

Archaeological Report

117 Hollinsworth Road, Marsden Park

Prepared for

Logos Property Group

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ASSOCIATES
Archaeology and Heritage

Aboriginal Cultural Heritage Management

Archaeological Report

117 Hollinsworth Road, Marsden Park

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EXECUTIVE SUMMARY

Logos Property Group intend to rezone and develop land within the Marsden Park Industrial Precinct at 117 Hollinsworth Road, Marsden Park (Lots 23 and 24 DP262886). The study area is located in a previously semi-rural area that has been fully cleared in the past and retains only scattered regrowth trees over minimally managed pasture. The proposed work will involve subdividing the current property into four lots with the balance of land given over to access roads and stormwater management infrastructure. The type of industrial development proposed will shape the land into level construction sites for very large warehouse structures, serviced by an evenly graded access route. The consequence is that the entire area will therefore be subject to earthworks with little potential to retain original soil profiles.

The report includes background information on the Aboriginal cultural context and history of the area as well environmental information such as geology, soils, land use history and landscape characteristics. The archaeological context is presented in terms of the regional context of previous research and the distribution of site listings as well as aspects of archaeological theory and site classification that are relevant to the study.

While the approach of the archaeological investigation allowed for test excavation in the methodology distributed to RAPs, it was found that a reliable artefact distribution model was entirely possible based on detailed exposure-based survey alone. This is consistent with the Code insofar as it states that "The first priority in test excavations, and recording Aboriginal objects during test excavations, must always be to avoid or minimise, as far practicable, the risk of harm to the objects under investigation. This means due care must be taken when excavating and collecting objects, and that unnecessary excavations do not comply with this Code" (DECCW, 2010b, p. 24).

Exposure-based survey is an investigative methodology that has been developed and refined by the author over the last eight years. Given sufficient areas of suitable soil exposure, it has been found to more reliably construct an artefact distribution model than anything but very extensive archaeological test excavation. It relies on seeking out all areas of exposure, measuring their extent and undertaking intense (full coverage) search for flaked stone artefacts. With finds thus expressible in terms of density in precisely mapped sample units, the data are then used exactly as test excavation data are for the purposes of artefact distribution modelling.

The model is based on a division of the study area into six Landscape Zones based on proximity to water, hill and ridge top landscape features and slope which are then ascribed different relative densities of artefacts. Analysis is presented in terms of results for the study area alone as well within the context of a larger area incorporating two recent investigations using the same methods on adjoining land.

253 discrete areas of exposure totalling 2638m² were measured and searched for artefacts, of which 31 were recorded. The reliability of the artefact distribution model is aided (and verified) by the integration of the additional archaeological investigation data from adjoining land comprising an additional 132 exposures measuring a combined 2527m². Excavation data on that adjoining land comprising 24.75m² (recovering 17 artefacts) is also used to verify the reliability of the model.

The results indicate that most of the study area has nil-low artefact density defined in the report as 'Sparse Lithic Sites'. However, there is also a definable area of moderate density archaeological potential associated with the single discrete hill top in the study area described as a 'Dispersed Lithic Site'. The areas of Sparse Lithic Sites are considered to have low archaeological significance, while the 'Dispersed Lithic Site' is of moderate significance.

The two key **recommendations** made are that:

1. An AHIP be sought to permit harm to Aboriginal objects in completing the proposed subdivision and industrial development of the land.
2. As a mitigation for the impact, the AHIP should include a condition of salvage excavation within the hill and ridge top area.

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

Logos Property Group (trading as 'Perpetual Corporate Trust Limited as the Trustee for the LALV Marsden Park Trust') intend to rezone and develop land at 117 Hollinsworth Road, Marsden Park 2765 (Lots 23 and 24 DP262886, County of Cumberland, Parish of Rooty Hill, Blacktown Local Government Area, Deerubbin Local Aboriginal Land Council area) (**Figure 1**). The land is within the Marsden Park Industrial Precinct.

On the basis of potential impact to Aboriginal cultural heritage, Associates Archaeology & Heritage Pty Ltd (AA&H) has been engaged to undertake the appropriate assessment to ensure compliance with the *National Parks and Wildlife Act 1974*. This report is a formal Aboriginal Cultural Heritage Assessment (ACHA) and Archaeological Report prepared to support an application for an Aboriginal Heritage Impact Permit (AHIP).

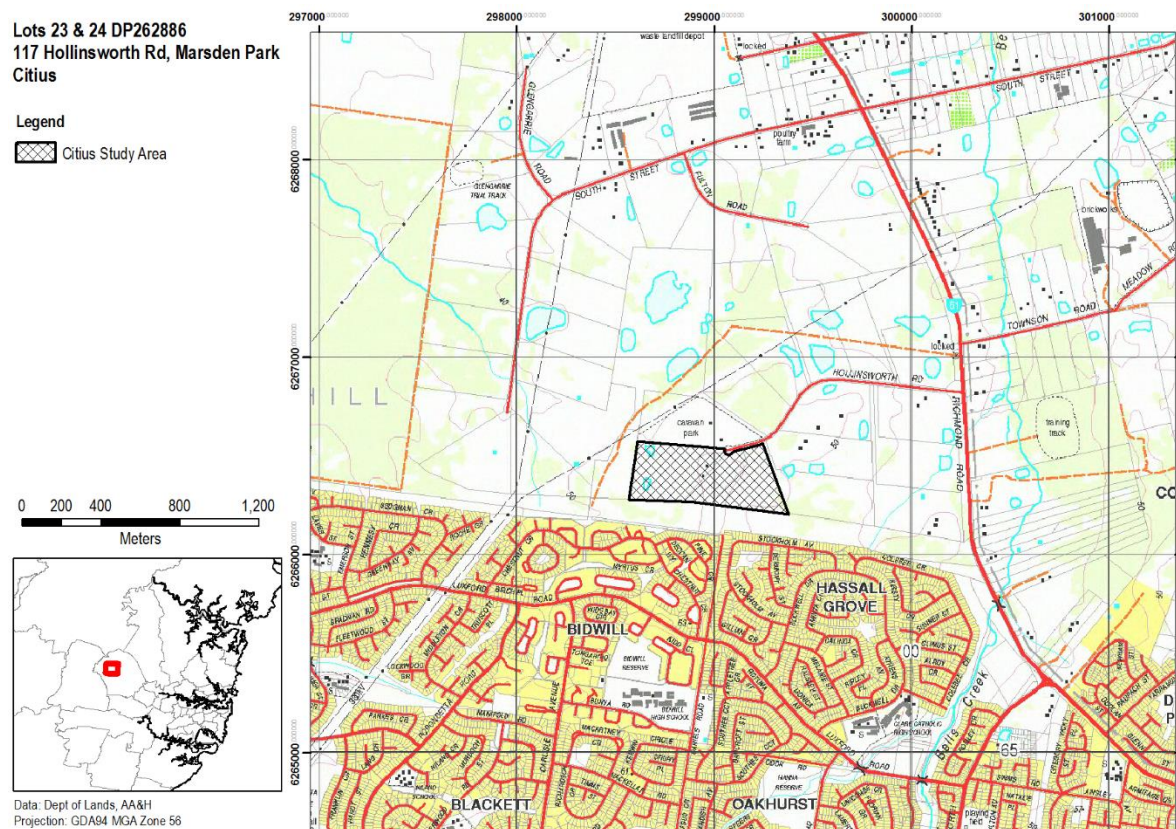


Figure 1: Location

1.2 REPORT STRUCTURE

Application for an AHIP requires that an ACHA is prepared as a separate document from an appended Archaeological Report. The contents and format of an ACHA are prescribed by the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH, 2011)

whereas the Archaeological Report must follow the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010b). Because these two guides require much of the same content, the result is that the ACHA is inevitably a document with an appendix (Archaeological Report) that duplicates much of its content. In general however, the ACHA focuses more on aspects of community consultation, the evaluation of cultural significance and associated management measures, whereas the Archaeological Report deals more with the outcomes of archaeological investigation.

1.3 CONTRIBUTORS AND ACKNOWLEDGEMENTS

This report has been produced by Associates Archaeology & Heritage and written by Oliver Brown. Oliver holds the appropriate qualifications for undertaking the investigation as required by the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b). Fieldwork was undertaken with Steve Randall of the Deerubbin Local Aboriginal Land Council.

Table 1: Proponent and consultant contact details

	Heritage Consultant	Proponent
Company	Associates Archaeology & Heritage	Logos Property Group (trading as 'Perpetual Corporate Trust Limited as the Trustee for the LALV Marsden Park Trust')
Contact person	Oliver Brown	James Greener
Email	oliver@archassociates.com.au	jamesgreener@logosproperty.com
Address	29 Hannan Street, Maroubra, NSW 2035	L12, 123 Pitt Street, Sydney NSW 2000
Phone	0427 414 226	02 8197 3900

1.4 STUDY AREA AND PROPOSED WORKS

The study area is located in a previously semi-rural part of Marsden Park that is being developed into industrial land within the Marsden Park Industrial Precinct. The land has been fully cleared in the past and retains only scattered regrowth trees over minimally managed pasture (**Figure 2**).

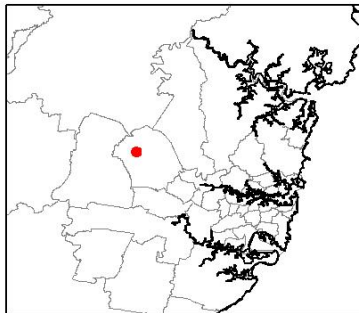
The proposed work will involve subdividing the current property into multiple lots with the balance of land given over to access roads and stormwater management infrastructure. The type of industrial development proposed is intended to shape the land into level construction sites for very large warehouse structures, serviced by an evenly graded access route (**Figure 3**). The consequence is that the entire area will therefore be subject to earthworks with little potential to retain original soil profiles.

Lots 23 & 24 DP262886
117 Hollinsworth Rd
Marsden Park

Legend

-  Study Area
-  2m Contour
-  Actual Former Drainage
-  Mapped Drainage

0 50 100 200
Meters



Data: Dept of Lands, AA&H, Logos
Projection: GDA94 MGA Zone 56

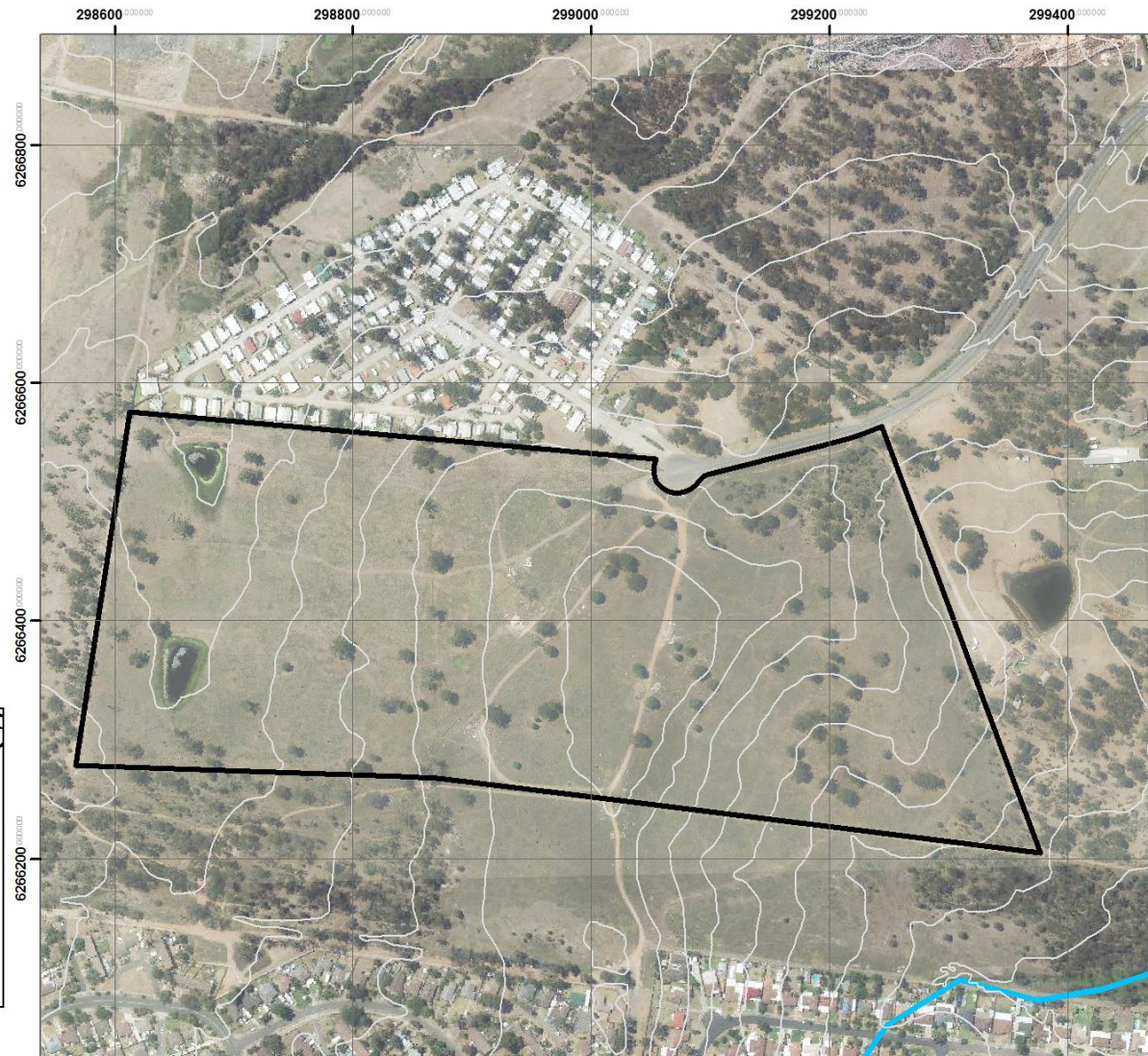


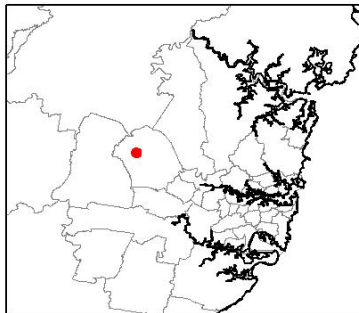
Figure 2: Aerial image and extent of study area

Lots 23 & 24 DP262886
117 Hollinsworth Rd
Marsden Park

Legend

 Study Area
 2m Contour

0 50 100 200
Meters



Data: Dept of Lands, AA&H
Projection: GDA94 MGA Zone 56



Figure 3: Proposed development

2 STUDY AREA SETTING

2.1 ENVIRONMENTAL CONTEXT, GEOLOGY AND SOILS

The study area is in a landscape typical of the Cumberland sub-region of the Sydney bioregion; being a gently undulating landscape bisected by north flowing drainage lines. The original vegetation would have been Cumberland Plain Woodland dominated by eucalypts over grassland kept relatively open through regular burning from Aboriginal firing and natural bushfire.

The underlying bedrock is Bringelly Shale (part of the Wianamatta Group of shales with occasional interbedded fine grained sandstone). Soils are described as part of the Blacktown Soil Landscape, comprising shallow (~20cm) A-horizon soils, typically silty loams to silty clay loam overlying clay B-horizon; all derived largely from the underlying shale. This soil has a low susceptibility to erosion when vegetated and free from disturbance but will erode completely down to the clayey B-horizon when damaged by intensive stocking and mechanical impact. The study area includes some areas where vehicle tracks have damaged most of the soil profile.

2.2 LANDSCAPE CHARACTERISTICS AND WATER

The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW, 2010a) defines a number of landscape features with high potential for the occurrence of Aboriginal objects that essentially trigger a requirement for either avoiding impact or undertaking further archaeological investigation. Of these factors:

- A small portion of the study area is within 200m of water, although at its closest this is 120m from a small unnamed tributary to Bells Creek. The influence of freshwater sources on the likely occurrence of artefacts is so well established in western Sydney (and Aboriginal archaeology in general) that it is generally the most important consideration in predictive models of open site distribution (White & McDonald, 2010) – see **Section 3.4**. In a large scale study of the Hills Shire (in the northern Cumberland Plain) of a total of 219 sites with verifiable locations, 94% were within 200m of water and those that weren't were mostly isolated finds (Brown O. , 2010). Only one site was located more than 300m from mapped water (**Figure 4**).
- There is a low hilltop with an associated ridgeline running to the northeast corner of the property. While distribution patterns in relation to hilltops are not as well established as they are with water, a number of studies have clearly shown that with hilltops that are distinctive features in the landscape, a higher likelihood of artefact occurrence can be dependably predicted (Brown, Farquharson, Mitchell, & Wilby, 2007b; Brown O. , 2016a).

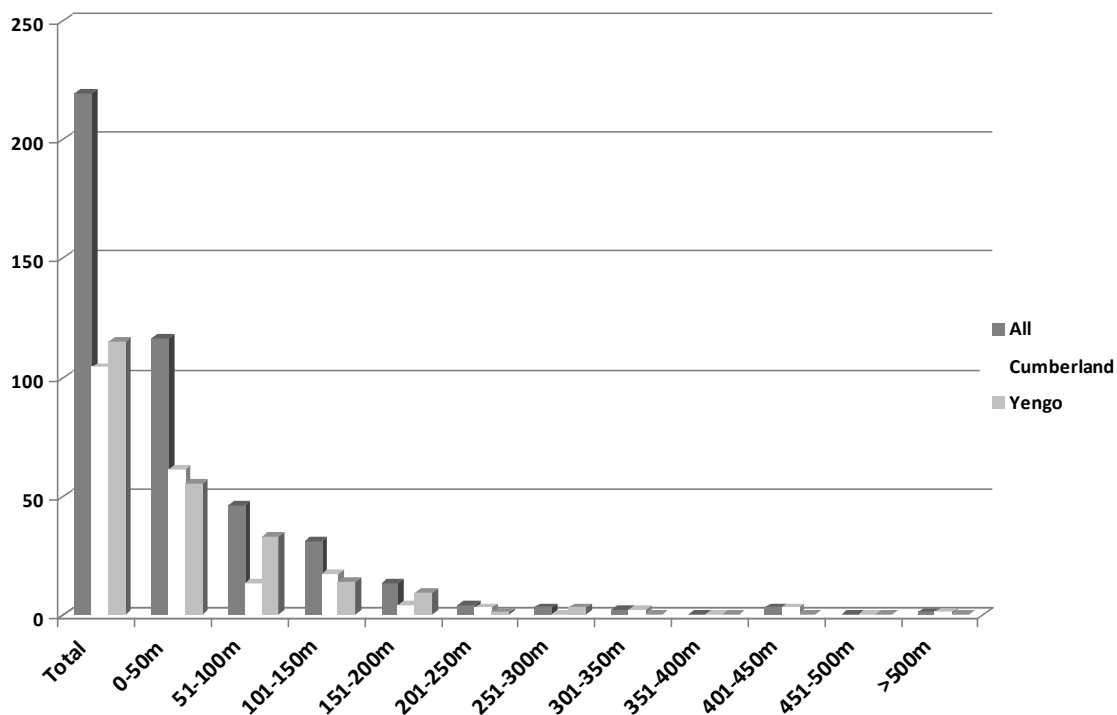


Figure 4: Site proximity to water in the comparable landform of the Hills Shire (Brown 2010b)

2.3 LANDFORM ZONES

The study area has been divided into six Zones which are subsequently used in developing the artefact distribution model (**Figure 5**). An additional four zones apply to neighbouring properties that are also included in the assessment process (as outlined below in **Section 4.2**). These are inevitably somewhat arbitrary, but are considered appropriate to the scale of the study area and the amount of data from archaeological investigation that can be applied to them for the purposes of artefact distribution modelling. They comprise:

- **West Slope:** Comprising gently sloping land across the western half of the study area with no elevated features and entirely >300m from water. On the basis of regional artefact distribution models it would be expected to have nil – low artefact occurrences.
- **West Hill:** Comprising a low by quite discrete hill within the study area. While not an especially distinctive landscape feature, it is nonetheless considered likely to have attracted some focus of use by Aboriginal people and was therefore considered likely to have some artefactual evidence.
- **Ridge:** Comprising a relatively indistinct saddle between the 'West Hill' (within the current study area) and an 'East Hill' in adjoining study areas where some higher artefact instances were recorded.
- **South Slope:** Comprising sloping land between the ridge and hilltops and the three zones determined purely by distance to water to the south.

- **200m to 300m to Water:** Self-explanatory
- **100m to 200m to Water:** Self-explanatory
- **50m to 100m to Water:** Self-explanatory. Not within study area, but relevant insofar as predicted higher artefact density information provides a comparative reference for areas within the study area.
- **0m to 50m to Water:** Self-explanatory. As above.
- **East Hill:** Not within the study area, but relevant to the potential distribution of artefacts within the 'Ridge' and 'West Hill'.
- **North Slope:** Not within the study area but potentially relevant insofar as artefact distribution would be expected to be largely similar to the 'West Slope'.

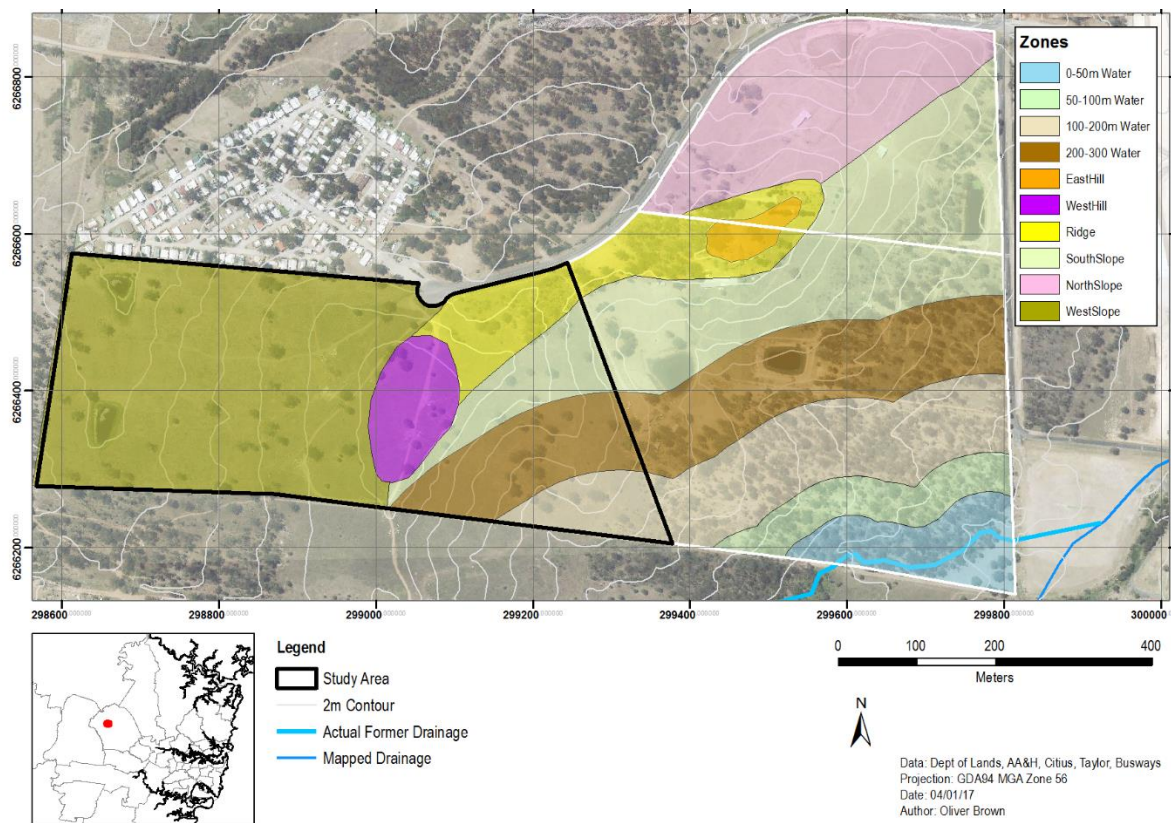


Figure 5: Landform zones



Plate 1: View northeast along interface of 'South Slope' and '200-300m Water'; southern boundary on right, 'West Hill' on left



Plate 2: View northwest across 'West Slope'; buildings over northwest boundary on right, western boundary on left

2.4 LAND USE HISTORY

Following the arrival of the British in Australia in 1788, with Parramatta settled that same year, farms were being settled across the Blacktown LGA from as early as the 1790s. The subject area is likely to have been mostly cleared in the early 19th Century for grazing. With the main focus of grazing shifting west of the Great Divide from the mid-19th Century, it is however quite possible that the grazing intensity was largely quite light, but the land has nonetheless been subject to changes affecting the original soil profile for two centuries.

The early 20th century appears to have come with little agricultural pressure, although it is likely to have been cleared again for grazing after the 1920s as a Soldier Settlement block. Aerial imagery in 1975 shows the western third of the block under regrowth vegetation and the eastern two thirds as almost fully cleared (**Figure 6**).

More recent soil disturbance relates to a couple of informal but heavily used tracks from Hollinsworth Road across to the neighbouring areas of Hassall Grove and Bidwill and some quite extensive recreational motocross tracks. Whilst constituting significant landscape damage to the study area, these have also been used to obtain very good subsurface visibility for the purpose of archaeological investigation.

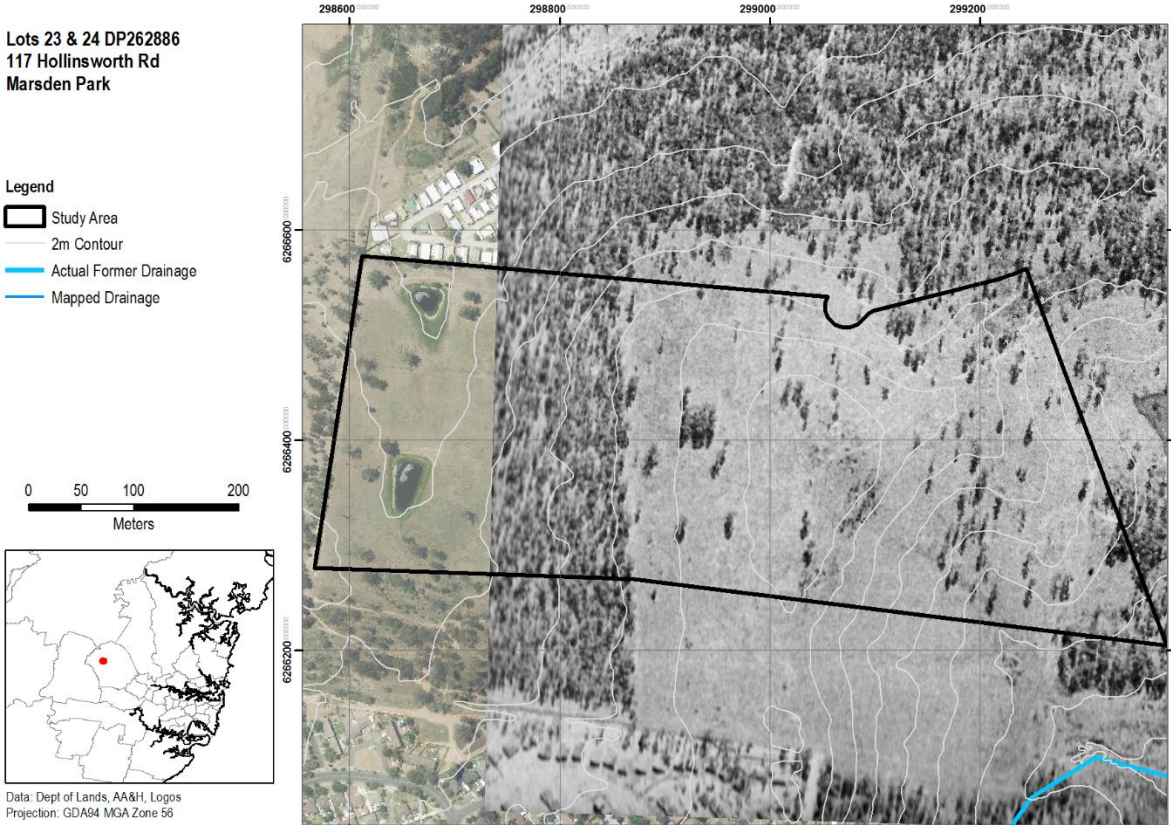


Figure 6: 1975 aerial imagery

3 ARCHAEOLOGICAL CONTEXT

3.1 REGIONAL CHARACTER

Within the shale country of the Cumberland sub-region, sites are overwhelmingly dominated by open artefact concentrations typically located near to freshwater resources. A considerably smaller number of scarred tree and stone quarry sites are also recorded. Where these have been dated, ages are typically within the last 2,500 years; with the older dates providing evidence of the great antiquity of Aboriginal occupation back to >30,000 years being limited to a few Pleistocene deposits on the Parramatta and Nepean Rivers.

3.2 AHIMS DATA

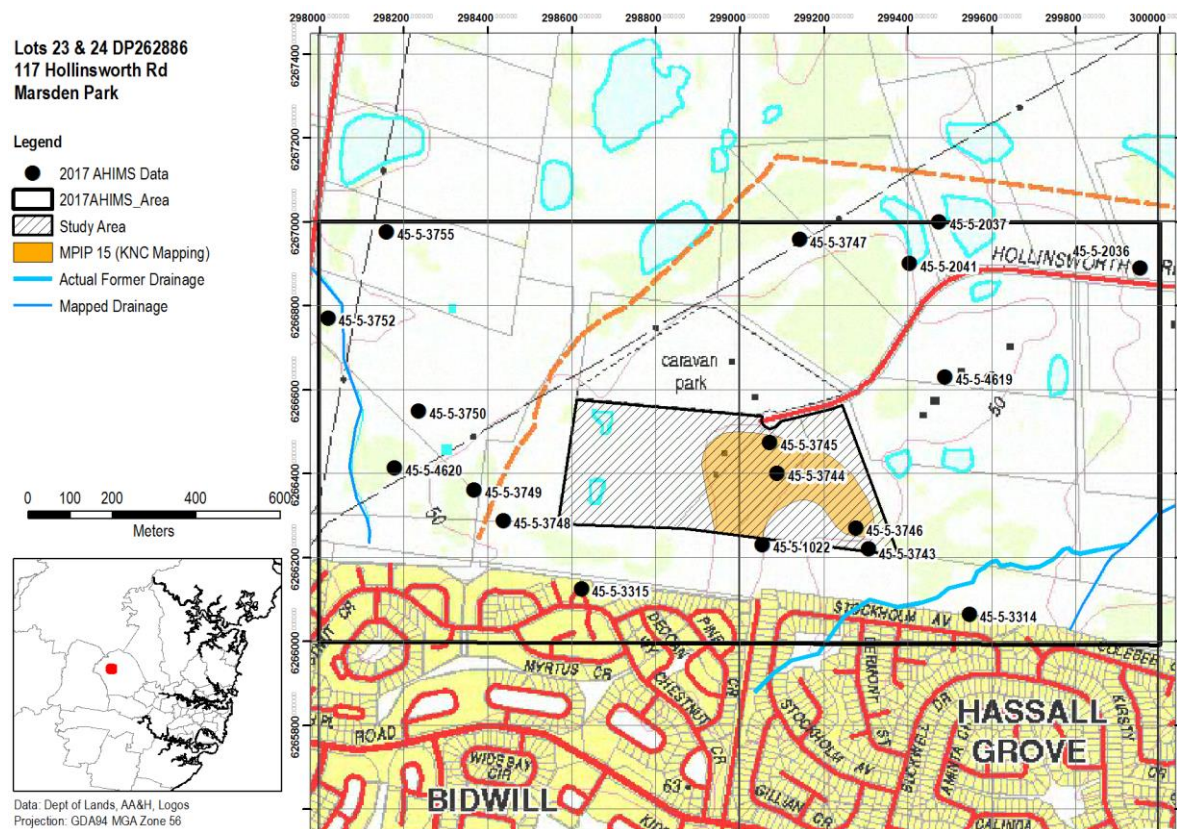


Figure 7: AHIMS listed sites following KNC assessment

The AHIMS listed sites for the area are largely the result of (or verified by) the previous assessment work for the Marsden Park Industrial area undertaken by Kelleher Nightingale (Kelleher Nightingale Consulting, 2009) and subsequently in a further assessment of the current study area (Kelleher Nightingale Consulting, 2015).

Of the 19 sites in the current search (Client Service ID: 260990), there is one PAD where artefacts are thought likely to occur and 18 confirmed artefact sites, including a PAD listed by KNC (45-5-4619) since confirmed as a site and listed as 45-5-4713 (some 400m NW of current study area as

shown in **Figure 7**). The Extensive Search data are provided in **Appendix 3**. A wider review of 120 surrounding sites has similarly found that are listed on the basis of recorded or potential stone artefacts with the exception of the nearby site of the former Blacktown Native Institute (AHIMS # 45-5-0398), which is listed on the basis of contemporary and historic values (Brown O. , 2015). There are no Aboriginal Places (locations nominated and listed as having special significance to the Aboriginal community) for the study area.

Kelleher and Nightingale made four site listings within the current study area (**Table 2**) although these all essentially relate to one site – MPIP15 – as shown in the orange shading of the site extent that they reported in **Figure 7**.

Table 2: Sites listed within the study area

AHIMS #	Site Name	Site Type
45-5-3743	MPIP 14	Artefact : 3
45-5-3744	MPIP 15	Artefact : 1
45-5-3745	MPIP 15A	Artefact : 1
45-5-3746	MPIP 15B	Artefact : 1

3.3 PREVIOUS STUDIES

3.3.1 REGIONAL

North-western Sydney is perhaps the most studied archaeological landscape in New South Wales due to the extent of development of greenfield sites in recent decades combined with an abundance of stone tool raw material leading to an almost ubiquitous distribution of 'Aboriginal objects' (as defined in the *National Parks and Wildlife Act 1974*).

The regional archaeological context for western Sydney has been widely and consistently summarised in something in the order of a thousand previous reports (583 being a count made in 2008, after which at least a few hundred more will have been written (RTA and DECC, 2008)). Significant regional studies were completed in the 1980s, covering large areas such as the Blacktown LGA (Haglund, 1980), the western Cumberland Plain Kohen (Kohen, 1986; 1993) and the northern Cumberland Plain (Smith, 1989). More recently, McDonald in particular has provided important synthesis of extensive consulting archaeological work in the area (focused around the Rouse Hill Development area (JMcDCHM, 2005; White & McDonald, 2010)).

3.3.2 LOCAL

The Marsden Park Industrial Precinct (of the study area is a part) was subject to full Aboriginal cultural heritage assessment in 2009 by Kelleher and Nightingale Consulting. That study identified 42 new sites within the MPIP in addition to 21 previously known sites. The study also identified four areas of Potential Archaeological Deposit (PAD). Of these sites, two sites (considered here to be just one) were recorded within the current study area:

MPIP 14: “consisted of three artefacts located in a mid slope context on the western margin of a stand of moderately dense young eucalypt trees. The area consists of patchy to dense grass cover, with a cleared, unformed vehicle access track running along the property boundary immediately to the south. The area appeared to be relatively intact, with vegetation clearance the main impact. The artefacts consisted of two red silcrete flakes and one red silcrete medial flake” (Kelleher Nightingale Consulting, 2009, p. 24). The site was recorded and mapped as a single point.

MPIP 15: “was located on a highpoint and associated narrow spur line south of the western termination of Hollinsworth Road. MPIP 15 was a predominantly cleared, pastoral area scattered with occasional large trees. The highpoint is located on an undulating ridgeline that runs north from Hassall Grove and then northeast from MPIP 15 along the southern margin of Hollinsworth Road. The surrounding area slopes gently-moderately down to the west, and moderately steep down to the east. Running south-east off the highpoint, and included as part of MPIP 15, was a narrow, gently sloping spur line” (Kelleher Nightingale Consulting, 2009, p. 24). In the current view, the ridgeline running to the nearby hill is considered to be more relevant landscape factor associated with higher artefact likelihood. The site was recorded and mapped as an area (polygon) within which two artefact locations were included:

- “MPIP 15A was a single artefact located in an upper slope context approximately 90m north of the crest of the highpoint, and 45m south of the western termination of Hollinsworth Road. The artefact was identified on a narrow (<50cm wide), deflated walking track that leads south of Hollinsworth Road, across the highpoint into Hassall Grove. The surrounding area was predominantly cleared, pastoral land with occasional large trees. The area appeared to be relatively intact, with vegetation clearance and the walking track the main impacts. The artefact was a red silcrete flake”.
- “MPIP 15B consisted of one artefact located in a mid slope context in the centre of a narrow spurline running south-east from the highpoint approximately 250m to the west. Site MPIP 15B was 60m north-west of site MPIP 14. Site MPIP 15B at the base of a tree in a largely cleared, pastoral area, with occasional large trees and dense grass cover. Surface exposures were primarily located around the base of the occasional large trees. The area appeared to be relatively intact, with vegetation clearance the main impact. The artefact was a red silcrete flake”.

The PAD was assessed as having moderate Aboriginal cultural heritage significance. For such areas the following recommendations were made in cases of proposed impact: (Kelleher Nightingale Consulting, 2009, p. 45):

“Test/salvage excavation should be undertaken at some of the impacted sites under a section 87(1) permit to mitigate against the loss of information. Strategy for test/salvage excavation would depend upon the layout of the Master Plan. (Note: test excavation may or may not be associated with the section 90 consent). DECC Interim Community Consultation Requirements for Applicants would be implemented”.

It is noted that the regulatory framework has changed since these recommendations following the

passage of the *National Parks and Wildlife Amendment Act 2010*. Under the current regime, this translates to the approach that is being taken in the current assessment.

3.4 PREDICTIVE MODELLING

In terms of assessing and predicting the distribution and potential for harm to any Aboriginal Objects (as defined in the NPW Act) within the study area, the current assessment can be limited to stone artefacts. This is confirmed by the AHIMS data (**Section 3.2**) and the recent fieldwork. With regard to other potential site types, it is noted that survey has confirmed the absence of any potential culturally scarred trees; there are no Aboriginal Places (locations nominated and listed as having special significance to the Aboriginal community) in or adjacent to the subject area; burial sites typically do not occur in the region outside of sandy or rockshelter contexts; midden (or other faunal) deposits do not generally occur on Blacktown Soils on minor creeks; and stone arrangements have not been recorded in Sydney shale country.

Predictive modelling of the likelihood of Aboriginal archaeological sites comprised of stone tools is well developed for the Cumberland sub-bioregion due to the large number of studies associated with development in western Sydney over recent decades. In relation to stone artefact sites, these may be found as isolated occurrences ('isolated finds'), in concentrations marking the locality of heavily used 'activity areas' (previously referred to as 'open camp sites'), or may be predicted to occur as undetected subsurface deposits ('potential archaeological deposits' (PADs)). Occasionally, additional evidence such as hearths may be found in association with these stone artefacts.

Starting in the 1980s, Haglund (1980), Kohen (1986; 1993) and Smith (1989) analysed strong correlations between the location of artefact sites and proximity to water in western Sydney – i.e. the Cumberland sub-bioregion. These patterns have been further investigated and formalised into predictive 'models' such as McDonald's 'stream order model' (JMcDCHM, 2005; White & McDonald, 2010) and Baker's 'activity zones model' (Baker, 1998; AMBS, 2000). While more recent GIS-based models do provide for some statistical determination of site likelihood, predictive modelling more frequently involves a largely discursive consideration of a number of principles. The most significant of these is proximity to water.

Other work by White and McDonald (2010) reviewing the large body of data from archaeological investigation of the Rouse Hill Development Area further refined the understanding of artefact location and proximity to water in relation to drainage of different stream orders. For 1st order streams (such as occurs 120m from the current study area), they found that the correlation with proximity to water was relatively weak and essentially representative of a general low density background scatter. For 2nd order streams, the pattern of high density within 50m previously observed by some authors since the 1980s (see above) was confirmed; however for the larger 4th order streams, density was found to be highest between 50m and 100m of water.

While 'complex sites' (as defined below in **Section 3.5**) where stone tools were either manufactured or extensively maintained did essentially have nearby freshwater as a precondition for use, lower density artefact concentrations may also occur elsewhere in the landscape, particularly on prominent ridge and hill tops. These are best envisaged as sites where people would be more inclined to stop

whilst out and about in the course of a day's work or travel and are more formally described as 'dispersed sites' in the classification scheme of this assessment outlined below in **Section 3.5**.

Beyond such sites of artefact concentration, Aboriginal people also obviously used the entirety of the landscape and in doing so inevitably left some artefactual evidence across it. This is considered to be a part of the 'background scatter' of artefacts that is theoretically present across most landscapes in Australia.

Predictive modelling as outlined above is done based on an initial assumption of a landscape undisturbed by development. Where development has essentially destroyed pre-European soil profiles, the statutory framework for heritage management tends to assume that the Aboriginal objects in it are also destroyed – although unless topsoil has been physically removed, this is inevitably not actually the case.

The sum of the information above provided a prediction for the study area to most likely contain some Aboriginal objects. They were considered likely to be concentrated along the ridgeline, although the considerable distance to water indicated that they would be present in low density.

3.5 SITE CLASSIFICATION SYSTEM

Archaeologists have established numerous ways of characterising those places where there is enough Aboriginal cultural material evidence for a place to be called a 'site'. Lewis Binford (1980:9-10) characterised the major types of hunter-gatherer sites as:

- 'Residential (home) bases' defined as "the hub of subsistence activities, the locus out of which foraging parties originate and where most processing, manufacturing, and maintenance activities take place"; and
- 'locations' defined as "a place where extractive tasks are exclusively carried out ... only limited quantities [of food and raw materials] are procured there during any one episode and therefore the site is occupied for only a very short period of time ... abandonment of tools is at a very low rate. In fact few if any tools may be expected to remain at such a site"

Among these 'locations' Binford also described sites relating to foraging activities such as hunting hides, overnight camps, butchery locations, raw material sources, etc to cover the full range of landscape use of the foraging people he observed.

Working with the Anbarra people in Arnhem Land, Meehan used the term 'dinnertime camp' for a site of daytime use where gathered resources were promptly consumed near to where they were obtained and occasionally processed for removal (Meehan, 1982). The use of 'dinnertime camp' as a term owes as much to Aboriginal use of English as it does to specific Aboriginal land use, and while attractive can nonetheless be misleading for a similar kind of daytime use where food was not consumed (e.g. expedient tool maintenance or simply resting). Meehan herself has gone on to suggest that the term has been used beyond the concept that she intended (Meehan, 1988). Nonetheless, it remains useful for considering dispersed sites away from water where people are

most likely to have stopped in the course of their day's work with an inference that site accumulation resulted from multiple brief visits.

In analysing stone tool assemblages in western Sydney that were excavated on hill and ridge tops, Brown and others have noted some lithic sites as having some parallels to 'dinnertime camps' even though nothing about food use could ever be inferred with such sites (Brown, Wilby, Mitchell, & Farquharson, 2007a; Brown, Farquharson, Mitchell, & Wilby, 2007b). At the time, these were likened to an archaeological signature of Aboriginal people out and about in their landscape 'at work' rather than the creekside sites with far higher densities of lithics that are the archaeological signature of people 'at home'; fitting well with the stream order modelling of others at the time (JMcDCHM, 2005). In relation to the continuum of lithic site types in western Sydney from tool manufacture sites with up to a thousand flaked pieces per square metre down to the single artefact isolated find, Beth White has questioned the use of terms like 'domestic' at all (pers. comm.). At the simplest level, tool manufacture producing thousands of sharp stone shards and 'domestic' use inclusive of activities like children's play would not seem mutually conducive, and yet archaeologists remain tempted to classify any areas of high lithic density as domestic camps. Indeed, the Aboriginal Heritage Information Management System (AHIMS) database, on which the recording of an archaeological site is a legal obligation in NSW, previously required that any site with more than one stone artefact outside of a rockshelter be described as an 'open camp site'.

On the basis of work at Mungerie Park in western Sydney, Baker has proposed a system for characterising sites according to an 'activity zone model' in relation to proximity to a freshwater creek in the western Cumberland Plain (Baker, 1998; AMBS, 2000). Although this was largely intended for use in relation to predicting the likelihood of sites occurring, there are inferences that follow from the varying density of lithic material that provides for assumptions to also be made about site use. Baker's zones were:

- "Complex zone" within a couple of hundred metres of the creek contains overlapping knapping floors and high densities of lithics. Representing sites with repeated use, these may also be stratified.
- "Dispersed zone" with discrete artefact concentrations typically further from streams representing occasional use away from the major foci of occupation or resource use areas.
- "Sparse zone" with consistently low density artefact distribution.

The classification system used in this report is based largely on Baker's model in terms of lithic characteristics (**Table 3**). However, it also adopts the likely site use terms discussed above by Binford (1980) and Meehan (1982; 1988) as well as considerations provided by Attenbrow (2002; 2004). A deliberate aspect of this combination is that it uses terms that are specifically not suggestive of any human behaviour other than that which is certain to have occurred. Therefore, words like 'domestic', 'camp' and 'residential' are largely rejected so that inferences about sites are not made before they have been properly understood.

Table 3: Site Classification System used in this assessment

Complex	A site in which dedicated stone tool manufacture and maintenance was among the range of
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Lithic Site	activities undertaken. The stone tool working will have led to areas with high densities of lithics and some representation of the earlier stages of lithic reduction. With likely repeated use over long periods, such sites may also be stratified. Accepting that such debitage densities may not be compatible with some residential activities such as sleeping and children's play, an apparent centre to a complex lithic site may actually mark an area marginal to most of the activity that may have occurred more generally (which can sometimes be used to explain why peak artefact densities may not occur in the areas of greatest amenity)
Dispersed Lithic Site	A concentration of lithic material away from a site likely to have been a 'residential base' (in Binford's terminology) and representing a range of lithic reduction evidence generally focused away from initial manufacture, other than small tool manufacture from small portable cores, and more on later stages such as tool maintenance/curation, discard of unwanted material and occasional loss of functioning tools. This is the site type predicted in this assessment for MPIP15 – as noted also in its assessment by Kelleher and Nightingale (2015).
Sparse Lithic Site	Anything from a single isolated find to a low density occurrence of lithics (often recorded as 'isolated finds') considered to be part of the 'background scatter' of lithics generally accepted to be across most landscapes. The circumstances of deposition – in the sense of a site use – will almost invariably remain unknown.

4 ARCHAEOLOGICAL SURVEY

4.1 EXPOSURE-BASED SURVEY APPROACH AND RATIONALE AGAINST TEST EXCAVATION

Archaeological survey in western Sydney follows a surprisingly wide array of different methodologies from relatively passive general site inspection, regular spaced transects and adaptive meanders to the high intensity exposure-based approach taken here – outlined below.

Using this approach, archaeological survey has been found to provide sufficient data to reliably model the artefact distribution within the study area without the need for test excavation. This relies on four key contributive factors:

- The previous work by Kelleher and Nightingale (2009, 2015) that provides a relatively reliable founding distribution model;
- A high intensity exposure-based survey (outlined below) able to capitalise on extensive subsurface exposure caused by car and motorbike tracks, locating 31 artefacts within 2638m² of exposed ground.
- The integration of extensive survey data from the adjoining two properties comprising an additional 133 artefacts recorded on an additional 2527m² of exposed ground;
- The ability to use test excavation data from the adjoining properties to:
 - a) test the reliability of the exposure-based survey and
 - b) determine that additional excavation data would not meaningfully improve the model; and
- The fact that in lieu of test excavation it is intended that more archaeologically meaningful salvage excavation be undertaken instead.

Exposure-based survey is an investigative methodology that has been developed and refined by the author over the last eight years. Given sufficient areas of suitable soil exposure, it has been found to more reliably construct an artefact distribution model than anything but very extensive archaeological test excavation. This is demonstrated in this study below in **Section 4.5** as well as other studies (Brown O. , 2016a). It relies on seeking out all areas of exposure, measuring their extent and undertaking intense (full coverage) search for flaked stone artefacts. With finds thus expressible in terms of density in precisely mapped sample units, the data are then used exactly as test excavation data are for the purposes of artefact distribution modelling.

The efficacy of the method relies on dividing a study area up into meaningful landform zones based on proximity to water, slope and the isolation of distinctive landscape features such as ridge and hill tops. All data for each zone are then pooled and each zone is thereby provided measure of artefact density (artefacts per 100m²) that is an accurate expression of its relative archaeological sensitivity and potential significance. The exposure survey data can also be used to calculate survey coverage as required by the Code (**Table 4** and **Table 5**).

Recent studies in an Australian context have noted that test excavation at anything but very close spacing (<5m) has a low likelihood of intersecting discrete artefact concentrations or knapping events, finding for example that for test units to have better than even odds of detecting a concentration they need to be closer than the 5m spacing permissible under the Code (Way, In press). Given that test excavation would therefore seem not to be fit for specific artefact concentration detection, it is appropriate to question what test excavation is for. The Code states that it is:

“To collect information about the nature and extent of sub-surface Aboriginal objects, based on a sample derived from sub-surface investigations. Test excavations contribute to the understanding of site characteristics and local and regional prehistory and they can be used to inform conservation goals and harm mitigation measures for the proposed activity” (DECCW, 2010b, p. 24).

The Code also states that:

“The test excavations permitted by this Code are limited in their scope as described below. The first priority in test excavations, and recording Aboriginal objects during test excavations, must always be to avoid or minimise, as far practicable, the risk of harm to the objects under investigation. This means due care must be taken when excavating and collecting objects, and that unnecessary excavations do not comply with this Code” (*ibid*).

Put another way, test excavation should only be used specifically only if, and up to such a point as, it is required to determine whether any part of the study area is of an archaeological significance to warrant:

- The avoidance of harm or conservation;
- Destruction under an AHIP on the basis of low significance; or
- Impact mitigation in the form of archaeological salvage excavation.

4.2 ASSESSMENT WITHIN A LARGER STUDY CONTEXT.

While the study area is formally confined to area shown above in **Figure 2**, with the current investigation and management recommendations limited to that parcel, it is noted that much of the assessment of Aboriginal cultural heritage potential is done in a wider context. This results from the ability to integrate data from two adjoining blocks undertaken over the last two years using the same investigation methods. In particular, this applies to the artefact distribution modelling which benefits from the integration of larger data sets.

4.3 METHODS

Survey was undertaken on 23rd November 2016 by Oliver Brown (Associates A&H) and Steve Randall (Deerubbin LALC). The property was covered on foot and by car sufficient to locate all significant areas of exposure. These were focused in the eastern, more archaeologically sensitive, half where vehicles have exposed large areas of soil.

253 discrete areas of exposure totalling 2638m² were measured and searched for artefacts. Locations were recorded using a handheld GPS. These were entered into GIS and combined with an additional 132 exposures measuring 2527m² on adjoining properties in order to improve the reliability of modelling.

4.4 RESULTS AND DISCUSSION

Thirty one (31) artefacts were recorded during the survey (**Table 4**) which, when analysed in terms of artefact density within the landform Zones, show a clear concentration on the ridge and hill top (**Figure 8**). This is consistent with the basic predictions and previous assessment (Kelleher Nightingale Consulting, 2015). Artefact density is low across the western side of the study area, as predicted. Density appears to taper off moving down the hill, although it is noted that there is slightly different pattern when the larger body of data is considered. This can be seen by comparing **Figure 8** and **Figure 9**.

When the results are put in the context of the wider dataset, the following further observations can be made:

- The relative density of artefacts in the current study area is diminished when compared to higher density occurrences found elsewhere nearer to water.
- The ranking of the 'South Slope Zone' decreases in the context of the wider dataset. This is considered to be because the artefacts within in the current study area may be derived from the adjoining ridge and hill top whereas across the wider area, they are more reflective of the low density expected for a landform more than 300m from water.
- The low density in the area 100-200m from water in the current study area is relatively increased with the wider dataset that includes slightly more level land that includes a greater proportion that is relatively closer to water.
- The artefact density on the 'East Hill', while likely to be relatively high, is based on a notably low sample area. It is also noted that the excavation data for that area may also be skewed by sample size – detailed in the report for that property (Brown O. , 2015). As a result, the possibility should be allowed that:
 - a) Of greatest relevance to the current study area, the 'East Hill' may not have artefact density that is as relatively higher than the 'West Hill' as current data suggest; and
 - b) The indication that it has higher relative artefact density to the area '0-50m from Water' may also be misleading. In support of this, when the small sample size for 'East Hill' is made up for by combining all ridge and hill top data into more reliable 58,220m² Zone with 1.78% survey coverage, that combined Zone ranks third after the 0-50m and 50-100m Zones as we would more reasonably predict (see additional entry at the foot of **Table 5**).

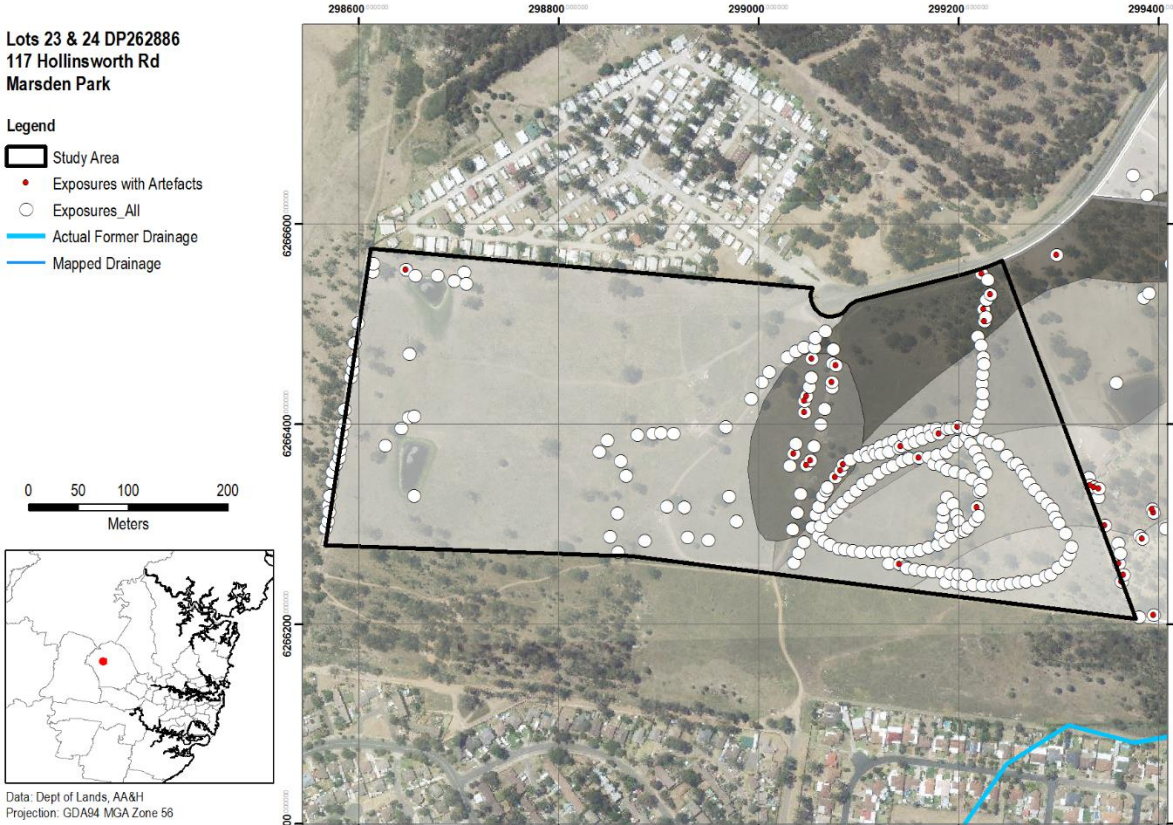


Figure 8: Artefact density represented by shading across the study area

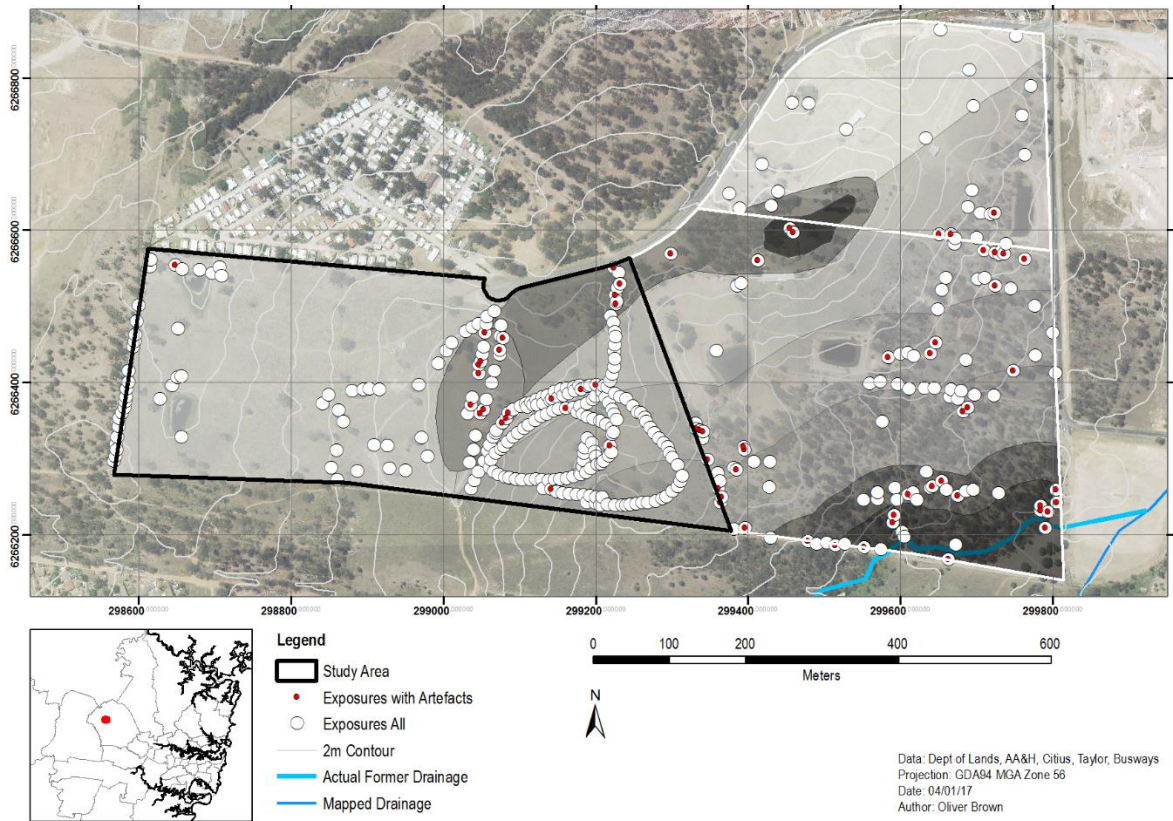


Figure 9: Artefact density represented by shading across the expanded study area

Table 4: Exposure survey data by landform zone and survey coverage (current study area)

	Area (m2)	Total area of Zone	% Survey	AFT	Aft/100m2	Rank
Ridge	120	16670	0.72	10	8.33	1
WestHill	360	15670	2.30	14	3.89	2
SouthSlope	732	18100	4.04	4	0.68	3
WestSlope	296.8	125750	0.24	1	0.34	4
200to300mWater	906	27650	3.28	2	0.22	5
100to200mWater	263	12920	2.04	0	0.00	6
TOTAL	2677.8	216760	1.24	31	0.22	

Table 5: Exposure survey data by landform zone and survey coverage (expanded study area)

Zone	Area (m2)	Total area of Zone	% Survey	Aft	Aft/100m2	Rank
EastHill	12	5180	0.23	7	58.33	1
50to100mWater	247.35	18900	1.31	18	7.28	2
0to50mWater	256.9	21550	1.19	18	7.01	3
Ridge	667	37370	1.78	30	4.50	4
WestHill	360	15670	2.30	14	3.89	5
100to200mWater	473.15	60350	0.78	12	2.54	6
200to300mWater	1537.3	78150	1.97	20	1.30	7
SouthSlope	1218	106680	1.14	14	1.15	8
WestSlope	280.8	125750	0.22	1	0.36	9
NorthSlope	112	58870	0.19	0	0.00	10
TOTAL	5152.5	528470	0.97	127	2.46	
All Ridge/Hill Combined	1039	58220	1.78	51	4.91	3

4.5 TEST OF RELIABILITY AGAINST ADJOINING TEST EXCAVATIONS

In support of the determination that test excavation has not been a necessary component of the archaeological investigation, test excavation results from the neighbouring properties are presented below in **Figure 10** and **Table 6**. Across those areas, a total of 99 test units were dug leading to the recovery of 17 artefacts. This sample size alone, when considered as just 13% of the 127 artefact sample size from exposure survey (with equally good spatial reliability), suggests that more than 700 test units would be needed to get an equally applicable assemblage. Or conceivably as many as 1000 test units to substantially improve the artefact distribution model reliability – an outcome that our confidence in the distribution model sees as unnecessary.

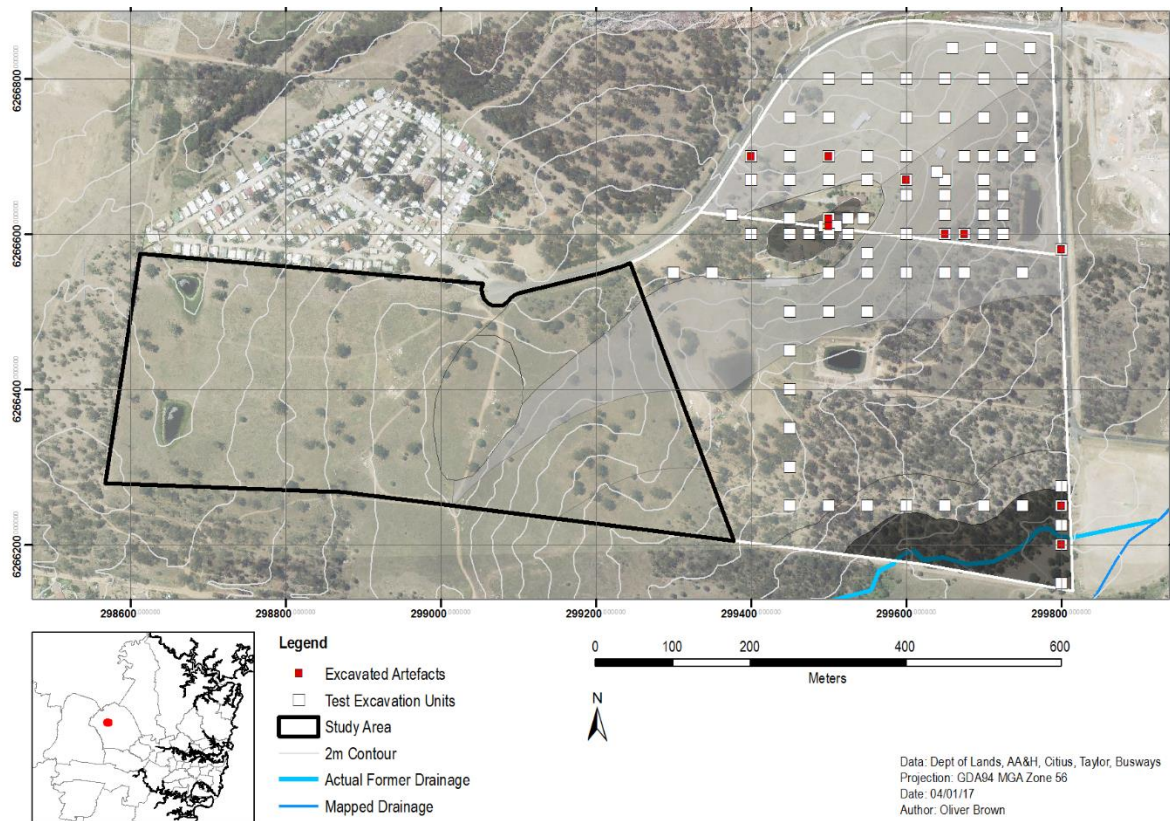


Figure 10: Artefact distribution model based on neighbouring test excavation

Table 6: Test excavation results in neighbouring properties by landform Zone

Zone	Area	Aft	Aft/m2	Excavation Rank	Exposure Rank	Final Interpreted Rank*
0to50mWater	1.25	4	3.20	1	3	1
50to100mWater	1.25	0	0.00	n/a	2	2
EastHill	3.5	7	2.00	2	1	3
Ridge	1.5	0	0.00	n/a	4	4
WestHill	n/a	n/a	n/a	n/a	5	5
100to200mWater	0.75	0	0.00	n/a	6	6
200to300mWater	0.75	0	0.00	n/a	7	7
SouthSlope	10	4	0.40	3	8	8
WestSlope	n/a	n/a	n/a	n/a	9	9
NorthSlope	5.75	2	0.35	4	10	10
TOTAL	24.75	17	0.69			

* This is a minor adjustment accounting for sampling issues on the 'East Hill', although of only limited relevance to the current study area.

4.6 SITE DEFINITION

Due to relatively close convergence of the previously listed sites MPIP15 (AHIMS # 45-5-3744; also incorporating MPIP 15A (45-5-3745) and MPIP 15B (45-5-3746) and MPIP 14 (45-5-3743), the results of the current archaeological investigation will not result in changes to those listings. There is therefore only one new site listing. This has been listed as 'Hollinsworth Industrial IF1' (AHIMS # 45-5-4894). The new listing applies to the isolated find in the northwest corner of the study area and is relevant to the western half of the study area more generally. The site listings will be used to cover

separate parts of what is inevitably an essentially continuous but variable distribution of artefacts across the study area (and, for that matter, western Sydney). While this requires some reconsideration of the previously listed sites, it is considered preferable to adding site numbers in a way that would do more to confuse than clarify the sites register (AHIMS) – which we should note as being essentially indelible and which should be tended mostly for the benefit of future researchers.

The purpose of dividing artefact occurrences up under different site listings in this way is to group them according to the Site Classification System that we use, as outlined above, to support the process of:

- Understanding each part as a relatively consistent archaeological representation of past Aboriginal land use;
- Assessing their archaeological significance (rarity, representativeness and research potential)
- Defining specific parts of the cultural heritage resource to similarly assess cultural (social or spiritual) significance to the Aboriginal community.
- Allow for consideration to be made of the considerations by the proponent of options to avoid, minimise or mitigate development-related harm to Aboriginal objects;
- Assist community and OEH in the consideration of a likely application for an Aboriginal Heritage Impact Permit (AHIP).

Areas for these defined site areas are shown in **Figure 11** and delineated as much for management utility as a landscape wide archaeological assessment. Classification and descriptions are provided in **Table 7**.

Table 7: Division of artefact distribution across study area into sites

Site	AHIMS #	Description	Classification	Characteristics
MPIP15	45-5-3744	Concentration of dispersed lithics on a low hilltop more than 300m from water	Dispersed Lithic Site	A low - moderate concentration of lithic material away from any stone tool manufacturing site or 'residential base' (in Binford's terminology) likely to representing a range of lithic reduction evidence generally focused away from initial manufacture, other than small tool manufacture from small portable cores, and more on later stages such as tool maintenance/curation, discard of unwanted material and occasional loss of functioning tools.
MPIP15A	45-5-3745	Concentration of dispersed lithics on a ridgeline between two low hilltops more than 300m from water	Dispersed Lithic Site	As above
MPIP15B	45-5-3746	Sparse occurrences of artefacts on sloping ground between hill/ridge and water, but >200m from that water.	Sparse Lithic Site	Low density occurrence of lithics considered to be part of a 'background scatter' of material lying between relatively higher concentrations between the nearest water and the hill top. The circumstances of deposition – in the sense of a site use – remains unknown but may include downslope movement of artefacts from MPIP15 or random loss and discard of material moving across the landscape.
MPIP14	45-5-3743	Sparse occurrences of artefacts on sloping ground between 100m and 200m from a first order stream	Sparse Lithic Site	Low density occurrence of lithics considered to be part of a 'background scatter' of material greater than 100m from a first order stream. The circumstances of deposition – in the sense of a site use – remains unknown but may include increasingly sparsely distributed material associated with a potentially complex site on the nearby creek.

Site	AHIMS #	Description	Classification	Characteristics
Hollinsworth Industrial IF1	45-5-4894	Sparse occurrences of artefacts on undulating ground (no hills or ridges) between 300m and 500m from any water.	Sparse Lithic Site	Low density occurrence of lithics often described as part of a 'background scatter' of material generally accepted to be across most landscapes. Some small isolated clusters of material may also occur across the area, but it will largely be characterised by an absence of lithic material. The circumstances of deposition are unlikely to be determinable.

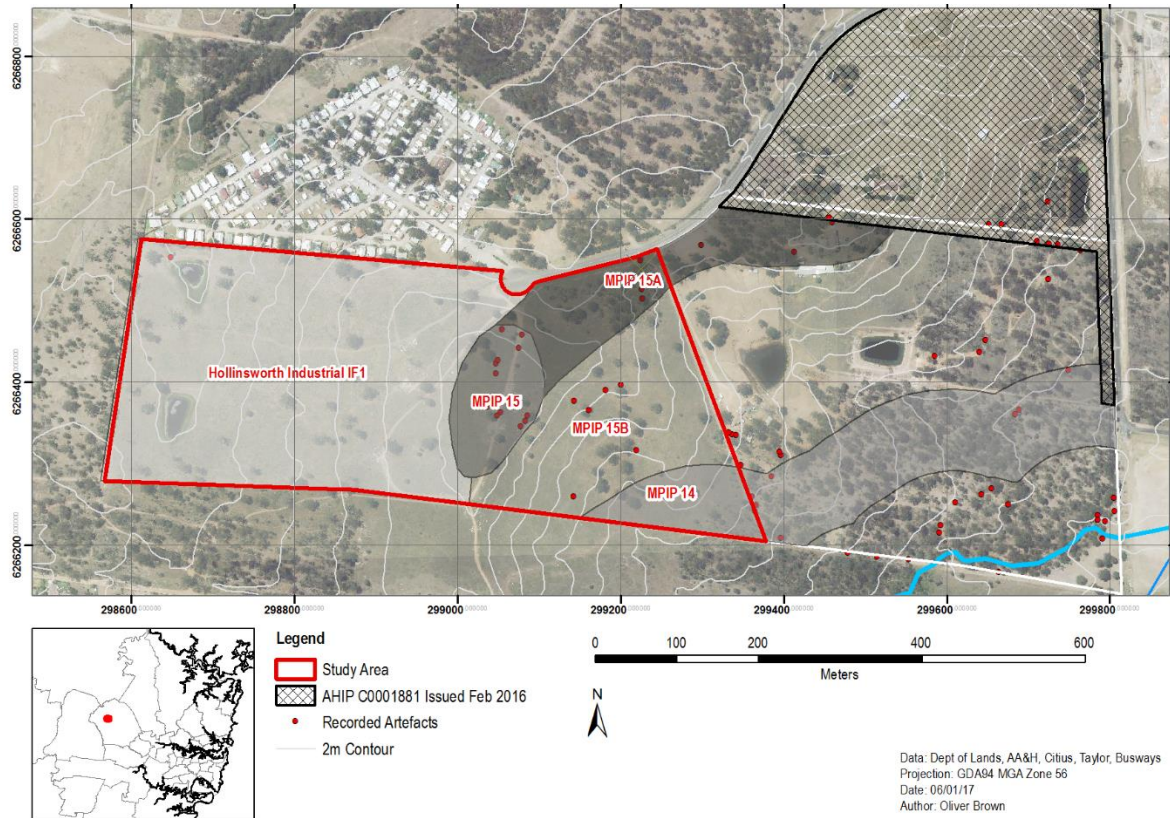


Figure 11: Division of artefact distribution across study area into sites

5 SIGNIFICANCE ASSESSMENT

5.1 GENERAL

The heritage significance of Aboriginal archaeological sites can be assessed using the four values outlined in the Burra Charter of aesthetic, historic, scientific, and social or spiritual significance (Australia ICOMOS, 2013).

5.2 SOCIAL OR SPIRITUAL (CULTURAL) SIGNIFICANCE

This value concerns the relationship and importance of sites to the contemporary Aboriginal community. Aspects of cultural significance include people's traditional and contemporary links with a given site or landscape as well as an overall concern by Aboriginal people for sites and their continued protection. Recent updates ('Practice Notes') to the *Burra Charter* have emphasised the importance of interpreting how cultural significance to Aboriginal people may change over time, just as it does with most communities (Australia ICOMOS 2013a:4).

Aboriginal cultural values may include the consideration of significance of a place for its traditional mythological, historic, traditional resource, aesthetic values or be tied to values associated with the natural environment. Cultural values will also commonly be associated with the archaeological features of the site but may independently, and even contradictorily, stand alongside archaeological or scientific value.

Table 8: Statement on Cultural Significance

Cultural Significance:	Views on the cultural significance of the site (represented by the listings MPIP15 (AHIMS # 45-5-3744), incorporating MPIP 15A (45-5-3745) and MPIP 15B (45-5-3746) along with MPIP 14 (45-5-3743) and the new listing Hollinsworth Industrial IF1' (45-5-4894) are being sought from Aboriginal community representatives. Key questions include: • What significance does the Aboriginal community attach to the defined site, wider study area or the artefacts recovered? • Do you have any comments on the management recommendations? The major comment, provided by DCAC was that "This area is significant to the Darug people due to the evidence of continued occupation, within close proximity to this project site there is a complex of significant sites".
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5.3 SCIENTIFIC SIGNIFICANCE

The structuring of the process used to assess scientific significance has been outlined by Bowdler (1981) as the specific consideration of the interrelated issues of research potential and the rarity and/or representativeness of a site. In a development context, we also find it useful to add integrity as a separately assessed co-factor to both of these issues. This is summarised in **Table 9**.

The Sparse Lithic Sites (MPIP15B, MPIP14 and Hollinsworth Industrial IF1) are all considered to have low archaeological significance. Sparse representation of flaked stone artefacts are common

across the Blacktown Soil Landscape (and western Sydney more generally) to the extent that they are essentially ubiquitous where natural soil profiles remain.

Despite the low density when compared to Complex Lithic Sites near water and the fact they are quite disturbed, the hill and ridge top Dispersed Lithic Sites (MPIP15 and MPIP15A) are considered to have at least moderate archaeological significance. This assessment was also made in the previous Aboriginal cultural heritage assessment of the property (Kelleher Nightingale Consulting, 2015). This relates not so much to rareness or representativeness but the potential to address timely and significant research questions through the comparison of the archaeological signature of Aboriginal people undertaking mobile activities.

In such assemblages, a compensating corollary of the lower number of flaked stone pieces is that this comes with less of the less informative background bulk dominance of rejected stone and debitage that occurs in primary stone manufacturing sites. Without being able to determine at this stage whether it applies to these sites, Dispersed Lithic Sites can conceivably have something of a 'less is more' value related to their likely higher proportion of functional and previously functional (broken or exhausted through retouching) tools. Within the general class of Dispersed Lithic Sites with this potential, MPIP15 and MPIP15A are certainly not considered exceptional, but the previous recommendation by Kelleher and Nightingale (2015) that it is enough to justify at least some salvage excavation is reiterated here as a result (see summary of KNC assessment in **Table 10** and **Table 11** and our recommendations below in **Section 6**).

Table 9: Statement on Scientific Significance

	Research Potential:	Rarity and Representativeness:	Integrity and Disturbance:	SUMMARY:
MPIP15	While there is generally a relatively low density of artefacts and a considerable degree of disturbance, there remains some research potential associated with the comparative value of the site against more commonly investigated Complex Lithic Sites near water	This type of site is not rare and is better represented elsewhere with sites that are either higher in artefact density or less disturbed (or both).	Highly disturbed in parts although some relatively intact deposits may survive	Moderate archaeological significance
MPIP15A	As above	As above	As above	Moderate archaeological significance
MPIP15B	Artefact assemblage yield per excavation effort would not justify excavation given the extent of previous work in the region.	The site type is very common, to the extent of being almost ubiquitous across any natural soil profiles in Sydney shale country	As above	Low archaeological significance
MPIP14	As above	As above	As above	Low archaeological significance
Hollinsworth Industrial IF1	As above	As above	Excepting two dams, some intact soil profiles appear to remain.	Low archaeological significance

5.4 AESTHETIC SIGNIFICANCE

This value refers to aspects of sensory perception and the emotional response that the site elicits. The guidelines to the *Burra Charter* note that assessment may include consideration of the form, scale, colour, texture and material of the item or place, as well as sounds and smells. With regard to pre-contact Aboriginal cultural heritage sites, the placement within the landscape would be considered in the light of this value. Individual artefacts, sites and site features may also have aesthetic significance. The aesthetic significance of the site (in particular the landscape setting) may also articulate with cultural values held by members of the Aboriginal community.

Conclusion: Aesthetic significance is not considered to be of relevance in this case.

5.5 HISTORIC SIGNIFICANCE

The guidelines to the *Burra Charter* include the following discussion of historic significance:

A place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase or activity. It may also have historic value as the site of an important event. For any given place the significance will be greater where evidence of the association or event survives in situ, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment.

In relation to Aboriginal cultural heritage, many post-contact places and sites would have historic value. Places of historic significance may include sacred or ceremonial sites, and archaeological sites with evidence of technological developments.

Conclusion: Historic significance is not considered to be of relevance in this case.

Table 10: Significance and management recommendations made by KNC (2009)

Site		Significance	Management Option where impact proposed
MPIP 14		Some: - These identified artefact scatters and isolated finds occur frequently across the MPIP, the North West Growth Centre and the Cumberland Plain. - Every Aboriginal site is important to the local Aboriginal community, however, there are more intact or better examples of these site types within the MPIP. - All of these sites have experienced some degree of impact/disturbance, including vegetation clearance, erosion, and road/infrastructure development. Several of these sites have been destroyed. - Any change or loss of these sites is unlikely to diminish the Aboriginal cultural heritage of the MPIP or the local Aboriginal community.	Section 90 consent should be obtained prior to the commencement of works affecting these sites.
MPIP 15	MPIP 15A	Moderate: - These sites and PADs represent rare, intact areas of known or potential archaeological deposit within the MPIP. - In combination, these sites represent the utilisation of varying landforms within the MPIP by the original Aboriginal inhabitants of the area. - These sites are important to the local Aboriginal community as the sites provide information on lithic raw material procurement and site distribution across different landforms within the Precinct, as well as representing the traditional land-use activities of the original Aboriginal inhabitants of the area. - All of these sites have been impacted by vegetation clearance and some infrastructure development, but overall are in relatively good condition. - The loss or unsympathetic disturbance of these sites may diminish the Aboriginal cultural heritage of the Precinct.	Test/salvage excavation should be undertaken at some of the impacted sites under a section 87(1) permit to mitigate against the loss of information. Strategy for test/salvage excavation would depend upon the layout of the Master Plan. (Note: test excavation may or may not be associated with the section 90 consent).
	MPIP 15B		

Table 11: Revised significance and management recommendations by KNC (2015)

Site		Significance	Management Option where impact proposed
MPIP 14		Low: Site MPIP 14 comprised a low density artefact scatter that was located in a mid slope context overlooking an unnamed first order creek approximately 100m to the south. The site represents a commonly occurring site type in the region. The site is a low-density artefact scatter containing artefacts produced from a locally available raw material (silcrete). The site area has been impacted by vegetation clearance, sheet wash and a vehicle track. Site integrity is low, with a low artefact density. The site demonstrates low scientific value and it is unlikely that further investigation could contribute to our understanding of Aboriginal landscape use in the region. Based on the intactness, representativeness, and research potential of the site, MPIP 14 is determined to have low archaeological significance.	AHIP required prior to commencement of works affecting the site
MPIP 15	MPIP 15A	Moderate: Site MPIP 15 consisted of an artefact scatter that was situated on the upper slopes and spur lines of a prominent hill that overlooked several minor creeks to the west and east. The site represents a commonly occurring site type in the region; however, the prominent location, distance from permanent water sources and relative intactness of the subsurface deposit within the site provide an opportunity to explore the relationship between the site and artefact scatters closer to the major creeks in the area. The site demonstrated moderate scientific value and it is likely that further investigation could contribute to our understanding of Aboriginal landscape use in the region. Based on the intactness, representativeness, and research potential of the site, MPIP 15 (including MPIP 15A and MPIP 15B) is determined to have moderate archaeological significance.	Salvage excavation AHIP required prior to commencement of works affecting the site
	MPIP 15B		

6 DISCUSSION AND RECOMMENDATIONS

A full discussion of the Aboriginal cultural heritage management strategy and recommendations is provided in the ACHA. In summary, the study area has been found to have Aboriginal objects present in variable density (from nil to moderate) and degrees of disturbance, entirely consistent with regional patterns. As such, it does not represent material of any outstanding Aboriginal cultural heritage value. Nonetheless, the nature of the development of industrial land is such that almost all existing soil profiles are destroyed in the shaping of large areas of flat land that the industrial land use requires. Aboriginal cultural heritage values, moderate though they may be, will therefore be lost.

Table 12: Potential for harm

Site	Type of Harm	Degree of Harm	Consequence
MPIP15	Directly harmed	Whole	Total loss of value
MPIP15A	Directly harmed	Whole	Total loss of value
MPIP15B	Directly harmed	Whole	Total loss of value
MPIP14	Directly harmed	Whole	Total loss of value
Hollinsworth Industrial IF1	Directly harmed	Whole	Total loss of value

Within the development area, it is not considered that there are any practical options to avoid or minimise harm. The higher concentrations of material are concentrated around the key area of interface between a sizable development area and the only road access. In this context, the sites present are not considered to be of high enough significance to justify the prevention of the proposed work on the basis of a heritage conservation motive.

Where harm is not to be avoided, the alternatives are then whether or not that harm is at least mitigated. Mitigation is usually in the form of salvage excavation, Aboriginal community collection of artefacts or some other process that compensates Aboriginal people for the loss of heritage value. In the current case, the best option to mitigate harm is through a limited salvage excavation program to be included as a condition of an Aboriginal Heritage Impact Permit. In order to address an issue of social equity whereby the loss of heritage value is borne particularly by the Aboriginal community, it is also considered that while the archaeological aim of recovering a spatially controlled lithic assemblage for expert analysis be a core consideration, the excavation work itself be undertaken as an Aboriginal community-dominated project. This recommendation comes from the following considerations:

- That some research potential has been identified for the hill and ridge top sites (MPIP15 and MPIP15A) and the work would therefore contribute to our understanding of former Aboriginal land use in the area;
- While the exposure-based survey has provided for the full extent of artefact distribution modelling required for the study area, finer scale spatial resolution of artefact distribution within areas of artefact concentration can only be done with some reasonably sized contiguous area of excavation (larger than permissible under the Code). Such work would not affect considerations around the issuing of an AHIP, but it is this type of information that is considered central to mitigation against the loss of archaeological value.

- The level of archaeological excavation experience among the western Sydney Aboriginal community is high enough to undertake the majority of the archaeological work; and the proposed excavation archaeologically simple enough to be overseen by just a single suitably qualified archaeologist working with a community team.

It is therefore recommended that:

1. An AHIP be sought to permit harm to Aboriginal objects in completing the proposed subdivision and industrial development of the land.
2. The AHIP should apply to all sites: MPIP15 (AHIMS # 45-5-3744), MPIP15A (AHIMS # 45-5-3745), MPIP15B (AHIMS # 45-5-3746), MPIP14 (AHIMS # 45-5-3743), Hollinsworth Industrial IF1 (AHIMS # 45-5-4894).
3. The AHIP application follows Blacktown City Council's DA15-275 issued September 2015 which includes subdivision and "associated bulk earthworks and drainage infrastructure".
4. Given the known occurrence of Aboriginal objects, the proponent should be aware that any disturbance of the ground surface prior to the issuing of an AHIP may be found to constitute a knowing offence under the NPW Act.
5. The AHIP should apply to the entire development area, bounded by the coordinates shown in **Figure 12**.
6. As a mitigation for the impact, the AHIP should include a condition of salvage excavation as proposed in **Appendix 1** of the ACHA. In summary, this involves:
 - a) **Phase 1** testing comprising six 1x1m units with provisions to dig another two units if no artefacts are found. If no artefacts are found in this initial 8m², excavation should cease.
 - b) **Phase 2** testing comprising the opening up of whichever Phase one unit has the highest number of artefacts to a total of 12m² dug in the direction of highest apparent density. If the overall artefact density is less than 3 artefacts per square metre (<36 artefacts in total), it should be taken as a sufficient threshold of low density to cease excavation.
 - c) **Phase 3:** In the event of artefact density of 3/m² or more within the Phase 2 excavation, it should continue to a maximum of 25m². The excavation layout (placement of squares) should continue to work in the direction of highest apparent artefact concentration at the discretion of the excavation director for as long as the overall artefact density remains >3/m². The salvage excavation should then cease.
 - d) The AHIP should however allow for any subsequent amount of excavation within the AHIP area as a contingency. This may relate to justifications based on
 - i. Variations of raw materials that warrant further investigation;
 - ii. Unusual artefact types being found such as ground edged implements, etc;
 - iii. Any other relevant archaeological features appropriate for further investigations, e.g. evidence of burning in a hearth, stone features; clay features etc.

- iv. Other finds that come to light in the course of excavation deemed relevant for further investigation by the excavation director and/or RAP representatives and which are approved by the proponent (as the paying client)
- 7. The AHIP should permit development work to commence straight away in areas other than the salvage area marked in Error! Reference source not found..
- 8. Analysis: The archaeological recording should be subject to analysis as proposed in **Appendix 1** of the ACHA.
- 9. Upon completion of salvage an Aboriginal Site Impact Recording Form should be submitted to AHIMS along with other relevant documentation and any other details specified in the AHIP.
- 10. The long term management of artefacts would ideally be with the Australian Museum, noting however that this will be contingent on the excavated material turning out to be a good representative assemblage for a Dispersed Lithic Site (Australian Museum, 2012). The AHIP is being sought to reflect this measure as the statutory default under the NPW Act. In the event that Museum deposition is not possible, the artefacts should be retained for reburial in association with artefacts from the other two projects (one complete, one ongoing) in a single consolidated collection. As a last resort, the artefacts can be reburied in the location shown in Error! Reference source not found.. The involvement of an archaeologist is also recommended to adhere to other requirements as detailed in Requirement 26 of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* as detailed in **Appendix 1** of the ACHA.
- 11. No AHIP will approve impact to Aboriginal human remains. If human skeletal material less than 100 years old is discovered, the *Coroners Act 2009* requires that all works should cease and the NSW Police and the NSW Coroner's Office contacted. Traditional Aboriginal burials (older than 100 years) are protected under the *National Parks and Wildlife Act 1974* and if found, all work should cease. Interpreting the age and nature of skeletal remains is a specialist field and an appropriately skilled archaeologist or physical anthropologist should be consulted. Should the skeletal material prove to be archaeological Aboriginal remains, notification of Office of Environment and Heritage (OEH) and the relevant Aboriginal stakeholders will be required. Notification should also be made to the Commonwealth Minister for the Environment, under the provisions of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*.

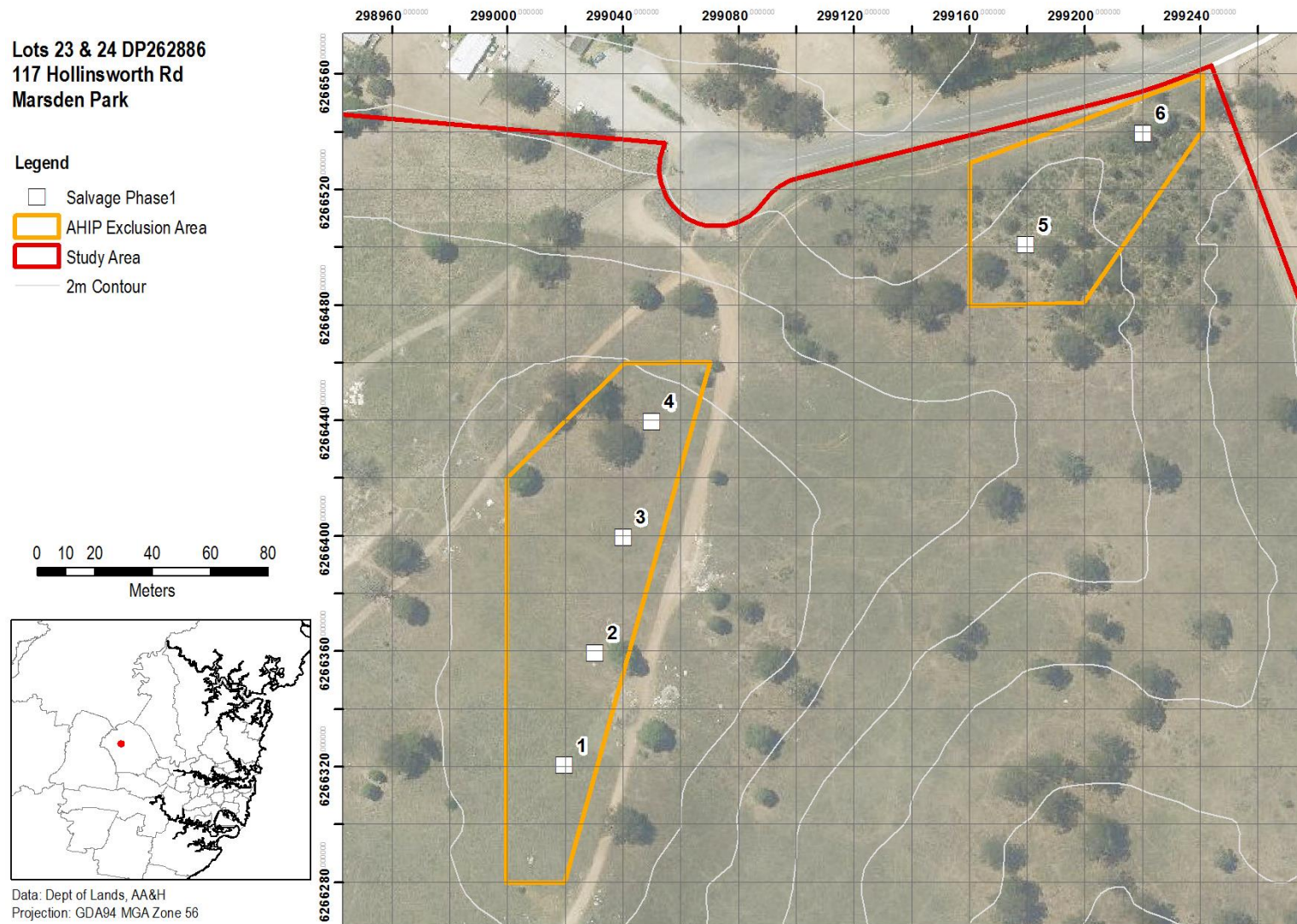


Figure 12: Map showing salvage locations

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GLOSSARY AND ABBREVIATIONS

AHIP	Aboriginal Heritage Impact Permit
	The statutory instrument that OEH issues under section 90 of the NPW Act to manage harm or potential harm to Aboriginal objects and places.
BP	Before Present
	This term is generally used specifically in relation to radiometric dating and is taken to be before 1950, being an approximate point at which nuclear weapons testing artificially altered the world's carbon isotope ratios.
AHIMS	Aboriginal Heritage Information Management System
	AHIMS is a part of OEH and maintain the NSW records database of Aboriginal objects / sites, declared Aboriginal Places and archaeological reports submitted either voluntarily or as part of compliance-related submissions.
BCC	Blacktown City Council
CMA	Catchment Management Authority (now Local Land Services)
DECCW	NSW Department of Environment, Climate Change and Water.
	Now OEH and formerly the DECC
DLALC	Deerubbin Local Aboriginal Land Council
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Reg	Environmental Planning and Assessment Regulation 2000
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
FGS	Fine Grained Siliceous
	We use the term FGS for most flaked artefact raw materials of finer crystal structure than silcrete. Many raw materials used to manufacture flaked stone artefacts remain petrologically poorly defined and given different names by different archaeologists, such that many classifications attempting to be more precise than 'fine grained siliceous' are often a hindrance rather than a help for comparative analysis. FGS are typically sedimentary rocks that have been partially metamorphosed through dissolution and recrystallisation of silica and include chert, silicified tuff, silicified mudstone and chalcedony; although it can also include petrified wood.
BCC	Blacktown City Council
LALC	Local Aboriginal Land Council

LEP	Local Environmental Plan
LGA	Local Government Area
CMA	Catchment Management Authority (now Local Land Services)
NNTT	National Native Title Tribunal
NPW Act	National Parks and Wildlife Act 1974
NP&W Reg	National Parks and Wildlife Regulation 2009 This introduced a number of significant changes to the NPW Act including the <i>Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW</i> and the <i>Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i> .
NTSCorp	Native Title Services Corporation
OEH	Office of Environment and Heritage OEH was formed in 2011 (having been formerly known as DEC, DECC and DECCW within the preceding decade). It is currently an agency within the Department of Environment and Planning, having moved from the Department of Premier and Cabinet in 2014 and (a now defunct) Department of Environment in 2011. The roles of OEH include the administration of those parts of the NPW Act relating to 'Aboriginal country, culture and heritage'.
ORALRA	Office of the Registrar, Aboriginal Land Rights Act
REF	Review of Environmental Factors; An environmental assessment under Part 5 of the EP&A Act often undertaken by local government authorities as a self-assessment process.
SEPP	State Environmental Planning Policy
SHR	State Heritage Register

APPENDIX 1: FULL EXPOSURE SURVEY DATA

Object_ID	ZONE	Area (m2)	AFT	Northing	Easting
1	WestSlope	6	0	6266295.765	298567.2322
2	WestSlope	6	0	6266302.313	298569.0292
3	WestSlope	6	0	6266317.978	298569.6781
4	WestSlope	6	0	6266311.435	298570.7485
5	WestSlope	6	0	6266327.767	298571.6711
6	WestSlope	2	0	6266341.658	298573.2977
7	WestSlope	2	0	6266352.092	298574.158
8	WestSlope	2	0	6266359.287	298577.5577
9	WestSlope	2	0	6266366.076	298580.6242
10	WestSlope	2	0	6266373.96	298581.375
11	WestSlope	2	0	6266380.9	298582.8218
12	WestSlope	2	0	6266390.603	298583.4255
13	WestSlope	2	0	6266414.34	298586.2203
14	WestSlope	2	0	6266399.76	298586.3177
15	WestSlope	4	0	6266446.472	298591.9931
16	WestSlope	4	0	6266453.518	298594.0284
17	WestSlope	4	0	6266462.367	298594.72
18	WestSlope	8	0	6266480.173	298596.3032
19	WestSlope	6	0	6266500.485	298599.4266
20	WestSlope	3	0	6266552.076	298614.1773
21	WestSlope	2	0	6266560.239	298614.9689
22	WestSlope	1	0	6266377.612	298627.1708
23	WestSlope	12	0	6266395.104	298643.0129
24	WestSlope	6	1	6266553.669	298647.8786
25	WestSlope	6	0	6266406.184	298650.2397
26	WestSlope	3	0	6266469.697	298651.2874
27	WestSlope	4	0	6266407.637	298655.641
28	WestSlope	2	0	6266327.901	298655.7201
29	WestSlope	4	0	6266548.065	298656.8793
30	WestSlope	4	0	6266547.82	298679.2578
31	WestSlope	5	0	6266542.64	298696.0051
32	WestSlope	6	0	6266550.956	298705.8393
33	WestSlope	4	0	6266539.807	298708.1335
34	WestSlope	4	0	6266371.942	298841.0652
35	WestSlope	8	0	6266383.203	298848.9256
36	WestSlope	10	0	6266286.996	298852.1083
37	WestSlope	3	0	6266310.326	298859.4506
38	WestSlope	8	0	6266271.364	298860.1229
39	WestSlope	8	0	6266362.56	298862.3456
40	WestSlope	2	0	6266347.928	298867.9223
41	WestSlope	3	0	6266388.548	298879.3225
42	WestSlope	3	0	6266283.093	298886.686
43	WestSlope	3	0	6266390.085	298894.4593
44	WestSlope	3	0	6266390.602	298902.6624
45	WestSlope	4.8	0	6266317.032	298908.5312
46	WestSlope	3	0	6266390.041	298915.3722
47	WestSlope	6	0	6266316.189	298925.9016
48	WestSlope	12	0	6266286.506	298929.1216
49	WestSlope	3	0	6266283.791	298949.9273
50	WestSlope	3	0	6266396.458	298967.5367
51	WestSlope	5	0	6266326.979	298971.0963
52	WestSlope	10	0	6266302.399	298978.5917
53	WestSlope	2	0	6266424.589	298992.6674
54	WestSlope	4	0	6266441.499	299003.4011
55	WestSlope	8	0	6266451.61	299011.014
56	WestSlope	4	0	6266466.525	299029.0325
57	WestHill	4	0	6266358.114	299032.0814
58	WestHill	4	0	6266294.124	299034.4372
59	200to300mWater	24	0	6266260.436	299036.0082

Object_ID	ZONE	Area (m2)	AFT	Northing	Easting
60	WestHill	2	1	6266369.851	299036.0699
61	WestSlope	3	0	6266472.197	299037.8578
62	WestHill	2	0	6266379.731	299037.9836
63	WestHill	4	0	6266311.193	299039.4792
64	200to300mWater	24	0	6266270.497	299040.3582
65	WestHill	2	0	6266329.617	299042.5888
66	WestSlope	4	0	6266476.236	299045.9482
67	SouthSlope	24	0	6266281.787	299046.1045
68	WestHill	4	1	6266411.078	299046.2535
69	WestHill	8	1	6266422.734	299046.4125
70	WestHill	4	1	6266358.677	299048.653
71	WestHill	8	1	6266427.453	299048.8311
72	WestHill	12	0	6266437.008	299051.1947
73	WestHill	4	1	6266363.382	299052.6106
74	WestHill	8	0	6266446.244	299053.021
75	SouthSlope	24	0	6266296.147	299054.0942
76	WestHill	9	1	6266464.905	299054.144
77	WestHill	5	0	6266377.19	299056.0193
78	Ridge	12	0	6266476.042	299056.6142
79	WestSlope	10	0	6266485.96	299057.2683
80	WestHill	24	0	6266309.139	299057.6522
81	200to300mWater	18	0	6266287.576	299060.4757
82	WestHill	24	0	6266317.11	299060.795
83	SouthSlope	14	0	6266297.663	299062.5094
84	WestHill	2	0	6266399.115	299062.8943
85	WestHill	24	0	6266327.487	299064.6799
86	200to300mWater	20	0	6266282.355	299065.621
87	WestHill	10	0	6266415.017	299066.4222
88	WestSlope	8	0	6266492.565	299067.0921
89	WestHill	24	0	6266333.28	299068.2027
90	SouthSlope	14	0	6266306.366	299068.6288
91	WestHill	24	0	6266336.225	299069.3609
92	200to300mWater	30	0	6266278.496	299071.8257
93	WestHill	5	0	6266435.861	299074.0582
94	WestHill	14	3	6266441.734	299074.2766
95	WestHill	12	0	6266460.399	299074.7313
96	SouthSlope	12	0	6266311.671	299075.4411
97	Ridge	10	0	6266474.337	299075.4951
98	WestHill	24	1	6266346.163	299077.1484
99	WestHill	15	1	6266458.084	299078.308
100	SouthSlope	14	0	6266315.349	299079.226
101	200to300mWater	18	0	6266274.617	299080.6418
102	WestHill	30	1	6266352.805	299082.5339
103	SouthSlope	14	0	6266321.211	299084.6591
104	WestHill	24	1	6266359.051	299085.0525
105	200to300mWater	15	0	6266274.341	299086.5225
106	SouthSlope	16	0	6266327.339	299091.2599
107	WestHill	24	0	6266363.739	299091.7226
108	200to300mWater	10	0	6266272.584	299094.5325
109	SouthSlope	16	0	6266332.994	299097.9252
110	SouthSlope	18	0	6266367.793	299101.4289
111	200to300mWater	8	0	6266271.778	299103.0509
112	SouthSlope	16	0	6266339.45	299105.0865
113	SouthSlope	15	0	6266371.432	299108.1832
114	SouthSlope	8	0	6266367.377	299109.4807
115	SouthSlope	14	0	6266343.423	299111.8337
116	200to300mWater	6	0	6266271.578	299113.8956
117	SouthSlope	10	0	6266373.361	299115.463
118	SouthSlope	8	0	6266369.927	299117.54
119	SouthSlope	14	0	6266350.103	299120.8165
120	200to300mWater	8	0	6266272.097	299120.9097
121	SouthSlope	6	0	6266377.075	299122.2389

Object_ID	ZONE	Area (m2)	AFT	Northing	Easting
122	SouthSlope	8	0	6266369.661	299123.0398
123	SouthSlope	12	0	6266355.408	299128.5382
124	200to300mWater	6	0	6266271.15	299128.9648
125	SouthSlope	6	0	6266380.727	299130.0499
126	200to300mWater	6	0	6266260.305	299130.6614
127	SouthSlope	8	0	6266372.052	299131.0482
128	SouthSlope	16	0	6266357.779	299135.1404
129	SouthSlope	6	0	6266382.658	299136.0785
130	200to300mWater	6	0	6266270.846	299138.3663
131	SouthSlope	8	0	6266375.411	299140.839
132	200to300mWater	6	1	6266259.598	299141.6955
133	SouthSlope	10	1	6266377.441	299142.7391
134	SouthSlope	14	0	6266362.341	299144.2222
135	SouthSlope	6	0	6266387.617	299145.4938
136	200to300mWater	6	0	6266271.791	299145.7288
137	200to300mWater	6	0	6266256.467	299147.6051
138	200to300mWater	6	0	6266255.363	299148.6307
139	SouthSlope	14	0	6266379.846	299150.0944
140	SouthSlope	12	0	6266365.074	299151.2286
141	200to300mWater	6	0	6266272.016	299153.3552
142	SouthSlope	6	0	6266389.809	299154.1902
143	200to300mWater	6	0	6266254.17	299156.8853
144	SouthSlope	14	0	6266381.903	299157.2705
145	SouthSlope	6	1	6266365.613	299160.9543
146	SouthSlope	15	0	6266391.778	299161.6246
147	200to300mWater	12	0	6266273.586	299161.6449
148	SouthSlope	14	0	6266384.604	299164.5263
149	200to300mWater	6	0	6266252.947	299165.1015
150	200to300mWater	10	0	6266276.351	299170.2281
151	SouthSlope	8	0	6266366.515	299170.2684
152	SouthSlope	15	0	6266394.003	299171.4471
153	SouthSlope	14	0	6266387.966	299172.7241
154	200to300mWater	6	0	6266251.903	299174.6895
155	200to300mWater	12	0	6266359.999	299175.7131
156	SouthSlope	15	0	6266395.24	299178.0887
157	SouthSlope	5	0	6266368.626	299179.1142
158	200to300mWater	7	0	6266280.42	299179.7476
159	200to300mWater	10	0	6266278.99	299179.8553
160	SouthSlope	16	1	6266390.175	299181.3813
161	200to300mWater	7	0	6266288.909	299182.7398
162	200to300mWater	12	0	6266357.554	299182.8361
163	200to300mWater	7	0	6266296.826	299183.7468
164	100to200mWater	6	0	6266250.974	299184.0342
165	200to300mWater	7	0	6266306.923	299184.9645
166	200to300mWater	7	0	6266314.035	299185.2969
167	200to300mWater	12	0	6266281.536	299187.2698
168	100to200mWater	9	0	6266241.645	299187.9758
169	200to300mWater	8	0	6266371.419	299188.1165
170	200to300mWater	7	0	6266326.061	299188.8753
171	SouthSlope	15	0	6266394.785	299189.1876
172	200to300mWater	12	0	6266353.99	299189.3686
173	100to200mWater	6	0	6266250.097	299192.321
174	SouthSlope	14	0	6266395.542	299192.4588
175	200to300mWater	12	0	6266286.87	299193.2423
176	200to300mWater	7	0	6266319.752	299195.3646
177	SouthSlope	10	0	6266377.241	299196.0761
178	200to300mWater	18	0	6266351.551	299197.2375
179	200to300mWater	7	0	6266308.636	299198.7609
180	SouthSlope	10	0	6266381.601	299199.1085
181	100to200mWater	9	0	6266240.741	299199.4103
182	SouthSlope	24	1	6266396.39	299200.0567
183	100to200mWater	6	0	6266249.053	299200.6034

Object_ID	ZONE	Area (m2)	AFT	Northing	Easting
184	200to300mWater	7	0	6266301.954	299200.7663
185	200to300mWater	12	0	6266291.469	299202.3388
186	200to300mWater	18	0	6266349.151	299205.6341
187	100to200mWater	9	0	6266238.401	299205.7462
188	200to300mWater	7	0	6266292.924	299206.5123
189	SouthSlope	14	0	6266387.154	299208.457
190	100to200mWater	6	0	6266248.432	299208.706
191	200to300mWater	12	0	6266296.541	299210.011
192	SouthSlope	24	0	6266394.425	299210.1538
193	200to300mWater	12	0	6266379.745	299212.5681
194	200to300mWater	18	0	6266344.649	299213.997
195	100to200mWater	9	0	6266238.792	299215.0554
196	SouthSlope	12	0	6266394.101	299215.0874
197	200to300mWater	24	0	6266303.037	299216.8917
198	200to300mWater	12	0	6266372.427	299217.0503
199	SouthSlope	8	0	6266401.658	299218.4334
200	200to300mWater	35	1	6266316.375	299219.207
201	Ridge	12	0	6266487.032	299219.8028
202	200to300mWater	30	0	6266307.446	299220.4903
203	200to300mWater	40	0	6266331.426	299221.1289
204	SouthSlope	6	0	6266410.673	299221.2514
205	200to300mWater	14	0	6266364.184	299221.3188
206	200to300mWater	18	0	6266339.807	299221.6755
207	200to300mWater	28	0	6266333.903	299223.0818
208	SouthSlope	16	0	6266478.18	299223.4002
209	SouthSlope	12	0	6266440.382	299223.7047
210	Ridge	8	1	6266549.76	299224.2202
211	200to300mWater	21	0	6266357.443	299224.4601
212	SouthSlope	10	0	6266420.294	299224.5541
213	SouthSlope	12	0	6266430.302	299224.6392
214	SouthSlope	14	0	6266449.395	299224.6655
215	100to200mWater	9	0	6266237.872	299224.8661
216	SouthSlope	16	0	6266466.155	299225.1527
217	200to300mWater	10	0	6266384.706	299225.1618
218	Ridge	12	1	6266514.245	299225.6268
219	SouthSlope	14	0	6266459.676	299226.1747
220	Ridge	16	7	6266502.567	299226.6104
221	Ridge	12	0	6266506.497	299227.7867
222	200to300mWater	21	0	6266350.325	299227.8812
223	Ridge	10	0	6266523.544	299228.6798
224	Ridge	12	0	6266543.7	299230.1292
225	200to300mWater	10	0	6266380.915	299231.9557
226	Ridge	16	1	6266529.229	299232.3216
227	100to200mWater	9	0	6266238.209	299234.7125
228	200to300mWater	10	0	6266378.282	299239.8752
229	100to200mWater	9	0	6266237.867	299240.1128
230	100to200mWater	8	0	6266239.133	299245.0285
231	200to300mWater	10	0	6266367.842	299248.4485
232	100to200mWater	8	0	6266239.848	299252.9476
233	200to300mWater	10	0	6266359.994	299255.1642
234	200to300mWater	10	0	6266359.672	299258.8778
235	100to200mWater	8	0	6266241.241	299260.8059
236	200to300mWater	10	0	6266353.053	299264.2934
237	200to300mWater	10	0	6266348.107	299266.5887
238	100to200mWater	8	0	6266241.706	299267.8988
239	200to300mWater	12	0	6266340.378	299271.4214
240	200to300mWater	12	0	6266333.369	299276.4799
241	100to200mWater	12	0	6266243.053	299278.4545
242	200to300mWater	12	0	6266326.057	299283.4331
243	100to200mWater	12	0	6266247.268	299287.4346
244	200to300mWater	12	0	6266319.785	299289.4708
245	100to200mWater	12	0	6266249.249	299292.7317

Object_ID	ZONE	Area (m2)	AFT	Northing	Easting
246	200to300mWater	12	0	6266314.354	299294.7836
247	200to300mWater	12	0	6266306.45	299297.4519
249	100to200mWater	12	0	6266256.208	299300.3798
250	200to300mWater	18	0	6266300.27	299300.7833
251	100to200mWater	12	0	6266262.639	299307.2774
252	100to200mWater	18	0	6266290.467	299307.8355
253	100to200mWater	12	0	6266269.4	299311.2541
254	100to200mWater	12	0	6266276.957	299313.7375
Total		2637.8	31		

APPENDIX 2: ARTEFACT DATA

ID	Northing	Easting	Type	Rock	Col	MD	Lengt	Widt	Thick	Platf	Dorscars	Cortex	Term.
1	6266549.8	299224.2	Block frag (not a core)	Silcrete	Red	62	n/a	49	25	n/a	n/a	0	n/a
2	6266529.2	299232.3	Distal flake frag	Silcrete	Red	25	22	23	4	n/a	2	0	Feath
3	6266514.2	299225.6	Prox flake frag	Silcrete	Red	38	35	34	10	Flaked	3	0	n/a
4	6266502.6	299226.6	Angular frag	Silcrete	Red	13	n/a	8	4	n/a	n/a	0	n/a
5	6266502.6	299226.6	Prox flake frag	Silcrete	Red	21	20	16	5	Flaked	2	0	n/a
6	6266502.6	299226.6	Angular frag	Silcrete	Red	29	n/a	20	11	n/a	n/a	0	n/a
7	6266502.6	299226.6	Comp flake	Silcrete	Red	18	18	13	4		3	0	Feath
8	6266502.6	299226.6	Embedded	Silcrete	Red	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9	6266502.6	299226.6	Embedded	Silcrete	Red	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10	6266502.6	299226.6	Embedded	Silcrete	Red	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11	6266502.6	299226.6	Prox flake frag	Silcrete	Red	28	28	28	10	Cort	0	90 dors	n/a
12	6266502.6	299226.6	Angular frag	Silcrete	Red	14	n/a	2	4	n/a	n/a	12 tot	n/a
13	6266365.6	299161.0	Angular frag	Silcrete	Red	34	n/a	31	10	n/a	n/a	5 tot	n/a
14	6266316.4	299219.2	Comp flake	Silcrete	Red	19	15	18	3	Facet	3	0	Feath
15	6266259.6	299141.7	Angular frag	FGS	Red-brown	20	n/a	16	6	n/a	n/a	0	
16	6266396.4	299200.1	Multiplat Core	Silcrete	Red	44	Plat 1	30	16	Flaked	3	0	n/a
							Plat 2	44	36	Flaked	4		
17	6266390.2	299181.4	Angular frag	Quartz	White	20	n/a	17	4	n/a	n/a	0	n/a
18	6266377.4	299142.7	Angular frag	Silcrete	Red	17	n/a	10	4	n/a	n/a	0	n/a
19	6266359.1	299085.1	Med flake frag	Silcrete	Red	15	14	9	2	n/a	4	0	n/a
20	6266352.8	299082.5	Comp flake	Silcrete	Red	16	13	16	3	Gull	3	0	Feath
21	6266346.2	299077.1	Prox flake frag	Silcrete	Red	17	14	16	3	Facet	3	0	n/a
22	6266358.7	299048.7	Angular frag	Silcrete	Red	20	n/a	10	4	n/a	n/a	0	n/a
23	6266363.4	299052.6	Block frag	Silcrete	Red	40	n/a	32	27	n/a	n/a	5	n/a
24	6266441.7	299074.3	Angular frag	Silcrete	Red	22	n/a	12	9	n/a	n/a	0	n/a
25	6266441.7	299074.3	Singplat Core	Silcrete	Red	22	Plat 1	12	9	Flaked	5	30 plat	n/a
26	6266441.7	299074.3	Comptool	Silcrete	Red	23	23	11	5	Focal	1	0	~
27	6266458.1	299078.3	Comp flake	Silcrete	Red	22	15	20	4	Flaked	3	0	Feath
28	6266464.9	299054.1	Comp flake	FGS	Red	21	14	20	6	Flaked	2	0	Throu gh
29	6266427.5	299048.8	Angular frag	Silcrete	Red	26	n/a	22	12	n/a	n/a	20 tot	n/a
30	6266422.7	299046.4	Embedded	Silcrete	Red	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31	6266411.1	299046.3	Angular frag	Silcrete	Red	27	n/a	12	8	n/a	n/a	0	n/a
32	6266369.9	299036.1	Comp flake	Silcrete	Red	32	32	23	7	Facet	2	0	Hinge
33	6266553.7	298647.9	Comp flake	Silcrete	Red	21	21	12	4	Focal	2	0	Feath

Table 13: Representative artefact images

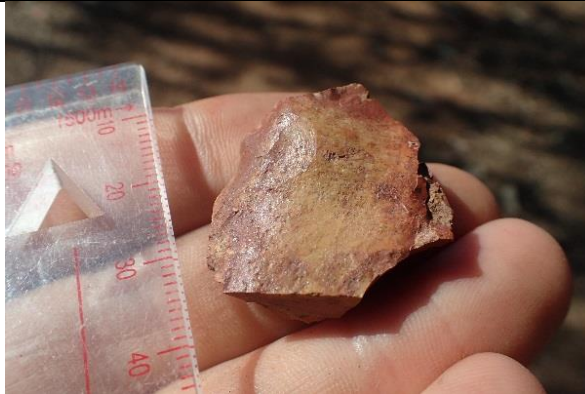


Artefact Plate 1: AFT01. Block fragment broken by vehicle damage. A large piece of silcrete that was not interpreted as a working core but may instead have been a reduced



Artefact Plate 2: AFT08, AFT09, AFT10. Embedded artefacts. Provisions in the Code prevent these from being analysed in the field.

piece of raw material intended to be one.



Artefact Plate 3: AFT11. Proximal flake fragment. The general shape and retouch (see also Plate 4) suggests that this was a functional tool that was either lost or discarded, possibly with breakage of the distal portion (although this may have broken post-deposition).



Artefact Plate 4: AFT11. Proximal flake fragment (same as Plate 3). There was 90% dorsal cortex on this piece, however cortex is otherwise uncommon among the analysed artefacts; this is a characteristic of a Dispersed Lithic Site in which material is predicted to be centred on functioning tools, portable raw material and debitage associated with occasional manufacture of expedient tools.



Artefact Plate 5: AFT20. A viable small flake with no cortex consistent with Dispersed Lithic Site material.



Artefact Plate 6: AFT20. Platform interpreted as "gull wing" resulting from small, skilfully removed successive flakes.



Artefact Plate 7: AFT30. Embedded artefact



Artefact Plate 8: Silcrete cobble in excavated spoil of a dam, presumably from deep within the clayey subsoil. Not considered artefactual, but relevant to the presence of deeply buried silcrete in the area although only accessible in limited areas.

APPENDIX 3: AHIMS EXTENSIVE SEARCH



Office of
Environment
& Heritage

AHIMS Web Services (AWS) Extensive search - Site list report

Your Ref/PO Number : HollinsworthLogos
Client Service ID : 260990

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-5-2036	MP8 Marsden Park	AGD	56	299850	6266700	Open site	Valid	Artefact : -	Open Camp Site	4152
	Contact	Recorders			Helen Brayshaw, Ms.Laila Haglund			Permits	3531	
45-5-2037	MP9 Marsden Park	AGD	56	299370	6266810	Open site	Valid	Artefact : -	Open Camp Site	4152
	Contact	Recorders			Helen Brayshaw, Ms.Laila Haglund			Permits	3531	
45-5-2041	MP13 Marsden Park	AGD	56	299300	6266710	Open site	Valid	Artefact : -	Isolated Find	4152
	Contact	Recorders			Helen Brayshaw, Ms.Laila Haglund			Permits	3531	
45-5-3314	Western Sydney 2	GDA	56	299548	6266065	Open site	Valid	Artefact : 1		100554
	Contact	Recorders			Navin Officer Heritage Consultants Pty Ltd			Permits		
45-5-3315	Western Sydney 3	GDA	56	298624	6266125	Open site	Valid	Artefact : 2		100554
	Contact	Recorders			Navin Officer Heritage Consultants Pty Ltd			Permits		
45-5-4731	Hollinsworth Industrial 1	GDA	56	299600	6266625	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders			Mr.Oliver Brown			Permits	3969	
45-5-1022	ADI-17;	AGD	56	298950	6266040	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders			Margrit Koettig, Rex Silcox, Miss Marjorie Sullivan, Phil Hughes			Permits		
45-5-3743	MPIP 14	GDA	56	299307	6266221	Open site	Valid	Artefact : 3		
	Contact	Recorders			Kelleher Nightingale Consulting Pty Ltd			Permits		
45-5-3744	MPIP 15	GDA	56	299090	6266400	Open site	Valid	Artefact : 1		
	Contact	Recorders			Kelleher Nightingale Consulting Pty Ltd			Permits		
45-5-3745	MPIP 15A	GDA	56	299072	6266474	Open site	Valid	Artefact : 1		
	Contact	Recorders			Kelleher Nightingale Consulting Pty Ltd			Permits		
45-5-3746	MPIP 15B	GDA	56	299277	6266270	Open site	Valid	Artefact : 1		
	Contact	Recorders			Kelleher Nightingale Consulting Pty Ltd			Permits		
45-5-3747	MPIP 16	GDA	56	299143	6266957	Open site	Valid	Artefact : 2		
	Contact	Recorders			Kelleher Nightingale Consulting Pty Ltd			Permits		
45-5-3748	MPIP 17	GDA	56	298438	6266288	Open site	Valid	Artefact : 2		
	Contact	Recorders			Kelleher Nightingale Consulting Pty Ltd			Permits		
45-5-3749	MPIP 18	GDA	56	298368	6266361	Open site	Valid	Artefact : 9		
	Contact	Recorders			Kelleher Nightingale Consulting Pty Ltd			Permits		
45-5-3750	MPIP 19	GDA	56	298236	6266549	Open site	Valid	Artefact : 2		
	Contact	Recorders			Kelleher Nightingale Consulting Pty Ltd			Permits	3928	
45-5-3752	MPIP 21	GDA	56	298020	6266770	Open site	Valid	Artefact : 1		
	Contact	Recorders			Kelleher Nightingale Consulting Pty Ltd			Permits		
45-5-3755	MPIP 22A	GDA	56	298160	6266975	Open site	Valid	Artefact : 3		

Report generated by AHIMS Web Service on 05/01/2017 for Oliver Brown for the following area at Datum :GDA, Zone : 56, Eastings : 298000 - 300000, Northings : 6266000 - 6267000 with a Buffer of 0 meters. Additional Info : ACHA. Number of Aboriginal sites and Aboriginal objects found is 19
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AHIMS Web Services (AWS) Extensive search - Site list report

Your Ref/PO Number : HollinsworthLogos
Client Service ID : 260990

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-5-4619	MPIP PAD 2	GDA	56	299490	6266630	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders			Kelleher Nightingale Consulting Pty Ltd			Permits	3969	
45-5-4620	MPIP PAD 3	GDA	56	298179	6266413	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders			Kelleher Nightingale Consulting Pty Ltd			Permits		

Report generated by AHIMS Web Service on 05/01/2017 for Oliver Brown for the following area at Datum :GDA, Zone : 56, Eastings : 298000 - 300000, Northings : 6266000 - 6267000 with a Buffer of 0 meters. Additional Info : ACHA. Number of Aboriginal sites and Aboriginal objects found is 19
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