**Reference:1974**
8 May 2020

James Harris
Town Planner
Allen Price & Scarratts Pty Ltd
75 Plunkett Street,
Illawarra NSW 2541

Dear James,

## RE: ABORIGINAL CULTURAL HERITAGE DUE DILIGENCE ADVICE FOR THE ELAMBRA WEST URBAN RELEASE AREA, GERRINGONG, NEW SOUTH WALES

Austral Archaeology Pty Ltd (Austral) has been engaged by Allen Price & Scarratts Pty Ltd (APS) to provide Aboriginal cultural heritage due diligence advice for the proposed subdivision of parts of Lot 2, DP1168922 and Lot 11, DP1045242 at Gerringong, New South Wales (NSW) [the study area]. The location of the study area is shown on Figure 1 and Figure 2.

The proposed impacts are likely to consist of cut and fill works throughout the study area associated with the subdivision. This advice is intended to assist APS in determining their obligations with regards to the *National Parks and Wildlife Act 1974* (NPW Act) and to determine whether the project will involve activities that may harm Aboriginal objects or places. Where an activity is likely to harm Aboriginal objects or places, consent in the form of an Aboriginal Heritage Impact Permit (AHIP) is required.

Section 87 of the NPW Act makes it a strict liability offence to knowingly or unknowingly harm Aboriginal objects or declared Aboriginal places without an AHIP. Harm is defined under the NPW Act as "*any act or omission that destroys, defaces or damages the object or place or in relation to an object, moves the object from the land on which it had been situated*". The NPW Act allows for a person or organisation to exercise due diligence in determining whether their actions will or are likely to impact upon Aboriginal objects or places. Any person or organisation who can demonstrate that they have exercised due diligence has a defence against prosecution under the strict liability provisions of the NPW Act.

The *National Parks and Wildlife Regulation 2009* (NPW Regulation) adopted the *Due diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW 2010a) [the Code], which sets out the reasonable and practicable steps which individuals and organisations need to take in order to:

- Identify whether Aboriginal objects are, or are likely to be, present within the study area.
- If Aboriginal objects are present, or are likely to be present, determine whether the proposed activities are likely to cause harm.
- Determine whether further assessment or an AHIP application is required for the activity to proceed.

This advice has been formulated to provide a robust assessment that will identify whether Aboriginal objects or places are present or are likely to be present within the study area. This has been achieved through the completion of a desktop review and archaeological survey of the study area. The Code provides a series of questions that clarify whether a due diligence assessment is applicable to a proposed project. These questions are addressed in Table 1.

**Table 1 Applicability of the Code to the proposed activity.**

| Question | Response |
|---|---|
| Is the activity a declared project under Part 3A of the *Environmental Planning and Assessment Act 1979*? | No |
| Is the activity an exempt activity listed in the NPW Act or other legislation? | No |
| Will the activity involve harm that is trivial or negligible? | No |
| Is the activity in an Aboriginal place or are you already aware of Aboriginal objects on the land? | No |
| Is the activity a low impact activity for which there is a defence in the NPW Regulation? | No |
| Do you want to use an industry specific code of practice? | No |
| Do you wish to follow your own procedure? | No |

The proposed activity is not considered to be a low impact activity under Clause 80B(g)(iii) of the NPW Regulation. As a result, it is necessary to ensure that due diligence is fully established through use of the series of five steps from the Code outlined below.

## Step 1: Will the activity disturb the ground surface or any culturally modified trees?

The activity will disturb the ground surface and therefore consideration of steps 2a and 2b of the Code is required. The study area does not contain old growth vegetation and as such no culturally modified trees will be impacted by the proposed activity.

## Step 2a. Search the Aboriginal Heritage Information Management System (AHIMS) database and use any other sources of information of which you are already aware

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted on 12 November 2019 (Client Service ID:463568). The search identified 66 Aboriginal archaeological sites within a 5 kilometre search area centred on the study area (Table 2). None of these registered sites are located directly within the study area, and the closest site is located within 15 metres of the study area (Figure 3).

The highest site type occurrences in the vicinity of the study area are, artefacts and Potential Archaeological Deposits (PAD). The low hills type topography of the landscape plays a key role in the potential for finding PADS and other sites within the survey area. The closest sites to the survey area are two isolated finds: “Elambra Isolated Find 1” (AHIMS #52-5-0404) a brownish red volcanic flake, and “Elambra Isolated Find 2” (AHIMS #52-5-405) a white quartz flake (Navin 2000: 10). The volcanic material of these artefacts is certainly present within this area, amongst other stone tool resources such as chert, silcrete, chalcedony, mudstone and sandstone (Navin 2012: 86). Although shell midden with artefact type sites have the third highest occurrence, the study area is not located within a suitable landscape to accommodate such a site. For one, shell middens are generally found along a coastal shore landscape and the study area is squarely within the coastal plains of the Illawarra escarpment. These sites have to do with the finds situated in Werri Beach area. Overall, these results concur with the majority of research done in the Gerringong – Gerroa region, where prehistoric occupation dates back to at least 6000 years during the Holocene Stillstand (Navin 2000: 8).

**Table 2 Previously recorded sites identified within 5 kilometres of the study area.**

| Site feature(s) | Occurrence | Frequency (%) |
|---|---|---|
| Site feature(s) | Occurrence | Frequency (%) |
| Artefact | 22 | 33.35 |
| Potential Archaeological Deposit (PAD) | 17 | 25.75 |
| Shell Midden with Artefact | 14 | 21.25 |
| Artefact with PAD | 9 | 13.65 |

| | | |
|---|---|---|
| Shell Midden | 2 | 3 |
| Modified Tree (Carved or Scarred) | 1 | 1.5 |
| Burial | 1 | 1.5 |
| **Total** | **66** | **100** |

A review of the reports held in the AHIMS database identified several archaeological studies which have been undertaken in the vicinity of the study area. These are summarised in Table 3.

**Table 3 Archaeological studies undertaken in the vicinity of the study area.**

| References | Study area location / description | Results of the assessment | Site distribution |
|---|---|---|---|
| Navin Officer Heritage Consultants Pty Ltd (NOHC) [2013] | Princes Highway between Berry and Bomaderry, approximately 12 kilometres from study area. | NOHC was commissioned by the Roads and Traffic Authority NSW (RTA) to undertake a cultural heritage assessment of indigenous and non-indigenous sites ,The research notes one artefact scatter and 16 PADS, three of these were recorded with surface artefacts, 14 with subsurface artefacts. In addition, large and mature fig trees were also recorded. | The PADS are located, for the most part, on the banks, flats, adjacent slopes and ridges associated with local creeks. As well on the basal slopes next to valley floors and likely former wetland basins. One PAD also transects across a series of minor tributary gullies and low spurs. The artefact scatter was found along the south side of a road cutting along Croziers Road, on a spurline crest, in the cutting near the topsoil. An isolated artefact was also recovered in a shallow vehicle track, on flat ground and on a low broad rise adjacent a creek. |
| Navin Officer Heritage Consultants Pty Ltd 2012 | Princes Highway between Toolijooa Road north of Foxground and Schofields Lane south of Berry in New South Wales (NSW). Approximately | Navin Officer Heritage Consultants (NOHC) was commissioned by the Department of Transport Roads & Maritime Services (RMS) to undertake an archaeological survey and subsurface testing of the 11.6 kilometres upgrade to the Princes Highway. The research notes that 29 Aboriginal heritage items were found within the project area, including: two lithic artefacts, 23 potentially archaeological sensitive areas (PADS) and four historical recordings of places of Aboriginal cultural significance. 18 out of the 23 PADS revealed 236 lithic artefacts with an abundance of them found in subsurface investigations. | These artefacts revealed to be mostly found in locally elevated micro-topographies within a 200 metres margin around former wetland basins, such as low gradient basal slopes and the crests of low spurs. Archaeological sensitivity remains low in the alluvial flats within the valley floors. |

| References | Study area location / description | Results of the assessment | Site distribution |
|---|---|---|---|
| Navin Officer Heritage Consultants Pty Ltd and AECOM Australia Pty Ltd (2010) | Princes Highway between Mount Pleasant and Toolijooa Road, approximately 700 metres from study area. | NOHC was commissioned by the RTA to undertake an assessment of the environmental impacts on the cultural and archaeological heritage of the projected upgrade to the Princes Highway. The research notes 12 Aboriginal Sites within or near the survey area with sub-surface and surface artefacts as well as PADS. These finds revealed to be of low to very low artefact densities. It also found: five mature fig trees, which were deemed to hold significant Aboriginal cultural significance. | The subsurface testing sites were located on elevated topographies adjacent to major creek lines, as well as in or near riparian corridors and major ridge crest. |
| Navin Officer Heritage Consultants Pty Ltd (2007) | Princes Highway between Gerringong and Bomaderry, approximately 700 metres from the study area. | NOHC was commissioned by the RTA to undertake a preliminary indigenous and non-indigenous assessment. The research notes the discovery of 74 Aboriginal sites within their study area, comprising 32 artefact scatters, 19 shell middens, seven isolated artefacts, seven rock shelters, one "natural mythological site", one bora ceremonial site, one midden or artefact scatter, one potential archaeological deposit (PAD), four axe grinding groove sites and one Aboriginal Place at Foxground. | Of the subsurface tested sites, the ones which yielded artefacts where almost exclusively located on elevated topographies near major creek lines and few sites revealed surface artefacts. Other artefacts were found within or near riparian corridors and on major ridge crests. The overall artefact assemblage remained between very low- and low-density distributions. |
| Navin Officer Heritage Consultants Pty Ltd 2006 | Gerroa, NSW. Approximately seven kilometres from the study area. | NOHC was commissioned by the Cleary Bros (Bombo) to write an Aboriginal Cultural Heritage Review for the extension of their sand mine. The research notes that a total of 26 shell material and 39 lithic artefacts were recovered from the 51 tests pits. | Both elements of this investigation were found to be located in spasmodic occurrences across the limited study area. Higher concentrations of shells were noted on the crest of the western side of the studied dune, overlooking Foys Swamp. |
| Navin Officer Heritage Consultants Pty Ltd 2002 | East Gerringong NSW, approximately five kilometres from the study area | NOHC was commissioned by the Kiama Municipal council to conduct an archaeological survey on lots 4 and 6 DP541889. The research notes the finding of one Aboriginal and one PAD, with further lithic artefacts found in eight out of 16 subsurface testing pits. | |
| Navin Officer Heritage Consultants Pty Ltd 2000 | Elambra estate, Gerringong, NSW, adjacent to the study area. | NOHC were commissioned by the Council of the Municipality of Kiama to undertake an archaeological survey in preparation of a site master plan and Development Control Plan (DCP). The research notes two isolated Aboriginal stone artefacts found during the survey. | The first was located on the cleared edge of a damn on a minor tributary that drains out of the survey area and the second, on an eroded embarkment adjacent to an animal track. This survey was done directly east to the current survey area. |

| References | Study area location / description | Results of the assessment | Site distribution |
|---|---|---|---|
| Rex Silcox (1990) | Pacific Highway between Dunmore and North Kiama, NSW, approximately 10 kilometres from the study area. | Rex Silcox conducted an Archaeological assessment of Aboriginal and Historic sites on behalf of Connell Wagner Pty Ltd for the RTA within the anticipated Pacific Highway upgrade. The research notes that four Aboriginal sites featuring artefacts associated with shell middens were found as well as two potential camp sites. | These results, as well as previous research done on the subject, highlight that middens in estuarine environments are usually located on elevated topographies around estuary margins or on the raised surfaces of older sediment deposition; above their inundation zones. |
| Mary Dallas Consulting Archaeologists (MDCA) (1987) | Werri Beach, Gerringong, NSW. Approximately two kilometres from the study area. | MDCA was commissioned by the Kiama Municipal Council to investigate an Aboriginal shell midden and camp site. These sites where found during the construction of a water pipeline and the evidence was highly disturbed. | Proximity to the ocean was a noted environmental factor in the report |

Austral has also undertaken a desktop review of information that may indicate the presence of Aboriginal objects within the study area. This includes an assessment of information relating to ethnography, soils, geology, landform, disturbance and resource information pertinent to the study area. A summary of this information is presented in

**Table 4 Review of sources that may indicate the presence of Aboriginal objects.**

| Source | Summary |
|---|---|
| Ethnographic | The pre-European context of the Illawarra is one of small bands of Aboriginal people living a mobile hunting and gathering lifestyle. Traditionally, this district falls within the tribal area of the Wodi Wodi People, with the Shoalhaven River forming a natural boundary with the Wandandian people to the south (Tindale 1974). The Wodi Wodi people speak Dharawal (Thuruwal), which is part of the larger encompassing Yuin linguistic group (Schmidt 1919). However, Aboriginal people formed part of a dynamic culture which encouraged movement throughout the landscape in order to assist in the ceremonial and functional practicalities of daily life. As such, defined borders for tribal groups need to be recognised as an artificial constraint designed by anthropologists. Population estimations at the time of contact were difficult to estimate due to disease decimating populations.<br>The Aboriginal peoples of the Illawarra region, or the Elouera meaning “a pleasant place”, refer to themselves broadly as the Wandiwandian people, meaning “the home of lost lovers” (Illawarra Historical Society 1974:76).The town of Gerringong derives its meaning from the Tharuwal Aboriginal word for a “fearful” or “perilous” place (Reed 2010:38).<br>The social structure of Aboriginal groups was slightly stratified, with elders of clans holding decision making capabilities. Subsistence activities were sexually dimorphic, and the spirituality of groups is detailed and explained through an oral tradition of Dreamtime. Material culture, such as tools, was made of a variety of materials such as bark, resin, shell, bone and reeds. Hard stone raw material that was made into stone tools is the main element of this tool kit to remain in the archaeological record.<br>The pre-European landscape of the Illawarra would have been the setting for a variety of human activity. This human activity would have included camping, hunting, gathering, cooking, ceremonies, and other cultural activities associated with semi-permanent settlement sites in the region. Of note, the southern Illawarra Range or escarpment has been shown to hold certain cosmological and cultural significance as well being a frequented travel corridor (Navin 2007:21). Cultural importance would have been placed by Aboriginal Peoples on the nearby Crooked River as well as large, mature fig trees. In particular, fig trees have been noted as having an association with birthing and women’s lore, the spirit Yaroma, and more practically for their use as sources of shade and food (Navin 2012:45). |
| Landform | The study area is located in the Southern Illawarra coastal plain, in the shadow of the Illawarra escarpment. It is typically characterised by low-lying, gently undulating plains and small hills. The local area includes residential properties interspersed with large tracts of land which have been cleared for pastoral purposes. It is typically characterised by level to gently undulating riverbeds and banks as well as active floodplains (Hazelton 1992:68). The eastern portion of the study area is placed squarely in the Kiama geological landscape. This erosional landform is characterised by rolling low hills with broad crests, long convex slopes and an extensively cleared landscape with stands of closed forests (Hazelton 1992:52). The Crooked River, a 4$^{th}$ order creek, runs approximately 1.6 kilometres south-west of the study area.<br>Archaeological finds of Aboriginal cultural material across the Illawarra highlights the importance of creek lines and identifies associated elevated terraces as areas of higher archaeological potential. The highest archaeological potential is therefore along the creek lines between the two hills in the study area, where a similar landscape is situated (Figure 7). |

| Source | Summary |
|---|---|
| Geology | The underlying geology of the survey area is the Kiama and Shoalhaven Groups. The Kiama Group consists of the Blow Hole Latite Membrane; a mid-grey, latite trachyte tuff with pebbly bands of sandstone, siltstone and a conglomerate layer which is part of the Gerringong volcanics. This volcanic bedrock is a Permian deposit which can be up to 50 metres thick (Hazelton 1992:52). The Shoalhaven Group is an alluvium layer derived from sandstone and shale overlying buried estuarine sediments. The alluvium is made up of gravel, sand, silt and clay and the subsoil is predominantly made of clay. The study area is therefore expected to predominantly be composed of clay soils, which result in a shallow sediment deposit for artefacts, reducing the overall archaeological potential.<br>Furthermore, basal slopes, predominant in the Kiama geological group, presents an added factor for consideration, as PADS and isolated artefacts have been known to be found on both basal slopes and ridges surrounding former wetland basins (Figure 4). |
| Soils | The study area is located within the Kiama and Shoalhaven soil landscape. The Shoalhaven soil landscape (Figure 4) takes up the western portion of the study area and is moderately deep (between 0.5 and 1 metre). It consists of Prairie soils which occur on levees, Red Earths and Yellow and Red Podzolic Soils which occur on the terraces as well as alluvial Soils and Gleyed Podzolic (potential Acid Sulphate) Soils on the floodplains. The Shoalhaven landscape also presents with level to undulating floodplains with less than 5 metres relief and 3% slope (Hazelton 1992:68). The Kiama soil landscape takes up the eastern half of the study area and consists of more than 1.5 metres of deep kransnozems-type soils on the crests and upper slopes as well as prairie soils on the lower slopes. It also has a relief of between 40 to 60 metres and a slope of less than 20% steep. Crests are broad with long moderately inclined concave footslopes (Hazelton 1992: 52). |
| Hydrology | The study area is located within the Crooked River catchment. The Crooked River, a 4$^{th}$ order creek, lies approximately 1.6 kilometres south-west of the study area (Figure 1 and Figure 2). The elevated terrace in this area and its proximity to gentle slopes and minor creeks make it an ideal location for Aboriginal people to camp. This area would have provided them with a rich resource base as well as travelling corridors through the landscape (Attenbrow 2010). Flooding in the study area is related to the nearby creeks and minor tributaries running through the area. A flood study by AWT Environment, Science and Technology noted that in the past 100 years, flows have increased between 25-30 $m^3/s$. However, this estimate has at least tripled in recent years due to the intensive uses of the upstream land (AWT 2001:17). Due to this increase, it is expected that a moderate potential for archaeological deposit will be found, despite the promising landforms. |

| Source | Summary |
|---|---|
| Resources | The study area has been cleared as a result of historical land use practices. However, prior to this it would have featured a diverse range of flora and fauna resources that would have been utilised by Aboriginal people. Aboriginal people frequenting the study area would have exploited resources from the nearby Crooked River as well those within the smaller drainage lines.<br>Vegetation would have consisted of tall open forests, specifically populated with lillypilly (*Acmena smithii)*, native quince (*Alectryon subcinereus)*, brush bloodwood (*Baloghia lucida)*, red-fruited olive plum (*Cassine australis)*, brittlewood (*Claoxylon australi)*, hairy clerodendrum (*Clerodendrum tomentosum)*, murrogus (*Cryptocarya microneural)*, giant stinging tree (*Dendrocnide excelsa*), black plum (*Diospyros australis)*, sassafra *(Doryphora sassafras)*, koda (*Ehretia acuminate)*, moreton bay fig (*Ficus macrophylla*), deciduous fig (*Ficus superba)*, cabbage tree palm (*Livistona australis*), northern boobialla (*Myoporum acuminatum)*, large mock olive (*Notelaea longifolia*), snow-wood (*Parachidendron pruinosum*), black apple (*Planchonella australis*), plum pine(*Polocarpus elatus*), yellowwood (*Sarcomelicope simplicifolia*), flintwood (*Scolopia braunii*), wilkias (*Wilkiea huegeliana*), whalebonetrees *(Streblusbrunonianus*), bastard rosewood (*Synoun glandulosum*), buff hazelwoods (*Symplocos thwaitesii*), scrub beefwood (*Stenocarpus salignus)*, olivers sassafra (*Cinnamomum oliveri*), coast canthium (*Canthium coprosmoides)*, bird lime tree (*Pisonia umbellifera*), swamp oak (*Casuarina glauca)*, illawara flame tree (*Brachychiton acerifolium*) and various reeds in swamps (Hazelton 1992:52, 69).<br>The study area and its nearby surroundings would have also provided habitats for the usual variety of macropods found in the Illawarra region, most notably the grey eastern kangaroo *Macropus giganteus*. Meanwhile, the rivers and creeks would provide access to additional faunal resources such as fish species, a range of migratory wetland birds and a variety of lizards and frogs. |
| Disturbance | The locality today consists of cleared pastures as well as farming and residential structures constructed along the north to south aligned ridge of the western part of the survey area, which also contains the primary driveway to the property. Other tracks are present in the study area as well as other farming infrastructure such as fences and dams.<br>Due to historical land clearance, an activity which is particularly devastating to cultural deposits located on hill slopes, and general farming and ploughing activities in other parts of the site, the entirety of the study area can be considered disturbed land according to the Code. As seen in some historical aerials dating back to 1948 and 1961, the same disturbances can be noted with little to no changes throughout the years (Figure 8). |

## Step 2b. Activities in areas where landscape features indicate the presence of Aboriginal objects

A multitude of studies have been undertaken that have established a general criterion for predicting the location of Aboriginal sites in landforms associated with the Illawarra Coastal Plain (c.f. Kohen 1986; Haglund 1980; Smith 1988; McDonald and Mitchell 1994, McDonald 2005 Biosis 2017).

These studies, combined with the results from Step 2a of the Code, make it possible to develop a series of predictive statements. These indicate the type and character of Aboriginal cultural heritage sites that are likely to exist within the study area and where they are more likely to be located. These predictive statements indicate that:

- Disturbance including land clearance, building construction, farming, and limiting factors including grass coverage and areas of dense vegetation may impact visibility and the potential to identify artefacts. Some of these may also impact the integrity of surface and sub-surface deposits.
- Stone artefacts, isolated finds and PADs are the types of sites most likely to occur within the study area due to the proximity of the Crooked River and its minor tributaries.
- Sites would most commonly be found near creeks and on high ground near water, as well as along ridgelines and spurs with flat or gently sloping crests.
- High levels of past disturbances within the study area mean that the general archaeological landscape is not suitable for conservation.

- Stone artefact sites may be present on flat terrain adjacent to creeks, however disturbances including land clearance or flooding events may relocate these objects.
- Stone artefacts are likely to occur in smaller assemblages.
- Chert and quartz will be the most likely be the dominant raw material.
- Scarred trees are unlikely to be present within cleared and regrowth areas.
- Grinding grooves are unlikely to be present due to a lack of suitable requirements (i.e. exposed bedrock near to a water source).
- Ceremonial grounds are unlikely to be present due to their general rarity within New South Wales.
- Burials are unlikely to be present, due the lack of deep sandy locations suitable for burial.
- Shell middens are unlikely to be present due to the distance from Lake Illawarra and the coast.
- Stone arrangements are unlikely to be present due to their general rarity within New South Wales.

Based upon the above, whilst the study area is located in reasonably close proximity to a known water source, the Crooked River, the study area's potential to contain Aboriginal objects is reduced through the presence of multiple slopes, clearly visible changes in waterways as well as the historical use of the area as a pasture.

### Step 3. Can you avoid harm to the object or disturbance of the landscape feature?

It is not possible to avoid harm to the landscape features within the study area.

### Step 4. Desktop assessment and visual inspection

Based upon the results of Step 2a, it was necessary to conduct a visual inspection in order to ground truth the predictive statements outlined in Step 2b. A visual inspection of the study area was undertaken on 13 November 2019 by Alexander Beben (Director, Austral), and Pauline Ramsey (Archaeologist, Austral), as well as a member of the Tharawal Local Aboriginal Land Council. The visual inspection consisted of a systematic survey of the study area to identify and record any Aboriginal archaeological sites visible on the surface, or areas of Aboriginal archaeological potential and cultural sensitivity. The archaeological survey was conducted on foot. The methods used during the visual inspection conformed to the Code (DECCW 2010b).

The visual inspection identified that the study area contained three main landforms; the two facing hills in the north east corner, their surrounding creek lines and terraces and the flood plains in the west and southern portions of the study area. Ground exposure within the proposed developed area was poor overall, with at times less than 1% visibility. Drainage lines had particularly low visibility because of the presence of tall grasses and swamp reeds in and around the drainage lines (Figure 9 View facing east of creek line and elevated terrace. and Figure 12 View facing east of creek and terraces). This low percentage of visibility made it difficult to identify the presence of any surface artefacts.

The western most hill, which runs in the middle of the survey area, includes a long crest on which sits two large fig trees and 7 large built structures along its north to south oriented ridge (Figure 14 Cropped panorama facing west of creek, slope and ridgeline with southern fig tree on crest. and Figure 15 View facing north of crest, southern fig tree disturbed areas.The second hill to be incorporated into the developed area lends only a portion of its western facing slope (Figure 13 View facing east of hill. Moderate slopes in south east of study area.). The first hill is of a simple waning slope, whereas as its neighbour has a moderate, waxing slope. Between these two hills are terraces which overlook open drainage lines.

The creek line between the two hills is overlooked by a dug ditch with some artificial pooling: an attempt to deviate the water flow from its natural course (Figure 14 Cropped panorama facing west of creek, slope and ridgeline with southern fig tree on crest.However, this is not the first attempt to change the landscape as multiple paleo creek channels are also visible, which have resulted in the creation of various undulating mounds (Figure 10 View facing north of slope.). This area is of high archaeological potential, and particularly the higher plateau area adjacent to the medium sloping hill (Figure 9 View facing east of creek line and elevated terrace.).

As mentioned previously, the lots have been used for pastoral activities and therefore the hills and valleys included in the survey area are comprised of medium to high tall grass, with an abundance

of vegetation in the creek lines. In these areas less than 1% visibility and exposure of ground surface can be seen: highly impacting the survey's visibility potential.

In the distance Broughton Head is particularly visible (Figure 18 View facing west of dirt track and mount Barrengarry in the distance.).

## Step 5: Further investigations and impact assessment

Based upon the outcome of Steps 1 to 4 of the Code, it has been determined that Aboriginal objects are likely to occur in identified areas of moderate potential within the study area. The proposed plan for this site is subdivision followed by groundworks, when this phase occurs, an Aboriginal Cultural Heritage Assessment (ACHA) will be required to determine the complete impact on the archaeological resource.

- Archaeological sites in this area occur majorly on the crests of low spurs, on elevated topographies adjacent to major creek lines, in or near riparian corridors and on major ridge crests.
- Foothills contain many paleochannels, and the current creek alignments should not be relied upon in order to determine the location of archaeological sites.
- Aboriginal places may occur within the landscape.
- Where significant flooding does not occur, Aboriginal sites on alluvial soils appear to be stratified.
- Site frequency and density are dependent on their location in the landscape.
- There is a dominance of low density surface artefact scatters and isolated finds.
- Landforms associated with walking routes may contain a greater variety of archaeological material than only stone tools. Items other than stone tools were possibly transported up and down from the escarpment.

No previously recorded Aboriginal archaeological sites will be impacted by the proposed works. The location of the study area was likely used as a travel route between the Illawarra escarpment and the coast. Archaeological deposits within the study area, if present, would most likely be represented by artefacts, isolated artefacts or PADs. The field survey confirmed that the study area was comprised of mostly gently undulating, low hills with alluvial terraces on minor tributaries related to the fourth order creek: Crooked River.

If you have any questions regarding the advice within this letter, please do not hesitate to contact me on the details below.

Yours sincerely,

Pauline Ramsey

Archaeologist

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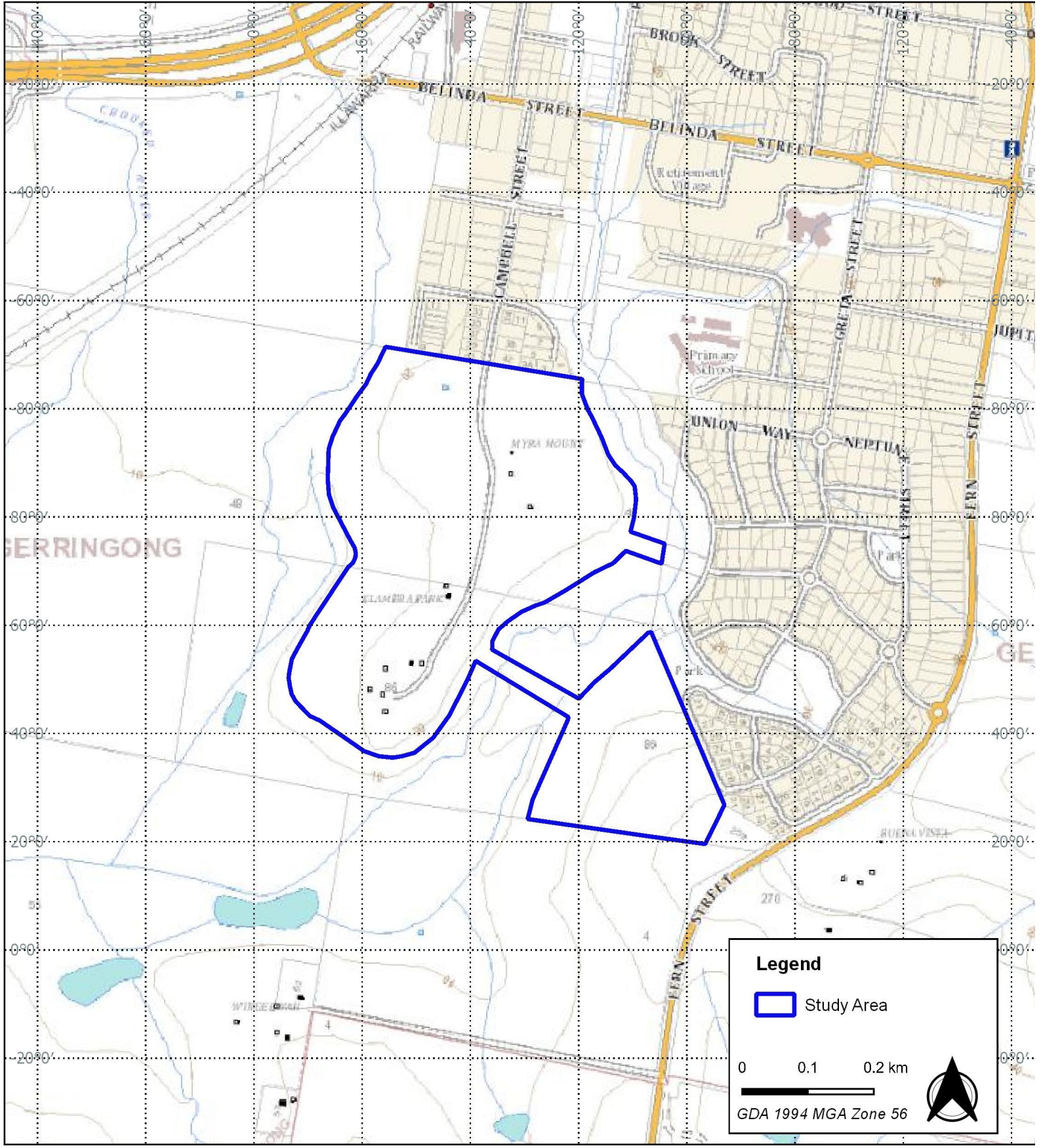


**Figure 1 Topographic map of the study area**

1974 West Elambra proposed subdivision

*Source: NSW LPI base maps*

*Drawn by: PR Date: 08/05/2020*

AUSTRAL ARCHAEOLOGY

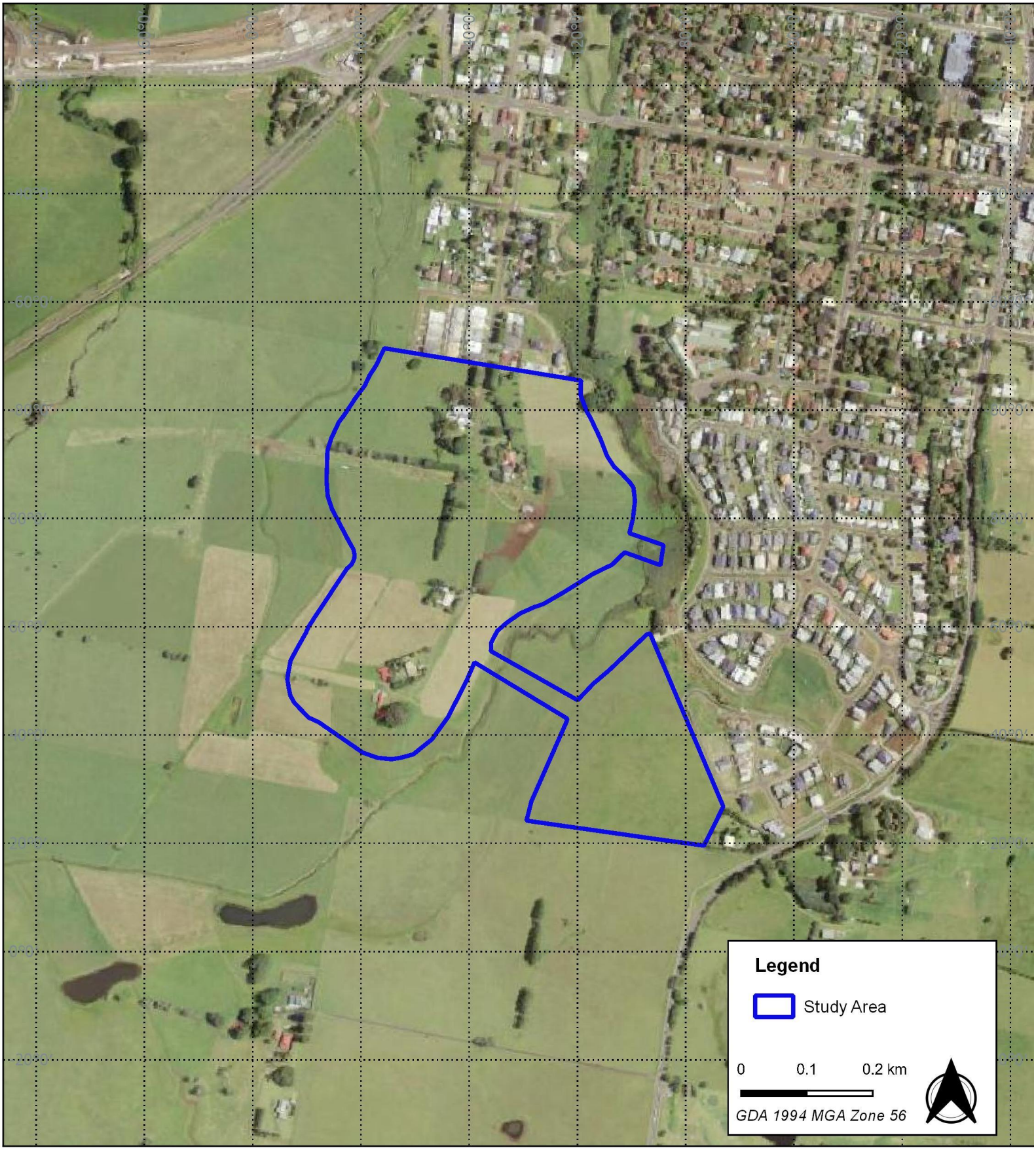


**Figure 2 Detailed aerial of the study area**

1974 West Elambra proposed subdivision

*Source: NSW base maps*

*Drawn by: PR Date: 08/05/2020*

AUSTRAL ARCHAEOLOGY

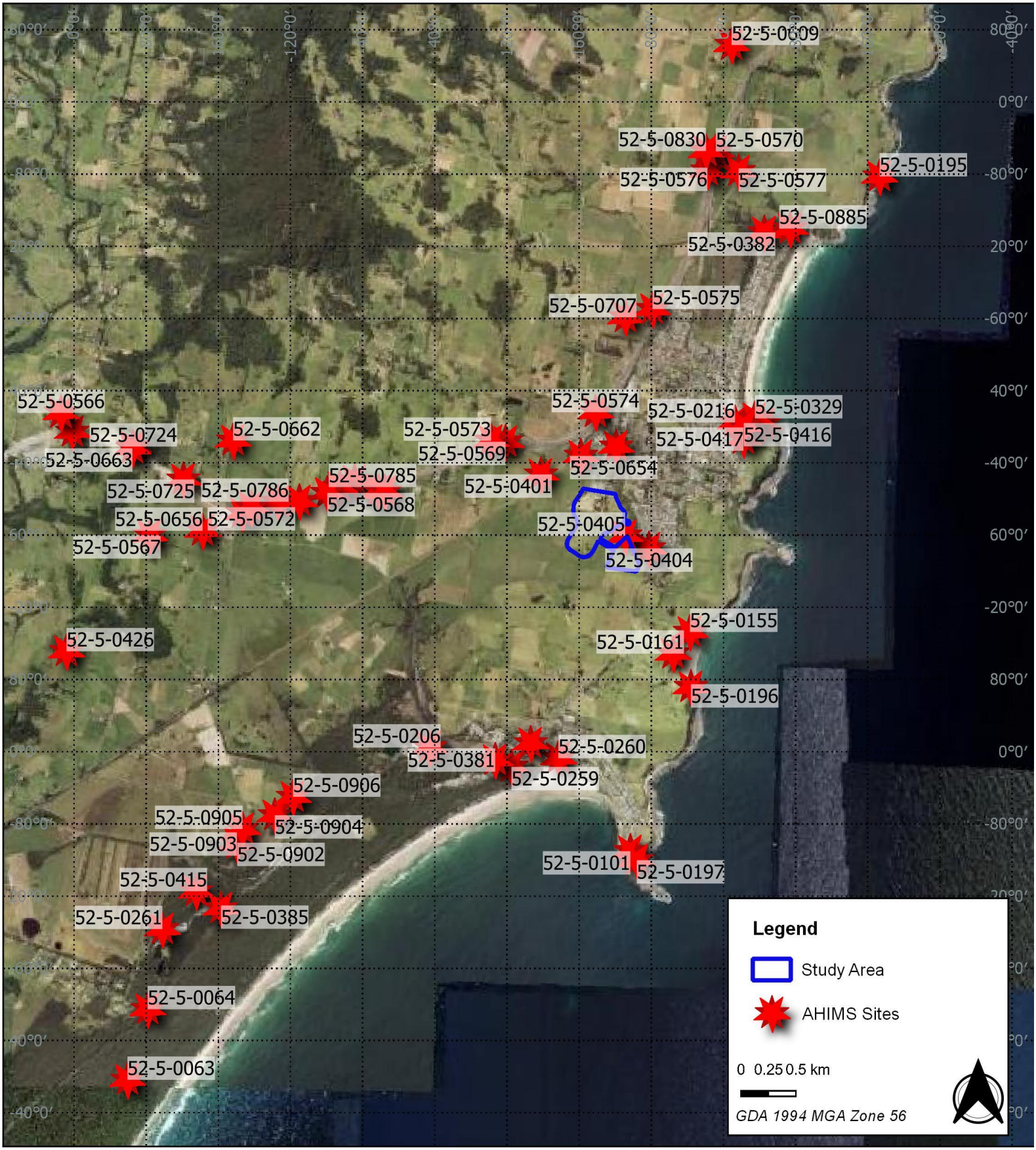


**Figure 3 AHIMS Sites surrounding the study area**

1974 West Elambra proposed subdivision

*Source: NSW Department of Lands Aerial* *Drawn by: PR* *Date: 08/05/2020*

AUSTRAL ARCHAEOLOGY

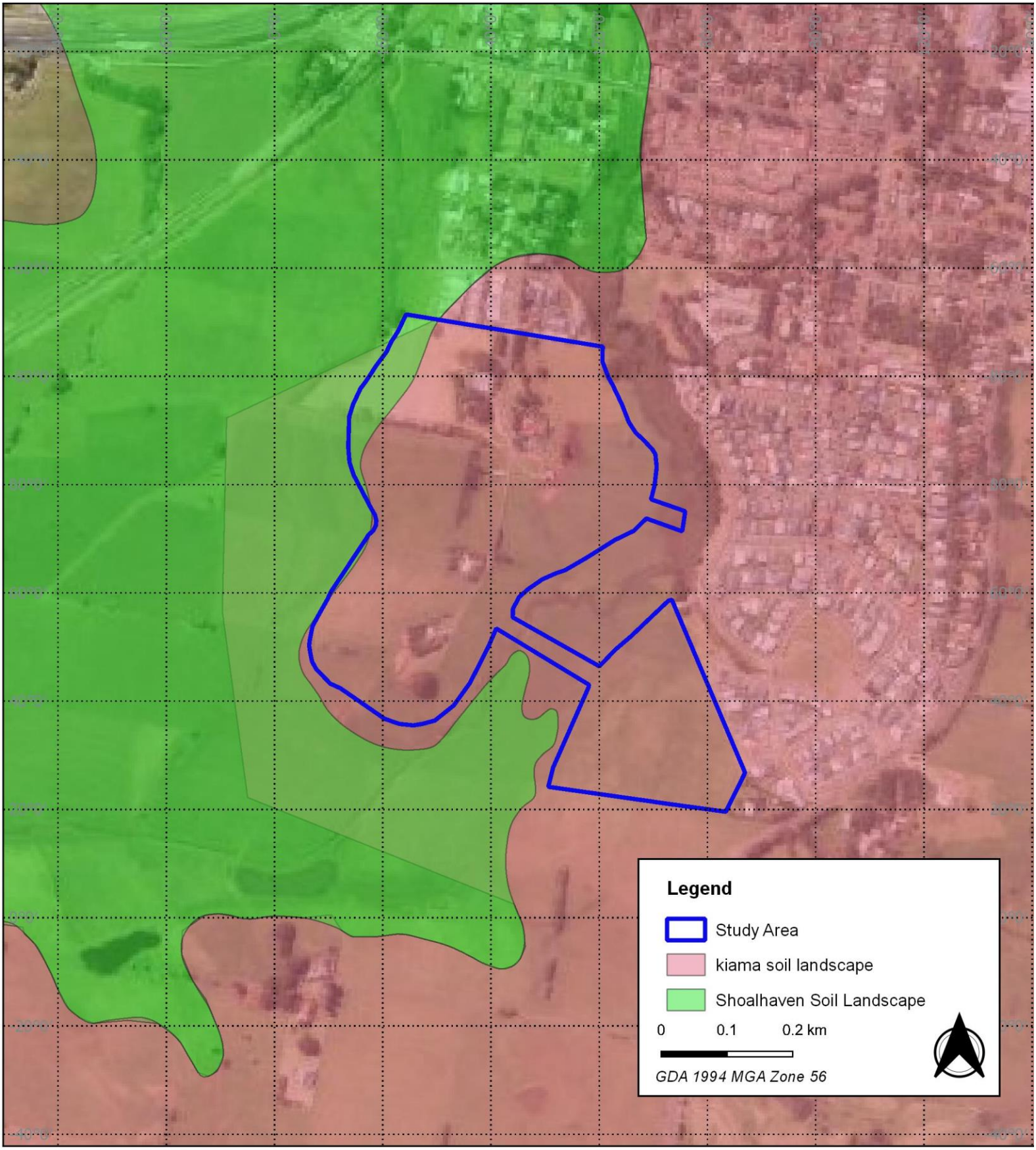


**Figure 4 Geological units associated with the study area**

1974 West Elambra proposed subdivision

*Source: ESpade Soil Landscapes of NSW* *Drawn by: PR* *Date: 08/05/2020*

AUSTRAL ARCHAEOLOGY

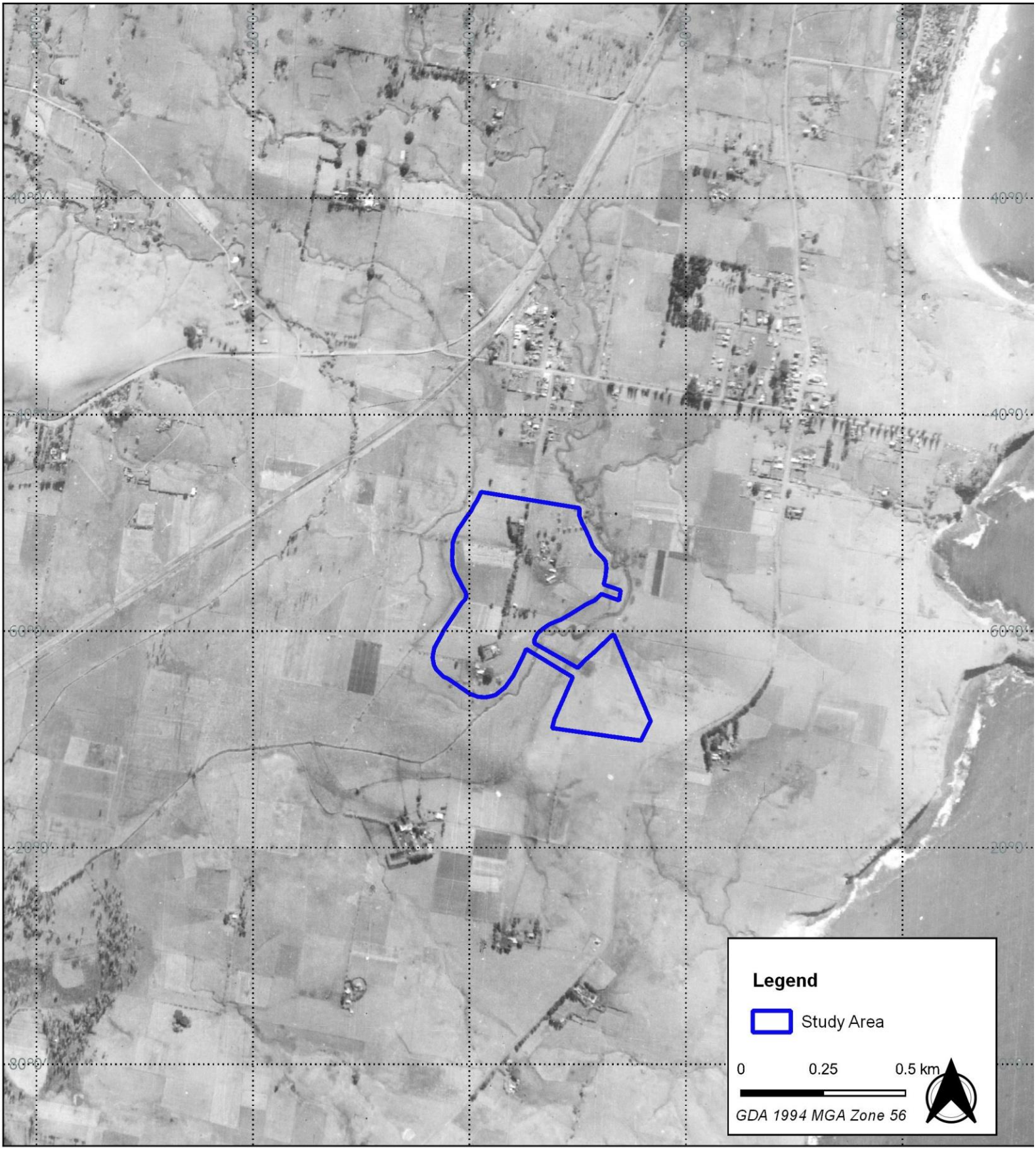


**Figure 5 1949 Historical Aerial Imagery**

1974 West Elambra proposed subdivision

*Source: DCS Spatial Services*

*Drawn by: PR Date: 08/05/2020*

AUSTRAL ARCHAEOLOGY

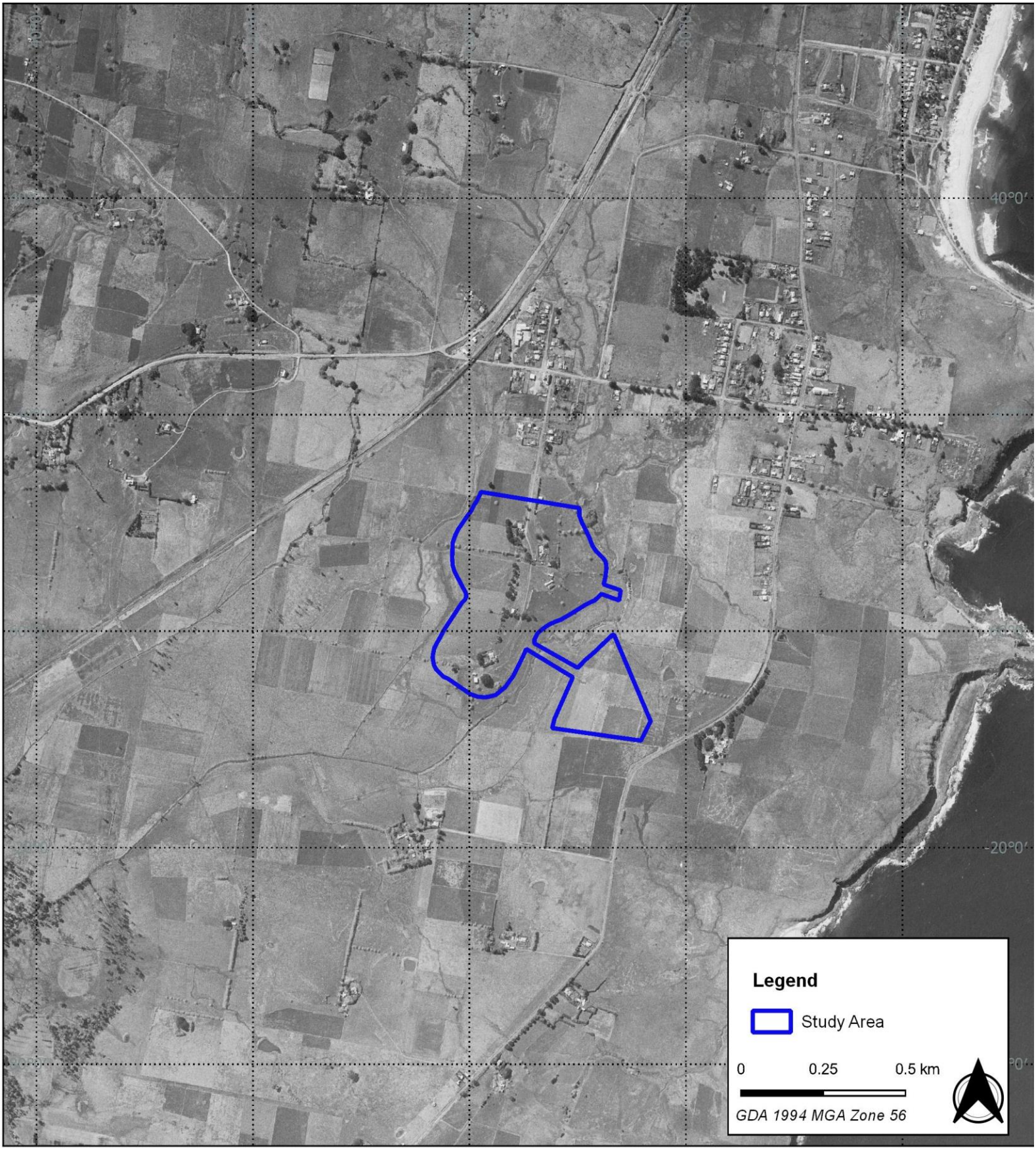


**Figure 6 1961 Historical Aerial Imagery**

1974 West Elambra proposed subdivision

*Source: DCS Spatial Services*

*Drawn by: PR Date: 08/05/2020*

AUSTRAL ARCHAEOLOGY

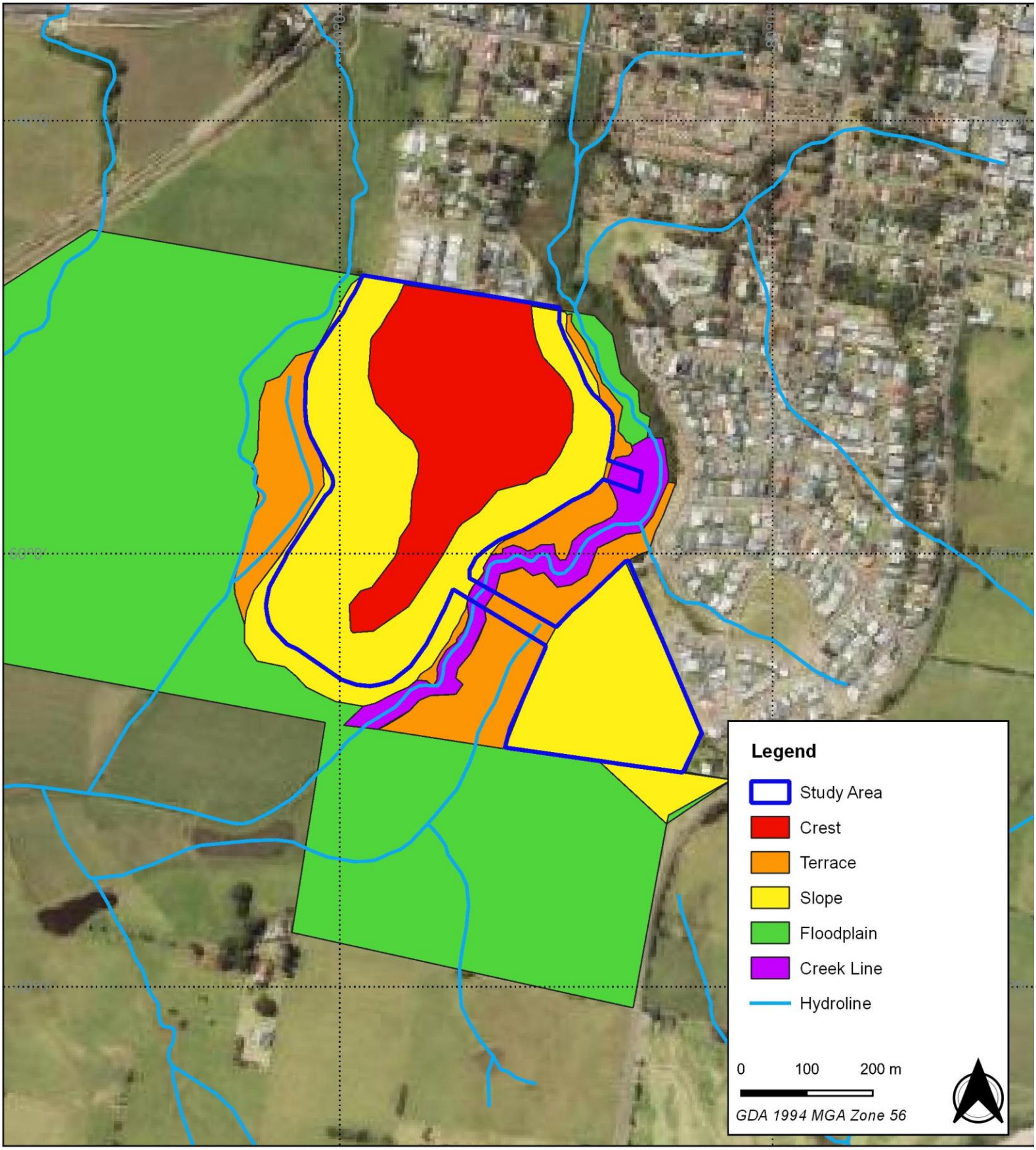


**Figure 7 Visula inspection results: landforms within the study area**

1974 West Elambra proposed subdivision

*Source: NSW Department of Lands Aerial* *Drawn by: PR* *Date: 08/05/2020*

AUSTRAL ARCHAEOLOGY

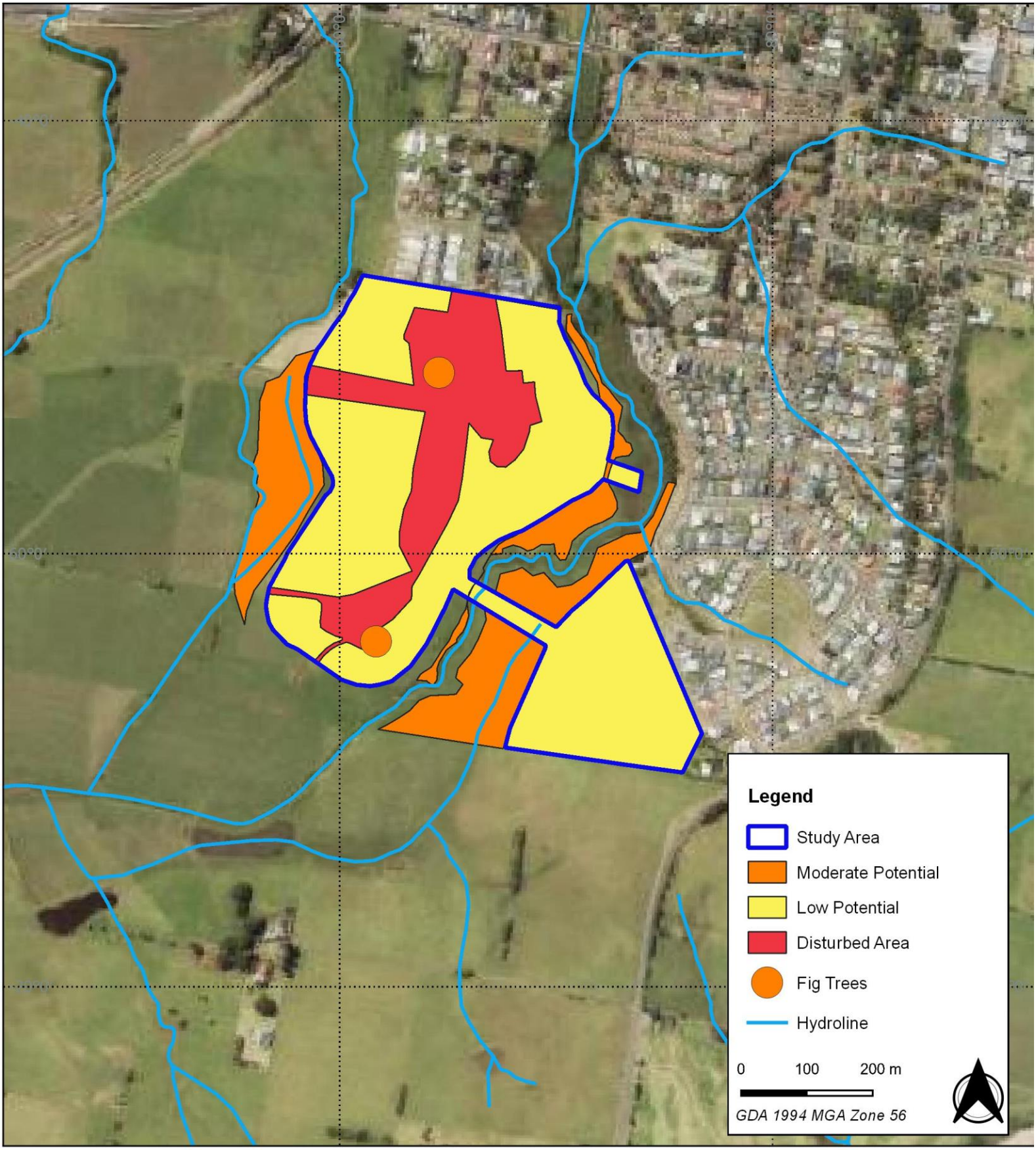


**Figure 8 Aboriginal archaeological potential inside study area**

1974 West Elambra proposed subdivision

*Source: NSW Department of Lands Aerial* *Drawn by: PR* *Date: 08/05/2020*

AUSTRAL ARCHAEOLOGY

**Figure 9** View facing east of creek line and elevated terrace.

**Figure 10** View facing north of slope.

**Figure 11 View facing south west of floodplain and creek**

**Figure 12 View facing east of creek and terraces**

**Figure 13** View facing east of hill. Moderate slopes in south east of study area.

**Figure 14** Cropped panorama facing west of creek, slope and ridgeline with southern fig tree on crest.

**Figure 15** View facing north of crest, southern fig tree disturbed areas.

**Figure 16** View facing south of floodplains.

**Figure 17** View facing west of dirt track, slope and floodplain.

**Figure 18** View facing west of dirt track and mount Barrengarry in the distance.

**Figure 19** View facing west of northern fig tree.

**Figure 20** View north of soil stratigraphy: Horizon B visible.