archaeological assessment was recommended. The survey report was attached as Appendix G to the CHMP.

Site context

The study area's hydrology, topography, geology and soil landscapes have been described in detail in (Biosis 2018), (Biosis 2020a, Biosis 2020d). The information below comprises a summary only. For further details, please refer to the original reports.

The study area is located within Cumberland Lowlands physiographic region that consists of low lying, gently undulating plains and low hills on Wianamatta Group shales and sandstones with a dense drainage net of predominantly northward flowing channels (Bannerman & Hazelton 1990a, pp. 2). The Wianamatta formation, which underlies the study area, tends to contain low relief landforms with well-developed drainage systems. This in turn makes water sources, which form an important part of the prehistoric landscape, easier to locate. These water sources can be good indicators of potential Aboriginal occupation.

Topographically, the study area is located on a broad formation of alluvial plains/flats sloping very gently down toward South Creek from the lower slope landforms along the eastern boundary of the study area. South Creek, a sixth order watercourse, is the nearest source of permanent water, located approximately 500 metres west of the study area (Figure 5). A second order water course enters South Creek approximately 300 metres the south of the study area. A large man-made dam directly adjoins the study area to the north.

The study area is contained within the Bringelly Shale sub-formation (Figure 6). This formation consists of a shale (claystone and siltstone), carbonaceous claystone, laminate and fine to medium-grained lithic

sandstone (Bannerman & Hazelton 1990a, pp. 3). Aboriginal artefact scatter sites are common across this formation, as are potential archaeological deposits (PADs). The presence of underlying shale deposits suggests that sites commonly found within sandstone formations, such as grinding grooves and rock shelters/rock art, are less likely to be present.

One soil landscape occurs in the study area, the South Creek Soil Landscape (Bannerman and Hazelton 1990) (Figure 7). The South Creek Soil Landscape is most often associated with drainage depressions and alluvial flats (Bannerman & Hazelton 1990a, pp. 68–71). The topography of this soil landscape is one of flat to gently sloping alluvial plain with occasional terraces and levees providing low relief of <10m, and slopes <5%, and incised channels. Underlying geology consists of Quaternary alluvium derived from Wianamatta Group shales and Hawkesbury Sandstone. Soils are often very deep layered sediments over bedrock or relict soils. On lower terraces and levees soils are red and yellow podzolic soils consisting of sandy clay loams and clay loams as topsoils and medium to heavy clays as subsoil.

Aboriginal land use

The Cumberland Plains region would have provided an abundance of natural resources able to be utilised in a variety of ways by Aboriginal people. 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 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).

Current aerial photography shows that beyond the riparian corridor, the study area has been extensively cleared except for a few small stands of remnant vegetation throughout the area. Remnant vegetation within the study area is likely to include a mixture of native Flora associated with the South Creek Soil Landscape, and introduced species. Vegetation within the South Creek Soil Landscape reflects the soil landscape's frequent inundation, which supports common tree species such as the broad-leaved apple *Angophora subvelutina,* Cabbage Gum *Eucalyptus amplifolia,* and Swamp Oak *Casuarina glauca*. Tall spike rushes (such as *Eleocharis sphacelata, Juncus usilatus* and *Polygonum*), have the potential to occur where channels are silted. Upon elevated streambanks tall shrubland consisting of Paperbarks *Melaleuca,* and Tea Trees *Leptospermum* may also occur. However, the South Creek soil landscape has been extensively cleared, and as a direct result is now dominated by noxious weeds, such as Blackberry *Rubus vugalris* (Bannerman & Hazelton 1990b, pp. 68–69).

Animal products were also used for tool making and fashioning a myriad of utilitarian and ceremonial items. For example, tail sinews are known to have been used to make fastening cord, while 'bone points', which would have functioned as awls or piercers, are often an abundant part of the archaeological record. Brush-tailed Possums were highly prized for their fur and could be fashioned into a cloak (Attenbrow 2002, pp. 117).

The accessibility of water is a strong indication as to the likelihood for the presence of Aboriginal sites. Rivers, creeks and waterholes provide sources of fresh drinking water, whilst also supplying a habitat for fish and shellfish resources. The presence of permanent water sources would have also attracted a number of animals to the area, that would have been hunted by Aboriginal people (Attenbrow 2002, pp. 62–76). Native Fauna that could have been present in the study areas includes, but is not limited to the Australian Brush Tail Possum *Trichosurus vulpecula*, Short-beaked Echidna *Tachyglossus aculeatus*, Swamp Wallaby *Wallabia bicolor*, Rainbow Lorikeet *Trichoglossus moluccanus*, Kookaburra *Dacelo novaeguineae*, Australian Magpie *Cracticus tibicen*, Water Dragon *Intellagama lesueurii*, and Eastern Blue-Tongue *Tiliqua scincoides*.

Historic land use

The following discussion relates to the entire area covered by SSD9522, of which the study area is small, centrally-located portion.

Historically, the area along Mamre Road has been used for farming and pastoral practices, as well as the establishment of large estates, such as Mamre House, approximately 3 kilometres north of the current study area (Thorpe 1986). As such it would not be unreasonable to expect the study area had undergone disturbance from activities such as ploughing and grazing. It is firmly established in both Aboriginal and historical archaeology (Brooks et al. 2009, Steinberg 1996) that agriculture, and in particular ploughing, causes extensive disturbance to the upper levels of soil profiles on many sites, with Steinberg claiming that this disturbance extends to approximately 30 centimetres below the surface. These activities disturb the original context of archaeological deposits, redistributing their contents across the ploughed area and disrupting the stratigraphic profiles of the area.

The area encompasses three initial grants from 18 December 1805, made up of two 300 acre grants to Ezekiel/Edward Wood (Kingswood) and Richard Fitzgerald (Restitution Farm), and a portion of a 360 acre grand to James Scott (Photo 1). All grants appear to have been historically used as farms, however Richard Fitzgerald was a notable convict with associations with both John MacArthur and Lachlan Macquarie.

Historical aerial photographs provide further information on how the land within the study area has been used. Aerial photographs of the study area dated to1955 indicate that the land was primarily used for agricultural and pastoral purposes at this point in time, being cleared of vegetation and crop lines and dam visible (Photo 2). An aerial photograph dated to 1986 shows continued agricultural use with evidence of crop lines and damming present throughout. Three residential structures had also been constructed along the eastern border (Photo 3).

An aerial photograph dated to 2005 shows significant disturbance had occurred within the study area through the construction of a large dam (Photo 4). Extensive use of the land for agricultural practices is evident in the crop lines throughout Lot X DP 421633, adjacently south and to the east within the study area.

4. Aboriginal heritage constraints

A search of the AHIMS register, the draft Mamre DCP and the CHMP did not identify any previously recorded Aboriginal sites within the study area. Biosis has undertaken two surveys of the study area, one undertaken as part of an ACHA (Biosis 2020c), and the other as part of an additional survey for the CHMP (Biosis 2020a). Both assessments were associated with the development approvals process for SSD9522. No Aboriginal heritage sites, objects or areas of high or moderate archaeological potential were identified in either survey (Figure 8). In accordance with the draft Mamre DCP, no further assessment of this area is required.

A large portion of the study area has been subject to ground disturbance as a result of agricultural land use, and is considered to possess low archaeological potential. The shallow soil deposits associated with the South Creek Soil Landscape are unlikely to have been preserved due to increased levels of erosion as a result of agricultural disturbance.

Whilst the study area has been assessed as having low archaeological potential, isolated artefacts may be present due to the proximity of South Creek, a fresh water source, as well as the presence of crest and gentle slope landforms within and adjacent to the study area. These landforms have been previously

identified as having archaeological potential within the Kemps Creek region (Jo McDonald Cultural Heritage Management [JMCHM] 2002, Kelleher Nightingale Consulting 2010, White & McDonald 2010, Biosis Pty Ltd 2021).

It is recommended that no further archaeological assessment is required, and that the study area be managed in accordance with the strategies and protocols set out in the CHMP (Biosis 2020c) . Should any suspected Aboriginal heritage sites or objects be identified, then the protocols set out in the CHMP should be followed.

Summary of test and salvage excavations

Following the recommendations of the survey undertaken in 2018 (Biosis 2018), a program of test excavations were carried out within the wider study area. It should be noted that Ardex Development falls outside of the areas of test and salvage excavations described in this section.

Three open areas (OA) were identified for test excavation:

- OA1, incorporating MSP-09 (AHIMS# 45-5-5344) and MSP-10 (AHIMS# 45-5-5345).
- OA2, incorporating MSP-05 (AHIMS# 45-5-5340) and MSP-06 (AHIMS# 45-5-5341).
- OA3, incorporating MSP-02 (AHIMS# 45-5-5188), MSP-03 (AHIMS# 45-5-5189) and MSP-11 (AHIMS# 45-5-5346).

A total of 691 artefacts were recorded following subsurface excavation at OA1, OA2 and OA3, across 274 excavated test pits in total. OA1 had a lower density of artefacts, containing 16 artefacts across 37 test pits and accounting for 2.3% of the total assemblage, while OA2 contained 9 artefacts from 79 test pits which amounted to 1.3% of the total subsurface assemblage. The highest density of artefacts were recorded at OA3, which contained 666 artefacts out of 158 excavated test pits and accounted for 96.4% of the total subsurface assemblage.

Within the north and western section of OA3, test excavations undertaken in site MSP-11 (AHIMS# site 45-5-5346), resulted in the recovery of 58 artefacts from 59 test pits. The site was classified as a low density subsurface artefact scatter on a gentle slope landform. MSP-11 (AHIMS# site 45-5-5346) was subsequently assessed as possessing low scientific significance.

In contrast, test excavations in the southern portion of OA3 indicated that MSP-02 (AHIMS# 45-5-5188) and MSP-03 (AHIMS# 45-5-5189) were part of the same site. As a result MSP-02 (AHIMS# 45-5-5188) and MSP-03 (AHIMS# 45-5-5189) were combined into one site, MSP-02 (AHIMS# 45-5-5188), with the AHIMS record being updated. A total of 603 subsurface artefacts were identified across AHIMS 45-5-5188/MSP-02 and it was found that artefact densities decreased closer to South Creek, with dispersed, low density deposits present along the alluvial flats. The assemblage at OA3 contained a varied artefact deposit including a number of backed artefacts which placed it within the Middle Bondaian phase of occupation, approximately 4,000 to 1,000 years before present. Consequently, MSP-02 (AHIMS# 45-5-5188) was assessed as having high cultural and scientific significance.

Distance to water appeared to be a determining factor in the density of subsurface deposits within the study area. OA1 and OA2 were located the furthest from water and both contained low density artefact deposits, while a high density artefact deposit was identified in the southern portion of OA3, located on a raised area adjacent to South Creek and the confluence of a smaller, unnamed watercourse. A low density deposit was identified within the northern portion of OA3 on a gentle slope landform.

Following the test excavation program, the ACHA recommended salvage of MSP-02 (AHIMS# 45-5-5188), prior to the commencement of construction works on the site.

The salvage program commenced in February 2021. Within the southern portion of MSP-02 (AHIMS# 45-5-5188), manual excavations were undertaken in 1 metre by 1 metre units, expanding to an area of 127 metres squared. Due to the high density of artefacts being recovered from the site, and time constraints within the project, RAPs requested that a number of mechanical scrapes be undertaken. These recommendations were discussed with Heritage NSW in April 2021. Consequently, mechanical excavations were also undertaken across three 8 metre by 4 metre areas within the site. The salvage program was completed in May 2021, with approximately 35,000 artefacts were recovered from MSP-02 (AHIMS# 45-5-5188). Analysis of the artefacts is not yet complete, and will be discussed within a full salvage excavation report (forthcoming).

Discussion of predictive model

A full discussion of the predictive model relating to the anticipated archaeology within the study area is provided in Section 3 of the AR (Biosis 2020b). The information which follows in Table 1Table 3 and below summarises the predictive model.

Based upon previous archaeological studies and the initial field survey described in Biosis (2018), the predictive model comprises the following parameters:

- Surface artefact assemblages and PADs had a high likelihood of being present in portions of the study area located in the South Creek soil landscape.
- The potential for surface artefact assemblages and PAD to occur within the South Creek soil landscape was particularly high when in close proximity to the confluence of watercourses, especially those comprising permanent supplies of fresh water.
- Whilst silcrete was predicted to be the most common raw material found within the study area, where sites were located closer to fresh water, there was the potential for very high density deposits to occur along with a wider range of raw materials.
- Modified trees also have the potential to occur within the study area where remnant vegetation is present (though limited), particularly in association with Blacktown soils (JMCHM 1997a, DSCA 2003, Navin Officer Heritage Consultants Pty Ltd 2005, Biosis Research 2010, Biosis Pty Ltd 2016).

Table 3 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.	**High:** This site type has been recorded in all locally identified soil landscapes, landforms and landform elements, as well as being the most common site type in relation to both geological formations underlying the study area. Three previously identified AHIMS sites are located within the study area and there is high potential for more to be identified.

Site type	Site description	Potential
Potential archaeological deposits (PADs)	Potential sub surface deposits of cultural material.	**High:** This site type has been recorded locally within the Blacktown soil landscape, which covers a portion of the study area. PAD sites also have the potential to occur within alluvial landforms though they may not be *in situ*. This site type represents the second most commonly recorded site type within the vicinity of the study area and has high potential to occur within the study area.
Modified trees	Trees with cultural modifications	**Moderate**: Although there has been extensive clearing within the study area, there is still the potential for this site type to be identified in relation to the riparian corridor along South Creek and in areas where remnant vegetation is present. Modified trees therefore have moderate potential to occur within the study area.
Shell middens	Deposits of shells accumulated over either singular large resource gathering events or over longer periods of time.	**Low:** Shell middens have not previously been recorded locally. Although there is a higher order South Creek is a permanent source of fresh water and may have provided suitable resources for shell middens to occur, this site type has low potential to occur.
Quarries	Raw stone material procurement sites.	**Low:** There is no record of any quarries being within the study area, though silcrete cobbles have been previously located within the region.
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 may have deep sandy deposits present, though this site type has not been previously recorded within the vicinity of 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.

Site type	Site description	Potential
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.
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.
Axe grinding grooves	Grooves created in stone platforms through ground stone tool manufacture.	**Nil:** The geology of the study area lacks suitable horizontal sandstone rock outcrops for axe-grinding grooves. Therefore there is low potential for axe grinding grooves to occur in the study area.
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.	**Nil**: This site type will only occur where suitable sandstone exposures or overhangs possessing sufficient sheltered space exist, which are not present in the study area or supported by the underlying geology or soil landscapes within the study area.

The results of the test excavations undertaken at OA1, OA2 and OA3 correspond with the predictive model. Both OA1 and OA2 were located further away from permanent water sources and lower numbers of artefacts (OA1, n=16; OA2, n=9) were recovered.

The test excavations conducted at OA3 identified a high density, relatively intact subsurface deposit within the south-western section of the area, where MSP-02 (AHIMS 45-5-5188) and the former MSP-03 (AHIMS 45-5-5189) were previously recorded. Topographically, MSP-02 (AHIMS 45-5-5188) is located on a slightly elevated flat near the confluence of South Creek and a smaller, unnamed watercourse. A total of 603 artefacts were recovered from the test excavations in this section of OA3. A much lower density of artefacts (n=58) were recovered from MSP-11 (AHIMS 45-5-5346) (also located within OA3), located on a gentle slope landform.

A total of 666 artefacts, comprising eight raw material types and 23 discrete tool types were recovered from OA3. The dominant raw material type in OA3 comprised silcrete (n=552, 82.9%), with indurated mudstone tuff (IMT) making up 7.1% (n=47), and chert (4.5%, n=30). Less common raw material types in the assemblage include quartz (n=18, 2.7%), siltstone (n=13, 2%), quartzite (n=3, 0.5%), petrified wood (n=2, 0.3%) and tuff (n=1, 0.2%). Backed artefacts were the most common tool type found in the assemblage making up 78.3% of all tools. Backed artefacts were further broken up into Bondi points (39.1%, n=9), geometric microliths (13%, n=3), eloura (n=1, 4.3%) and backed artefact fragments (21.7%, n=5). The assemblage at OA3 also included two steep edged scrapers (8.7%, n=2), two dihedral burins (8.7%) and one notched tool (4.3%).

The salvage excavation program focussed on MSP-02 (AHIMS 45-5-5188). Approximately 35,000 lithics were recovered from MSP-02 (AHIMS 45-5-5188). Full analysis of this assemblage is not yet complete, so information about raw materials and tool types is currently unavailable.

Whilst the density of lithics recovered from MSP-02 (AHIMS# 45-5-5188) is extremely high, the results of both the salvage and test excavations concur with the predictive model and previous subsurface archaeological investigations undertaken within the immediate local area. The predictive model stated that high density sites consisting of a range of raw materials and tool types were likely to occur within the South Creek soil landscape, and that higher densities of artefacts would be found on raised flats adjacent to permanent fresh water supplies. The results of the test and salvage excavations fall within these parameters.

In regards to the extremely high number of artefacts recovered from the salvage excavations, test excavations conducted by JMCHM (2008) on Mamre Road, approximately one kilometre from the current study area recovered a total of 8,867 lithics from 298 square metres, indicating a density of 29.8 artefacts per square metre. The area assessed in JMCHM's report contains a number of similarities to the study area, including its relatively low relief (around 10 metres) JMCHM 2008, p.7). JMCHM concluded that artefact density was relational to the number of landscape and resource features in the area, with artefact density decreasing in association with lower order stream lines, and the use of silcrete as a raw material decreasing 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 (JMCHM 2008, p.i).

The current salvage program recovered an estimated 938 lithics per square metre from within MSP-02 (AHIMS 45-5-5188). This is exponentially higher than that the lithics recovered by JMCHM (2008). The site's elevated location immediately adjacent to South Creek, along with the relatively undisturbed nature of the soils in this portion of the study area again suggest that very high densities of artefacts were to be expected. As the AR (Biosis 2020b) notes in Section 3, the area would have provided an ideal campsite for Aboriginal people given its proximity to food, water and other resources.

Lastly, the predictive model within Section 3 of the AR (Biosis 2020b) is arguably broad, combining a review of previous archaeological studies with an analysis of soils, landforms, and hydrology to produce generalised quantitative statements about site presence and density within the study area. No specific quantitative indicators of lithic densities were proposed by the predictive model. However, the possibility of high density deposits occurring within the study area were noted within the discussion at the beginning of Section 3 of the AR (Biosis 2020b). In particular, the potential for high density deposits to occur was informed by the results of JMCHM's (2008) investigation located only one kilometre away on similar landforms within similar soil types. Consequently, the results of the test and salvage excavations can be said to concur with the predictive model's qualitative parameters and with the general results of previous studies carried out in the immediate area.

5. Historical heritage constraints

Based on the preliminary background research conducted and previous archaeological investigations (Biosis 2020d), no areas of archaeological potential or items which may contain relics as defined by the *Heritage Act 1977* were identified within the study area. A search of the Schedule 5 of the Penrith Local Environmental Plan 2010, the NSW State Heritage Register, NSW Heritage Database, Commonwealth Heritage List, the Register of National Estate, and the National Trust Heritage Register did not identify any items of historical significance within or adjacent to the study area (Figure 5). The background research indicates that the study area has likely undergone historical clearing activities, and was utilised historically as grazing and agricultural land. The study area possesses low potential to contain early farm buildings or homesteads associated with early European settlement in the Kemps Creek region.

It is recommended that no further archaeological assessment is required, and that the study area be managed in accordance with the strategies and protocols set out in the CHMP (Biosis 2020c). Should any suspected heritage items be identified during works, then the protocols set out in the CHMP should be followed.

Please contact me if you have any enquiries.

Yours sincerely

Dr Amanda Markham
Senior Archaeologist

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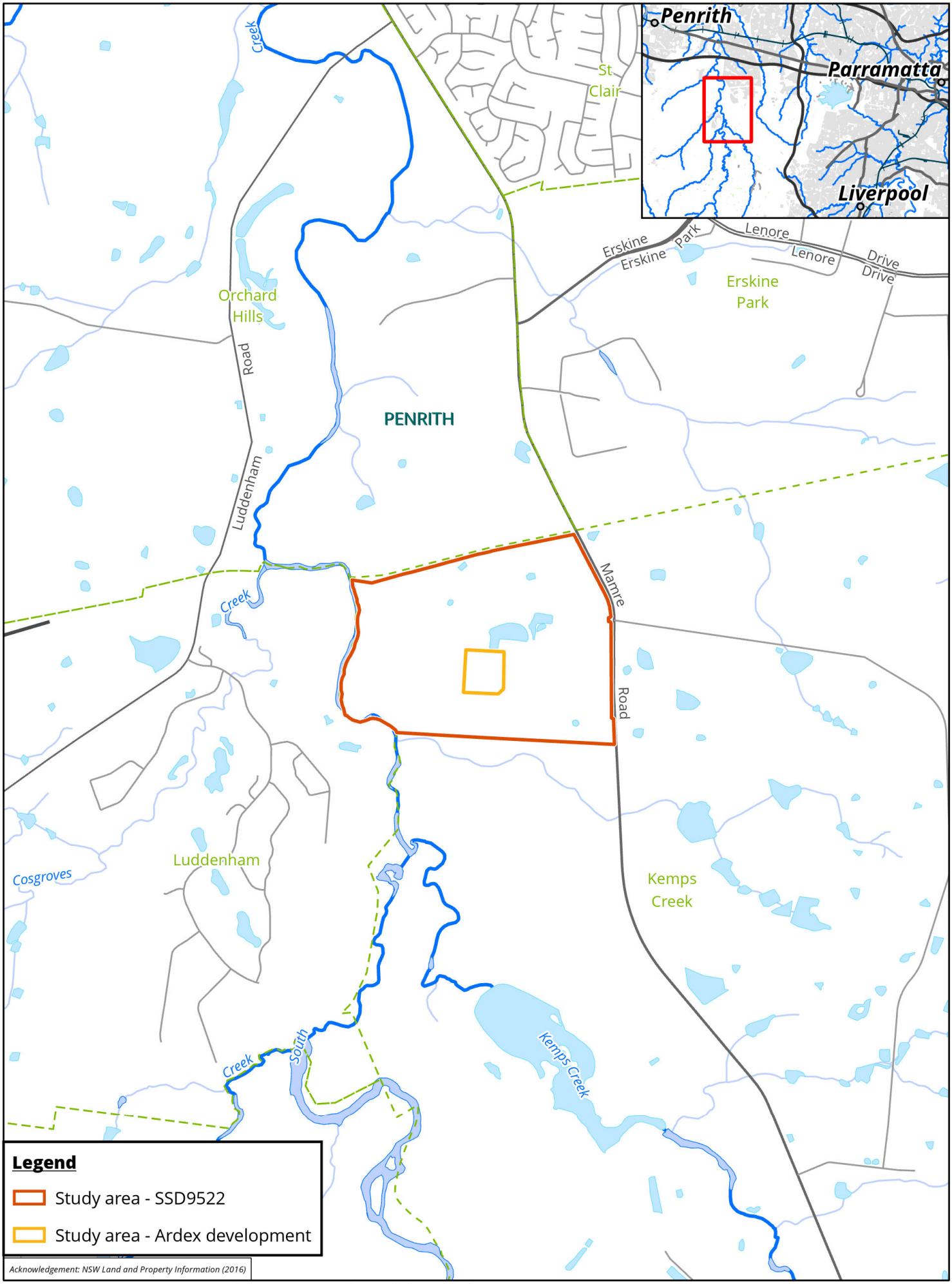

Figure 1 Location of the study area

biosis

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Date: 13 July 2021 ,
Prepared for: AM, Prepared by: LW, Last edited by: lwilson
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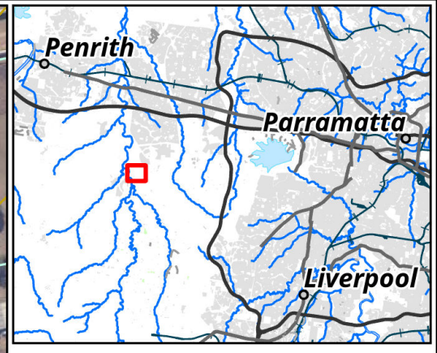

Legend

- Study area - SSD9522
- Study area - Ardex development
- Lot
- Contour

Figure 2 Study area detail

0 50 100 150 200

Metres

Scale: 1:4,500 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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biosis

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Date: 13 July 2021 ,
Prepared for: AM, Prepared by: LW, Last edited by: lwilson
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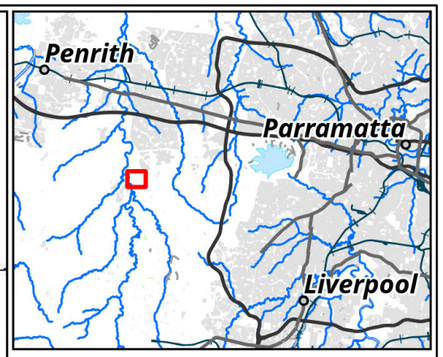

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- Study area - SSD9522
- Study area - Ardex development

Figure 3 Proposed development

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Matter: 35475,
Date: 14 July 2021 ,
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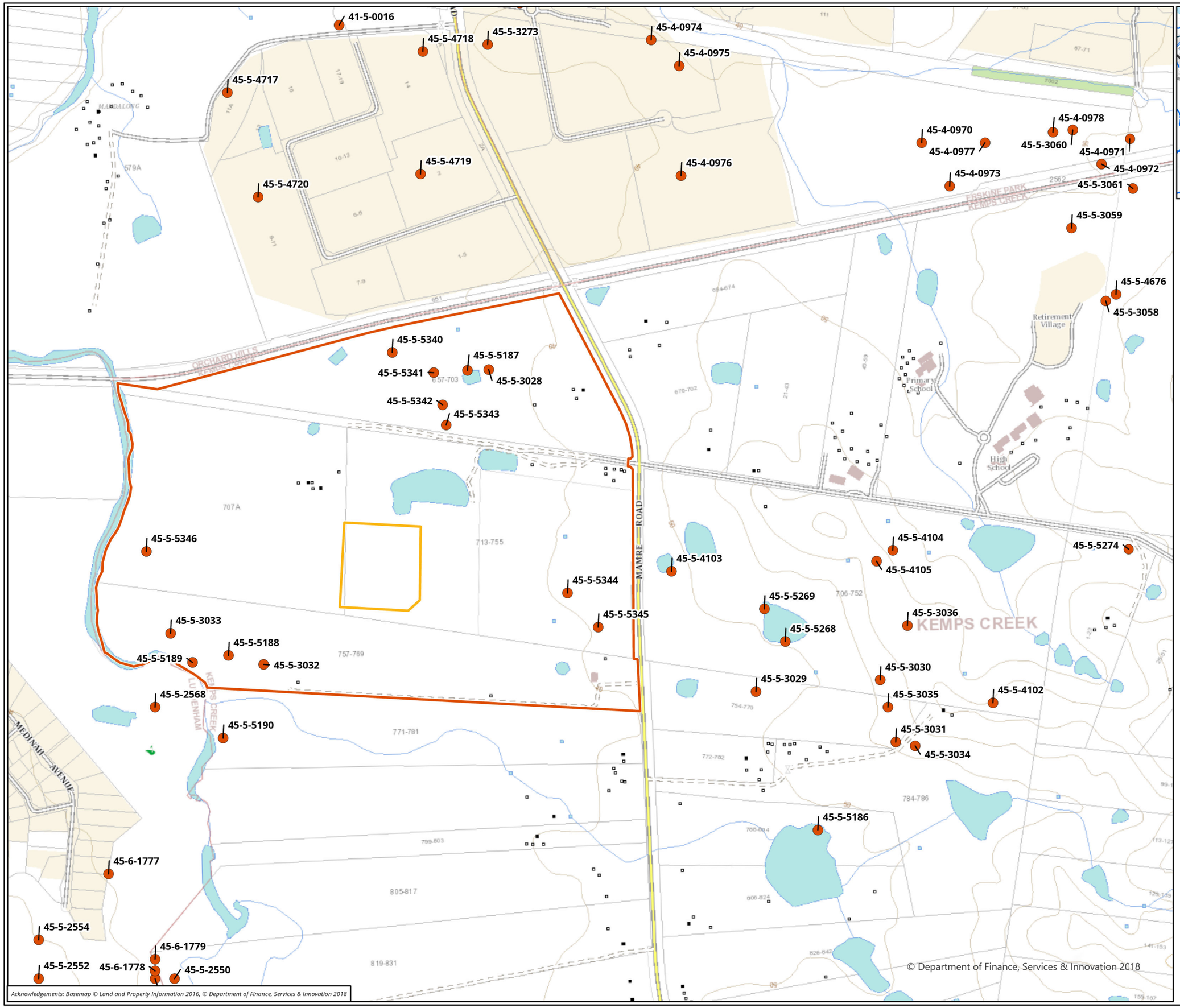

Legend

- Study area - Ardex development
- Study area - SSD9522
- AHIMS record

Figure 4 AHIMS records near the study area

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Scale: 1:9,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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Date: 13 July 2021 ,
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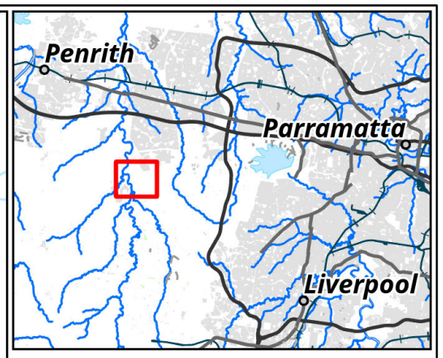

Legend

- Study area - SSD9522
- Study area - Ardex development

Hydrology

- Canal-Drain
- Natural watercourse

Strahler Order

- 1
- 2
- 4
- 6

Figure 5 Hydrology in the vicinity of the study area

0 100 200 300 400

Metres

Scale: 1:10,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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biosis

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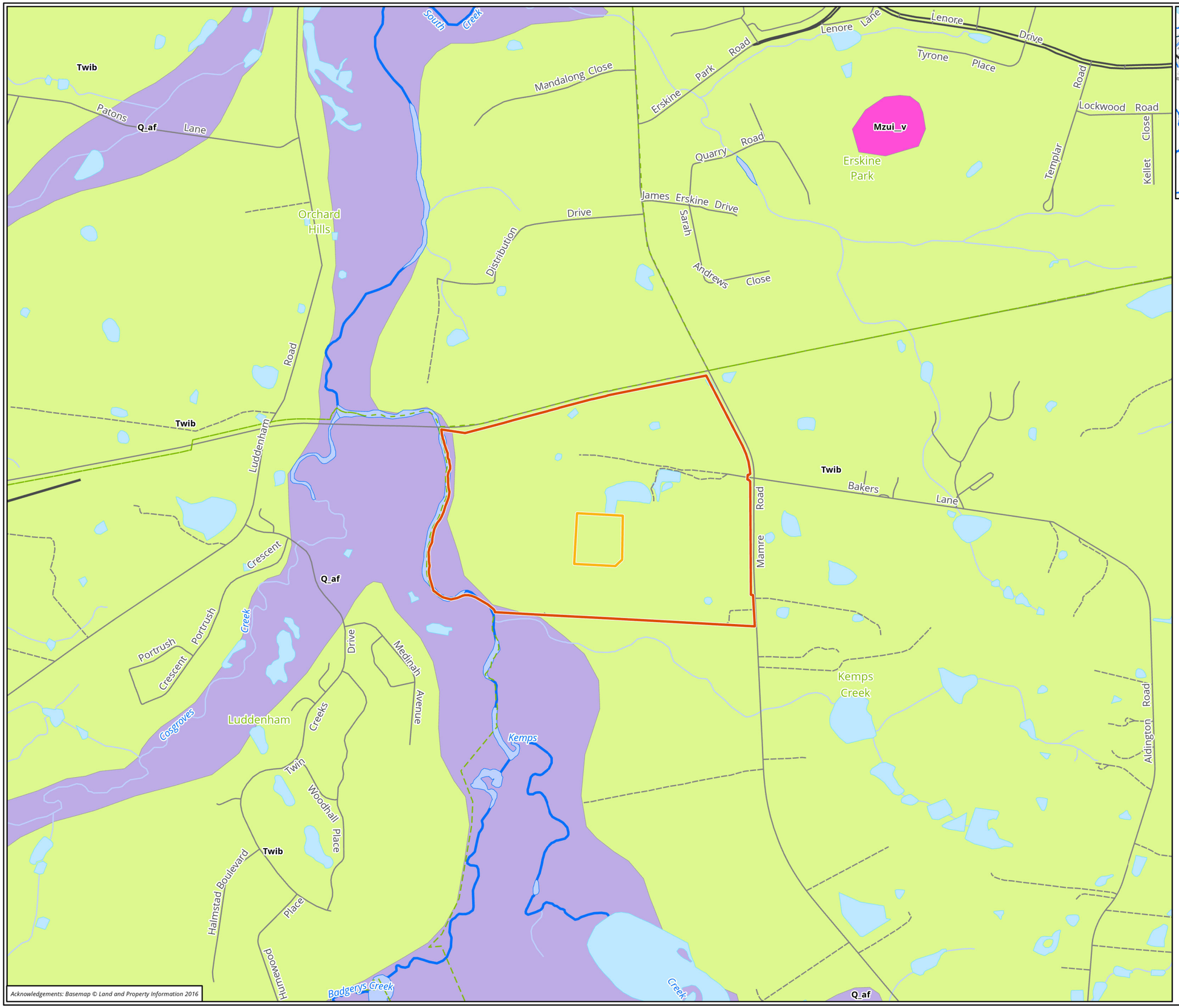
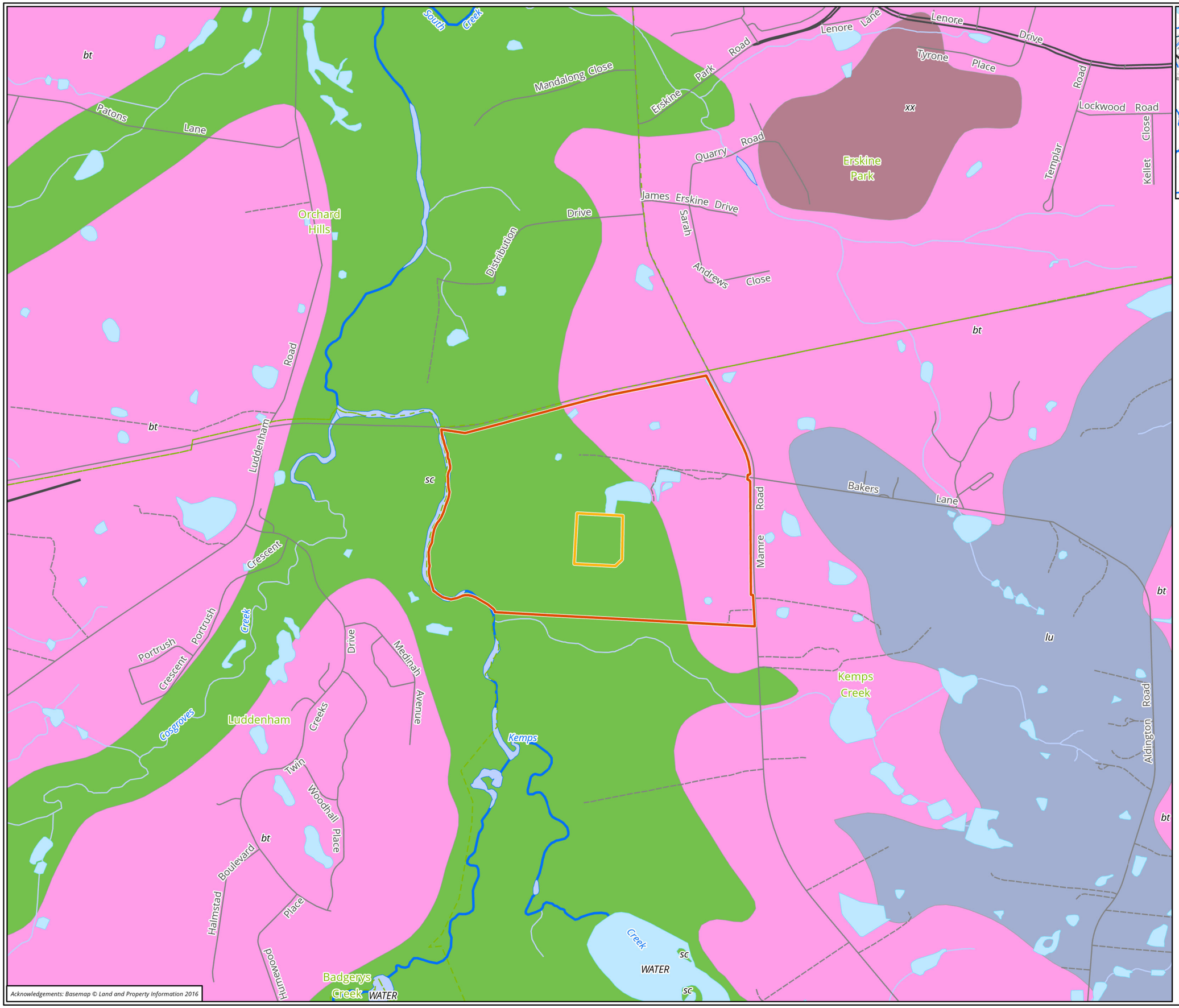


Figure 6 Geological units in the vicinity of the study area



Legend

- Study area - SSD9522
- Study area - Ardex development

Soil landscape units

- bt - BLACKTOWN
- lu - LUDDENHAM
- sc - SOUTH CREEK
- WATER - WATER
- xx - DISTURBED TERRAIN

Figure 7 Soil landscapes in the vicinity of the study area

0 200 400 600

Metres

Scale: 1:15,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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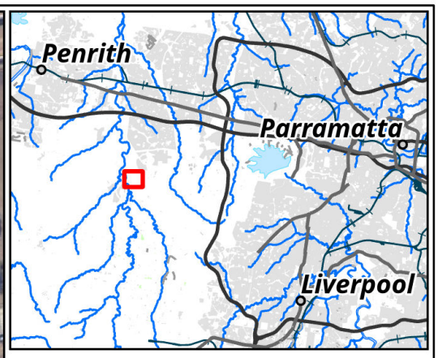

Legend

- Study area - Ardex development
- Study area - SSD9522

Archaeological potential

- Low

Figure 8 Archaeological potential

0 50 100 150 200

Metres

Scale: 1:4,500 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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biosis

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Date: 14 July 2021 ,
Prepared for: AM, Prepared by: LW, Last edited by: lwilson
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Acknowledgements: Basemap © Land and Property Information 2016

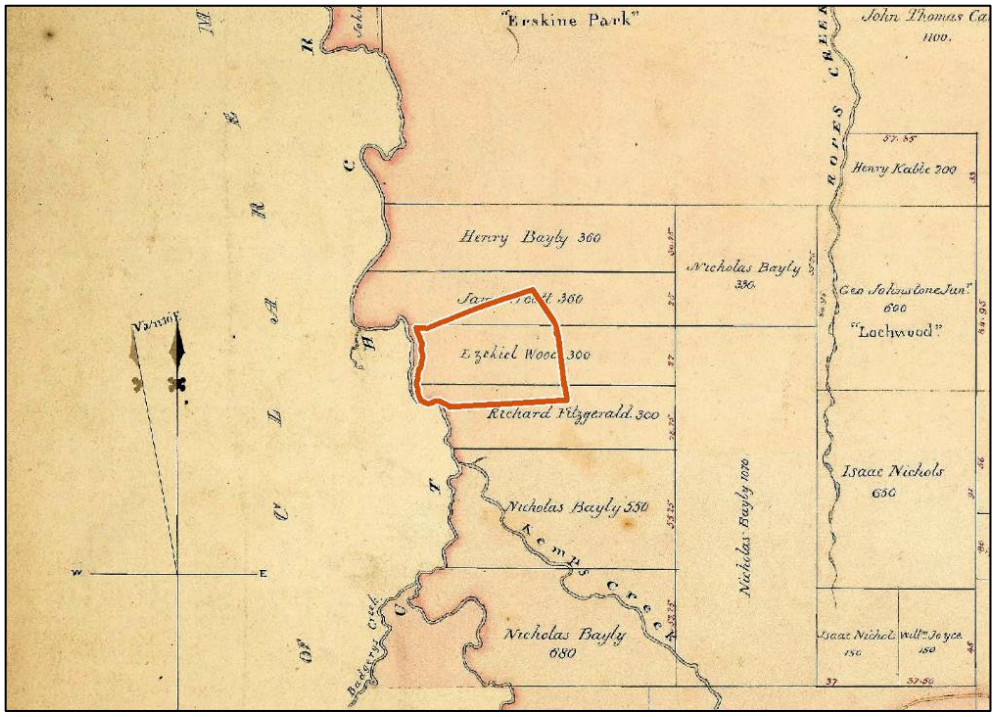

Photo 1 Excerpt from Parish Map of Melville, SSD9522 area outlined in red (NSW LPI 2015)

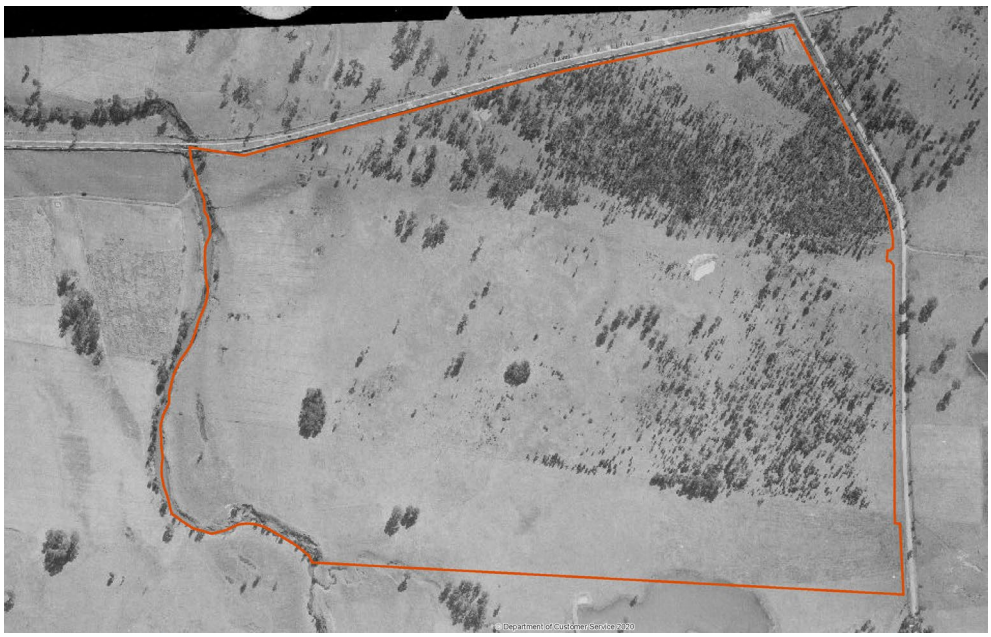

Photo 2 Aerial photograph dated to 1955, SSD9522 area outlined in red (Source: NSW Spatial Services)

Photo 3 **Aerial photograph dated to 1986 with the SSD9522 area outlined in red (Source: NSW Spatial Services)**

Photo 4 **Aerial photograph dated to 2005, SSD9522 area outlined in red (Source: NSW Spatial Services)**