Archaeological investigation of the Oran Park Precinct within the South West Growth Centre, Camden, NSW.

Stage 2 report

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Draft

Report to APP on behalf of

the Growth Centre Commission and Camden City Council

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1. INTRODUCTION AND BACKGROUND

This report was commissioned by APP on behalf of the Growth Centres Commission (GCC) and Camden Council. It documents the Stage 2 assessment of the Oran Park Precinct. This report summarises the existing information, the archaeological fieldwork undertaken within the Oran Park Precinct and details preliminary recommendations for the management of the Indigenous cultural heritage within the Precinct.

1.1 Background

The Western Sydney Growth Centres project is seen to present an opportunity to provide housing for Sydney's growing population within an environmentally sustainable framework. The South West Growth Centre comprises a total area of c.17,000 ha and includes land between Camden in the south and Kemps Creek in the north. There are eighteen designated precincts within the South West Growth Centre.

The Oran Park Precinct is one of the two first release precincts for the South West Growth Centre. The Oran Park Precinct (c. 1,120 ha) will be developed for a range of land uses. This includes residential (with approximately 8,500 dwellings proposed), and employment land, a town centre and open space.

All work undertaken for this study is being done in accordance with the Protocols and Precinct Assessment Method developed by the GCC and DEC (Appendix 1). This Stage 2 report documents the second stage of the indigenous heritage assessment as defined in the Protocols and Methodology, involving a complete investigation of the archaeological significance of the Oran Park Precinct.

1.2 Summary of findings and recommendations

A total of 44 sites and four areas of high potential archaeological deposit were identified as a result of the current archaeological investigation. Twenty one of the identified sites and three of the areas of PAD will definitely be impacted by the currently proposed development (Figure 3), nineteen of the sites and one of the PADs will not be impacted and three of the sites have the potential to be conserved within proposed riparian corridors associated with the tributaries to South Creek.

It is recommended that:

1. An indigenous heritage conservation strategy should be applied to the Oran Park Precinct based on the results of the Stage Two investigation. A meaningful conservation outcome should incorporate a representative set of landscapes from Zone 1 landscapes and areas identified by the indigenous stakeholders as having high cultural significance;

2. Once the conservation zone has been identified, a Plan of Management will be required to ensure the appropriate protection and management of archaeological and cultural values within the conservation zone;

3. Land that falls outside the conservation zone should be considered developable and managed on the basis of the sensitivity mapping and the defined management principles. A sample of Zone 1 and Zone 2 landscapes impacted by the proposed development should be targeted for sub-surface investigation as mitigation against their destruction. Zone 3 and Zone 4 landscapes will not require any further archaeological investigation;

4. Once the conservation area has been identified, development impacts finalised and locations chosen for salvage, a 'whole of development' Section 90 consent should be sought from DEC NSW for the Oran Park Precinct;

5. The TLALC, CBNTCAC and other interested Aboriginal groups have indicated their interest in seeing a meaningful public education outcome in relation to the local Aboriginal heritage. Suggestions from the stakeholder groups include a heritage walking trail through the proposed conservation areas, the naming of suburbs and streets to reflect the colonial and Aboriginal heritage and an Aboriginal heritage centre within the Oran Park Precinct;

6. The TLALC, CBNTCAC and other interested Aboriginal groups may wish to collect the identified surface artefacts prior to the commencement of any construction activity;

7. The TLALC, CBNTCAC and other interested Aboriginal groups may wish to monitor the initial stages of construction activity within the Oran Park Precinct;

8. The TLALC, CBNTCAC and other interested Aboriginal groups continue to be involved in all stages of the assessment process in accordance with the GCC guidelines;

1.3 Report authorship

This report was written by Amy Stevens, with contributions from Peter Mitchell (Groundtruth Consulting) and management input from Jo McDonald. Dr. Peter Mitchell undertook the land use interpretation, completed the assessment on the geomorphology and soils (Appendix 2) and contributed to the analysis of potential archaeological sensitivity.

2. ABORIGINAL CONSULTATION

The Oran Park Precinct fall within the boundaries of the Tharawal Local Aboriginal Land Council. Cubbitch Barta Native Title Claimants Aboriginal Corporation, Darug Tribal Aboriginal Corporation, Darug Custodial Aboriginal Corporation and Darug Aboriginal Cultural Heritage Assessments have also been identified as stakeholders. Relevant documentation is provided in Appendix 3.

Advertising for interested parties has been undertaken in accordance with DEC guidelines and GCC consultation Protocols. Notices were placed in the Koori News and the Indigenous Times on 23.11.06, and in the Wollondilly Advertiser on 28.11.06.

2.1 Identification of Stakeholder groups

Responses registering interest were received by Mr Pat Lock of Carwoola Council Elders, Mr Nigel Robinson of Gundungarra Local Aboriginal Land Council, Ms Sarah James of the University of Western Sydney and Dr Greg Teal of the University of Western Sydney, all of whom indicated an interest in reviewing reports upon the completion of the site inspection. In accordance with their request, Mr. Nigel Robinson and Ms. Sarah James were also invited to attend the stakeholder meetings. La Perouse Botany Bay Aboriginal Corporation, Wadi Wadi Coomaditchie Aboriginal Corporation and Moran Elders Council have also registered separate expressions of

interest in being involved in the project through the Northern Illawarra Aboriginal Corporation (NIAC).

All identified stakeholders were invited to contribute to the background research and prioritisation of further work. Their responses to the Stage 1 works are summarised here.

- Tharawal Local Aboriginal Land Council is interested in being involved in all aspects of the fieldwork and reporting in order to assist in the appropriate management of the cultural heritage for the study area.

- Ms Glenda Chalker (Cubbitch Barta Native Title Claimants) recalls identifying artefacts while surveying the Denbigh curtilage, and that the landowners had collected some of these artefacts and submitted them with the Australian Museum. Ms Chalker indicated that she would like the landowner to accompany the archaeologist during the survey of that area to identify the location from which these artefacts were removed. As a part of the expected outcomes for this project, the Cubbitch Barta group is interested in pursuing evidence that the Dharawal people were the inhabitants of the land covered by the Oran Park and Turner Road Precincts when white settlers arrived in this area.

  A report that was commissioned by Cubbitch Barta in 1999 and written by Dan Tuck was not made available to the consultant due to a perceived conflict of interest between Cubbitch Barta and several of the registered claimants being consulted as a part of this study.

- Mr Des Dyer (Darug Tribal Aboriginal Corporation) noted that there has been very little archaeological work undertaken within the study area. Mr. Dyer expressed a strong interest in participating in the survey in order to add to our knowledge of the local archaeology.

- Ms Leanne Watson (Darug Custodial Aboriginal Corporation) has registered interest in being involved in all aspects of the project.

- Ms Celestine Everingham (Darug Aboriginal Cultural Heritage Assessments) observes that the entire area is close to permanent water and she believes there will be a significant number of sites within the study area.

- La Perouse Botany Bay Aboriginal Corporation, Wadi Wadi Coomaditchie Aboriginal Corporation and Moran Elders Council have contributed to the background research through NIAC. Mr. Chris Illert has provided a large amount of information relating to the study area and surrounds on their behalf. Much of the information contained in the *Social and Cultural Associations* section of this report has been as a result of the contributions made on behalf of these groups.

2.2 Stakeholder meeting

A Stakeholder meeting was held at Camden City Council on Monday 12th February, to which all registered stakeholders were invited. Representatives were present from the following indigenous stakeholder groups:

- Tharawal Local Aboriginal Land Council (Cliff Foley, Wendy Lewis, Donna Whillock, and Leeanne Hestelow);
- Cubbitch Barta Native Title Claimants Aboriginal Corporation (Glenda Chalker and Rebecca Chalker);
- Darug Tribal Aboriginal Corporation (Des Dyer and Gordon Workman);
- Darug Custodial Aboriginal Corporation (Leanne Watson);
- Darug Aboriginal Cultural Heritage Assessments (Celestine Everingham and Gordon Morton);
- Wadi Wadi Coomaditchie Aboriginal Corporation (Allan Carriage);
- La Perouse Botany Bay Aboriginal Corporation (Yvonne Simms);
- Carwoola Council of Elders (Pat Lock and Gladys Lock);
- NIAC representative (Chris Illert)

Apologies were sent by Mr. Nigel Robinson who had previous work commitments on the day and was unable to attend.

The agenda for the Stakeholder meeting was as follows:

1. Introduction
2. Introduction to SWGC - Oran Park Precinct and Turner Road Precinct
3. Stakeholder Involvement
4. Discussion of Stage One Results
5. Timing of proposed Fieldwork (Stage 2)
6. Timing of Assessment and Planning Process

After a Welcome-to-Country by Cliff Foley, David Taylor (APP, on behalf of the Growth Centres Commission) provided a brief overview of the planning and processes for the South West Growth Centre and the Oran Park and Turner Road Precincts in particular. It was explained that the Growth Centres Commission was in the process of developing an Indicative Layout Plan to inform the planning process and that this was yet dependant on the archaeological assessment being completed.

Stakeholder Involvement

As a large number of groups had identified that they wished to have primary involvement in the consultation process, the logistics of organising fieldwork were discussed with the Growth Centre Commission and the Department of Environment and Conservation, prior the Stakeholder meeting. It was decided that an appropriate strategy would be to request the Tharawal Local Aboriginal Land Council and Cubbitch Barta Native Title Claimants Aboriginal Corporation, both with a long term prior commitment to cultural heritage assessment in this area, to provide a representative from each of their organisations to undertake the systematic archaeological survey of both Precincts. Each of the other registered stakeholder groups would then also be asked to attend at least one day's fieldwork in each Precinct in a paid capacity, to ensure that there was familiarity by all groups of the sites and landscapes concerned. The Stakeholder meeting provided the first opportunity for all groups to discuss this strategy and confirm whether this would be an acceptable approach.

It was explained to all of the stakeholders during the meeting that the allocation of fieldwork time and budget had been based on the acknowledgement of statutory roles (as registered Native Title Claimants and the Local Aboriginal Land Council) as well as long term precedent for undertaking the management of cultural heritage within the area. During the course of the Stakeholder meeting, there was considerable debate

about this allocation of fieldwork between the various stakeholder groups. It was made clear that this disagreement was largely over the allocation of the budget rather than the consultation process itself.

There was considerable discussion about how the burgeoning number of interested groups could be accommodated in the process of the systematic survey and Cliff Foley (Chairperson; TLALC) made an impassioned plea for the Native Title claimant groups to enter into discussions with TLALC to enable a co-ordinated approach to cultural heritage management by the Aboriginal community in this area. He pointed out that TLALC and Cubbitch Barta (a registered Native Title Claimant group within the Tharawal LALC's boundaries) had reached a mutually beneficial working arrangement, and invited the other registered parties in this area to do the same.

It was pointed out that stakeholder groups were not being excluded from information about the archaeological survey, but that a pragmatic decision needed to be made to ensure that all groups had access to the information as well as being recompensed for their involvement. The invitation was extended to all of the stakeholder groups to participate in as much of the field survey as they wished (on a voluntary basis) in addition to their paid consultation on each Precinct. It was also decided at the Stakeholder meeting that in order to ensure all of the identified Stakeholder groups had a comprehensive understanding of the nature and extent of archaeological sites and landscapes within the study area, an inspection of all sites and PADs would be arranged at the completion of the systematic survey. By this process it was agreed that all registered stakeholders would be fully informed of the results of field investigations at the conclusion of the fieldwork.

It was envisaged that this inspection would provide each of the stakeholder groups with an understanding of the local context of sites and landscapes in order to allow a meaningful contribution to the consultation process. It was agreed by those attending (representing the client) that if a total inspection of all sites in each Precinct could not be achieved in one day that the budget would be flexible enough to ensure that all groups had full access to the sites recorded.

Discussion of Stage One Results

Each of the Stakeholder groups had been sent a copy of the Stage One Archaeological Background Report prior to the Stakeholder meeting. This report detailed the background information from previous work within the region and potential gaps in that information. It also proposed a focus for the archaeological field investigation in both Precincts. This report included preliminary mapping of archaeological sensitivity across both Precincts as well as the identification of known sites / areas of potential.

Darug Tribal Aboriginal Corporation raised the issue at the Stakeholder meeting that the sensitivity mapping focused on archaeological values over cultural values. It was acknowledged that this was the case and pointed out that the Indigenous groups would have the opportunity to provide their own interpretation of cultural sensitivity, to be incorporated into the sensitivity mapping, at the conclusion of fieldwork and once the Indigenous representatives had a more complete understanding of the landscape and sites within the subject land.

Several ideas for the management of archaeological and cultural sensitivity were also discussed on the day. Several of the groups (CBNTCAC, DTAC, DCAC and DACHA) raised the suggestion of pursuing an outcome that would increase the public education and awareness of Aboriginal heritage within the region. Options that were considered included the development of a heritage walking trail through potential conservation zones, and the construction of a heritage centre within the Oran Park Precinct that would have the potential to double as an education centre and a keeping place for local cultural and archaeological materials.

Further discussion of these options concentrated on ways in which the Aboriginal community might otherwise benefit from the development within their areas, and frustrations were aired about the lack of tangible outcomes for the Aboriginal community from the cultural heritage process. The possible employment of Indigenous community members in the construction and maintenance of walking trails and the staffing of a cultural heritage centre were several possible options aired. It was considered that this would be one way of ensuring the local cultural heritage was maintained in a way that is meaningful to the local indigenous stakeholders and providing an ongoing connection with the cultural heritage for current and future generations.

Timing

It was decided that the systematic fieldwork would commence on 19th February 2007 in accordance with the suggested fieldwork strategy. A preliminary date was also set for a site inspection by all Stakeholder groups for the week starting the 5th March 2007.

The timing of the assessment and planning phases were also discussed at the meeting. It was pointed out by several of the Stakeholder groups that the timing for the Oran Park and Turner Road Precincts was significantly shorter than what had been envisaged in the Protocols and Precinct Assessment Methods developed for the Growth Centres.

This was agreed (David Taylor, APP) that this was certainly the case for the Oran Park and Turner Road Precincts; however it was established and acknowledged that the Protocols and Precinct Assessment Methods were still being followed within the abbreviated timetable and that the assessment itself would not be adversely effect by the shorter time frame. It was established at the conclusion of this discussion that if the archaeological fieldwork and assessment was not able to be completed within the allocated timeframe then more time would be allowed by the Growth Centres Commission in order to ensure that the archaeological assessment was not compromised.

2.3 Fieldwork involvement and outcomes

Survey of the Oran Park Precinct was undertaken over 8 days between 19th to 28th February 2007. All of the identified stakeholders participated in the survey. Tharawal Local Aboriginal Land Council was represented by Donna Whillock between 19th and 28th February. Cubbitch Barta was represented by Glenda Chalker on 19th – 21st February and 23rd to 28th February, and Rebecca Chalker on 19th and 20th February.

Leanne Watson (Darug Custodial Aboriginal Corporation) and Gordon Moreton (Darug Aboriginal Cultural Heritage Assessments) participated in the survey on 26th February. Des Dyer and Gordon Workman (Darug Tribal Aboriginal Corporation) participated in the survey on the 27th February.

Allan Carriage (Wadi Wadi Coomaditchie Aboriginal Corporation), Keith Simms (La Perouse Botany Bay Aboriginal Corporation) and Joel Kelly (NIAC / Metropolitan Local Aboriginal Land Council) participated in the archaeological fieldwork on 22nd-

23rd February. Ms. Daniella Reverbere, wife of Mr. Chris Illert, also attended on the 22nd – 23rd February as an observer. Ms. Reverbere is not an Aboriginal person and when challenged by the Aboriginal community members as to her role, indicated that she was acting as a volunteer observer on these occasions.

A site inspection of all sites in the Oran Park Precinct was arranged for all representatives who had not taken part in the entire systematic survey. This took part on Wednesday 7th March (attended by Des Dyer and Ron Workman) and Thursday 15th March (attended by Leanne Watson and Celestine Everingham). As discussed above, it had been arranged at the Stakeholder meeting that traditional owners from the La Perouse Botany Bay Aboriginal Corporation, Wadi Wadi Coomaditchie Aboriginal Corporation and Moran Elders Council would also be present to inspect all sites to ensure that all groups were fully aware of the lands that had been surveyed and the nature of the archaeological sites which have been recorded. Representatives from each of these groups had been present on two days each during the systematic survey. Ms. Reverbere attended the site inspection on the 7th March, stating that none of these group's representatives were available, either because of prior commitments or their elderly status. Ms. Reverbere indicated that she had been designated as their representative on this occasion, that she would be presenting a PowerPoint presentation at a meeting of these groups to inform them of our archaeological findings.

3. THE STUDY AREA

Oran Park Precinct is 1,119 ha of land at the south-western extent of the South West Growth Centre (Figure 1). South Creek runs along one boundary and The Northern Road bisects the Precinct (Figure 2). The two major land holders within this Precinct are the Oran Park Raceway and the Macarthur Anglican School. Denbigh, a heritage homestead, is also located within this Precinct, as are 10 smaller land holdings.

3.1 History of European Land Use

A detailed summary of the history of European land use is provided in the Stage 1 background report for the Oran Park and Turner Road Precincts (JMcD CHM 2007). The current report summarises the information on previous land use in relation to the potential effect such practices may have had on the preservation or destruction of intact archaeological deposit.

Figure 1: Plan of the South West Growth Centre, showing Precinct layout.

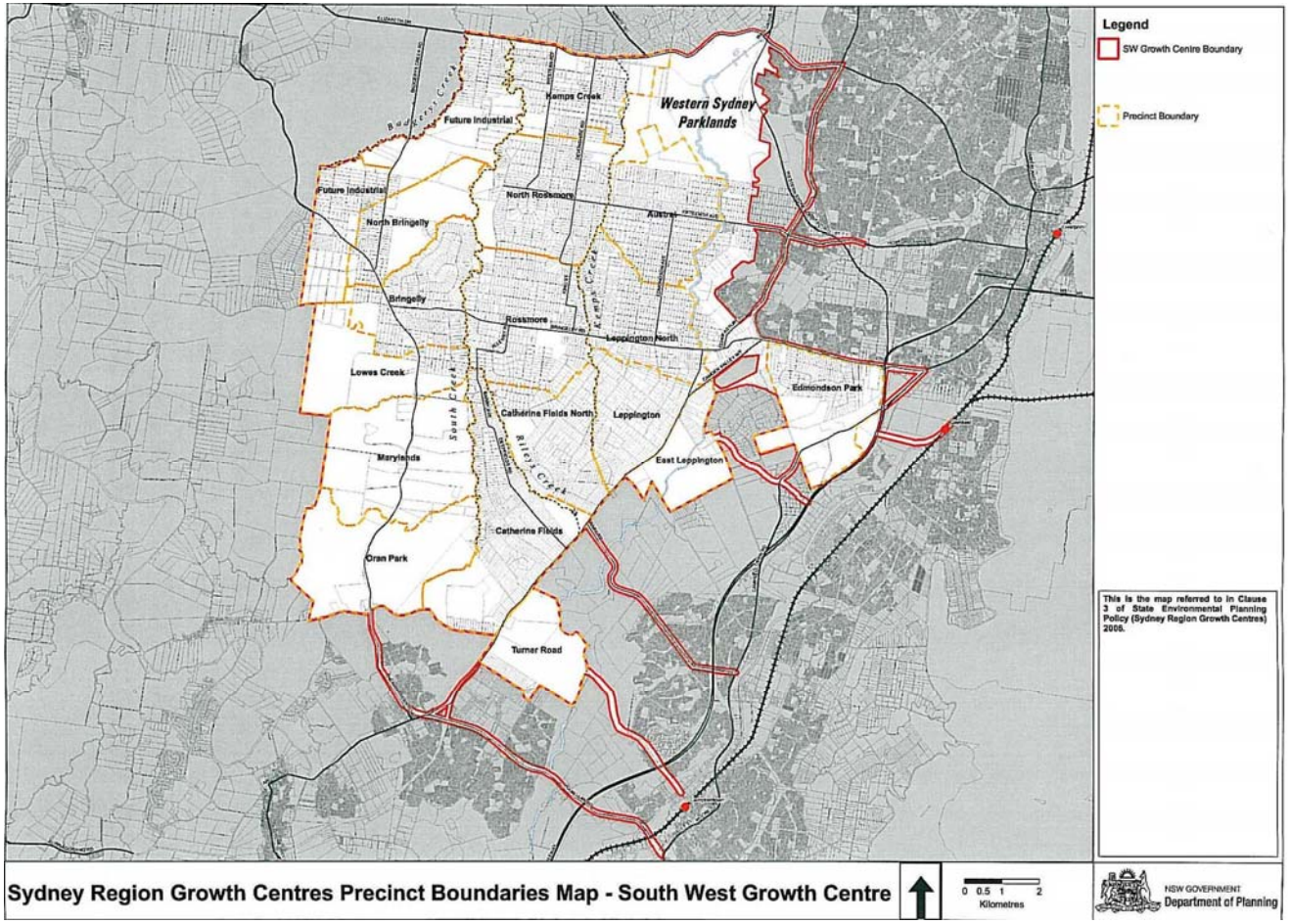


Figure 2: Topographic map of the Oran Park Precinct, showing roads, creeks and landscape parameters discussed throughout this report.

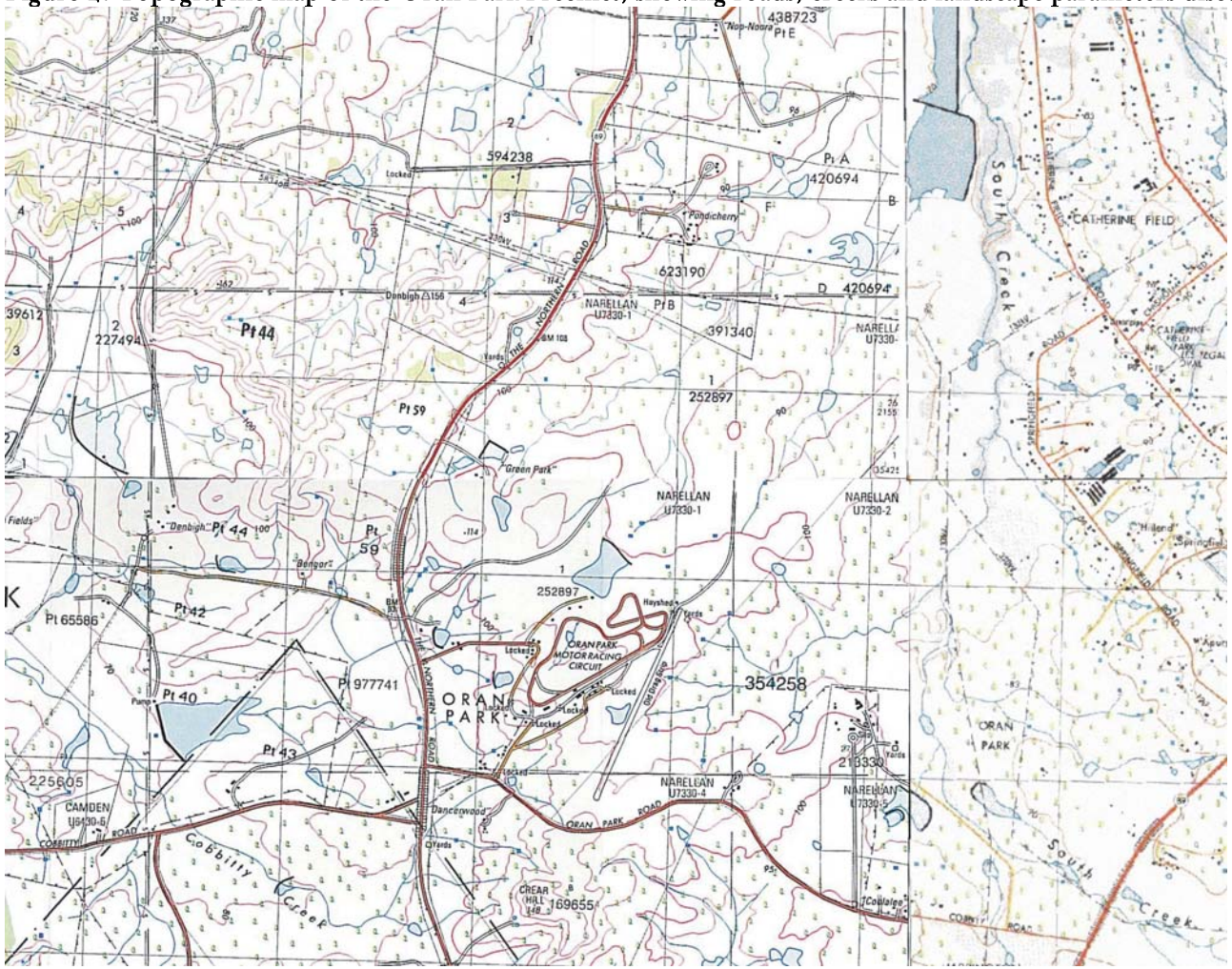
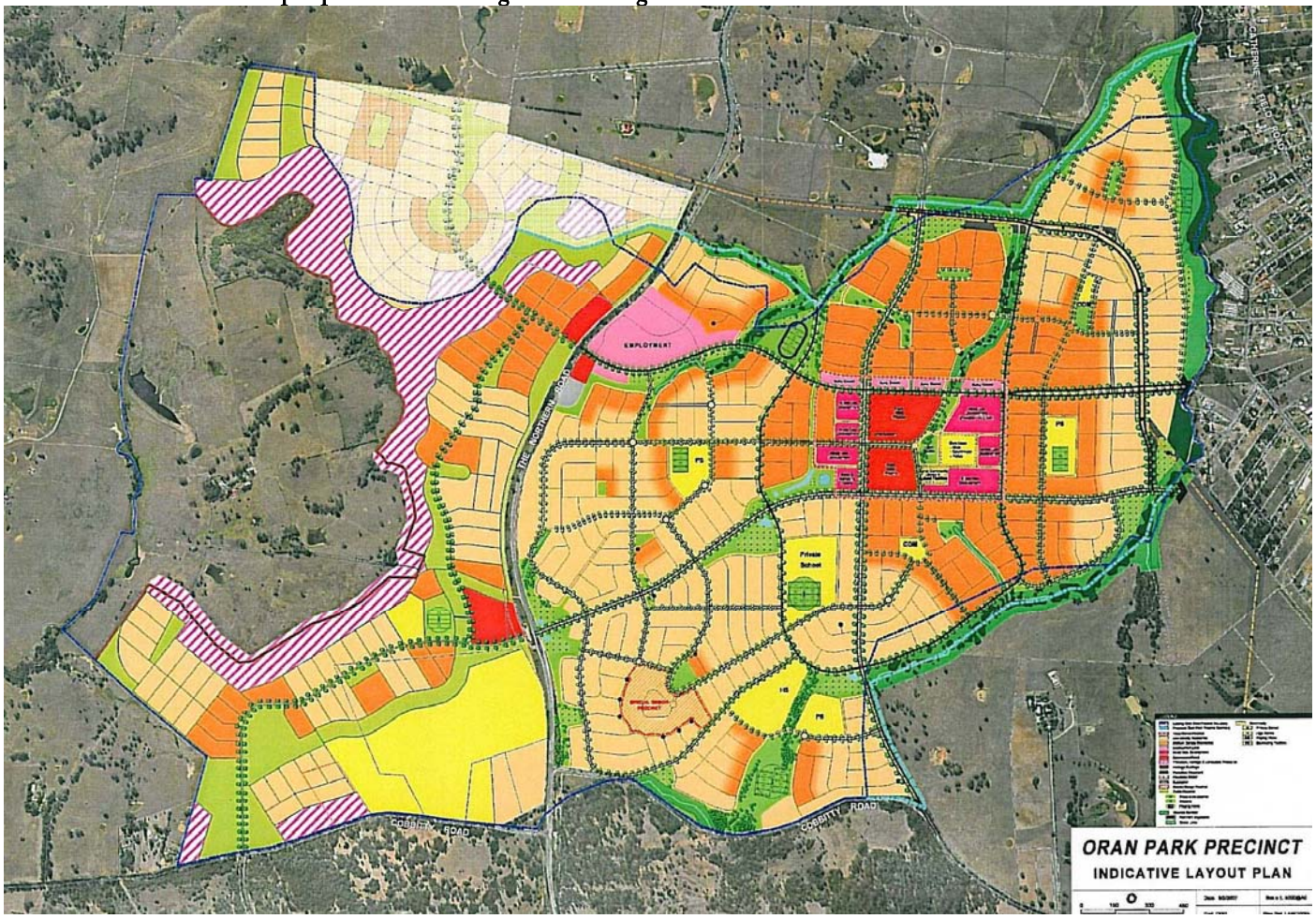


Figure 3: Indicative Layout Plan for the Oran Park Precinct. The unshaded area indicates the Denbigh curtilage. Pink hatching indicates the interface lands proposed for heritage and ecological conservation.



The first land grant of 5,000 acres in the Cowpastures area was made in 1805. Much of the land-use history known for the region comes from records related to the Macarthur property (now Camden Park). The government began expanding pastoralism in order to attain self-sufficiency within the settlement, and in 1815, Harrington Park (the original grant in which Oran Park is located) was granted to William Campbell.

Clearing and burning of the Cowpastures land grants was undertaken immediately and the area was utilised for diverse farming, including grain, meat, fruit and dairy produce. The area was subject to fires and severe drought from the late 1820s, and consistently throughout the nineteenth and twentieth centuries.

By 1841 Camden Village had been established. The area continued to be used for a diverse range of farming activities, though by the late nineteenth century, dairying had become the most profitable industry for the area. Further clearing, burning and ring-barking was undertaken at this stage to allow for an expansion in grazing and fodder crops. Severe drought in the early twentieth century provided the impetus for the construction of many more silos and dams throughout the area.

Industrialisation of rural industries took off in the 1950s, and new technology was brought to the area in relation to the dairies, orchards and irrigation systems that included the construction of large new dams.

3.2 Landscape parameters

The study area is located towards the southern end of the Cumberland Plain. The landscape comprises gently rolling hills and wide valley floors with channel and floodplain merging with a low angle colluvial slope. The Oran Park Precinct is situated on bedrock of Bringelly Shale.

The Oran Park Precinct ranges in elevation from 162m asl (above sea-level) in the northwest corner to 66m asl on Cobbitty Creek. The total relief of 96m over c.5.5km kilometres is reflected in an average slope of 2-4˚ with short segments up to 15˚ on the northern margin.

Stream Order Analysis

The Oran Park Precinct is located around the headwaters of South Creek. Steam order analysis has been used to indicate the potential distribution of Aboriginal sites across the landscape. Dr Peter Mitchell conducted this analysis using the Strahler method using 1:25k topographic maps. Constraints to this approach result from the fact that many of the first order streams are not identified on the 1:25k maps and that the Precincts are not defined by catchment boundaries. These results however, provide a broad interpretative tool which inform the results of our field investigation.

The Oran Park Precinct lies within the headwaters of left bank tributaries of South Creek and right bank tributaries of Cobbitty Creek. South Creek is variably a third or fourth order stream within the Oran Park Precinct, and provides the highest potential for containing more extensive Aboriginal sites. Only the left bank of South Creek is within the Oran Park Precinct.

Table 1: Strahler statistics for streams in the Oran Park Precinct (see Appendix 2).

Stream Order	1	2	3	4
Number of segments	42	12	4	2
Length (km)	15.9	8.2	4.1	2.9

Vegetation

According to a study of remnant bushland on the Cumberland Plain (NPWS 2000), remnant vegetation is shale hill woodland dominated by grey box *Eucalyptus moluccana,* forest red gum *Eucalyptus tereticornis*, with some narrow leaved ironbark Eucalyptus *crebra* on a few of the ridges, with patches of alluvial woodland, mainly swampy oak *Casuarina glauca* along the streams. In the past, most of the landscape has been extensively cleared but patches of regenerating woodland have become more common in the last two decades. These usually have an understorey of boxthorn *Themeda australis*. The most common weed species is African olive *Olea europaea*.

3.3 Stone Raw Materials

Silcrete was the most common raw material utilised by Aboriginal people for stone artefact production on the Cumberland Plain. Known sources include the St Marys Formation, Rickabys Creek gravels and terraces along the Nepean-Hawkesbury River, which include Agnes Bank Sand and the Cranebrook Formation. Silcrete generally occurs as pebbles, cobbles and occasionally boulders: some boulders up to 2m long have been recovered from the bed of the Nepean-Hawkesbury River (Attenbrow 2002).

Stone raw materials such as silicified tuff, silicified wood, quartz, quartzite and chert were also utilised for production of stone artefacts on the Cumberland Plain. The Rickabys Creek Gravels contain cobbles of quartzite, silcrete, chert, porphyry and igneous rock. Pebbles of igneous rock, suitable for grinding into hatchet heads, are also known to occur in gravel beds on the Nepean River.

The St Marys Formation has been mapped at the South / Eastern Creek systems downstream of the study area, at Mulgoa Creek c.18 km north of the study area and near the Georges River at Moorebank c.22km northeast of the study area. Pleistocene terraces along the channels of the Nepean River have been mapped from the junction of Nepean and Warragamba River (c.20 km northwest of the study area). Rickabys Creek Gravel is located c.24km north of the study area.

None of the naturally occurring geological materials observed within the study area (Groundtruth Consulting 2006) are rock types suitable for the manufacture of artefacts. Any artefacts identified within the study area have been imported from more distant resource locations.

3.4 Existing Disturbance

The Oran Park Precinct has been subject to a range of previous land use disturbance impacts which have affected both ground surfaces and sub-soils. Clearing, cultivation, agricultural activities and the construction of tracks, roads and farm dams has occurred across the majority of the Precinct. Extensive disturbance to the soil is also evident in relation to earthworks associated with Oran Park Raceway and the margins of The Northern Road and Camden Valley Way.

Sheet erosion during the early to mid 20th century has resulted in the effective stripping of hill crests throughout the study area. This has left the clay subsoil exposed in parts of the study area, though much of the land has recovered. Aboriginal sites are often exposed through sheet erosion, and this process has the effect of compromising the condition of, or completely destroying archaeological sites.

As a method of identifying potentially sensitive archaeological landscapes throughout the study area, basic land use mapping has been undertaken for the Oran Park Precinct by Dr. Peter Mitchell (see Appendix 2). This provided a framework with which to guide the current field investigations and initial sensitivity mapping, which has subsequently been modified according to a more detailed recording of disturbance during the current survey work.

The land use assessment draws on the *Land use and Fragmentation Study* (EDGE Land Planning 2003) and the currently accepted approach to cultural heritage management (e.g. JMcD CHM 1997, 1999, 2005a). This assessment is based on an obvious inverse relationship between ground disturbance and the potential survival of buried Aboriginal sites and is used as an indication of the potential survival and relative condition of sites. The EDGE Planning report identifies five primary land uses, four of which are identified within the Oran Park Precinct (Figure 3). These are:

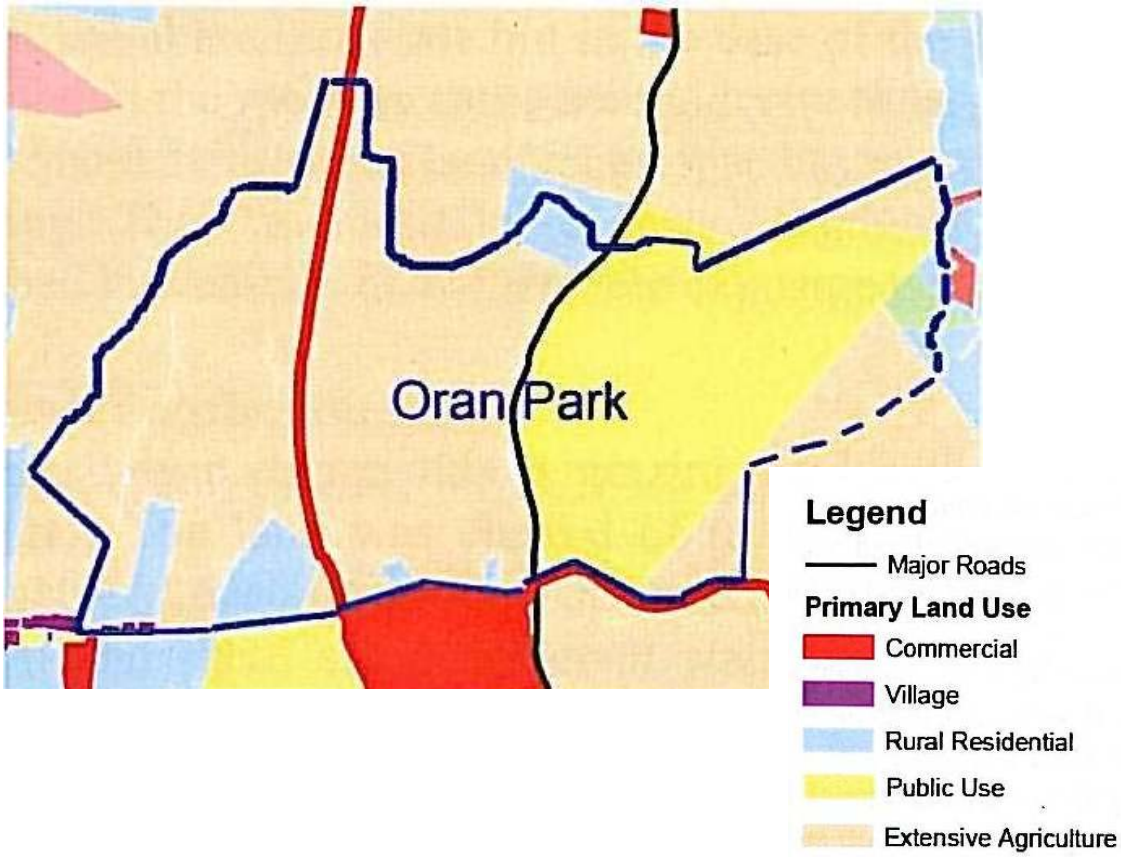
- Village
- Rural Residential
- Public Use
- Extensive Agriculture

Land identified as village land use and rural residential land use comprises an extremely small proportion of both study area. Both categories of land use are likely to be characterised by higher ground disturbance due to the construction of buildings and dams, grazing and sheet erosion. The chance of Aboriginal sites surviving intact is considered respectively to be extremely low (village land use) and low (rural residential land use).

Public land use is defined in this study as the Oran Park Raceway. The expected levels of site disturbance vary across the raceway complex. Overall the chance of Aboriginal sites surviving in these lands is considered to be moderate, although there will be

pockets of land with higher or lower potential determined by varying degrees of disturbance.

Figure 4: Principle land uses identified by EDGE Land Planning (2003) with approximate Precinct Boundaries (blue lines).



Extensive agriculture has been identified as the principle land use across much of the study area. Disturbance to this land has resulted from clearing, cultivation, grazing and sheet erosion. Areas of extreme ground disturbance are expected within these lands associated with roads, tracks, buildings, pipelines, quarries, sand pits and particularly farm dams.

A summary of these results indicates that land identified as intensive agriculture is the most likely area in which Aboriginal sites will have survived and where sites will likely be in the least disturbed condition, particularly in pockets with lower previous impacts. Public land has variable potential for containing intact deposit, but is considered to be moderate overall. Village and rural residential land has low – very low potential for containing intact deposit.

4. ETHNOGRAPHIC CONTEXT

There is considerable debate over which language groups occupied the Camden area prior to European contact and the extent and nature of territorial boundaries in the Sydney basin. This is due in part to the absence of ethnographic and linguistic study at the time of European contact and the scarcity of adequate historical documentation and anthropological interest until well after settlement of the region. Undoubtedly, there was also some confusion due to the inability of many European settlers to distinguish between tribal groups.

The linguistic evidence for the Sydney region indicates the presence of five discrete language groups at European contact (Capell 1970, Dawes 1790, Mathews 1897, 1901, Mathews and Everitt 1900, Threlkeld in Fraser 1892, Tindale 1974, Troy 1990). This evidence is sketchy, and there are conflicting views on how it can be interpreted (Kohen 1986, 1988; Kohen and Lampert 1988; Ross 1976, 1988). The boundaries between these different language groups, as well as inter-relationships between these create the greatest disagreement in archaeological and current socio-political interpretation.

Linguistic evidence collected at contact was largely in the form of unprovenanced word lists (Collins 1798: Appendix XII, Hunter 1793[1968]:523, Tench 1793[1961]:291-3), with the Dawes (1790) manuscript providing a detailed and comprehensive analysis of the Sydney (*Eora*) language, which Tindale described as a dialect of the Tharawal language.

Mathews' work in this southern part of the region defined three distinctive languages, the *Darkingung*, *Gandangara* and *Tharawal*. *Darug* was defined as a dialect of *Gandangara* (Mathews and Everitt 1900:265). These four languages did not include the coastal area north of the Hawkesbury River (specifically), where *Guringai* was spoken, possibly as far south as the northern shores of Port Jackson (Capell 1970). Mathews placed the *Darkingung* to north of the Hawkesbury River in the drainage basins of the Macdonald and Colo Rivers, Putty Creek and Wollombi Brook (Mathews 1897:1; and see Tindale 1974). Tindale (1974: 193) states their range as "at Goulburn and Berrima; down Hawkesbury River (Wollondilly) to about Camden. . .". The *Gandangara* were said to have existed in 'the coastal district ... from the Hawkesbury River to Cape Howe, extending inland to the Blue Mountains, and thence southerly ...' (Mathews and Everitt 1900:262). The *Tharawal* speaking people were spread over the coast from Port

Hacking to Jervis Bay, …extend[ing] inland for a considerable distance (Mathews 1901:127). Mathews recorded *Darug* dialect being spoken at 'Campbelltown, Liverpool, Camden, Penrith, and possibly as far east as Sydney, where it merged with *Thurrawal' (*Mathews and Everitt 1900:265).

A book of memoirs published (1914) by William Russell (Werriberri) identifies the Camden Aborigines as a distinctly separate language group and their tribal area as 'Cubbitch-barta' after its white pipe clay. William Russell recalls that 'Old Bundle' was the chief of the Camden people during the 1830's. Lists put together from the 1828 NSW census and the 1832-43 Return of Aboriginal Natives also identify the Cobbiti Barta as the name of the tribal group associated with Camden, and there are records of Old Bundle living in the area until 1843. Reverend William Ridley compiled word lists in the 19th century including an unnamed language he recorded as being spoken at George's River, Cowpasture and Appin.

Mapping and description of tribal boundaries by Tindale (1974) indicates that the Camden region was occupied by the *Dharawal* language group, their land extending south side of Botany Bay and Port Hacking to north of the Shoalhaven River and inland to Campbelltown and Camden. The *Dharug* language group also was seen as occupying country which included "Campbelltown, Liverpool and Camden". As described above, the *Gundangara* language group occupied country to the south and south-west of Camden (Tindale 1974: 193).

More recent linguistic research (e.g. Troy 1990) has shown a wide variation on the geographical boundaries of these languages and dialects, although it is likely that there were enough common words between them that the groups could communicate without too much difficulty. The geographical boundaries of language groups and territories are only indicative. The issue is subject to significant debate and the interpretation based on extremely limited historical documentation. It is important to realise that such boundaries may not have been originally well-defined or obviously delineated across the landscape.

What is apparent from the ethnohistoric and historic records is that the Camden region may have been on the periphery of the core territories of a number of separate Aboriginal groups. It seems that, at European contact, this area was close to the boundary between the Darug, Dharawal and Gandangara language groups (and see

Haglund 1989). The Narellan Valley area may also have been part of a 'travel corridor' linking the northern Cumberland Plain, the Cowpastures/Camden area and the Illawarra region (Haglund 1989).

Early contact between Europeans and the Aboriginal groups of the Cowpastures

The Camden area was first known as the Cowpastures after Governor Phillip's escaped cattle were discovered there in 1795. The six head of cattle escaped and vanished in 1788. A number of reports were made that the cattle were under the care of natives beyond the western settlements, but it was not until 1795 that two emancipated convicts were sent to find the cattle (Liston 1988). With Tharawal guides, the cattle were located in the Cowpastures. Governor Hunter visited the area to confirm the sighting shortly thereafter and found that the herd had increased significantly in number.

Early accounts of the Cowpastures noted an abundance of resources that made Camden and the surrounding areas a good prospect for European settlement and it would certainly have made an attractive area for occupation by Aboriginal groups.

Governor King sent a party led by Ensign Barrallier in 1802, to attempt a crossing of the mountains west of the Cowpastures. The party was accompanied by a number of native guides and came across a group of Aborigines, an encounter retold by King in a letter to Camden in 1805. According to this account, the chief of this particular group was *Goondel* and the surrounding country belonged to him. This is confirmed in Russell's memoirs, which cites *Goondel* as the earliest of the chiefs he remembers (Russell, 1914: 9).

A botanist, George Caley was also one of the first Europeans to venture into the Cowpastures on a series of surveys. At this time he made significant contact with Aboriginal people inhabiting the region. He recounts meeting with two Aboriginal groups whilst on a survey in 1804 (Caley's journal quoted in Design 5 2006). One group was familiar to him from previous visits and greeted him by name. This group was occupied with '*WalPonta*' at the time of Caley's visit, hunting, using fire to flush out the kangaroos.

Though there was some confusion in the midst of the fire, Caley noted that there were two distinct groups present – the individuals he recognised from previous visits being the tribe inhabiting the Cowpastures and a visiting group from the mountains. Caley is

more specific about the details of the visiting group and notes in particular the presence of a well known 'chief' '*Cannabaygal* (also known as *Cannaboygal* or *Cannamikel*). Caley spoke with *Cannabaygal* through an interpreter and observed a distinct authority in his countenance and a profound respect from the local Aboriginal group during their visitors' stay (Proudfoot 1990).

Aboriginal / European relations during initial settlement of the Cowpastures

During the initial years of expansion into the Cowpastures, relations between the Europeans and Aboriginal people were generally peaceable. John Warby was stationed in the Cowpastures from c.1802 and conducted extensive exploration of surrounding areas with the assistance of the Tharawal people (Liston 1988:50). Certain individuals are recorded as having frequently acted as guides, translators and mediators for European explorers and settlers in these initial years, particularly *Boodbury* and Old *Bundal*.

More extensive settlement of the Cowpastures continued through the early 19th century, although there was a serious drought that began in 1812 and lasted for four years. This put a significant strain on local resources, both for European settlers and Aboriginal peoples (the local groups and neighbouring groups driven from their own drought stricken lands).

The first recorded instance of open conflict in the Cowpastures occurred in 1814. After the murder of several Aboriginal people and Europeans settlers, a tribe generally agreed to be from beyond Stonequarry Creek (Jervis Bay tribe) killed a number of stockmen and waged a battle with settlers near Cawdor (Liston 1988). *Boodbury* and other Aboriginal people from the local tribes acted as mediators and translators. Five mountain Aboriginals (*Gandungarra*) were held responsible for the murder of James Daley's children at Bringelly (Atkinson 1988) and a number of the local tribe assisted in tracking the offenders, who were not found.

During this period of conflict, it was generally thought that the Camden tribe and the Tharawal were relatively peaceful and that the visiting mountain tribes and southern highland tribes were instigating the violence (Liston 1988).

The hostilities worsened in 1816, when a number of men were killed by visiting Aboriginal groups. Settlers engaged in battle with the Aboriginal men, taking a number

of local *Tharawal* men (including *Boodbury*) to fightwith them, though the visiting Aboriginal men managed to escape. In retribution, Governor Macquarie sent three detachments of the 43rd regiment to put an end to the conflict. This culminated in the massacre of 14 Aboriginal people hiding at Appin, including *Cannabayagal*, the *Gandungarra* man encountered by Caley in 1804 (Liston 1988: 52).

Continuing Aboriginal occupation in the Cowpastures

After this initial conflict, relations between Aboriginal people and European settlers in the Cowpastures were relatively quiet. There are limited records of the Aboriginal groups still inhabiting Camden, though there is evidence of Aboriginal people being employed to work as guides, farm hands, trackers and policemen and certain individuals are well known from historic documents.

Bundal is known to have accompanied expeditions as guide and interpreter in 1818 for Charles Throsby and was appointed as a constable at Narellan in 1822 (Atkinson 1988). *Bundal* was also employed as a tracker on a number of occasions, helping the police to track down thieves and escaped convicts. In 1851, 'Yellow Johnny', an Aboriginal man who worked on William Macarthur's orchard is known to have tracked down three children lost in the bush near Appin (Atkinson 1988). Another Aboriginal man, Johnny Tindal is recorded as being employed from the 1830s as a rough rider.

There are also records of Aboriginal people being employed as seasonal workers, for which they were paid in provisions. James Hassall, whose family purchased the Denbigh Property in 1826 recalls up to 200 Aboriginal people working at their estate during burning off periods (Hassall 1977).

A permanent camping place remained on Camden Park until the late 19th century. James Macarthur and his family have recounted stories of Aboriginal corroborees nearby Camden Park in 1839, 1846 and 1850. James Hassall also recalls witnessing a number of corroborees on the Denbigh Property, overlooking Cobbitty Creek (Hassall 1977). It is suggested that a ceremonial ground may have been located to the north of the Denbigh Homestead (Mary Dallas Consulting Archaeologists 2003).

Population numbers are indicative at best and derived from diaries, letters and blanket return lists. Governor Macquarie's journals list nine adults and four or five children in 1810. William Macarthur recorded 18 Aboriginal people living permanently at Camden

in 1843 (Atkinson 1988). A list compiled in 1842 records the Aboriginal population as 62, however this is the combined population of the Camden people and the people from Burragorang and Nattai, often described as one tribe due to their close relations. In 1845, the combined population was recorded as 67, including nine part-Aboriginal children. Blanket return lists from 1865 recorded the names of nine Aboriginal people living within Camden.

4.1 Social and Cultural Associations

A number of documents have been compiled in recent years detailing the ancestry of Aboriginal families living in and around the Camden district at the time of European expansion into the region. There has also been an attempt to record some of the traditional stories and significant events associated with the study area, from the early 19th century and in the more recent past.

Documentation provided by Cubbitch Barta Native Title Claimants indicates that the Cubbitch Barta people are a clan of the Dharawal language group. These people were known to early colonists as the Cowpastures people. This is supported by William Russell's memoirs and documented by lists put together from the 1828 NSW census and the 1832-43 Return of Aboriginal Natives. Cubbitch Barta records corroborees at the Denham Court property up into the 1850s. These corroborees were documented as including local Aboriginal people as well as other visiting groups.

One such story is an oral account by Jean Stewart of La Perouse, known as 'The story of the littlest Gundungaras and their great walk to La Perouse' (Illert 2005). Jean Stewart relates a story that was told to her by her aunt (Emma Timbery), which is thought to have occurred around 1890. Jane Timbery (wife of *Gundungurra* man known as Henry John Simms) died in childbirth in an Aboriginal camp in the Southern Highlands. Emma Timbery (Jane's mother), upon learning that her grandchildren had been abandoned, walked from La Perouse to find them. Emma and the three children (and possibly a fourth Gundungara child) then walked all the way back to La Perouse where she raised the children herself.

Another story documented by Chris Illert is that of Ellen Anderson (1855 – 1931), an Aboriginal woman born in Unanderra, c.7km south of Wollongong. Through the 1920's, Ellen recounted a number of traditional Aboriginal stories and stories from her

own life, which were recorded by C. W. Peck. Peck recalls a conversation with Ellen upon their meeting where she told him that her father was a king and Ellen herself a princess. According to Peck, Ellen recalled her father 'King Mickey', being crowned by the white people at Wollongong Show. Ellen went on to become one of Peck's main sources for his published Aboriginal stories and legends, many of which relate to the Illawarra and Burragorang Valley regions. An assessment of these stories has been undertaken previously (Illert 2003), which suggests that a tradition of Aboriginal storytelling continued long after European contact and the cessation of traditional ways of life.

Another such story tells of a fight for leadership after the death of 'King' Mongang in 1845. An interpretation by Illert (unpub *no date*) on behalf of the Moran Elders Council, suggests that *Murruin* and *Moyengully* were fighting for leadership of the *Gundungarra* nation. Derived largely from an account by Ben Carlton (published by William Cuneo in 1893), this suggests that a battle was waged between the two during an 'ascension' ceremony witnessed by Carlton and his father (c.1845). At this time, *Moyengully* was elected king. Within weeks, having been accused by *Murruin* of the leader's murder, a fight eventuated between the two in revenge for this death. Illert asserts that the leadership of the *Gundungarra* nation altered after this fight.

5. ARCHAEOLOGICAL CONTEXT

5.1 Regional Context

Most of the 4,000-plus archaeological sites recorded on the Cumberland Plain are open artefact scatters. There are few surviving scarred trees due to previous bushfires, land clearing and disturbance, and stone extraction sites occur in areas where there area naturally occurring lithic resources.

Various models have been proposed to explain the distribution and variability of Indigenous heritage sites across the Cumberland Plain. Haglund's (1980) model for sites in the Blacktown area stated that these would most likely occur on or near water sources, often on elevated ground. Based on a larger sample of surface scatter data, Kohen (1986) and Smith (1989) found that the primary determinant for Aboriginal open site location on the Cumberland Plain was proximity to water.

Contrary to earlier models, which tried to explain site location and variation based primarily on surface evidence, the Rouse Hill test excavation programme and further work on the Cumberland Plain has found that:

- Most areas – even those with sparse or no surface manifestations – contain sub-surface archaeological deposits;
- Where open sites are found in aggrading and stable landscapes, some are intact and have potential for internal structural integrity. Sites in alluvium possess potential for stratification;
- While ploughing occurs in many areas of the Cumberland Plain, this only affects deposit up to 30cm deep, and even then ploughed knapping floors have been located which are still relatively intact;
- Contrary to earlier models for surface open sites, many sites contain extremely high artefact densities, with variability appearing to depend on the range of activity areas and site types present;
- The complexity of the archaeological record is also far greater than was previously identified on the basis of surface recording and more limited test excavation; and,
- Gross site patterning is identifiable on the basis of environmental factors: sites on permanent water are more complex than those on ephemeral or temporary water lines.

Distance from stone raw material sources explains some variability in surface assemblages (distance-decay model). Dallas and Witter (1983) originally suggested that sites close to raw material sources (e.g. silcrete), would have more cores and knapping debitage and less utilized stone than sites further from the source. Artefacts would tend to be discarded in earlier stages of manufacture and be larger nearer the source. Since this study, many new silcrete sources have been identified on the Cumberland Plain, (Corkill 1999, JMcD CHM 1997) and there has been a series of project which have identified that the relationship between sources and the movement of material around the landscape is more complex (JMcD CHM 2005b, 2006). The model has proved less successful as more sources useable cobbles have been discovered across the Cumberland Plain.

5.2 Local Context

Previously recorded sites

A search of the AHIMS database (24.11.06) and subsequent research has identified 121 sites previously recorded within an 8 kilometre radius of the study area. These include primarily open camp sites and isolated finds (Table 1), though areas of potential archaeological deposit (PAD), scarred trees and shelters with rock art are also identified within the larger region.

Table 2: Sites within the Camden region (data derived from DEC AHIMS Register information as at 24.11.06 and review of recent reports).

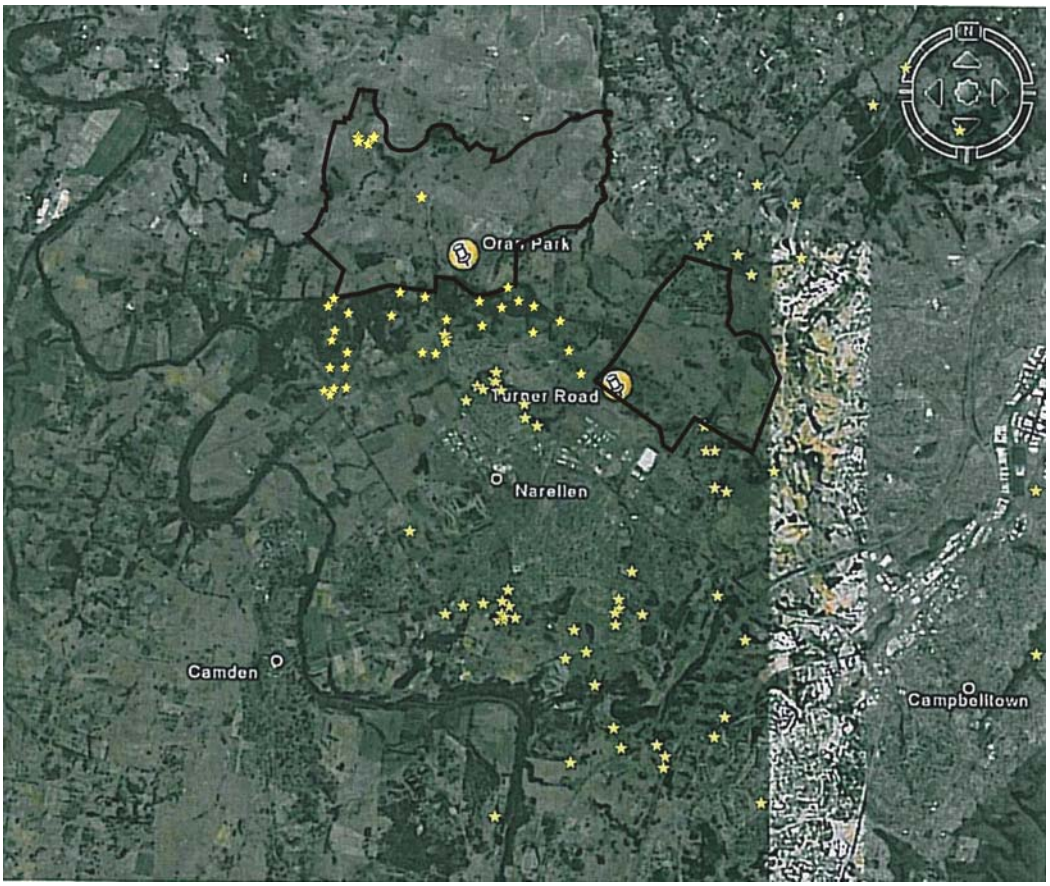
Site type	Number of recordings	*%f*
Open camp site	54	*44.6*
Isolated finds	52	*43*
PAD	12	*9.9*
Scarred Tree	2	*1.7*
Shelter with art	1	*0.8*
Total	**121**	***100***

Open lithic scatters and isolated finds are the dominant site types, accounting for 87.6% of the total number of recorded sites within the study area. These surface lithic scatters (open camp sites) comprise of mostly low density artefact scatters. PADs have been identified on the basis of landuse and landscape parameters, and are generally small (c.100m^2) areas with a high potential for containing archaeological deposit.

Carved trees (or dendroglyphs) are an extremely rare site type within Australia and are found only within south-eastern Queensland and eastern New South Wales. Of the 97 recorded carved tree sites, the majority occurred on the Western slopes and south as far as Sydney (Attenbrow 2002; Bell 1982). Ten of these sites occur within 100 km of Camden. Research into the dendroglyphs by Etheridge in the early 20th century suggested that these could be divided into two basic groups – taphoglyphs (indicating a burial) and teleglyphs (indicative of initiation sites). Based on this division, all ten carved trees within the vicinity of Camden are thought to be burial markers. One of these sites, consisting of five carved trees, is recorded as having been located c.10km north-west of the Oran Park Precinct, within the Greendale Estate near Narellan. These were recorded and donated to the Australian Museum in the early 20th century (Bell 1982).

One of the recorded scarred trees (where bark is removed for containers, canoes or shields) is located inside the Denbigh curtilage, within the Oran Park Precinct. Sites containing scarred or carved trees require trees of at least 150 years in age (or dead mature trees), allowing for the manufacture of these during the prehistoric or contact-period. Due to the extent and totality of previous land use disturbance throughout the area, these are sites locally and regionally rare.

Figure 5: Previously recorded sites within the region (AHIMS register information and more recent reports).



Previous surveys within the region

An Aboriginal cultural heritage planning study in the Camden Area c.5km south of the Oran Park Precinct (JMcD CHM 1996), made several predictions regarding the likely locations of Aboriginal archaeological sites, including:

- Significant sites were likely to occur on elevated ground associated with Narellan Creek;

- The spurs and ridges associated with the steeper Luddenham landscape group will contain archaeological sites, although they will mostly occur as lag deposits due to previous soil erosion; and,

- The alluvial sands and terraces of the Nepean River floodplain may contain significant sites, including Aboriginal burial sites, dating to between 5,000 and 20,000 years ago.

Reconnaissance of areas assessed as archaeologically sensitive located five low density open artefact scatters (Clutha 1-5), containing between 2 – 9 artefacts. Three of the open artefact scatters were associated with Narellan Creek. Four isolated finds (IF1-4) were also identified.

A survey conducted more recently (Mary Dallas Consulting Archaeologists 2003) concentrated on the area surrounding the historic Denbigh homestead. This survey, recorded several surface features, including an Aboriginal scarred tree, and four isolated artefacts. The scarred tree is described as being of definite Aboriginal origin on a eucalypt to the NW of the homestead complex. The scar was an elongated ellipse measuring 150 x 25cm with c.10cm of regrowth, a scar size indicated that the bark was procured to make a shield.

The four isolated artefacts consist of a broken edge ground hatchet and three fragments of worked glass. The hatchet is made of basalt, with grinding evident of the distal end and possible hafting notches at the proximal end. The glass has been identified as 19th century bottle glass and was considered as evidence that traditional practices continued through the Cowpastures during initial European settlement (see section 4 above).

In 2004, Central West Archaeological and Heritage Services Pty Ltd completed a desktop assessment and initial inspection (Phase 1) of the Harrington Park 2 and Mater Dei development area, immediately south of the Oran Park Precinct on the other side of Cobbitty Road. In 2006, the Australian Museum Business Service (AMBS) completed a survey of the same area (Phase 2). The combined surveys identified 30 sites and six areas of PAD. All recorded sites were isolated finds or low - very low density lithic scatters. Less than three artefacts were recorded at most lithic scatters and a maximum of 16 artefacts was recorded at any one site. Extremely low levels of visibility would have had an impact on the identification of sites and artefacts within sites,

although low numbers of artefacts within areas of relatively good exposure would seem to indicate a background scatter of artefacts across much of the subject land.

Three of the identified PADs within the HP2MD study area are concentrated on the ridgelines running through the subject land, and it is proposed that these may be a part of a larger complex of sites that encompass the series of exposures where artefacts were identified. Two PADs identified on lower ridge slope and alluvial flats are interpreted as an extension of the series of sites recorded along a drainage line to Cobbitty Creek. a spur running off the main ridgeline and one on an alluvial flat associated with Cobbitty Creek.

A 'canoe tree' (i.e. a tree bearing a scar from the removal of bark to make a canoe) recorded near Camden Park, located c.8km south east of the Oran Park Precinct, is an extremely rare Aboriginal archaeological site type for the Cumberland Plain (English 1994b). Two large scars, measuring 3-5m in length and 80cm wide, were recorded on a dead Eucalypt on the bank of the Nepean River. The site card for this scarred tree was unavailable at the time of undertaking this study and the current condition of these sites is unknown.

Menangle Park and its surrounds have been the focus of extensive archaeological work over recent decades. Twenty-two surface open sites have now been recorded within the Menangle Park release area as have a number of PAD area/sensitive landscapes (Barker 1999, Byrne 1994, Corkill and Edgar 1991, Dibden 2002a, 2002b, 2003a, 2003b; HLA 2004, JMcD CHM 1996, 2004; Kohen and Knight 2000; McDonald and Brayshaw 1983, McDonald 1990). The sand bodies along the Nepean, while seldom containing surface artefacts, have been identified as having the potential for buried camp sites and possibly human interments.

Haglund (1985) investigated the (then) proposed Mt Annan Botanic Garden and Native Arboretum. One open camp site was located consisting of a sparse scatter of artefacts, as well as six isolated finds. There was no evidence of artefact manufacture and the material was interpreted as debris left behind from hunting and gathering trips through the area. It was noted that the locations more favourable for camp sites and thus more likely to contain higher density sites had been significantly disturbed by previous land use.

A survey for the upgrading of West Camden Sewerage Plant (Oakley 1993), undertaken c. 6km south west of Oran Park, did not identify any Aboriginal sites, but assessed the entire study area as archaeologically sensitive.

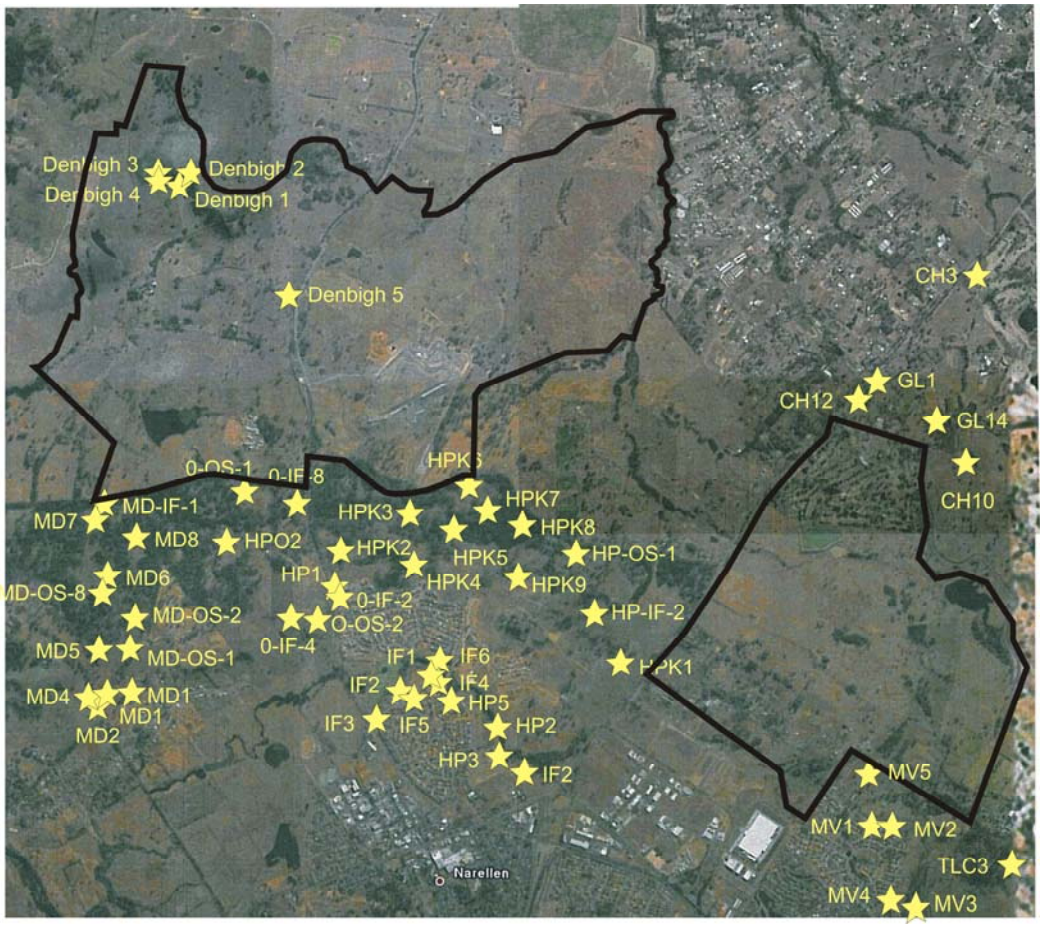
Surveys related to the Camden Gas Project (Dibden 2003a, 2003b) occurred from c.5km south of the Turner Road Precinct. Twenty sites were located on both sides of the Nepean River in the vicinity of Camden and Menangle Parks. These consisted of 12 open lithic scatters, seven isolated finds and one scarred tree. Four of the open lithic scatters were assessed as having moderate archaeological significance and the remaining sites assessed as having low or undetermined archaeological significance.

The Narellan Creek Valley, located c.2km south of the Oran Park Precinct, was surveyed in the early 1980s (Hanrahan 1981, 1982a, 1982b). Eight sites were located during the course of three surveys. Site 2 was described as a dense, localised scatter of artefacts and was subsequently excavated. The remaining seven sites were described as minor, sparse artefact scatters, though site five was also subsequently excavated.

Manooka Valley is located immediately adjacent to and east of the Turner Road Precinct. Two surveys here (JMcD CHM 2000, 2001) located two open camp sites (MV3 and MV5) and three isolated finds (MV1, MV2 and MV4). These sites were located on hillslopes in disturbed contexts, with 1st and 2nd order ephemeral creeks providing the closest water sources. This was interpreted as a sparse background scatter of material, conforming to the general prediction for the area that evidence will be sparse in the vicinity of temporary water sources.

There have also been a large number of surveys undertaken within the area that have failed to locate any surface sites or areas of potential archaeological deposit. This may have been for reasons relating to visibility (Kohen & Knight 2000; Lee and Somers 1999; Crew 1989; Corkill 1992; Oakley 1993), erosion (Therin 1998; Dallas 1986), land-use disturbance (Byrne 1987) or environmental reasons (McDonald 1992; Dibden 2000, 2001b, 2002a, 2002b; Corkill 1992). This scarcity of artefactual material across the Camden area may also be the result of differential use of the landscape, whereby the majority of the landscape was occupied on a rare, seasonal or short-term basis and artefactual material simply did not accumulate in these areas.

Figure 6: Previously recorded sites within and close to the study area



Previous sub-surface investigations within the region

Three sub-surface investigations have so far been conducted within the Camden area. Test excavations have been conducted within the Narellan Creek Valley, located c.1km south of the Oran Park Precinct (English 1994a; English and Gay 1994; Haglund 1989; Hanrahan 1981, 1982a, 1982b) and further south within Menangle Park (Corkill and Edgar 1991).

Site HP4 (PAD 1 as identified in English 1994) is located c.1.5km south of the Oran Park Precinct, associated with Narellan Creek and was excavated in 1994 (English and Gay 1994). HP4 was found to contain a high density of lithic material with a total of 98 artefacts retrieved by excavation and three by surface collection. Silcrete was the dominant raw material (81%), followed by indurated mudstone (11%), quartz (5%) and fine grained siliceous material (3%). A variety of tool types were recovered, including

backed artefacts, which was taken to indicate that occupation of the site had occurred within the 3-5,000 years before present (English and Gay 1994).

In 1989, Sites N2 and N5 were excavated c.3km south of the Turner Road Precinct within the Narellan Creek Valley, on either side of Narellan Creek (Haglund 1989). Site N2 was located at the junction of Narellan Creek, and a large tributary, c.1.3km south of Camden Road. A total of 259 artefacts were recovered from site N2, including a ground edge hatchet and a hammerstone. Silcrete dominated the assemblage (66%), followed by indurated mudstone (24%) and quartz (10%). A variety of tool types were recovered, including backed artefacts. Site N5 was located c.1km further south, east of a large dam. A total of 41 artefacts were recovered from site N5, a total too small for detailed statistical analysis, though with similar ratios of raw material and tool types to that of N2.

The density and type of material recovered from N2 suggested repeated occupation over a considerable period of time. The presence of a backed artefact assemblage was interpreted as indicating occupation of the site was concentrated within the last three millenia. Site N5 was interpreted as representing short term camps by occasional small groups or individuals. Furthermore, it is suggested that the sites identified by Hanrahan (1982a) represent a network of occupation, with site N2 representing a focal point, around which was located a spread of less permanent camp sites occupied by smaller groups.

Further south, c.10km south of the Oran Park Precinct and within Menangle Park, Sites Menangle Park 1, Menangle Park 2 and Menangle Park 3 were excavated in 1991 (Corkill and Edgar 1991). Menangle Park 1 was located on a ridge spur c.1km north of the Nepean River. Three artefacts were recovered from a surface collection. Given the disturbed nature of the site, excavation focused on a flat section of the spur c.300m west of MP1. Seven artefacts were recovered from this area. A transect linking this area with MP1 recovered no artefacts and so the area of artefact recovery was designated a separate site (MP3). Menangle Park 2 was located within a shallow valley c.2km north of the Nepean River. A total of 18 artefacts were recovered from MP2 by means of surface collection, ninety-five shovel probes and six 0.25 square meter trenches.

Silcrete was the dominant raw material in all excavated and surface collection assemblages, followed by indurated mudstone and with a small quartzite component.

All of the Menangle Park sites were subject to disturbance and were assessed as being in poor condition and with low archaeological potential. The two excavated sites (MP2 and MP3) contained low density assemblages consisting primarily of unmodified silcrete flakes and were considered unsuitable for determining the age or use of these sites.

Previous work indicates that the archaeology of the local area is best described as a sparse scatter of artefacts across the landscape, with larger concentrations of artefacts (interpreted as larger camp sites) found near major watercourses and favourable geological and environmental factors. The absence of extensive open area excavation (as has occurred across the northern Cumberland Plain over the last 15 years) precludes more definitive statements – and suggests that our understanding of the archaeology of the area is as yet poorly understood.

5.3 Predictions for sites in the regional context

Based on previous work in the region and using general stream order models (after Schrever 1966 and Strahler 1952, McDonald and Mitchell 1994) it has been predicted that within the Oran Park Precinct, archaeological features will vary according to gross geomorphological factors and proximity to water.

Stream order identification can assist in the prediction of variability in the archaeological record, given the low levels of surface exposure across the Precinct during the current survey. Predictions for how the archaeological record will be subject to the effect of landscape parameters include:

- Areas of archaeological potential occur wherever there has been limited prior disturbance;
- The nature of sites within these areas of potential is likely to vary: the model used here is aimed at predicting the likely nature of sites across the study area in terms of landscape features;
- The nature (density and complexity) of archaeological evidence will vary according to the permanence of water (i.e. stream order), landscape unit and proximity to lithic resources in the following way;

- In the headwaters of upper tributaries (first order creeks) archaeological evidence will be sparse and represent little more than a background scatter;
- In the middle reaches of minor tributaries (second-order creeks) there will be archaeological evidence for sparse but focused activity (e.g. one-off camp locations, single episode knapping events);
- In the lower reaches of minor tributaries (third order creeks) there will be archaeological evidence for more frequent occupation. This will include repeated occupation by small groups, knapping floors, and evidence for more concentrated activities;
- On major creek lines (fourth / fifth order creeks) there will be archaeological evidence for more permanent or repeated occupation. Sites will be complex and some may be stratified, depending on sedimentation processes; and
- Creek junctions (confluences) may provide foci for site activity. The size of the confluence (in terms of stream ranking nodes) could be expected to influence the size and /or complexity of the site.

- Ridge top locations between drainage lines will usually contain limited archaeological evidence, although isolated knapping floors or other forms of one-off occupation may occur in such locations;
- Where naturally outcropping lithic resources (such as silcrete) occur, these will have been exploited. Evidence for extraction activities (decortication, testing and limited knapping) would be expected in such locations, as might more general occupation evidence;
- Sites in close proximity to an identified stone raw material source would cover a range of characteristics relating to artefact size and retention of cortex. As a general rule, the general size of artefacts in an assemblage should decrease, as should the percentage of cortex with distance from source.

5.4 Sensitivity Mapping

Initial sensitivity mapping was done based on an interpretation of aerial photos and topographical maps and the land use assessment undertaken by Peter Mitchell. This exercise was aimed at developing a more detailed assessment of archaeological potential.

The assessment of sensitivity is based on a consideration of land use impacts, practical landscape parameters and high value landscapes (i.e. locally or regionally threatened). Threatened landscapes across the Cumberland Plain generally include first order tributary creeklines, shale ridges and low ridge tops, and shale hillslopes, all of which are present within the current study area.

The archaeological sensitivity for the Oran Park Precinct was also reassessed during the current fieldwork. Areas of higher archaeological potential were identified on the basis of landscape parameters and sites showing indications of occupation within these landscapes. Areas with rare or unusual site types are of higher archaeological sensitivity than would otherwise have been discernable through mapping based primarily on land use. Moreover, some disturbance was encountered on the ground that was not discernable from an aerial photo interpretation and the sensitivity mapping has been adjusted accordingly. This more detailed understanding of the land use disturbances throughout the Oran Park Precinct will provide a more useful method for assessing the archaeological sensitivity of sites and landscapes given the extremely low levels of visibility across the Precinct.

None of the land within the Oran Park Precinct remains in pristine condition, and the entire precinct has been subject to a range of previous land-use disturbances. Some of the landscapes however, are in significantly better condition than others and zoning has been undertaken accordingly.

- Zone 1 is land with high potential for containing intact archaeological deposit;
- Zone 2 is land with good potential for containing intact archaeological deposit;
- Zone 3 is land with moderate potential for containing intact archaeological deposit; and
- Zone 4 is land with low potential for containing intact archaeological deposit.

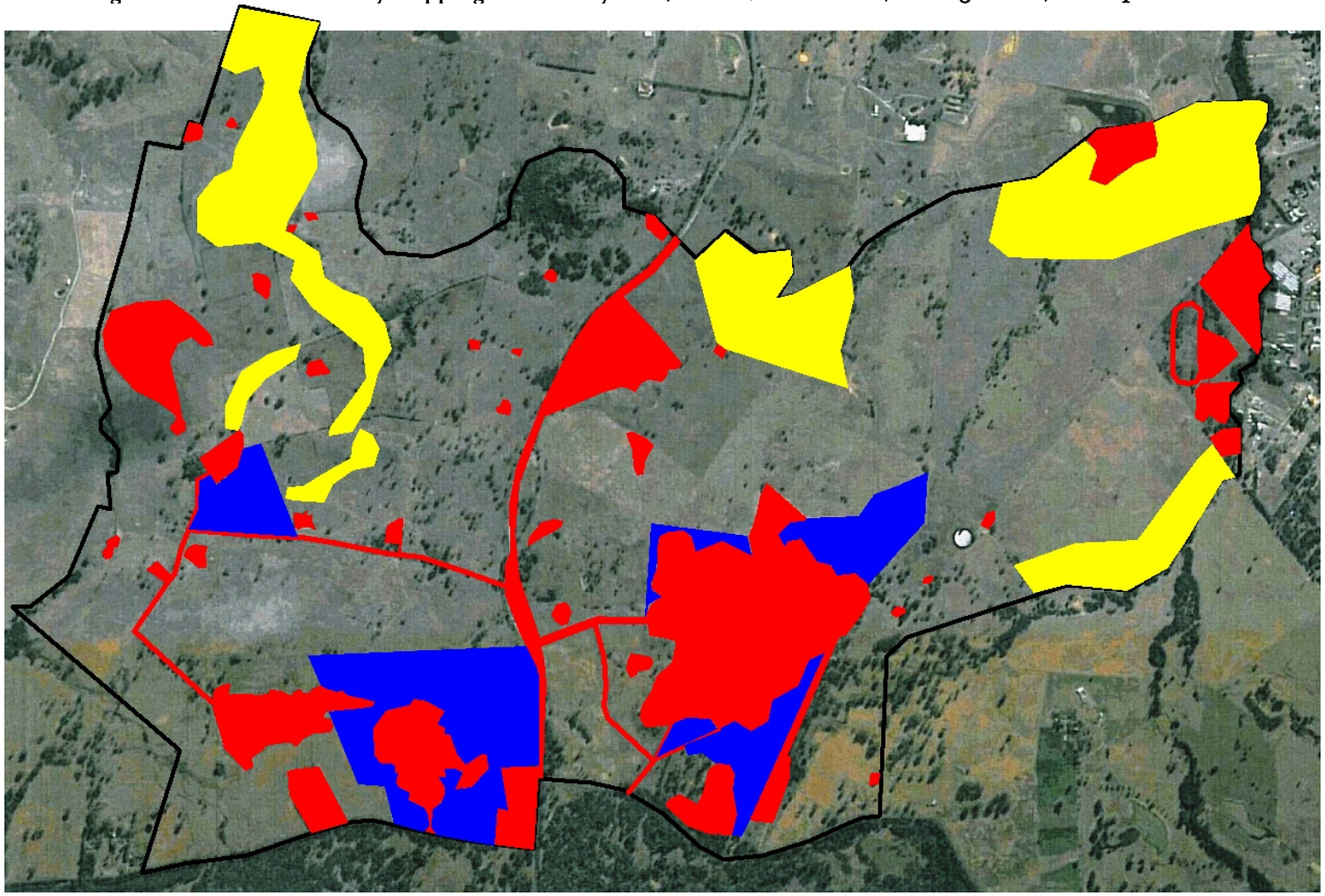
The sensitivity assessment for the Oran Park Precinct identified four general areas with high potential for containing intact archaeological sites. Within the Denbigh side of the Oran Park Precinct, the best PAD is concentrated on the ridge tops surrounding the Denbigh homestead and some of the associated upper ridge slopes.

Within the Oran Park Raceway land, three areas of high potential archaeological deposit have been identified. One of these is on a major fifth order creek line, at the junction of South Creek and a high order tributary. While the eastern bank of South Creek would likely be the focus of concentration given the proximity to the junction of other high order streams, archaeological evidence was recorded along the west bank: the east bank is outside the current study area. The remaining two areas of PAD are located in the headwaters and middle reaches of first and second order creeks that ultimately feed into South Creek c.1km and c.200m away respectively. Within Oran Park, c.15% of the land has been identified as having high archaeological sensitivity (Table 4). The majority of the land (59%) is agricultural and has been identified as having good potential for containing intact archaeological deposit.

Table 3: Summary of sensitivity mapping results for the Oran Park Precinct.

Zone	Area (ha)	%
Zone 1	163.8	14.6%
Zone 2	659.8	59%
Zone 3	96.9	8.7%
Zone 4	198.5	17.7%
Total	1119	100

Figure 7: Oran Park ground-truthed sensitivity mapping. Zone 1 = yellow; Zone 2 = no colour; Zone 3 = blue; Zone 4 = red.



6. METHODOLOGY

Given the size of the Oran Park Precinct, the subject land was inspected by a combination of vehicle and pedestrian survey. Areas where there was zero ground surface visibility were transected by car to identify the location of any ground surface visibility. Exposures were then investigated on foot for the possible presence of artefacts and grinding grooves.

Some of the land within the Denbigh curtilage was not inspected during the current field survey, as access to the land around the Denbigh homestead was restricted. This land however, was the subject of a previous investigation (Mary Dallas Consulting Archaeologists 2003) and as the results of this previous investigation were consistent with the current brief for the Oran Park Precinct, it was decided the relatively recent, previous survey did not need to be replicated.

Creek banks, creek beds, drainage channels and artificial dam walls provided the largest exposures within the two Precincts, and these areas were covered by a completely pedestrian survey. Exposures also occurred as a result of vehicle and animal tracks, salt scars, patchy areas of sparser grass, extensive sheet wash, disturbance associated with the construction of buildings and infrastructure and erosion due to high pedestrian traffic. All of these exposures were inspected closely on foot.

Much of the vegetation within the Oran Park Precinct is relatively young regrowth vegetation, but isolated stands of old growth trees are present. All old growth trees were carefully inspected for scars.

Definition of Sites

Isolated Finds are single artefacts identified more than 100m from any other identifiable archaeological feature.

Open Camp Sites are recorded when multiple artefacts are located within 100m of each other in an open area (i.e. not a rockshelter).

All artefacts are documented individually (isolated finds and open camp sites), and a number of attributes (colour, material, artefact type, dimensions, retouch and usewear) recorded for each artefact. Stone was not recorded as artefactual unless it was

demonstrably flaked or ground. Isolated non-artefactual fragments of quartz and silcrete do occur sporadically across the landscape, but were not recorded as archaeological sites.

A number of scarred trees were identified during the current archaeological investigation. It is likely that some of these scars are of a modern or natural origin and a set of criteria developed by Navin Officer (1997: 14-16) and used subsequently (JMcD CHM 1999) to distinguish between natural, historic and Aboriginal scars have been applied here.

Criteria:

Distance from ground level: Aboriginal scarred trees do not usually run to ground level, though there are some accounts of canoe manufacture scarring trees to the ground. Where they do occur, the sides must be relatively parallel (i.e. not triangular). Scars resulting from fire, fungal attack or lightning nearly always reach the ground.

Symmetry: Aboriginal scarred trees should have roughly parallel sided or concave symmetrical sides. Few natural scars are likely to have these properties, although fire scars may be symmetrical, but are usually wider at their base.

Outline: Aboriginal scarred trees should have a reasonably regular outline and regrowth. Natural scars tend to be more irregular.

Symmetrical ends: Aboriginal scarred trees should be symmetrically shaped at each end of the scar. Different shapes at the top and bottom are more likely the result of natural processes.

Axe marks: A scar with cut marks on the original wood is likely to be the result of human modification. The type of axe marks that occur may lend support to the scar's origin (i.e. stone axe marks suggest an Aboriginal origin, while steel axe marks post-European, could be Europen or Aboriginal post-contact).

Age of the tree: An Aboriginal scarred tree should be old enough to have been used in a traditional or semi-traditional manner (i.e. at least 150 years old). The age of the scar should be reflected in the thickness of the regrowth. Young natural scars generally have thin regrowth.

Type of tree: The tree should be native to the region.

These seven criteria are used to provide an indication of the likelihood of a scar being of Aboriginal origin. Three rankings are thus used (after JMcD CHM 1999) to assess any scarred trees encountered during the current archaeological investigations.

Definite Aboriginal scar: conforms to all of the criteria stated above. All conceivable natural causes of the scar can be reliably discounted.

Probable Aboriginal scar: conforms to most of the criteria, where an Aboriginal origin is thought to be most likely. Natural origin of the scar cannot be ruled out.

Possible Aboriginal scar: conforms to most of the criteria, where an Aboriginal origin cannot be considered more likely than natural causes. The characteristics of this scar will be consistent with a natural cause or with its production during modern times.

A number of the stakeholder groups were interested in finding and recording the site of corroborees that reportedly took place during the time of James Hassall (discussed above). Though the area was closely inspected for any signs of such activity, none were encountered.

Rock 'circles' initially identified by Ms. Daniella Reverbere were subsequently inspected by Jo McDonald, Amy Stevens, Des Dyer and Ron Workman. The feature observed during the survey was confirmed as being part of a more extensive outcropping of stone along this ridgeline. Its cultural origin was discounted by all, including Ms. Reverbere.

7. RESULTS

A total of 44 sites and four areas of potential archaeological deposit (PAD) were recorded within the Oran Park Precinct during the current survey. Five of these sites were originally identified by Mary Dallas Consulting Archaeologists (2003) and were relocated for the purposes of a condition report. One of these previously recorded sites was unable to be relocated.

A range of sites were encountered across the Oran Park Precinct, including surface open lithic scatters, isolated surface finds, scarred trees and flaked glass artefacts (indicating a contact site). Open lithic scatters were generally low density, with one very high density site (OPR/15) located in the north east of the Precinct. There were many

extensive exposures surveyed during the current fieldwork where sites were not identified and sites tended to be concentrated in the immediate vicinity of tributaries and drainage channels.

Effective survey coverage for the Oran Park Precinct was generally low - very low. The majority of the ground surface across the Precinct was obscured by dense vegetation (grass and weeds). Exposures occurred as vehicle tracks, narrow animal tracks, salt erosion scars, artificial dam walls, disturbance associated with the construction of houses, race track, schools and associated buildings, occasional more patchy grass cover and the eroding banks of creeks, tributaries and drainage channels.

In an effort to calculate effective survey coverage, ground surface visibility was recorded at a general percentage level for most of the precinct, and more specifically in the location of archaeological sites. Visibility was zero – low across the majority of the study area. Where exposures occurred, they were generally in eroding landscapes (tracks, salt scars, erosion scars, sheet wash, channelised creek lines) or due to artificial exposure of the subsurface (dam walls, modified creek lines).

Sites were recorded on less than 50% of the exposures encountered, and sites do appear to be primarily concentrated in proximity to higher order creeks and at the junction of lower order tributaries. Sites identified further from water sources are commonly isolated finds and / or scarred trees.

Table 4: General visibility across the Oran Park Precinct

Visibility Zone	Surface Visibilty	%	Exposures
Zero	0	49	None – dams, dense grass, roads, buildings
Very low	1-5%	30	Patchy grass
Low	6-20%	10	Patchy grass, overgrown tracks
Moderate	21-50%	<1	Patchy grass, creek banks, overgrown tracks
High	51-75%	<1	Tracks, creek banks, dam walls, sheet wash, erosion
Very high	76-100%	<1	Dam walls, sheet wash, erosion scars

Around half of the identified sites (21 out of 44) will be impacted upon by development as proposed in the Indicative Layout Plan (Figure 1). Sites that will not be impacted are those within the Denbigh curtilage and potentially those within the riparian corridors along creeks and tributaries. The archaeological potential of these sites and PADs has been assessed on the basis of sensitivity mapping and predictive modeling.

Plate 1: Typical level of exposure across the Oran Park Precinct. Narrow cattle track runs along boundary fence and wild olives – grass cover restricts visibility across rest of paddock.

Plate 2: Exposure along low order tributary to South Creek. Typical of the patchy, eroding nature of exposures across the Oran Park Precinct.

7.1 Previously identified sites

An archaeological assessment undertaken by Mary Dallas Consulting Archaeologists (2003) identified five sites within the Denbigh curtilage. These included one scarred tree, a basalt hatchet and three pieces of flaked glass. Four of these sites were relocated, based on photographs and the recollection of Glenda Chalker who was present on both surveys. One of the flaked glass artefacts were unable to be found during the current survey.

Denbigh 1 Basalt hatchet

MDCA (2003) Description of site:

Broken edge-ground hatchet found in a burnt out tree stump approximately 30m due south of a partially built recent slab shed on the site of a previously removed cottage, in the hills to the NNE of the main homestead complex. The stump, located at the southern margin of a tree line of introduced olive trees contained ash, fragments of sandstone and metal adze head. The artefact is a basalt handaxe with a broken edge which had been reused as an adze.

Dimensions: 105 x 56 x 38mm

Grinding visible on the distal end within a triangular area on one side surface 50 x 25mm; opposite side surface broken away; possible hafting notches at the proximal end; possible anvil pitting.

Site relocated: UTM AGD66 56 288640E 6236213N

Current observations: Hatchet relocated in the middle of a grove of wild African olives. Ashy deposit within burnt out tree stump is being washed down slope and the metal adze head was c.50cm from burnt out tree stump. Hatchet partially buried still within tree stump.

Denbigh 2 Bottle glass artefact

MDCA (2003) Description of site:

Worked fragment of green-black bottle glass located on an exposure near gate to NNW of aforementioned shed. Glass appears to be from a relatively large alcohol bottle c.19th century. Aboriginal modification occurs as stepped working along one side on the bottle base.

Bottle base fragment 52 x 39 x 10mm

Site relocated: UTM AGD66 56 288640E 6236273N

Current observations: Artefact relocated on track, near gate of paddock adjacent to shed.

Denbigh 3 Bottle glass artefact

MDCA (2003) Description of site:

Worked fragment of green-black bottle glass base located within an area of land subsidence in the vicinity of the former 19th century orange grove and vineyard. Aboriginal modification occurs as pressure flaking on the interior surface of the rounded base fragment.

Dimensions: 45 x 52 x 14 (max) – 5 (min) mm

Denbigh 4 Bottle glass artefact

MDCA (2003) Description of site:

Worked green-black 19th century glass bottle base located approximately 50m due south of artefact 3. Bottle base appears to have been used as a core - ~7 blade scars visible on the exterior surface of the body of the bottle above the base.

Dimensions: 85 – 90mm in diameter; approximately 55mm of the wall of the bottle preserved above the base.

Site relocated: UTM AGD66 56 288463E 6236267N

Current observations: Artefact relocated in long grass surrounded by wild African olive thickets, immediately north of animal track running generally north – south.

Denbigh 5 Scarred Tree

MDCA (2003) Description of site:

Scarred Eucalypt (possibly Redgum) on top of ridgeline to NW of homestead complex. Tree is 20m tall, 4500mm circumference at the scar and a large part of the crown had fallen away. Scar located on east facing side of tree, base of scar 1300mm above ground level. Scar was elongated elipse, 1500mm long with a max width of 250mm. Approximately 100 – 150mm of regrowth, some rot in the lower south margin. Size of scar may indicate that the bark was procured to make a bark shield.

Site relocated: UTM AGD66 56 289050E 6235780N

Current observations: Scarred tree relocated on ridgetop northwest of small house. Scar is currently obscured and not easily accessible due to large fallen branches and thick vegetation surrounding tree. According to the current assessment criteria, Denbigh 5 is a Probable Aboriginal Scar.

7.2 New recordings

A total of 38 previously unrecorded sites were identified within the Oran Park Precinct. Twenty four of these were located on the Oran Park Raceway side of the Northern Road and were assigned the prefix OPR-. Fifteen sites were located on the Denbigh side of The Northern Road and were assigned the prefix OPD- or OPM-, depending on their location within the Denbigh property or the Macarthur Anglican School.

Sites were numbered sequentially during the field investigation. Upon review at the completion of fieldwork, a number of sites were amalgamated based upon their proximity and location within a landscape unit (i.e. if they were less than 100m apart and within the same landscape).

OPD – 3 Isolated Find 56 289341E 6235649N

Single artefact eroding from small exposure between two forest red gums c.50 m west of N-S running fence and east of ridgeline.

Red silcrete flaked fragment (1-2cm)

OPD – 4 Open Lithic Scatter 56 288431E 6235337N

Low density lithic scatter in midst of sparse grove of eucalypt trees, SE of ridgeline. Patchy visibility, only c.10% ground surface visibility within exposure due to grass, weeds and leaf litter. Northern extent of scatter is at 289490E 6235449N.

1 x red silcrete core fragment with c.25% cortex.
1 x red silcrete backed artefact with usewear; 2.8 x 1.9 x 0.4cm
1 x red silcrete fragment with cortex (c.10% along margin); 1-2cm.
2 x red silcrete fragments (<1cm); 1 x silcrete fragment (1-2cm)

OPD – 5 Isolated Find 56 289458E 6235843N

Artefact located at base of large Eucalypt in c.1m exposure around tree. Site is in the middle of sparse grove of gums – 6 trees, c.250m NW of bend in The Northern Road, c.120m NW of dam and c.50m north of associated drainage channel.

1 x red silcrete flake with focal platform and feather termination; c.80% cortex on dorsal surface. Retouch along all edges.

OPD – 6 Open Lithic Scatter 56 289310E 6236295N

Low density lithic scatter with artefacts visible on erosion at edges of tributaries and at junction of tributaries south of dam in paddock c.1.2km north east of Denbigh homestead. Bank of tributary is a red / brown sandy loam, with some red clay eroding.

1 x red silcrete thumbnail scraper; 1.5 x 1.7 x 0.3cm
2 x tuff fragments (1-2cm); 1 x tuff fragment (2-3cm)
3 x quartz fragments (<1cm); 2 x quartz fragments (2-3cm)
(Possible slightly beyond our northern boundary).

OPD – 7 Flaked Glass / Open Camp Site 56 288624E 6236193N

A high number of pieces of flaked bottle glass occurring within an area c.100 x 200m on ridge top and upper ridge slopes, where thickets of wild African olive occur in varying density across the identified area of exposure. MDCA Sites Denbigh 1, 2, 3 and 4 are incorporated within the larger OPD – 7 Site and generally mark the northern and eastern boundaries of the visible scatter.

Originally recorded as a series of isolated sites, these artefacts were grouped into one site on the basis of their proximity and landscape parameters. The majority of artefacts are located on the steeper, west facing ridge slopes, but artefactual glass and stone is almost certainly being moved down the steep slopes from the ridge top, and it was likely on the level ridge top that any occupation would have been concentrated. The total area of the site has mixed land use disturbance, with some of the site retaining high archaeological potential and some of the site having been subject to serious disturbance related to the terracing of the ridge slopes and the construction of a slab hut and boundary fences.

Artefacts include:

One piece of green / black bottle glass with stepped working along external top of glass fragment around whole piece. Pont protrudes to maximum height of fragment.

Dimensions: 7.6 x 5.5 x 4 (pont).

One piece of green / black bottle glass. Flaking from external body of fragment, 11 distinct scars along half of bottle, appears to have been used as a core, with blade scars evident.

Dimensions: 7.8cm diameter, max height 4.6cm – body of bottle remaining.

One piece of green / black bottle glass with stepped working along internal top of Pont, and negative blade scars from external top of fragment.

Dimensions: 8.6 x 4.5 x 4.7cm

One piece of much younger brown bottle glass, which is a part of the base of a relatively small bottle and retains one distinct blade scar on the external surface, from the top of the fragment.

Dimensions: 5 x 3.3 x 0.8cm

One piece of olive green bottle glass with stepped working from the external and internal surface of the top of the fragment.

Dimensions: 4.2 x 2.4 x 0.9cm

One piece of green bottle glass with percussion flaking to the edge of the top (body) margin from the internal and external surfaces.

Dimensions: 4 x 3 x 1.8cm

One piece of green / black bottle glass. Base of bottle, c.70% intact, which may have been used as a core, with 4 distinct negative blade scars.

Dimensions: 7.6cm diameter, 4cm maximum wall height, 1.3cm maximum thickness.

One piece of olive green bottle glass with percussion flaking from top exterior of bottle. Tiny lip of base remains, appears to be a very small circumference.

Green / black glass, small fragment of bottle base with small (c.1.8cm) amount of body remaining. Percussion flaking from top exterior surface of fragment.

Dimensions: 7 x 2.2 x 1.8 cm

Green / black glass, c. half of bottle base with pont and c.4.5cm of body remaining. Glass may have been used as a core, with two blade scars visible, flaked from the external surface of the top section of bottle body.

Dimensions: 7.8 x 4.4 x 4.6 cm

1 x red silcrete fragment (1-2cm)

1 x basalt edge-ground hatchet; 11.1 x 6.2 x 3.3cm; opposite side broken along entire length; grinding visible along one margin of the basalt piece.

Plate 3: Flaked bottle glass that appears to have been used as a core – 11 blade scars visible around base of bottle.

Plate 4: Basalt edge-ground hatchet recorded as part of site OPD-7. Grinding visible on bottom margin .

OPD – 12 Isolated Find 56 288382E 6235590N

Artefact on bank of drainage channel running down gully between lower slopes of ridge lines. Lying on topsoil with some evidence of topsoil being washed down slope. North of small grove of wild African olives.

1 x red silcrete distal flake with feather termination.

OPD – 13 Open lithic scatter 56 288072E 6236476N

Artefacts eroding from banks of dam and drainage channel running generally N – S, c.1.2km North of Denbigh homestead and c.250m south of transmission line. Northern extent of site is the bank of a dam, southern extent of site (288064E 6236046N) is on east bank of drainage channel underneath and east of a large eucalypt and thicket of wild African olives.

1 x white tuff fragment (1-2cm)
1 x pink silcrete fragment (1-2cm)
1 x pink silcrete core with three multidirectional negative flake scars

OPD – 14 Isolated Find 56 289547E 6234722N

Artefact located on exposure / strip along fence line bordering The Northern Road (c.70m to the east), south of private road – main access to Denbigh homestead (c. 40m to the north). Sporadic gums to the south (c.20m), associated with drainage channel running E – W under The Northern Road.

1 x red silcrete flake with wide area platform and feather termination; 0.5 x 1.5 x 0.4cm

OPD – 15 Open Lithic Scatter 56 288517E 6233980N

Low density artefact scatter located on series of exposures associated with SE bank of dam SW of Macarthur Anglican College. Artefacts also visible on both sides of drainage channel running SW – NE to dam. Area of site is c. 40 x 25m, located c.250m north of The Northern Road and c.400m NE of junction with Cobbitty Road. Visibility is c.75%, restricted by sporadic grass and weeds, no visibility in surrounding area. One tuff fragment also located c.100m west of main site, exposed in area of sheetwash.

1 x purple silcrete core with two negative flake scars (unidirectional)
1 x grey silcrete flake with gullwing platform and step termination; 1.6 x 1.2 x 0.5cm
1 x grey tuff flake with focal platform and step termination; 2 x 1.5 x 0.8cm

2 x quartz fragments (<1cm); 3 x quartz fragments (1-2cm); 1 x quartz fragment (2-3cm)

1 x quartzite fragment (2-3cm)

2 x silcrete fragments (<1cm); 6 x silcrete fragments (1-2cm); 2 x silcrete fragments (2-3cm)

1 x tuff fragment (<1cm); 2 x tuff fragments (1-2cm); 1 x tuff fragment (3-4cm)

OPD – 16 Isolated Find 56 289512E 6234044N

Artefact is located in small exposure with c.20% visibility between two young regrowth box gums, c.25m from rear boundary fence of 645 Cobbitty Road.

1 x pink quartzite proximal flake with wide area platform and c.10% cortex along margin.

OPM – 1 Isolated Find 56 289581E 6234536N

Artefact located on small exposure (c.5 x 10m) along fence line of north east paddock of Macarthur Anglican College, c.1m from fence line adjacent to Denbigh property and c.20m from The Northern Road. No visibility in surrounding area, c.40% visibility across exposure due to grass and weeds.

1 x cream tuff flake in two pieces – conjoined cone split flake with focal platform and step termination; 2.2 x 1.4 x 0.4cm

OPM – 2 Scarred tree 56 289616E 6234265N

Tree located in eastern paddock of Macarthur Anglican School – live grey box c.25m tall in small grove of five grey boxes. Site c.80m from The Northern Road, c.20m north of drainage channel. Small shrubs around base of tree and no visibility in surrounding area.

Scar is a generally oval shape with a wavy outline, slightly wider at the top than it is at the base. Height: 101cm; width: 19cm; regrowth: 12cm. Bottom of scar is 76cm from ground. Circumference of tree is 356cm.

According to the assessment criteria, OPM - 2 is a Possible Aboriginal Scar: likely to be the result of natural causes.

OPM – 3 Open Lithic scatter 56 289180E 6234283N

Low density artefact scatter located on the banks of a dam within the Macarthur Anglican College. Area of site is c.150 x 50m. Visibility in surrounding area is c.30%, but very disturbed and one silcrete fragment was identified c.60m north of dam.

1 x red silcrete flake with wide area platform and feather termination; 1.2 x 1.2 x 0.6cm

1 x tuff fragment (1-2cm)

2 x quartzite fragments (1-2cm)

1 x silcrete fragment (<1cm); 7 x silcrete fragments (1-2cm); 3 x silcrete fragments (2-3cm)

OPR – 1 Open Lithic scatter 56 290225E 6235707N

Low density open lithic scatter located on embankment along west bank of first order creek running generally NE – SW and associated dams within paddock northwest of race circuit. On bank of tributary, artefacts are eroding from transitional layer between compact sandy silt deposit and clay (c.30cm onto clay). Total area of site is c.100 x 20m.

1 x red silcrete flake with focal platform and hinge termination; 2.5 x 0.8 x 0.4

1 x red silcrete core with 2 negative flake scars (multidirectional)

1 x red tuff flake with focal platform and hinge termination; 1.6 x 2 x 0.5cm

1 x white quartz flake with focal platform and step termination; 1.2 x 1 x 0.3cm

1 x grey tuff core (on flake) with four negative flake scars (multidirectional)

2 x white quartz fragments (<1cm), 1 x white quartz fragment (1-2cm)

1 x grey tuff fragment (1-2cm)

3 x red silcrete fragments (2-3cm)

OPR – 2 Open Lithic scatter 56 289877E 6235609N

Low density lithic scatter recorded within an area of sheetwash erosion, on western side of dam wall west of wooden jetty. 100% visibility within exposure, none in surrounding area. Red / brown sandy clay silt washed down from dam wall with ironstone gravels throughout. Area of exposure is c.40 x 10m along side of dam wall.

1 x red silcrete flake

3 x yellow tuff fragment (<1cm)

1 x red silcrete flake fragment (<1cm), 1 x red silcrete fragment (1-2cm), 1 x red silcrete fragment (2-3cm)

OPR – 3 Open Lithic scatter 56 290637E 6235900N

Artefacts eroding from bank of first order tributary running generally NE – SW through paddock at mid-northern boundary. Exposure along creek close to stand of pines, casuarinas and gums c. half way across paddock.

1 x red silcrete core with three negative flake scars (multidirectional)

2 x white quartz fragments (<1cm), 1 x white quartz fragment (1-2cm)

OPR – 4 Scarred Tree 56 290629E 6235207N

Scarred tree located at northwest corner of huge exposure associated with collapsed dam north of Oran Park Raceway. Scar is on a live Forest Red Gum that has its roots exposed on the eastern side.

Scar is an oval shape with a slightly wavy, asymmetrical outline. Modern axe mark is present on the scar and termites have attacked the inside of the tree. Height: 202cm; width: 18cm; regrowth: 5cm. Circumference of tree is 227cm and bottom of scar is c.45cm from exposed roots, original ground level uncertain.

According to the assessment criteria, OPR - 4 is a Possible Aboriginal Scar: likely to be the result of natural causes.

OPR – 5 Open Lithic scatter 56 290423E 6234442N

Artefacts located within an exposure in the middle of the Oran Park Race Track, close to the control tower. Total area of site is c.160 x 30m. Artefacts are eroding from compact, silty sand deposit with lots of gravels. Visibility is c.75% across exposure. Site is located on and close to the former course of the race track (changed in 1978?).

2 x grey tuff distal flake

1 x grey tuff core exposed in situ – 3 negative flake scars are visible on the c.3.5 x 2cm that is exposed.

1 grey and orange banded tuff flake with gullwing platform and feather termination; 4.5 x 1.5 x 0.7cm

4 x tuff fragments (1-2cm), 1 x tuff fragment (<1cm)

1 x quartz fragment (<1cm)

1 x quartzite fragment (2-3cm).

OPR – 6 Open Lithic scatter 56 291037E 6235153N

Artefacts eroding from bund running E - W, c.150m north of Oran Park Raceway track, north of two small groves of old standing gums. Light brown sandy deposit with orange clay exposed sporadically. Total area of site is c.180 x 10m. At western extent of bund is large collapsed dam. Very disturbed context.

1 x cream and red banded tuff distal flake

2 x quartz fragments (<1cm)

1 x silcrete fragment (<1cm)

1 x tuff fragment (1-2cm)

OPR – 8 Open Lithic scatter 56 290953E 6235645N

Artefacts identified on large erosion scar west of small first order tributary, c.50m west of where tributary has been extensively modified. Erosion scar is c.150 x 50m and is a fine sandy silt deposit with evidence of water drainage across entire exposure.

1 x pink tuff core exposed in situ, with at least two negative flake scars visible on the c.2.5 x 1.8cm of the exposed surface.

1 x white quartz flake with focal platform and feather termination; 1.3 x 0.6 x 0.2cm

OPR – 9 Open Lithic scatter 56 291163E 6236351N

Low density lithic scatter located on banks of small tributary running generally N – S. Site located north of junction of two first order tributaries and c.80m south east of dam outside of Precinct, c.50m south of transmission line.

1 x red silcrete distal flake with hinge termination

1 x purple silcrete multidirectional core with 8 negative flake scars

1 x cream tuff fragment with retouch and incomplete negative flake scars.

1 x grey tuff distal flake

1 x silcrete fragment (1-2cm) 5 x silcrete fragments (2-3cm), 1 x silcrete fragment (3-4cm)

1 x quartz fragment (<1cm)

1 x tuff fragment (2-3cm)

OPR – 10 Open Lithic scatter 56 290787E 6235567N

Low density scatter located on hillslope in paddock c.450m north of Oran Park Raceway track. Artefacts identified on an erosion scar, c.25m north of boundary fence and c.200m west of tributary.

1 x weathered red silcrete flake with gullwing platform and feather termination

1 x quartz fragment (1-2cm).

OPR – 11 Scarred Tree 56 291328E 6236006N

Scarred tree located in small grove of 16 gums, c.1km north of Oran Park Raceway. Transmission line runs E – W through the same paddock c.450m to the north of the scarred tree. Scar is on a live Forest Red Gum that appears to have dieback.

Scar is an oval shape on the southern facing side of the tree. Height: 157cm; width: 40cm; regrowth: 45cm. Circumference of tree is 308cm and bottom of scar is c.15cm from exposed roots, original ground level uncertain.

According to the assessment criteria, OPR - 4 is a Possible Aboriginal Scar, and is just as likely to be the result of natural causes.

OPR – 13 Open Lithic scatter 56 290563E 6234777N

Low density lithic scatter eroding from patchy exposure in the middle of the main Oran Park Race track, artefacts are c.5m off the track, immediately south of extension track.

1 x green tuff proximal flake with wide area platform
1 x cream tuff distal flake with feather termination and retouch
1 x tuff fragment (<1cm)
1 x silcrete fragment (1-2cm)
1 x quartz fragment (2-3cm).

OPR – 14 Isolated Find 56 290782E 6234651N

A single artefact located in the middle of Oran Park Race Track, on the south eastern stretch, directly opposite Pit 37. Artefact is c.5m from edge of track.

1 x red silcrete flake with wide area platform and feather termination; 3.2 x 1.8 x 0.9cm

OPR – 15 Open Lithic scatter 56 291821E 6236386N

Very high density site with 193 recorded artefacts located on bank of tributary and drainage channels running generally N – S, south of and within catchment area of large dam that cuts through the north east corner of the Oran Park Precinct. Integrity of the site is variable – with the southern extent of the site concentrated on the eroded banks of a small modified creekline, the northern extent of the site extending into the dam catchment area and a paddock boundary fence and small concrete bridge cutting across the creek approximately half way through the identified exposure of artefacts.

1 x red silcrete flake with focal platform and feather termination; 2.6 x 0.9 x 0.5cm
1 x red silcrete distal flake with feather termination
1 x red silcrete flake with wide area platform and feather termination; 1.4 x 0.9 x 0.6cm
1 x red silcrete proximal flake with wide area platform
1 x red silcrete flake fragment with two incomplete negative flake scars and c.25% cortex
1 x orange silcrete flake with gullwing platform and feather termination; 1.5 x 1.2 x 1.1
1 x red silcrete proximal flake with focal platform

1 x red silcrete distal flake with hinge termination

1 x red silcrete core fragment with 3 complete negative flake scars

1 x yellow silcrete backed artefact; 2.8 x 1.0 x 0.4cm

1 x distal flake (two pieces conjoined) with feather termination

1 x yellow silcrete distal flake with feather termination

1 x red silcrete flake with focal platform and feather termination; 1.8 x 0.8 x 0.3cm

1 x red silcrete flake with focal platform and hinge termination; 0.9 x 1.1 x 0.7cm

1 x red silcrete flake with wide area platform and feather termination; 2.8 x 2.5 x 1.1

1 x red silcrete proximal flake with focal platform

1 x red silcrete flake with wide area platform and feather termination; 2.0 x 1.5 x 0.4cm

1 x purple silcrete flake with gullwing platform and feather termination; 2.2 x 1.6 x 0.4cm

1 x red silcrete distal flake with feather termination

1 x red silcrete distal flake with hinge termination

1 x red silcrete flake with wide area platform and feather termination; 1.2 x 1.2 x 0.3cm

1 x red silcrete core fragment with 1 x complete negative flake scar

1 x pink silcrete flake with gullwing platform and step termination; 1.3 x 0.8 x 0.3cm

1 x purple silcrete flake with gullwing platform and step termination; 0.8 x 0.5 x 0.2cm

1 x cream tuff cone split flake with focal platform and feather termination

1 x purple silcrete flake with gullwing platform and feather termination; 1.5 x 1.2 x 0.2cm

1 x purple silcrete flake with gullwing platform and feather termination; 0.9 x 1 x 0.2cm

1 x purple silcrete flake with focal platform and feather termination; 1.7 x 1.8 x 0.5cm

1 x cream tuff distal flake with hinge termination

1 x red silcrete flake with wide area platform and feather termination; 50% cortex on dorsal and platform; 2.2 x 2.4 x 0.9

1 x cream tuff flake with wide area platform and feather termination; 2.1 x 1.2 x 0.6

1 x red silcrete flake with focal platform and feather termination; 1.3 x 0.9 x 0.3

1 x pink tuff flake with focal platform and feather termination; 1.5 x 1.1 x 0.2

1 x purple silcrete flake with focal platform and feather termination; 2.7 x 1.9 x 0.3cm

1 x red silcrete flake with focal platform and step termination; 2 x 1.3 x 0.7cm

1 x red silcrete backed artefact; 2.7 x 1.1 x 0.2cm

1 x red silcrete flake with wide area platform and outrepasse termination; 2.1 x 1.5 x 0.8cm

1 x purple silcrete cone split flake with focal platform and step termination with three distinct negative flake scars on dorsal surface

1 x red silcrete core with two negative flake scars (multidirectional)

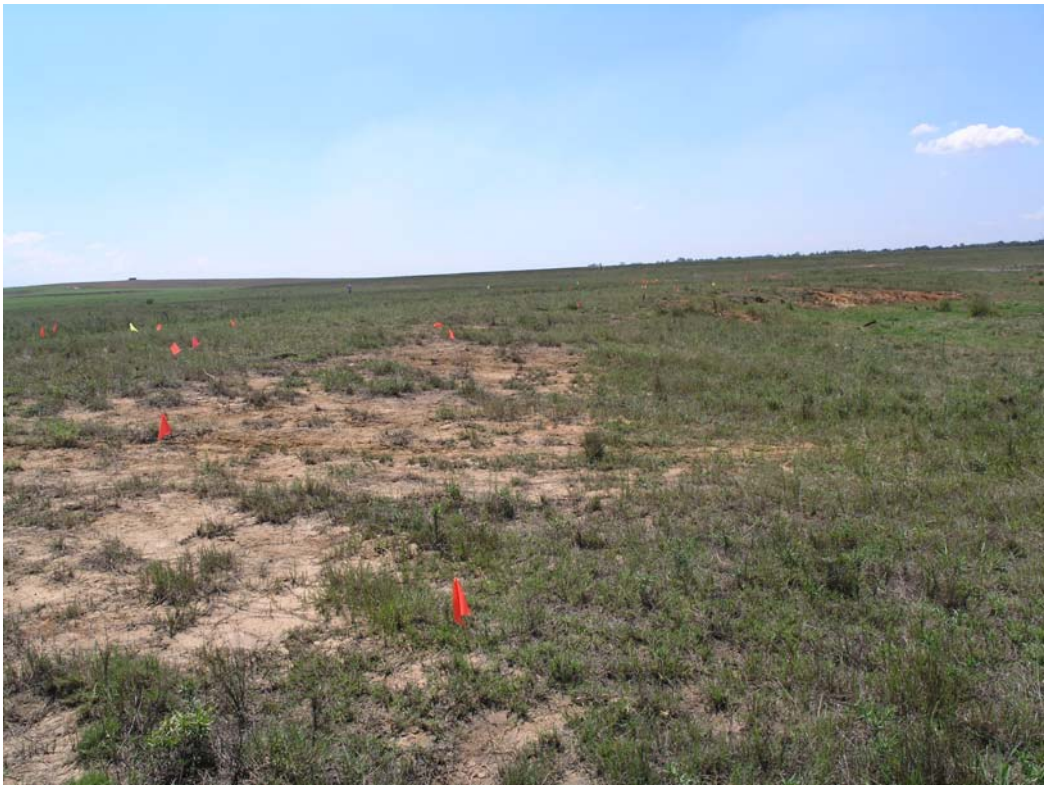


Plate 5: Artefacts flagged and recorded at Site OPR-15 (view to north). A total of 193 artefacts and fragments were recorded at this site.

Plate 6: Example of artefacts recorded at Site OPR-15.

1 x red silcrete core with five negative flake scars (multidirectional)

1 x red silcrete distal flake with feather termination

1 x red silcrete flake with gullwing platform and feather termination; 2.2 x 2.8 x 0.3cm

1 x red silcrete flake with focal platform and step termination; 2 x 0.6 x 0.3cm

1 x red silcrete flake with wide area platform and feather termination; 2 x 1.2 x 1.5cm

1 x pink silcrete flake with focal platform and feather termination; 2.6 x 1.1 x 0.3cm

1 x pink silcrete distal flake with feather termination

1 x red silcrete medial flake

1 x red silcrete distal flake with outrepasse termination

1 x purple silcrete flake with focal platform and feather termination

1 x purple silcrete flake with gullwing platform and feather termination; 2 x 1.6 x 0.3cm

1 x red silcrete flake with wide area platform and feather termination; 2.8 x 2.1 x 0.7cm

1 x orange tuff backed artefact; backing from both surfaces; 2.2 x 0.6 x 0.2cm

1 x yellow silcrete core with three negative flake scars (multidirectional)

1 x green tuff fragment with c.60% cortex

1 x yellow and orange banded tuff flake with focal platform and feather termination; 3.1 x 1.8 x 0.4cm

1 x yellow and orange banded tuff flake with focal platform and hinge termination; 1.6 x 1.9 x 0.5cm

1 x yellow and orange banded tuff flake with wide area platform and feather termination; 1.9 x 1.1 x 0.3cm

1 x yellow and orange banded tuff distal flake with feather termination

1 x red silcrete flake with gullwing platform and outrepasse termination; 3 x 1.3 x 0.6cm

1 x yellow silcrete core fragment with two negative flake scars

1 x petrified wood fragment

Non diagnostic fragments:

Material	<1cm	1-2cm	2-3cm	3-4cm	4-5cm	>5cm
Silcrete	22	18	29	8	2	1
Tuff	6	5				
Quartz	17	7		1		
Quartzite		3	2	1		
Petrified Wood			1			

OPR – 16 Open Lithic Scatter 56 292304E 6236000N

Artefacts recorded on exposure in rear paddock of 185 Springfield Road. Exposure is an oval track (possibly old horse training track), with dense regrowth gums (>100) and casuarinas in middle and surrounding. Artefacts also present off track to east and west

in exposures associated with old skateboarding ramp and boundary fence. One artefact also recorded on exposure associated with boundary fence c.50cm into Leppington Pastoral property. Artefacts eroding from light brown / cream sandy silt deposit with occasional exposure of orange clay.

1 x red silcrete distal flake with feather termination

1 x yellow silcrete flake with focal platform and feather termination; very weathered; 3.7 x 2.4 x 1.5

1 x grey / pink tuff cone split flake with wide area platform and feather termination; 2.4 x 3.2 x 1.1

1 x grey tuff fragment (<1cm)

1 x red silcrete fragment (1-2cm)

OPR – 17 Open Lithic Scatter 56 291755E 6234756N

Artefacts eroding from dirt animal track that crosses small tributary to South Creek. Artefacts are c.3m apart on south bank of tributary in paddock c.750m east of Oran Park race track.

1 x red silcrete core with 6 negative flake scars (multidirectional)

1 x red silcrete fragment (<1cm), 1 x red silcrete fragment (3-4cm).

OPR – 18 Open Lithic Scatter 56 292271E 6234941N

Artefacts eroding from dirt animal track and erosion scar associated with huge ants nest on west bank of South Creek. Recorded artefacts are c.3m from creek side vegetation limit (pines, gums and casuarinas) and eroding from light brown sandy silt deposit with occasional ironstone gravels and fragments.

1 x yellow tuff distal flake

1 x yellow tuff fragment (<1cm)

1 x red silcrete fragments (<1cm), 1 x red silcrete flake (2-3cm)

OPR – 19 Open Lithic Scatter 56 292405E 6235177N

Artefacts eroding from animal track c.20cm wide, c.5m from the west bank of South Creek and small exposure c.20m to the south west. Grass limits exposure to either side and between exposures.

1 x red silcrete proximal flake with wide area platform; retouch; very weathered

1 x pink silcrete core with four negative flake scars

1 x white silcrete fragment (1-2cm)

OPR – 20 Isolated Find 56 292534E 6235338N

Artefact located on the west bank of South Creek, directly under transmission line, at the boundary between the Leppington Pastoral property and 26 Curtis lane. Grass cover and low shrubs restrict visibility in the surrounding area.

1 x cream tuff flake with focal platform and feather termination; 2.3 x 1.8 x 0.8cm

OPR – 21 Open Lithic Scatter 56 290471E 6234151N

Site is located on the hill slopes south of the Oran Park race track, both sides of the main access road off Cobbitty Road. Sporadic old growth gums across hill slopes. Ground surface visibility is c.5% overall and up to 80% within exposures. Exposures occur as erosion scars, sheet wash, drainage channels, fence lines, and around the base of trees. Deposut is generally a light brown / cream sandy silt with frequent gravels eroding. Total area of recorded artefacts is c.450 x c.200m.

1 x cream tuff core with possible usewear; three complete flake scars; 4-5cm

1 x grey silcrete cores with one complete negative flake scar; 2-3cm

1 x grey silcrete cores with one complete negative flake scar; 4-5xm

1 x white tuff flake with focal platform and feather termination; retouch and possible usewear; 4.1 x 2 x 1.7cm

1 x red silcrete core with two negative flake scars; 2-3cm

4 x tuff fragments (<1cm); 1 x tuff fragment (1-2cm); 2 x tuff fragments (3-4cm)

1 x red silcrete fragment (3-4cm)

1 x white quartz fragment (1-2cm)

OPR – 23 Isolated Find 56 291250E 6234437N

Artefact located c.3m from west bank of South Creek on red / brown sandy silt deposit, eroding from cow track, south east of Oran Park race track. Shrubby weeds and casuarinas surrounding.

1 x red silcrete flake with wide area platform and feather termination; 2.1 x 2.3 x 0.5cm; c.10% cortex.

OPR – 24 Open Lithic Scatter 56 292078E 6235225N

Artefacts located in paddock north east of Oran Park race track, within a large erosion scar at north west extent of drainage channel running NW - SE into South Creek. Three dead trees stand c.15m to the south and the east. Site is c.500m from South Creek,

1 x red silcrete fragment (1-2cm)

1 x white quartz fragment (1-2cm)

OPR – 25 Open Lithic Scatter 56 292153E 6236395N

Artefacts recorded along dirt vehicle track running N – S through paddock at north east extent of Oran Park Precinct, circling around base of large dam. Total site area is c.30 x 200m.

1 x cream silcrete core with 4 negative flake scars (unidirectional); >5cm

1 x red silcrete flake with focal platform and outrepasse termination; 2.4 x 1.5 x 0.6cm

1 x red silcrete core fragment with 2 negative flake scars; 3-4cm

1 x red silcrete flake (2 pieces conjoined) with wide area platform and feather termination; small section of the margin has broken off; 3.8 x 1.8 x 0.9cm

1 x red silcrete core with 4 negative flake scars (multidirectional); 2-3cm

1 x tuff fragment (<1cm); 2 x tuff fragments (1-2cm); 1 x tuff fragment (2-3cm)

1 x silcrete fragment (1-2cm); 1 x silcrete fragment (2-3cm)

5 x quartz fragments (<1cm); 1 x quartz fragment (2-3cm)

OPR – 26 Isolated Find 56 291915E 6234874N

Artefact located on narrow (c.20cm) cattle track in paddock c.800m east of Oran Park race track. Cattle track heads north from dam along South Creek. Artefact is located c.60m along track from dam.

1 x red silcrete proximal flake with wide area platform

OPR – 27 Open Lithic Scatter 56 290070E 6234450N

A low density scatter of artefacts recorded along artificial dam wall c.100m west of Oran Park race track. Total site area is c.30 x 20m. No artefacts were located in exposures along drainage channels in proximity to the dam.

1 x white tuff core with 4 complete negative flake scars (multidirectional); 4-5cm.

1 x red silcrete fragment (1-2cm)

7.3 Potential Archaeological Deposit

Areas of PAD were identified within the Oran Park Precinct and identify areas with a higher likelihood of containing intact archaeological deposit. The identification of PADs across the Oran Park Precinct was based on relatively low levels of prior

disturbance and landscape parameters that are predicted as desirable for Aboriginal occupation.

PAD – OP1

This area of PAD has been identified at the north east extent of the Oran Park Precinct and continues beyond the northern boundary of the study area. The PAD is defined as the gentle hill slopes surrounding site OPR – 15, and also includes the island of intact deposit that exists between the tributaries. The original junction of creeks that would have been the focus of occupation has been destroyed by the construction of a large dam. The high density of artefacts exposed along the tributaries suggests that a high level of occupation probably continued upstream along these watercourses from the confluence.

The location of the PAD in relation to the junction of relatively high order creeks suggests that it is

There is c.500 x 200m of relatively intact PAD located within the Oran Park Precinct, though this is likely to extend north beyond the Precinct boundaries.

PAD – OP2

This area of PAD is located on the west bank of South Creek, close to the junction of two high order creeks. The identification of PAD was based on its landscape parameters, a gentle gradient slope, close to a significant water source. Very few artefacts were located during the site survey, though visibility was extremely low. The four low density sites recorded here may be a part of a more extensive scatter of artefacts along these creekbanks that are not visible due to thick vegetation coverage in a more stable landscape where artefacts have not been exposed.

The disturbance to the identified PAD appears to have been minimal, restricted to clearing and light agricultural uses such as grazing and possibly ploughing. There has been no obvious large scale disturbance to the sub-surface deposit.

PAD – OP3

This area of PAD is located on the gently undulating hillslopes on the west bank of an otherwise significantly modified second order tributary to South Creek. The identified area is between two east – west running first order tributaries, providing a junction of low order tributaries. The southern extent of this drainage system is seriously modified

along the creekline - by dams, and the adjacent hillslopes - through the construction of roads and dam walls.

PAD – OP4

This is located within the Denbigh property, on the ridge top and upper ridge slopes overlooking the Denbigh homestead from the NNE. The PAD has been subject to a certain amount of disturbance from cattle movement and slope wash down the steep SW slopes of the ridge line. Disturbance via human means however, has been restricted to the construction of a stone slab hut and the dumping of small amounts of (largely historic) rubbish. The ridgeline and steep slopes to the north are significantly more disturbed by terracing associated with 19th century orange groves and vineyards.

Sites Denbigh 1, Denbigh 2, Denbigh 3, Denbigh 4 (MDCA), OPD-9, OPD-10 and OPD-11 are all located within this PAD. The importance of this PAD derives from its obvious contribution to the archaeological record of early Aboriginal – European contact and the interaction between indigenous and settler groups during the early pastoral period. The ridge slopes are too steep to retain evidence of Aboriginal sites, although the ridge tops are more likely to have attracted (and to retain) occupation sites. Sources of water are located within 100m and the high elevation provides a good vantage point.

8. SIGNIFICANCE ASSESSMENT

The scientific significance of each site recorded within the Oran Park Precinct is assessed on the basis of its likelihood for containing intact, archaeologically significant deposit.

The Aboriginal stakeholders involved in the consultation process will provide their own reports on the cultural significance of the sites and lands within the Oran Park Precinct. The cultural significance assessment should be taken into consideration in conjunction with the scientific significance of the landscapes when developing a conservation outcome.

It is well documented on the Cumberland Plain (JMcD CHM 1999, 2000, 2003) that sites cannot always be detected or characterised on the basis of surface evidence. Given the low effective survey coverage across the Oran Park Precinct, the concept of PAD is used to determine the archaeological significance of landscapes where ground surface visibility and exposure was not conducive to locating sites or identifying the extent of sites.

This method takes into account the levels of previous land use disturbance and the likelihood of retaining an intact archaeological deposit, as well as assessing areas that may prove archaeologically significant in terms of contributing to our understanding of how Aboriginal people were using these landscapes in the past.

Fifteen of the identified sites and PADs within the Oran Park Precinct are located in Zone 1: within land with good potential. Fourteen sites fall within Zone 2: land considered to have moderate potential. Two sites are located within Zone 3 land with low potential and thirteen sites are considered to have no archaeological potential (i.e. Zone 4). The remaining two identified PADs are considered to have mixed potential, whereby their sensitivity is considered to be good overall with occasional areas within the PAD that are significantly more disturbed.

Three of the sites assessed here as being of no potential are scarred trees that are assessed as having low significance (i.e. they are unlikely to be anthropogenic), regardless of what landscape or sensitivity zone they are located within.

Figure 8: Identified sites within Oran Park Precinct overlain on sensitivity mapping.

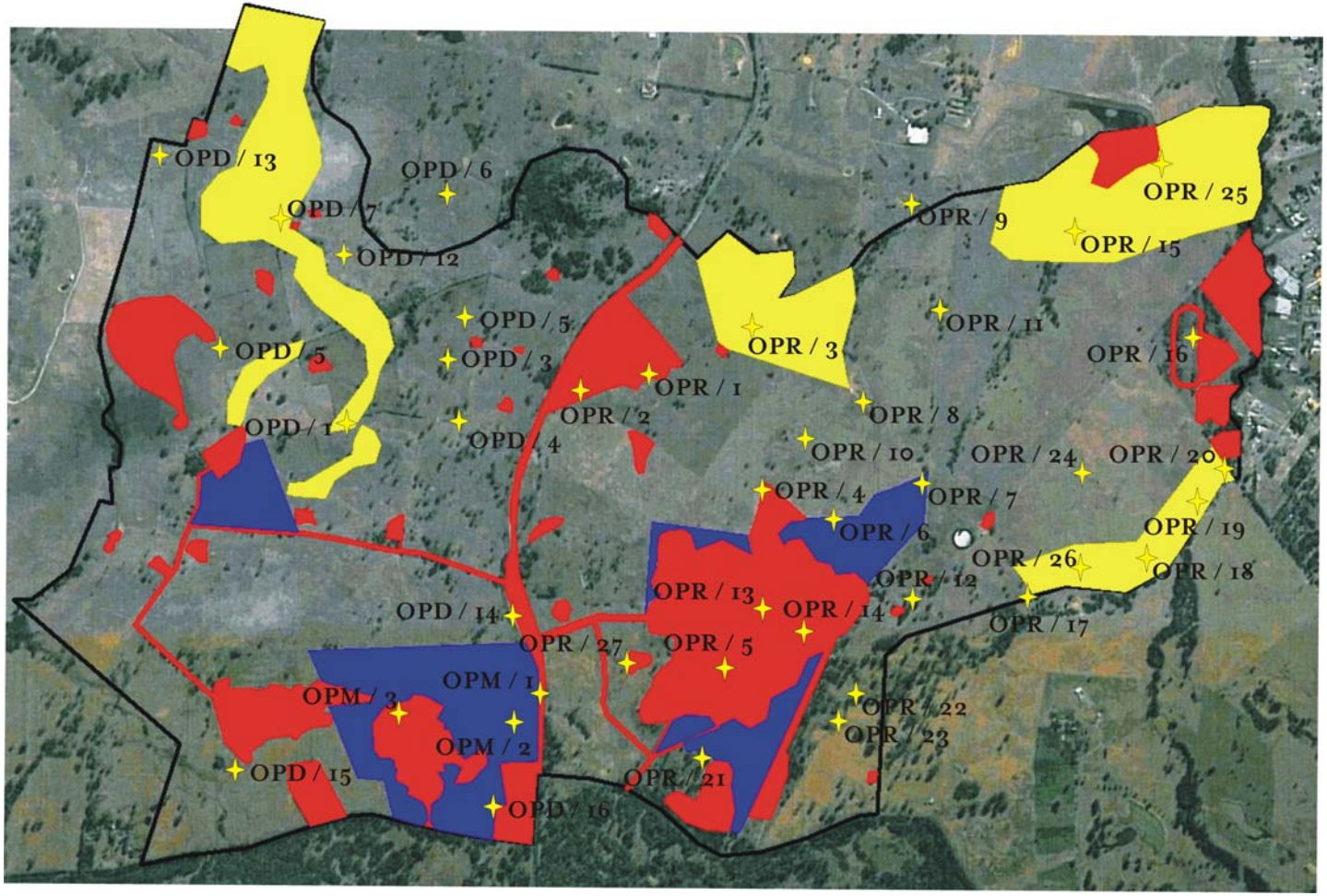


Table 5: Archaeological significance of all identified sites and PADs within the Oran Park Precinct.

Site ID	Landform	Site Type	Impact	Archaeological Significance
Denbigh 1 – within total defined area of OPD-7	Ridge top	IF	N	Good
Denbigh 2 – within total defined area of OPD-7	Ridge top	IF	N	Good
Denbigh 3 – within total defined area of OPD-7	Ridge top	IF	N	Good
Denbigh 4 – within total defined area of OPD-7	Ridge top	IF	N	Good
Denbigh 5	Ridge top	ST	N	Moderate
OPD – 3	Lower hill slopes	IF	Y	Moderate
OPD – 4	Mid hill slopes	OCS	Y	Moderate
OPD – 5	Lower hill slopes	IF	N	Moderate
OPD – 6	Low order creek bank	OCS	N	Moderate
OPD – 7	Ridge top / upper slopes	OCS	N	Good
OPD – 12	Low order creek bank	IF	Y	Moderate
OPD – 13	Low order creek bank	OCS	N	Moderate
OPD – 14	Flat	IF	Y	No
OPD – 15	Low order creek bank	OCS	M?	Moderate
OPD – 16	Flat	IF	Y	No
OPM – 1	Flat	IF	N	No
OPM – 2	Flat	ST	N	No – unlikely to be cultural
OPM – 3	Flat	OCS	N	No
OPR – 1	Low order creek bank	OCS	Y	No
OPR – 2	Low order creek bank	OCS	Y	No
OPR – 3	Low order creek bank	OCS	Y	Good
OPR – 4	Low order creek flat	ST	Y	No – unlikely to be cultural
OPR – 5	Hill crest	OCS	N	No
OPR – 6	Low order creek flat	OCS	Y	Low
OPR – 7	Low order creek bank	OCS	Y	Low
OPR – 8	Alluvial flats	OCS	Y	Moderate
OPR – 9	Low order creek bank	OCS	N	Moderate
OPR – 10	Low order creek flat	OCS	Y	Moderate
OPR – 11	Upper hill slope	ST	M?	No – unlikely to be cultural
OPR – 13	Hill crest	OCS	N	No
OPR – 14	Hill crest	IF	N	No
OPR – 15	Creek junction	OCS	Y	Good
OPR – 16	Flood plain	OCS	Y	Mixed
OPR – 17	High order creek bank	OCS	M?	Moderate
OPR – 18	High order creek bank	OCS	N	Good
OPR – 19	High order creek bank	OCS	N	Good
OPR – 20	High order creek bank	IF	N	Good
OPR – 21	Lower hill slopes	OCS	Y	Moderate
OPR – 23	Low order creek bank	IF	Y	Moderate
OPR - 24	Low order creek bank	OCS	Y	Moderate
OPR – 25	Flood plain	OCS	Y	Good
OPR – 26	Floodplain	IF	Y	Good

OPR - 27	Low order creek bank	OCS	Y	No
PAD – OP1	Creek junction	PAD	Y	Good
PAD – OP2	High order creek bank	PAD	Y	Good
PAD – OP3	Hill slopes / low order creek bank	PAD	Y	Mixed
PAD – OP4	Ridge top / upper slopes	PAD	N	Mixed

9. DISCUSSION

The objective of the Stage Two investigation was to identify and assess Aboriginal cultural heritage values for the Oran Park Precinct. This involved combining the background research on the area, consultation with identified Aboriginal stakeholders and a complete field survey of the Precinct in order to identify areas of known or potential archaeological and cultural significance. Identified sites and landscapes are assessed according to their archaeological significance in order to develop preliminary management recommendations to inform the development planning of the Oran Park Precinct. The identified stakeholder groups will provide individual reports assessing the cultural values of landscapes within the Oran Park Precinct.

The assessment process was designed to comply with the Protocol for Aboriginal stakeholder involvement and the Precinct Assessment Method for Aboriginal cultural assessment of lands within the Growth Centres.

A total of 44 sites and four areas of high potential archaeological deposit were identified as a result of the current archaeological investigation. Twenty one of the identified sites and three of the areas of PAD will definitely be impacted by the currently proposed development (Figure 3), nineteen of the sites and one of the PADs will not be impacted and three of the sites have the potential to be conserved within proposed riparian corridors associated with the tributaries to South Creek.

There is the potential for a significant conservation outcome within the Oran Park Precinct within the Denbigh property which is being conserved for its historic heritage values. There are no areas within the Oran Park Precinct with very high archaeological potential, but there is approximately 15% of land that has been assessed as having high archaeological potential. While a relatively intensive development of the Precinct has been proposed in the indicative layout plan, a significant proportion of the land assessed as having high archaeological sensitivity is located within the Denbigh curtilage. The Denbigh curtilage thus provides an ideal opportunity for achieving a meaningful

Indigenous conservation outcome within the Oran Park Precinct. There is also the intention to provide regional open space and to maintain existing watercourses and riparian corridors. The development of a strategy for managing these areas in terms of their archaeological values as well as their ecological values will ensure a conservation outcome that preserves the majority of the identified higher value landscapes.

While a detailed understanding of occupation patterns and use of sites is not possible from an investigation of surface evidence alone, certain trends are detectable. It is apparent that occupation was focused on the junctions of first and second order tributaries as well as along the higher order creeks. Sites have also been located at a higher distance from water, though these are generally low density lithic scatters that may represent an expected background scatter of artefactual material. Ridge tops, hill crests and low order creek flats appear to be the focus of some occupation activity across the Oran Park Precinct.

Given the low number of previous excavations within the local area, the detailed analysis of lithic assemblages through salvage excavation has the potential to contribute significantly to our understanding of how different landscapes were being used, as well as providing a context for sites and landscapes within the designated conservation areas. For this reason, the designation of a conservation zone and the selection of landscapes for salvage excavation should concentrate on a range of different landscapes with high potential for retaining intact archaeological deposit.

Conservation Management Strategy

One of the aims of cultural heritage management is a sustainable management outcome for Indigenous heritage. The South West Growth Centre Project – with its associated residential and industrial parcels – should aim to have an Indigenous heritage conservation strategy and outcome. Significant heritage areas should be conserved to enhance the character of the Oran Park Precinct.

Any identified conservation area should include a representative set of landscapes, most of which should have the best conservation potential. Areas of identified Aboriginal significance should also be accommodated in this conservation outcome. A conservation area defined on this basis would achieve a meaningful management outcome.

A conservation management strategy is required to ensure that the identified conservation areas are managed appropriately and that the heritage values are identified and maintained throughout the development and use of the Parklands and associated development parcels.

It is envisaged that no development – or archaeological investigation – would take place within the defined conservation areas but that these would be managed into the future on the basis of their Aboriginal (and other) heritage values.

Protocols and strategies still need to be developed for the management of these conservation areas.

The land falling outside the defined conservation areas would be deemed developable – and may be subject to a range of development impacts.

In summary, the Indigenous conservation management strategy for the Oran Park Precinct is based on the following principles:

- A set of representative landscapes with high potential to contain intact archaeological deposit should be contained in the conservation areas;
- The conservation area(s) should also contain sites and or areas with high cultural (or social) value;
- The selection of the conservation area should be achieved by considering a range of environmental values and development requirements (i.e. development yield, best/requisite location of infrastructure, conservation outcome, and etc.);
- The conservation management strategy needs to consider the long term management of the identified conservation areas;
- Once the conservation areas within the study area have been defined the remainder of the land should be considered as developable;
- Archaeological sites/landscapes falling within the developable lands are not a constraint to development. However, these sites should be managed in accordance with a defined set of management principles (see below). High value sites in a representative set of landscape should be salvaged to mitigate against their destruction.

Strategic Management Model

In various contexts across the (northern) Cumberland Plain a strategic management approach to Indigenous cultural heritage has been implemented (JMcD CHM 2004; McDonald 1996). This strategy is based both on scientific and cultural (or social) values (JMcD CHM 2002). By identifying the range of representative landscapes with the best conservation potential, and by adding to this identified areas of Aboriginal significance - and targeting these for conservation - a meaningful management outcome should be realised. A similar approach is advocated here to ensure an appropriate management outcome for Indigenous heritage is achieved (JMcD CHM 1997).

The overriding aim of a strategic Indigenous heritage management strategy is the preservation of a representative sample of intact landscapes, to ensure that a range of human responses, as represented by the archaeology, can be protected. Rather than targeting only sites of known extent or known significance (e.g. through sub-surface investigation), zones based on landscape parameters have been defined, and these areas are to be managed on the basis of their conservation potential.

Most of the archaeological sites on the Cumberland Plain are comprised of open stone artefact scatters. Different types of sites provide information on the different ways that the Plain was used by Aboriginal people. It is the variety of site types which have the potential, through their content and arrangement across the landscape, to provide the details which will enhance our general understanding of prehistoric human occupation of this region. It is likely that such a certain variety of sites and types of evidence will be present across the Oran Park and Turner Road Precincts because of the range of environmental landscapes present. We know little detail about this likely range of sites because no previous excavations have been done in these specific landscapes. Because a relatively large proportion of these areas are already disturbed, not all parts of these precincts are likely to contain good contextual information – and indeed the potential for conservation areas is apparently low.

The general principles for a Strategic Management Model (SMM) are as follows:

- The primary selection criteria for the conservation strategy is identified landscapes which have been minimally disturbed by land-use practices over the last 200 years;

- A similarly important criteria for the selection of conservation areas is that these landscapes must provide, and be representative of, the range of landscapes present across the study area;

- An additional criteria is that regionally threatened landscapes, sites of recognised regional significance (i.e. rarity) and areas of significance to the Aboriginal community should be included within the conservation area, as long as these are minimally undisturbed by previous land use disturbance;

- Areas are also been assessed on the basis of a predictive model of Aboriginal site occupation on the Cumberland Plain, since some areas have a greater potential to contain archaeological sites of high significance than others;

- Landscapes which have been comprehensively disturbed by sub-surface soil removal or rearrangement are of limited potential for archaeological sites. These require no further archaeological investigation and pose no constraint for development.

Four management zones are devised for the Oran Park Precinct. Each of these is likely to have a different designated management outcome (Table 4; see Figures 9 and 10). None of the land within the Oran Park Precinct has been identified as having very high potential for intact archaeological significance: this is in contrast with other studies undertaken on the Cumberland Plain, where landscapes have not been impacted in the last 50 years by agricultural and/or industrial land uses (e.g. the former ADI Site at St Marys: JMcD CHM 1997).

Zone 1 here is identified as the potential conservation zone. It is envisaged that land identified as requiring conservation would come from this Zone and that no development take place within the designated conservation area. This land would be managed into the future on the basis of its Aboriginal (and other) heritage values.

In keeping with this approach, no archaeological investigation would take place within the land which is to be conserved. Protocols and strategies would need to be developed for the management of this conservation area. Zone 1 lands which cannot be conserved should be the subject of a salvage (mitigation) exercise (see below).

The land falling outside the defined conservation area would all be deemed developable.

The developable land has been ranked for its archaeological sensitivity and is likely to contain landscapes that are residual Zone 1 and Zone 2. The SMM presumes that while containing varying sensitivity zones, that these will be developed; i.e. that the archaeology in these areas would be impacted upon by a range of development proposals.

Table 6: Management zones showing management outcomes

Management Zone	Archaeological sensitivity	Management outcome
Zone 1	Good potential for intact archaeological evidence	Conservation zone (CCZ) to be selected from this zone. Remainder to be developable, but may require salvage of representative landscapes.
Zone 2	Moderate potential for intact archaeological evidence	Developable land. Some salvage of representative landscape units not in Zone 1 may be required.
Zone 3	Low potential for intact archaeological evidence	Developable land with no constraints – no further archaeological work required.
Zone 4	No potential for intact archaeological evidence	Developable land with no constraints – no further archaeological work required. Clearances not technically required for these lands as likelihood of relics surviving here is so low.

Further archaeological investigation will be required in high sensitivity areas which fall within the developable lands. Archaeological evidence should be salvaged here from a representative range of landscapes as these occur within the overall study area. This salvage will provide archaeological evidence and context for conservation areas and/or mitigate against the destruction by development of sites that may be encountered.

No further archaeological work will be required in areas of low or no archaeological sensitivity, where sites are assessed as having minimal or no archaeological potential. There is no constraint to development in these areas, and further archaeological works will not be undertaken in these areas. It should be noted that the Aboriginal community may wish to monitor development which takes place in this zone, particularly along stream lines and waterways.

In accordance with these strategies, it is recommended that a conservation outcome for the Oran Park Precinct should focus on the ridge tops surrounding the Denbigh homestead (PAD-OP4).

The three other Zone 1 landscapes also offer landscapes with conservation values – which will require further discussion with the client in terms of management options. PAD-OP3 is located on the banks of a high order stream likely to have been the focus of Aboriginal occupation prior to European settlement. Much of this PAD is located within the proposed riparian corridor associated with South Creek. Some land within PAD-OP1 and PAD-OP2 are also located within proposed Riparian corridors and have the potential to be incorporated into a conservation zone. The extension of these riparian corridors to include the development of a conservation management strategy would ensure that Aboriginal heritage values are identified and maintained within a wider range of landscapes, incorporating lower and higher order tributaries within a major creek complex.

PAD-OP4 is an area of good archaeological sensitivity. Given the surface sites within this PAD, the position of this PAD within the landscape, its proximity to water and its historic association with known cultural events at the Denbigh property, the high value of this landscape is based both on its archaeological significance and its cultural significance.

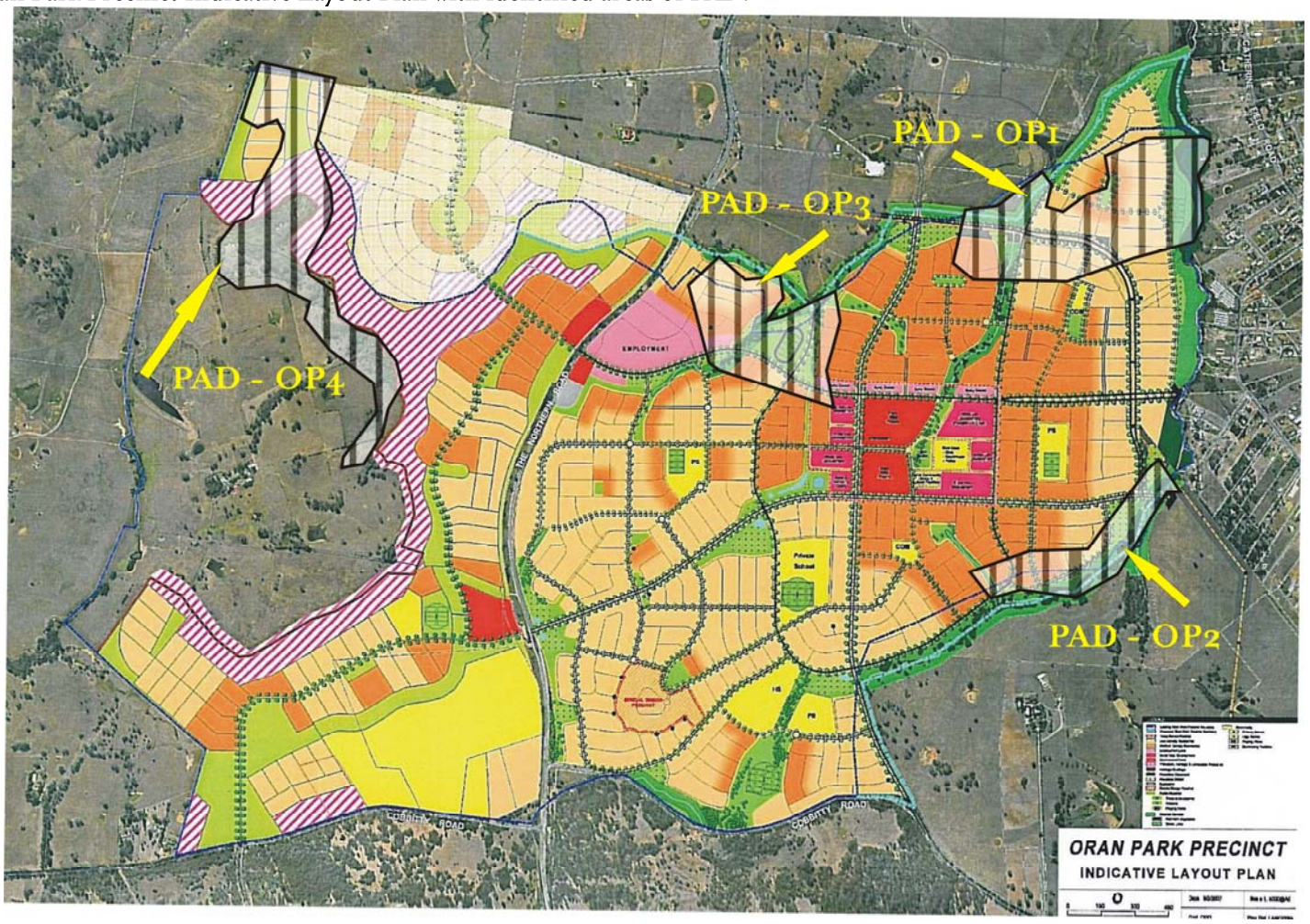
The conservation of the ridge tops and upper ridge slopes of PAD-OP4, in conjunction with the South Creek creekline (PAD-OP3) and tributary junctions (riparian corridors) would contribute to the preservation of a representative set of landscapes. The conservation of these landscapes would achieve a meaningful management outcome for the Oran Park Precinct.

Given the proposed development impacts and the recommended conservation areas within the Oran Park Precinct Indicative Layout Plan, further discussions with the

client will contribute to understanding the flexibility of the Precinct layout. Zone 1 lands which will be impacted by the proposed design are those areas that are likely to require salvage.

The lands that falls outside of the proposed conservation zones across the Oran Park Precinct should be subject to salvage excavation as mitigation against their destruction.

Figure 9: Oran Park Precinct Indicative Layout Plan with identified areas of PAD.



10. RECOMMENDATIONS

The following recommendations are based on consideration of:

- Legal requirements under the terms of the *National Parks and Wildlife Act* (1974) (as amended) which states that it is illegal to damage, deface or destroy an Aboriginal object or Place without first obtaining the written consent of the Director-General, Department of Environment & Conservation, NSW;
- The Strategic Management Model to be employed in the management of cultural heritage landscapes throughout the Oran Park Precinct;
- The four management zones based on archaeological sensitivity identified across the Oran Park Precinct;
- The results of this Stage 2 Indigenous heritage assessment, and the identified areas of social and cultural sensitivity;
- The interests of the Tharawal Local Aboriginal Land Council, Cubbitch Barta Native Title Claimants Aboriginal Corporation, and other identified stakeholders;
- The stage of the planning process and the likely impact of the proposed development.

It is recommended that:

1. An indigenous heritage conservation strategy should be applied to the Oran Park Precinct based on the results of the Stage Two investigation. A meaningful conservation outcome should incorporate a representative set of landscapes from Zone 1 landscapes and areas identified by the indigenous stakeholders as having high cultural significance;
2. Once the conservation zone has been identified, a Plan of Management will be required to ensure the appropriate protection and management of archaeological and cultural values within the conservation zone;
3. Land that falls outside the conservation zone should be considered developable and managed on the basis of the sensitivity mapping and the

defined management principles. A sample of Zone 1 and Zone 2 landscapes impacted by the proposed development should be targeted for sub-surface investigation as mitigation against their destruction. Zone 3 and Zone 4 landscapes will not require any further archaeological investigation;

4. Once the conservation area has been identified, development impacts finalised and locations chosen for salvage, a 'whole of development' Section 90 consent should be sought from DEC NSW for the Oran Park Precinct;

5. The TLALC, CBNTCAC and other interested Aboriginal groups have indicated their interest in seeing a meaningful public education outcome in relation to the local Aboriginal heritage. Suggestions from the stakeholder groups include a heritage walking trail through the proposed conservation areas, the naming of suburbs and streets to reflect the colonial and Aboriginal heritage and an Aboriginal heritage centre within the Oran Park Precinct;

6. The TLALC, CBNTCAC and other interested Aboriginal groups may wish to collect the identified surface artefacts prior to the commencement of any construction activity;

7. The TLALC, CBNTCAC and other interested Aboriginal groups may wish to monitor the initial stages of construction activity within the Oran Park Precinct;

8. The TLALC, CBNTCAC and other interested Aboriginal groups continue to be involved in all stages of the assessment process in accordance with the GCC guidelines;

9. One copy (each) of this report should be sent to:

Ms. Donna Whillock,
Cultural and Heritage Representative,
Tharawal Local Aboriginal Land Council
PO Box 20
BUXTON, NSW, 2571.

Ms. Glenda Chalker
Cubbitch Barta Native Title Claimants Aboriginal Corporation
55 Nightingale Road,
PHEASANTS NEST, NSW, 2574

Mr. Desmond Dyer,
Darug Tribal Aboriginal Corporation
PO Box 441
BLACKTOWN, NSW, 2148

Ms. Leanne Watson,
Darug Custodian Aboriginal Corporation,
PO Box 81,
WINDSOR, NSW, 2756

Mr. Gordon Morton
Darug Aboriginal Cultural Heritage Assessments
90 Hermitage Road
KURRAJONG HILLS. NSW, 2758

Moran Elders Council
c/o NIAC
2/3 Birch Crescent
EAST CORRIMAL, NSW, 2518

Wadi Wadi Coomaditchie Aboriginal Corporation
c/o NIAC
2/3 Birch Crescent
EAST CORRIMAL, NSW, 2518

La Perouse Botany Bay Aboriginal Corporation
c/o NIAC
2/3 Birch Crescent
EAST CORRIMAL, NSW, 2518

Mr. Nigel Robinson
52 Bombala Crescent
QUAKERS HILL, NSW, 2756

Mr. Pat Lock

Carwoola Elders Council
NARELLAN VALE

10. Three copies of this report should be sent to:

Ms Lou Ewins
Manager Cultural Heritage Unit
Sydney Zone, DEC NSW
PO Box 686
PARRAMATTA, NSW, 2134.

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