



WAGGA WAGGA LOCAL ENVIRONMENTAL STUDY
Aboriginal Cultural Heritage Assessment

Report for Willana Associates

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1 Introduction

Wagga Wagga City Council is preparing a draft Local Environmental Study (LES) to implement the strategic planning of the Wagga Wagga Spatial Plan 2007. As part of the LES preparation, environmental studies are required of eight sites which are subject to rezoning:

- ⑩ Lloyd;
- ⑩ Bomen;
- ⑩ Estella West;
- ⑩ Edison Road;
- ⑩ Hammond Avenue;
- ⑩ Copland Street;
- ⑩ Boorooma East; and,
- ⑩ Moorong Street.

The study areas are shown in Figure 1. Four of the sites are considered major release areas – Boorooma East, Estella West, Lloyd and Bomen.

The LES aims to identify appropriate land uses for each of the eight sites. There is a proposed mix of residential and industrial land use categories. Proposed categories to be considered include residential for three of the four major release areas (Boorooma East, Estella West and Lloyd) and industrial for the remaining sites, with the exception of Moorong Street where options were to be considered.

The environmental study will provide information to support the rezoning of the land, taking into consideration a range of issues and cumulative impacts. A number of specialist studies were required to input into the LES and resulting draft Local Environment Plan.

1.1 Study Objectives

The aim of this study was to identify the Aboriginal cultural heritage values of the eight study areas for inclusion in the LES. Information pertaining to the LES process, including planning context, legislation, broader stakeholder consultation and details on other specialist studies are contained within the LES (Willana Associates). Key aspects that relate to the assessment of Aboriginal cultural heritage are summarised in this report.

The objectives of the Aboriginal cultural heritage assessment were;

- ⑩ a preliminary investigation of Aboriginal site distribution and landscape features based on desktop and field-sourced information;
- ⑩ to develop a predictive model of site distribution and areas of archaeological sensitivity based on desktop and field-sourced information; and,
- ⑩ consultation with the local Aboriginal community and involvement of community members in study area visits, discussions relating to the Aboriginal archaeological sensitivity of the eight study areas and recommendations for the management of Aboriginal cultural heritage during the rezoning process.

This Aboriginal cultural heritage assessment is preliminary in nature and will contribute to the LES for rezoning the eight parcels of land. Further detailed studies would occur at the development/subdivisions applications stages, following rezoning.

This assessment has been undertaken in accordance with the principles and guidelines for Aboriginal cultural heritage assessment of the Department of Environment and Climate Change (DECC).

1.2 Aboriginal Community Consultation

The Wagga Wagga Local Aboriginal Land Council (WWLALC) has been contacted in relation to the Aboriginal cultural heritage assessment for the Wagga Wagga LES. This consultation has involved a brief discussion with John Little, a sites officer of the WWLALC, about the project and his availability for a day visit to the eight study areas.

A letter was sent to the WWLALC office outlining the scope of the Aboriginal cultural heritage assessment and the potential availability of a WWLALC representative for a visit to the study areas. Figures showing the location and boundaries of the eight study areas were attached to the letter.

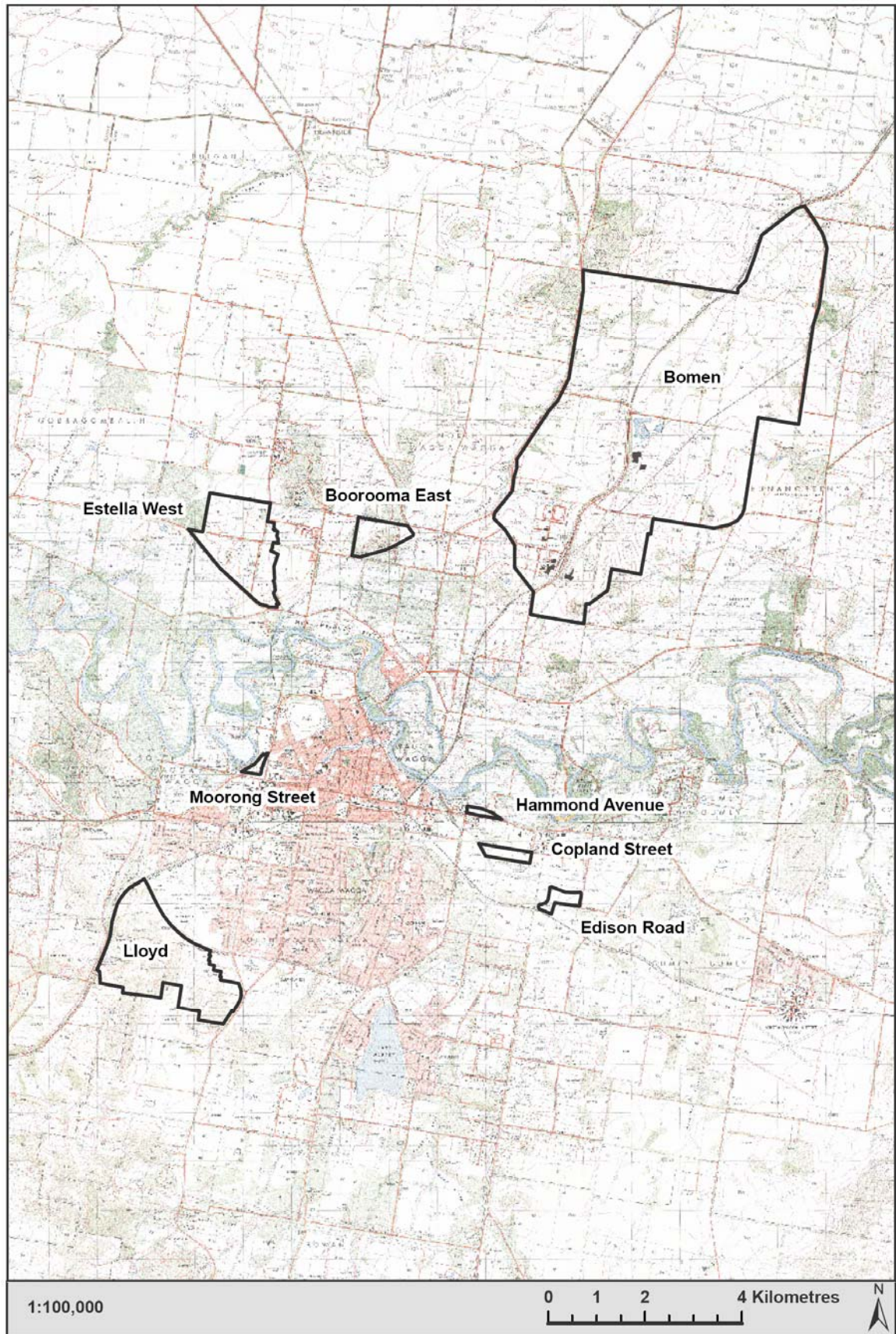


Figure 1. Location of study areas.

A study area visit was conducted on Friday 28th September 2007, attended by John Little (WWLALC), Alison Nightingale (KNC) and Josh Symons (KNC).

Following from the study area visits a collection of background information was sent to John Little at the WWLALC address. This information included copies of previous archaeological investigations in the area as well as copies of AHIMS site cards for those sites recorded within the study areas.

A report from the WWLALC has not yet been sent through. Any comments received from the Land Council will be provided to the Wagga Wagga City Council and attached as Appendix A to this report.

2 Background

2.1 Environment

The study areas are located across the western foothills of the Great Dividing Range. The dominant landforms in this area are vast undulating terrain consisting of metamorphic, igneous and sedimentary geology, and the creek and river floodplains cutting through these features.

The main floodplain in the Wagga Wagga area is associated with the Murrumbidgee River. This floodplain consists of vast deposits of Quaternary alluvium, which have incised through older Tertiary alluvium. The undulating terrain to the north of the Murrumbidgee floodplain consists largely of granite geology, whereas the terrain to the south consists of granite and sedimentary geology.

Prior to historical land clearance, the Murrumbidgee River and associated floodplain would have comprised a diverse range of flora and fauna, with a similar range of subsistence resources found along smaller creeks, billabongs and floodplains. There was also a diverse range of flora and fauna across the higher, undulating terrain, although the Murrumbidgee floodplain would likely have provided more consistent and concentrated resources.

2.2 Current Land Use

The study areas are predominantly used for rural activities, with industrial and quarrying confined to smaller areas. There has been large scale vegetation clearance within all areas, with any extant large trees confined to watercourses or scattered throughout paddocks.

Industrial activities are confined to smaller parts of several of the study areas, including the southern portion of the Bomen study area, and a large portion of the Hammond Avenue and Copland Street study areas. There is one active quarry located within the Lloyd study area. There is more likely to be dramatic landscape modification in built up areas, although there is potential for intact landforms in vacant blocks or open spaces.

2.3 Archaeology of the Region

A number of archaeological investigations have been conducted in the Wagga Wagga area, summarised in Table 1.

Table 1. Aboriginal investigations in the Wagga Wagga region

Year	Author	Locality	Comments	Results
1980	Witter, D.	Wagga Wagga to Young	Survey for proposed gas pipeline. Limited permanent water available throughout study area, majority of stone artefacts manufactured from quartz.	14 artefact scatters, 21 isolated finds, 1 possible rock well, 1 scarred tree
1980	Kelly, A.	Bowen – Young	Salvage excavation of artefact scatter BY/4, identified by Witter (1980). Included surface collection and test excavation.	319 artefacts from surface collection, 48 artefacts from excavation
1983	Witter, D. and Hughes, P.	Murrumburrah – Yass and Murrumburrah – Wagga Wagga	Survey for proposed transmission line. Conclusion of the survey was that a majority of activity was associated with river valleys, especially where there was a diverse selection of vegetation types.	4 artefact scatters, 1 scarred tree
1983	Hiscock, P.	Wagga Wagga to Darlington Point	Survey for proposed transmission line. A majority of the artefacts identified during the survey were located away from reliable water sources.	13 isolated finds, 9 scarred trees
1987	Silcox, R.S.	Gumly Gumly	Test excavation at Gumly Gumly based on results of survey for proposed replacement of water pipeline between Wagga Wagga and Ungarie, and Jugiong and Kingsvale.	52 stone artefacts recovered
1997	Everett, C.	Bomen	Survey for proposed effluent ponds. One isolated stone artefact was identified – silcrete, possibly grinding stone fragment.	1 isolated find
1998	Officer, K., Navin, K. and Kamminga, J.	Wodonga – Wagga Wagga	Subsurface testing was conducted at 4 artefact scatters sites and at 7 PADs. All excavated PADs contained artefacts.	39 artefact scatters, 19 isolated finds, 8 PADs
1999	Gay, L.	Kapooka	Survey for proposed replacement of the Olympic Highway bridge over the Main Southern Railway line at Kapooka.	No sites identified

A majority of the archaeological investigations listed in Table 1 have been straight line surveys for pipelines, roads or transmission lines. This means that although they only incorporate a portion of the Wagga Wagga region, they do provide information from a cross-section of landforms.

The initial straight line surveys in the region (Witter 1980, Witter 1982, Hiscock 1983, Witter and Hughes 1983) identified a number of characteristics relating to the distribution and nature of the archaeological material across the region that have been supported by subsequent investigations. These characteristics include a relationship between the distribution of subsistence resources and areas of longer-term or repeated occupation, access to raw materials, and landform.

These investigations have highlighted the importance of the Murrumbidgee River and associated floodplain, based largely on the notion that this area would provide the most consistent and diverse resource zone. Witter (1982: 17) provided a summary of his site distribution model:

1. The major flood channels may produce mounds, occupation debris of worked stone, scarred eucalypts, and on the sand features where there are cypress pines, torch bark scars.
2. Minor flood channels and temporary swamps may produce scarred eucalypts, fired clay hearths and occupation debris of worked stone, particularly where sand features are present.
3. Rare isolated artefacts of flaked or abraded stone and scarred eucalypts are found scattered throughout the plains.'

The results of subsequent surveys supported this model (Hiscock 1983, Witter and Hughes 1983). Hiscock (1983) identified a number of isolated artefacts and scarred trees across an area with limited access to permanent water, whilst Witter and Hughes (1983) identified several artefact scatters associated with river valleys. Gay (1999) did not identify any Aboriginal archaeological sites during her survey of the area surrounding the Olympic Highway crossing over the Main Southern Railway at Kapooka. She suggests that distance from water source was one factor which reduced the potential occurrence of Aboriginal sites or Potential Archaeological Deposits (PADs).

Access to lithic raw material is another variable relating to the nature and distribution of archaeological deposits. Previous investigations in the region have highlighted the predominance of the use of quartz for stone artefact manufacture. Quartz of varying qualities is available from a number of contexts across the region, including bedrock seams, inclusions within granite, and colluvial/alluvial deposits.

Witter (1982: 13) suggests that 'the Riverina plain has a characteristic form of stone tool technology which I call a "small stone industry". This is because the stone artefact assemblages tend to consist of very small flakes with few identifiable or formal tools. This is undoubtedly because local flakeable stone is not usually common, and where it is present, it occurs as small pebbles'. Hiscock (1983: 19) suggests that the lack of identified artefact scatters from his survey between Wagga Wagga and Darlington Point 'is probably explained by the absence of sources for both water and suitable stone'. Everett (1997) identified the lack of flakeable raw material across a study area in southern Bomen as a contributing factor to a lack of identified archaeological material.

Navin *et al.* (1998) conducted a number of subsurface investigations along a proposed gas pipeline route between Wodonga and Wagga Wagga. The findings from these excavations were that quartz was the main raw material type, and that it was likely to have been sourced from bedrock exposures rather than water rolled material collected from alluvial contexts. The findings of their excavations were interpreted as demonstrating that there were not sustained or repeated visits to particular areas, and that the generally small size of the recovered artefacts was the result of raw material shortages.

Landform type/position has also been identified as a factor relating to the distribution of archaeological material. Witter and Hughes (1983: 13-14) discuss the possible relationship between landform position and temperature at various times of the day, such as the retention of warmer air amongst denser vegetation on the plains, in hilly areas the location of sites on low ridges or benches away from cold night air flowing into the valleys, and a north east aspect in higher areas.

In low-lying areas, previous archaeological investigations have highlighted the importance of well drained, raised locations. This includes raised mounds on floodplains, elevated terrain bordering floodplains, and well drained areas. However, investigations by Everett (1997) and Navin *et al.* (1998) identified limited archaeological material in these contexts. Everett (1997) surveyed a portion of southern Bomen that encompassed a portion of the floodplain and elevated margins. Despite high surface visibility and exposure, only one possible silcrete grinding stone fragment was identified.

Navin *et al.* (1998) excavated a raised mound on the Murrumbidgee River floodplain following the identification of two artefacts during a previous survey. Four artefacts were recovered from two test pits, suggesting that there was not concentrated activity at this locality. The results of Everett (1997) and Navin *et al.* (1998) demonstrate that not all elevated areas associated with the Murrumbidgee River floodplain were necessarily used as campsites.

2.4 AHIMS Database Search

Two searches of the Aboriginal Heritage Information Management System (AHIMS) database were conducted on the 23rd August, 2007. This search was conducted in order to identify whether any previously recorded Aboriginal sites occur within the study areas, as well as to determine the type and distribution of recorded sites in the region. The searches were conducted within the following coordinates (AGD):

- Ⓢ Box 1: 525000E to 548000E
6114000N to 6131000N
Number of sites within AHIMS database: 18
- Ⓢ Box 2: 523000E to 549000E
6102000N to 6114000N
Number of sites within AHIMS database: 21

A total of 16 of these recorded Aboriginal sites are within the current study area boundaries, 13 within the Lloyd study area and 3 within the Bomen study area. The frequency of site types within both of these search areas is outlined in Table 2:

Table 2. Frequency of site types from AHIMS database search

Site Type	Frequency	Frequency (%)
Scarred Tree	21	53.8
Open Camp Site	8	20.5
Isolated Find	7	17.9
Quarry	1	2.6
Midden / Open Camp Site	1	2.6
Isolated Find / Scarred Tree	1	2.6

The higher frequency of scarred trees is likely due to the fact that they are generally the most visible site type, and quite often other site types such as open camp sites may be buried or covered by vegetation. The generally low number of recorded sites in this area is due to the relatively limited number of archaeological investigations that have occurred.

2.5 Previous Archaeological Investigations within the Study Areas

Archaeological investigations ranging from desktop studies to field surveys have been conducted in the Lloyd, Bomen, Estella West, and Copland Street. Two of these reports were not seen for this study as they were not available from the AHIMS report catalogue at Hurstville. These included a survey for a proposed power plant at Bomen (Officer and Navin 1998) and an Aboriginal archaeological study of the proposed extension of Copland Street (Kelton 2005). The remaining study areas have not been subject to specific Aboriginal archaeological investigations.

These previous archaeological investigations are discussed in Section 5 below for each of the study areas.

3 Predictive Model

Based on information from previous archaeological investigations there are a number of contributing factors to the potential distribution and nature of Aboriginal sites. Although there is the possibility of Aboriginal archaeological material occurring anywhere across the study areas, it is more likely to occur in locations with access to lithic raw material, diverse and consistently available subsistence resources, and landforms associated with these features.

There is more likely to be the procurement of lithic raw material where:

- ⑩ there are outcrops of suitable raw material. Granite is one of the main underlying geological units in the terrain bordering the Murrumbidgee River floodplain and it is likely that it will outcrop along the crests and upper slopes of spurs/ridges and hills. There is a variety of stone types that occur as inclusions within this granite, and where this is suitable for stone artefact production there is likely to be evidence of raw material procurement and artefact manufacture. Other stone types may also outcrop across the study areas, such as the basalt outcrop identified in southern Bomen (AHIMS # 56-1-0043); and,
- ⑩ there are occurrences of suitable raw material in alluvial and/or colluvial deposits. Suitable raw material may have eroded from outcrops in upper slope/crest landforms and occur as cobbles/fragments in lower hillslope colluvial deposits. This material may subsequently be relocated by fluvial activity and occur in alluvial deposits along drainage channels or floodplains.

The location and density of open camp sites, including stone artefact scatters and hearths, will vary according to access to subsistence resources, access to lithic raw material and associated landforms:

- ⑩ major valleys in the region, especially the Murrumbidgee River floodplain, would have been an important source of water and subsistence resources even through drier periods. Elevated, well drained areas associated with these floodplains will potentially demonstrate longer term and more frequent occupation;
- ⑩ archaeological material along smaller tributaries is likely to represent smaller, more focussed occupation events;
- ⑩ spur/ridgelines are likely to provide limited archaeological material demonstrating infrequent occupation events possibly associated with the use of these landforms to move across the landscape; and,
- ⑩ very limited archaeological material is expected to occur across landforms that are a substantial distance from water and subsistence resources.

Isolated artefacts are likely to occur anywhere across the study areas, and may represent areas where further archaeological material remains buried, or areas away from water and subsistence resources where activity was sparse and infrequent.

Scarred trees are likely to occur anywhere across the study areas where there are stands or isolated occurrences of mature trees. Due to extensive tree clearance in the region during the historical period it is difficult to determine the characteristics of scarred tree distribution.

Burials may occur anywhere across the study areas, but are more likely to occur where there are deeper soil deposits, such as sand deposits associated with floodplains and drainage channels.

4 Study Area Visit

4.1 Methodology

4.1.1. *Aims*

Due to the fact that this was largely a desktop based study, the study area visits were limited to a brief inspection. The main aims of these inspections were to:

- ⑩ look at the variety of landforms and potential archaeological sensitivity across the study area;
- ⑩ where possible, inspect surface exposures for archaeological material and large trees for scarring; and,
- ⑩ identify areas that have been heavily modified from industrial/rural activities.

Where possible, properties were accessed by vehicle before inspection on foot. Vehicle access allowed greater and more targeted coverage within the larger study areas.

4.1.2. *Land Access*

Each of the study areas is divided amongst a number of different landowners. Contact details for a majority of these landowners were provided by Willana Associates. Permission was sought from landowners before any private land was entered during the study area visit. Vehicle access was restricted to established vehicle tracks. Foot access was generally unlimited, although where there had been recent cropping access was limited to tracks around the perimeter of the paddocks.

4.1.3. *Archaeological Sensitivity Assessment Criteria*

Archaeological sensitivity is an assessment of the likelihood of archaeological material occurring in a specified area/landform based on background research and/or field observations. Different levels of archaeological sensitivity can be designated to generic landform units based on desktop background research. More detailed sensitivity mapping can be achieved by adding information from field observations, such as specifying areas that may have been heavily disturbed or modified.

There are three levels of archaeological sensitivity, they are:

- ⑩ high archaeological sensitivity;
- ⑩ moderate archaeological sensitivity; and,
- ⑩ low (or no) archaeological sensitivity.

High archaeological sensitivity includes those areas where there are identified cultural and archaeological sites, areas of Potential Archaeological Deposit (PAD), or specific areas/landform units, which based on background information and the predictive distribution of Aboriginal archaeological sites across the landscape, are likely to contain Aboriginal archaeological deposits and/or scarred trees.

Moderate archaeological sensitivity includes specific areas/landform units which are either less likely to contain Aboriginal archaeological deposits or scarred trees based on the predictive distribution of Aboriginal archaeologist sites, or areas/landforms that are less likely to contain intact deposits.

Low (or no) archaeological sensitivity includes areas that appear to be heavily modified or disturbed and either contain heavily disturbed Aboriginal archaeological deposits or are likely to contain no archaeological deposits at all.

Except where sites or PADs have been identified, there is a degree of uncertainty attached to areas designated as low, moderate or high archaeological sensitivity as to the exact nature and distribution of Aboriginal archaeological material. The identification of areas as archaeologically sensitive is the first step in a process of designating areas for conservation or further investigation.

5 Aboriginal Cultural Heritage Assessment

5.1 Lloyd

Lloyd study area is a large area to the south of Wagga Wagga, bordered by the Olympic Highway and Main Southern Railway along the western margin, Holbrook Road on the eastern margin, urban subdivisions along the northern margin, and rural land to the south. A majority of the Lloyd study area is used for rural activities, mainly cattle grazing. There is one active quarry located in the middle of the study area, and one large water storage tank located around 200 m east of the quarry. The water tank is on Riverina Water County Council property.

5.1.1. Previous Archaeological Investigations

Two archaeological investigations have been conducted in the western portion of the current Lloyd study area; they do not include any properties east of the Lloyd and Ehkuk properties (Navin Officer 2002, Kelton 2006). During the Navin Officer (2002) archaeological investigation five Aboriginal archaeological sites and three Potential Archaeological Deposits (PAD) were identified. These are summarised in Table 3 below.

Table 3. Previously identified Aboriginal archaeological sites and PADs (Navin Officer 2002)

Site Name / AHIMS Number	Site Type	Findings	Assessed Significance
LN1 (56-1-0047)	Open campsite (artefact scatter)	Two quartz artefacts, drainage line	Low due to disturbed nature
LN2 (56-1-0048)	Open campsite (artefact scatter)	19 artefacts, terrace	Low due to disturbed nature
LN3 (56-1-0049)	Isolated artefact	White quartz flake, lower hillslope	Minimal: isolated find in disturbed context
LN4 (56-1-0050)	Open campsite (artefact scatter)	Three quartz artefacts, lower hillslope	Low due to disturbed nature
LN5 (56-1-0051)	Scarred Tree	Probable Aboriginal scarred tree	Moderate
LNPAD 1	Potential archaeological deposit	Moderate potential, lower hillslope	
LNPAD 2	Potential archaeological deposit	Moderate potential, lower hillslope	
LNPAD 3	Potential archaeological deposit	Moderate potential, lower hillslope	

During the Kelton (2006) archaeological investigation eight Aboriginal archaeological sites and four PADs were identified. These are summarised in Table 4 below.

Table 4. Previously identified archaeological sites and PADs (Kelton 2006)

Site Name / AHIMS Number	Site Type	Findings	Assessed Significance
L-IF-1 (56-1-0096)	Isolated artefact	Quartz flake, upper hillslope	Low due to disturbed nature
L-IF-2 (56-1-0097)	Isolated artefact	Quartz flake, lower hillslope	Low due to disturbed nature
L-ST-1 (56-1-0098)	Scarred Tree	One possible scar	Low
L-ST-2 (56-1-0099)	Scarred Tree	One possible scar	Low
L-ST-3 (56-1-0100)	Scarred Tree	One probable scar	Low - moderate
L-ST-4 (56-1-0101)	Scarred Tree	One possible-probable scar	Low
L-ST-5 (56-1-0102)	Scarred Tree	One possible scar	Low
L-ST-6 (56-1-0103)	Scarred Tree	Two probable scars	Low
LNPAD4	Potential archaeological deposit	Low potential, lower hillslope	
LNPAD5	Potential archaeological deposit	Moderate potential, terrace	
LNPAD6	Potential archaeological deposit	Moderate potential, terrace	
LNPAD7	Potential archaeological deposit	Moderate potential, terrace	

Prior to these two studies there were no recorded Aboriginal archaeological sites within the Lloyd study area.

5.1.2. Study Area Visit

The following properties were accessed in the Lloyd study area: Lloyd, Roman Catholic Church and State of New South Wales.

The Lloyd study area has the most undulating terrain of the eight study areas within the LES. There are two ridgelines running north-south through the western half of the study area (Plate 1), two small hills in the eastern half (Plate 2) and numerous drainage lines between these landforms.

The soils along the top of the main ridgelines in the western half of the study area appear quite skeletal. Bedrock was visible along one of the unformed vehicle tracks on the crest of the western ridgeline (Plate 3). In other areas fragments of eroding bedrock were visible scattered across the crests and slopes of the ridgelines. In comparison, the eastern half of the Lloyd study area consists of more rolling terrain, with less evidence of floating bedrock and fewer incised drainage channels.

It is evident that numerous parts of the Lloyd study area have been modified during the historical period. The most visible landscape modifications include the quarry and the large water tank. Other less visible disturbance includes modified drainage channels and the effects of tree clearance (Plate 4). However, based on the deeply incised drainage channels in the western half of the study area it is evident that historical tree clearance dramatically altered the extant drainage and erosion regime.

There are a number of locations within the study area that provide good views north over the Wagga Wagga area and south to The Rock. However, these higher areas in the western half of the study area are quite exposed to prevailing winds. Some of these areas also demonstrate the most skeletal soil profile within the Lloyd study area. Based on these factors these areas are likely to be of low to moderate archaeological sensitivity.

The areas that have been dramatically impacted, such as the quarry and the location of the large water storage tank, have very low archaeological sensitivity.

Areas where Aboriginal archaeological sites have previously been identified are highly archaeologically sensitive. The more gently undulating terrain bordering drainage channels and associated low rises are likely to be moderate to highly archaeologically sensitive. A majority of the previously recorded Aboriginal artefact sites within the Lloyd study area were identified in drainage line or lower hillslope contexts.

Table 5. Lloyd study area archaeological sensitivity

Landform Type	Archaeological Sensitivity	Sensitivity Description	Previously Recorded Sites	New Recorded Sites	Previously Identified PADs
Ridgeline Crest	Low to Moderate	Limited possibility of extensive archaeological deposit due to skeletal soils	n/a	n/a	n/a
Spurline Crest	Low to Moderate	Less exposed to prevailing winds, increased sensitivity with proximity to drainage lines/terraces	Scarred tree	n/a	n/a
Upper/Mid Hillslope	Low to Moderate	Less possibility of intact archaeological deposits, increased sensitivity with gentler slopes and proximity to open drainage lines/terraces	Isolated find, scarred tree	n/a	n/a
Lower Hillslope	Low to Moderate	Increased sensitivity in association with alluvial/colluvial deposits associated with drainage lines	2 isolated finds, 2 scarred trees	n/a	1 PAD
Undulating/Flat Colluvial Deposits	Moderate to High	Increased sensitivity in association with proximity to drainage lines/terraces	n/a	n/a	2 PADs
Drainage Line and Associated Alluvial/Colluvial Deposits	Moderate to High	Increased sensitivity where gentle slope or raised above regular floods	3 scarred trees, 3 artefact scatters	n/a	4 PAD

The location of recorded Aboriginal sites, PADs and areas of archaeological sensitivity in the Lloyd study area are shown in Figure 2.

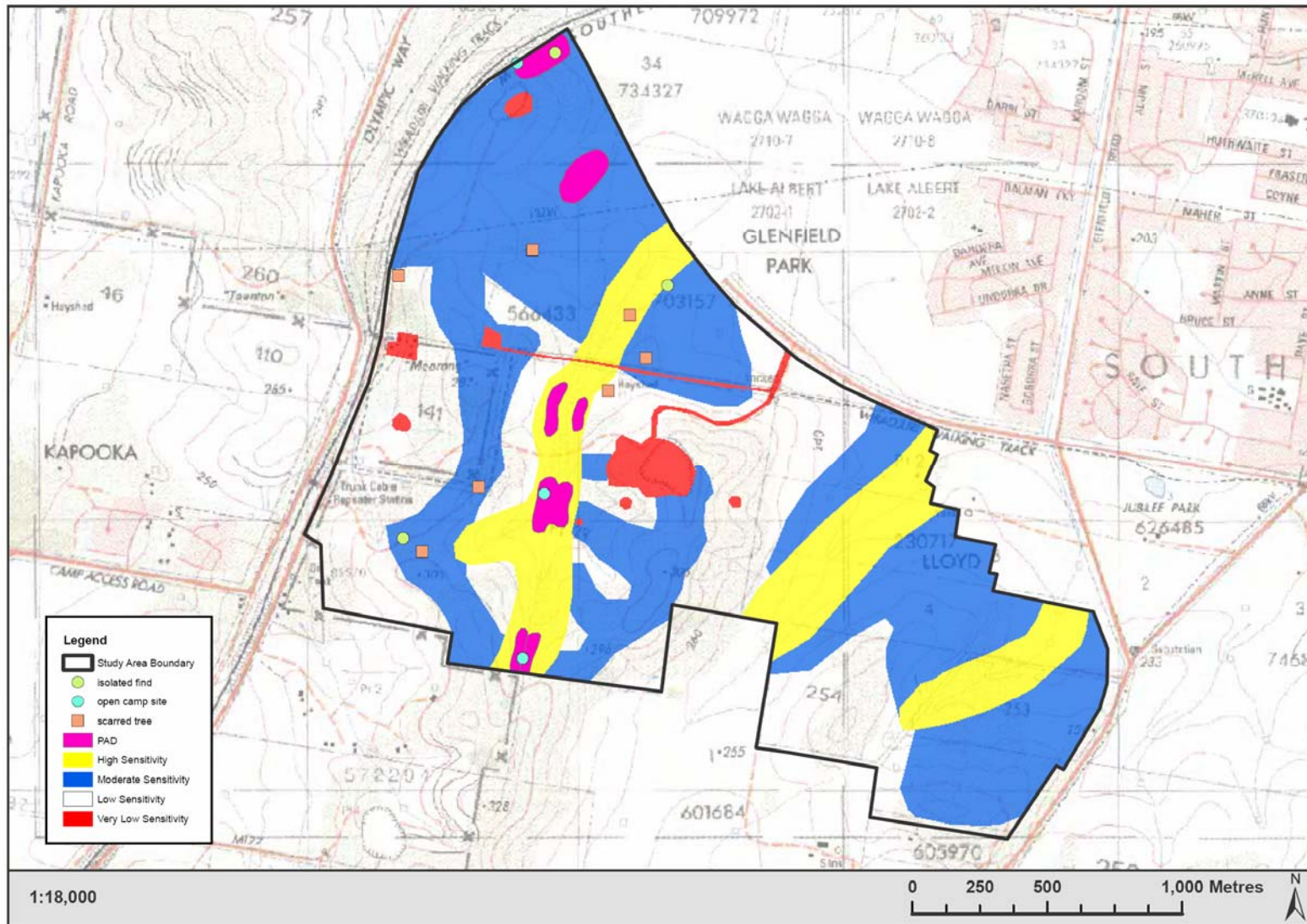


Figure 2. Location of recorded Aboriginal sites, PADs and areas of archaeological sensitivity within the Lloyd study area.



Plate 1. Looking north along western ridgeline within the Lloyd property.



Plate 2. Looking east across two small hills in eastern half of Lloyd study area.



Plate 3. View south showing shallow soils along main ridgeline in western half of Lloyd study area. The Rock is visible in the background, Lloyd study area.



Plate 4. Looking south from a vehicle track, showing the effect on the drainage line of concrete stream channelling beneath the vehicle overpass, Lloyd study area.



Plate 5. Looking west across the eastern half of the Lloyd study area.

5.2 Bomen

The Bomen study area is a large area to the north of Wagga Wagga bordered by the Olympic Highway along the western margin and rural land around the remainder of the study area. A majority of the study area is used for rural activities, with concentrated industrial use in the southern portion. There are numerous large dams in the centre of the study area associated with wool cleaning activities.

5.2.1. *Previous Archaeological Investigations*

A survey was conducted by Officer and Navin (1998) in Bomen for a proposed power plant, their survey included the southern portion of the current Bomen study area. Their report is not held within the DECC AHIMS report catalogue at Hurstville. However, based on the AHIMS database search, it is evident that three Aboriginal archaeological sites were identified during the survey, including East Bomen IF1, an isolated find, East Bomen IF2, an isolated find, and East Bomen 1, an Aboriginal surficial hardstone basalt quarry. All three of these sites IF1 (AHIMS # 56-1-0045), IF2 (AHIMS # 56-1-0044) and the quarry (AHIMS # 56-1-0043) are located within the southern boundary of the current Bomen study area.

Site East Bomen 1 (AHIMS # 56-1-0043) is located in Wagga Wagga City Council property on the crest and upper slopes of a spur. The site is associated with outcropping basalt and granite. Officer and Navin (1998: 16) note that 'the site provides evidence for the on-site procurement of basalt rock through the flaking of naturally occurring surface cobbles, and subsequent on-site reduction of this flaked material to form axe (or hatchet) preforms'. Officer and Navin (1998) note that there is a surface scatter of around 500 artefacts, including hammer stones, cores, primary flakes and secondary flakes.

Based on the scarcity of lithic raw material in the region, discussed in Section 2, this site would likely have been a very important source of quality material for artefact production.

5.2.2. *Study Area Visit*

The following properties were accessed in the Bomen study area: Wilks, Riverina Wool Combing Pty Ltd and Wagga Wagga City Council.

The centre of the Bomen study area consists largely of low undulating terrain and broad drainage lines. The northern section consists of a wide valley associated with long ridgelines outside the eastern and western boundaries of the study area (Plate 6). The most undulating terrain occurs in the southern section associated with two small hills located around 1 km to the north of the Murrumbidgee River floodplain.

Where crops had recently been sown, access was limited to tracks along the perimeter of paddocks. Surface exposure along these tracks was quite low, making it less likely to see archaeological material. In one paddock that had not been recently ploughed, surface visibility and exposure was relatively high, and one Aboriginal artefact was identified. This site was called Bomen IF1 (B IF1) and further details are discussed below. No skeletal soils like those in the Lloyd study area were observed during the visit to the Bomen study area.

A high degree of landscape modification has taken place in certain parts of the Riverina Wool Combing property associated with the wool processing factory. Large dams, some around 400 – 500 m long, have been constructed on the northern and southern side of Trahairs Road. There has been a substantial amount of landscape modification associated with these dams, including dumped dredging and large excavated areas where soil may have been removed to create the dam walls.

Parts of the study area that have been dramatically impacted, such as the earthworks in the Riverina Wool Combing property and the location of roads and industrial buildings have very low archaeological sensitivity.

The more gently undulating terrain along drainage channels, such as along Dukes Creek, are likely to be moderate to highly archaeologically sensitive. This is demonstrated by the location of Bomen IF1 (B IF1) and by previous archaeological investigations in the area that have demonstrated that a number of Aboriginal archaeological sites and Potential Archaeological Deposits (PAD) have been identified in these contexts.

The higher terrain in the southern portion of the study area provides good views over sections of the surrounding area and is part of a series of high points bordering the Murrumbidgee River floodplain. AHIMS Site # 56-1-0043) is located in this section, and shows that there was exploitation of outcropping bedrock in upper slope and crest contexts. These higher landforms and associated slopes are likely to be moderately archaeologically sensitive, with the likelihood of certain landforms/contexts having high sensitivity, including AHIMS Site # 56-1-0043.

Table 6. Bomen study area archaeological sensitivity

Landform Type	Archaeological Sensitivity	Sensitivity Description	Previously Recorded Sites	New Recorded Sites	Previously Identified PADs
Ridgeline Crest	Moderate	Less exposed to prevailing winds, increased sensitivity with proximity to drainage open drainage lines/terraces	n/a	n/a	n/a
Granite Outcrop along Upper Hillslope/Crest	High	Increased sensitivity where potential artefact raw material present, such as quartz	1 quarry	n/a	n/a
Upper/Mid Hillslope	Low	Less possibility of intact archaeological deposits, increased sensitivity with gentler slopes and proximity to open drainage lines/terraces	n/a	n/a	n/a
Lower Hillslope	Low to Moderate	Increased sensitivity in association with alluvial/colluvial deposits associated with drainage lines	n/a	n/a	n/a
Undulating/Flat Colluvial Deposits	Moderate to High	Increased sensitivity in association with proximity to drainage lines/terraces	n/a	n/a	n/a
Drainage Line and Associated Alluvial/Colluvial Deposits	Moderate to High	Increased sensitivity where gentle slopes or raised above regular floods	n/a	Isolated find	n/a

The location of recorded Aboriginal sites, PADs and areas of archaeological sensitivity in the Bomen study area are shown in Figure 3.

5.2.3. *Bomen IF1 (B IF1) 540614E 6120623N (AGD 66)*

This site consisted of one stone artefact identified within an exposed paddock in the Riverina Wool Combing property (Plate 7). The site was located on a gentle slope on the northern side of a small rise running approximately north-south between a first order ephemeral stream immediately to the west, and a second order ephemeral stream further to the east. The artefact was approximately 10 m west of a fence line dividing the paddock and the M190 vehicle track.

The artefact was a mid reddish brown mudstone flake with a flaked platform, feather termination, multiple dorsal scars, 10% dorsal cortex (Plate 8). The flake measured 23 mm x 25 mm x 8 mm (L x W x D). Surface visibility in the immediate area was around 80%, with exposure around 40%.

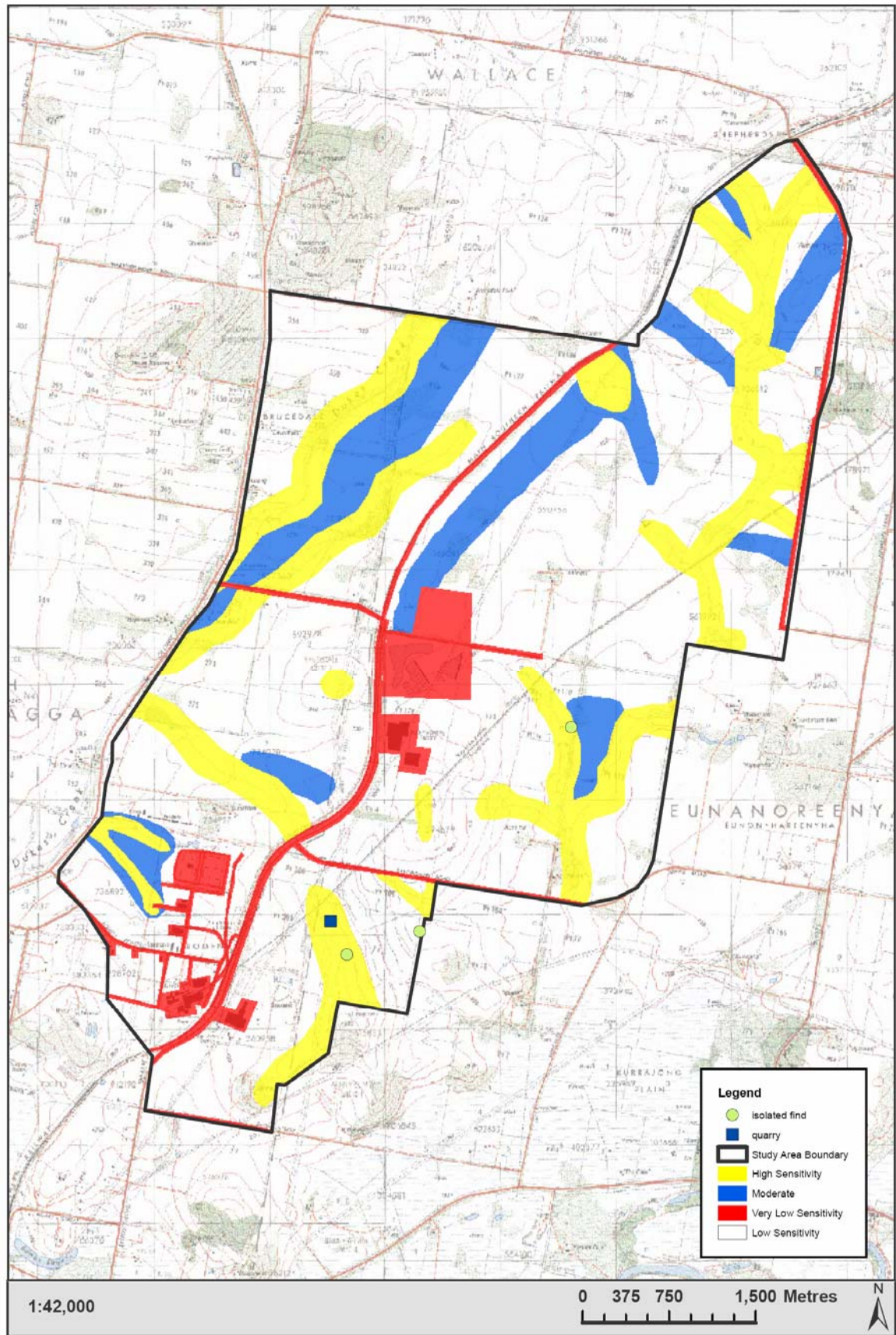


Figure 3. Location of recorded Aboriginal sites, PADs and areas of archaeological sensitivity within the Bomen study area.



Plate 6. Looking south along broad valley in the northern section of the study area. View from Holloways Road, Bomen study area.

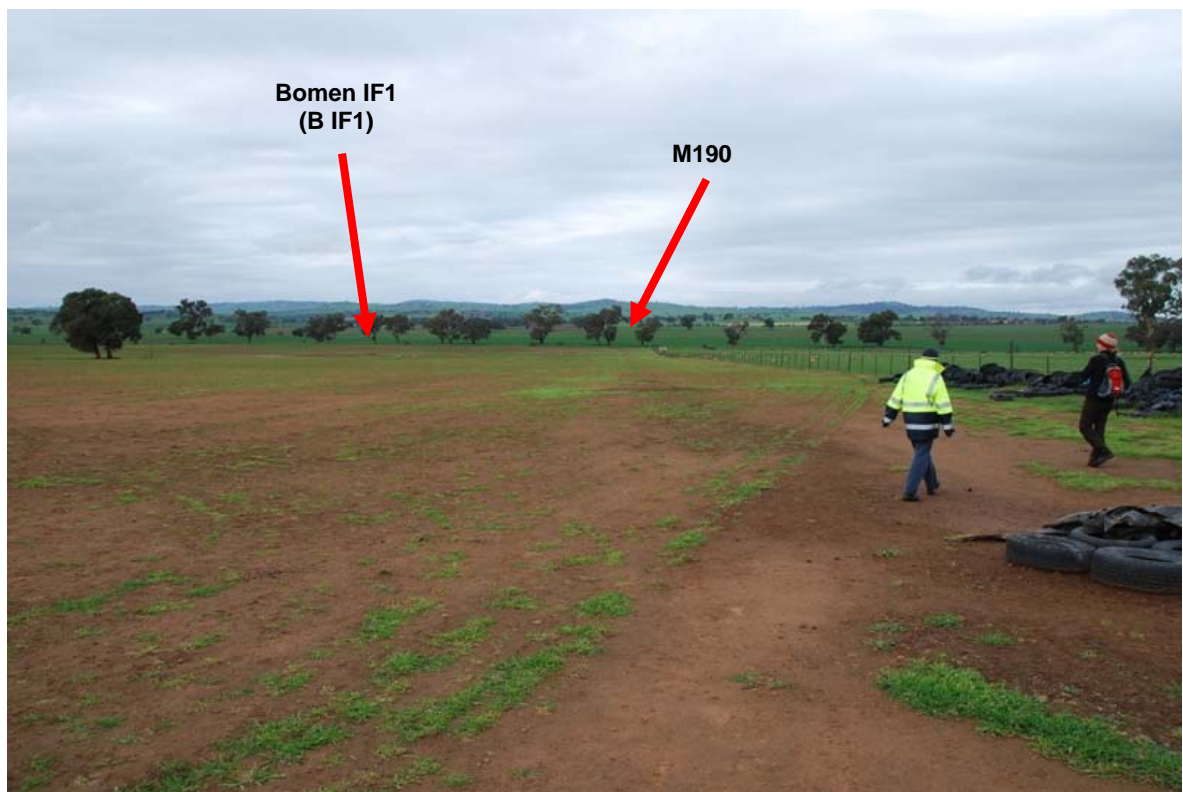


Plate 7. Looking east across paddock to B IF1, Bomen study area.



Plate 8. Detail of ventral surface of isolated artefact, Bomen IF1 (B IF1), Bomen study area.

5.3 Estella West

The Estella study area is located to the northwest of Wagga Wagga, bordered by Old Narrandera Road to the south and rural around the remainder. A majority of the study area is used for rural activities.

5.3.1. Previous Archaeological Investigations

There are no recorded Aboriginal archaeologist sites within the Estella West study area. One Aboriginal archaeological heritage study has been conducted east of Pine Gully Road in the eastern portion of the study area (Kelton 2005). Kelton's study was primarily a desktop investigation, with limited field reconnaissance. During the field reconnaissance, Kelton (2005) identified one Potential Archaeological Deposit (PAD). PAD 1 was situated on a flat alluvial/colluvial terrace adjacent to Dukes Creek, outside the current study area. Kelton assessed PAD 1 as having low-moderate archaeological potential.

5.3.2. Study Area Visit

The Estella West study area comprises undulating terrain on the northern boundary of the Murrumbidgee River floodplains. Surface exposures were largely restricted to unformed vehicle/animal tracks. No Aboriginal archaeological material was observed.

There are several areas of major impact to the landscape, including two horse training tacks, houses and associated buildings, and roads. These areas are likely to have very low archaeological sensitivity.

Areas of outcropping granite were observed in upper hillslope/crest contexts (Plate 9). Inclusions within the outcropping granite may have been used as a source of raw material for stone artefact manufacture. Another important factor regarding the location of the study area is its proximity to the vast floodplains immediately to the south. This higher terrain would have provided a dry, elevated position above a resource rich area (Plate 10). Based on this and the gently undulating characteristics of the study area, land not impacted by road and building construction is likely to be of moderate to high archaeological sensitivity.

Table 7. Estella study area archaeological sensitivity

Landform Type	Archaeological Sensitivity	Sensitivity Description	Previously Recorded Sites	'New' Recorded Sites	Previously Identified PADs
Spurline Crest	Low to Moderate	Less exposed to prevailing winds, increased sensitivity with proximity to drainage open drainage lines/terraces	n/a	n/a	n/a
Granite Outcrop along Upper Hillslope/Crest	Moderate	Increased sensitivity where potential artefact raw material present, such as quartz	n/a	n/a	n/a
Upper/Mid Hillslope	Low to Moderate	Less possibility of intact archaeological deposits, increased sensitivity with gentler slopes and proximity to open drainage lines/terraces	n/a	n/a	n/a
Lower Hillslope	Low to Moderate	Increased sensitivity in association with alluvial/colluvial deposits associated with drainage lines, increased sensitivity where associated with Murrumbidgee River floodplain	n/a	n/a	n/a
Undulating/Flat Colluvial Deposits	Moderate to High	Increased sensitivity in association with proximity to drainage lines/terraces	n/a	n/a	n/a
Drainage Line and Associated Alluvial/Colluvial Deposits	Moderate to High	Increased sensitivity where gentle slopes or raised above regular floods	n/a	n/a	n/a

The areas of archaeological sensitivity in the Estella West study area are shown in Figure 4.



Plate 9. Looking south across outcropping granite within the Estella study area.



Plate 10. View south from the Estella study area across the Murrumbidgee River floodplain.

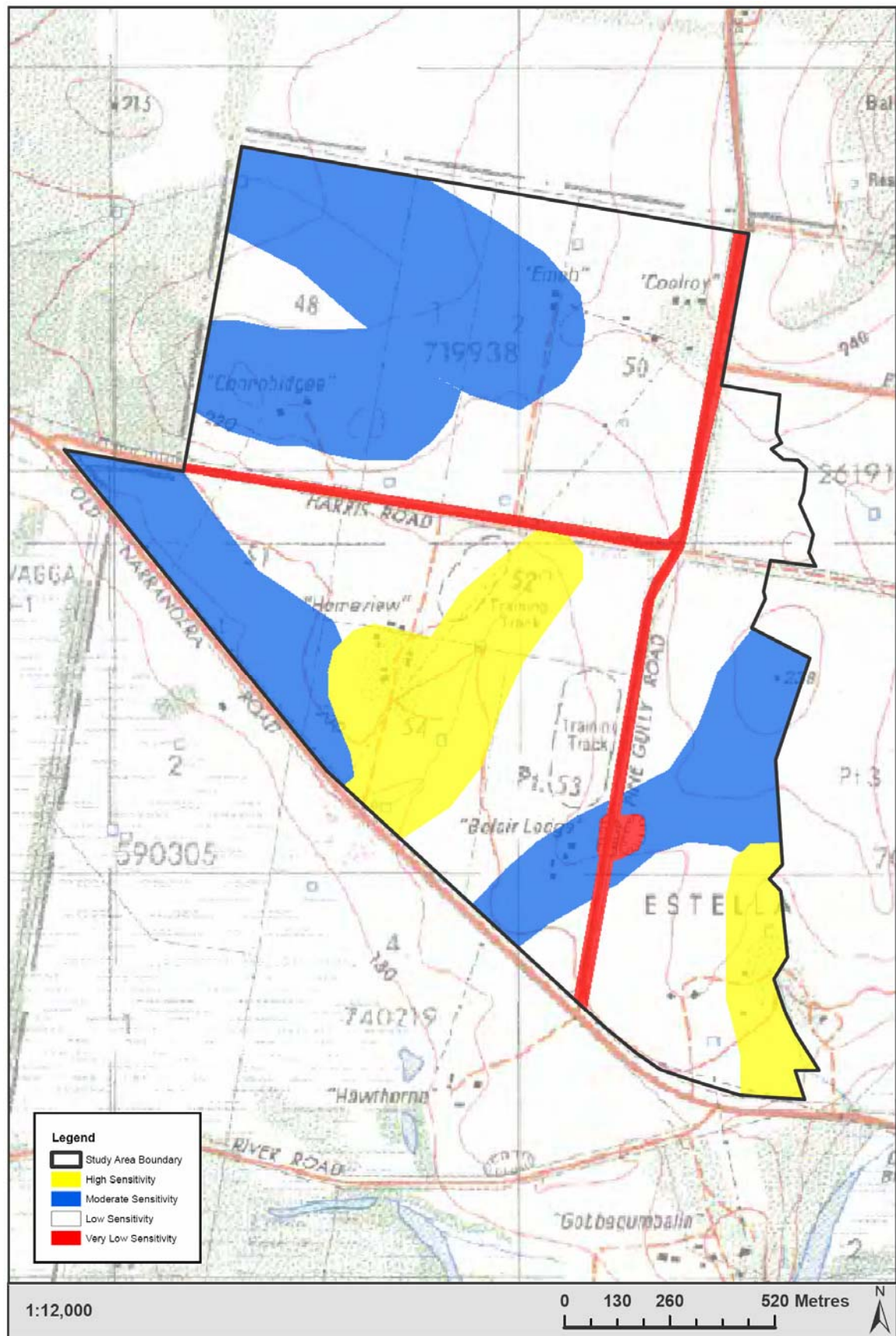


Figure 4. Areas of archaeological sensitivity within the Estella West study area.

5.4 Edison Road

The Edison Road study area is located to the east of Wagga Wagga, and is bounded by Tasman Road to the east, Edison Road and the Wagga Wagga – Tumbarumba Railway to the south, and rural land to the north and west. A majority of the study area is used for rural activities. There has been no previous archaeological assessment of this study area.

The go-cart track in the eastern portion of the study area is the only major area of landscape impact. This area is likely to have very low archaeological sensitivity.

The study area has low archaeological sensitivity, as it includes a section of the Murrumbidgee River floodplain where there are no elevated positions.

Table 8. Edison Road study area archaeological sensitivity

Landform Type	Archaeological Sensitivity	Sensitivity Description	Previously Recorded Sites	'New' Recorded Sites	Previously Identified PADs
Alluvial Floodplain	Low	Flat Murrumbidgee River floodplain	n/a	n/a	n/a



Plate 11. Looking north across the Edison Road study area.

The archaeological sensitivity of the Estella West study area is shown in Figure 5.

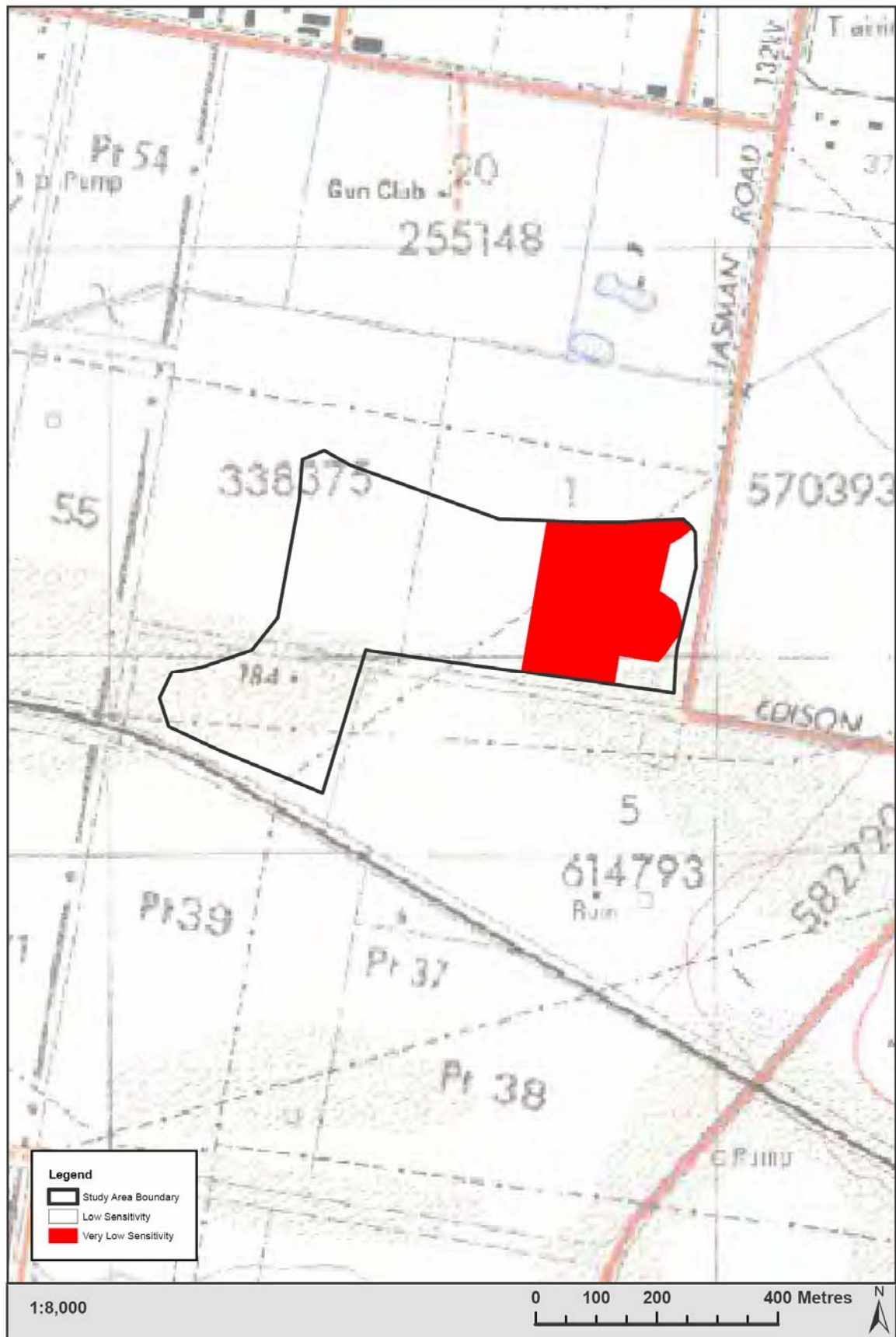


Figure 5. Areas of archaeological sensitivity within the Edison Road study area.

5.5 Hammond Avenue

The Hammond Avenue study area is located to the east of Wagga Wagga and approximately 500 m north of the Copland Street study area. It is bounded by the Sturt Highway/Hammond Avenue to the south, Koorngal Road to the west and rural land to the north and east. Land use within the study area is a mix of rural and industrial/commercial activities. There has been no previous archaeological assessment of this study area.

The area associated with the industrial/commercial buildings in the eastern portion of the study area is likely to have very low archaeological sensitivity. The remainder of the study area has low archaeological sensitivity, as it includes a section of the Murrumbidgee River floodplain where there are no elevated positions and the drainage regime of the area has been heavily modified (Plate 12).

Table 9. Hammond Avenue study area archaeological sensitivity

Landform Type	Archaeological Sensitivity	Sensitivity Description	Previously Recorded Sites	'New' Recorded Sites	Previously Identified PADs
Alluvial Floodplain	Low	Flat Murrumbidgee River floodplain	n/a	n/a	n/a



Plate 12. Looking east across the Hammond Avenue study area.

5.6 Copland Street

The Copland Street study area is located to the east of Wagga Wagga and approximately 500 m south of the Hammond Avenue study area. It is bounded by the Copland Street easement to the north, Marshalls Creek to the west, a canal to the east and rural land to the south. A majority of the study area is used for rural activities.

5.6.1. Previous Archaeological Investigation

An archaeological study conducted by Kelton (2005) for the extension of Copland Street was not held within the DECC AHIMS report catalogue at Hurstville. Based on information from the AHIMS database search, no Aboriginal archaeological sites were identified during the study.

5.6.2. Study Area Visit

The study area is located on the Murrumbidgee River floodplain (Plate 13). There are no elevated positions and the drainage regime of the area has been heavily modified. The study area has low archaeological significance.

Table 10. Copland Street study area archaeological sensitivity

Landform Type	Archaeological Sensitivity	Sensitivity Description	Previously Recorded Sites	'New' Recorded Sites	Previously Identified PADs
Alluvial Floodplain	Low	Flat Murrumbidgee River floodplain	n/a	n/a	n/a



Plate 13. Looking west across the Copland Street study area towards Rocky Hill.

The archaeological sensitivity of the Hammond Avenue and Copland Street study areas is shown in Figure 6.

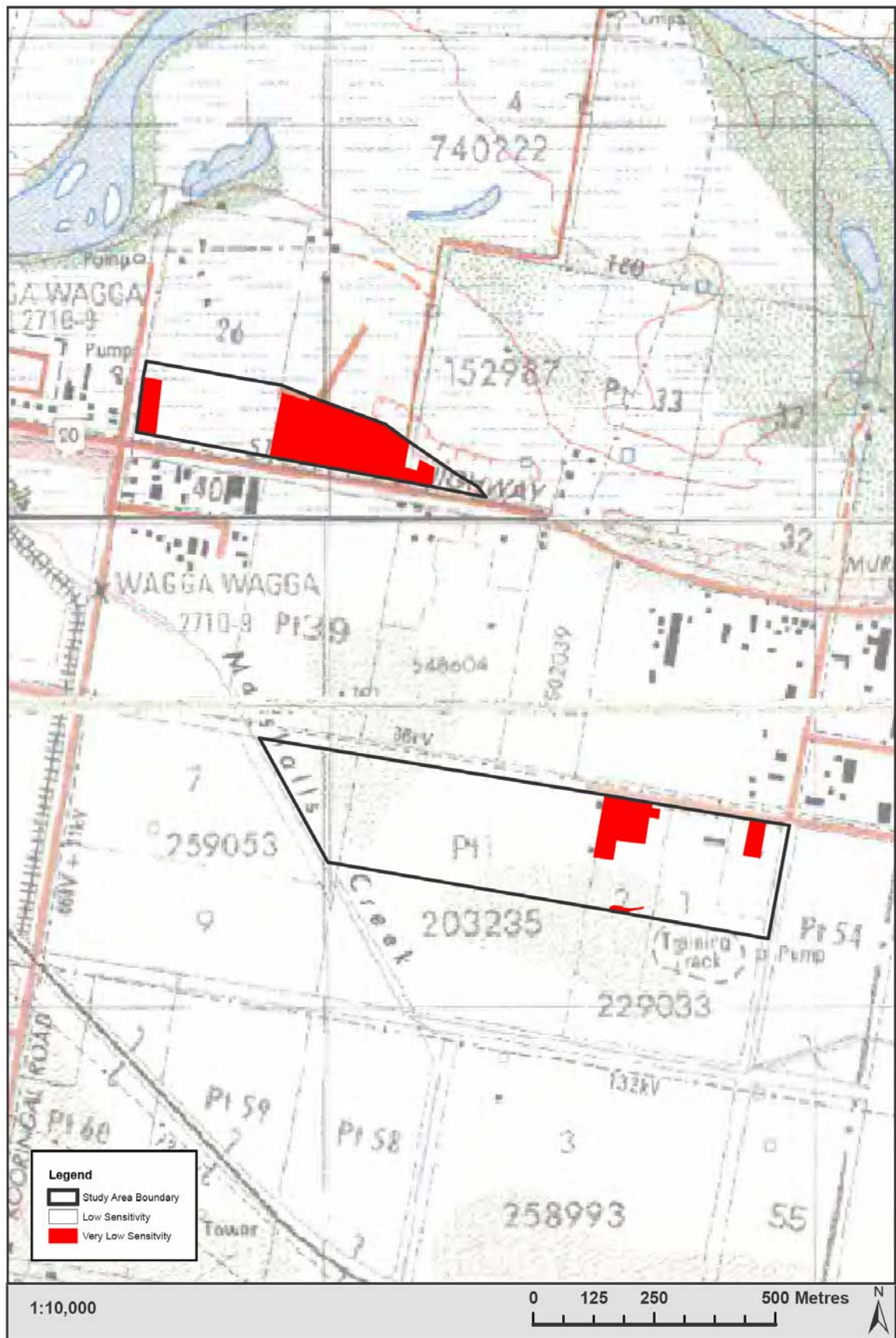


Figure 6. Areas of archaeological sensitivity within the Hammond Avenue and Copland Street study areas.

5.7 Boorooma East

The Boorooma East study area is located to the north of Wagga Wagga. It is bounded to the north by Farrer Road, to the east by Coolamon Road, to the south by the Olympic Highway, and to the west by Amundsen Street. A majority of the study area is used for rural activities.

5.7.1. Previous Archaeological Investigation

No Aboriginal archaeological investigation has been conducted within the current Boorooma study area. An Aboriginal archaeological survey was carried out immediately to the west by Egan (2005), in an area bordered by Amundsen Street, Farrer Road, Boorooma Street and the Olympic Highway. No Aboriginal sites were identified during the survey. Egan (2006) noted that there was a lack of surface visibility due to thick grass cover, and that any assessment of subsurface archaeological potential would require soil testing (test excavation).

5.7.2. Study Area Visit

The study area is located on the northern margin of the Murrumbidgee River floodplain. The main landform within the study area is the southern termination of a spur that originates in the Bomen area to the north. A large amount of outcropping granite was observed along the crest of this spur (Plate 14).

The general archaeological sensitivity of the study area is moderate to high due to the combination of its elevated position above the Murrumbidgee River floodplain and the large amount of outcropping granite. The extensive floodplain to the south is likely to have provided a variety of subsistence resources, whilst the elevated position of the study area would have provided a dry area with a good outlook over the floodplain (Plate 15) and access to areas further to the north. Inclusions within the outcropping granite may have been used as a source of raw material for stone artefact manufacture.

Table 11. Boorooma study area archaeological sensitivity

Landform Type	Archaeological Sensitivity	Sensitivity Description	Previously Recorded Sites	'New' Recorded Sites	Previously Identified PADs
Spurline Crest/Granite Outcrops	High	Increased sensitivity with proximity to drainage open drainage lines/floodplain, increased sensitivity where potential artefact raw material present, such as quartz	n/a	n/a	n/a
Upper/Mid Hillslope	Low to Moderate	Less possibility of intact archaeological deposits, increased sensitivity with gentler slopes and proximity to open drainage lines/terraces	n/a	n/a	n/a
Lower Hillslope	Low to Moderate	Increased sensitivity in association with alluvial/colluvial deposits associated with drainage lines, increased sensitivity where associated with Murrumbidgee River floodplain	n/a	n/a	n/a
Colluvial/Alluvial Floodplain Deposits	Moderate to High	Increased sensitivity where associated with elevated areas	n/a	n/a	n/a

Areas of archaeological sensitivity within the Boorooma East study area are shown in Figure 7.

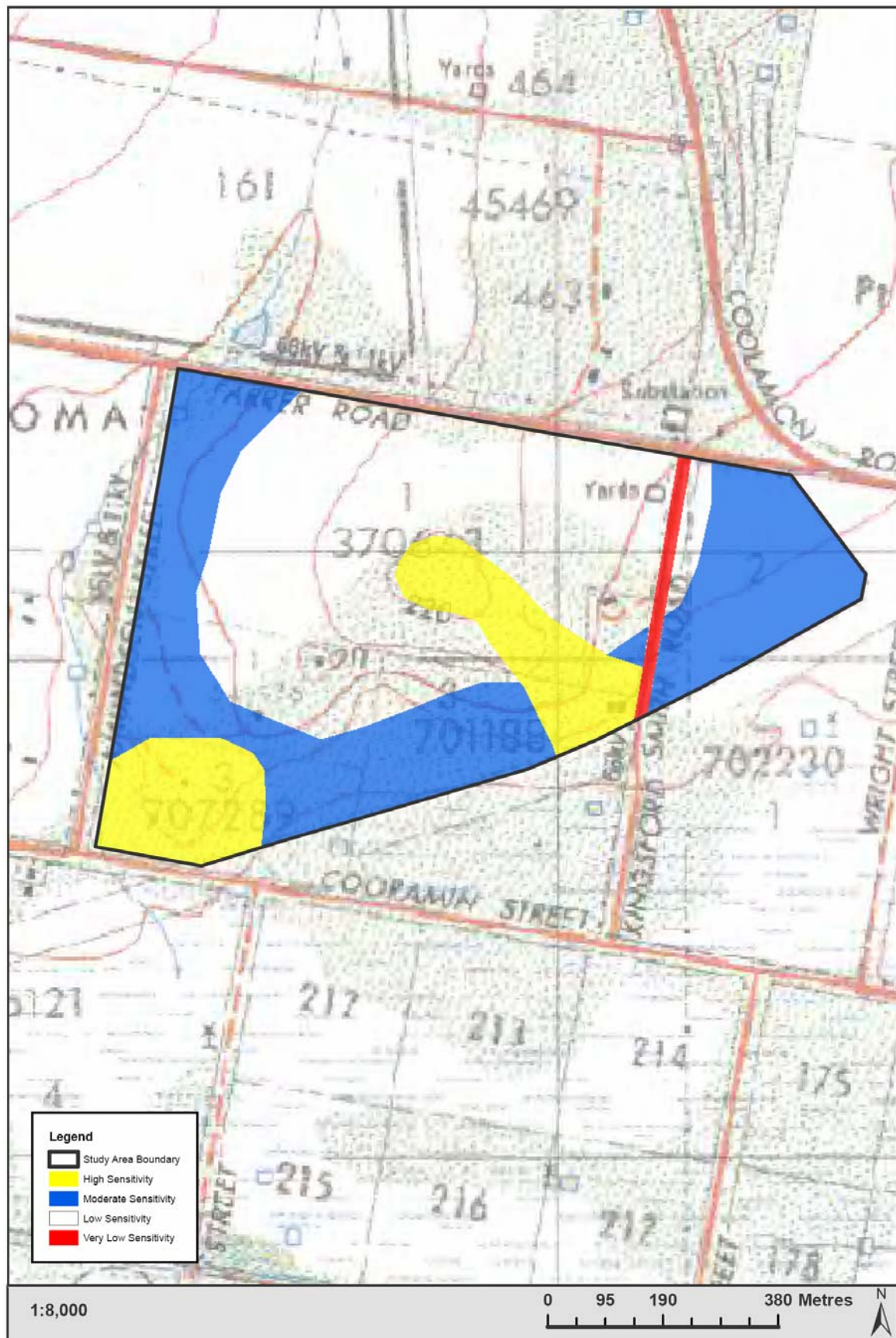


Figure 7. Areas of archaeological sensitivity within the Boorooma East study area.



Plate 14. Granite outcrop on crest of spur, Boorooma study area.



Plate 15. View south from Boorooma study area across Murrumbidgee River floodplain.

5.8 Moorong Street

The Moorong Street study area is located in western Wagga Wagga, and is bounded by an abandoned railway line to the northwest, the Olympic Highway to the east and the Sturt Highway to the south (Plate 16). The Murrumbidgee River is located approximately 70 m to the northwest. There has been no previous archaeological investigation of this study area.

The study area is located on the Murrumbidgee River floodplain. There are no elevated positions and the drainage regime of the area has been heavily modified. The study area has low archaeological significance.

Table 12. Moorong Street study area archaeological sensitivity

Landform Type	Archaeological Sensitivity	Sensitivity Description	Previously Recorded Sites	'New' Recorded Sites	Previously Identified PADs
Alluvial Floodplain	Low	Flat Murrumbidgee River floodplain	n/a	n/a	n/a



Plate 16. Looking southwest across the Moorong Street study area towards Sturt Highway

The archaeological sensitivity of the Moorong Street study area is shown in Figure 8.

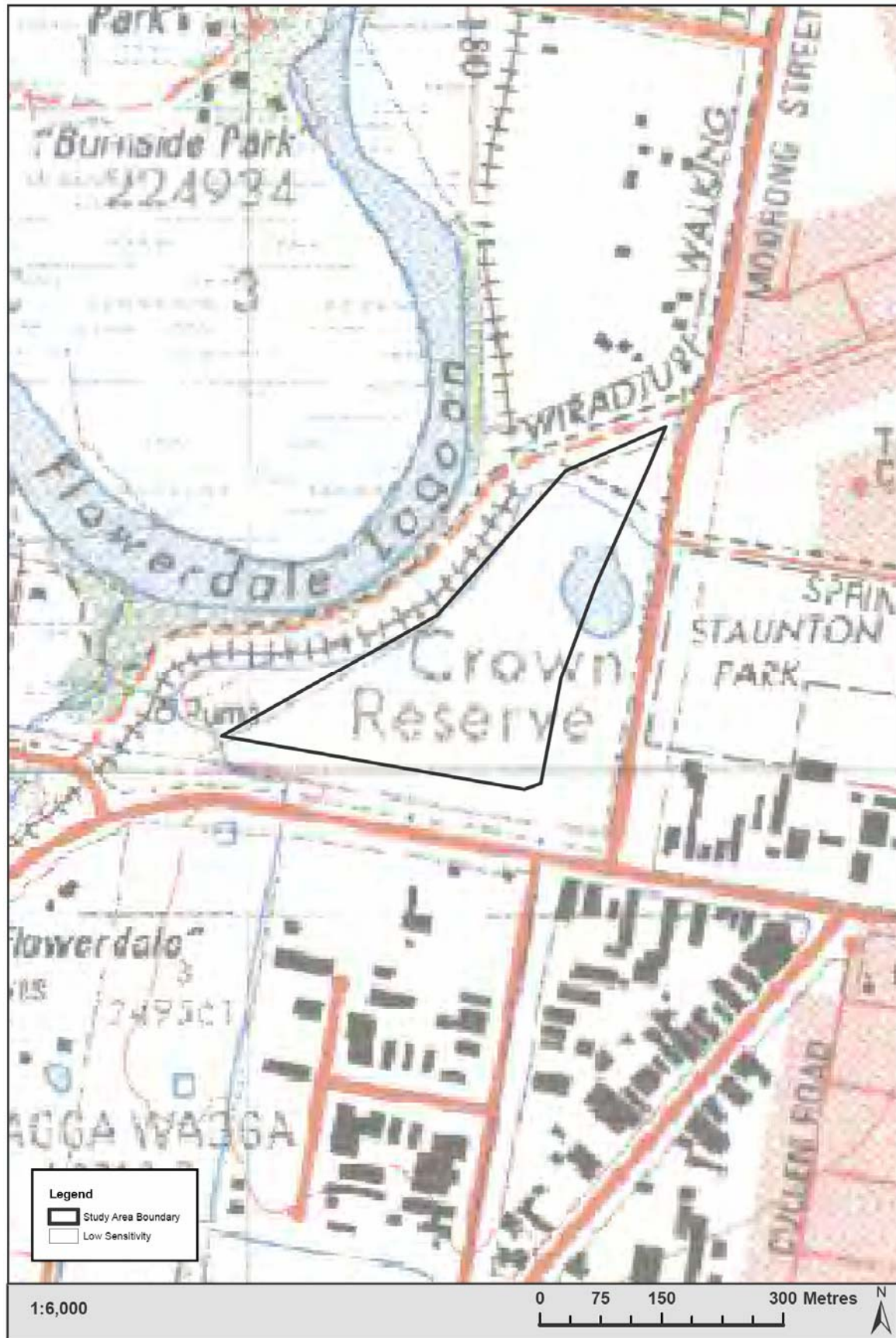


Figure 8. Areas of archaeological sensitivity within the Moorong Street study area.

6 Statement of Significance

One of the primary steps in the process of cultural heritage management is the assessment of significance. Not all sites are equally significant and not all are worthy of equal consideration and management (Sullivan and Bowdler 1984, Pearson and Sullivan 1995:7). The determination of significance can be a difficult process as the social and scientific context within which these decisions are made is subject to change (Sullivan and Bowdler 1984). This does not lessen the value of the heritage approach, but enriches both the process and the long-term outcomes for future generations as the nature of what is conserved and why, also changes over time.

Significance assessment can generally be described under three broad headings (Pearson and Sullivan 1995:7):

- ⑩ Value to groups such as Aboriginal communities;
- ⑩ Value to scientists and other information gatherers; and,
- ⑩ Value to the general public in the context of regional, state and national heritage.

Professional guidelines to the assessment of significance (NPWS 1997) discuss two types of significance: social significance and archaeological significance.

6.1 Social Significance

This area of assessment concerns the value/s of a feature or site to a particular community group, in this case the local Aboriginal community. Aspects of social significance are relevant to sites, objects and landscapes that are important or have become important to the local Aboriginal community. This importance involves both traditional links with specific areas as well as an overall concern by Aboriginal people for sites generally and their continued protection. Aboriginal cultural significance may include social, spiritual, historic and archaeological values.

6.2 Scientific Significance

For archaeologists, scientific significance refers to the potential of a site to contribute to current research questions. Alternately, a site may be an *in situ* repository of demonstrably important information, for example rare artefacts of unusually high antiquity.

Scientific significance is assessed using criteria to evaluate the contents of a site, state of preservation, integrity of deposits, representativeness of the site type, rarity/uniqueness and potential to answer research questions on past human behaviour (NPWS 1997). DEC guidelines recommended criteria for assessing archaeological significance include:

- ⑩ *Archaeological Research Potential* – significance may be based on the potential of a site or landscape to explain past human behaviour and can incorporate the intactness, stratigraphic integrity or state of preservation of a site, the association of the site to other sites in the region, or a datable chronology;
- ⑩ *Representativeness* – all sites are representative of those in their class (site type/subtype) however; the issue here relates to whether particular sites should be conserved to ensure a representative sample of the archaeological record is retained. Representativeness is based on an understanding of the regional archaeological context in terms of site variability in and around the study area, the resources already conserved and the relationship of sites across the landscape; and,
- ⑩ *Rarity* – which defines how distinctive a site may be, based on an understanding of what is unique in the archaeological record and consideration of key archaeological research questions (i.e. some sites are considered more important due to their ability to provide certain information). It may be assessed at local, regional, state and national levels.

High significance is usually attributed to sites which are so rare or unique that the loss of the site would affect our ability to understand an aspect of past Aboriginal use/occupation of an area. In some cases a site may be considered highly significant because it is now rare due to destruction of the archaeological record through development. Medium significance is attributed to sites which provide information on an established research question. Low significance is attributed to sites which cannot contribute new information about past Aboriginal use/occupation of an area. This may be due to site disturbance or the nature of the site's contents.

6.3 Statement of Scientific Significance

6.3.1. *Bomen IF1 (B IF1)*

Site B IF1 is located on a small spur immediately to the east of a 1st order drainage line, and approximately 500 m west of a 3rd order drainage line. The archaeological sensitivity of areas bordering drainage channels within the Bomen study area has been assessed as being moderate to high (See Table 6). Surface visibility in the immediate area of the site was relatively high, in contrast to the surrounding paddocks where crops had recently been sown and access was limited to unformed vehicle tracks along the fencelines. The identification of BF 1 is important from the perspective that it both demonstrates the occurrence of archaeological material in the area and provides some indication of what may occur in adjacent paddocks where access and surface visibility was much more limited.

The archaeological research potential of site B IF1 is assessed as being high. This is due to the limited archaeological investigation in the area and the potential for further investigation of the site to provide valuable information regarding the distribution and nature of archaeological deposits in the area.

The representativeness of site B IF1 is assessed as moderate. As outlined in the predictive model, archaeological material along smaller tributaries in the region is likely to consist of small, focussed occupation events. With the combination of a low spur raised above two drainage channels leading to the Murrumbidgee floodplain, and the relatively close proximity of known raw material resources, it is possible that archaeological material in the area around B IF1 would represent frequent visitation. This means that the representative archaeological deposit for this area is more likely to be an artefact scatter rather than an isolated find.

The rarity of site B IF1 is assessed as moderate. Although only seven previously recorded isolated find sites were identified in the AHIMS database search, it is a site type that has been discussed in a number of different archaeological investigations across the wider region. There are two previously recorded isolated find sites within the Bomen study area, AHIMS # 56-1-0044 and 56-1-0045, as well as one isolated find site immediately south of the study area, AHIMS # 56-1-0033.

The overall scientific significance of site B IF1 is assessed as moderate. With further archaeological investigation there is high potential for the site to provide more information on the nature and distribution of archaeological material in the area.

7 Management Principles and Recommendations

7.1 Statutory Controls and Management Principles

The *National Parks and Wildlife Act 1974* (NPW Act) is the primary statutory control dealing with Aboriginal heritage in New South Wales. Items of Aboriginal heritage or declared Aboriginal places are protected under the NPW Act.

Under the Act, an "Aboriginal object" is defined as "any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains". As such, "objects" are confined to physical evidence and are commonly referred to as Aboriginal sites.

All "objects" are protected under section 90 of the Act. It is an offence to destroy, deface or damage an Aboriginal site without the prior consent of the Director-General of the DECC. Section 90 consent is required to be granted by DECC before an Aboriginal object (site) can be disturbed. Failure to obtain this consent may result in prosecution.

One of the Objects of the NPW Act is to conserve objects, places or features of cultural value within the landscape, including places, objects and features of significance to Aboriginal people and places of scientific significance (section 2A(1)6(i) and (iii)).

Section 90 therefore ensures Aboriginal objects are protected and/or regulated. However, the Objects of the Act and Aboriginal cultural heritage assessment process is designed to ensure that places or features of cultural value within the landscape and of significance to Aboriginal people are conserved in addition to the sites and objects.

Aboriginal sites and areas of archaeological sensitivity should be considered in relation to the detailed design of any future rezoning within the Wagga Wagga study areas. Incorporating the identified Aboriginal cultural heritage sites and values into the detailed planning of the study areas will fulfil the legislative obligations and objects of the NPW Act.

The *Environmental Planning and Assessment Act (1979)* ensures Aboriginal heritage will continue to be considered in future development assessments of the study areas.

7.2 Conservation, Management and Recommendations

The local environmental study should establish land use controls which recognise Aboriginal cultural heritage and provide for the ongoing protection and recognition of identified Aboriginal cultural heritage assets and values for the future development of the study areas.

Particular attention should be given to maintaining a connection between the identified Aboriginal sites and areas of archaeological sensitivity. These connections are important as they retain key elements of a holistic Aboriginal cultural heritage landscape. Such complete cultural landscapes are of higher significance than their individual parts.

If possible, all Aboriginal sites, PADs and areas of high or moderate archaeological sensitivity should be conserved. This can be achieved by incorporating identified sites, PADs and areas of high/moderate sensitivity within conservation areas established by the LES, avoiding the placement of development proposals in the locations of these features and by establishing protocols or a plan of management for their ongoing protection.

The findings of the predictive model do not prevent the rezoning of any of the study areas. The model is a starting point for more rigorous investigation into whether PADs and areas of high or moderate sensitivity do, in fact, contain Aboriginal objects. Rezoning may occur on the condition that such investigations, which may involve techniques such as test pitting, will be required at development assessment stage. Should investigations demonstrate the presence of objects, then development designs and management practices will be required to ensure the conservation of objects and sites.

Relevant approvals under the NPW Act (section 90 consent and/or section 87 permit) would be required. Any work requiring section 90 consent or section 87 permit will require the DECC Interim Community Consultation Requirements for Applicants to be implemented.

Disturbed areas and areas of low archaeological sensitivity should not pose a constraint to future development.

Consultation with and involvement of the local Aboriginal community should continue through all phases of planning and development of the study areas.

On the basis of the preliminary Aboriginal heritage assessment and predictive analysis of archaeological potential, the following recommendations are made for each of the eight study areas:

7.2.1. Lloyd

- ⑩ Management of the identified Aboriginal heritage features will require consideration during the strategic planning process of Lloyd;
- ⑩ Conservation should be the prime consideration when establishing Aboriginal heritage management strategies during the planning process;
- ⑩ While rezoning may occur, it should be conditional upon further investigations being undertaken at development assessment stage to identify whether or not objects are, in fact, present within PADs and areas of high or moderate sensitivity. Such investigations may result in a requirement to ensure that sites and objects are conserved;
- ⑩ Identified sites, PADs or areas of high/moderate sensitivity not possible to conserve may require section 90 consent and/or section 87 permit for test/salvage excavation;
- ⑩ Consultation with the WWLALC is ongoing. This assessment will be finalised following consultation and input from the Land Council;
- ⑩ A significance assessment of recorded Aboriginal sites in the western half of the current Lloyd study area was conducted by Kelton (2006). Kelton's investigation was comprehensive, and, in combination with the recommendations listed above, his recommendations should be adopted for future works in the portion of the current Lloyd study area covered by his study. A summary of his recommendations are included in Table 13; and,

Table 13. Summary of Kelton's (2006) recommendations relating to recorded Aboriginal sites within his study area at Lloyd.

Site / Landform	Recommendation
All Sites	Protective buffer zones around all recorded Aboriginal archaeological sites during all works in their vicinity; develop a management plan with the local Aboriginal community, DECC, landowners/developers for the long-term management of recorded sites; notification of recorded site location to all contractors and employees working in development related activities; if a Section 90 Consent to Destroy is issued over any of the recorded sites the local Aboriginal community should be contacted in relation to the fate of the sites or archaeological deposits.
All PADs (LNPAD1 – LNPAD7)	Where possible, PADs should be conserved. Where such conservation is not practicable, rezoning may occur, conditional upon a requirement that development consent cannot be granted until further investigations have determined whether or not Aboriginal objects are present on the land. Should such objects be present, management practices may be required to ensure their conservation.
Scarred Tree Sites	Recommended conservation of all recorded scarred tree sites; at least 15 m protective buffer placed around scarred tree sites during any works; long-term management plan with landowners relating to the protection of scarred tree sites.
Open Camp Sites	Recommended conservation of all open camp sites; at least 20 m protective buffer zone maintained around all recorded open camp sites during any works.
Isolated Finds	Based on their assessed low significance of isolated finds L-IF1 and L-IF-2, if these sites will be disturbed the proponent will need to apply for a Section 90 Consent to Destroy; if they are not impacted by works, at least a 20 m protective buffer zone maintained around recorded isolated find sites during any works.
Potential Sites	If unrecorded Aboriginal archaeological material is identified at any stage work must cease in the vicinity and the DECC Regional Archaeologist must be contacted.

7.2.2. Bomen

- ⑩ Management of the identified Aboriginal heritage features will require consideration during the strategic planning process of Bomen;
- ⑩ Conservation should be the prime consideration when establishing Aboriginal heritage management strategies during the planning process;
- ⑩ While rezoning may occur, it should be conditional upon further investigations being undertaken at development assessment stage to identify whether or not objects are, in fact, present within PADs and areas of high or moderate sensitivity. Such investigations may result in a requirement to ensure that sites and objects are conserved;
- ⑩ Identified sites, PADs or areas of high/moderate sensitivity not possible to conserve may require section 90 consent and/or section 87 permit for test/salvage excavation; and,
- ⑩ Consultation with the WWLALC is ongoing. This assessment will be finalised following input from the Land Council.

7.2.3. Estella West

- ⑩ Management of the identified areas of potential Aboriginal archaeological sensitivity should be considered during the strategic planning process of Estella West;
- ⑩ Conservation should be the prime consideration when establishing Aboriginal heritage management strategies during the planning process;
- ⑩ The assessment has identified there is some potential for this study area to contain Aboriginal objects that were not visible at the time of current site visit due to extensive ground cover and preliminary nature of the investigation. As a result, this area warrants further survey and assessment for proposed future development, as part of the development assessment process;
- ⑩ Identified areas of high/moderate sensitivity not possible to conserve may require further investigation through section 87 permit for test excavation; and,
- ⑩ Consultation with the WWLALC is ongoing. This assessment will be finalised following input from the Land Council.

7.2.4. Edison Road

- ⑩ No archaeological constraints for rezoning have been identified on the site; and,
- ⑩ Consultation with the WWLALC is ongoing. This assessment will be finalised following input from the Land Council.

7.2.5. Hammond Avenue

- ⑩ No archaeological constraints for rezoning have been identified on the site; and,
- ⑩ Consultation with the WWLALC is ongoing. This assessment will be finalised following input from the Land Council.

7.2.6. Copland Street

- ⑩ No archaeological constraints for rezoning have been identified on the site; and,
- ⑩ Consultation with the WWLALC is ongoing. This assessment will be finalised following input from the Land Council.

7.2.7. Boorooma East

- ⑩ Management of the identified areas of potential Aboriginal archaeological sensitivity should be considered during the strategic planning process of Boorooma East;
- ⑩ Conservation should be the prime consideration when establishing Aboriginal heritage management strategies during the planning process;
- ⑩ The assessment has identified there is some potential for this study area to contain Aboriginal objects that were not visible at the time of current site visit due to extensive ground cover and preliminary nature of the investigation. As a result, this area warrants further survey and assessment for proposed future development, as part of the development assessment process;

- ⑩ Identified areas of high/moderate sensitivity not possible to conserve may require further investigation through section 87 permit for test excavation; and,
- ⑩ Consultation with the WWLALC is ongoing. This assessment will be finalised following input from the Land Council.

7.2.8. Moorong Street

- ⑩ No archaeological constraints for rezoning have been identified on the site; and,
- ⑩ Consultation with the WWLALC is ongoing. This assessment will be finalised following input from the Land Council.

8 References

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Appendix A Aboriginal Community Report

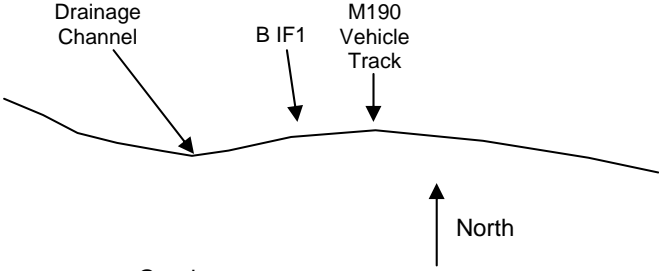
Appendix B B IF1 Site Card



National Parks and Wildlife Service

PO Box 1967, Hurstville, NSW, 2220. Tel: (02) 9585 644
Standard Site Recording Form

1:250,000 map sheet: <u>Wagga Wagga</u>		NPWS Code	HEAD OFFICE USE ONLY: NPWS Site no: _____
AMG Grid reference 540614 mE 6120623 mN		Site types: Accessioned by: _____ Date: _____	
Scale of map used (or grid reference <input checked="" type="checkbox"/> 25K.50K <input type="checkbox"/> 100K <input type="checkbox"/> 250K Please use largest scale available (preferred)		Data entered by: _____ Date: _____	
1:25K. 50K. 100K map name: <u>Wagga Wagga</u>		Owner/Manager: Address: <u>Riverina Wool Combing Pty Ltd</u>	
Site name: <u>Bomen IF1 (B IF1)</u>	Locality/property name: <u>Bomen</u>		
NPWS District:	Region:		
Reason for investigation <u>Archaeological study for Wagga Wagga LES.</u>			
Portion no: <u>Portion 110</u> Parish: <u>Eunanoreenya</u>			
Photos taken? <u>Yes</u> How many attached? <u>2</u>			
How to get to the site (refer to permanent features, give best approach to site eg. from above, below, along cliff (Draw diagram on separate sheet.) <u>Access site through Riverina Wool Combing Pty Ltd property, from Trahairs Road. Site is located 10 m west of an unsealed road easement, "M190". No access from "M190" due to fenced off revegetation area along edge of paddock.</u>			
Other sites in locality? <u>Yes</u> Are sites in NPWS Register? <u>Yes</u>		Site Types include: <u>Isolated finds and one basalt quarry.</u>	
Have artefacts been removed from site? <u>No</u> By whom?		When? Deposited where?	
Is site important to local Aborigines? Give contact(s) name(s) + address(es) Contacted for this recording? <u>Yes</u> (attach additional information separately) If not, why not?			
Verbal/written reference sources (including full title of accompanying report) <u>'Wagga Wagga Local Environment Study: Aboriginal Cultural Heritage Assessment', report for Willana Associates.</u>			NPWS Report Catalogue
Checklist: surface visibility damage/disturbance/ threat to site	Condition of site: <u>Cleared paddock.</u>		
Recommendations for management & protection (attach separate sheet if necessary): <u>Site should be considered a constraint for future rezoning with the aim of incorporating the site location into a conservation area.</u>			
Site recorded by: <u>Kelleher Nightingale Consulting Pty Ltd</u> Address/institution: <u>Suite 604, 267 Castlereagh St, Sydney NSW 2000</u>			Date: <u>JUL 2007</u>

SITE POSITION & ENVIRONMENT		OFFICE USE ONLY: NPWS site no:
1. Landform a. beach/hillslope/ridge top, etc: Hillslope d. mark on diagram provided or on your own sketch the position of the site  f. Local rock type: Granite		b. site aspect: n/a c. slope: Gentle e. describe briefly: Site B IF1 is located on the western slope of a small spur immediately to the east of a 1 st order drainage line, and approximately 500 m west of a 3 rd order drainage line. g. Land use/effect Pastoral
2. Distance from drinking water: 50 m		Source: 1 st order ephemeral drainage channel
3. Resource zone associated with site (estuarine, riverine, forest etc): Forest (originally) and creek		
4. Vegetation: Now cleared		
5. Edible plants noted:		
6. Faunal resources (including shellfish):		
7. Other exploitable resources (river pebbles, ochre etc)		
Site type: Isolated Find CHECKLIST TO HELP: length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated, depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART area of surface decorated, motifs, colours, wet, dry pigment, technique of engraving, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead, likely age, scar shape, position, size, patterns, axe marks, regrowth QUARRIES, rock type, debris, recognizable artefacts, percentage quarried. OTHER SITES EG. structures (fish traps, stone arrangements, bora rings, mia mias), mythological sites, rock holes, engraved groove, channels, contact sites (missions massacres, cemeteries) as appropriate.	DESCRIPTION OF SITE & CONTENTS. Note state of preservation of site & contents. Do NOT dig, disturb, damage site or contents. This site consists of one stone artefact identified within an exposed paddock in the Riverina Wool Combing property. The site is located on a gentle slope on the western side of a small rise running approximately north-south between a first order ephemeral stream immediately to the west, and a second order ephemeral stream further to the east. The artefact is located approximately 10 m west of a fence line dividing the paddock and the M190 vehicle track. The artefact is a mid reddish brown mudstone flake with a flaked platform, feather termination, multiple dorsal scars, 10% dorsal cortex. The flake measured 23 mm x 25 mm x 8 mm (L x W x D). Surface visibility in the immediate area was around 80%, with exposure around 40%.	

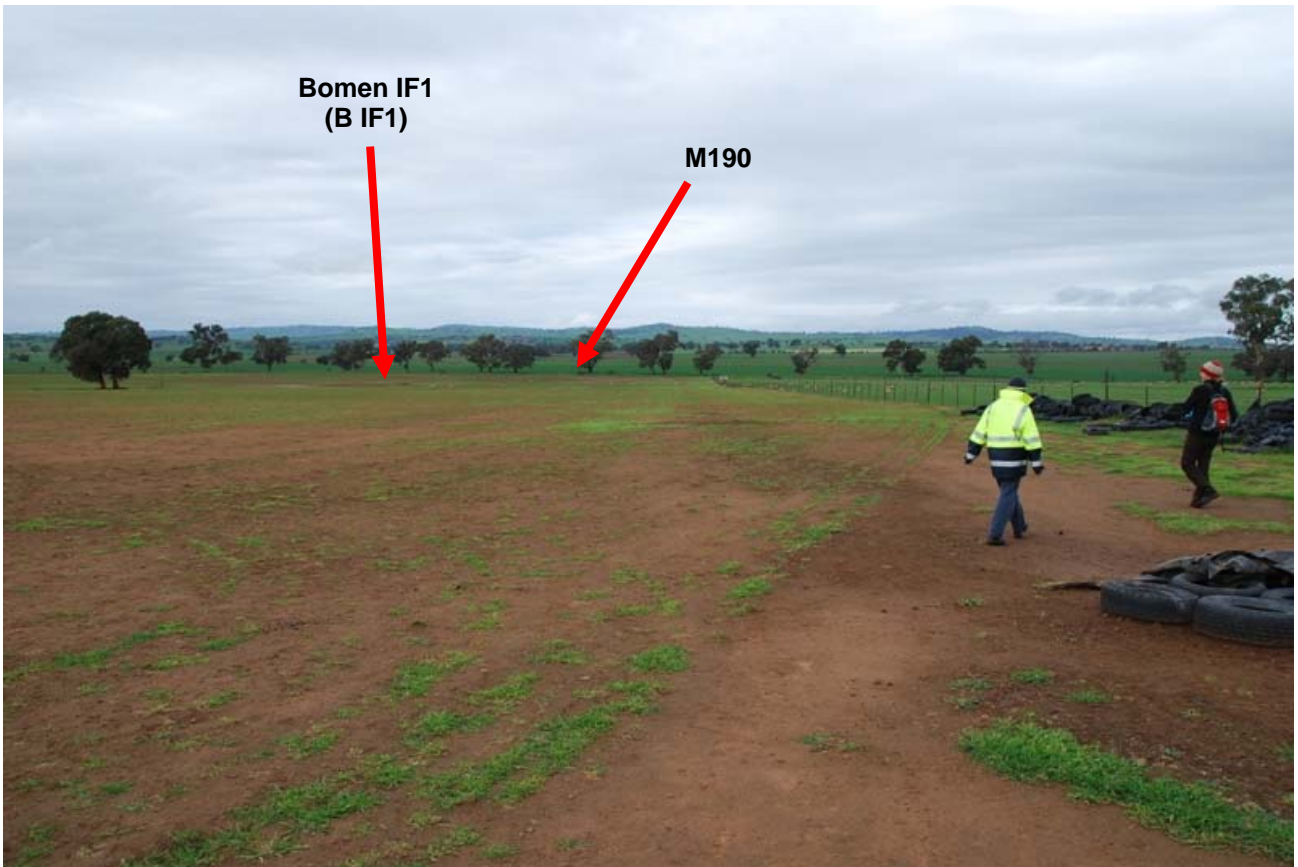


Plate 1: Looking east across paddock to B IF1.



Plate 2: Detail of ventral surface of isolated artefact, Bomen IF1 (B IF1).