

# Regional Detention Basins C and V6, SMDS

## Aboriginal Archaeological and Cultural Assessment Methodology

Report prepared for Maryland Development Company

November 2019



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## Report Register

The following report register documents the development and issue of the report entitled Regional Detention Basins C and V6, SMDS Aboriginal Archaeological and Cultural Assessment Methodology, undertaken by GML Heritage Pty Ltd in accordance with its quality management system.

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## 1.0 Project Background

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### 1.1 Introduction

Maryland Development Company Pty Ltd (MDC), on behalf of Lendlease, is proposing to construct two Regional Detention drainage basins in the northwestern area of the St Marys Development Site (SMDS), Penrith. The basin sites, Basin C and Basin V6 (collectively the 'study area'), adjoin the Jordan Springs precinct within the SMDS.

The project has been identified as a Designated Development under Section 78A of the *Environmental Planning and Assessment Act 1979* (NSW) (EPA Act). Environmental Assessment Requirements (SEAR No. 1360) have been issued for the project including the requirement for:

*Identification and description of the Aboriginal cultural heritage values that exist across the whole area that will be affected by the proposal. This may include the need for surface survey and test excavation. The identification of cultural heritage values must be conducted in accordance with the Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW (OEH 2010), and should be guided by the Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW 2011) and consultation with OEH regional branch officers;*

GML Heritage Pty Ltd (GML) has been engaged to prepare an assessment of Aboriginal cultural heritage to inform the Environmental Impact Statement (EIS) for the project. An Aboriginal Cultural Heritage Assessment Report (ACHAR) will be prepared at a future stage of the project to support application for an Aboriginal Heritage Impact Permit (AHIP) under Section 90 of the *National Parks and Wildlife Act 1974* (NSW) (NPW Act).

The purpose of this document is to provide Registered Aboriginal Parties (RAPs) with information about the Regional Detention Basins C and V6 and afford an opportunity to provide input into the project methodology and Archaeological Research Design (ARD). The current project is being undertaken to:

- ensure Aboriginal archaeological constraints and opportunities are adequately addressed and appropriately managed throughout the life of the project;
- consult with the Aboriginal community with regards to the cultural significance of the study area; and
- ensure that any risks to Aboriginal heritage values (both intangible and tangible) are appropriately identified and mitigated.

### 1.2 Development Context

The Sydney Regional Environmental Plan No. 30—St Marys (SREP 30) provides the framework for the redevelopment and management of land across the entire SMDS and includes performance objectives to achieve environmental, social and economic outcomes. SREP 30 also sets out the zoning arrangement of site and relevant development controls.

Basins C and V6 are proposed on land currently zoned part 'Drainage' and part 'Regional Park' under the SREP 30. Development for the purpose of stormwater drainage is permissible in the 'Drainage' zone. However, this use is not permissible in the 'Regional Park' zone.

Amendments are currently proposed to SREP 30 involving revisions to the zoning arrangement for land zoned 'Drainage' to reflect the proposed relocation of drainage infrastructure (including on-site detention

basins). The draft amendments to SREP 30 were publicly exhibited by the Department of Planning, Industry and Environment (DPIE) between 4 April to 11 May 2018. Once formally made, the proposed amendments will result in Basins C and V6 being contained entirely on land zoned 'Drainage' and will therefore be wholly permissible under the SREP 30.

### 1.3 Project Description

The proposal involves the construction of two detention basins (Basins C and V6) to detain, treat and attenuate stormwater runoff from Village 3 and Village 6; the Jordan Springs development. The basins are located within the north-western extent of the St Marys Development Site and within the Wianamatta Regional Park. Basins C and V6 will be constructed wetlands and act as water quality improvement basins with the provision for active stormwater detention during high flows.

Basin C will have a surface area of approximately 1.8 hectares and a notional depth of 1.7m. Whereas Basin V6 approximately 0.3 hectares and a notional depth of 1.6m

Each basin is designed to contribute to the water quantity and quality management objectives under the Sydney Regional Environmental Plan No. 30 – St Marys (SREP 30) and Penrith City Council's (Council) Water Sensitive Urban Design Policy (December 2013). The basins will incorporate the features for both water quality treatment and detention including a drainage inlet point, low level culvert outlet, spillway with erosion protection and vegetated slopes to provide effective nutrient removal. An access track along the side of each basin with access ramps will be constructed for regular inspection and maintenance access.

### 1.4 Study Area

The study area is situated in the northwest corner of the Wianamatta Regional Park, part of the former St Marys Development Site (SMDS), and abuts the Jordan Springs residential area (Figure 1.1 and Figure 1.2). The SMDS is located within the Penrith Local Government Area approximately 50km west of Sydney.

The study area occupies parts of Lot 1, Lot 4 and Lot 5 DP1216994. The study area is adjacent to the boundary of the Jordan Springs AHIP No. C0000362 (formerly known as the Western Precinct), which forms its northern boundary.

For the purpose of this assessment, a wider study area has been assessed as the final design of the basins has yet to be finalised. Figure 1.2 shows the approximate location of these basins and the connecting track in relation to the broader study area.

### 1.5 Aboriginal Heritage Legislation

In NSW, Aboriginal heritage is protected under the NPW Act. Under Part 6 of the NPW Act, Aboriginal objects are protected from harm. Aboriginal objects are defined under the act as any 'deposit, object or material evidence relating to the Aboriginal habitation of the area that comprises New South Wales'. To assist in the implementation of the NPW Act, the DPIE has developed a series of guidelines that determine how Aboriginal cultural values are managed. This report has been prepared as a requirement of the DPIE guidelines.

#### 1.5.1 Aboriginal Heritage Guidelines

- The methodology presented in this report fulfils the requirements of the Department of Environment, Climate Change and Water (DECCW) and Office of Environment and Heritage

(OEH), both now DPIE policy and guiding documents: the DECCW *Aboriginal cultural heritage consultation requirements for proponents 2010*.<sup>1</sup>

- the DECCW *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*;<sup>2</sup>
- the OEH *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW 2011*;<sup>3</sup>
- the DECCW *Guide to Determining and Issuing Aboriginal Heritage Impact Permits 2009*;<sup>4</sup> and
- the OEH *Applying for an Aboriginal Heritage Impact Permit: Guide for Applicants*.<sup>5</sup>

## 1.6 Approach to Aboriginal Heritage Assessment

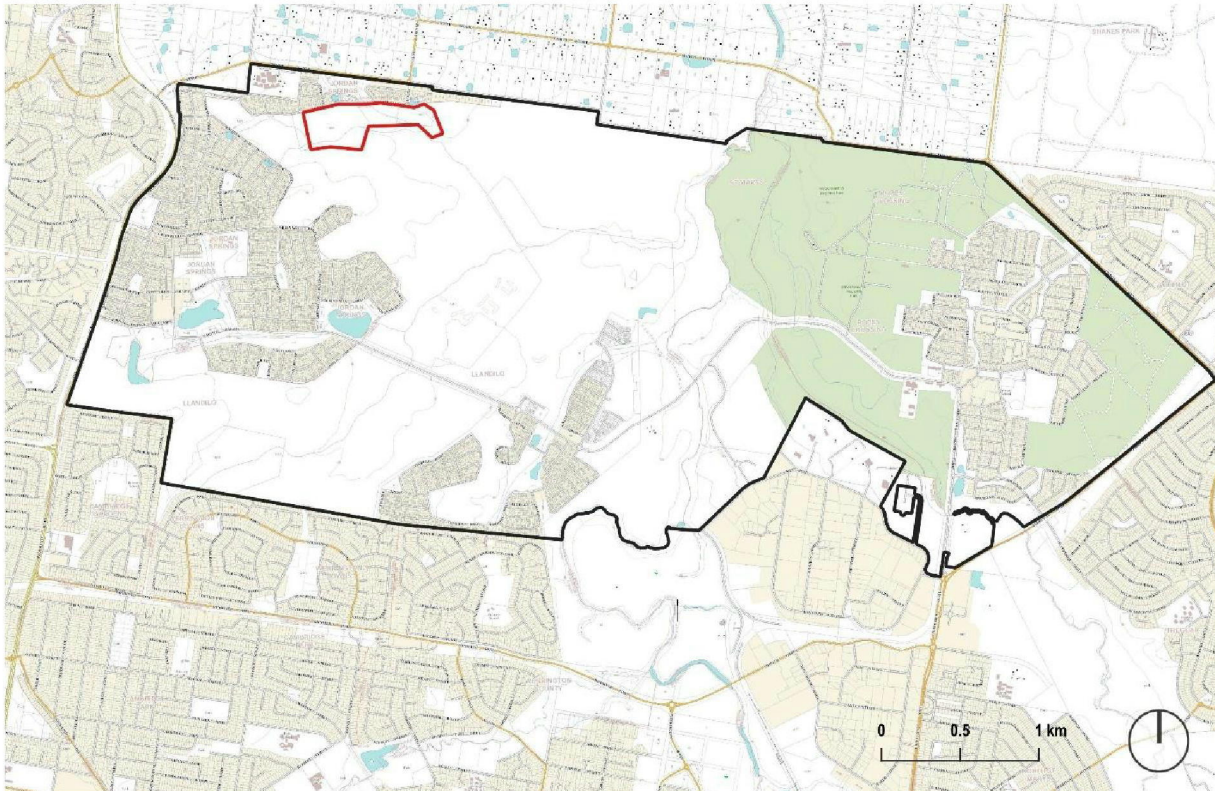
The aim of consulting with Aboriginal people is to facilitate a process for registered Aboriginal parties (RAPs) to contribute culturally appropriate information, as well as to enable them to participate in the determination of the cultural significance of Aboriginal objects and/or places that may be present within the study area. Consultation also provides an opportunity for RAPs to have input into the development of cultural heritage management options.

As part of this consultation, the proponent seeks cultural information from RAPs to identify:

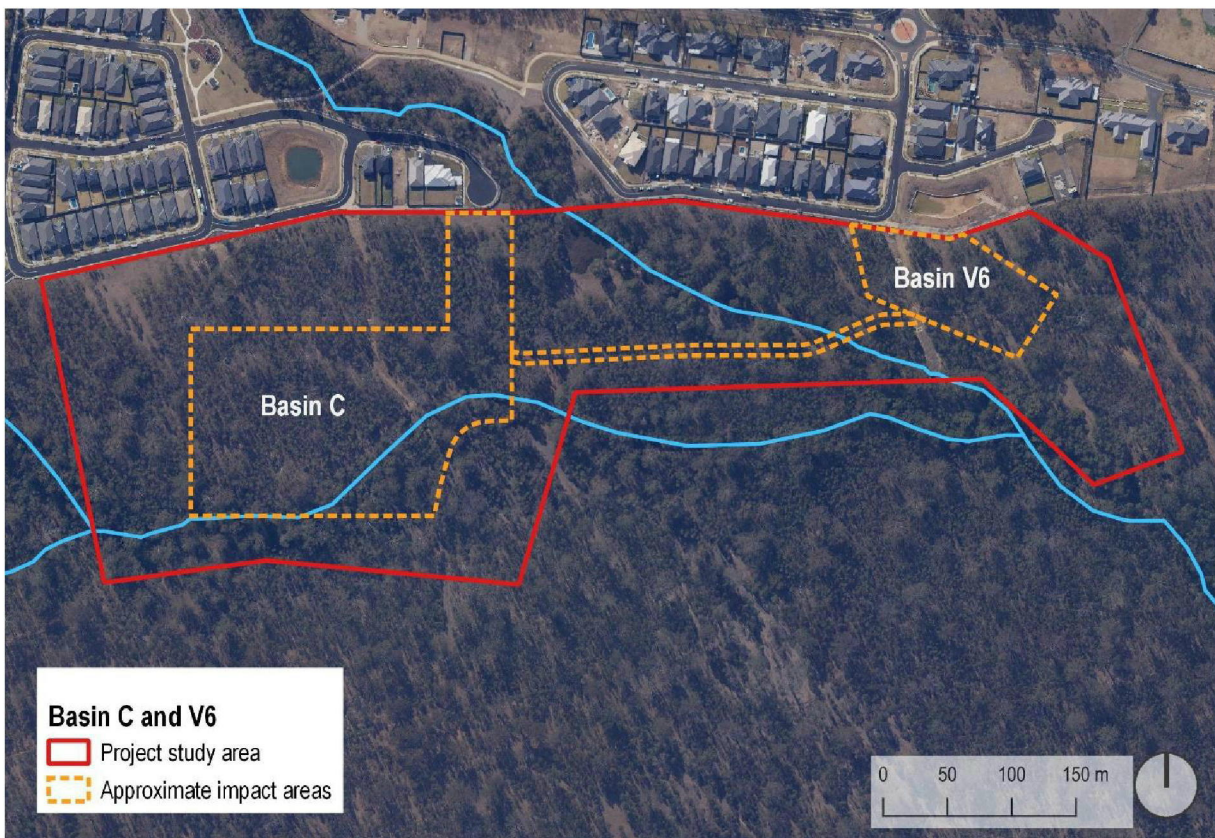
- any comments on the proposed project and/or Aboriginal heritage methodology;
- whether there are any Aboriginal objects of cultural value to Aboriginal people in the area of the proposed project; and
- whether there are any places of cultural value to Aboriginal people in the area of the proposed project (whether they are Aboriginal places declared under Section 84 of the NPW Act or not). This includes places of social, spiritual and cultural value, historic places with cultural significance, and potential places/areas of historic, social, spiritual and/or cultural significance.

## 1.7 Authors

This report has been written by Hannah Morris (Heritage Consultant) and Sophie Jennings (Senior Heritage Consultant) and reviewed by Dr Tim Owen (Principal).

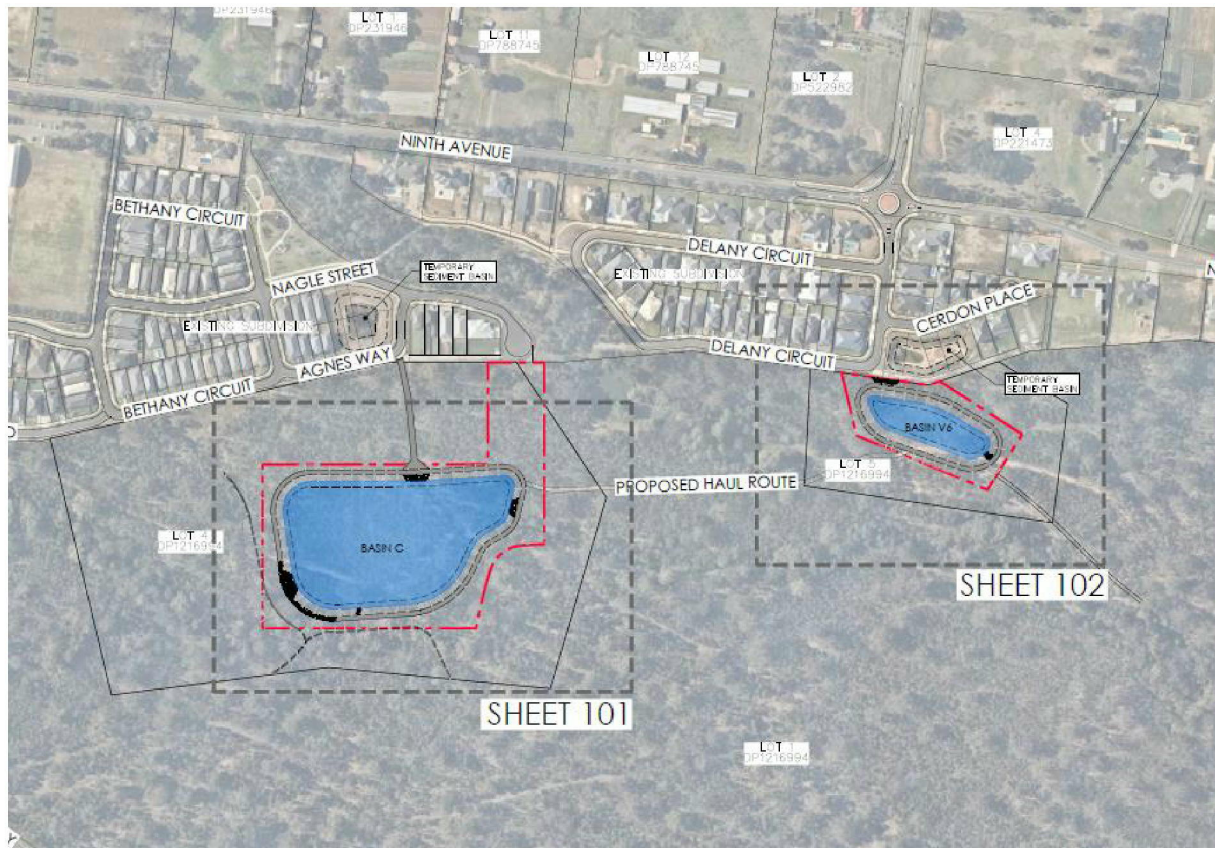


**Figure 1.1** Location of the study area (outlined in red) in relation to the SMDS (outlined in black). (Source: NSW Land and Property Information (LPI) with GML additions)



**Figure 1.2** Plan showing the area assessed in this report (outlined in red) and the approximate areas required for construction of the basins. (Source: NSW LPI with GML additions 2019)





**Figure 1.3** Preliminary designs for Basins C and V6. (Source: ADW Johnson, dwg 300225-CENG-003, Rev. A, 18.11.2019)

## 1.8 Endnotes

- 1 Department of Environment, Climate Change and Water, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*.
- 2 Department of Environment Climate Change and Water NSW, *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales, 2010*.
- 3 Office of Environment and Heritage NSW, *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW 2011*, Office of Environment and Heritage, Department of Premier and Cabinet, Sydney South.
- 4 Department of Environment and Climate Change, *Guide to Determining and Issuing Aboriginal Heritage Impact Permits 2009*.
- 5 Office of Environment and Heritage 2011, *Applying for an Aboriginal Heritage Impact Permit: Guide for Applicants*, Office of Environment and Heritage, Department of Premier and Cabinet, South Sydney.

## 2.0 Environmental and Archaeological Context

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### 2.1 Introduction

The purpose of this chapter is to provide contextual information for use in developing a predictive model relating to the prospective remains of evidence for Aboriginal occupation and use within the study area. This chapter is separated into the following sections:

- Section 2.2 provides an overview of the existing environmental conditions of the study area;
- Section 2.3 provides an overview of Aboriginal history in the region;
- Section 2.4 reviews previous archaeological investigations completed within the SMDS to inform the expected archaeological potential of the study area; and
- Section 2.5 presents a predictive model of the archaeological potential for the study area that synthesises the information from Sections 2.2 to 2.4.

### 2.2 Environmental Conditions

The project area's 'environment' forms a component of the Darug's peoples traditional lands and Country. An understanding the environment through the geology, soils, landforms, water and ecology is important to understand the context of long-term Aboriginal connections to the land. Combining basic environmental information with the history and contemporary connections starts to provide an understanding of the local and regional cultural landscape. Describing and mapping the landscape contextualises the physical data, and underpins intangible connections inherent in most Aboriginal cultural landscapes. An overview of the baseline datasets for geology, soil, landforms, water, the climate and ecology is provided in this section.

#### 2.2.1 Geology, Geomorphology and Soils

The SMDS overlies two main soil landscapes—Luddenham and South Creek (Figure 2.1). Basins C and V6 are both located on the Luddenham soil landscape,<sup>1</sup> a residual soil developed from in situ weathering of the underlying Wiananmatta Group shales, often associated with Minchinbury Sandstone. The Luddenham soils are highly prone to erosion. Soils of this landscape generally occur as a friable dark brown loam A<sub>1</sub> horizon, overlying a hard-setting brown clay loam to fine sandy clay loam (A<sub>2</sub> horizon). The B horizon comprises a reddish-brown to bright yellowish-brown medium clay, sometimes a silty clay or heavy clay.<sup>2</sup> Previous excavations across Western Sydney have demonstrated that in general B horizon soils do not contain Aboriginal artefacts. To the east of Basin V6, following the main watercourse, is the South Creek soil landscape. The mapped extent of the soil profile is representative of the creek's floodplains that bisect the SMDS.

#### 2.2.2 Hydrology

The availability of water has significant implications for the range of resources available and the suitability of an area for human occupation. The study area is located west of South Creek, the major creek network on the Cumberland Plain, that bisects the SMDS. Around the study area there are a number of modern artificially created bodies of water that mostly relate to farming or the former use of the site as part of the St Marys Munitions Factory.

Figure 2.2 shows the location of Basins C and V6 in relation to the waterways that form part of the South Creek network. A second-order creek, located within a very shallow, narrow valley, runs west to east outside the southern boundary of Basin C, and passes through the southeastern corner of the study area. Basin V6 is also located 30m north of a second order creek that flows east towards South Creek. The creek also passes nearby the northern extent of Basin C.

### 2.2.3 Landform and Topography

The landforms associated with the Luddenham soil landscape typically consist of undulating to rolling hills. The local relief around the study area is between 28m to 52m above Australian Height Datum (AHD), and the slopes are shallow, ranging from less than 2% to 10% (Figure 2.3). The study area is located at the base of a series of hills to the west and south. To the east of the study area, the landscape flattens out into the floodplains associated with South Creek and Ropes Creek.

#### *Basin C*

Basin C is characterised by flats adjacent to the creek. The southern portion of Basin C is located within a shallow valley associated with the creek running through it. On the northern side of the creek, the landscape comprises a almost level plain that rises up very gradually to the west at a gradient of c2%. Directly on the southern side of the creek, outside the study area, the landscape slopes more steeply, around 10%, into a series of low hills. The topographic map also reveals the location of a series of structures related to the ADI site and munitions storage. They are visible on the mid-slope of the hill in the southeastern corner of Basin C (Section 2.5).

#### *Basin V6*

Basin V6 falls into the valley associated with the creek to the south. The area is relatively flat, with a slight rise to the west. Directly to the north of the study area, low hills are present with a gradient of around 10%. They are similar to those on the southern side of Basin C.

### 2.2.4 Vegetation

The SMDS is located within the Cumberland Plain Woodlands. It would have originally comprised open woodland (eg Forest Red Gum) with closed woodland (eg Paperbark, Swamp Oak) along the creek margins. Today, the study area is within native Shale Plains Woodland vegetation, with freshwater wetland vegetation and introduced species along the creek margins.



Figure 2.1 Soil landscape surrounding the study area. (Source: NSW LPI and NSW Spatial Services, with GML additions 2019)

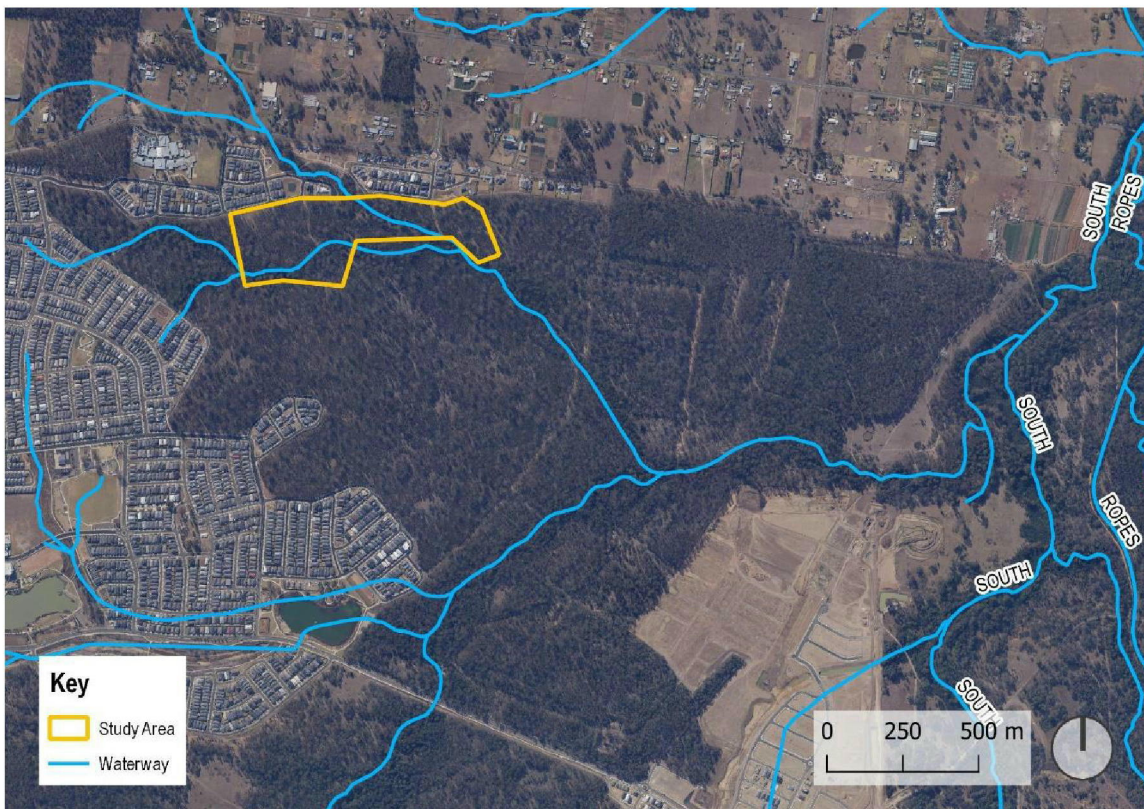
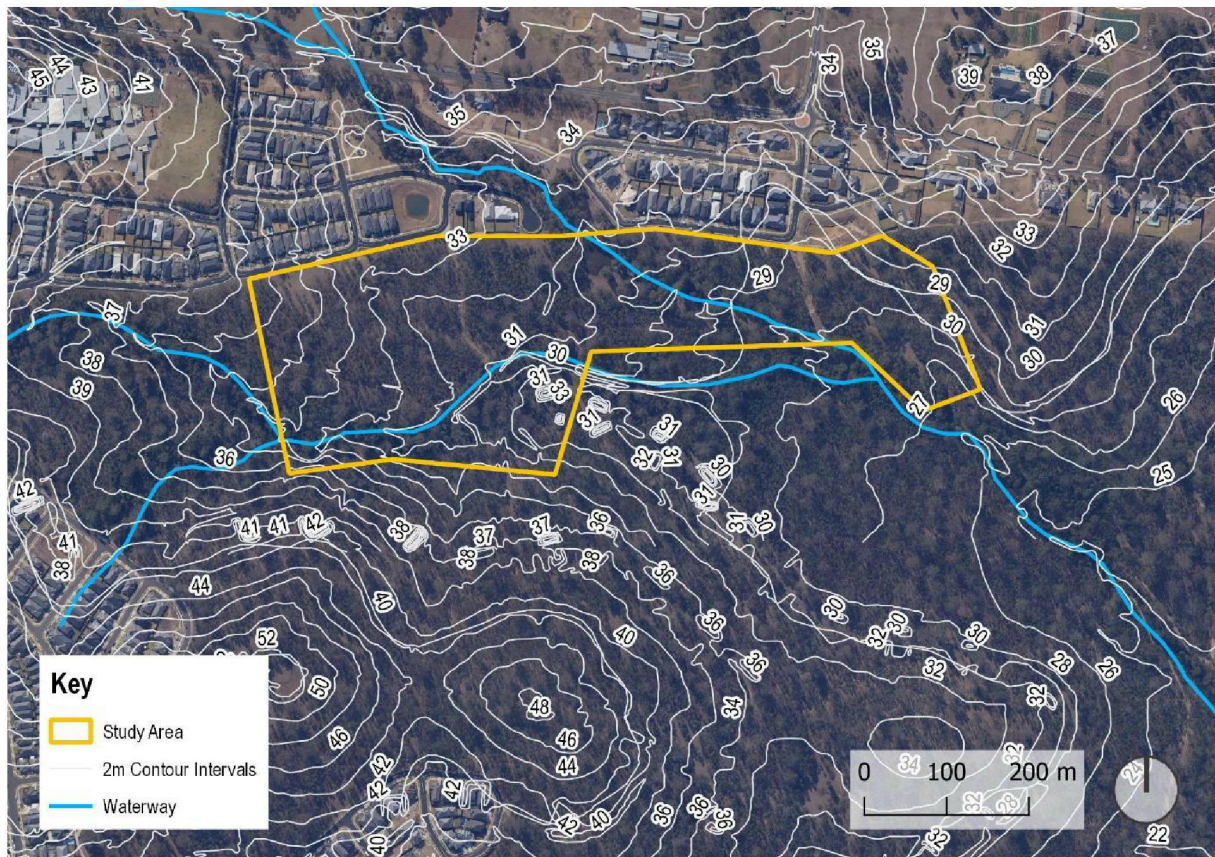


Figure 2.2 Natural hydrology, waterways and areas linked to the study area and wider landscape. (Source: GML 2019)



**Figure 2.3** Contours at 2m intervals and their relationship to the waterways and study area. (Source: GML 2019)

### 2.2.5 Land Use Impact Analysis

The project areas has been subject to a history of recent land use notably associated with the former Australian Defence Industries (ADI) site. Prior land uses may affect the ability of the landscape to inform and relate its history of Aboriginal connections. Vegetation clearance, movement of creeks and waterways, cut and fill, some Defence activities, notably construction, can change how the landscape appears. These activities can also affect and alter original soil profiles, which may have implications for the intactness of Aboriginal archaeological sites.

Understanding the range and extent of prior recent land use, allows a model of Aboriginal heritage sensitivity to be developed. To assess changes to the project area we have undertaken investigations of historical aerial images.

The entire SMDS was utilised for grazing and farming for approximately 150 years before the land was acquired in 1941 for the ADI site. Evidence of some vegetation clearance and dirt roads (tracks) can be seen on the 1940s aerial (Figure 2.4). The development of the ADI site at St Marys saw the construction of factory and munitions storage complexes, which assembled and filled bombs, shells, fuses and pyrotechnics. A series of these buildings can be seen in the southeastern portion of the study area near Basin C, running along the edge of the plains. They can be faintly observed in the 1940s aerial (Figure 2.4) and the contour map as round shapes (Figure 2.3). None of these former structures fall within the study area. After World War II, many of the munition installations were disassembled, while others continued to be used by the department of Defence.

During the Korean War (1950–1953), the St Marys Munitions Factory was re-established. The aerial from 1955 (Figure 2.5) shows that roads through the site have become more established. Again, no

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evidence of structures within the study area has been identified. Aerials from 1965 (Figure 2.5), 1978 (Figure 2.6), 2000 (Figure 2.7) and the present (Figure 2.8) shows the progressive regrowth of woodland vegetation. The most recent aerial shows the establishment of the residential area at Jordan Springs, immediately north of the basin sites.

An inspection of the area on 30 October 2019 provided an opportunity to assess the extent of ground disturbance resulting from historic uses of the area. The site inspection focused on the footprint of the proposed basins. These are summarised below for each of the basin sites.

- Basin C—in the northern arm of Basin C, a large bund was located. Construction of the bund appears to be the result of pulling soil from the vicinity into a mound. The process removes the potential for intact, or in situ, artefact scatters on the surface or upper layers of earth. Drainage channels running beneath the haul road were identified in the eastern part of Basin C. These, too, removed any possible Aboriginal archaeological deposits in the area the works were undertaken.
- Basin V6—the northeastern portion of Basin V6 is heavily landscaped. An artificial slope, running upward to the east, leads to a second bund. The earthworks would have caused disturbance to the upper layers of soil. The eastern half of the study area is unlikely to yield intact archaeological deposits. The western portion of the basin has been disturbed by a number of drainage features. These include large, deep pits visible on the main clearer area, and smaller pits along the southern edge of the haul road. These drainage features have removed archaeological deposits from their footprints entirely.
- Haul Road—drainage pits and channels running beneath and beside the haul road are present in the area between Basins C and V6.

In summary, Basin C has been subject to historical landscaping activities. These activities will have disturbed the upper layers of soil in the northern arm of the study area and along the haul road. As a result, the potential for intact archaeological deposits in these locations is nil to low.

Basin V6 has been heavily disturbed by landscaping and the construction of drainage systems. Landscaping in the eastern half of the study area has likely disturbed the upper layers of soil. The potential for intact archaeological deposits on the surface or upper layers of soil is nil to low. Moreover, the deep and extensive drainage pits along the western boundary of the study area will have entirely removed both surface and subsurface archaeological deposits.

The construction of the haul road also lowers the potential for archaeological deposits along the road between Basins C and V6. While some artefacts have been identified on the road surface, these will have been displaced from their original location due to the landscaping required to clear the road, and continued vehicular disturbance. While they are evidence of Aboriginal occupation in the vicinity, these deposits are not considered to be intact deposits. Artefacts recovered on either-side of the road itself may contain intact archaeological deposits.

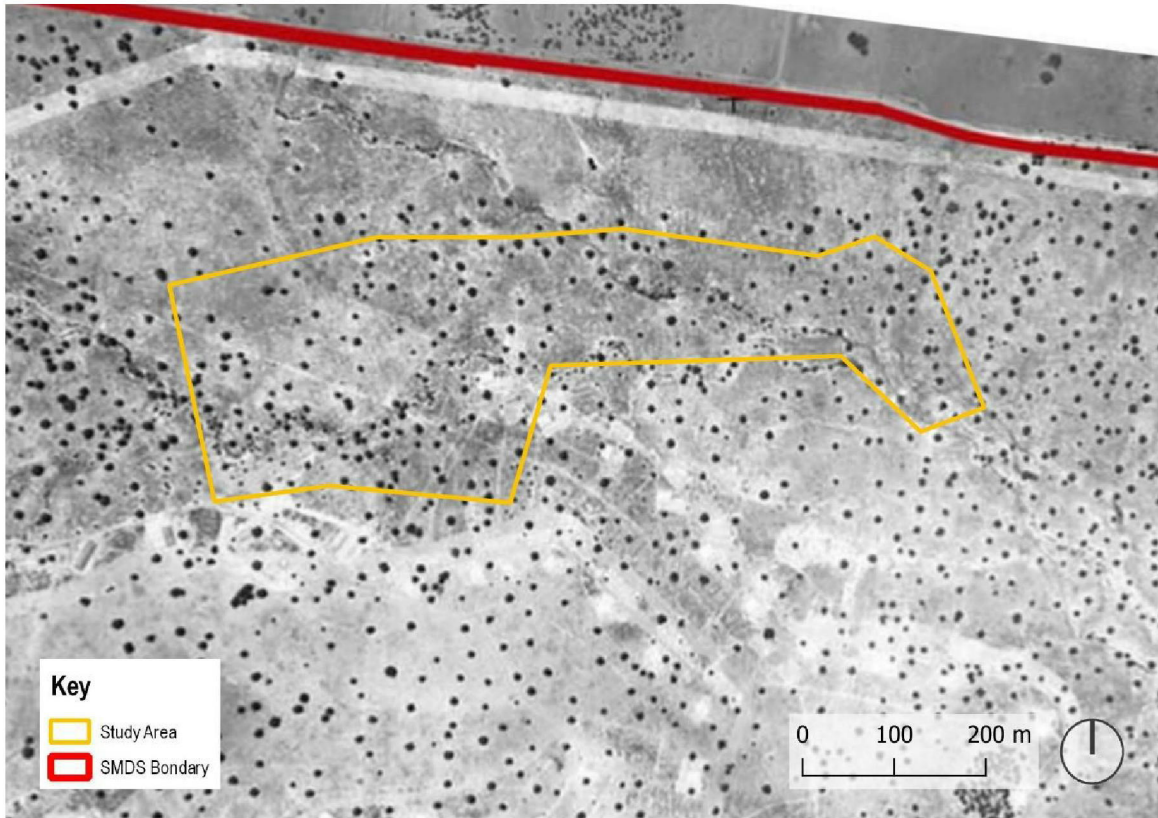


Figure 2.4 1940s aerial with ground disturbance from ploughing present. (Source: NSW LPI, with GML additions, 2019)

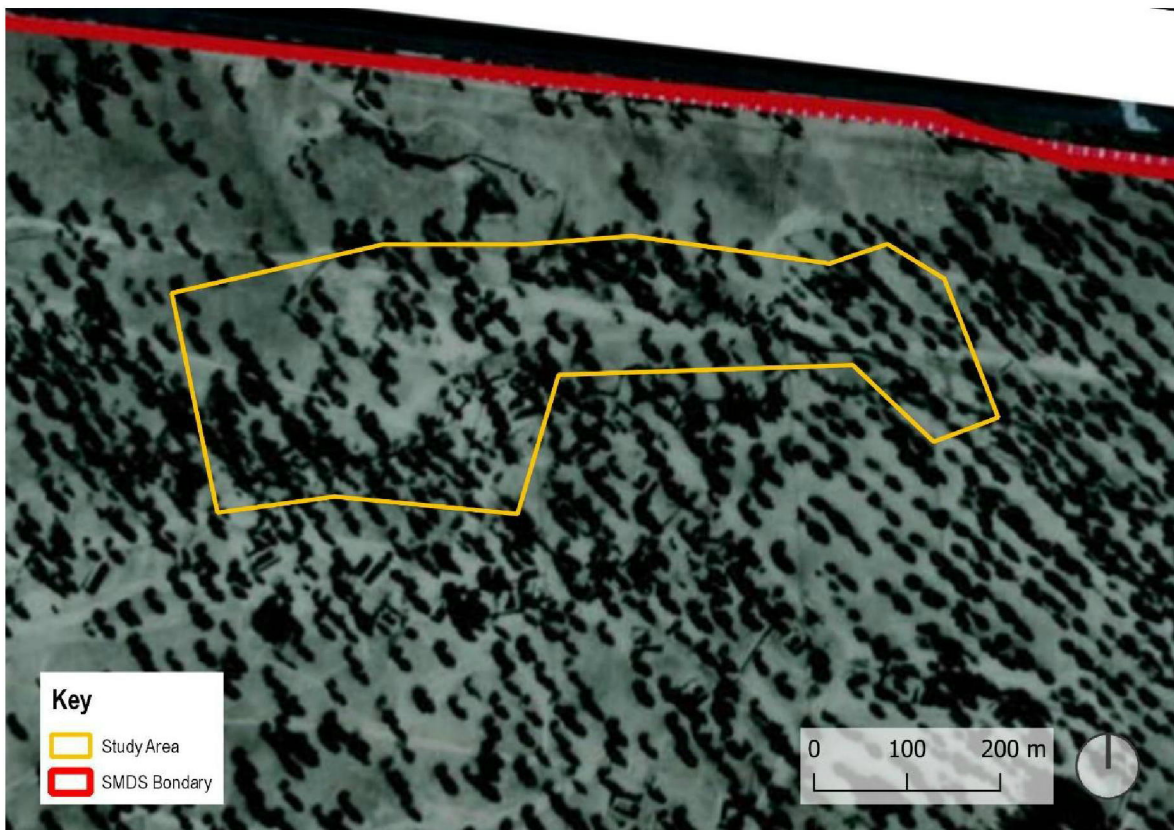


Figure 2.5 1955 aerial showing greater forestation of the land around the study area. (Source: NSW LPI, with GML additions, 2019)



Figure 2.6 1978 aerial showing greater forestation of the land around the study area. (Source: NSW LPI, with GML additions, 2019)

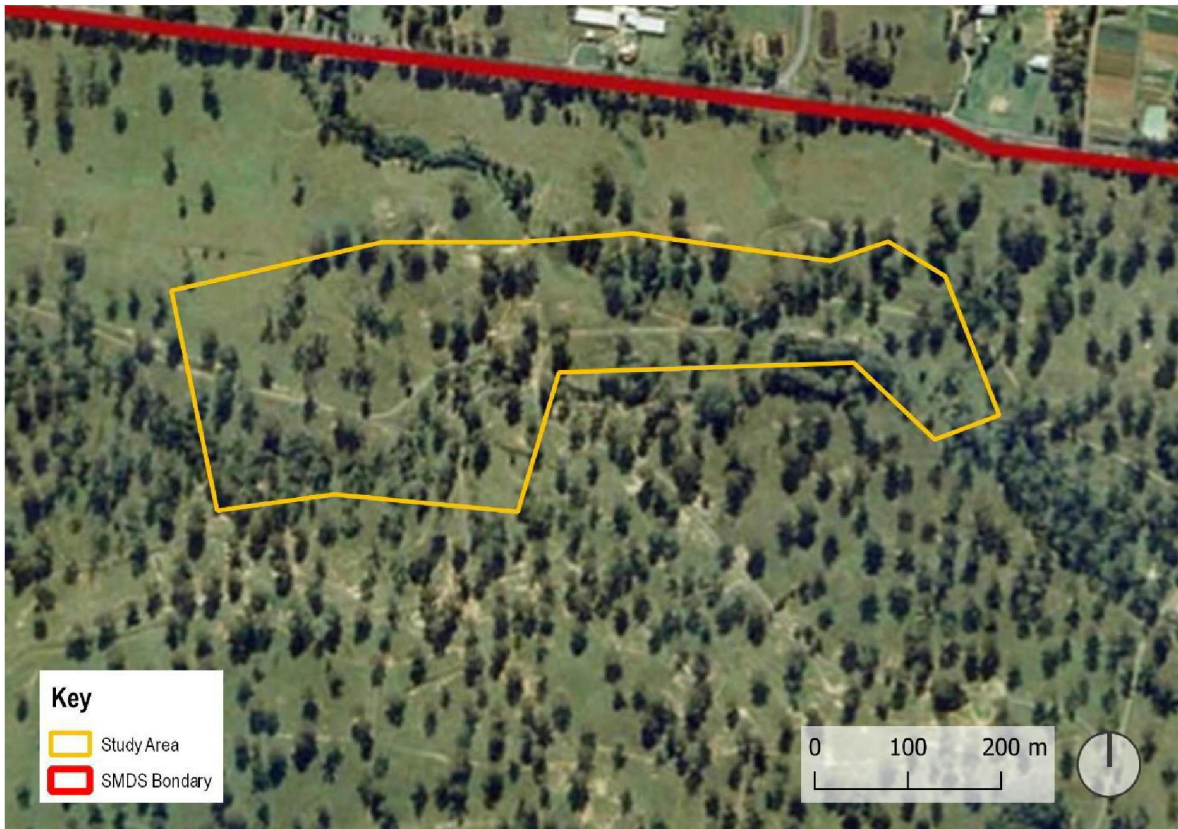
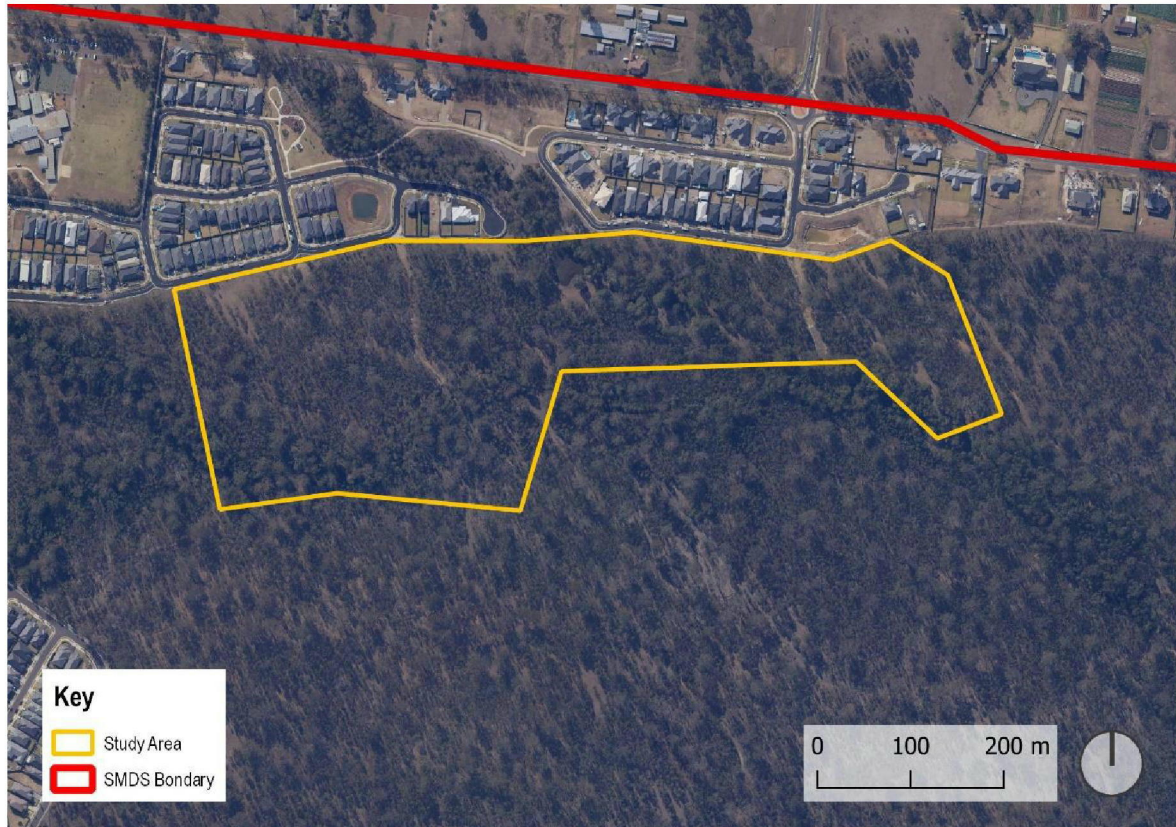


Figure 2.7 2000 aerial showing greater forestation of the land around the study area. (Source: NSW LPI, with GML additions, 2019)





**Figure 2.8** c2019 aerial showing greater forestation of the land around the study area and the Jordan Springs residential development immediately to the north. (Source: NSW LPI, with GML additions, 2019)

## 2.3 Aboriginal Ethnohistory

The SMDS, as with much of the Cumberland Plain, was part of the territory of the Gomerigal clan of the Darug (various spellings including Dharug, Dharrook, Dharruk, Dhar-rook) people for thousands of years prior to European occupation, which inscribed the land with a different pattern and form.<sup>3</sup> The Darug was a language group that represented a number of different groups of people who occupied the Sydney basin from the coast between South Head and the north shore of Botany Bay, out to the edge of the Blue Mountains. Within this area there were approximately 20 different bands, each having a different territory, boundaries and sacred spaces.<sup>4</sup>

The SMDS is traversed by two major watercourses (Ropes Creek and South Creek) less than 2km east of Basin V6 (Section 2.2.2). The resulting floodplain would have created wetlands and river terraces, providing a range of food resources (associated with the varied ecological communities) and raw materials for tools, shelters, clothes and other purposes for people moving within the wider area. The Darug people would have used the landscape seasonally, and formed open campsites on the higher ground with ready access to numerous natural water sources present across the land in association with Ropes and South Creeks.

The plains directly to the east of the study area provided native animals, vegetable foods and other resources including timber and leaves, natural gums and resins that were used for a range of implements and tasks. The Darug would have fired areas within their traditional Country to maintain a clear and open understorey. This encouraged the fruiting of plants and the growth of fresh herbage for animals to graze. Kangaroos, emus, snakes, bandicoots, possums and other game foods would have been eaten. Roots and tubers including yams would have been dug along the creeks and roasted in open campfires.

Stone was a vital material and its distribution in the landscape played a role in determining people's movements and patterns of trade and exchange with other language groups.<sup>5</sup> Silcrete was the dominant stone material used in the manufacture of the stone tools in the region. Silcrete sources have been located only a few kilometres east of the study area, within the former Eastern Precinct of the SMDS. However, the Darug people also utilised other locally available stone such as silicified tuff, chert and quartz.

It is likely that the different groups of Darug people living on the Cumberland Plain had the rights to the natural resources which occurred in their respective habitation area.<sup>6</sup> As such, the silcrete quarry, and the acquisition and use of the silcrete from this location, may have been subject to the control of members of the South Tribe Gomerigal clan. Archaeologically there are distinct patterns of stone access and consequent use in sites located either side of South Creek.

## 2.4 Aboriginal Cultural Values

The Wianamatta Regional Park has Aboriginal cultural values beyond the archaeological resources. These values were investigated and reported on as part of a Conservation Management Plan, in 2011. The values identified, notably the landscape and intangible values are connected with the current study area. Basins C and V6 are located within the northwest section of the regional park. The CMP recognised that the park would be formally gazetted as a regional park under the NPW Act. Regional parks under this Act are managed to identify, conserve and promote the appreciation of natural and cultural heritage values whilst providing uses and visitation.<sup>7</sup> The report acknowledges that the Wianamatta Regional Park 'embodies a range of cultural heritage values', reflecting both natural processes and human interactions. Therefore, the CMP identified the park as a cultural landscape, and included an assessment of the contemporary social values attributed to the park by local people. This included a description of the land as Darug Country, a summary of the archaeological resource, assessment of heritage values across the land in reference to the Aboriginal landscape and, most notably, consultation with the local Aboriginal community.

Consultation was undertaken in accordance with the DECCW guidelines, and was initiated by GML in August 2009. Eight stakeholder groups were identified at this time as having a likely interest in the use and conservation of the park's heritage resources, namely: Darug Aboriginal Cultural Heritage Assessments (DACHA), Darug Cultural Aboriginal Custodians (DCAC), Darug Land Observations (DLO), Darug Tribal Aboriginal Corporation (DTAC), Darug Peoples Advisory Committee, Deerubbin Local Aboriginal Land Council (DLALC), Colin Gale, and Yarrowalk (Scott Franks). It was also noted that a Memorandum of Understanding (MOU) was negotiated in 2007 between (what was then known as) Department of Conservation (DEC), and members of the Darug community, namely the Darug Peoples Advisory Committee. This MOU acknowledged the Darug people's ongoing interest in the management of their traditional lands.

Consultation with these Aboriginal stakeholder groups was undertaken in the form of a start-up workshop, and a tour of some Aboriginal sites of social significance (both post-contact and pre-contact) within the regional park. The sites visited were suggested by Aboriginal stakeholders with input from the project team and DECCW. At each site, there was a brief discussion about the value of the site and future management. It is noted that a concentration of significant historical/contact period landscapes are present between South and Ropes Creeks, to the northeast of the Central Precinct.

Several meanings and values were identified by the Aboriginal people relating to the Wianamatta Regional Park during this consultation process, including:

- *Country is a spiritual life force—we are born into it, it is in our blood, our mother, our church.*
- *Aboriginal culture is resilient, dynamic and enduring.*
- *Continuing connections—Aboriginal cultures and interactions with other culture.*
- *Country, its form and the seasons, native flora and fauna, creeklines, routes and passages, and special places have meaning and are connected.*
- *Aboriginal history is a story of survival, displacement and exclusion, but also one of resilience and cultural continuity and connection.*
- *Wianamatta Regional Park includes tangible physical evidence of Aboriginal people's presence and use of the land's rich natural resources over thousands of years.<sup>8</sup>*

A range of actions and management suggestions for future park management were also discussed during consultation.

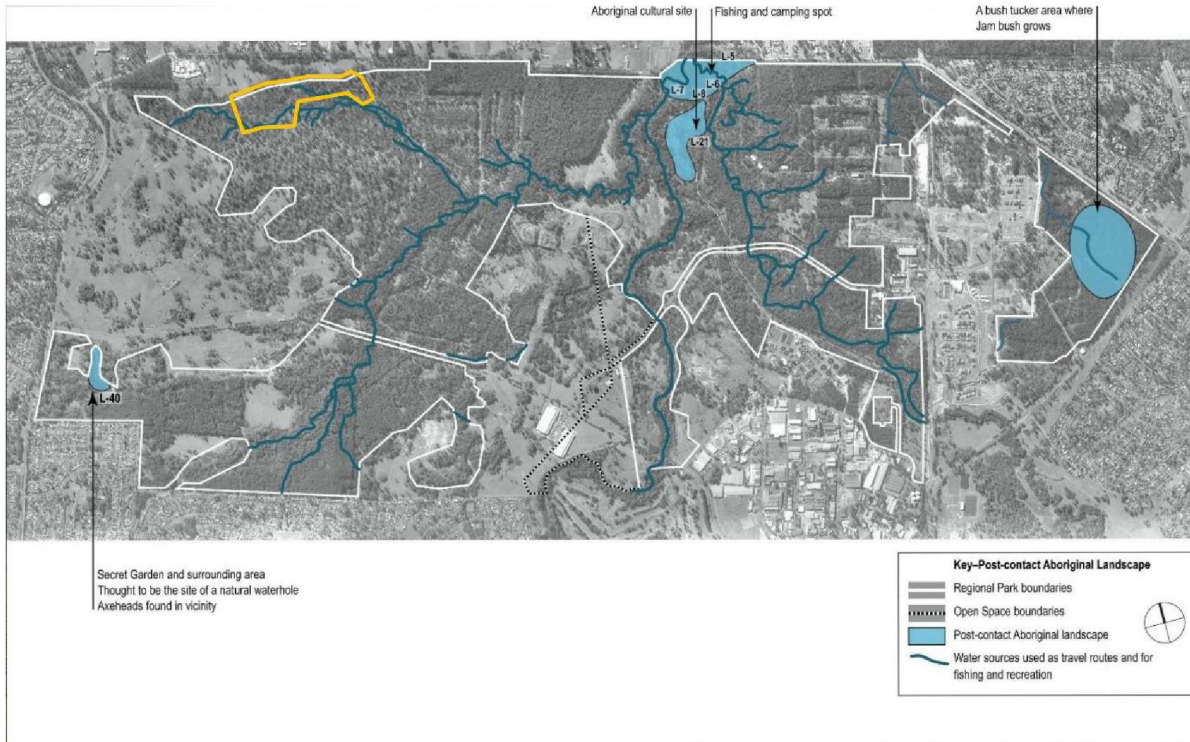
A brief summary of these is included below:

- *Display Aboriginal welcome to Country signs at the park exit and entry points.*
- *Develop an Aboriginal community/cultural centre incorporating education and arts and crafts.*
- *Refine and synthesise the scientific (archaeological) data as necessary to develop understanding of Aboriginal occupation and use of the land.*
- *Ensure that previously recorded Aboriginal sites are entered onto the Aboriginal Heritage Information Management System.*
- *When naming park features, use local Aboriginal language.*
- *Re-use stored silcrete cobbles in public art.*
- *Employ local Aboriginal artists in art projects.*
- *Ensure local Aboriginal people are engaged in ongoing park planning and management.*
- *Plan and prioritise cultural heritage assessments including archaeological surveys to align with on-park works.*
- *Where possible, explore the location and siting of interpretive nodes and initiatives to tell the story of Aboriginal cultural heritage.*
- *Remember that Aboriginal people are the rightful interpreters of their cultural heritage.<sup>9</sup>*

A discussion was held following the site visit. Points discussed included: the need for further archaeological assessment to be coordinated at a landscape scale in order to help develop the understanding of occupation and use of the landscape by Aboriginal people; the importance to Aboriginal people of continuing/controlled access to Aboriginal sites within the park; the importance of respect for Aboriginal history and heritage; and the need to keep the local Aboriginal community informed of processes.

Through this consultation process, it was clear that the abundant evidence of Aboriginal occupation within the Wianamatta Regional Park (and wider SMDS), as demonstrated through the archaeological record, 'connects Darug people to their ancestors and is a powerful affirmation of their cultural continuity'. In addition, the 'Aboriginal history and archaeology of the park provides an opportunity to learn more about how Aboriginal people in the past used the landscape'.<sup>10</sup>

Development of the CMP culminated in the identification of pre and post contact places, with connected intangible values. These places are shown in Figure 2.10. While the study area is located away from the significant post-contact sites, it is part of the broader landscape within the park that holds cultural, historic, social, aesthetic values for the Aboriginal community.



**Figure 2.9** Plan of the SMDS showing post-contact and some pre-contact Aboriginal places identified and visited during consultation for the Wianamatta Regional Park CMP. (Source: GML 2011, Figure 4.1)

## 2.5 Previous Heritage and Archaeological Work

The purpose of this section is to synthesise available information from previous heritage studies to provide a context and baseline for what is known about Aboriginal cultural heritage in the study area.

Over the past 30 years of development works at the SMDS, many archaeological assessments, surveys, test and salvage excavations have been undertaken. The archaeological investigations have identified a range of archaeological sites, now registered on the AHIMS database. Moreover, the breadth of archaeological works has created a strong background on which to base future expectations and understandings of the study area and surrounding landscape.

### 2.5.1 Aboriginal Heritage Information Management System (AHIMS) Search

An extensive search of the AHIMS database was undertaken on 30 September 2019. The search included the study area, western half of the SMDS, and areas beyond the SMDS boundary.

The search returned 113 sites, falling into four categories—artefact sites (meaning multiple stone artefacts in a landscape location), isolated finds (single stone artefacts unconnected with a bigger site), Potential Archaeological Deposits (PADs) (locations with a yet to be proven sub-surface archaeological expression), PADs with isolated finds, and (Table 2.1). The majority of sites within the search area are classified as artefact sites, sometimes referred to as open camp sites in the AHIMS database and literature. The second most frequent type of site was isolated finds. Five of these isolated finds have

been interpreted as being part of a PAD, meaning there is the potential for further artefacts to be recovered through archaeological investigation of subsurface deposits.

**Table 2.1** Results of AHIMS Search.

Site Feature	Frequency	Percentage (%)
Artefact Site	70	62
Isolated Find	35	31
Isolated Find and PAD	5	4
PAD	3	3
Total	113	100

### *Basin C*

The AHIMS search identified two sites registered within Basin C. The artefact site (AHIMS No. 45-5-3610) was recorded as an open artefact scatter containing eight lithics (**Figure 2.11**). As a result, more artefacts will be potentially located on the surface of the area within the Basin C footprint. This site is positioned in approximately the location of the access road, visible on the 1955 aerial (Figure 2.5). The presence of stone artefacts on the surface could be a factor of erosion resulting from this period.

A second open artefact scatter (AHIMS No. 45-5-3609) is located in the southwest corner of Basin C. The open artefact scatter only contained two artefacts; however, the scatter may be considered in conjunction with an isolated find (AHIMS No. 45-5-3608) only 150m to the west and the aforementioned scatter within Basin C. These two sites are in locations that have been subject to minimal historical disturbance. They are located on the northern bank of the second order creek (Figure 2.2), and potentially relate to occupation activities on flats adjacent to the creek.

The landscape position of these three sites are within the 50m zone that Jo McDonald Cultural Heritage Management (JMcDCHM) suggested contains higher potential for archaeological evidence.<sup>11</sup> In synopsis, it is likely that the 50m zone on either side of the creek will retain archaeological evidence of Aboriginal activities.

### *Basin V6*

No archaeological sites have been recorded within the Basin V6 boundary. However, the location of the second order tributary river is only approximately 35m to the south of the southern boundary of the study area. As a result, the potential for archaeological sites such as open artefact scatters are highest in the southern half of the Basin V6 boundary. The closest recorded artefact site (AHIMS 45-5-3587) was subject to archaeological test and salvage excavation in 2014 as part of the Jordan Springs redevelopment (WP1), the results of which are discussed further below.

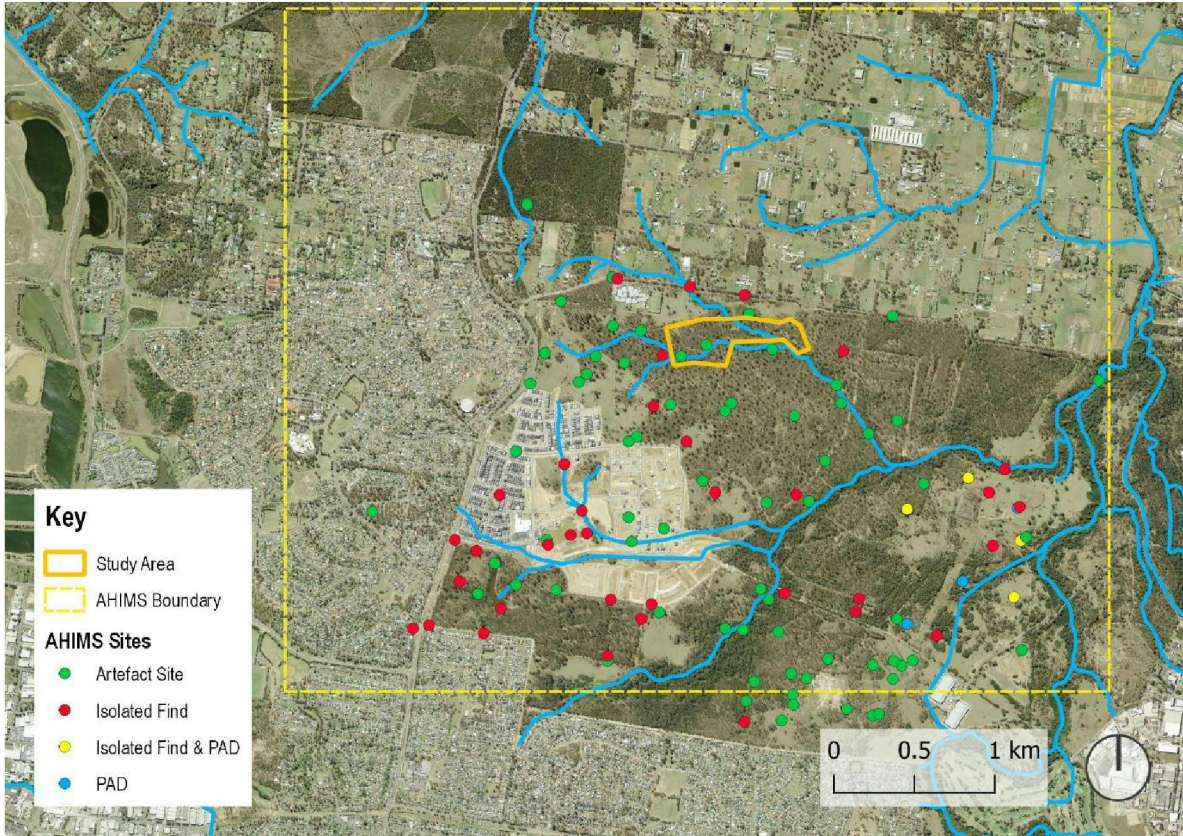


Figure 2.10 Sites identified through an extensive AHIMS search. (Source: NSW LPI and DPIE, with GML additions 2019)

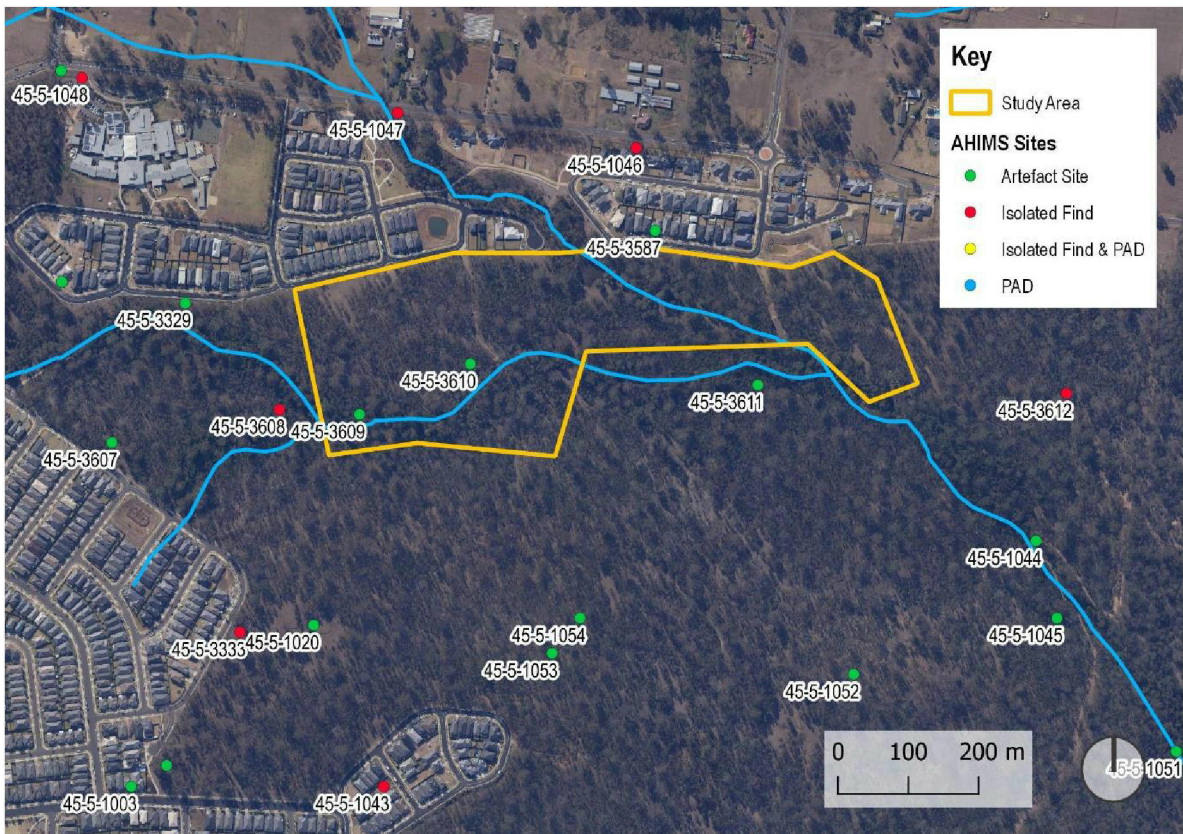
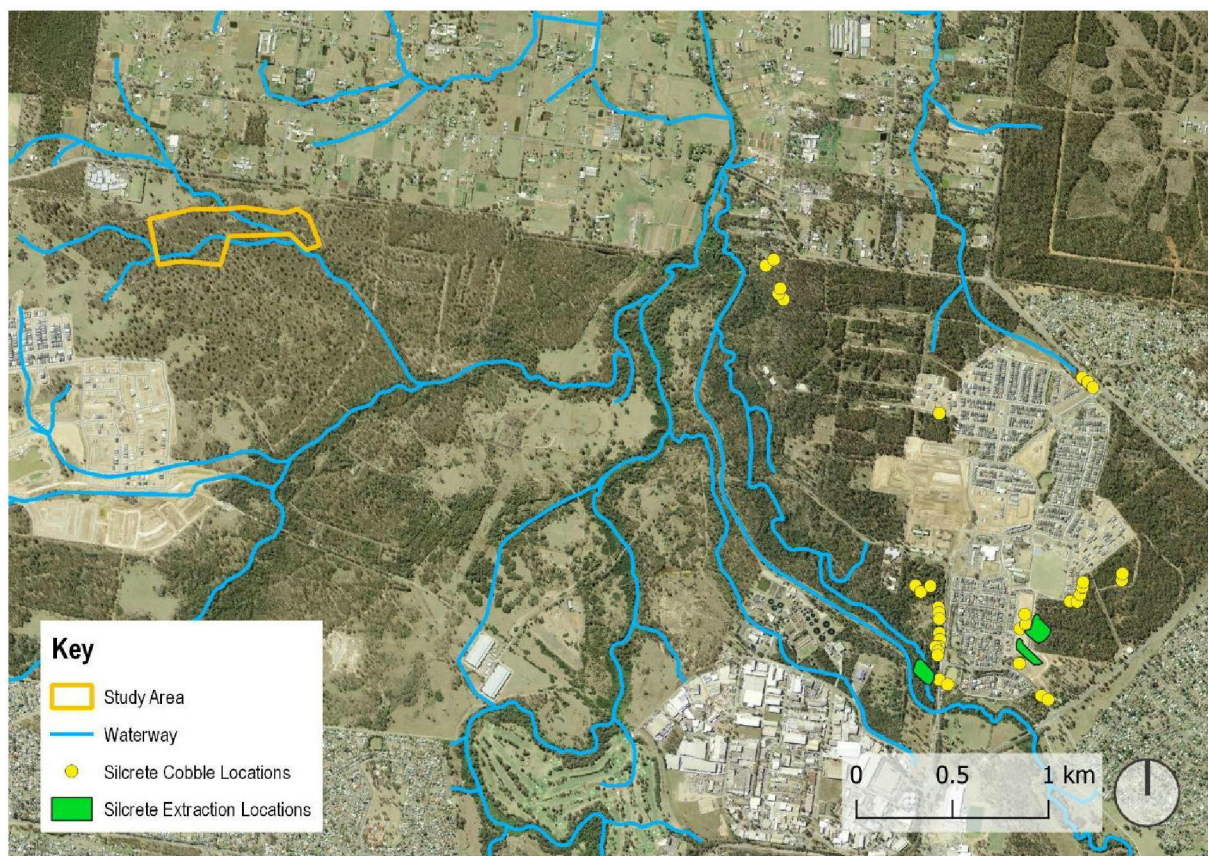


Figure 2.11 Registered AHIMS sites located directly around the study area. (Source: DPIE, with GML additions, 2019)

## 2.5.2 Previous Archaeological Investigations in the SMDS

This section discusses only those archaeological investigations undertaken within the SMDS on the Luddenham soil landscape to provide comparative data for the study area under consideration. Those excavations along South Creek with alluvial deposits, notably the Central Precinct, have been excluded here.



**Figure 2.12** Location of silcrete sources within the SMDS. (Source: JMcDCHM 1997a, Map 8, with GML additions)

### JMcDCHM 1997a—Interim Heritage Management Report<sup>12</sup>

JMcDCHM identified locations where silcrete, a raw material that can be manufactured into stone artefacts, could have been obtained.<sup>13</sup> Silcrete formed a major part of artefact assemblages collected in SMDS (see below). For example, as identified by the WS4&PAD test and salvage excavations,<sup>14</sup> the vast majority of artefacts collected from the area to the southeast of Basins C and V6, were manufactured from silcrete. The location of the silcrete raw materials are only 2km to 3km north east of WS4&PAD, and 4km to 5km southeast of the present study area. Another location of silcrete cobble is directly east of the study area, on the eastern side of Ropes Creek, only 2.5km from Basin V6.

### JMcDCHM 1997b—St Marys ADI Test Excavation<sup>15</sup>

In September 1997, JMcDCHM excavated 113 test pits (1m by 1m) across five sample areas, with members of the Deerubbin Local Aboriginal Land Council (DLALC). Open artefact scatters were identified in each of the areas, and a total of 3,461 Aboriginal stone artefacts were recovered. The closest to the present study area was Area 5 (AHIMS No. 45-5-1044), located on the Luddenham soils and situated 700m southeast of Basin C and 500m from Basin V6. A total of 33 test units were excavated along two transects, with a total of 321 lithics recovered.

## GML Heritage

The aims of the test excavation were to investigate the designation of conservation areas within the ADI site. JMcDCHM did so by assessing potential conflicts between the proposed works (filling of the floodplain) and heritage management requirements. JMcDCHM concluded that there was 'minimal conflict' between the proposed works and Aboriginal heritage management requirements as the areas of works are located in areas zoned as containing 'low or no archaeological potential'.<sup>16</sup>

Importantly, the conclusions from the report suggested that there is a moderate potential for archaeology around the study area. JMcDCHM designated the area on which proposed Basins C and V6 are located as Management Zone 3, defined as:

*Moderate disturbance – land which has been cleared and grazed, and on which there is evidence of at least one phase of ploughing. Aboriginal sites may be found in these areas but they will have been disturbed to a depth of about 20 to 30cm.*<sup>17</sup>

JMcDCHM furthermore redefined the boundaries of the conservation zone corridors, adding that their testing works 'indicated that a conservation corridor width of 50m either side of the creekline would be inadequate to encompass areas of archaeological significance' and therefore suggested a conservation corridor of 150m on either side of the creek channel.<sup>18</sup> As there are creek lines running through and beside the study area, the results of this report would suggest that the current areas being assessed possess potential for intact archaeological evidence.

### **JMcDCHM 2004,<sup>19</sup> 2005,<sup>20</sup> 2006<sup>21</sup>—Fauna Fence Survey**

JMcDCHM undertook several field surveys between 2004 and 2006 along the route of a proposed fauna fence constructed across the SMDS. The purpose of the fauna fence was to mark the boundary of the regional park and to manage macrofauna (ie kangaroos and emus) during the construction phase of residential and industrial precincts. As such, an area of the fence line (referred to as Section B to C) which defines the edge of Jordan Springs is located directly to the north of the study area.

The field surveys focused on the centre line of the proposed fence route with a 5m corridor to either side (a 10m corridor in total). Field surveys subsequent to the first survey were undertaken due to adjustments of the proposed path of the fence.

Along Section B to C, six open artefact scatters, three isolated finds, one open artefact scatter and PAD, and one PAD were recorded.<sup>22</sup> Three are notable for being close to the present study area. Firstly, ADI/FF9 (AHIMS No. 45-5-3609), an open artefact scatter and PAD, is located less than 25 metres from the southwestern extent of Basin C. The PAD was designated as containing moderate to high potential for further archaeological remains. Moreover, as it is a PAD, it is possible that the extent of the PAD covers the footprint of Basin C. Secondly, ADI/FF10 (AHIMS No. 45-5-3610), an open artefact scatter, is located directly within the boundary of Basin C. The scatter is potentially an extension of ADI/FF9 to the west. JMcDCHM notes that the area around it has been cleared and possibly graded for dam banks and therefore has low to moderate potential for intact deposits due to the disturbance. The third site within the vicinity of the study area is ADI/FF12 (AHIMS No. 45-5-3611), another open artefact scatter, located approximately 120m to the south of Basin V6. The report stated that there is moderate to high potential for intact archaeological deposits in the area.

### **JMcDCHM 2009—WP3 and WP4 Salvage Excavation<sup>23</sup>**

Assessment of the SMDS Western Precinct (Jordan Springs)<sup>24</sup> identified seven target areas to be subject to salvage excavation prior to development taking place in these areas. A precinct-wide AHIP was applied for and granted for Jordan Springs (AHIP No. 10996059).



Archaeological excavation of WP3 and WP4 in 2009 was the first phase of salvage excavation with the AHIP. A combined total of 80 1m<sup>2</sup> test squares and 154m<sup>2</sup> of open area (OA) excavation was completed from the WP3 and WP4 excavations. A total of 2,355 cultural lithics were recovered from this excavation, with 1,967 meeting technical criteria to be classified as artefacts. Artefact density and distribution from both excavated sites generally conformed to distributions identified for first order streams in other areas of the Cumberland Plain (ie low discontinuous distribution, consistent with infrequently used or one-off sites).

The excavation at WP3 demonstrated sparse distribution of artefacts, as well as small-scale flaking and discard events. The excavation of this landform, in combination with its close proximity to a source of silicified tuff and quartz (Mount Pleasant), provided the opportunity to investigate raw material preference within a discrete location. This allowed some investigation into the way in which lithic material procurement may have influenced broader trends in silcrete use (ie possibly influencing an increase in artefact discard as opposed to that common for other first order landscapes). Evidence for a silcrete heat treatment area was present within OA A of WP3.

The artefact assemblage from dispersed testing at WP4 included raw material types of silcrete, silicified tuff and quartz in almost equal proportions (silcrete=37%, silicified tuff=33% and quartz= 29%). Artefact density and distribution was similar to WP3.

The investigation confirmed that artefact bearing deposits can remain relatively intact even with the low to moderate disturbance associated with historic ploughing, and the more recent impacts related to the use of the SMDS as a munitions storage area by ADI.<sup>25</sup> Excavation of both sites also provided an insight into the nature of raw material procurement in association with distance from sources.

### **GML + JMcDCHM 2012—Jordan Springs WP5 Salvage Excavation<sup>26</sup>**

Salvage excavation of WP5 within the Jordan Springs development area was undertaken in August and September 2012 in accordance with AHIP No. 10996059. A total of 42 1m by 1m test squares and 59m<sup>2</sup> of open area excavation was completed from excavation within WP5. A total of 1,835 cultural lithics were recovered from this excavation program.

Excavation at WP5 demonstrated a low density, discontinuous lithic distribution across the landform, with occasional artefact clusters. The artefact densities were slightly lower than predicted by the application of the Cumberland Plain predictive model for landforms associated with second order streams. Following test excavation, three squares were selected for expansion. The expansion of two of these three squares demonstrated evidence for on-site production of backed artefacts. One OA (Area B) presented with possible evidence for a circular cultural burning feature; however, charcoal recovered from this feature has not yet been dated. However, artefact heat shatter and breakage surrounding the burning feature does not point to a higher percentage of artefacts demonstrating breakage through heat.

### **GML + JMcDCHM 2014—Jordan Springs WP1**

A program of archaeological test and salvage excavation was undertaken at WP1 during January and February 2014. This involved the excavation of 41 TUs, with six TUs expanded into OA excavations. The excavation took place across two lower hill slopes on the Luddenham soil landscape, bisected by a north–south orientated open depression/first order drainage creek. Remains of a paleochannel were also discovered on the western slope of WP1. The area of excavation is situated immediately north of Basin V6.

## GML Heritage

The purpose of the excavation was to investigate a lower hill slope on shale geology. The excavation encountered low density artefact concentrations (ie a maximum of 25 artefacts in a single metre squared), with some evidence for repeated occupation or use of areas within the landscape. The excavation on the slope east of the creek encountered mainly shallow, eroded or stripped soil profiles with very few artefacts. The slightly steeper slope across this area, coupled with the flatter area on the western slope opposite, were identified as possible factors for the lack of Aboriginal artefacts.

In comparison, several stone artefact concentrations and cultural burning features (interpreted as possible ovens) were identified on the western slope. The artefact concentrations ranged from 22 artefacts recovered from 11m<sup>2</sup> at TU15 to a total of 259 artefacts recovered from 45m<sup>2</sup> at TU1. The results of comparative analysis to other sites excavated across the northern Cumberland Plain showed that WP1 does not conform to the predictive modelling for archaeological sites associated with first order streams.

### **GML + JMcDCHM 2011—WP2 and WP6 Salvage Excavation**

Salvage excavation of WP2 and WP6 within the Jordan Springs development area was undertaken in late 2011. A combined total of 92 1m<sup>2</sup> test squares and 217m<sup>2</sup> of open area excavation was completed from the WP2 and WP6 excavations, with a total of 4282 cultural lithics recovered.

WP2 had an average density of five artefacts/m<sup>2</sup>, which was much higher than other first order landscapes in the comparative area. In addition, WP2 displayed a low percentage of silcrete (51%), followed by quartz (35%) and silicified tuff (13%), compared with that expected. The artefact density encountered at WP2 was more consistent with predictions for locations further down the ridge (ie locations generally predicted to possess higher artefact densities). It was concluded that the ridge landscape of WP2 would have been occupied repeatedly over the Holocene, with the highest point of the ridge top as a focus for activity.

WP6 was located in association with a third order stream which is a landscape in which fewer excavations have been undertaken across the Cumberland Plain. Lithic assemblages from WP6 were expected to show less use of rationing strategies as people were less mobile, potentially staying in one camp for several days or even weeks. However, WP6 demonstrated relatively low and/or varying proportions of silcrete compared to sites with similar landform features from other locations across the Cumberland Plain. Proximity to sources of silicified tuff and quartz within the gravels at Mount Pleasant and/or associated with the Nepean River may have influenced Aboriginal peoples' use of silcrete.

Potential explanations to account for the smaller than expected size of the lithic assemblage in association with a third order stream (WP6) include the possibility that sediments of the South Creek soil landscape may have been too sandy for the adjacent creeks to retain ponds for extended periods; alternatively, people may have preferred the open woodland of the adjacent shale slopes for residential occupation rather than the forest of the South Creek soil landscape.

The excavations undertaken at these salvage areas produced scientifically significant results and provided further information about the use and occupation of landscapes around tributaries and low hilltops in the former Western Precinct of the SMDS. As with the salvage excavations undertaken in WP3 and WP4 in 2009, the excavation of WP2 and WP6 confirmed that intact soil horizons do remain in association with landforms that have been identified as of low–moderate disturbance.

## 2.6 Preliminary Site Inspection

A preliminary inspection of the Basin C study area was undertaken to identify landforms to inform statutory management and identify the appropriate Aboriginal heritage management process. The location of two previously registered sites (AHIMS No. 45-5-3609 and 45-5-3610) were inspected, but no artefacts were observed at either site, likely in part due to dense leaf litter that limited visibility to less than 10% across these areas. Two new artefact sites were recorded during the inspection (Figure 2.17). They are currently being registered to the AHIMS database. Both were located on the 4WD track in areas of 100% visibility.

- Basin C AS1—this site comprised four artefacts: three mudstone flakes and an IMSTC flake. The artefacts were located on the 4WD track in the eastern portion of Basin C, to the west of AHIMS site 45-5-3610 and may be related to a larger PAD (Figure 2.13 and Figure 2.14);
- Basin C AS2—this site comprised a one mudstone flake and two flakes of IMSTC located on the 4WD track in the western portion of Basin C. The vehicle track has 100% visibility (Figure 2.15 and Figure 2.16).



**Figure 2.13** Basin C AS1, landscape context. (Source: GML 2019)



**Figure 2.14** Basin C AS1, site content. (Source: GML 2019)



**Figure 2.15** Basin C AS2, landscape context. (Source: GML 2019)



**Figure 2.16** Basin C AS2, site content. (Source: GML 2019)

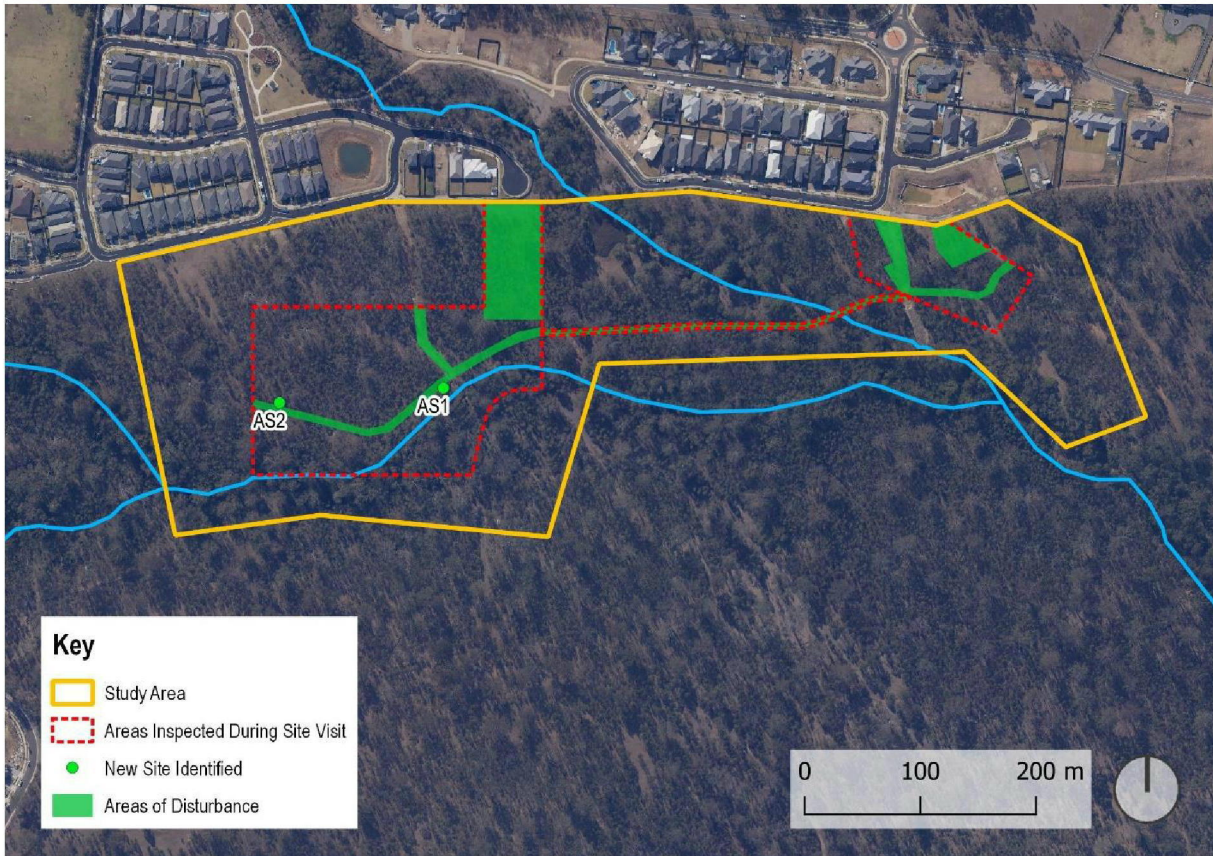


Figure 2.17 General areas of disturbance observed during initial site visit. (Source: GML 2019)

## 2.7 Archaeological Predictive Model for the Study Area

The Cumberland Plain is one of Australia's most archaeologically excavated landscapes. Over the past 20 years hundreds of excavations have occurred here across many locations and landforms. A number of key Aboriginal heritage archaeological excavations have been undertaken that have informed the archaeological record and provided the basis for predictive modelling on the Cumberland Plain.<sup>27</sup>

Development of a predictive model for the archaeological landscape within the study area applies the stream order model. The stream order model posits that artefact sites of higher density and complexity are more likely to occur in association with higher-order streams, on lower slopes and terraces with a north or northeast-facing aspect.

On the basis of relevant archaeological research, a predictive model, referred to as the Cumberland Plain Predictive Model (CPPM), has been developed that suggests how the likely nature of sites across the Cumberland Plain can vary in terms of landforms and landscape. Stream order is the basis for this model of Aboriginal site location, and assumes that people would have preferentially selected camping locations where the water supply was more permanent and predictable.<sup>28</sup> This model predicted that the size (density and complexity) and nature of archaeological features will vary according to the permanence of water (ie ascending stream order), landscape unit and proximity to lithic resources.

The key components of the CPPM regarding the potential for Aboriginal archaeological sites along second order creeks is as follows:

- In the middle reaches of minor tributaries (second order creeks) there will be archaeological evidence for sparse but focused activity (eg one-off camp locations, single episode knapping floors).
- Creek junctions may provide foci for site activity; the size of the confluence (in terms of stream ranking nodes) could be expected to influence the size of the site.

The CPPM also posits that in any landscape location there is a chance that a 'background scatter' of Aboriginal objects exists—that is, objects deposited as a consequence of one-off manufacture, use and/or discard use, where no correlation would be associated with a landform or a more permanent activity area. Such areas are unlikely to contain a subsurface archaeological deposit. Another major conclusion of the CPPM was that surface artefacts are not an accurate reflection of subsurface archaeological potential, as soils are largely aggrading across the Cumberland Plain and most artefacts are therefore buried.

### 2.7.1 Basin C and Basin V6 Predictive Model

It is predicted that the soil landscape connected with Basins C and V6 will contain stone artefacts, retained in an unstratified context. Within this assemblage some ochre (or stones used to manufacture ochre) could also be identified. There is a low potential for other types of associated archaeological material, such as hearths, manuported stone (used as heat retainers) or ground ovens.

There are a number of reasons explaining why other site types will not be encountered. Firstly, all the registered sites within the vicinity of the study area have been open scatters, isolated finds or PADs. Secondly, the landscape is very flat and there are no sandstone outcrops or ridgelines. As such, there is no possibility of encountering rock shelters and associated occupation sites. It is also therefore highly unlikely that rock art (painting or engraving), or grinding grooves will be discovered within the study area. Thirdly, the initial site visit and arials suggest that vegetation in the study areas is less than 100 years old. Much of the vegetation appears to be regrowth from the 1940s. As a result, the potential is low for identifying trees, such as car trees, which have been culturally modified by Aboriginal people. The site survey will confirm any presence of culturally modified trees. Finally, the fresh water creeks do not contain edible shell fish that would have been used consumed by Aboriginal people.

Based on the CPPM and results of archaeological excavations at Jordan Springs, the following predictions are made regarding the potential for Aboriginal archaeological sites within the study area:

- Basin C—a 50m corridor along the creek that borders the southern edge of Basin C is the area most likely to contain stone artefact. This translates to the southernmost boundary of the study area which is only 30m away from the creek line, and the southwestern corner of the study area where the creek crosses through the basin site. The northern half of the study area is expected to exhibit a lower density background scatter of surface and subsurface artefacts.
- Basin V6—this area has been heavily disturbed in the past and is not expected to retain in situ archaeological deposits. The results of the excavation at WP1 immediately north of Basin V6 indicated that this area had been subject to disturbance that had stripped the soil profile and very few artefacts were recovered. The northeastern area of Basin V6 is likely to contain no intact archaeological deposits, and minimal artefacts. The western half of Basin V6 is also considered heavily disturbed as a result of the drainage infrastructure.
- Haul Road—during the site visit it was observed that creation of the existing 4WD track/road required earthworks to build up the road surface which will have disturbed the surrounding area.

Additionally, the road is heavily eroded and is unlikely to retain deposits containing in situ Aboriginal artefacts.

## 2.8 Endnotes

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- <sup>2</sup> Bannerman, S M and Hazelton, P A 1990, *Soil Landscapes of the Penrith 1:100 000 Sheet*, Soil Conservation Service of NSW, pp 64–65.
- <sup>3</sup> Attenbrow, V, Pre-colonial Aboriginal Land and Resource Use in Centennial, Moore and Queens Parks Assessment of Historical and Archaeological Evidence for Centennial Parklands Conservation Management Plan, report prepared for Beyond Consulting on behalf of Conybeare Morrison and Partners, January 2002, p 33; Kohen, J 1993, *The Darug and their Neighbours—The traditional Aboriginal owners of the Sydney Region*, Darug Link in association with the Blacktown and District Historical Society, Blacktown, p 21.
- <sup>4</sup> Murray, R and White, K 1988, *Dharug and Dungaree: The History of Penrith and St Marys to 1860*, Hargreen Publishing Company, North Melbourne, p 20.
- <sup>5</sup> Attenbrow, V, Pre-colonial Aboriginal Land and Resource Use in Centennial, Moore and Queens Parks Assessment of Historical and Archaeological Evidence for Centennial Parklands Conservation Management Plan, report prepared for Beyond Consulting on behalf of Conybeare Morrison and Partners, January 2002, p 43.
- <sup>6</sup> Kohen, J 1993, *The Darug and their Neighbours—The traditional Aboriginal owners of the Sydney Region*, Darug Link in association with the Blacktown and District Historical Society, Blacktown, p 6.
- <sup>7</sup> Department of Environment, Climate Change and Water 2011, *Wianamatta Regional Park, Volume 2: Conservation Management Plan*, March 2011.
- <sup>8</sup> Department of Environment, Climate Change and Water 2011, *Wianamatta Regional Park, Volume 2: Conservation Management Plan*, March 2011, p 94.
- <sup>9</sup> Department of Environment, Climate Change and Water 2011, *Wianamatta Regional Park, Volume 2: Conservation Management Plan*, March 2011, p 94.
- <sup>10</sup> Department of Environment, Climate Change and Water 2011, *Wianamatta Regional Park, Volume 2: Conservation Management Plan*, March 2011, p 97.
- <sup>11</sup> JMcDCHM, Interim Heritage Management Report, ADI Site St Marys, Test Excavation Report, vol. 1, report prepared for the Lend Lease-ADI Joint Venture in Response to the Section 22 Committee Interim Report, September 1997.
- <sup>12</sup> JMcDCHM, Interim Heritage Management Report, ADI Site St Marys, Maps, vol. 2, report prepared for the Lend Lease-ADI Joint Venture in Response to the Section 22 Committee Interim Report, April 1997.
- <sup>13</sup> JMcDCHM, Interim Heritage Management Report, ADI Site St Marys, Maps, vol. 2, report prepared for the Lend Lease-ADI Joint Venture in Response to the Section 22 Committee Interim Report, April 1997. Map 8.
- <sup>14</sup> Biosis Research, Western Sydney Recycled Water Initiative Replacement Flows Project - Aboriginal Archaeological Testing and Salvage Results, report prepared for McConnell Dowell on behalf of Sydney Water, June 2010.
- <sup>15</sup> JMcDCHM, Interim Heritage Management Report, ADI Site St Marys, Test Excavation Report, vol. 1, report prepared for the Lend Lease-ADI Joint Venture in Response to the Section 22 Committee Interim Report, September 1997.
- <sup>16</sup> JMcDCHM, Interim Heritage Management Report, ADI Site St Marys, Test Excavation Report, vol. 1, report prepared for the Lend Lease-ADI Joint Venture in Response to the Section 22 Committee Interim Report, September 1997, p i.
- <sup>17</sup> JMcDCHM, Archaeological Subsurface Investigations at WP3 and WP4 - Western Precinct St Mary's Development Site, report prepared for Marylands Development Company, December 2009, p 26.
- <sup>18</sup> JMcDCHM, Interim Heritage Management Report, ADI Site St Marys, Test Excavation Report, vol. 1, report prepared for the Lend Lease-ADI Joint Venture in Response to the Section 22 Committee Interim Report, September 1997, pp 4–5.
- <sup>19</sup> JMcDCHM, Additional Archaeological Assessment of Indigenous Heritage Issues Menangle Park Rezoning, report prepared for APP Corporation on behalf of Campbelltown City Council and Landcom, September 2004.
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- <sup>26</sup> GML Heritage and JMcDCHM, Jordan Springs WP5 Archaeological Salvage Excavation (formerly Western Precinct, St Marys Development Site)—Post-Excavation Report, report prepared for Maryland Development Company, July 2014.
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White, E and McDonald, J 2010, 'Lithic Artefact Distribution in the Rouse Hill Development Area, Cumberland Plain, NSW', *Australian Archaeology*, vol 70, no 70.
- <sup>28</sup> McDonald, J and Rich, B 1994, 'The Discovery of a Heat Treatment Pit on the Cumberland Plain, Western Sydney', *Australian Archaeology*, vol 38.  
White, E and McDonald, J 2010, 'Lithic Artefact Distribution in the Rouse Hill Development Area, Cumberland Plain, NSW', *Australian Archaeology*, vol 70, no 70.

## 3.0 Aboriginal Community Consultation

### 3.1 Aboriginal Community Consultation to Date

Aboriginal community consultation was initiated in accordance with the DECCW *Aboriginal cultural heritage consultation requirements for proponents* (Consultation Requirements).<sup>1</sup> In accordance with stage 1, letters to statutory bodies were sent on 2 October 2019, requesting contact details for Aboriginal people who may have an interest in the study area. These statutory bodies included:

- the DPIE;
- Deerubbin Local Aboriginal Land Council;
- Office of The Registrar, Aboriginal Lands Right Act 1983;
- National Native Title Tribunal;
- Native Titles Service Corporation;
- Penrith City Council; and
- Greater Sydney Local Land Services.

Following the receipt of responses from Stage 1, a number of potential Aboriginal stakeholders were identified. Letters were sent to the identified Aboriginal people on 16 October 2019, and an advertisement was placed in the *Penrith Press* on 3 October 2019. Both the letters and the advertisement invited Aboriginal people with an interest in the St Marys ADI site area to register as a stakeholder in order to be involved in consultations. Registrations were accepted until 30 October 2019.

Following this process, a list of Aboriginal groups and/or individuals who registered an interest in the project has been compiled (Table 3.1). These groups and/or individuals, the RAPs, will be consulted throughout the preparation of the AHIP application.

**Table 3.1** List of RAPs for Regional Detention Basins C and V6, St Marys ADI Site Project.

Registered Aboriginal Party (RAP)	Representative
Widescope Indigenous Group	Steven Hickey
Goodradigbee Cultural & Heritage Aboriginal Corporation	Caine Carroll
Darug Custodian Aboriginal Corporation	Justine Coplin
Deerubbin LALC	Steven Randall
Didge Nhunawal Clan	Lilly Carroll and Paul Boyd
Kamilaroi Yankuntjatjara Working Group	Philip Khan
A1 Indigenous Services	Carolyn Hickey
Barking Owl Aboriginal Corporation	Jody Kulakowski
Aragung Aboriginal Cultural Heritage Site Assessments	Jamie Eastwood
Ginninderra Aboriginal Corporation	Krystle Carroll
Amanda Hickey Cultural Services	Amanda Hickey



### 3.2 Cultural Heritage Assessment Program

The DPIE has defined a number of stages during the Aboriginal consultation process. The following table provides a synopsis of the process to date.

**Table 3.2** Cultural Heritage Assessment Program Synopsis—Progress To Date.

Stage	Status
Write to statutory bodies to obtain contact details for Aboriginal people who may have an interest in the project.	Complete
Write to identified Aboriginal people, inviting them to register an interest in the project.	Complete
Place an advertisement in local print media, inviting Aboriginal people with cultural knowledge of the area to register an interest in the project.	Complete
Proponent records names of Aboriginal people who have registered an interest in the project.	Complete
Proponent advises Local Aboriginal Land Councils (LALC) and DPIE of RAPs' details (subject to privacy requests).	Complete
Proponent presents information regarding proposed project to RAPs.	This document
Proponent provides methodology for the cultural heritage and archaeological assessment to RAPs.	This document
RAPs invited to provide input for the assessment methodology.	Pending response to this document
RAPs invited to identify: <ul style="list-style-type: none"> <li>• whether any Aboriginal objects of cultural value are present within the study area; and</li> <li>• whether any places of cultural value are present within the study area.</li> </ul>	Pending response to this document
RAPs invited to comment on potential management outcomes.	Forthcoming
Proponent prepares draft ACHAR and provides to RAPs for comment.	Forthcoming
RAPs provide comment and proponent incorporates comments into final ACHAR.	Forthcoming
Final ACHAR (and AHIP application) provided to RAPs, LALC and OEH.	Forthcoming

### 3.3 Roles and Expectations

The DECCW<sup>2</sup> Consultation Requirements list a number of responsibilities and expectations for both the Aboriginal community and the proponent regarding the assessment of the study area's cultural heritage.

The Aboriginal community is responsible for determining who is authorised to speak for Country and its associated cultural heritage. If there is a dispute regarding who has the right to speak for Country, it is up to the Aboriginal community, not the proponent or DPIE, to resolve the dispute in a timely manner.<sup>3</sup>

RAPs are also responsible for providing information relating to Aboriginal cultural heritage relevant to the study area to assist in managing its cultural significance in an appropriate manner.<sup>4</sup>

It is expected that:

- Aboriginal people providing knowledge regarding the cultural heritage of the study area are trusted and allowed by the rest of the Aboriginal community to speak for Country;<sup>5</sup>
- people speaking for Country hold knowledge about the cultural significance of their heritage and are able to provide input into appropriate management strategies;<sup>6</sup>

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- RAPs have an understanding of the commercial environment in which the proponent is operating and the constraints associated with this environment;<sup>7</sup> and
- RAPs understand the Chief Executive of DPIE is the final decision maker relating to the consideration of applications under Part 6 of the NPW Act, and that these decisions may not be consistent with the views of the RAPs.<sup>8</sup>

The proponent is responsible for consulting with the Aboriginal community and managing the consultation process in accordance with the Consultation Requirements.<sup>9</sup>

It is expected that:

- the proponent would develop and implement appropriate consultation methods, in accordance with the Consultation Requirements;<sup>10</sup>
- Aboriginal views are considered and appropriately incorporated into the assessment process;<sup>11</sup> and
- the consultation process is accurately documented, including both the consultation undertaken and the input from the RAPs.<sup>12</sup>

DPIE is responsible for assessing any application under Part 6 of the NPW Act and is the decision maker regarding whether an AHIP application is refused or granted. DPIE is responsible for ensuring any conditions attached to an AHIP are complied with by the AHIP holder.<sup>13</sup> Internal policies for assessing AHIP applications would be followed by DPIE and all information provided as part of an AHIP application would be considered.

The proponent has a lengthy history of engaging with Aboriginal heritage and local Aboriginal people able to speak for Country in this area—this is demonstrated through the history of engagement detailed through the archaeological works described in Section 2.4. Notably the engagement with local Aboriginal people for development of the Wianamatta Regional Park CMP (Section 2.3) provided a context for the individuals with a long history and connection with this place, as required under OEH/DPIE policy.

## 3.4 Endnotes

<sup>1</sup> Department of Environment, Climate Change and Water, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, Department of Environment, Climate Change and Water, 2010.

<sup>2</sup> Department of Environment, Climate Change and Water, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, Department of Environment, Climate Change and Water, 2010.

<sup>3</sup> Department of Environment, Climate Change and Water, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, Department of Environment, Climate Change and Water, 2010, p 36.

<sup>4</sup> Department of Environment, Climate Change and Water, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, Department of Environment, Climate Change and Water, 2010, p 15.

<sup>5</sup> Department of Environment, Climate Change and Water, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, Department of Environment, Climate Change and Water, 2010, p 8.

<sup>6</sup> Department of Environment, Climate Change and Water, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, Department of Environment, Climate Change and Water, 2010, p 8.

<sup>7</sup> Department of Environment, Climate Change and Water, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, Department of Environment, Climate Change and Water, 2010, p 16.

<sup>8</sup> Department of Environment, Climate Change and Water, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, Department of Environment, Climate Change and Water, 2010, p 15.

<sup>9</sup> Department of Environment, Climate Change and Water, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, Department of Environment, Climate Change and Water, 2010, p 16.

- <sup>10</sup> Department of Environment, Climate Change and Water, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, Department of Environment, Climate Change and Water, 2010, p 6.
- <sup>11</sup> Department of Environment, Climate Change and Water, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, Department of Environment, Climate Change and Water, 2010, p 16.
- <sup>12</sup> Department of Environment, Climate Change and Water, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, Department of Environment, Climate Change and Water, 2010, p 16.
- <sup>13</sup> Department of Environment, Climate Change and Water, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, Department of Environment, Climate Change and Water, 2010, p 16.

## 4.0 Proposed Aboriginal Cultural Assessment Methodology

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### 4.1 Overview

Aboriginal heritage sites, objects and places hold value for communities in many diverse ways. The nature of those values is a highly important consideration when deciding how to manage a heritage site, object or place, and balance competing land use options. The approach to the Aboriginal heritage assessment is based upon identifying the key Aboriginal heritage values—values that are likely to be both tangible and intangible. This approach needs to consider the values assessed from scientific and Aboriginal community perspectives, in accordance with Australian best practice documents.

The proposed methodology details how Aboriginal people will be consulted and provides an opportunity to comment and guide the methodology used to gather cultural information and determine the cultural significance of Aboriginal objects identified within the study area. Consultation provides an opportunity for RAPs to have input into the development of cultural heritage management options and interpretation of the project area.

To assess and consequently manage Aboriginal heritage it is proposed to further consult with the RAPs, undertake field survey within the study area, and a program of archaeological test excavation in zones attributed with moderate or greater archaeological potential.

An Archaeological Research Design (ARD) is required to guide the archaeological test excavation for Aboriginal objects from soil horizons that will be impacted by the proposed developments of Basins C and V6 within the St Marys Development Site. A methodology for undertaking archaeological survey and test excavation at Basins C and V6 is set out below.

### 4.2 Archaeological Survey

An archaeological survey will be undertaken with the aim of identifying, recording and assessing the condition of previously unrecorded Aboriginal sites within the study area. The archaeological survey would be undertaken in accordance with the DPIE Archaeological *Code of Practice* and the results would be recorded in an ATR, which would be an appendix to the ACHAR.

Basin C is 1.8ha and Basin V6 is 0.9ha. It is proposed to survey the area on foot, in a single team comprised of an archaeologist with experience in Aboriginal cultural heritage assessment and representatives from the RAPs. The site would be navigated using aerial maps and hand-held GPS. The study area would be systematically surveyed with parallel transects where possible. Opportunistic inspection would be undertaken of areas and features that have been identified as having potential to be associated with Aboriginal cultural heritage, or which are identified by the RAPs as requiring investigation. Notes will be made regarding the soil condition and evidence of disturbance.

Newly identified sites would have their location recorded and their extent mapped on the aerial and/or topographic maps. They would be photographed and AHIMS cards completed—these will be submitted to the OEH. The landscape of the study area will be characterised and areas with PAD will be designated.

Any areas which cannot be inspected due to occupational health and safety concerns would be visually assessed (as far as possible) and the limitation recorded.

### 4.3 Archaeological Test Excavation

Archaeological test excavation is permitted under the DPIE *Archaeological Code of Practice*<sup>1</sup> without the need for an Aboriginal Heritage Impact Permit (AHIP) under Section 90 of the NPW Act 1974 (ie archaeological test excavation is excluded from the definition of harm under the NPW Act), provided that the subsurface investigations are not carried out in the following areas:

- in or within 50m of an area where burial sites are known or are likely to exist;
- in or within 50m of a declared Aboriginal place;
- in or within 50m of a rock shelter, shell midden or earth mound; and/or
- in areas known or suspected to be Aboriginal missions or previous Aboriginal reserves or institutes.

As described by DPIE the purpose of test excavation 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.*<sup>2</sup>

This section sets out the methodology for archaeological test excavation developed in accordance with DPIE guidelines. Aboriginal community consultation is being undertaken in accordance with NPW Regulation, subclause 80C(6), and was commenced prior to this proposed methodology being prepared and will continue throughout the project.

Existing knowledge has been gathered from register site data, previous reports of other investigations within the SMDS, the landscape context and known impacts to the study area (Section 2.0). The combination of these aspects defines the zones within the study area that are suitable for archaeological testing. A substantial body of work exists for previous archaeological excavations undertaken within the SMDS that has provided a good overall understanding of the nature and likely extent of archaeological deposits across the site in areas of good soil integrity and archaeological potential.

#### 4.3.1 Archaeological Research Framework

While the requirement for undertaking the detailed Aboriginal archaeological works is statutory and designed to mitigate work impacts, the works and associated archaeology present the opportunity to address key research questions relating to our understanding of long-term Aboriginal occupation of the Cumberland Plain, over the different soil landscapes.

The objective for the proposed excavations should be to gain further Aboriginal archaeological insight into the long-term Aboriginal use of this area, determining its values and contribution to the broader stories of Western Sydney. All proposed impacts to Aboriginal heritage sites should be driven by defined themed research questions, which culminate in sufficiently detailed excavation to allow the research questions to be answered. Developing an understanding of the long-term Aboriginal cultural landscape provides opportunities for connection with Aboriginal social and scientific values, which would provide significant benefit to the Aboriginal community and general public. The interpretation of these aspects should benefit future generations.

In order to achieve the objective, a series of research questions has to be established to guide the archaeological process and provide the basis for questioning the data collected. The results of

excavations within the Jordan Springs Precinct (see WP1–6 in Section 2.0) found that the archaeological sites presented variables that were not consistent with the CPPM. This project presents an opportunity to collect additional data to expand on our understanding of past Aboriginal occupation and use of locations along lower stream-order waterways.

Broad research questions for the potential Aboriginal archaeological resource include:

1. What is the nature of the archaeological deposit and how can it be interpreted?
  - a. What are the physical attributes of the deposit (stone, carbon, clay or other)?
  - b. What, if any, evidence other than stone is present for Aboriginal occupation of this region?
  - c. For stone deposits, what are the physical characteristics and do they indicate a specialised use? Is there a difference in stone tool types between the different locations tested?
  - d. For other deposits (ie burning features), what are the physical characteristics and how do they compare to features identified at Jordan Springs (former Western Precinct)? Is it possible to identify relationships with concentrations of stone deposits?
  - e. What are the spatial characteristics of the archaeological deposit at each location? Is the archaeological deposit consistent with depth? Were Aboriginal people utilising the same locations for thousands of years or was there considerable variation in landscape use and selection strategies? How does the archaeological deposit vary spatially within one site? Is there evidence for domiciliary areas within the deposit?
2. Can the archaeology be interpreted in a regional context?
  - a. Where did the raw stone materials originate from? Have they been brought into the study area? From how far away has the stone been brought?
  - b. Is there evidence of trade in connection to stone deposits? Within a single context, does one stone material exhibit a higher degree of 'working' than another? Does the level of working or percentages of stone change over time (ie across stratigraphical layers)? How do these differences relate to stone procurement strategies? What are the implications for regional Aboriginal economy and possibly local tribal boundaries?
  - c. How does the archaeological evidence compare with the results of Jordan Springs (former Western Precinct), which did not wholly conform to the CPPM in terms of the distance-decay to stream order model?
3. How is the archaeological deposit significant?
  - a. What is the heritage value of the deposit, both scientifically and culturally?
  - b. How does the Aboriginal community view and value the deposit identified?
  - c. Does the deposit conform to the standard stream order model? Can the combined evidence from all the excavations across the SMDS be used to refine or describe a new model for Aboriginal occupation?
4. Is there a deposit worthy of future research? Is there a high scientific value archaeological deposit(s) worthy of extensive salvage excavation?

- a. Are chrono-stratified deposits (if present) located in a position that lends itself well to large scale open area excavation?
- b. What new research questions should be asked of open excavation? Are there benefits to undertaking larger scale investigations? Will we learn new information from bigger excavations? Or would it be better to 'window sample' very large landscape areas to obtain representative pockets of archaeological deposit?

### 4.3.2 Excavation Methodology

A methodology for archaeological test excavation has been defined by the OEH.<sup>3</sup> The sampling strategy for test excavation at Basins C and V6 has been developed following OEH guidelines, in response to the specific conditions of the study area and in accordance with the needs of the project.

Figures 4.1 and 4.2 shows the proposed location of test units (TUs) (0.5m x 0.5m) within areas expected to contain Aboriginal archaeological deposits. The sampling framework for the test excavation has been developed in response to the CPPM and is based upon a 20m grid, where TUs will be excavated in transects, with 20m spacing between TUs. Further TUs will be placed outside the primary area with higher archaeological potential to confirm the lower density and/or absence of Aboriginal artefacts in that zone. These TU's will be placed at a 40m spacing.

For Basin C, transects are orientated roughly perpendicular to the alignment of the creek to ensure that the samples provide optimum coverage of the zones that have the greatest potential for containing a dense archaeological deposit. To confirm areas of low potential additional TUs have been placed on a 40m grid beyond the areas of predicted archaeological deposits.

For Basin V6, two transects have been placed to avoid previously disturbed areas and confirm whether the results of the excavation at WP1 also apply to this location eg is the area highly disturbed, and does not retain an intact archaeological signature. As with Basin C, to confirm areas of low potential additional TUs have been placed on a 40m grid beyond the areas of predicted archaeological deposits.

For the roadway between the two Basins, a single transect has been placed along the route. Test pits staggered along either side of an existing 4WD track to avoid areas that are highly disturbed and test zones that have potential to contain an archaeological deposit.

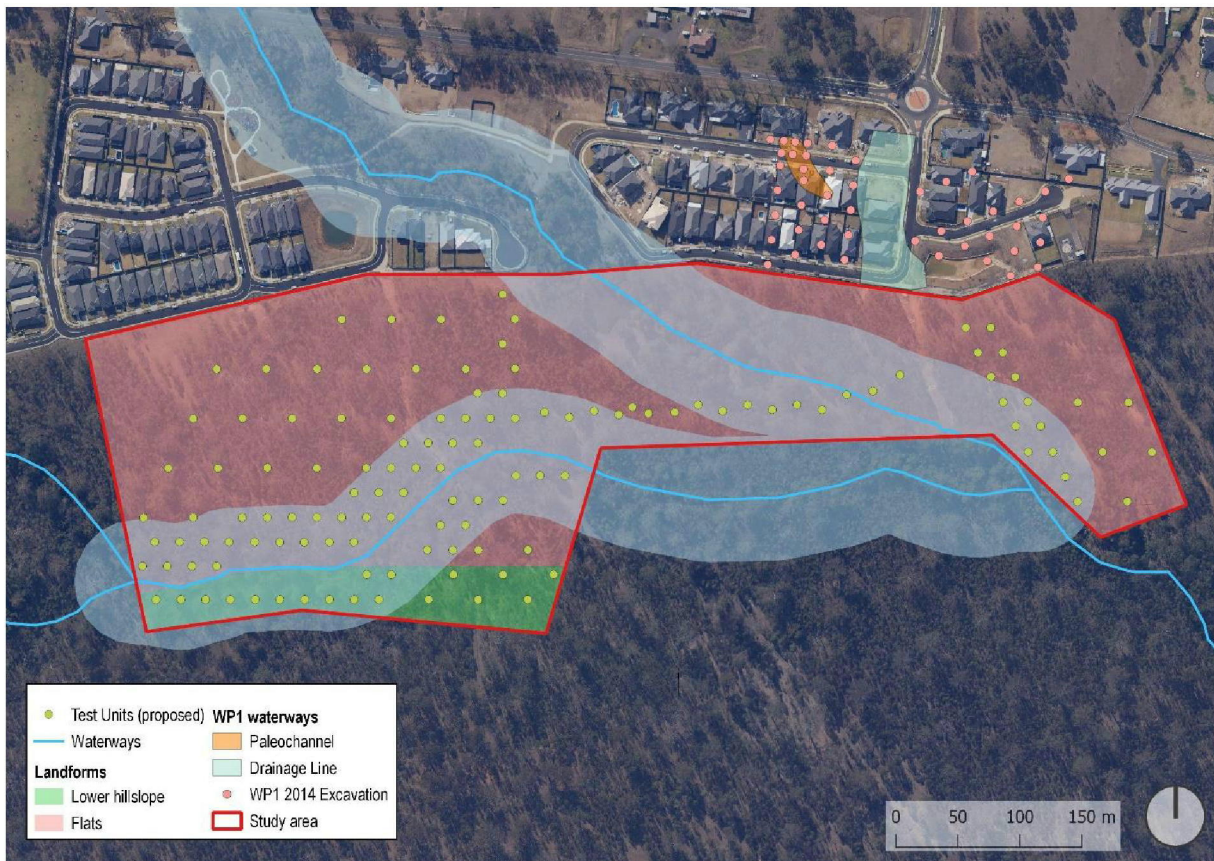
At both Basin C and V6 should a density of more than 24 artefacts/m<sup>2</sup> be identified in a TU (eg 6 artefacts in all excavated spits of a 0.5m by 0.5m test pit), additional TUs would be placed on a 10m grid to confirm the extent of the artefact expression.

In general, it is not proposed to expand TUs, unless features are identified. TU's may be expanded should the project's sampling parameters require verification of a density at a certain location, eg if all TUs return low densities, except for an isolated TU, it would be warranted expanding the TU to confirm the extent and nature of the deposit. A maximum of 3m<sup>2</sup> could be excavated in such as way.

The Aboriginal archaeological excavation will be undertaken by a team comprising an Excavation Director, between three to four field archaeologists and six Aboriginal representatives (from the RAPs).

**Table 4.1** Summary of TU by Landform. All TU are Located on the Residual Luddenham Soil Landscape.

Landform	Basin C	Connecting Roadway	Basin V6
Flat, adjacent to the creek	80	16	19
Lower slopes	19	–	–



**Figure 4.1** Location of test units (TUs) proposed within the study area. The blue shaded area along the creeks marks the 50m archaeological potential zone. (Source: NSW LPI with GML additions)

### 4.3.3 Recording Methods

All TU locations will be set out by a surveyor, based upon the sample pattern developed in GIS software (with minor variation only where physical features on the ground necessitate this). Additional TUs, when required, will be set out in the field by hand using standard surveying techniques. Excavation of each spit will be determined by an archaeologist using a hand tape; the vertical control for excavating should be around 10mm.

Archaeological data sampling will require collection of information on standard archaeological excavation parameters, such as excavation location, landform, aspect, depth of each spit/context as excavated, number of stone objects, features, total number of objects, the identification of any features or inclusion (such as carbon), taphonomic factors (disturbance, bioturbation etc), soil characteristics, section and plan diagrams (especially where features are present). Cultural samples of carbon and clay will be retained and subject to dating. In order to complete this data sampling, archaeological excavation of sufficient extent and depth will be required.

## 4.4 Significance Assessment

Management of Aboriginal cultural heritage within the study area is largely based on an assessment of its significance.<sup>4</sup> Generally, an assessment of the significance of Aboriginal cultural heritage considers two factors—archaeological (or scientific) values, and the cultural values identified by the RAPs.

Consideration of these two values would allow an assessment of the significance of cultural heritage within the study area. An assessment of the cultural significance of any objects or places identified within



the study area will be sought from the RAPs prior to the finalisation of the ACHAR. Should any restrictions apply to the cultural knowledge supplied (for example, male-only information), these will be strictly adhered to by the proponent.

The archaeological significance of any Aboriginal objects or places identified within the study area would be assessed in accordance with the Burra Charter.<sup>5</sup> Any archaeological potential would be mapped and zoned as high, moderate or low, based on consideration of the predictive model for the study area and the assessed archaeological significance criteria.

#### **4.5 Impact Assessment and Management Strategies**

The potential of the development to impact identified Aboriginal cultural values within the study area would be assessed. Statements of impact would be provided and recorded in the ACHAR.

Based on the proposed impact and the assessed significance (both cultural and archaeological) of the site, management strategies would be produced in consultation with the RAPs. Input from the RAPs would be considered and documented in the final ACHAR and an explanation of how suggestions were considered and/or implemented in the final management recommendations for the site would be provided.

#### **4.6 Human Skeletal Material**

Should human skeletal material be unexpectedly identified during the excavation, work would cease in the immediate area and DPIE and the NSW police would be notified.

Should the skeletal material be identified as Aboriginal, it should be an aim to leave the burial intact and unexcavated. The location would be registered on the AHIMS. Non-Aboriginal human skeletal material would be dealt with by the NSW police.

#### **4.7 Reporting**

A report detailing the results of the archaeological assessment would be produced in accordance with the Consultation Requirements, the OEH *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*,<sup>6</sup> and the Code of Practice. The draft of this report would be provided to the RAPs for their review and comment prior to the finalisation of this report. The ATR will be an expanded iteration of this initial document, to include the outcomes of the survey, test excavation, significance assessment and impact assessment.

#### **4.8 Community Input**

This methodology has been provided to all RAPs for their review and comment. Any input from the RAPs will be considered in the final methodology for the project.

GML is currently planning the archaeological survey component of this project. We will soon contact all RAPs to discuss their involvement in this work. The archaeological survey will occur following the 28-day review period for this methodology.

In accordance with DPIE guidelines, please provide written and/or oral comments by 18 December 2019. Please advise when commenting if you wish to be involved in the physical archaeological site inspection and test excavation phases of this project. All participants will be required to have a good level of physical fitness and be able to walk up to 10 kilometres per day.

## 4.9 Endnotes

- <sup>1</sup> Department of Environment, Climate Change and Water (NSW), *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (24 September 2010)*, pp 24–28.
- <sup>2</sup> Department of Environment, Climate Change and Water (NSW), *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (24 September 2010)*, p 24.
- <sup>3</sup> Department of Environment, Climate Change and Water (NSW) 2010, *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*, Requirement 16 a, pp 26–27.
- <sup>4</sup> Department of Environment, Climate Change and Water (NSW), *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, April 2010.
- <sup>5</sup> Marquis-Kyle, P and Walker, M 2004, *The Illustrated Burra Charter*, third revision, Australia ICOMOS Inc.
- <sup>6</sup> Office of Environment and Heritage, *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*, Sydney, Office of Environment and Heritage, April 2011.