APPENDIX F
CULTURAL HERITAGE ASSESSMENTS

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Executive Summary

Project Description

The ACT Government is proposing to develop the Southern Memorial Park (SMP) to provide crematorium and memorialisation services for the Canberra community in the south of Canberra. The chosen site comprises Blocks 1676; 1521; 1677 and 1520 Hume and is located along Mugga Lane, near the intersection with the Monaro Highway (see Figures 1 and 2). A Masterplan for the proposal is currently in the development stages.

Cultural Heritage Management Australia (CHMA) has been engaged by Place Laboratory, on behalf of the ACT Government, to undertake a cultural heritage survey and assessment of the development site ahead of the proposed impacts. The purpose of this assessment is to help inform the placement of proposed infrastructure with regard to identified heritage values within the block. This report details the results of the Cultural Heritage Assessment and incorporates an Excavation Permit application to investigate the heritage values of areas identified as having archaeological potential.

Aims of the Investigation

The primary aims of the cultural heritage assessment were as follows:

- Conduct a desktop review to identify previously listed heritage sites within the study area.
- Liaise with stakeholders including Registered Aboriginal Organisations and the ACT Heritage Unit.
- Undertake a field survey of the study areas, including representatives of the four RAOs in the ACT and identify any existing heritage sites within the study area.
- Assess the scientific and Aboriginal cultural values of any identified sites located within the study area; and
- To develop a set of management recommendations aimed at minimising the impact of the proposed road works on identified significance values.

Fieldwork and Methodology

The fieldwork component of the project. Fieldwork was undertaken over the course of a day and a half (11th and 15th May 2020). The following individuals were involved in the fieldwork assessment:

- Wally Bell (Buru Ngunawal Aboriginal Corporation)
- Bella and Bo House (Mirrabee)
- Justin Brown (King Brown Tribal Group)
- Dr Sophie Collins (CHMA Archaeologist)

The field assessment was undertaken on foot and involved the team walking a series of 100m wide transects through the study area. Erosion scalds and vehicle tracks were specifically targeted for the improved visibility they provided to subsurface contexts.

Results of Search of the ACT Heritage Register

A search was requested of the ACT Heritage site database 6th May 2020 including a radius of 1km from the boundary of the study area. An online search of ACTMapi was also undertaken on 5th May 2020. A total of 3 Aboriginal sites are listed on the ACT Heritage register as occurring directly within the current study area. The results of the requested ACT Heritage Register search were received on 10th August 2020. The Register results provided failed to identify the results of the BIOSIS 2013 investigations included here. These findings compound a previously incomplete site search in 2013 in which the Grinbergs in 2008 survey results were missed. A comprehensive list of sites within the study area has therefore been compiled independently by CHMA with a total of 2 isolated finds, 5 low density scatters and 6 areas of potential archaeological deposit already recorded within the study area.

Summary Results

A total of 9 new Aboriginal sites and one European site was identified during the current investigations. The locations of these sites are mapped in Figures 15 to 17. Summary findings are provided in Table 3. The sites comprise 2 scarred trees (RC Scarred Tree #1 and #2), two areas of PAD (RC PAD #1 and #2), three low density scatters (RC#1, RC#2 and RC#5) and two scatters with associated PADs (RC#3 and PAD and RC#4 and PAD).

Several previously recorded sites were also redefined based on recent findings.

The study area is identified as being highly sensitive with areas of PAD occurring throughout due to the landforms present, presence of drainage lines and proximity to Dog Trap Creek and other high density and highly significant sites identified at the Hume Resource Recovery Centre and environs.

It is therefore likely that the entirety of this study area has been traversed by Aboriginal groups in the past and that isolated finds occur throughout the landscape.

The current assessment has identified extant visible sites and areas of highest potential for concentrations of occupation within the study area, the remainder of the study area outside these PADs is assessed as having lesser potential for Aboriginal sites and for high density sites with predictable distribution.

Significance Assessment

The sites recorded as part of the present project have been assessed against the criteria outlined in Section 8 of the Heritage Act 2004 and have been accorded a significance rating. Table i provides the summary significance ratings and conservation values for the heritage sites, together with the rationale for these assessments.

Table i. Summary Significance Assessment for Sites Identified within Current Program

Site Name	Significance Assessment and Rating	Conservation Value
HA16, HA17, SM1, SM5, RC#1, RC#2, RC#5	These site types, assemblage content and raw materials utilized are all extremely common and well represented in the archaeological record of the area. These sites will not add to/alter what is currently understood of the area. The RAOs have stated these sites have significant cultural value to the local Aboriginal community. ***Site has heritage significance under Criterion G***	Low – based on the commonality of the site type, artefact and raw material types, and presence within disturbed contexts
RC Scarred Tree #1, RC Scarred Tree #2	Scarred trees served as markers for a wide range of Aboriginal behaviours ranging from markers of important site locations, provision of directions and for the production of implements such as shields and vessels. Scarred trees are a rapidly declining resource. The RAOs have stated these sites have significant cultural value to the local Aboriginal community. ***Site has heritage significance under Criteria A, B and G***	High – based on rarity of site type
HA18 and PAD, HA19 and PAD, SM2 and PAD, SM3 and PAD, SM4 and PAD, RC#3 and PAD, RC#4 and PAD, RC PAD #1, RC PAD #2	As yet unable to be assessed. These sites should be subject to assessment following subsurface investigation and a more thorough assessment of site contents, distribution and spatial and temporal spread	As yet unknown

Impact Assessment and Statement of Heritage Effect

The current proposal has made every effort to avoid areas of known or potential heritage significance. While two areas of previously identified PAD will be impacted by the proposal, neither was considered a PAD during the current investigations or two other undertaken on the property. A single area of potential overlaps with the current assessment and has been avoided by the current proposal. It is therefore determined that the Stage 1 proposal will not adversely impact on any identified heritage values in the project area.

Two sites are at risk of ***indirect*** or ***inadvertent impacts*** during construction through vehicle and machinery movement, however protective measures will be implemented through the construction period.

Management Recommendations

The heritage management options and recommendations provided in this report are made on the following basis:

- Consultation with representatives of the Representative Aboriginal Organisations present at the field assessment:
  - Wally Bell (Buru Ngunnawal Aboriginal Corporation);
  - Justin Brown (King Brown Tribal Group);
  - Bella and Bo House (Mirrabee – formerly Little Gudgenby Tribal Council);

- The legal and procedural requirements of Environment ACT;
- The results of the investigation as documented in this report; and
- Background research into the extant archaeological and historic record for the study area and its surrounding regions.

The recommendations are aimed at minimising the impacts of the proposed Memorial Park on identified Aboriginal heritage resources.

It is important to note that the recommendations presented below have been discussed with the RAO representatives involved in the assessment. Appendix C shows the RAO support provided for management recommendations contained herein.

Copies of this report were issued to all four RAOs on 21st May 2020 with a request for comment and feedback within 14 days. No written responses were received. Following a meeting with ACT Heritage 20th August 2020 and discussions pertaining to Grinbergs PAD sites D-Block PAD1 and PAD2, discussions were held in person with the RAOs during subsequent fieldwork (1st and 2nd September and 1st and 2nd October), modifications were made to this report and updated copies were reissued to the RAOs on 12th October 2020. No written responses were received.

Site Specific Recommendations
Management recommendations for each of the sites within the study area are summarised in Table ii below.

Table ii. Summary Recommendations for Sites within Stage 1 Study Area

Site Name	Management Recommendation
SM1/D-1	Occurs outside current impact area No further work required.
D-2	Occurs outside current impact area No further work required.
D-PAD1	No further work recommended
HA16	Occurs outside current impact area. Site has not been relocated since 2000 No further work required.
RC PAD#1	PAD is vulnerable to inadvertent impacts by vehicles during construction Construction barriers must be established around the boundary of the PAD during conservation. The boundary of the PAD should be established on the ground in the presence of both a qualified archaeologist and the RAOs, to ensure its protection from inadvertent impacts during construction. A report detailing these measures have been implemented prior to works commencing should be submitted to ACT Heritage
D-PAD2	No further work recommended

Site Name	Management Recommendation
RC#2 Scarred Tree	Must be conserved An arborist should be engaged to assess the health and age of this tree. An arborist should review the proposed plantings/soft landscaping within 50m of the tree to ensure none of the proposed landscaping will adversely impact the long term health and growth of the tree. Construction fencing must be established around the tree, in the presence of both a qualified archaeologist and the RAOs, to ensure its protection from inadvertent impacts during construction and remain in place until an approved CMP has been established (see below). A report detailing these measures have been implemented prior to works commencing should be submitted to ACT Heritage A Conservation Management Plan should be established to manage the long term conservation and maintenance of this tree.

The remainder of the study area has been surveyed ad assessed to be of low archaeological potential. There are no further heritage requirements for the study area.

Recommendations for Sites within Project Area (Stages 2, 3 and 4)
Several previous and newly recorded sites occur outside the Stage 1 study area but within the proposed 100 year extent of the Southern Memorial Park (Stages 2, 3 and 4). Impacts to these sites must be mitigated before any of these subsequent impacts go ahead. In the interim, these sites and their boundaries must be added to the ACT Heritage Register for future protection. Requirements for impact mitigation at these sites will need reviewing at the time of development to accord with existing legislation and requirements in the future.

General Recommendations
If, during the course of the proposed road improvement works, previously undetected archaeological sites or suspected skeletal remains are located, the processes outlined in the Unanticipated Discovery Plan should be followed (Section 12.0).

A copy of this report should be submitted to ACT Heritage and the ACT Heritage Council for consideration and advice must be made to and approved by ACT Heritage Council. Alternatively a Statement of Heritage Effects to allow for the proposed development works to go ahead must be submitted and approved by ACT Heritage Council.

1.0 Project Outline

1.1 Project Introduction

The ACT Government is proposing to develop the Southern Memorial Park (SMP) to provide crematorium and memorialisation services for the Canberra community in the south of Canberra. The chosen site comprises Blocks 1676; 1521; 1677 and 1520 Hume and is located along Mugga Lane, near the intersection with the Monaro Highway (see Figures 1 and 2). A Masterplan for the proposal is currently in the development stages.

Cultural Heritage Management Australia (CHMA) has been engaged by Place Laboratory, on behalf of the ACT Government, to undertake a cultural heritage survey and assessment of the development site ahead of the proposed impacts. The purpose of this assessment is to help inform the placement of proposed infrastructure with regard to identified heritage values within the block. This report details the results of the Cultural Heritage Assessment and incorporates an Excavation Permit application to investigate the heritage values of areas identified as having archaeological potential.

1.2 Project Background and Community Value

The Canberra region is currently serviced by cemeteries at Woden, Gungahlin and Hall. All three of these cemeteries are nearing capacity and have been identified as insufficient to meet the region's projected demand; particularly in southern Canberra where there is a gap in burial and crematorium services. Crematorium services are currently limited to the northern portion of Canberra with a private facility near Gungahlin cemetery and the first public crematorium planned for construction in Gungahlin in 2020.

The proposed Southern Memorial Park will therefore provide vital geographically equitable internment, crematorium and memorialisation services.

1.3 Project Description

The proposed Memorial Park is to be undertaken over four stages, with a predicted completion date of the next 100 years or so. Figures 3 and 4 show each of these stages and proposed areas of impact. While CHMA completed archaeological survey over the entire project area (i.e. the 100 year plan), the current Statement of Heritage Effects refers to Stage 1 impacts only, on the assumption that governments, legislative requirements and planning streams and heritage requirements will change many times over before subsequent stages will be relevant. As such, the following approval is sought for Stage 1 only, while future planning will take into account and seek to avoid impacts to known heritage sites across the entire subject area.

The Stage 1 proposal includes the following components:

- Upgrades to the Mugga Lane intersection
- Sealing of existing service road to the site,

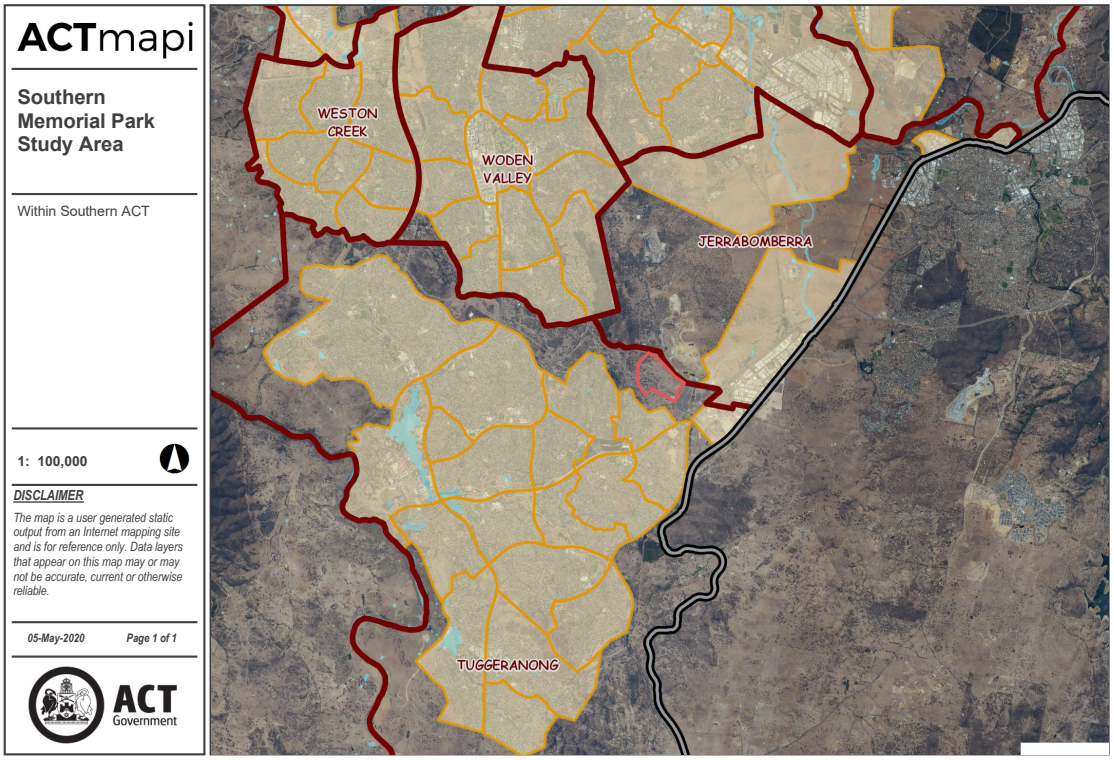

Figure 1. Location of Southern Memorial Park within Southern Canberra (image modified from ACTmapi accessed 4th May 2020)

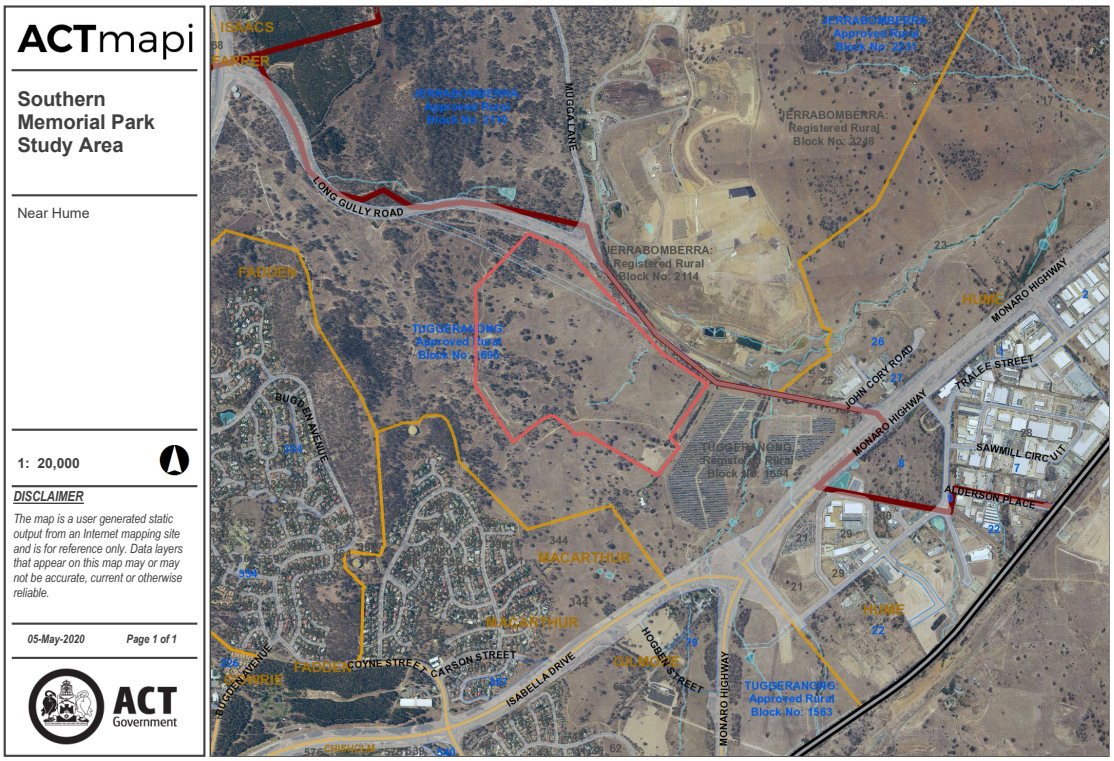

Figure 2. Location of Southern Memorial Park within Hume (image modified from ACTmapi accessed 4th May 2020)

- Establishment of formal tree plantings and wetlands,
- Establishment of Entry Pavilion, works depot, maintenance yards, maine carpark and access roads
- Establishment of traditional burial grounds

The area to be impacted by the Stage 1 proposal is illustrated in Figure 3.

1.4 Aims of the Investigation

The primary aims of the cultural heritage assessment were as follows:

- Conduct a desktop review to identify previously listed heritage sites within the study area.
- Liaise with stakeholders including Registered Aboriginal Organisations and the ACT Heritage Unit.
- Undertake a field survey of the study areas, including representatives of the four RAOs in the ACT and identify any existing heritage sites within the study area.
- Assess the scientific and Aboriginal cultural values of any identified sites located within the study area; and
- To develop a set of management recommendations aimed at minimising the impact of the proposed road works on identified significance values.

1.5 Consultation and Collaboration with the Registered Aboriginal Organisations

At present there are four Registered Aboriginal Organisations (RAOs) in the ACT. These are:

- The Buru Ngunanwal Aboriginal Corporation;
- King Brown Tribal Group;
- Mirrabee; and
- Ngarigu Currawong Clan.

A log of consultation conducted for the current project is included in Appendix A.

1.6 Limitations of the Investigation

All archaeological investigations are subject to limiting factors that may affect the reliability of the results. This survey was limited to some extent by low surface visibility. Both blocks had extensive ground cover, comprising introduced grasses and thistles often up to knee height. Surface visibility is a major impediment to the identification of some site types, especially Aboriginal artefact scatters and isolated artefacts. Visibility is discussed further in section 1.8 below.

1.7 Project Methodology

The scope of works for the present archaeological investigations have been undertaken in three stages.

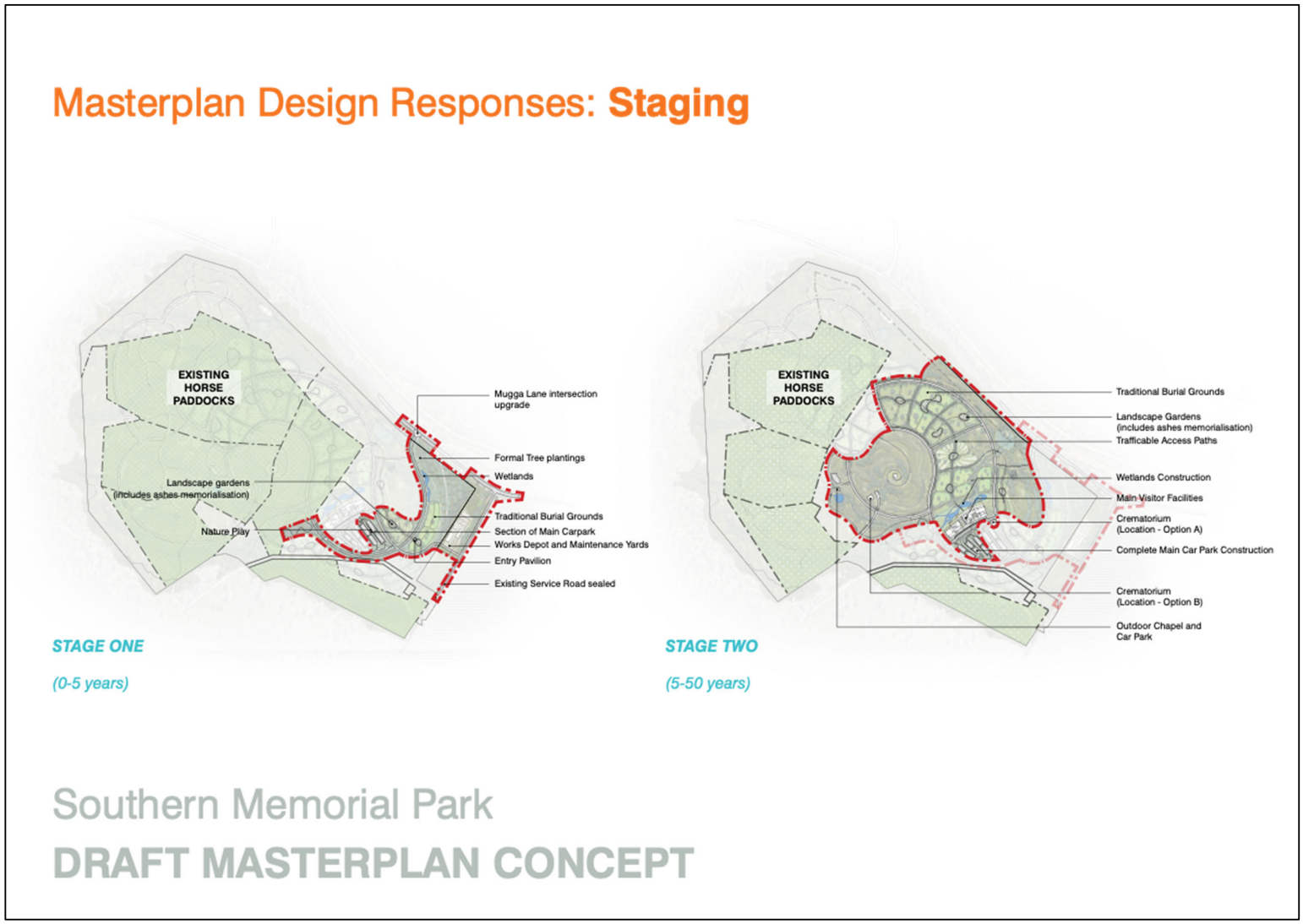

Figure 3. Stages 1 (current stage) and 2 – Southern Crematorium over the next 50 years

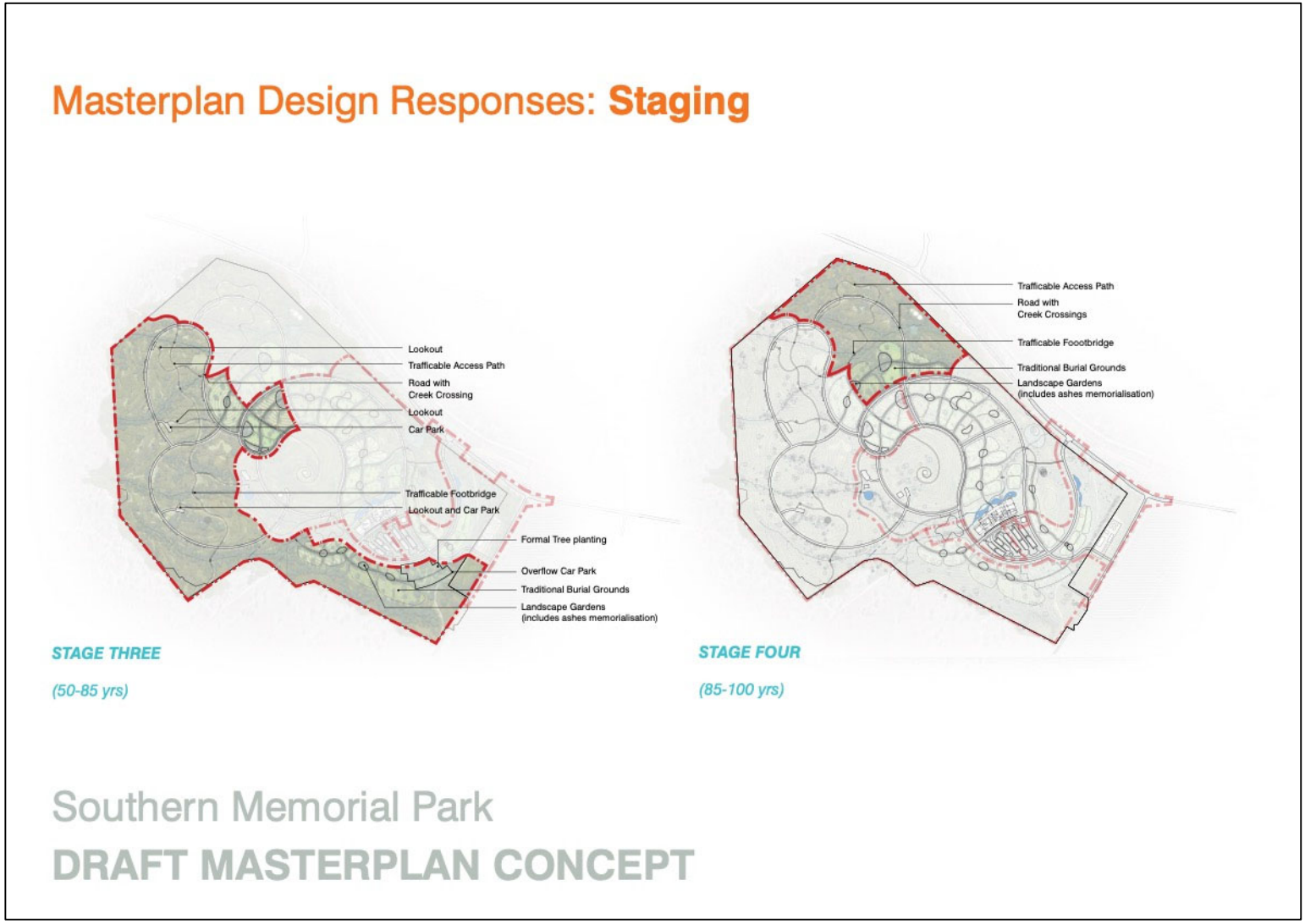

Figure 4. Stages 3 and 4 – proposals for Southern Crematorium in 50 to 100 years

Stage 1 – Background Research

As part of stage 1, the following tasks were completed prior to the commencement of fieldwork.

Liaison with the Registered Aboriginal Organisations (RAOs)

Prior to the commencement of fieldwork, each of the four Registered Aboriginal Organisations were contacted in order to:

- Invite one representative from each group to participate in the investigations;
- Discuss the proposed methodology for the project, including logistics and timing;
- Advise the groups (verbally and in writing) of the requirement that all participants must have their own insurances.

As part of an ongoing consultation process, all aspects of the project were discussed with the groups, including the findings of the field work, the significance of sites dealt with, and the proposed management recommendations for the site areas. Section 2 presents a more detailed account of the consultation undertaken with the RAOs.

The collation of relevant documentation for the project

The following background information was collated:

- A review of the relevant heritage registers and the collation of information pertaining to any heritage sites located within the study area.
- 1 : 25 000 maps of the study area;
- relevant reports documenting the outcomes of previous heritage studies in the vicinity of the study area;
- ethnohistoric literature for the region;
- references to the land use history of the study area.

Stage 2 – Fieldwork

Stage 2 entailed the fieldwork component of the project. Fieldwork was undertaken over the course of a day and a half (11th and 15th May 2020). The following individuals were involved in the fieldwork assessment:

- Wally Bell (Buru Ngunawal Aboriginal Corporation)
- Bella and Bo House (Mirrabee)
- Justin Brown (King Brown Tribal Group)
- Dr Sophie Collins (CHMA Archaeologist)

The field assessment was undertaken on foot and involved the team walking a series of 100m wide transects through the study area. Erosion scalds and vehicle tracks were specifically targeted for the improved visibility they provided to subsurface contexts.

Stage 3 – Report Writing

Stage 3 of the project involved the production of a Draft and Final Report of findings, including analysis of the data obtained from the field survey, an assessment of significance

and management recommendations. This report was written by Sophie Collins.

1.8 Survey Coverage, Surface Visibility and Effective Survey Coverage

Survey coverage refers to the estimated proportion of the study area that has actually been visually inspected as part of a field survey assessment. For the purpose of this assessment, it has been estimated that a single member of a field team walking a single transect can achieve a twenty-metre wide survey inspection coverage (10m either side). The field team of 5 individuals therefore achieved a transect width of 100m. The entirety of the current study area was subject to survey via these transects, achieving 100% survey coverage for the project area.

Surface Visibility refers to the extent to which the actual soils of a ground surface are available for inspection. There are a number of factors that can affect surface visibility, including vegetation cover and the presence introduced materials over the ground surface. A guide to assessing surface visibility is presented in Figure 5 below (AHT 2011).

Surface visibility within the study area was highly variable even within a single paddock, which had areas of dense ground cover, as well as large patches of sheet erosion, incised creeklines, and informal animal and vehicle tracks. Visibility therefore ranged from zero in some areas to up to 90% in others. Average visibility is approximated at 10% across the site.

Variations in both survey coverage and surface visibility have a direct bearing on the ability for a field team to detect heritage sites. The combination of survey coverage and surface visibility is referred to as effective survey coverage. Table 1. below presents levels of effective survey coverage across the study area. Figure 5 shows the tracklog of survey transects walked.

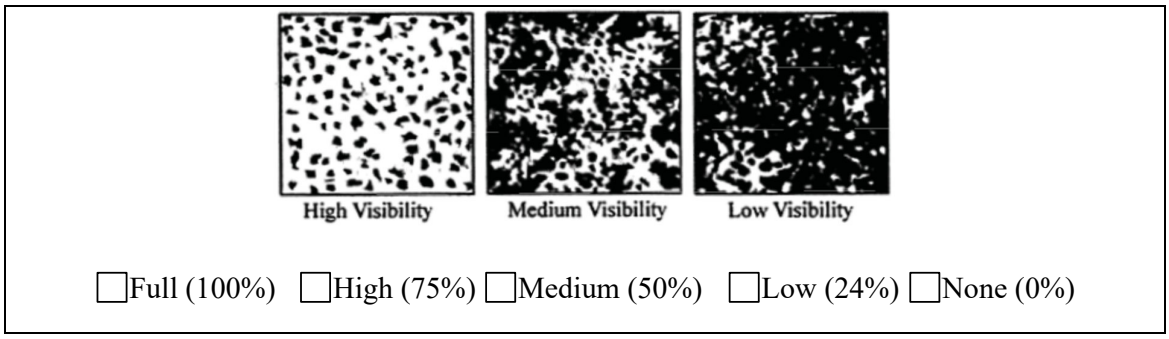

Figure 5. Guidelines for the estimation of surface visibility (from AHT 2009)

Plates 1 to 3. Examples of variable exposure and visibility across the study area

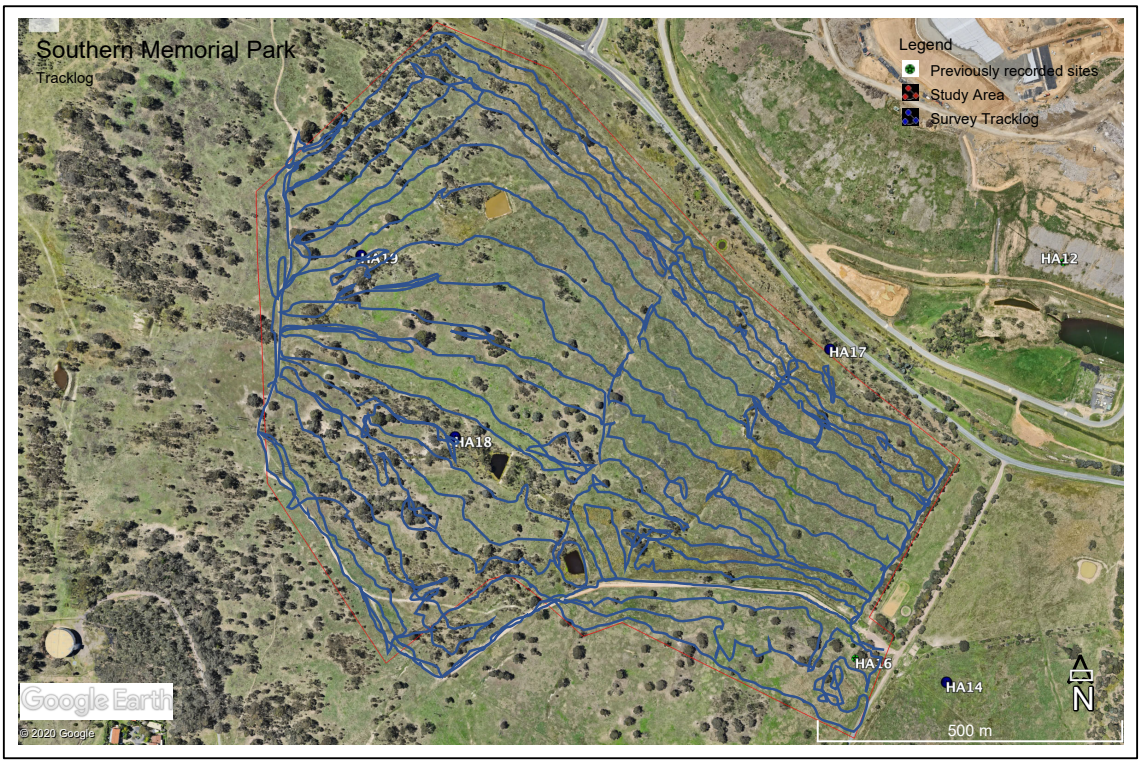

Figure 6. Tracklog showing survey transects across study area. Areas of higher visibility were actively sought out.

Table 1. Effective Survey Coverage

Section of Survey	Total Area	Estimated Survey Coverage of Section	Average Surface Visibility	Effective Coverage of Section
Study Area	764,881m2	(100%)	10%	10% x 764 881m2 = 771488.1m2 or 10%

2.0 Environmental Setting

The following is discussion of the geology, soils, landforms and hydrology within the broader study area. These aspects of environment have influenced past occupation of the area in many ways as well as affecting archaeological site formation processes.

2.1 Geology and Topography

The broad valley in which the Hume Resource Recovery Estate (HRRE) is located is formed on Silurian volcanic rocks, specifically the Deakin Volcanics (ACT Geotechnical Engineers 2001: 1). Intruded into these rocks is the Mugga Mugga Porphyry (Canberra 1:250,000 geological series sheet). In outcrop, rocks of this intruded geological formation commonly look very similar to granite with respect to their mineral composition, texture and weathering characteristics. The steep hills on the western side of the current study area are formed on this rock. Occasional boulders of the porphyry occur in the surface soil layer across the study area.

2.2 Topography and Hydrology

The present day Dog Trap Creek, to the east of the study area and the primary source of water to the current study area; has cut a deep (up to 6 m) but relatively narrow channel (no more than 30 m wide) into Pleistocene alluvium which accumulated in an older, wider channel (up to 100 m wide) along the northern side of the valley floor. However, the creek was almost certainly much smaller before the local hydrology was altered by European land use involving initial tree-clearing with associated periods of increased runoff.

The current study area is traversed by several drainage lines which drain from west to east and into Dog Trap Creek. Either side of these drainage lines are the gentle low lying basal spurs of the steep hills to the west. The majority of the study area is therefore occupied by broad gentle spur crests elevated above a series of drainage and creeklines (see Figure 7).

2.3 Soils

The majority of the soils within the study area consist of the Williamsdale Soil Landscape, with a tiny slither of Burra Soils in the northwestern corner (See Figure 8). The Williamsdale group occupies undulating rises, fans and valley flats; comprising moderately deep, well drained chromosols formed on the crests and upper slopes and grading to moderately deep, poorly drained sodosolic soils on the mid- and lower-slopes (Jenkins 2000:132).

These soils tend to be shallow, well drained (poor moisture retention) and highly erodible, with sheet erosion common across level areas and gully erosion through creek lines. A tranferral landscape, these soils tend to consist primarily of eroded parent materials from upper slope areas (Jenkins 2000:12).

The Burra Landscape is also a transferral landscape occupying undulating to rolling hills and alluvial fans with slopes of 5-32%.

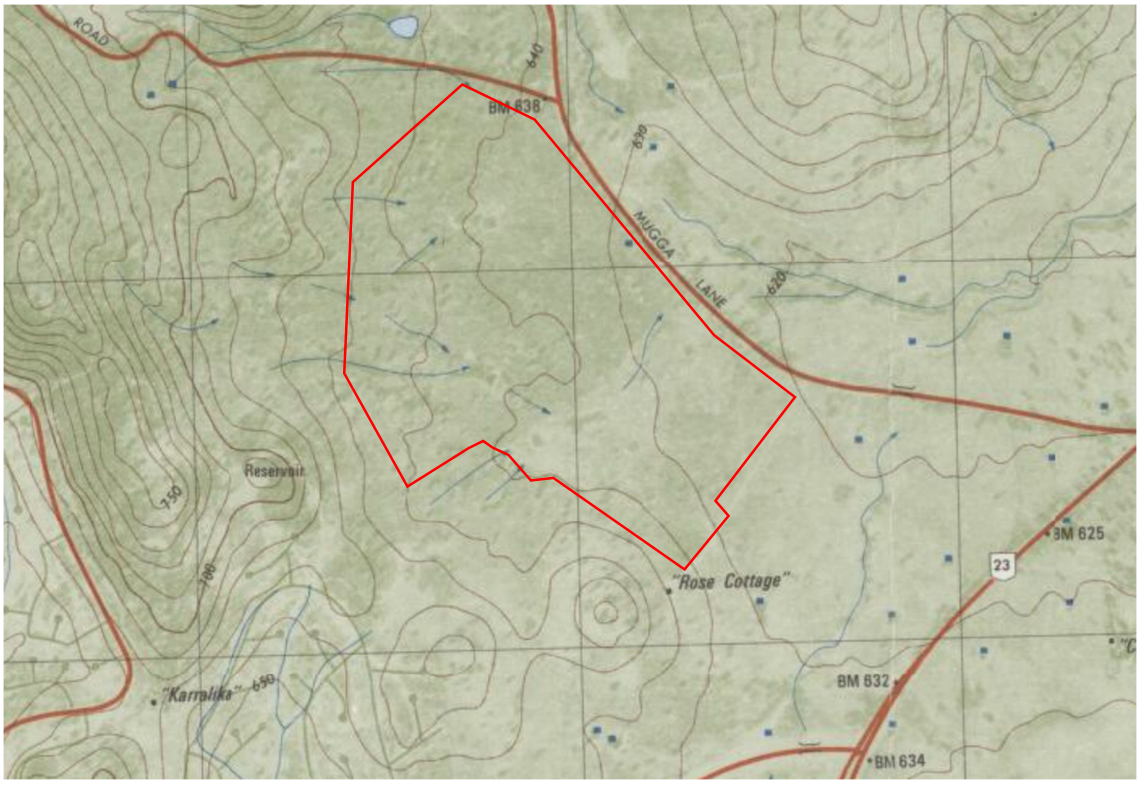

Figure 7. Map of Tuggeranong, Bureau of Meteorology 1980 (accessed NLA 5th May 2020 http://nla.gov.au/nla.obj-1127897042)

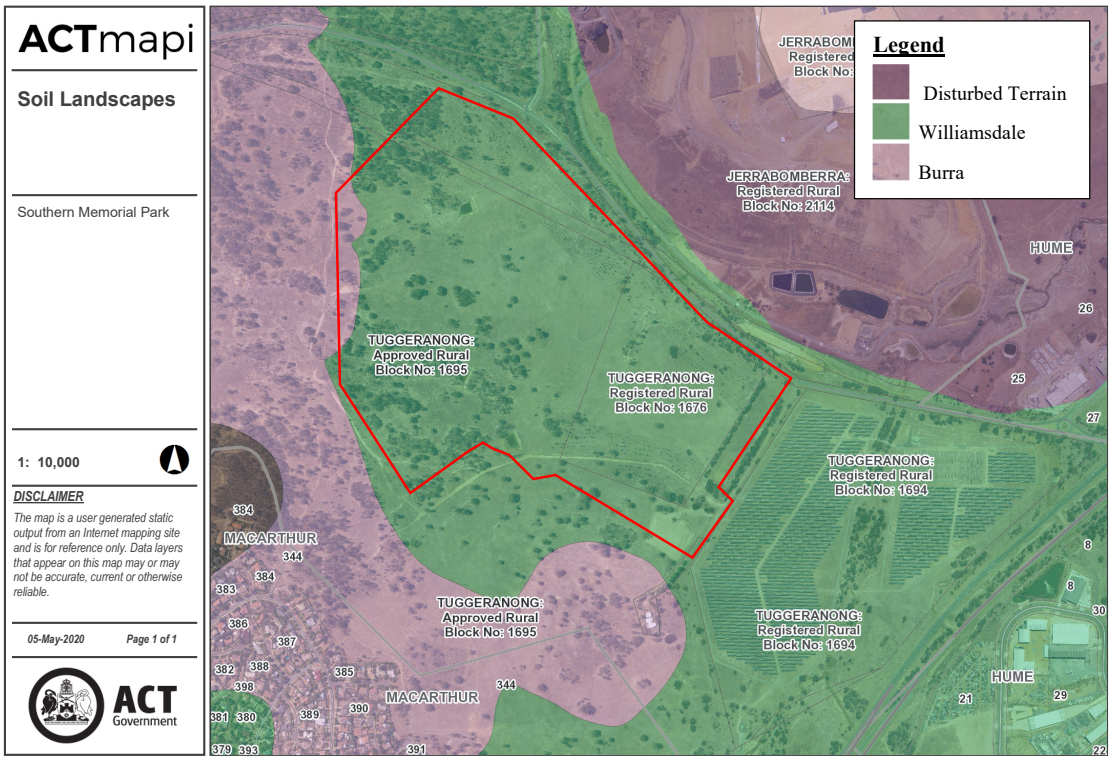

Figure 8. ACT Soil Landscapes across the current study area (image modified from ACTmapi soil landscapes layer, accessed 4th May 2020)

2.4 Vegetation/Fauna

The study area would once have supported tall open mixed woodland, comprising Eucalyptus bridgesiana (apple box), E. melliodora (yellow box), E. blakelyi (Blakely's red gum), E.dives (broad-leaved peppermint and E.rubida (candlebark). Native pastures would once have contained Stipa spp. (speargrasses), Themeda australis (kangaroo grass), Danthonia spp (wallaby grasses) and Poa spp. (snow grasses) (Jenkins 1993). These communities would once have supported a wide range of edible plant and fauna species, ranging from small marsupials such as possums, to avian species and macropods. Various types of lizards also inhabit this region and would have been exploited by Aboriginal groups in the past.

The drainage lines within the study area and towards Dog Trap Creek would have supported additional resources, focussing mammal and birdlife and providing hunting opportunities and access to water. Previous investigations show Dog Trap Creek was an intensively occupied focal point for prehistoric Aboriginal settlement (CHMA 2010).

Existing vegetation across the study area is illustrated in Figure 9. The study area has been subject to partial clearance during the early European settlement period and continues to be used for horse grazing. Two broad vegetation communities now occupy the study area; original Native Grasslands and Grassy Woodlands. These grassy woodlands comprise a mix of Blakeleys Red Gum – Yellow Box tall grassy woodland and Red Box tall grass-shrub woodlands along the hillslopes and footslopes.

In addition to these are large blocks of Eucalypt plantings which look to have been planted within the last 5-10 years.

2.5 Resource Statement

The original species within the study area would have provided a range of resources for exploitation by Aboriginal people. Food, tools, shelters and ceremonial items were all produced from floral resources. Eucalypts in particular provided valuable resources for bark and wood which could be used in the production of a number of tools and weapons. These vegetation communities, combined with the nearby water sources would once have supported a wide range of fauna species, including birds, mammals, reptiles and invertebrates.

Environmental information relating to climate, hydrology, flora and fauna all impact upon the resources available to inhabitants of the area in the prehistoric past. The presence of permanent water within the study area, coupled with the original vegetation and animals that would have fed and sheltered by the waterlines, mean this area would once have been an attractive location for Aboriginal occupation.

2.6 Previous Land Use and Disturbance

During the 19th century the study area was occupied by various early European settlers, including Hya Macqoid's 'Wanniassa,' Andrew Cunningham's 'Tuggeranong Estate' and Richard James Harris's 'Sweet Hills Estate' and later under the ownership of George Campbell of 'Duntroon'. During each of these periods of occupation, the study area was

used for grazing and agricultural use, with no structures or hut sites recorded in the area. Partial clearing of the area has occurred, however old growth trees remain in a number of areas over the site.

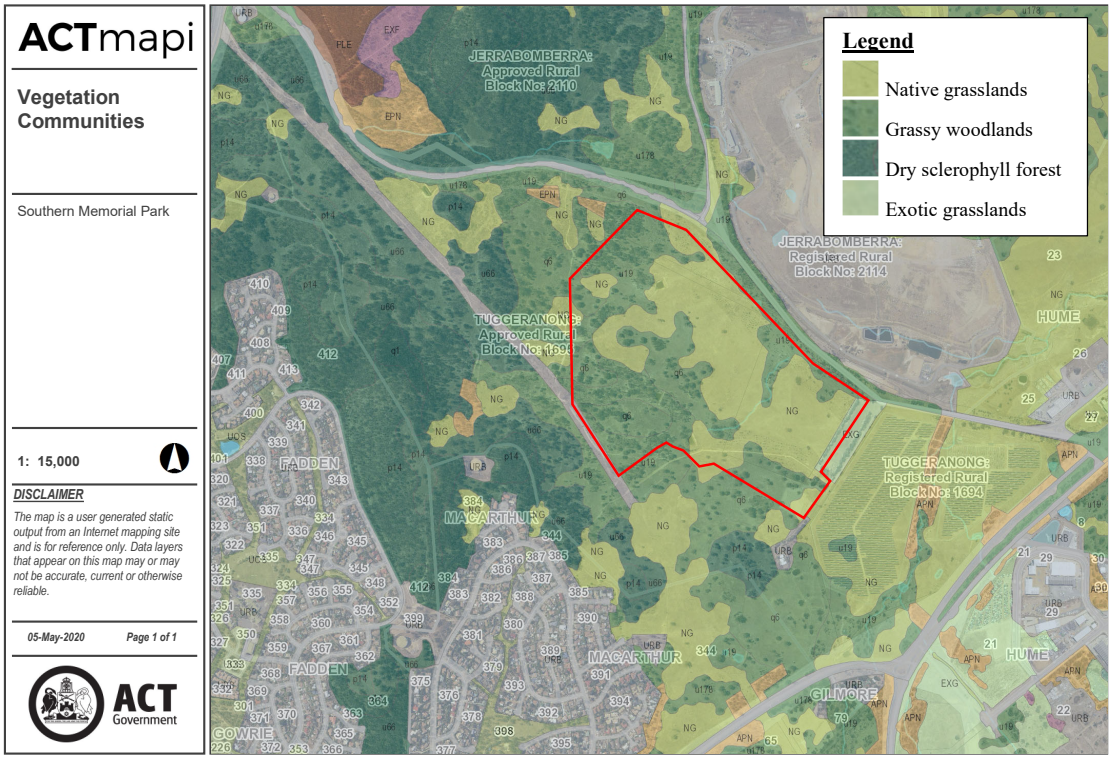

Figure 9. Existing vegetation across the current study area (image modified from ACTmapi Vegetation Communities layer, accessed 4th May 2020)

A handful of small culverts have been installed over creek lines and water pipelines occur to service at least 4 water troughs for horses on the property. Powerlines run along the eastern edge of the study area .

Two locations within the study area are where kangaroo culls have resulted in mass graves. These were identified for CHMA in the field by the current owner of the land (sees Plates 4 and 5).

Large areas within the project area have been subject to formal planting. These plantings have resulted in localised disturbance around trees (see Plates 6 and 7). The southwestern corner of the study area is currently occupied by a large mound/battery of soil. It is unclear where this soil is from but it has large amounts of blue metal and mixed material within it (see Plates 8 to 10).

Land clearance during European settlement is likely to have affected erosion rates across the study area and altered the flow of drainage lines feeding into Dog Trap Creek, Overall,

however, this area remains relatively undisturbed, with the vast majority of the site relatively intact.


Plates 4 and 5. Views across kangaroo culling burial locations


Plates 6 and 7. Formalised tree plantings at several locations across the study area


Plates 8 and 9. Looking east and south respectively across soil stockpile in southwest corner of the study area.

Plate 10. Power lines running along eastern edge of stud area.

3.0 Aboriginal Occupation Models – Ethnohistory

3.1 Background Information

Ethnohistory entails the use of historical literature as a source for constructing ethnographic analogies and models in the study of the prehistory and contact history of indigenous peoples (McBryde 1979). Although ethnohistoric accounts have been recognised as a valuable source for providing insights into the life-ways of prehistoric people, their application can be problematical. These problems relate primarily to the nature of the sources, their accuracy and / or validity.

Flood (1990) identifies three types of ethnohistoric observations:

- the first hand, eyewitness observations made at the time of first contact with Europeans,
- first hand observations made at a later stage when Aboriginal society had become 'Europeanised', and
- second-hand or generalised accounts of Aboriginal life.

Of these sources of information, the most valuable and reliable for the reconstruction of pre-contact Aboriginal life are the first-hand observations made at the time of first contact with Europeans. These include the accounts by explorers, surveyors and pioneer settlers. This does not necessarily mean that other forms of observations should be disregarded. However, caution must be exercised in their application.

3.2 Overview of Ethno-Historic Models

The following provides a brief overview of the nature of pre-contact Aboriginal groupings, Aboriginal concepts of land ownership, and the relationship of both these to pre-contact Aboriginal land use in Australia. While this section does not specifically relate to the study area it does provide a basic framework of understanding regarding Aboriginal social organisation, within which the archaeology of the study area may then be viewed. Such an understanding is an essential prerequisite to any archaeological research analysing the relationship between Aboriginal people and their environment.

The model of Aboriginal society being divided into a series of tribes, based on Tindale's 1974 publication is now generally considered to be defunct. The tribe is described by the early ethnographers as having rights over a defined tract of land, that included control over entry to people from outside and the right to hunt and extract resources from within the bounds of that area (Keen 2010:46). Several researchers have argued that the concept of a tribe does not account for the complexities of social interaction and organisation found in Aboriginal society (e.g. Keen 2004). The tribal model was used for most of the twentieth century by anthropologists to describe the social organisation of Aboriginal groups and how this related to land ownership. There has been a shift to attempts to describe Aboriginal society as multi layered and to explore interconnected relationships that operated within broad social groups.

In Australia, the band is generally considered by anthropologists as the basic social and economic unit in pre-contact Australian Aboriginal society (Service 1966, Peterson 1976). The band is described as a small-scale population, comprised or between two to six extended family units, or about 14 – 33 people, which together cooperate in the food quest (Service 1966; Keen 2004:106). The composition of this group (in terms of numbers) was not rigid; group size fluctuated in response to factors such as the availability of resources and visiting kin (Peterson 1975).

Individual bands are seen to occupy and exploit a specific range (Service 1966). The concept of a band's 'range' is not easily defined, and is therefore somewhat problematical to delineate. The ideal method of defining range would be to identify the outermost points of an area used by a group to demonstrate the total area, or range, in which that band operated. Yet, as Peterson (1986) points out, the kind of evidence needed to achieve this, (details of daily movements over several years) is not available for any group within Australia. Nor is such evidence likely to be discernible in the archaeological record. The practical alternative, both from an archaeological and an anthropological perspective, is to identify the base camps used over a period by a group. This provides a rough equivalent of a band's "home range".

3.2.1 Environmental Determinants of Social Organisation

Ecology is, according to Peterson (2008:186) a 'crucial variable' when assessing estate, range and domain. Range normally encompassed the estate, although there were exceptions to this (Peterson 2008:186). In cultures across the world it is impossible to separate natural landscapes from cultural landscapes (White 2003:188). From an archaeological perspective, it is equally impossible to discuss economy and subsistence without reference to the environment.

As Sutton (2008:170) explains, WEH Stanner explored the connectedness of economy, environment and spirituality over forty years ago. Stanner's famous paper 'Aboriginal territorial organisation: estate, range, domain and regime' published in Oceania in 1965 was a benchmark as it provided a new framework within which to define and discuss Aboriginal land ownership (Peterson 2008:185). This framework separated concepts of land ownership from the land that people actually used. Peterson (2008:185) suggests that this was a fundamental shift that has influenced the last forty years of anthropological debate.

In coastal and riverine environments where a higher population density could be supported compared to desert environments, people could lead more sedentary lives (Keen 2004:103). In these situations, the social organisation of neighbouring groups could become more individualised; whereas in more arid climates people relied on being able to traverse vast tracts of land to access food and water, requiring closer social relations with neighbouring people (Keen 2004:103).

This argument reflects Louis Binford's model of 'foragers' and 'collector' societies. Foragers are highly mobile groups that move regularly and as a whole to new locations to exploit resources. In contrast, collector societies may move less often but rely on individual members of a society venturing out beyond the camp site location to provide the group with resources to continue residing at the location (Keen 2004:104). Keen (2004:104) suggests that most Australian Aboriginal societies fall within Binford's 'collectors' model – forming home bases and voyaging out from these bases to exploit resources from the surrounding area, which could be very large.

It was economically vital for Aboriginal people to be organised into bands, as this made groups more effective at surviving. Subsistence becomes more efficient and reliable if people are organised into groups that are larger than the nuclear family. This increases the number of 'producers' (people who can actively provide food for a group) and acts as a buffer against the sickness, injury or death of any one individual (Keen 2004:105). However, these groups will never become too large, as increased numbers reduce the mobility of the band, as well as potentially leading to broader social disintegration (Keen 2004:106).

The range of a band had to be capable of providing for the survival of the group for much of the year. Keen (2004) takes an economic view of range and presents a case for the range of a group to be determined by access to preferred food resources. As Keen (2004) argues, availability of foods, food preferences, production techniques and methods of transport all affect how Aboriginal people across Australia could access food resources at varying times of the year. These factors therefore greatly affected mobility; groups had to be able to mobilise and move to where the preferred, available and accessible foods were located (Keen 2004:23).

Keen (2004:126) suggests that seasonal mobility of a particular group is largely influenced by rainfall. In Gippsland where there are clearly defined seasons, but steady year-round rainfall people operated within a broad seasonal migration pattern. However, in the Western desert where rainfall was much less reliable, this was a weaker pattern of seasonal movement. Regular droughts brought on by the El Nino cycles and other more haphazard climatic events all influenced the seasonal movement based on food resources that Aboriginal people required (Keen 2004:79). These affected issues of range, ceremony and interactions with neighbouring groups (Keen 2004:79).

The factors that influence selection of a 'home base' are varied and illustrate the nature of pre-contact Aboriginal societies. Access to fresh water is probably the most fundamental requirement, and will be common to all home base sites. Distance to food resources is the next consideration. As Keen (2004:104) notes it may be that home sites are better located adjacent to less transportable resources, rather than in areas where there is the highest abundance of food items. The distance that an individual collector can travel within a single day forms an important scope of the range of the home base, and therefore the size of the resource pool available. Keen (2004:104) suggests that in hunter-gatherer societies around the world, 20-30km is considered the maximum foraging distance from a home base. People could then establish smaller temporary camps away from the central home site to enable longer foraging journeys (Keen 2004:105).

Despite the difficulties faced in defining ranges, Peterson (1986) believes there is good evidence for supposing that bands are localised and generally have bounded and exclusive ranges. The most significant evidence is ethnographic accounts recording the elaborate rites of entry accorded to visitors when entering a bands range (see Peterson 1986). However, it appears that the boundaries of a group's 'range' were not necessarily clearly demarcated lines. Trigger describes these overlapping boundaries as 'zones of transition' (Trigger 2010:155).

3.2.2 Aspects of Aboriginal Social Organisation

Individual bands or clans were by no means a social or cultural isolate, but rather interacted with each other in a variety of ways. Typically, these interactions involved visitations, marriage, ceremonies and trade. Through these interactions, links were established or re-affirmed between neighbouring bands. The result was the formation of a cluster of bands, wherein there was some sense of collective identity, often expressed in terms of possessing a common and distinctive language (White & Cane 1986). Most people in pre-contact Aboriginal society were multi-lingual and marriages outside of the language group were common (Keen 2004:134). Indeed, within some totemic groups several languages were spoken (Keen 2004:135).

Linguistic inheritance could be multi-layered. Trigger (1992:104) records how in some northern Australian societies most people were (a) multi-lingual and (b) adopted a primary linguistic label based on where their present circumstances were aligned.

This implies that linguistic affiliation was perhaps a less formal and more adaptive social mechanism. Trigger (1992:105) suggests that this undermines the concept of linguistic groups, which was a characteristic often used in the past to define tribal groups.

Similarly, Keen argues that a shared language did not necessarily indicate shared cosmic beliefs or social customs, nor did language or dialect clearly define social groups (Keen 2004:135). Rather, Keen suggests that broad social groups tended to define themselves more by location, with reference to the type of environment (coastal, hinterland etc.) or direction (northerners or southerners) (Keen 2004:135). Groups were also sometimes named after and therefore defined by, the name of the leader or a prominent person in that community (Keen 2004:135). Blundell (2003) discusses how the Wandjina rock art sites of the Kimberly formed the cultural and cosmic centres for the 'little countries' or 'dambina' which correlate with the concept of an estate as used by anthropologists (Blundell 2003:162).

Keen (2004:170) presents a model of the complexities of Aboriginal society, where an individual's identity depended largely on context. In some situations, Keen (2004) argues language was the defining factor, in another the broad region to which you claimed affinity, and in yet other circumstances it may be totemic identity that was important. Interestingly, Keen (2004:170) suggests that identity was 'most clearly defined' in areas rich in resources, such as coastal zones, while people in more arid environments had less strongly applied rules governing identity. This reflects the imperative for desert people to be on solid relationships with their neighbours. The following section discusses issues of Aboriginal connection to the land in more detail.

3.2.3 Concepts of Aboriginal Land Ownership

The band was in essence a land using group, but not a land-owning group. Land ownership was vested in 'the clan' or 'corporate group' which is defined as a broad group of people that shared social characteristics, and was often tied to having rights over certain tracts of land, known as an 'estate' (Keen 2004:134; Peterson 1986). It is uncertain whether clans within eastern Australia were strictly patrilineal (as is suggested in other parts of Australia), or whether membership was determined more on the basis of place of birth (White and Cane 1986). Keen (2004:136) argues that across Australia it was common for totems to be patrifilial, where a child took their father's totem, and that this was strongly tied to land ownership. The totem was an important feature of Aboriginal society and was used to define individuals, small groups and larger groups (Keen 2004:135). This was by no means the only form of land connection across Australia; in some parts, a person's place of birth determined which country they were tied to (Keen 2004:137).

Where matrifilial systems operated (where a totem was passed from mother to child) it tended to cause people of the same totemic identity to be dispersed among several land based groups. In this way, matrifilial relations become important when determining marriage and other social ceremonies, but were not generally connected to land ownership (Keen 2004:137).

The system of patrifilial transition of land ownership concepts is reflected in Patterson's 1811 account of Bennelong's sense of ownership of Goat Island (Keen 2010:45). Patterson wrote that Bennelong had 'inherited' Goat Island from his father and that he in turn had the right to pass it on to his companion By-gone (Keen 2010:45). This is supported by Eyre's 1845 observations about the hereditary transmission of Aboriginal land ownership (Keen 2010:46).

Ancestral law was the defining principle that controlled access to country and landmarks, including water sources (Keen 2004:299). Tied to this notion are concepts of cosmology, religion and the ongoing influence of the ancestors (Keen 2004:303). Keen suggests that: 'ancestral significance integrated country, resources and technologies into the all-encompassing framework of ancestral law, not only as a mode of control, but as a way of being.' (Keen 2004:303). Myers has also argued that ownership of territory was largely vested in knowledge of the 'stories, objects, and ritual associated with the mythological ancestors of the dreaming at a particular place (in Peterson 2008:192).

Ethnographic and anthropological research provides a context within which to view the archaeological record. The overview presented here reveals the complexities of Aboriginal societies across Australia. It indicates the interrelated nature of the environment, religion and social structure in pre-contact Aboriginal societies and has implications for discussions of the archaeological record.

3.3 Aboriginal Social Organisation, Customs and Lifestyle in the ACT

According to Tindale (1974), the ACT was primarily occupied by the Ngunnawal (previously the Kamberri), whose country Tindale recorded as extending from Marulan and Goulburn to the Shoalhaven and Molonglo rivers, including Lake George and Queanbeyan, across to the Goodradigbee and Tumut rivers, north to Boorowa and back across to Goulburn. However, arguments have arisen suggesting that this boundary reflects the 20th century developments and not the territory of the Ngunnawal at the time European explorers first arrived at Lake George (see Jackson-Nakano 2001:21). According to Jackson-Nakanao, the broader area now known as the ACT was originally occupied by a wide range of Aboriginal groups, including the Pajong, Wallagalooa and Yass Communities, the Kamberri and the Moolingoolah or Molonglo Plains community.

Within the earliest historical documents, the Aboriginal of the Canberra region were variously referred to as the 'Kamberra' tribe (William Davis Wright of Lanyon), the 'Nganbra Pialligo' tribe and the 'Kgamburry' tribe (William Philip Bluett) and the 'Kembery' tribe (Dr John Lhotsky) by the various early European explorers of the region (Gillespie 1984:2). Importantly, the tribal names used by early settlers and explorers rarely mimicked the correct tribal names; instead tribes were regularly referred to by their location with numerous references appearing in early records to the 'Murrumbidgee blacks, the Lachlan blacks, the Limestone blacks, the Yass blacks and other similar appellations' (Gillespie 1984:45). Nevertheless, these records provide the best documentation for what is currently known of the customs and lifestyle of the Canberra Aboriginal peoples prior to and at the time of European settlement.

3.3.1 Population

Whilst an accurate count of the Ngunnawal tribal numbers was never made, available records seem to indicate that at the time of settlement Ngunnawal people numbered between 400 and 800, with 500 as the most frequent estimate (Gillespie 1984:2). William Davis Wright of Lanyon wrote in 1923 'From many conversations I had with various members of the tribe I got to know them and their customs pretty well…. It was an ordinary sized tribe, between 400 and 500 at the time of first white settlement', however subsequent reports suggest numbers of between 7 and 800 once existed (cited in Gillespie 1984:2).

More detailed records were made in 1938 by George Augustus Robinson, given his particular interest in Aboriginal people, who recorded a list of 48 Aboriginal people he encountered near Yarralumla. His list included Ong gong and several other members including Jemmy the Rover (Coolup).

Robinson described the Limestone natives as 'a fine, sturdy, athletic race, men and women well-proportioned and finely finished' (cited in Gillespie 1984:45).

Early explorers suggest that Aboriginal people generally lived in family groups or sub-groups, with gatherings of larger numbers only occurring on special occasions and involving the meeting of several tribes (Gillespie 1984).

Regardless of exact population counts, it is abundantly clear that Aboriginal people frequented the Canberra region in substantial numbers at the time of European settlement.

3.3.2 Hunting, Gathering and Settlement

The observations of early explorers indicate that, like most Aboriginal tribes, those of the Canberra region were hunter gatherers, with men taking the role of hunting and women gathering food (Gillespie 1984:45). Given the limited ability of tribes to transport and store large quantities of food, food procurement occurred on a daily basis.

Early observations by W.P Bluett indicate that the area surrounding the Limestone plains (prior to European settlement) abounded with bird and animal life including terrestrial animals around the open plains such as kangaroos, emus and brolgas, as well as resources related with the Queanbeyan, Molonglo and Murrumbidgee Rivers which provided excellent aquatic resources as well as scrubby growth and reeds which provided excellent cover and nesting places for aquatic birds. Smaller game included birds, lizards, opossums, native cats, squirrels, fish, birds' eggs, yams, berries, grubs and seed (cited in Gillespie 1984:45). The ready plentiful availability of kangaroos, opossums and wombats meant they were highest on the list of Aboriginal diets, however the smaller game was equally important.

The availability of game and other resources was noted to largely determine the location of campsites. However, the weather and the corresponding seasonal availability of some resources or droughts would also cause Aboriginal people to move on to more favourable locations. The arrival of the Bogong moths in late spring each year was noted to be a dependable food source, resulting in an annual trek to the mountains (Gillespie 1984). Campsites were usually in areas that provided shelter from the wind, were near water sources.

John Gale, an early arrival in the area recorded the following method of capturing wombats:

> *'A blackfellow enters the burrow, the roof of which he strikes as he progresses. His companions above ground listen for the sounds and by that means follow the direction of the burrow. When the animal is reached at the end of his burrow a certain signal is made, whereupon they dig down and effect a capture, the wombat being prevented from making his exit by the blackfellow who had pursued him'* (Cited in Gillespie 1984:45).

According to Gillespie, the Canberra Aboriginal peoples maximized all resources available to them 'overlooking very little which was tasty and edible' (1984:46).

3.3.3 Clothing

In 1834 Lhotsky encountered a group of 60 Aboriginal people near Gunning, recording that 'They were all naked, excepting that the men wore a girdle with a small sort of apron formed of fringes before and behind…. A few of the strong young men wore a sort of armlet upon their left

arms, made (as were also the girdles abovementioned) of the twisted hair of kangaroos and which was a sort of distinction for brave warriors' (Cited in Gillespie 1984:47)

Lhotsky later observed the preparation of opossum skins for cloaks and nets by women sitting in gunyahs, however it was noted that the wearing of cloaks was not for all members of the tribe, being reserved for the more privileged of the group.

3.3.4 Habitations

Most reports of the shelters created by Aboriginal people in the area suggest that they were simple structures. Bluett describes their 'gunyahs' as 'flimsy seasonal affairs' (cited in Gillespie 1984:47) constructed from green bushes with leaves sloping downwards against a low branch of a tree or against a pole set between two forks. He also noted furred skins for bedding, along with a few bark dishes vessels for holding water and food.

By comparison, Wright recorded that shelter types and complexity of construction varied with location, ranging between simply bough shelters sufficient to shield the rain to very good bark huts (cited in Gillespie 1984:47).

The Aboriginal people also made use of natural rock shelters wherever possible, with numerous rockshelters retaining rock art and cultural remains throughout the broader region.

3.3.5 Customs

Very few first-hand recordings exist of traditional Aboriginal customs. One exception is provided by German Naturalist Dr John Lotsky, who visited the area in 1834, who recorded the following information about a corroborree, which he overheard:

> *'Their strain was in 2-4 time, which they marked by beating crotchets and in moments of greater excitement, quavers……The tones weakened by degrees, the tones died away and grand silence and ethereal clearness filled the plain and all the wilderness about my camp*' (Cited in Gillespie 1984:30).

4.0 Archaeological Background

4.1 Investigations within the Hume District

A number of previous archaeological investigations have been undertaken within and in the general vicinity of the study area. Probably the most comprehensive archaeological investigation undertaken within Hume, including the Hume Resource Recovery Estate, is that of Barber (2000). Barber (2000) was contracted by the ACT Department of Urban Services to identify and record the heritage values of Hume and adjacent areas within the Tuggeranong and Jerrabomberra districts as part of the planning procedures for the possible expansion of the Hume Industrial Estate. The study area incorporated approximately 800ha, with surface visibility throughout this area noted to be generally poor.

In the course of the field investigations, Barber (2000) identified a total of 19 Aboriginal sites and 12 European heritage sites. The vast majority of Aboriginal sites (17 sites) are classified as isolated artefacts or small artefact scatters comprising less than 6 artefacts. The remaining two sites were classified as scarred trees. Interestingly, Barber (2000) observes that in terms of patterns of site location, a notable characteristic is that the majority of sites found were located some distance from water courses, with five of the sites being situated on the mid to upper slopes of hills, away from water. This pattern is unusual within the ACT, with most sites being located on elevated, level terrain, close to water. Artefact assemblages at the recorded sites were dominated by quartz and volcanic tuff.

The 12 European Heritage sites included an historic homestead, pieces of farm machinery, and various other constructed items (Barber 2000). In addition, Barber (2000) identified a total of 17 areas of potential archaeological sensitivity (PAD's). These areas generally consist of locally elevated ground (spur lines, hill crests etc), adjacent to water courses.

Navin and Officer (2001) were contracted by Maunsell McIntyre Pty Ltd to undertake a cultural heritage assessment of a proposed Resource Recovery Centre located in the vicinity of the Mugga lane Landfill area. The study area, which comprised approximately 58ha was located between Dog Trap Creek and the Monaro Highway in block 10, section 23, Hume.

In the course of their investigations, Navin and Officer (2001) re-located and recorded the three Aboriginal sites (H11, HA12, H13) and four areas of archaeological sensitivity previously identified by Barber (2000). In addition to the European sites recorded by Barber (2000), Navin and Officer (2001) also recorded a remnant portion of 19th Century ploughland.

The three Aboriginal sites (H11, HA12, H13) were all classified as low density surface artefact scatters, each comprising less than 10 artefacts. Site H11 was assessed as being of moderate significance and sites HA12 and H13 were assessed as having low to moderate significance (Navin and Officer 2001). Based on their assessment, Navin and Officer (2001) recommended that sub-surface testing should be undertaken within the seven identified areas of archaeological potential, associated with sites H11, HA12 and H13.

AASC (2003) was contracted by ACT Urban Services to undertake a salvage collection of artefacts associated with site H11 and to undertake sub-surface investigations at two identified PAD locations (PADs 1 and 2).
AASC (2003) excavated a total of twelve 30cm x 30xm test pits at PAD 1 and 35 test pits of the same dimensions at PAD 2. In total, 1 artefact was recovered from the test pits excavated at PAD 1 and 13 artefacts from the pits excavated at PAD2. In addition, a total of 35 surface artefacts were salvaged from site H11.

On the basis of the findings, PAD1 was as assessed as having low archaeological potential and PAD2 as having moderate archaeological potential. Site H11 was assessed as being of low significance and having low to moderate archaeological potential (AASC 2003). AASC (2003) recommended that further monitoring be undertaken at these three site locations, as part of construction activity, with the condition that should any unanticipated archaeological materials be detected during construction, work at the area should cease and the appropriate authorities be contacted for management advice.

Huonbrook Environment & Heritage (2007) was subsequently contracted by the Heritage Unit, Environment ACT to undertake prescribed monitoring works at sites HID 1391 (H11) and HID 1395 (PAD2). This monitoring was done in conjunction with representatives from the identified Aboriginal stakeholder groups for the region.

In the course of monitoring works, a total of 285 artefacts were recovered from site HID 1391 and a further 458 artefacts were recovered from site HID 1395. Huonbrook Environment & Heritage (2007) carried out a detailed analysis of the artefacts salvaged from the two site areas. It was concluded that the collected assemblages were unusually rich and diverse in terms of range of raw material and artefact types. Material types included quartz, a variety of hornfels and volcanic rocks, a variety of cherts and a variety of fine grained siliceous rocks. Artefact types included flakes, which dominated the assemblage, cores, retouched flakes (including backed artefacts), hammerstones, anvils and fragments of edge ground axes. Huonbrook Environment & Heritage (2007) were of the opinion that the artefact assemblages indicate that they were derived from dense, diverse and rich sites, which were used by Aborigines as occupation sites (perhaps even base camp sites) as well as artefact production sites.

In 2008 AASC and CHMA were contracted by the Land Development Agency (LDA) to undertake archaeological investigations within the proposed bounds of Stages 2 and 3 of the Hume Resource Recovery Estate (HRRE) to the east of the current study area. The field work component of this project involved initially mapping the landscape units that are present within the study area, and then undertaking sub-surface test pitting within the study area. The landscape mapping resulted in the identification of three main landscape units that are present within the study area; higher dissected plains, lower dissected plains and elevated terraces.

A total of 252 stone artefacts were recovered from the sixty 1m x 0.5m pits excavated in the study area. This equates to an average artefact density of 8.4 artefacts/m. This initial phase of sub-surface investigations identified three areas of comparatively high artefact concentrations located within the bounds of the study area. These three artefact concentrations were classified as HID 1395, HAC2 and HA12. The three sites or areas of artefact concentrations are all located on a series of three elevated terraces. Comparatively low artefact densities were recovered from the remainder of the study area.
As part of phase 2 test pitting works, three trenches were positioned within the identified bounds of each of the three elevated landscape units. On terrace 1 (site HID1395) and terrace 2 (site HAC2), trenches were positioned within the central portion of the terraces, where high artefact densities had already been identified. On terrace 3 (site HA12) the trench was positioned on the northern termination point of the terrace where the highest artefact densities were identified.

A total of 686 stone artefacts and 33 bone pieces were recovered from these three trenches. The average artefact densities at these three site locations varied considerably. At HID1395, the average artefact density was around 35 artefacts/m2. At HAC2 it was 56 artefacts/m2 and at HA12 it was 80 artefacts/m2. The average artefact densities recorded at these three locations are among the highest artefact densities recorded at sites in the ACT region.

The artefact assemblage of the study area as a whole, and the three artefact concentrations in particular, are described by AASC and CHMA (2008a) as being rich and diverse, both in terms of the variety of stone material types and artefact types represented. Eight different stone material types are represented in the artefact assemblage of the study area. The parent sources for some of these stone materials are likely to be situated within the local area (eg tuff, hornfel and quartz). However it seems very likely that some of these stone materials have been procured from sources outside the region and imported into the local area (ie FGS, the black chert and silcrete). With regard to the stone artefact types, nine different typologies are represented in the assemblage, including some rarer tool types including microliths, blades and scrapers.

Importantly, the analysis of the data obtained from the sub-surface investigations shows that the sub-surface artefact deposits associated with the three concentrations of artefacts in the study area (HID1395, HAC2 and HA12) has been subject to only low to moderate levels of prior disturbance, and are still reasonably intact.

The characteristics of the artefact assemblage of the study area indicate that the occupation of these locations was probably restricted to the period between 5000 to 200 years ago. This time frame corresponds to a period of apparent intensification within parts of Australia.

AASC and CHMA were engaged to conduct further investigations (AASC and CHMA 2008b) to explore the nature and distributions of these high-density sites (HID1395, HA12). Excavations at site HID1395 recovered over 900 artefacts, with average densities of 36.96

artefacts/m2, with variations in densities ranging between 11 and 70 artefacts/m2 across the site.

Excavations at site HA12 recovered a total of 463 artefacts and an average artefact density of 18.52 artefacts/m2. Again artefact densities varied across the site ranging from 4 to 43 artefacts/m2. At both sites, the majority of artefacts (over 90%) were recovered in the top 20cm of the deposit. Both assemblages comprised a wide range of artefact classes and raw materials, however quartz and fine grained siliceous materials dominated the assemblage (92%). The findings of this second phase of excavations were found to largely support the conclusions made by AASC and CHMA (2008a) following first phase works. The assemblages of the two trenches are noted to be remarkably similar, both in terms of artefact types and stone material types. Perhaps the only notable difference is in terms of the higher number (and comparative %) of blades and cores (2 of which are micro-blade cores) recovered from Trench 1. This indicates that blade production was being undertaken in this area. Otherwise, the general conformity of the assemblages from the two trenches indicates that similar activities were being undertaken in these two areas.

AASC and CHMA (2008b:45-46) made the following conclusions:
'The artefact assemblages of sites HID1395 and HA12 (and HAC2, although not investigated as part of the present studies) are rich and diverse, both in terms of the variety of stone material types and artefact types represented. Importantly, the analysis of the data obtained from the sub-surface investigations again confirms that the sub-surface artefact deposits associated with these sites have been subject to only low to moderate levels of prior disturbance, and are still reasonably intact. There is some evidence of the vertical movement of artefact deposits through the soil profile, mainly through bio-turbation and/or pedogenics, but there appears to be very little in the way of horizontal movement of artefacts. As such, it is still possible to identify features such as knapping events, blade production etc. This factor certainly increases the research potential of these archaeological deposits.

The characteristics of the artefact assemblage indicate that the occupation of these locations was probably restricted to the period between 5000 to 200 years ago. This time frame corresponds to a period of apparent intensification of occupation within various parts of Australia. It also appears to be roughly contemporaneous with the formation of the alluvial sand deposits in which the artefact material is located. At this stage it is not clear as to whether the artefacts were discarded and incorporated into the sediment as it progressively accumulated (i.e. the artefacts are potentially in situ) or that they were discarded on the present surface and have subsequently worked their way down through the upper soil profile. The consultant is of the opinion that the sand bodies were at least partially formed prior to the initial Aboriginal occupation of the area, and that it was these sand bodies that were (to a large extent) the reason why these areas were selected as preferred camp locations.

The most likely interpretation of the data obtained from test pitting and salvage excavations is that the three artefact concentrations in the study area (sites HID1395, HA12 and HAC2) are representative of (or the product of) interim camp locations that were frequented on a

regular basis. In other words, these areas were regularly used as overnight camp locations by Aboriginal people travelling through the landscape.

The presence of elevated terraces, comprised of well drained and soft sand deposits, and located in close proximity to a creek and swamp, would have provided the ideal locations for people to camp when taking this travelling route. The results of the investigations show that these terraces were the primary focus of activity in the study area. However, the presence of low densities of artefacts in various locations within the study area, attests to the fact that activity was not completely limited to these terraces. It is likely that these low densities of artefacts are representative of associated sporadic foraging and movement radiating out from these terraces.

In 2010 CHMA undertook a detailed heritage survey for a proposed sewer alignment to the north east of the current study area. The study resulted in the identification of a total of 6 Aboriginal sites (Hume 1, Hume 2, Hume 3 plus PAD, Hume 4 plus PAD, Hume 5 plus PAD and Hume 6) and the need to redefine the boundaries of HA12 was identified within the survey area. Two of these sites (Hume 2 plus PAD and HA12 extension) may be extensions of previously identified sites (HAC2 and HA12) and a third (Hume 3 plus PAD) may be the previously recorded site of HA13. Subsurface work to clarify the boundaries of these sites was recommended (CHMA 2010).

BIOSIS completed a heritage assessment for proposed upgrades to the Theodore to Gilmore Transmission Line in 2012. No sites or areas of potential archaeological deposit were identified during the assessment.

In the same year, a survey was completed for a proposed optic fibre cable from the Hume Industrial mobile tower to the Tralee mobile tower to the southeast (OzArk 2012). The study covered areas within both the ACT and NSW and recorded a single heritage site (Hume OS1) over a 1km section of an access track. The site consisted of 25 artefacts and was determined to have the potential for additional subsurface finds.

A desktop study was undertaken of the proposed Tralee Northern Entry Road was undertaken by NOHC in 2013, and accompanied by a brief site visit (NOHC 2014). Two previously recorded sites (PPS5 and PAD3) were relocated and updated map coordinates for both sites were made, however no new sites were identified.

In 2014 Ironbark Heritage completed a due diligence assessment for the rezoning of South Jerrabomberra for residential development. The study identified 8 new sites, three with associated areas of PAD. The majority of these sites were located on lower basal slopes in association with creek lines. This investigation was completed to the southeast of the current study area.

Further survey of the South Tralee Residential Development was completed by NOHC in 2016 and 2018. A total of 11 sites were identified, comprising an artefact scatter, eight

isolated finds and two areas of PAD (subsequently found to contain subsurface deposits). The areas of PAD were located in basal slope contexts near creek lines. The majority of the isolated finds located all in valley floor contexts on creeklines.

In 2020, Past Traces were engaged to prepare a CHA ahead of a proposed 3.5km long 11kV power cable from the Gilmore substation to the Canberra Data Centre at Hume. The study identified four Aboriginal sites and one area of PAD within the proposed alignment. Sites comprised 3 isolated finds and one low density scatter with PAD.

4.2 Previous Investigations within the Current Study Area

The current study area was included in the survey conducted by Matt Barber in 2000, as part of the Cultural Resource Survey of Hume and Adjacent Areas. The study has been summarised in the previous section. Of relevance, however, is the recording of sites HA16, HA17, HA18 and HA19 within the immediate bounds (or 50m of the boundary) of the current study area. Details of these sites are provided in Table 2.

In 2008, Grinbergs was engaged to undertake a cultural heritage assessment of the southern portion of the current study area on behalf of ACTEW AGL who proposed to develop a gas fired power station and data centre on the block. The study resulted in the identification of two new low density artefact scatters (Block D-1 and Block D-2) as well as two areas of Potential Archaeological Deposit (Block D-PAD1 and Block D-PAD2). The two areas of PAD were of sufficiently low significance as to not warrant subsurface testing and to instead be monitored during proposed mechanical works (Grinbergs 2008:18). Identified artefacts within the study area included flakes and flaked pieces manufactured on silcrete, volcanic tuff, quartz and chert.

In 2013, BIOSIS undertook a detailed heritage assessment within the exact bounds of the current study area for the Southern Memorial Park Masterplan. The study investigated both Aboriginal and European Heritage. Three of the four previously recorded sites within the study area were unable to be relocated by BIOSIS, while an additional artefact was located at HA19 and considered part of the original site. The study identified five new sites, comprising three low density scatters, one isolated find and one low-moderate density scatter. Four areas of PAD were also identified. Summary details for each of these sites are included in Table 2. No historic sites were identified within the study area.

4.3 Results of Search of the ACT Heritage Register

A search was requested of the ACT Heritage site database 6th May 2020 including a radius of 1km from the boundary of the study area. An online search of ACTMapi was also undertaken on 5th May 2020 (see Figure 10). A total of 3 Aboriginal sites are listed on the ACT Heritage register as occurring directly within the current study area. Details of each of these sites is included in Table 2.

The results of the ACT Heritage Register search were received on 10th August 2020. The Register results provided failed to identify the BIOSIS 2013 investigations included here.

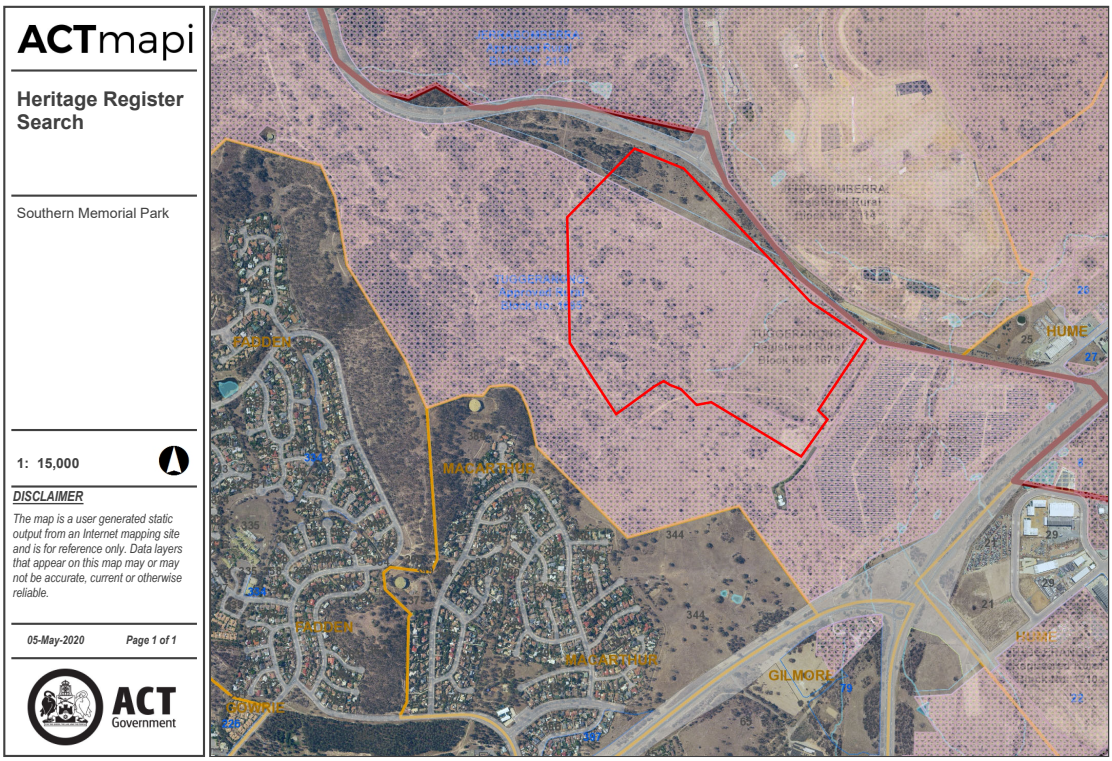

Figure 10. ACT Heritage Register search (image modified from ACTMapi accessed 4th May 2020)

Additionally, the current site search identified a report on the study area completed by Grinbergs in 2008 which ACT Heritage failed to provide to BIOSIS when they requested a site search in 2013. The failure of the register searches to provide a comprehensive list of sites within the study area in both 2013 and again in 2020 on a single study area demonstrates that the ACT Heritage Register is concerningly out of date and leaves proponents vulnerable to prosecution under the *Act* through inadvertent impacts to sites.

Table 2 and Figures 11 to 13 provide summary descriptions and show the locations of previously recorded sites in the area, respectively, as researched by CHMA.

Table 2. Summary details for previously recorded sites within Study Area

Site Name	Site Type	Location	Description	Significance Assessment	Current Status/Outstanding Recommendations	Proximity to Current Study Area
HA16 **Barber 2000** **Grinbergs 2008**	Low density scatter	E694457 N6080590	Scatter of three artefacts located on the gentle lower slopes of a hill, with potential for shallow subsurface deposits. BIOSIS were unable to relocate this site in 2013	Low	3?	Directly within impact area
HA17 **Barber 2000**	Isolated Find	E694427 N6081091	Isolated artefact protruding from the deposits of a hollow under a fenceline, with potential for a larger scatter with and subsurface deposits (though area assessed as generally low sensitivity) BIOSIS were unable to relocate this site in 2013	Low	3?	<10m from impact area
HA18 **Barber 2000**	Isolated Find	E693814 N6080963	Isolated find located at end of a minor spur line above an ephemeral creek. Artefact visible in a large area of sheet erosion and considered to have some potential for shallow subsurface deposits.	Moderate	3?	Directly within impact area

Site Name	Site Type	Location	Description	Significance Assessment	Current Status/Outstanding Recommendations	Proximity to Current Study Area
			BIOSIS were unable to relocate this site in 2013			
HA19 **Barber 2000**	Isolated Find	E693670 N6081256	Isolated find located on the shoulder of a minor spur between an ephemeral creek and a wide drainage depression. Potential for site to be larger with subsurface deposits.	Moderate	3?	Directly within impact area
BIOSIS 2013	Isolated Find and PAD	E693647 N6081212	Tuff flake was located 70m from original location recorded at this site and considered associated as part of the same landform and side of drainage line. Original flake not relocated. BIOSIS PAD4 is associated with this find and defined as within the western side of the drainage line on the mid slopes of the landform.	Low	Site to be avoided If avoidance not possible, site to be salvaged and PAD to be subsurface tested	
Block D-PAD1 **Grinbergs 2008**	Potential Area of Deposit	E0694136 N6080633 to E0694349 N6080907	The crest of the gently sloping spur bisecting the block on a roughly north-south alignment considered to have low to moderate archaeological sensitivity based on its spatial relationship with artefact scatters SM1/D-1 and D-2	Low to moderate	Additional structured sub-surface archaeological investigation no warranted. Monitoring recommended if impacts are to occur.	Directly within impact area

Site Name	Site Type	Location	Description	Significance Assessment	Current Status/Outstanding Recommendations	Proximity to Current Study Area
Block D-PAD2 **Grinbergs 2008**	Potential Area of Deposit	E694600 N6080877 To E0694281 N6081138	Level to very gently sloping sandy silty deposits considered to have low to moderate archaeological sensitivity based on the recovery of subsurface deposits of cultural material from similar landforms on the northern side of Mugga Lane	Low to moderate	Additional structured sub-surface archaeological investigation no warranted. Monitoring recommended if impacts are to occur.	Directly within impact area
D-2	Low density scatter	E0693976 N6080336	Scatter of three stone artefacts located within an area of approximately 5m x 15m (75m2) on a gently sloping, northerly facing, mid slope spur landform on the northern flanks of a low hill (the summit of which occurs outside the study area)	Low	Avoid impacts where possible. If impacts cannot be avoided, seek works approval to permit impact to site. Site remains in place	Outside proposed impact area
D-1/SM1 **Grinbergs 2008** **BIOSIS 2013**	Low density scatter	E694198 N6080637 to E694170 N6080627	Scatter of seven stone artefacts on a larger area on a gently sloping, northerly facing, mid slope spur landform on the northern flanks of a low hill. Scatter of four stone artefacts located within exposed area in the vicinity of the existing gate and pedestrian	Low	Remains in place	Outside proposed impact area

Site Name	Site Type	Location	Description	Significance Assessment	Current Status/Outstanding Recommendations	Proximity to Current Study Area
			track. Artefacts are scattered across an area of about 25m.			
SM2 and PAD1 **BIOSIS 2013**	Low density scatter and PAD	E693870 N6080637	Scatter of two artefacts located within the dirt road located outside the project area. Artefacts occur 50m south of a drainage line in an area of about 25m of good ground exposure. Site is associated with BIOSIS PAD1 defined as within 200m of both sides of the drainage line.	Low	No recommendations made Portion of PAD1 within impact area to be subsurface tested	Outside proposed impact area Portion of PAD1 within impact area
SM3 and PAD1 **BIOSIS 2013**	Medium density scatter and PAD	E693927 N6080675 to E693785 N6080692	Scatter of 23+ artefacts located within dirt road on both sides of a drainage line. Artefacts are scattered across an area of approximately 200m in area disturbed by pedestrian and vehicular traffic. Site is associated with BIOSIS PAD1 defined as within 200m of both sides of the drainage line.	Moderate	No recommendations made Portion of PAD1 within impact area to be subsurface tested	Outside proposed impact area Portion of PAD1 within impact area
SM4 and PAD2 **BIOSIS 2013**	Isolated Find and PAD	E693706 N6080881	Isolated hammerstone located 75m south of drainage line in mid-slope context. Ground surface visibility within exposure was 10% or less.	Low	Site to be avoided If avoidance not possible, site to be salvaged and PAD to be subsurface tested	Directly within impact area

Site Name	Site Type	Location	Description	Significance Assessment	Current Status/Outstanding Recommendations	Proximity to Current Study Area
			Artefact was found in an area of low previous disturbance. Site is associated with BIOSIS PAD2 defined as within 100m of the southern side of the drainage line.			
SM5 **BIOSIS 2013**	Low density scatter	E693910 N6081344	Scatter of three artefacts located on an exposed pedestrian track along eastern side of a small water dam. Ground surface visibility within the exposed areas was high, approximately 90% but was extremely poor in areas nearby. Extensive previous disturbance recorded, no potential for subsurface finds	Low	Site to be avoided If avoidance not possible, site to be salvaged	Directly within impact area
PAD 3 **BIOSIS 2013**	Area of Potential Archaeological Deposit		Area of potential archaeological deposit located within mid slopes above the junction of two drainage lines. HA18 was previously associated with this landform despite not being able to be relocated during the BIOSIS investigation	Low	PAD to be avoided, if not possible is to be PAD to be subject to subsurface investigation	Directly within impact area

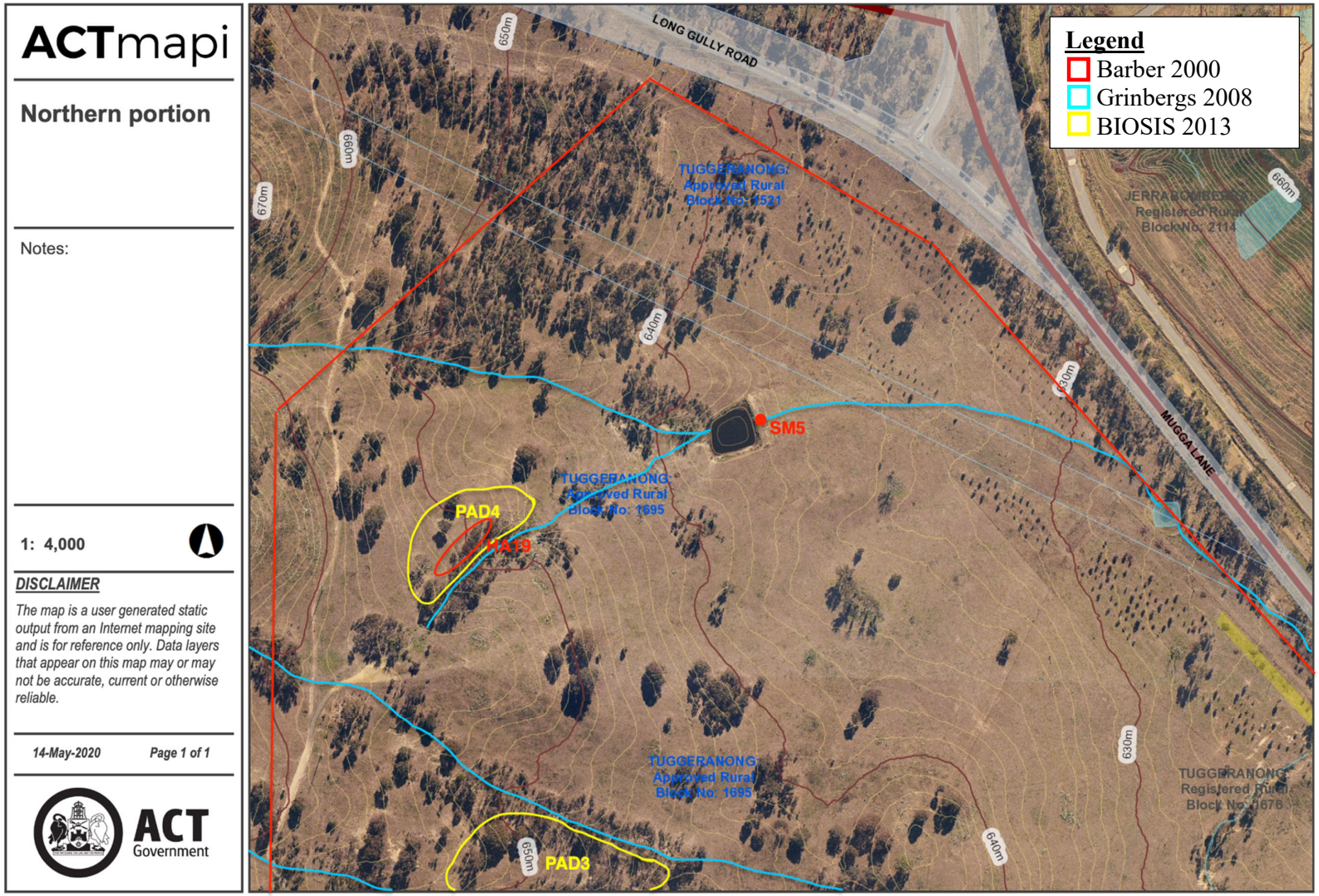

Figure 11. Previously recorded sites within Northern Portion of Study Area

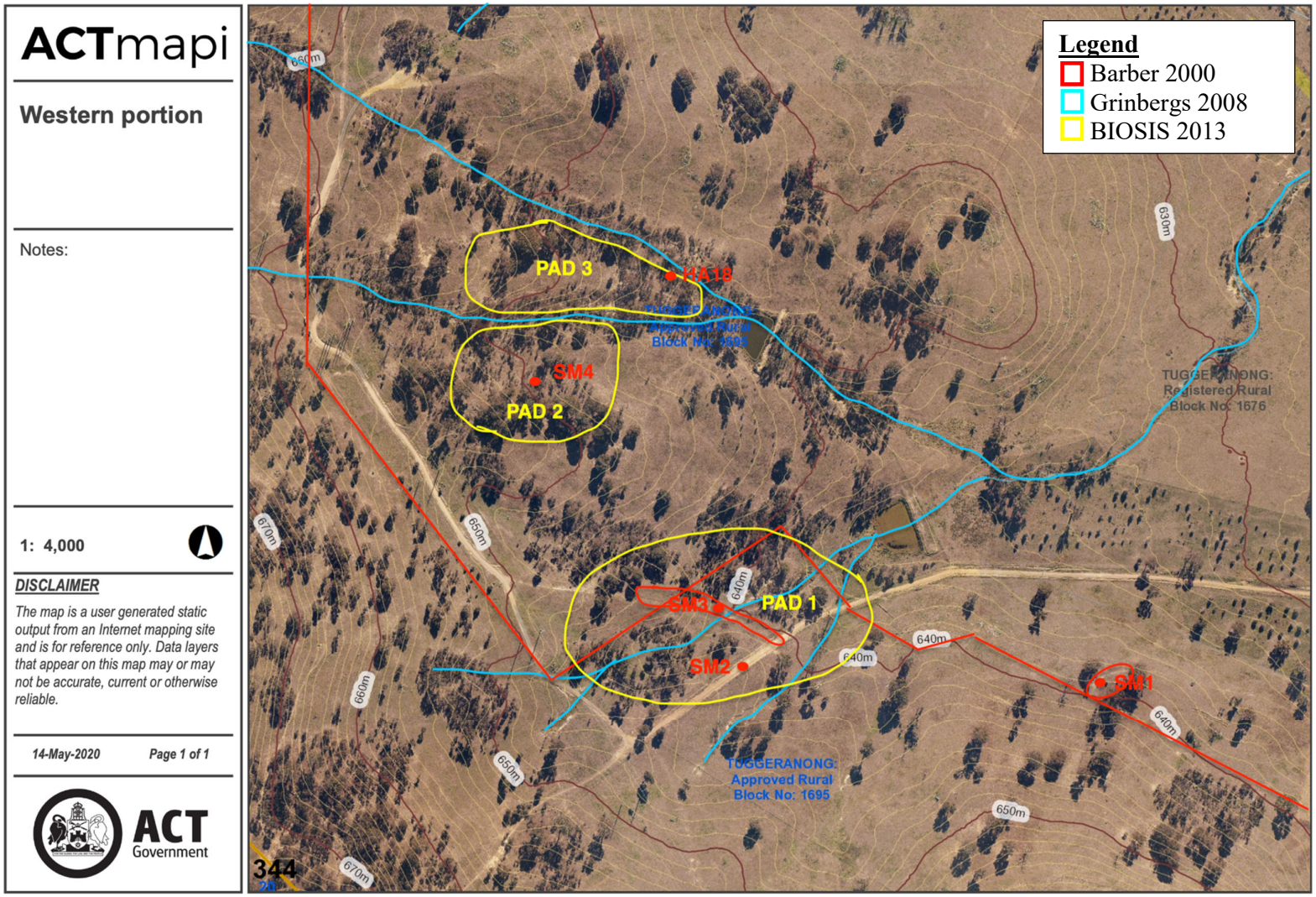

Figure 12. Previously recorded sites within Western/Central Portion of Study Area

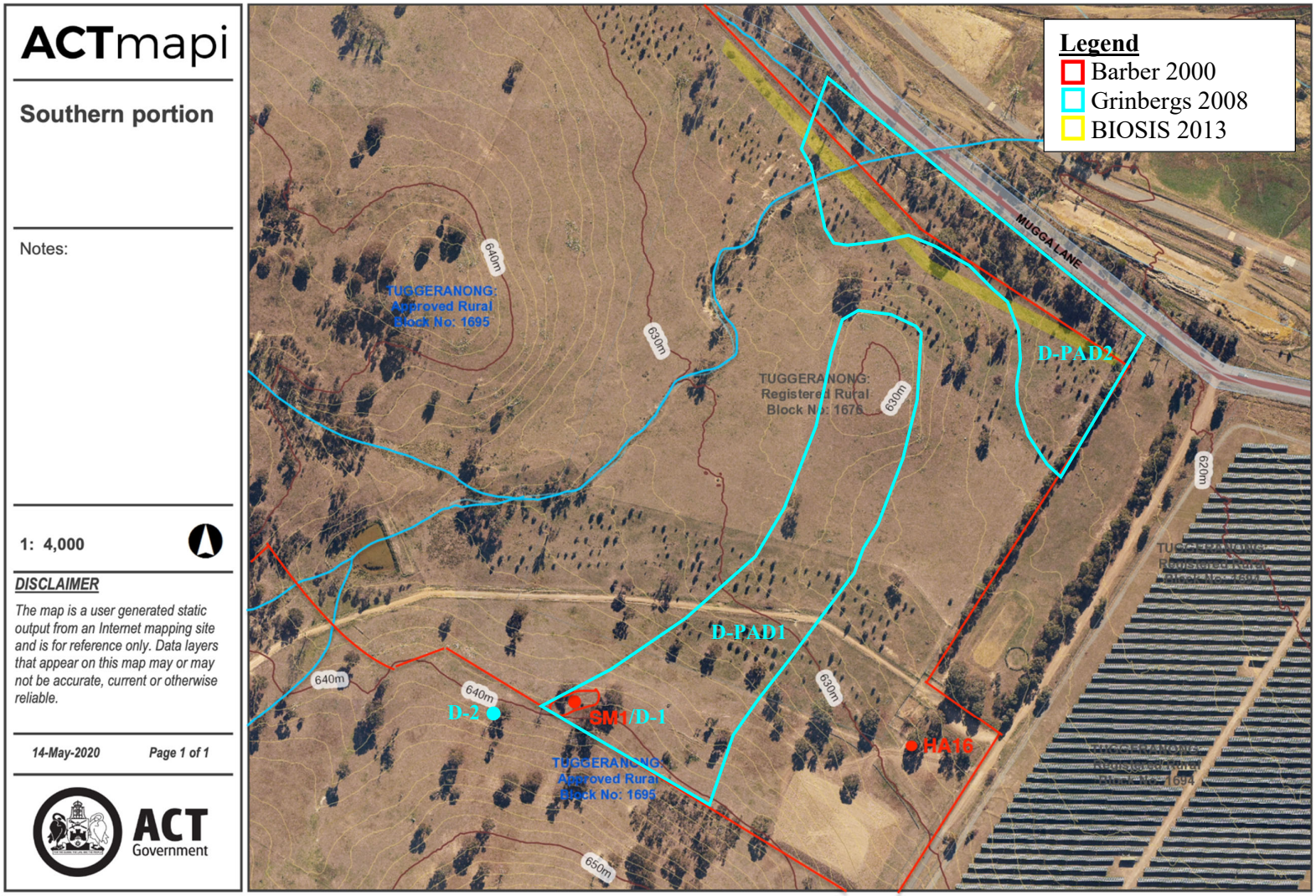

Figure 13. Previously recorded sites within the Southern Portion of the Study Area.

5.0 Historic Context

5.1 Brief Regional History

The first documented European visitor to the Canberra region was Charles Throsby, who arrived in search of the Murrumbidgee River in 1820. Throsby travelled through the northern section of Canberra, exploring from Lake George to the Murrumbidgee River, which he followed to the Queanbeyan River and further into the eastern part of the limestone plains (Cross 1985:3-8).

Following Throsby, officer of the Supreme Court Joshua Moore, also travelled to the area; liking the agricultural prospects of the region, he became the first squatter/settler by 1824. Moore soon established several employees along the Molonglo River with the aim of farming sheep and establishing crops (ERM 2012). Moore's status as squatter had shifted to landowner by 1827 with the purchase of 1000 acres of land, upon which he established the Acton sheep station on the Molonglo River.

By 1824, Robert Campbell had also arrived in the district, occupying Canberra's Duntroon region. Campbell, a Sydney Merchant, lost his ship 'the Sydney' whilst conducting government services, and was compensated for the loss with the land grant known as 'Pialligo'. He advertised in both Sydney and Britain for tenant farmers to work his estate. Each Tenant Farmer was given was a house and an area of land to farm, with a portion of each crop going to Campbell. At its most profitable, Duntroon (a sheep grazing estate) included some 32,000 acres of land, with 27 cottages including 'The Oaks Estate', Blundell's Cottage, several stables, an apple shed, an apiary, a dairy and a woolshed.

In 1826, Palmer acquired four portions of land within the Parish of Canberra. Portions 20, 21 and 22 each comprised 640 acres, with Portion 23 comprising 720 acres. Parts of portions 20 and 22 lie within District of Gungahlin (Gillespie 1985).

Around the same period, Morrissett purchased two portions of land within the Parish of Canberra. These being portion 19 of 728 acres and portion 24 of 640 acres. The majority of both portions lie within the district of Gungahlin (Gillespie 1985).

Probably the earliest free selector to settle in the Gungahlin District was John Gillespie, who acquired portion 28, this being 30 acres at 'Dead Horse Gully. In 1853, Gillespie built his permanent home, 'Horse Park', on this portion. 'Horse Park' is believed to be one of, if not the earliest homestead to be built in the Gungahlin District (Gillespie 1985).

The passing of Robertson Land Acts in 1861 led to an increase in demand for small areas of land within the Gungahlin District. The predominance of small land holdings tended to be in the poorer parts of country within the district. This is due to the fact that the original grantees (Robert Campbell, George Thomas Palmer senior and James Thomas Morrissett) had already selected the better portions of land.

By the 1890s, most of the land in the Gungahlin District had been taken up by European settlers. The few areas remaining were mostly rough timbered country.

Settlement of the southern ACT Catchment also began in the 1820s, with homesteads established in close proximity to the natural water courses such as the Murrumbidgee and Cotter Rivers and Tuggeranong Creek. By 1835, all the best land on the Limestone Plains was being rapidly occupied.

5.2 History of The Study Area

The current study area was settled during the 1820s as part of the large holdings of Hya Macqoid's Wanniassa Station. The land formed the northeastern boundary of the station before being sold on Macquoids death in 1857 to Andrew Cunningham who absorbed the land into part of Tuggeranong Station.

Between 1875 and 1877 the property was purchased from Andrew Cunningham by Richard James Harris, and incorporated into his 2000 acre property Sweet Hills Estate. In 1882, Richard Harris and his family moved to Cunningham's 'Tidbinbilla' Property. By 1938 and likely earlier, this portion of Harris' land had been absorbed into George Campbell's holdings (of Duntroon) (see Figure 14). There are no records of previous buildings or structures on the study area.

5.3 Previous Historical Studies within the Study Area

Both Barber (2000), Grinbergs (2008) and BIOSIS (2013) undertook historic heritage investigations in conjunction with Aboriginal heritage investigations of this study area. Neither identified any historic sites within the area. No historic sites are listed on the ACT Heritage Register within the study area, with the homesteads of Woden and Rose Cottage the closest properties to the current study area and both occurring in excess of 300m from the study area.

5.4 Predictive Historical Archaeology Statement

Given the European history of the study area it is possible that unrecorded historic sites and features of heritage significance may occur within the study area. These may include:

- Indications of historic field systems, drainage channels and/or furrow plough lands;
- Agricultural and transport infrastructure, plantings and evidence of land or animal husbandry;
- Remains of former temporary dwellings, outbuildings, timber-getterers huts etc
- occupational domestic and industrial tools and refuse deposits;
- fence posts and boundary delineators.

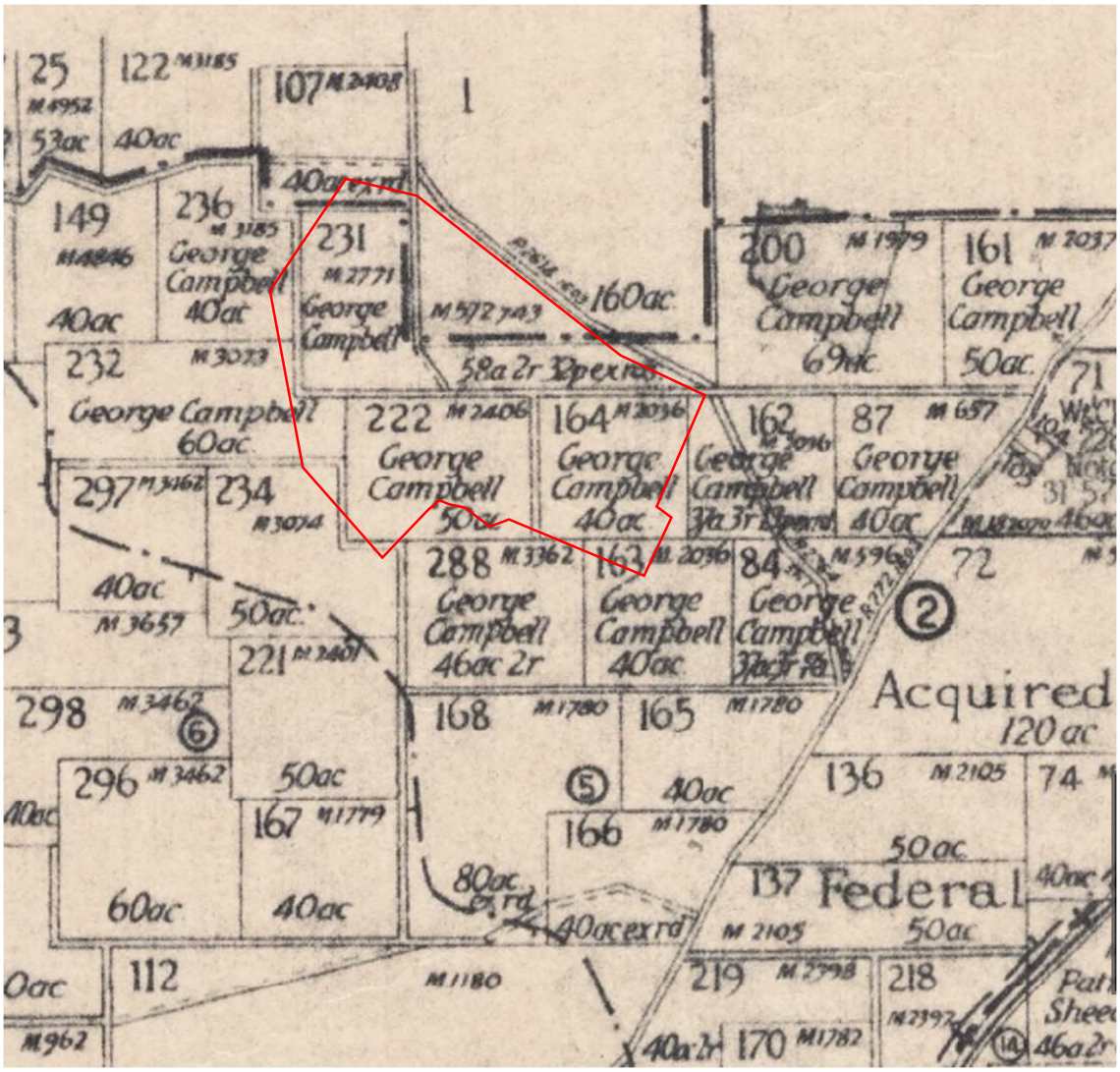

Figure 14. Current study area relative to Parish of Tuggeranong, County of Murray Land District of Queanbeyan c1938 (image modified from ACTMapi Federal Territory Maps layer accessed 4th May 2020).

6.0 Predictive Model of Site Type Distributions for the Study Area

Archaeologist's draw on a number of resources to predict the range, distribution and types of sites expected in any given area. These include the ethno-historic accounts of past Aboriginal population sizes, seasonal movements and material culture, previous archaeological investigations that have been carried out in the local area and in the region generally, and an understanding of the range, distribution and types of sites that have been identified as well as the contexts in which they have occurred. The following discussion of predictions of site types and locations for the proposed Southern Memorial Park is based upon all this evidence.

6.1 Introduction to Predictive Modelling

Predictive modelling, in an archaeological context, is a fairly straight forward concept and has been utilised by archaeologists in Australia for a number of years as a tool for undertaking research into Aboriginal heritage sites. In summary, predictive modelling involves the collation of information generated from previous archaeological research in a given region, and using this information to establish patterns of Aboriginal site distributions within the landscape of that particular region. On the basis of perceived patterns of site distribution, Archaeologists can then make predictive statements regarding the potential for various Aboriginal site types to occur within certain landscape settings, and can make preliminary assessments regarding the potential archaeological sensitivity of landscape types within a given region.

6.2 Predictive Models; Strengths and Weaknesses

It should be acknowledged that most, if not all predictive models have a number of potential inherit weaknesses which may serve to limit their value. These include, but may not be limited to the following.

1) The accuracy of a predictive model is directly influenced by the quality and quantity of available site data and information for a given region. The more data available and the greater the quality of that data, the more likely it is that an accurate predictive model can be developed.
2) Predictive modelling works very well for certain types, most particularly isolated artefacts and artefact scatters, and to a lesser extent scarred trees. For other site types it is far more difficult to accurately establish distribution patterns and therefore make predictive modelling statements. Unfortunately, these site types are generally the rarer site types (in terms of frequency of occurrence) and are therefore generally the most significant sites.
3) Predictive modelling (unless it is very sophisticated and detailed) will generally not take into account micro-landscape features within a given area. These micro features may include (but is certainly not limited to) slight elevations in the landscape (such as small terraces) or small soaks or drainage depressions that may have held water. These micro features have been previously demonstrated to occasionally be focal points for Aboriginal activity.

4) Predictive modelling to a large extent is often predicated on the presence of water courses. However, in some instances the alignment of these water courses has changed considerably over time. As a consequence the present alignment of a given water course may be substantially different to its alignment in the past. The consequence of this for predictive modelling (if these ancient water courses are not taken into account) is that predicted patterns of site distributions may be greatly skewed.

The findings of previous archaeological investigations undertaken in the Hume area and the broader ACT region (see Section 2 of this report for details) indicates that the area is rich in Aboriginal artefacts and was once a focal point for indigenous activities.

An examination of the topographic maps for the Canberra region shows that the valley system that the study area is located in provides a direct and easily traversable connection route from the Monaro into the broad valley system of Canberra. Moreover, this valley leads virtually directly through to Pialligo where the known base camp site is located. In addition, the valley system is also an easily traversable and relatively direct route between Pialligo and Lanyon, which was also thought to be a major focal point of Aboriginal activity. It is therefore possible, indeed likely, that this valley system was a preferred travelling route that was regularly utilised by Aboriginal people travelling between these locations.

Applying this broad pattern of site distribution to the study area, the following predictive statements can be made regarding the distribution of this site type in the study area

- Artefacts are likely to occur in moderate - high numbers within the study area;
- The majority of artefact scatters are associated with elevated soft sandy terraces;
- Within these assemblages there is a diverse range of artefact classes and both local and imported raw materials;
- sites are located within a local region of gentle hills and slopes perhaps used ephemerally by Aboriginal people to exploit nearby resources such as Dog Trap Creek and drainage lines.
- Scarred trees are possible amongst old growth trees in pockets of remaining woodlands across the site.

Full details and definitions of site types and predictive statements regarding their locations have been included in Appendix A.

7.0 Field Survey and Results

7.1 Survey Methodology

The survey methodology involved pedestrian field survey of the study area and recording of any identified Aboriginal cultural heritage sites. The field survey was undertaken by four individuals (the CHMA archaeologist and the three RAO representatives), spread 10m apart and walking linear transects across the entirety of the study area.

The CHMA archaeologist kept a written and photographic record of the general context and ground surface visibility of the surveyed area to provide an assessment of effective survey coverage. The location and details of any cultural materials observed during the field survey were recorded in detail and photographed.

7.2 Survey Results

A total of 9 new Aboriginal sites and one European site was identified during the current investigations. The locations of these sites are mapped in Figures 15 to 17. Summary findings are provided in Table 3. The sites comprise 2 scarred trees, two areas of PAD, three low density scatters and two scatters with associated PADs.

7.2.1 Previously Recorded Sites

HA16 *55H E694457 N6080590*

This site was first recorded in 2000 by Barber, as a scatter of three artefacts located on the gently lower slopes of a hill and with the potential for shallow subsurface deposits. In 2013, BIOSIS were unable to relocate the site and did not flag it as an area of PAD.

During the current survey, CHMA were again unable to relocate these artefacts. In the past 12 months a large deposit of soil was deposited immediately adjacent to the site. Associated with the soil overburden are sediment traps, so the area has been subject to a level of disturbance since the BIOSIS 2013 survey. This site no longer appears to be present and may well have been incorporated into the soil heap earlier this year.

HA17 *55H E694427 N6081091*

This site was first recorded by Barber in 2000, as an isolated find protruding from the deposits of a hollow under a fence line with the potential for a larger scatter. BIOSIS were unable to relocate this finding in 2013 and did not flag the area of PAD.

During the current survey, CHMA were again unable to relocate this artefact and no clear area of PAD was apparent. It is possible this artefact remains in place obscured from view by dense ground cover. The site is outside the current impact area.

Table 3. Summary Results and Findings from Current Survey

Site Name	Location	Brief Description	Current status
HA16	E694457 N6080590	Scatter of three artefacts	No longer in place – likely incorporated in recent disturbance
HA17	E694427 N6081091	Isolated find	No longer visible – dense ground cover at this location.
HA18 and PAD3	E693814 N6080963	Isolated find	Unable to be relocated New findings made and PAD boundary extended to E693570 N6081061 to E693537 N6080986 to E693771 N6080961
HA19 and PAD4	E693670 N6081256 E693647 N6081212	Isolated find	Artefacts unable to be relocated PAD boundary extended to E693629 N6081189 to E693728 N6081273 to E693653 N6081278
SM1/D-1	E694198 N6080637 to E694170 N6080627	Low density scatter	Artefacts unable to be relocated during the current survey
SM2 and PAD1	E693870 N6080637	Low density scatter and PAD	New PAD Boundary: E693917 N6080682 to E693800 N6080578
SM3 and PAD1	E693927 N6080675 to E693785 N6080692	Moderate density scatter with PAD	Newly defined PAD boundary and additional artefact location identified. New artefact location: E693735 N6080699 New PAD Boundary: E693863 N6080688 to E693623 N6080708
SM4 and PAD2	E693706 N6080881	Isolated Find, PAD	Originally recorded as an isolated Find. Current investigation identified RC Scarred Tree #1 and expanded original boundary of PAD/ Tree location: E693736 N6080843 New PAD Boundary: E693646 N6080855 to E693757 N6080903 to E693878 N6080859 to E693763 N6080821
SM5	E693910 N6081344	Low density scatter	Could not be relocated
RC#1	E693751 N6080624	Low density scatter	Scatter of 2 flakes eroding from drainage line in area of exposure measuring 2m x 2m
RC#2	E693504 N6081174	Low density scatter	Scatter of 2 flakes visible in area of exposure measuring 2m x 2m above drainage line in a mid-slope context (approx. 5 degree slope)

Site Name	Location	Brief Description	Current status
RC#3 and PAD	E693551 N6081369 and E693639 N6081368	Low density scatter and PAD	Scatter of >10 artefacts visible in existing vehicle track and associated with a broad low lying locally flat spur crest above an ephemeral drainage line. PAD boundary as follows: E693541 N6081358 to E693612 N6081380 to E693706 N6081359 to E693613 N6081339
RC#4 and PAD	E693574 N6081446	Isolated Find with PAD	Isolated find associated with a broad low lying locally flat spur crest above an ephemeral drainage line. PAD boundary as follows: E693579 N6081460 to E693662 N6081451 to E693740 N6081405 to E693646 N6081415
RC#5	E694288 N6081106	Low density scatter	Scatter of 2 artefacts located at base of recent formal planting. Area is highly disturbed and includes imported gravels. Site is unlikely to be in context.
RC Scarred Tree #1	E693736 N6080843	Scarred Tree	Culturally scarred tree
RC Scarred Tree #2	E694404 N6080982	Scarred Tree	Culturally scarred tree
RC PAD#1	E694418 N6080958 to E694434 N6080941 to E694422 N6080924 to E694405 N6080940	Potential Archaeological Deposit	Broad flat knoll elevated above valley floor. Area of potential comprises crest of the knoll and measures approximately 35m x 35m. Knoll occurs on 100m south of drainage line, tributary of Dog Trap Creek.
RC PAD#2	E694104 N6080991 to E694140 N6080959 to E694101 N6080922 to E694061 N6080954	Potential Archaeological Deposit	Broad flat knoll elevated above valley floor. Area of potential comprises crest of the knoll and measures approximately 70m x 70m. Knoll occurs on 120m north and east of a drainage line, tributary of Dog Trap Creek.

HA18 *55H E693814 N6080963*

This site was first recorded by Barber in 2000 as an isolated find located at the end of a minor spur line above an ephemeral creek. In 2013 BIOSIS failed to relocate the specific artefact recorded by Barber but they did confirm the landform as an area of PAD – PAD3, with the boundary defined as shown in Figure 15.

During the current investigations, eight artefacts were identified on the same landform. Artefacts were recorded at the following locations:

- E693577 N6080997 – 4 artefacts
- E693587 N6081015 – 2 flakes
- E693605 N6080987 – 2 flakes

Within the same landform is an identified kangaroo pit where previous culled animals were buried. The area of disturbance occurs within the following co-ordinates and measures approximately 4m in width:

- E693603 N6080990
- E693615 N6080979

Artefacts were found across this area of disturbance, suggesting the cull burial disturbed an existing cultural deposit. The location of the cull is marked with a green rectangle within PAD 3 extension in Figures 15 and 16. Table 3 details the metrics of a selection of artefacts recorded at the site. Images of the artefacts and PAD area are included in Plates 11 to 16.

These findings show the PAD extends further east than originally defined by BIOSIS. The new boundary of the PAD incorporates the entire spur line within the current study area. The spur has a broad flat crest elevated above two ephemeral drainage lines that feed into Dog Trap Creek to the east. The landform is well drained with sands visible across the surface. The newly defined boundary of PAD 3 incorporates the following co-ordinates:

- E693570 N6081061
- E693537 N6080986
- E693771 N6080961

Plates 11 and 12. Artefacts identified at HA18 and PAD3

Plate 13. Artefacts on top of cull site at HA18 and PAD3

Plate 14. View across PAD3 extension area

Plates 15 and 16. Views across HA18 and PAD3 extended boundary

This site was first recorded by Barber in 2000 as an isolated find located on the shoulder of a minor spur between an ephemeral creek and a wide drainage depression with larger subsurface deposits.

Table 4. Details of Sample of Artefacts Identified at HA18 and PAD

No	Type	Detailed Metrics
1	Broken Core	Broken silcrete core, measuring 66 x 27 x 20mm, 11 scars removed from 4 platforms, weathered, 10% cortex
2	Proximal Flake	Proximal portion quartz flake measuring 17 x 16 x 4mm, focal platform, no overhang removal
3	Distal Flake	Distal quartz flake, measuring 12 x 19 x 7mm, feather termination
4	Complete Flake	Quartz flake measuring 14 x 18 x 11mm, broad, single scar platform, overhang removal, 3 dorsal scars, feather termination.

No	Type	Detailed Metrics
5	LCS Flake	Longitudinally conal split acid volcanic flake, left lateral present, measuring 38 x 36 x 14mm, single scar broad platform, overhang removal present, feather termination, weathered

HA19 and PAD4 *55H E693670 N6081256 to E693647 N6081212*

In 2013, BIOSIS were unable to relocate Barber's original finding but discovered a new isolated find within the same landform. They defined the boundary of the site as the distance between the two recorded artefact locations and approximated a boundary for an associated PAD. This is illustrated in Figure 15.

During the current investigation, a thorough search was undertaken at both recorded artefact locations but neither was found. The boundary of the PAD was confirmed as that recorded by BIOSIS and bounded by the following co-ordinates:

- E693629 N6081189
- E693728 N6081273
- E693653 N6081278

Block D – PAD1 *55H E694136 N6080633 to E694349 N6080907*

This area of Potential Archaeological Deposit was identified by Grinbergs in 2008 and described as the 'crest of the gently sloping spur bisecting the block on a roughly north-south alignment considered to have low to moderate archaeological sensitivity based on its spatial relationship with artefact scatters SM1/D-1 and D-2' (described below).

BIOSIS failed to identify this area as a PAD during its subsequent survey of the area, and CHMA likewise does not consider the area a PAD. The location of the PAD is illustrated in Figure 17 which overlies a topographic map of the area. The 'spur' feature described by Grinbergs is not apparent at its mapped location, either on the topographic map or on the ground. The PAD as mapped traverses the side slopes of a gentle knoll to the south and low lying areas associated with creeklines across the area. There is no spur or crest within the area defined. BIOSIS and CHMA are both therefore of the opinion that the PAD area identified does not incorporate an area of potential. Errors in mapping seem likely.
One area of overlap between the current survey and Grinberg's survey is the area of PAD CHMA has here defined as RC PAD#1 and accords perfectly with the northern end of Grinberg's 'spur'. The two differ in size only because the PAD boundary has been defined by break of slope at different points within the downward continuum. Subsurface testing will be necessary to accurately pinpoint the subsurface distribution of any cultural material present.

Block D – PAD2 *55H E694600 N6080877 to E0694281 N6081138*

This area of potential was identified by Grinbergs in 2008 and described as 'level to very gently sloping sandy silty deposits considered to have low to moderate archaeological sensitivity based on the recovery of subsurface deposits of cultural material from similar landforms on the northern side of Mugga Lane'.

BIOSIS failed to identify this area as a PAD during its subsequent survey of the area, and CHMA likewise does not consider the area a PAD. The topographic maps shown in Figure 17 show portions of the PAD identified by Grinbergs occupying lower lying ground either side of an elevated knoll above the creekline. It is CHMA's opinion, based on existing predictive models for the area, that this knoll (identified as RC PAD#1 in Figure 17) holds a higher potential for subsurface finds than the area identified by Grinbergs in 2008. Predictive models for the area indicate that low lying flood plains retain water and comprise damp/waterlogged areas for occupation and frost hollows. Locally flat, elevated knolls above drainage lines may be consistently shown to have higher archaeological potential and appeal as occupation sites, by offering proximity to water as well as flat and dry areas for camping. BIOSIS and CHMA are both therefore of the opinion that the PAD area identified does not incorporate an area of potential.

SM1/D-1 *55H E694198 N6080637 to E694170 N6080627*

This site was first recorded by Grinbergs (2008) as a low density scatter of seven stone artefacts on an area of gently sloping, northerly facing ground, in a mid slope contexts on the northern flanks of a low hill. The site was associated with Block D- PAD1 as identified by Grinbergs. In 2013, BIOSIS were only able to relocate four stone artefacts visible in area of sheet erosion within the vicinity of an existing gate and pedestrian track. The site occurred on a track that continues to be used for livestock. BIOSIS did not identify an area of PAD in association with the scatter.

During the current investigation, the area of sheet erosion was inspected in detail but no artefacts were relocated. The site appears to have been washed away or moved by animals continuing to utilise the area.

SM2 and SM3 and PAD 1 *55H E693870 N6080637 to E693927 N6080675 to E693785 N6080692*

Site SM2 was first identified by BIOSIS in 2013 as a low-density scatter of two artefacts located south of a drainage line and in an area of good exposure. Site SM3 was identified at the same time, as a scatter of 23+ artefacts located within a dirt road on both sides of a drainage line over an area of approximately 200m. Both sites were associated with PAD1 which was defined as reaching 200m either side of the drainage line, despite the two sides of the drainage line representing two different landforms.

During the current investigations, additional artefacts were found on both landforms; both are low lying, gentle spurs elevated between ephemeral drainage lines. For the sake of clarity, CHMA have divided BIOSIS PAD1 into two areas of PAD associated with each of the two landforms; SM2 and PAD and SM3 and PAD. The two are defined below.

SM2 and PAD *55H E693917 N6080682 to E693800 N6080578*

SM2 and PAD incorporates a single artefact located along the existing track and the boundary of the landform bisected by the current track. During the current investigation, the artefact recorded by BIOSIS was not able to be relocated and is likely to have been moved by

the regular vehicle use of the track through the area. The area of PAD has been disturbed by the existing track. Both the site and the PAD have been subject to extensive prior disturbance.

SM3 and PAD *55H E693863 N6080688 to E693623 N6080708*

This PAD incorporates the majority of the scatter identified by BIOSIS 2013 with the eastern portion of the scatter no longer visible in regrowth over the site. The once used track along which this site was scattered is now disused and is being gradually grown over.
A scatter of more than 10 artefacts were located at E693735 N6080699 and running eastwards towards the BIOSIS mapped distribution of the site. Detailed metrics for several of these artefacts are included in Table 5 with images of the artefacts and surrounds shown in Plates 17 and 18and mapped in Figure 16.

The boundary of the PAD is defined above and comprises the low lying spur crest elevated above the two drainage lines, with well drained sandy soils. Artefacts appear to be consistently eroding out of this landform.

Table 5. Details of artefact identified at SM3 and PAD

No	Type	Detailed Metrics
1	Complete Flake	Complete quartz flake, measuring 32 x 25 x 15mm, single scar platform, overhang removal, 2 dorsal scars, 0 dorsal rotations, feather termination, 0% cortex.
2	Broken Flake	Proximal portion acidic volcanic flake, measuring 8 x 13 x 5mm, focal platform
3	Broken Flake	Proximal portion quartz flake measuring 12 x 15 x 9mm , broad single scar platform
4	Complete Flake	Complete quartz flake, measuring 15 x 9 x 4mm, single scar platform, overhang removal, 2 dorsal scars, 0 dorsal rotations, feather termination, 0% cortex.
5	Complete Flake	Complete quartz flake, measuring 13 x 12 x 6mm, single scar platform, overhang removal, 4 dorsal scars, 0 dorsal rotations, feather termination, 0% cortex.

Plate 17. Sample of artefacts at SM3 and PAD.

Plate 18. View along now disused track across SM3 and PAD

SM4 and PAD *55H E693699 N6080906 to E693661 N6080876 to E693703 N6080852 to E693748 N6080878*

This site was recorded by BIOSIS in 2013 as an isolated hammerstone in a mid-slope context with associated PAD2. During the current investigation, the hammerstone was not able to be relocated, however a scarred tree (RC Scarred Tree #1) was identified on the same landform at E693736 N6080843. The original boundary of BIOSIS' PAD2 included an area measuring 200m from the creek line.

The current investigation and discovery of RC Scarred Tree #1 shows a much longer length of the landform is likely to have been occupied, as a low lying broad, flat spur crest and is likely to extend as far back as the scarred tree or slightly more. The newly defined boundary of the PAD therefore falls within the following co-ordinates:

- E693646 N6080855
- E693757 N6080903
- E693878 N6080859
- E693763 N6080821

RC Scarred Tree #1 *55H E693736 N6080843*

This scarred tree occurs approximately 48m to the south south east of the last recorded location of isolated find SM4. The scar is visible on a mature gum box gum (see Plates 19 to 23) with a southerly aspect.

Scarred trees are one of the least understood Aboriginal site types with little information currently available on how to unambiguously to distinguish scars of Aboriginal origin from those of other causes (Long 2005). Much of this ambiguity arises from the fact that Aboriginal scars reflect a wide range of bark removal, wood removal and toe hold scar forms, and therefore come in a wide range of sizes and shapes. Additionally, Aboriginal cultural scars occur on a wide range of tree species and occur on a wide range of positions around the trunk and limbs of a tree (Long 2005).

Adding complexity to this is the fact that Europeans also created various scars during the historic period to cover a range of uses including removal of bark for roofing, creation of survey and blaze markers and bark strips.

The ability for natural and incidental scars to occur on trees in a way that mimics the expected attributes of Aboriginal scars, including their shape, size, position and age means that definitively identifying a scar as a cause of Aboriginal cultural activity is extremely difficult.

According to Long (2005:38), natural causes of scarring include the following:

- Trauma – including the general effects of fire, drought, crown loss and defoliation;
- Storm and Fire – including wounds directly caused by lightning strikes, burning and branch tears;

- Faunal damage – including wounds caused by insects, birds and livestock
- Impact and Abrasion Damage, including the effects of falling trees, branches and accidental collisions
- Ring-barking – and other deliberate or negligent human action.

It is therefore necessary to first eliminate the possibility of alternative/natural/incidental causes of scarring before a positive determination of cultural origin can be made. Long (2005:67) therefore states 'If you find a tree which you suspect may have an Aboriginal scar it is important to ask yourself the following questions and find satisfactory answers before recording it as a heritage site.' Each of these questions is included in Table 6 with answers relevant to RC Scarred Tree #1 (and #2) included. The location of these trees is mapped in Figures 16. Table 6 records those variables identified by Long (2005) as being a standardized recording process for scarred trees.

Plate 19. Cultural scar with Wally Bell

Plate 20.Cultural scar and tree

Plates 21 and 22. Views to and from RC Scarred Tree #1 and over identified crest of PAD

Table 6. Assessment of Potential for Identified Scar to Be Natural/Incidental

Potential sources of Damage	RC Scared Tree #1	RC Scarred Tree #2
What has happened in the local environment?	Surrounding area has been subject to low level historic clearing and grazing	Surrounding area has been subject to low level historic clearing and grazing
What impacts have occurred in the vicinity of the scar?	Tree will have been subject to crown loss and defoliation, branch tears and impacts by livestock	None can be clearly identified
How old is the tree on which the scar occurs, and how long has it been there?	Diameter of tree exceeds 1.62m. Appears to be of considerable age. Arborist needed to determine exact age of tree and scars.	Tree is of considerable age. Scar shows substantial regrowth. Arborist needed to determine exact age of both the tree and scars
What impacts have occurred to the tree? Is it possible to determine the order in which they have occurred?	Tree is in good health, no evidence of recent branch loss	Tree is in good health, no evidence of recent branch loss
Can you identify the form and size of the original scar on the tree?	Single scar is visible on surface of the felled tree. Scar exceeds 1.5m in length, with considerable regrowth, to the point where the scar has occluded.	Single scar is visible on southern side of tree. Existing scar measures 0.83m in length and up to 43cm in width. Approximately 9cm of regrowth present. The original scar is therefore likely to have been up to 1m in length and up to 50-60m in width.
Is the tree providing enough opportunity to determine the origin of the scar from a surface inspection only?	Location and size of scar exceeds what is reasonably expected by natural processes. Its length and uniform shape combined with extent of regrowth suggests this tree and the regrowth of the scar is of considerable age and is likely to be cultural in origin.	The location and size of the scar is consistent with having been produced by cultural activities. It's size exceeds its being the product of branch fall, it's length, uniformity of shape and position from the ground suggests the scar could not occur naturally. The regrowth of the scar and the size of the tree suggests both are of considerable age.

Table 7. Metrics Recorded for RC Scarred Trees #1 and #2

Variable	Scarred Tree #1	Scarred Tree #2
Tree Location	E693736 N6080843	E694404 N6080982
Tree Species	Box Gum	Box Gum
Tree Condition	Alive	Alive
Girth of the tree at 1.5m high	Approx 1.62m	Approx 3m
Scar Dimensions	118cm x 30cm (LxW)	83cm x 43cm (LxW)
Overgrowth	47mm	>87cm
Scar Orientation	One vertical	One vertical
Origin of Scar	Cultural	Cultural
Type of Scar	Elliptical	Elliptical
Scar Preservation	Considerable regrowth	Considerable overgrowth
Toe Holds	N/A	N/A
Tool Marks	N/A	N/A
Type of Tool Marks	N/A	N/A
Epicormic Stem Present	No	No
Images	See Plates 19 to 22	See Plates 40 and 41

SM5 *55H E693910 N6081344*

This site was recorded by BIOSIS as a scatter of 3 artefacts exposed along a pedestrian track along the eastern side of a small water dam. The site is no longer in context having been moved into its current location through the construction of the dam.

A protracted search was made along the dam wall for additional artefacts and to relocate those previously recorded, however none were found. It is likely the recent storms caused the movement of these items, most likely into the dam itself. No additional artefacts were identified. There is no potential for additional in situ finds.

7.2.2 Newly Identified Sites

RC#1 *55H E693751 N6080624*

This site comprises a low density scatter of 2 artefacts visible eroding out of a drainage line between SM2 and PAD and SM3 and PAD. The flakes are visible in an area of exposure measuring approximately 2m x 2m. This site occurs outside the current impact area, close to the existing track around the perimeter of the development area. Scatter has the potential for more artefacts to occur within spurs either side and to the east.

Plates 23 to 25 show the artefact and its surrounds, with detailed measurements of the stone artefacts provided in Table 8. The site location is mapped in Figure 16.

Plate 23. Artefacts comprising RC#1

Plate 24. View east from RC#1

Table 8. Details of artefact identified at RC#1

No	Type	Detailed Metrics
1	LCS Flake	Longitundinally conal split acid volcanic flake, right portion remaining, measuring 26 x 11 x 7mm, single scar platform, overhang removal, feather termination, 0% cortex.
2	Medial Flake	Medial portion of quartz flake measuring 25 x 12 x 6mm

Plate 25. View southeast from RC#1

RC#2 *55H E693504 N6081174*

This site comprises a scatter of 2 quartz flakes visible in an area of sheet erosion in a mid-slope context (approx. 5 degree slope) above an ephemeral drainage line. The artefacts are visible in an area of erosion measuring approximately 3m x 3m. The site is considered to have minimal potential for additional finds due to the degree of slope relative to flatter landforms available within the immediate vicinity.

Plates 26 and 27 show the artefact and its surrounds, with detailed measurements of the stone artefacts provided in Table 9. The site location is mapped in Figure 15.

Plates 26 and 27. Artefacts identified at RC#2

Table 9. Details of artefact identified at RC#2

No	Type	Detailed Metrics
1	Complete Flake	Complete quartz flake, measuring 29 x 26 x 15mm, single scar platform, overhang removal, feather termination, 3 dorsal scars, 0 dorsal rotations, 0% cortex.
2	Complete Flake	Complete quartz flake, measuring 19 x 13 x 9mm, single scar platform, overhang removal, feather termination, 4 dorsal scars, 0 dorsal rotations, 0% cortex.

Plates 28 and 29. Views south to drainage line and north east down slope from RC#2

RC#3 and PAD *55H E693551 N6081369 and E693639 N6081368*

This site comprises a scatter of more than 10 artefacts visible in the existing vehicle track and east. The current vehicle track cuts along the western edge of the PAD and study area. The track has been created through repeated use rather than any formal construction, so artefacts

appear to be eroding out of the deposits below. The PAD includes a knoll and low lying broad spur crest elevated above an ephemeral drainage line with sandy soils of some depth. Visibility outside the track is generally low, with a single artefact recovered in the grassed area to the east of the PAD. The boundary of the PAD is defined by the following co-ordinates:

- E693541 N6081358
- E693612 N6081380
- E693706 N6081359
- E693613 N6081339

Plates 30 to 33 show a sample of these artefacts and surrounds, with detailed measurements of sampled stone artefacts provided in Table 10. The site location is mapped in Figure 15.

Table 10. Details of artefact identified at RC#3

No	Type	Detailed Metrics
1	Complete Flake	Complete quartz flake, measuring 17 x 11 x 6mm, focal platform, overhang removal, step termination, 2 dorsal scars, 0 dorsal rotations, 0% cortex.
2	Complete Flake	Complete grey volcanic flake, measuring 22 x 8 x 3mm, focal platform, overhang removal, step termination, 2 dorsal scars, 0 dorsal rotations, 0% cortex, weathered
3	Complete Flake	Complete grey volcanic flake, measuring 26 x 24 x 4mm, broad single scar platform, overhang removal, feather termination, 4 dorsal scars, 0 dorsal rotations, 0% cortex, weathered
4	Complete Flake	Complete grey volcanic flake, measuring 14 x 9 x 3mm, focal platform, overhang removal, feather termination, 4 dorsal scars, 0 dorsal rotations, 30% cortex
5	Complete Core	Volcanic core, measuring 37 x 35 x 18mm, 15 scars removed from 3 platforms, 30% cortex
6	Complete Flake	Basalt flake manufactured on hammerstone measuring 36 x 35 x 10mm 25% cortex, broad cortical platform, 4 dorsal scars, 1 rotation, feather termination

Plate 30. Sample artefacts recorded at RC#3

Plate 31. View east along spur crest at RC#3 and PAD

Plate 32. Northeast down PAD from RC#3.

Plate 33. View of RC#3 and PAD from RC#4 and PAD

RC#4 and PAD *55H E693574 N6081446*

Site RC#4 comprises a single quartz flake located in close proximity to the scatter of artefacts identified within RC#3 and PAD, but on the opposite side of the drainage line and on an identical landform. The PAD includes a knoll and low lying broad spur crest elevated above an ephemeral drainage line with sandy soils of some depth. Artefact was visible in a large area of sheet erosion where it meets the current track, no other artefacts were visible but the erosion scald has been subject to repeated tranferral events.

The boundary of the PAD is defined by the following co-ordinates:

- E693579 N6081460
- E693662 N6081451
- E693740 N6081405
- E693646 N6081415

Plates 34 to 36 show the artefact and surrounds, with detailed measurements of the artefact provided in Table 11. The site location is mapped in Figure 15.

Table 11. Details of artefact identified at RC#4

No	Type	Detailed Metrics
1	Complete Flake	Complete quartz flake, measuring 15 x 13 x 3mm, single scar platform, overhang removal, step termination, 2 dorsal scars, 0 dorsal rotations, 0% cortex.

Plate 34. Artefact located at RC#4

Plate 35. Erosion scald within with RC#4 was identified

Plate 36. View east along spur crest at RC#4 and PAD

RC#5 *55H E694288 N6081106*

This site comprises a scatter of two artefacts located at the base of a recent formal planting in a locally flat area of the valley floor. The artefacts occur in a highly disturbed context including imported gravels. It is therefore possible the site has been moved to its current location in imported materials. There is no potential for in situ subsurface soils at the site.

Plates 37 to 39 show the artefacts and surrounds, with detailed measurements the stone artefacts provided in Table 12. The site location is mapped in Figure 17.

Table 12. Details of artefact identified at RC#5

No	Type	Detailed Metrics
1	Complete Flake	Complete grey quartzite flake, measuring 20 x 18 x 7mm, focal platform, overhang removal, feather termination, 1 dorsal scar, 0 dorsal rotations, 40% cortex, edge damage.
2	Flaked Piece	Fine grained siliceous flaked piece measuring 15 x 14 x 9mm, 40% cortex

Plates 37 and 38. Views north and south respectively with RC#5 in foreground

Plate 39. Artefacts comprising RC#5

RC Scarred Tree #2 *55H E694404 N6080982*

This scarred tree occurs 20m to the north of RC PAD#1 and approximately 80m south of the creek line. The scar is visible on the southern side of the tree trunk (facing RC PAD#1) in living box gum of considerable size. Full details of the tree are included in Tables 6 and 7.

Plate 40. Scar on RC Scarred Tree #2 with Wally Bell

Plate 41. Entire tree RC Scarred Tree #2

RC PAD#1 *55H E694418 N6080958 to E694434 N6080941 to E694422 N6080924 to E694405 N6080940*

This area of potential incorporates a broad flat knoll elevated above valley floor. Area of potential comprises crest of the knoll and measures approximately 35m x 35m. Knoll occurs on 100m south of drainage line, tributary of Dog Trap Creek. RC Scarred Tree #2 occurs 20m to the northeast of this area of potential.

Plates 42 and 43 below show views across the PAD. The mapped location of this PAD is illustrated in Figure 17.

Plates 42. and 43. Views northeast from PAD to Scarred Tree #2 and southeast across the PAD respectively.

RC PAD#2 *55H E694104 N6080991 to E694140 N6080959 to E694101 N6080922 to E694061 N6080954*

Broad flat knoll elevated above valley floor. Area of potential comprises crest of the knoll and measures approximately 70m x 70m. Knoll occurs on 120m north and east of a drainage

line, tributary of Dog Trap Creek. This area of PAD was of particular interest to Wally Bell who requested that it be subsurface tested.

Plates 44 and 45 below show views across the PAD. The mapped location of this PAD is illustrated in Figure 16.

Plates 44 and 45. Views east and west respectively across RC PAD#2

7.2.3 European Sites

European Timber *55H E694016 N6081315*

This patch of timber off cuts and associated disturbance is the only evidence of European occupation of the area apart from modern fencelines and horse paddock infrastructure. The materials cover an area measuring 3m x 2m and appears modern. BIOSIS did not report its presence in 2013, supporting the assertion that the site is recent and post dates 2013.

Plates 46 and 47. Timber dump and associated disturbance – modern timber

7.3 Remainder of the Study Area

The study area is identified as being highly sensitive with areas of PAD occurring throughout due to the landforms present, presence of drainage lines and proximity to Dog Trap Creek

and other high density and highly significant sites identified at the Hume Resource Recovery Centre and environs.

It is therefore likely that the entirety of this study area has been traversed by Aboriginal groups in the past and that isolated finds occur throughout the landscape.

The current assessment has identified extant visible sites and areas of highest potential for concentrations of occupation within the study area, the remainder of the study area outside these PADs is assessed as having lesser potential for Aboriginal sites and for high density sites with predictable distribution.

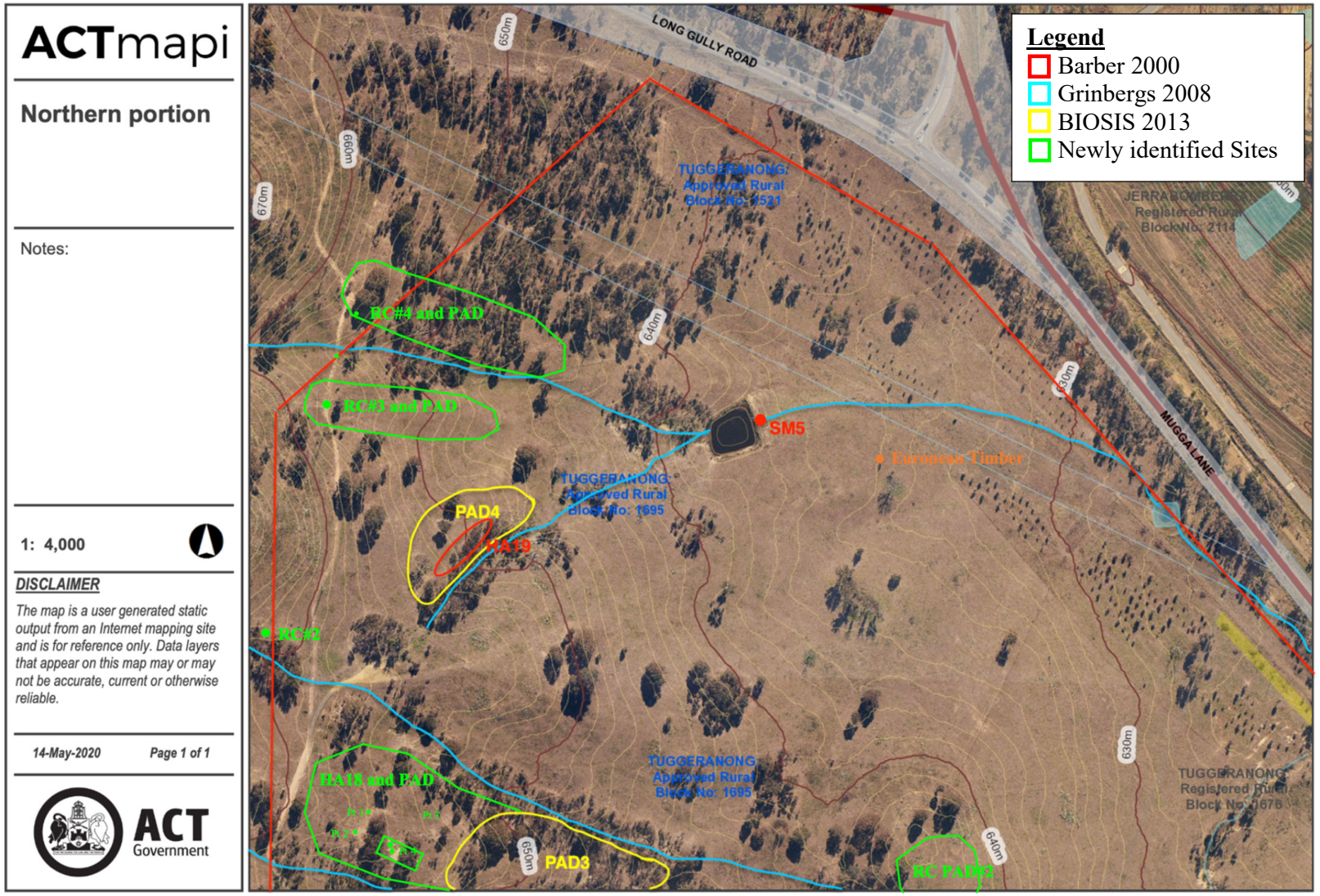

Figure 15. Newly recorded Sites and Extensions to Existing Sites in the Northern Portion of the Study Area

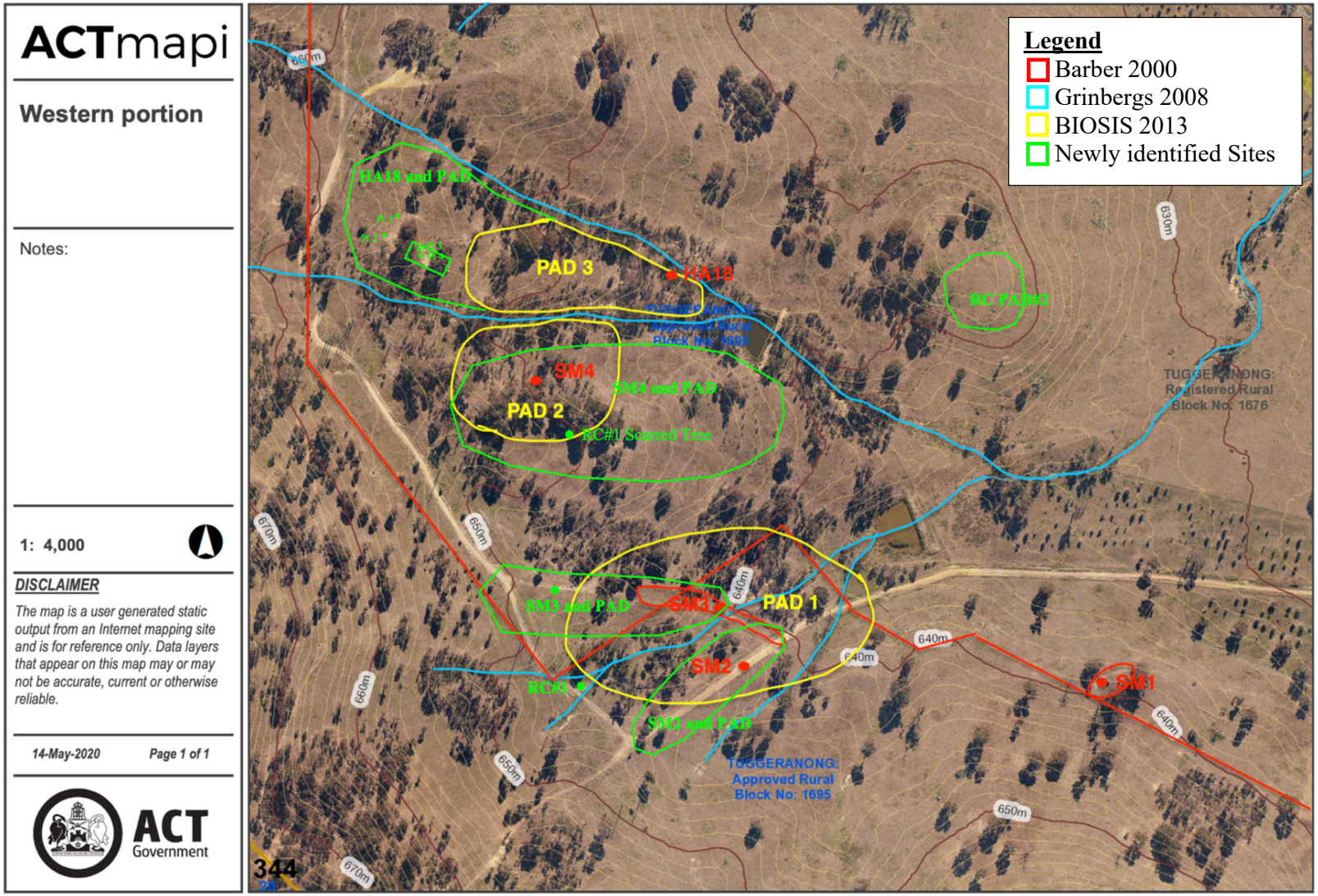

Figure 16. Newly recorded Sites and Extensions to Existing Sites in the Central/Western Portion of the Study Area

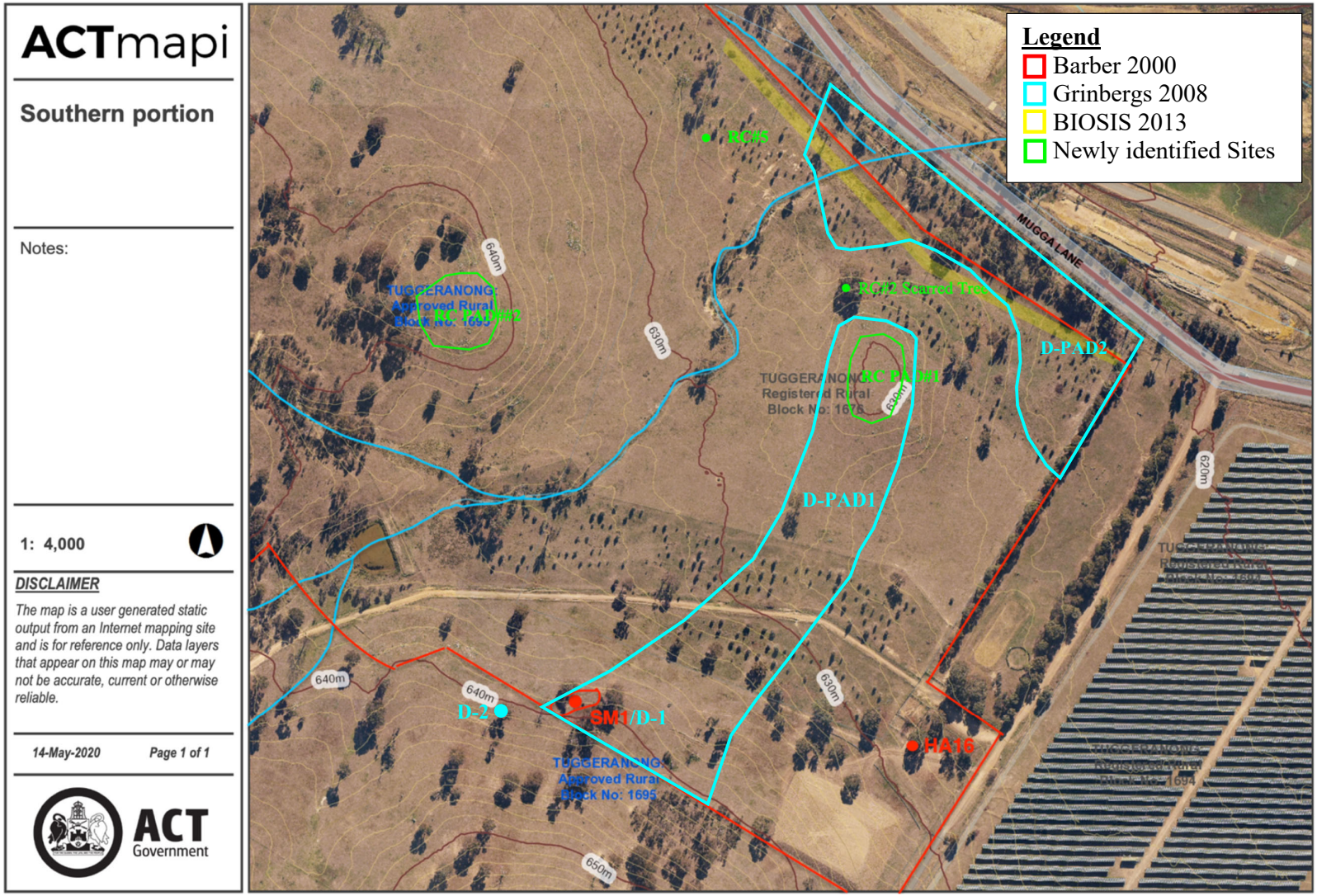

Figure 17. Newly recorded sites within Southern Portion of the Study Area.

8.0 Legislation

Heritage in the ACT is protected, or affected, by several Acts, which are summarised in the following section. Whilst every effort has been made to ensure that the information contained here is up to date and legally correct, it cannot be construed as being able to replace comprehensive legal advice provided by a legal practitioner admitted to practice in the relevant jurisdictions.

8.1 Australian Capital Territory Legislation

8.1.1 Heritage Act 2004

- The *Heritage Act 2004* provides protection to both Aboriginal and non-Aboriginal heritage items within the Australian Capital Territory. The Act aims to identify, register and conserve natural and cultural heritage 'objects or places' (collectively referred to as "sites" in this document). The Act also provides instrumentation for the facilitation of the ACT Heritage Council, for the development of heritage agreements to aid in the conservation of heritage items and for the enforcement of provisions within the Act that provide protection for such items.
- Under the Act the ACT Heritage Council has been established as an independent statutory authority.
- The Heritage Unit of the Environment, Planning and Sustainable Development Directorate provides secretariat support to the ACT Heritage Council, and is responsible for administration of the Act.
- Amendments to the Act were made in September 2014.

Heritage 'places', as defined by the Act include sites, precincts, parcels of land or components of the places, possessing significance, or contributing to the significance, of the place (§8{1}). An 'object' is defined as a 'natural or manufactured object, including an Aboriginal object' (§8{2}). Aboriginal objects (§9) are defined as being any object associated with Aboriginal people because of Aboriginal tradition. Aboriginal places are likewise any place associated with Aboriginal people because of Aboriginal tradition. In both cases, the term tradition refers to the customs, rituals, institutions, beliefs and/or general way of life of Aboriginal people. The heritage significance of an object or place is assessed against eight criteria. Only one of the eight assessment criteria listed in the Act need be satisfied for the item to be considered significant.

The Heritage Council must keep a register of heritage places and objects, a person can apply for a place or object to be listed on the heritage register. The process for registration includes the nomination for provisional registration of the place or object, public notification of this nomination that is then followed by a minimum appeal period of 5 months. If, following the appeal period, no successful appeals are lodged, registration of the item is concluded, also through public notification. Cancellation of a registered place or object may be considered if the Council is satisfied that an item no longer possesses heritage significance.

The registration of Aboriginal places or objects, in addition to the above registration process, must be undertaken in consultation with the Representative Aboriginal Organisations. The details of places or objects of Aboriginal significance are restricted from public access and only published or copied after it has been demonstrated that the release of specific site details will not adversely affect the significance of the place or object and with approval from the Council. Discovery of an Aboriginal place or object must be reported to the Council within five (5) working days of the identification.

The Heritage Council issues heritage directions to the owner or occupier of a place or object to assist in the conservation of the heritage significance of the item. Directions issued by the Heritage Council are served to prevent damage, through neglect or action, which may adversely affect the heritage significance of an object or place.

Heritage agreements, contrary to 'directions', are applied following and with the Council's advice and consultation with the owner, or person nominated by the owner. Heritage directions are put in place to assist in the conservation of registered places and objects. Heritage agreements are employed to provide financial, technical or professional advice, to review the valuation of heritage significance, to restrict use of a registered place or object, to apply standards and work requirements or to enable public appreciation and inspection of an object or place.

In accordance with the Act, it is an offence to diminish the significance of a place or object through either neglect or action. Damage to an Aboriginal place or object is also considered an offence under the Act. Exemptions to such offences include official persons acting under the Emergencies Act 2004 (ACT) 'for the purpose of protecting life or property, or controlling, extinguishing or preventing the spread of a fire' (§7(1)).

Excavation Permits

Permits to undertake Excavations (§61(E and F)) at or near any Aboriginal place or object need to be provided formally to the ACT Heritage Council for approval. Written notice of a decision about a permit is to be provided within 15 working days after the decision has been made. Permits are required to include the following information:

a) Applicant's details;
b) a description of the heritage site and its location;
c) details about the proposed excavation work including the reason for the excavation, the extent and duration of the excavation and any other work of which the excavation forms part;
d) details regarding the measures the applicant will adopt during the excavation to reduce the risk of diminishing the heritage significance of, or damage to, the site.

Statement of Heritage Effect (SHE)

Where activities are proposed that are likely to diminish the heritage significance of a place or object, requires an application to the council for approval of a *Statement of Heritage Effects* (SHE) (§61(G and H)). The SHE requires the inclusion of details regarding the

proposed activity, including the reason for the activity, as well as its extent and duration. The likely effects of the proposed activity on the heritage sites must also be included, with a discussion on any effects that may diminish or damage the heritage significance of the site. It must also include a discussion of the measures the applicant will adopt during the activity to reduce the risk of diminishing heritage significance or damage to the site and whether other reasonably practicable ways of carrying out the activity at the heritage site are available.

Under (§61(H)) Council is required to make a decision on the Statement of Heritage Effect as soon as is practicable with notice of the decision provided to the applicant within 15 working days.

Conservation Management Plan (CMP)
Under (§61(J)) of the amended Act, a person or entity responsible for a heritage site is required to establish an approved Conservation Management Plan for that site. The plan

a) sets out the conservation measures that must be adopted for, and conditions on future use of the heritage site to preserve its heritage significance; and
b) identifies any threat, or potential threat, to the heritage significance of the site, and sets out a plan for the management of threats

CMPs must also include a description of the site, its history, details of its heritage significance and any other matter prescribed by regulation.

Under (§61(K)) Council is required to make a decision on a Conservation Management Plan as soon as is practicable with notice of the decision provided to the applicant within 15 working days.

8.1.2 Tree Protection Act 2005

It should also be noted that in the ACT, some trees on land in built-up urban areas are protected under the provisions of the *Tree Protection Act 2005* because of their natural and cultural heritage values or their contribution to the urban landscape. The Act defines Aboriginal heritage trees as a tree of particular significance to Aboriginal people because of either or both of the following: (a) Aboriginal tradition; (b) the history, including contemporary history, of any Aboriginal people of the area where the tree is located. Management strategies for any Aboriginal heritage trees would need to be developed in consultation with the provisions of this Act.

8.1.3 Coroners Act 1997

Human remains are firstly dealt with under the Coroners Act. Any human remains located must in the first instance be reported to the Police. If the remains are determined to be prehistoric and of Aboriginal origin, then appropriate management strategies can be formulated in consultation with the Coroners' office.

8.2 Federal Legislation

There are several Federal Legislative Acts that pertain to Aboriginal cultural heritage, and that are relevant to this project. The main Acts are:

- *The Australian Heritage Council Act 2003*,
- *The Aboriginal and Torres Strait Islander Heritage Protection Act 1987,* and
- The *Environment Protection and Biodiversity Conservation Act 1999.*

9.0 Significance Assessment

9.1 Overview

The *Heritage Act 2004* provides the mechanism for assigning heritage significance to a site, under Section 10 of the Act. This acknowledges the value of the site to the community and helps provide protection under the Act. However, in terms of site conservation and management, it is necessary to also assign a relative significance rating to sites. The term 'significance' is sometimes used interchangeably to describe a site's 'conservation value'. This rating helps cultural resource managers to make decisions when considering how a site should be managed, given that to some extent resources for actively conserving sites will be limited. It is also a useful tool for giving an overall view of the body of sites in the ACT when developments occur and pragmatic decisions about site management must be made.

In the discussion below, the ACT Significance Criteria is briefly reviewed. Ways of deciding on relative significance ratings for sites are then discussed. These are the criteria used to assess the relative significance of sites in the Aboriginal Heritage Guidelines.

9.2 ACT Significance Criteria

Section 10 of the *Heritage Act 2004* states that a place or object has heritage significance if it satisfies one or more of the following criteria:

(a) importance to the course or pattern of the ACT's cultural or natural history;
(b) has uncommon, rare or endangered aspects of the ACT's cultural or natural history;
(c) potential to yield important information that will contribute to an understanding of the ACT's cultural or natural history;
(d) importance in demonstrating the principal characteristics of a class of cultural or natural places or objects;
(e) importance in exhibiting particular aesthetic characteristics valued by the ACT community or a cultural group in the ACT;
(f) importance in demonstrating a high degree of creative or technical achievement for a particular period;
(g) has a strong or special association with the ACT community, or a cultural group in the ACT for social, cultural or spiritual reasons;
(h) has a special association with the life or work of a person, or people, important to the history of the ACT.

9.3 Rating Site Significance

There are several different ways of defining types of significance, and many practitioners have developed their own system of significance assessment. However, as Pearson and Sullivan (1995) point out, there seems to be a general advantage in using a set of criteria which is already widely accepted. The Burra Charter provides a process for significance assessment for heritage practitioners. More recently, Australian ICOMOS has produced *The*

Illustrated Burra Charter, which further defines significance assessment. The guidelines to the Burra Charter comment:

Although there are a variety of adjectives used in definitions of cultural significance in Australia, the adjectives 'aesthetic', 'historic', 'scientific' and 'social' ... can encompass all other values.

The following provides the descriptions given for each of these terms.

Aesthetic Value

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria may include consideration of the form, scale, colour, texture and materials of the fabric; the smells and sounds associated with the place and its use (Marquis-Kyle & Walker 1992).

Historic Value

A place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase or activity. It may also have historic value as the site of an important event. For any given place, the significance will be greater where evidence of the association or event survives in situ, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment (Marquis-Kyle & Walker 1992).

Scientific Value

The scientific or research value of a place will depend upon the importance of the data involved or its rarity, quality or representativeness and on the degree to which the place may contribute further substantial information.

A site or a resource is said to be scientifically significant when its further study may be expected to help current research questions. That is, scientific significance is defined as research potential (Marquis-Kyle & Walker 1992).

Social Value

The social value of a place is perhaps the most difficult value for heritage professionals to substantiate (Johnston 1994). However, social value is broadly defined as 'the qualities for which a place has become a focus of spiritual, political, natural or other cultural sentimental to a majority or minority group' (ICOMOS 1988:30). In What is Social Value, Johnston (1994) has provided a clear definition of social value:

> *"Social value is about collective attachment to places that embody meaning important to a community, these places are usually community owned or publicly accessible or in some other way 'appropriated' into people's daily lives. Such meanings are in addition to other values, such as the evidence of valued aspects of history or beauty*

> *and these meanings may not be apparent in the fabric of the place, and may not be apparent to the disinterested observer". (Johnston 1994:10)*

Although encompassed within the criterion of social value, the spiritual value of a place is a new addition to the Burra Charter (ICOMOS 1999:1). Spiritual value is predominantly used to assess places of cultural significance to Indigenous Australians.

The degree to which a place is significant can vary. As Johnston (1994:3) has stated when trying to understand significance a 'variety of concepts [are] used from a geographical comparison ('national', 'state', 'local') to terms such as 'early', 'rare', or 'seminal''. Indeed, the Burra Charter clearly states that when assessing historic significance, one should note that for:

> *"any given place the significance will be greater where evidence of the association or event survives in situ, or where the setting are substantially intact, than where it has been changed or evidence does not survive"*. (ICOMOS 1988:29)

9.4 Significance Criteria Relevant to Aboriginal Sites

Aboriginal sites and places may have educational, tourism and other values to groups in society. However, their two principal values are likely to be in terms of their cultural / social significance to Aboriginal people and their scientific / archaeological significance. These are the two criteria, which are commonly used in establishing the significance of Aboriginal sites. The following provides an explanation of these criteria.

1) Aboriginal Cultural / Social Significance

This relates to the value placed upon a site or suite of sites by the local or regional Aboriginal community. The identification and assessment of those sites that are significant to Aboriginal people is a matter for Aboriginal people. The appropriate Aboriginal representatives of the relevant communities can only make this assessment.

2) Scientific (Archaeological) Significance

Archaeological significance values (or scientific values) generally are assessed on the potential of a site or place to generate knowledge through archaeological research or knowledge. Scientific significance should be assessed according to timely and specific research questions (research potential) and representativeness.

Research potential entails the potential of a site or suite of sites for scientific research and excavation. This is measured in terms of a sites' ability to provide information on aspects of Aboriginal culture. In this respect, the contents of a site and their state of preservation are important considerations.

Representativeness takes account of how common a site type is. That is, it allows sites to be evaluated with reference to the known archaeological record within the given region. The primary goal of cultural resource management is to afford greatest protection to a representative sample of sites throughout a region. The corollary of a representative site is

the notion of a rare or unique site. These sites may help to understand the patterning of more common sites in the surrounding area, and are therefore often considered of archaeological significance. The concept of a rarity cannot be easily separated from that of representativeness. If a site is determined to be rare, then it will be included as part of the representative sample of that site type.

The notions of both research potential and representativeness are ever changing variables. As research interests shift and archaeological methods and techniques change, then the criteria for assessing site significance are also re-evaluated. Consequently, the sample of site types that are used to assess site significance must be large enough to account for the change in these variables.

9.5 Significance Rating for Heritage Sites Investigated During the Present Study

The sites recorded as part of the present project have been assessed against the criteria outlined in Section 8 of the Heritage Act 2004, and have been accorded a significance rating. Table 13 provides the significance ratings and conservation values for the heritage sites, together with the rationale for these assessments.

Criterion G is forwarded on behalf of the RAOs who's written commentary on previous sites has highlighted that they do not agree with the ACT Heritage 2018 Guidelines which require cultural values to be defined by European significance criteria of 'levels' of significance. The RAOs assert that Aboriginal sites, regardless of context or content, meet threshold values of significance, stating

> 'The suggestion that one site may be more or less significant than another does not correlate with cultural values of our past, which places the same value on all surviving elements of our culture as it is slowly destroyed by modern Australian industrial expansion. To suggest that one site is more valuable than another is incongruent with the values we place on all remnants of our traditional cultural practice.' Wally Bell Buru Ngunnawal Aboriginal Corporation 19th May 2020

Paul House (Mirrabee) see's the requirement to determine 'levels of significance' to be offensive, stating the following:

> 'The non-First Nation and government classification of sites and cultural heritage values is offensive and inappropriate as it seeks to undermine and de-value First Nation identity and continued connection to sovereign lands and waters. Archaeology itself is non-First Nation construct that attempts to direct and in-directly (control) sideline First Nation peoples in the name of development and capitalism etc. The ACT's current approach is clearly a breach of their own ACT Human Rights Act 2004. Under Section 27 'cultural and other rights of aboriginal and Torres Strait Islander peoples and other minorities'.
>
> 1. Anyone who belongs to an ethnic religious or linguistic minority must not be denied the right with other members of the minority to enjoy his or her culture

to declare and practise his or her religion or to use his or her language. **(nil consultation by ACT Government)**

2. Aboriginal and Torres Strait Islander peoples hold distinct cultural rights and must not be denied the right
    a. to maintain control protect and develop their –
        i. cultural heritage and distinctive spiritual practises observances beliefs and teachings and
        ii. language and knowledge
        iii. kinship ties and
        iv. to have their material in economic relationships with the land and waters and other resources with which they have a connection under traditional laws and customs recognised and valued.'

Copies of both these comments with reference to previous sites are included in Appendix D.

Table 13. Summary significance assessment for heritage sites identified within the current study area

Site Name	Significance Assessment and Rating	Heritage Significance met Under this Criterion?	Conservation Value
HA16, HA17, SM1, SM5, RC#1, RC#2, RC#5	**a) importance to the course or pattern of the ACT's cultural or natural history;** Collectively, all Aboriginal sites contribute to an understanding of the ACT's cultural history. However, these sites in isolation are not of importance to the course or pattern of the ACT's cultural history.	Not Met	Low – based on the commonality of the site type, artefact and raw material types, and presence within disturbed contexts
	b) has uncommon, rare or endangered aspects of the ACT's cultural or natural history; These site types, assemblage content sand raw materials utilized are all extremely common and well represented in the archaeological record of the area.	Not Met	
	c) potential to yield information that will contribute to an understanding of the ACT's cultural or natural history; The site is one of many of its kind throughout the area. It will not add to/alter what is currently understood of the area.	Not Met	
	d) importance in demonstrating the principal characteristics of a class of cultural or natural places or objects; N/A	Not Met	
	e) importance in exhibiting particular aesthetic characteristics valued by the ACT community or a cultural group in the ACT; N/A	Not Met	
	f) importance in demonstrating a high degree of creative or technical achievement for a particular period; N/A	Not Met	
	g) has a strong or special association with the ACT community, or a cultural group in the ACT for social, cultural or spiritual reasons; The RAOs have stated these sites, along with all Aboriginal sites, meet threshold values of cultural significance in accordance with Aboriginal cultural values.	Site has Heritage Significance under this Criterion	
	h) has a special association with the life or work of a person, or people, important to the history of the ACT. N/A	Not Met	

Site Name	Significance Assessment and Rating	Heritage Significance met Under this Criterion?	Conservation Value
RC Scarred Tree #1, RC Scarred Tree #2	**a) importance to the course or pattern of the ACT's cultural or natural history;** Collectively, all Aboriginal sites contribute to an understanding of the ACT's cultural history. Scarred trees served as markers for a wide range of Aboriginal behaviours ranging from markers of important site locations, provision of directions and for the production of implements such as shields and vessels.	Met	High – based on rarity of site type
	b) has uncommon, rare or endangered aspects of the ACT's cultural or natural history; This site type is a rapidly declining resource (as trees die and urban development spreads)	Met	
	c) potential to yield information that will contribute to an understanding of the ACT's cultural or natural history; The site is one of many of its kind throughout the area. It will not add to/alter what is currently understood of the area.	Not Met	
	d) importance in demonstrating the principal characteristics of a class of cultural or natural places or objects; N/A	Not Met	
	e) importance in exhibiting particular aesthetic characteristics valued by the ACT community or a cultural group in the ACT; N/A	Not Met	
	f) importance in demonstrating a high degree of creative or technical achievement for a particular period; N/A	Not Met	
	g) has a strong or special association with the ACT community, or a cultural group in the ACT for social, cultural or spiritual reasons; The RAOs have stated these sites, along with all Aboriginal sites, meet threshold values of cultural significance in accordance with Aboriginal cultural values (see Appendix D).	Met	
	h) has a special association with the life or work of a person, or people, important to the history of the ACT. N/A	Not Met	
HA18 and PAD,	As yet unable to be assessed. These sites should be subject to assessment following subsurface investigation and a more thorough assessment of site contents, distribution and spatial and temporal spread	As yet unknown	

Site Name	Significance Assessment and Rating	Heritage Significance met Under this Criterion?	Conservation Value
HA19 and PAD, SM2 and PAD, SM3 and PAD, SM4 and PAD, RC#3 and PAD, RC#4 and PAD, RC PAD #1, RC PAD #2			

10.0 Impact Assessment and Statement of Heritage Effect

10.1 Impact Assessment

The nominated location of the Southern Memorial Park has been subject to multiple previous heritage assessments resulting in the identification of a large number of Aboriginal sites and areas of Potential Archaeological Deposit within the bounds of the proposed project area. Areas immediately adjacent, such as the Hume Resource Recovery Centre have also been shown to contain rich cultural deposits, leading to the assessment that the current project area has considerable archaeological potential in localised areas and landforms.

With this information in mind, the proponent has made every effort to avoid impacts to all known sites and areas of potential sensitivity. Figure 3 shows the Stage 1 proposed impacts, relative to identified heritage sites. Summary details for impacts and proximity of these impacts to individual sites are outlined in Table 14.

Only two sites are at risk of direct impacts by the Stage 1 proposal: Grinbergs PAD sites D-PAD1 and D-PAD2. Neither of these sites were identified by either Barber, BIOSIS or CHMA as areas of potential, with several of the features used to define D-PAD1 difficult to discern topographically. A single area of overlap exists between CHMA and Grinbergs within D-PAD1 at RC PAD#1. This portion of the PAD will not be impacted by the current proposal.

D-PAD2 likewise does not conform with existing knowledge of the area, targeting low lying flood plain rather than elevated, dry landforms. It is CHMA's assertion that the area of greatest potential around these to PADs is RC PAD#1 and its proximity to RC#2 Scarred Tree.

Given the nature of the proposed developments, it is CHMA's belief that Stage 1 of the Southern Memorial Park will not ***directly impact*** any identified heritage values within the project bounds. Two sites are at risk of ***indirect*** or ***inadvertent impacts*** during construction through vehicle and machinery movement and will require adequate management through the construction period.

10.2 Reasonable Alternatives

The proponent has made every effort to avoid all areas of heritage potential considered necessary from CHMA's recent investigations:

- Plantings near RC#2 Scarred Tree have been moved further to the north to ensure at least an 8m distance from the tree's current dripline.
- Access roads have been curved to give a sufficient buffer (i.e. >30m) from the identified bounds of RC PAD#1.
- Pathways and impact areas have been specifically designed to avoid heritage sites.

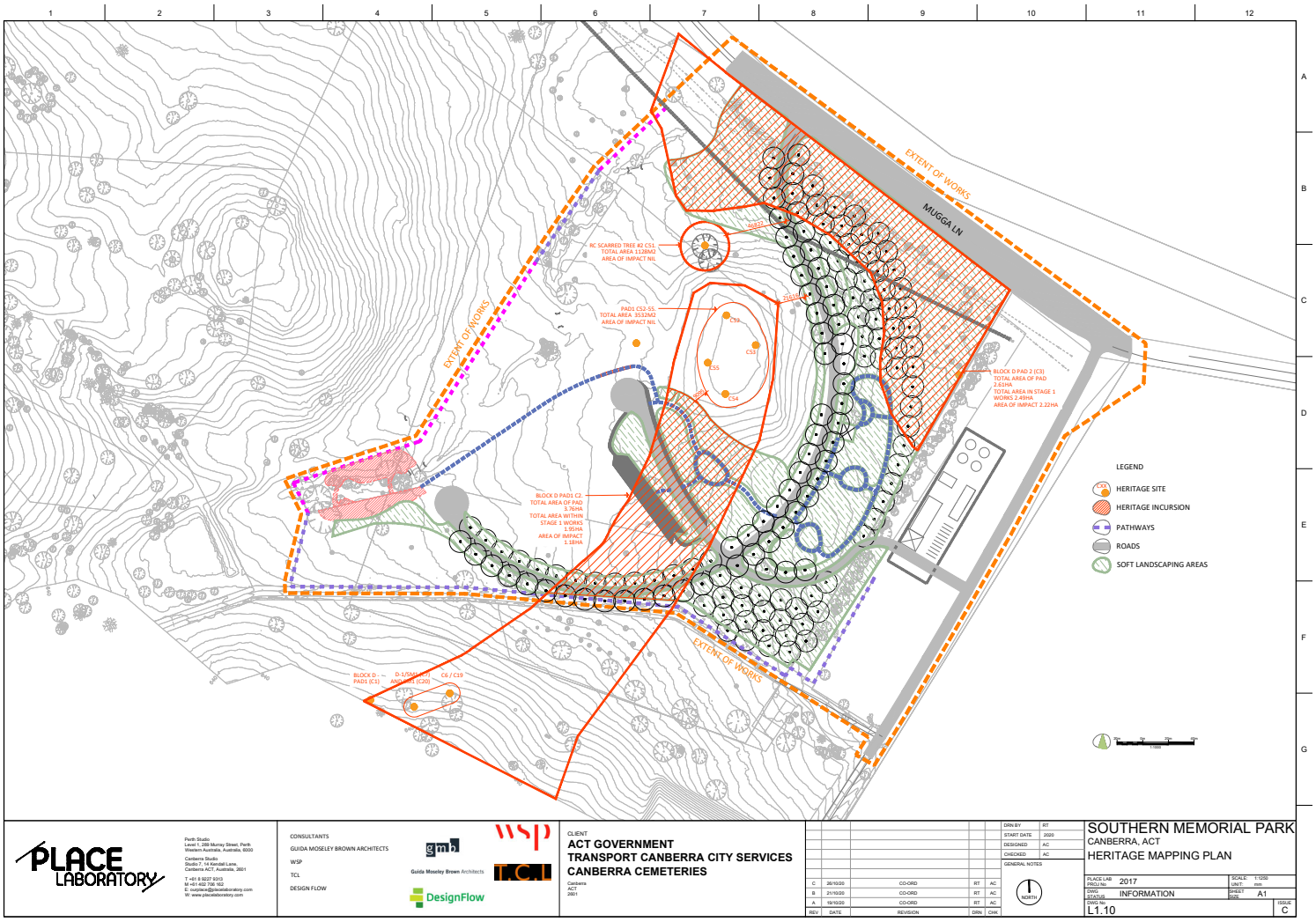

Figure 18. Proposed Stage 1 impacts relative to identified Heritage Sites within the Development Area

Table 14. Impact Assessment for Aboriginal Heritage Sites located within Stage 1 project area for Southern Memorial Park

Site	Footprint of impact	Type of Harm	Degree of Harm	Area of Harm within PAD	Proportion of PAD area impacted	Consequence of Harm
SM1/D-1	>80m outside impact area	None	None	$0m^2$	0	No loss of value
D-2	>100m outside impact area	None	None	$0m^2$	0	No loss of value
D-PAD1	Directly within impact area – will be partially impacted	Direct	Impact to part of the PAD. Total area of PAD = 4.3ha Total area within Stage 1 study area = 2.6ha	0.82ha	19%	No loss of value, this area of potential is not considered to hold cultural value
HA16	>30m outside impact area	None	None	$0m^2$	0	No loss of value
RC PAD#1	>40m from impact area	Inadvertent impact	Vulnerable to inadvertent damage/impact during construction	$0m^2$	0	Potential displacement of subsurface materials
D-PAD2	Directly within impact area	Direct	Impact to part of the PAD. Total area of PAD = 3.88ha Total area within Stage 1 = 2.87ha	2.07ha	53%	No loss of value, this area of potential is not considered to hold cultural value
RC#2 Scarred Tree	20m from impact area	Inadvertent impact	Vulnerable to inadvertent damage/impact during construction	None	None	Potential damage to tree

All reasonably practical alternatives have therefore been implemented for this project. Further reduction in impacts is not considered necessary or feasible.

10.3 Statement of Heritage Effect

The current proposal has made every effort to avoid areas of known or potential heritage significance. While two areas of previously identified PAD will be impacted by the proposal, neither was considered a PAD during the current investigations or two other undertaken on the property. A single area of potential overlaps with the current assessment and has been avoided by the current proposal. It is therefore determined that the Stage 1 proposal will not adversely impact on any identified heritage values in the project area.

Two sites are at risk of ***indirect*** or ***inadvertent impacts*** during construction through vehicle and machinery movement, however protective measures will be implemented through the construction period.

11.0 Management Recommendations

11.1 Introduction to the Management Recommendations

The heritage management options and recommendations provided in this report are made on the following basis:

- Consultation with representatives of the Representative Aboriginal Organisations present at the field assessment:
  - Wally Bell (Buru Ngunnawal Aboriginal Corporation);
  - Justin Brown (King Brown Tribal Group);
  - Bella and Bo House (Mirrabee – formerly Little Gudgenby Tribal Council);
- The legal and procedural requirements of Environment ACT;
- The results of the investigation as documented in this report; and
- Background research into the extant archaeological and historic record for the study area and its surrounding regions.

The recommendations are aimed at minimising the impacts of the proposed Memorial Park on identified Aboriginal heritage resources.

It is important to note that the recommendations presented below have been discussed with the RAO representatives involved in the assessment. Appendix C shows the RAO support provided for management recommendations contained herein.

Copies of this report were issued to all four RAOs on 21st May 2020 with a request for comment and feedback within 14 days. No written responses were received. Following a meeting with ACT Heritage 20th August 2020 and discussions pertaining to Grinbergs PAD sites D-Block PAD1 and PAD2, discussions were held in person with the RAOs during subsequent fieldwork (1st and 2nd September and 1st and 2nd October), modifications were made to this report and updated copies were reissued to the RAOs on 12th October 2020. No written responses were received.

11.2 Site Specific Recommendations

Management recommendations for each of the sites within the study area are summarised in Table 15 below. To eliminate a lot of the chaos arising from the multiple previous investigations at the site, Figures 19 to 21 show the outstanding sites and boundaries incorporating all three investigations into a single reference map for each area.

Remainder of the Study Area

The remainder of the study area has been surveyed ad assessed to be of low archaeological potential. There are no further heritage requirements for the study area.

11.3 Recommendations for Sites within Project Area (Stages 2, 3 and 4)

Several previous and newly recorded sites occur outside the Stage 1 study area but within the proposed 100 year extent of the Southern Memorial Park (Stages 2, 3 and 4). Impacts to

these sites must be mitigated before any of these subsequent impacts go ahead. In the interim, these sites and their boundaries must be added to the ACT Heritage Register for future protection. Requirements for impact mitigation at these sites will need reviewing at the time of development to accord with existing legislation and requirements in the future.

11.4 General Recommendations

If, during the course of the proposed road improvement works, previously undetected archaeological sites or suspected skeletal remains are located, the processes outlined in the Unanticipated Discovery Plan should be followed (Section 12.0).

A copy of this report should be submitted to ACT Heritage and the ACT Heritage Council for consideration and advice must be made to and approved by ACT Heritage Council. Alternatively a Statement of Heritage Effects to allow for the proposed development works to go ahead must be submitted and approved by ACT Heritage Council.

Table 15. Summary Management Recommendations for Sites within the Study Area

Site Name	Description	Management Recommendation
SM1/D-1	Low density scatter	Occurs outside current impact area No further work required.
D-2	Low density scatter	Occurs outside current impact area No further work required.
D-PAD1	Previously identified area of PAD not considered to hold archaeological potential	No further work recommended
HA16	Low density scatter	Occurs outside current impact area. Site has not been relocated since 2000 No further work required.
RC PAD#1	Area of PAD associated with RC#2 Scarred Tree	PAD is vulnerable to inadvertent impacts by vehicles during construction Construction barriers must be established around the boundary of the PAD during conservation. The boundary of the PAD should be established on the ground in the presence of both a qualified archaeologist and the RAOs, to ensure its protection from inadvertent impacts during construction. A report detailing these measures have been implemented prior to works commencing should be submitted to ACT Heritage
D-PAD2	Previously identified area of PAD not considered to hold archaeological potential	No further work recommended
RC#2 Scarred Tree	Scarred Tree	Must be conserved An arborist should be engaged to assess the health and age of this tree. An arborist should review the proposed plantings/soft landscaping within 50m of the tree to ensure none of the proposed landscaping will adversely impact the long term health and growth of the tree.

Site Name	Description	Management Recommendation
		Construction fencing must be established around the tree, in the presence of both a qualified archaeologist and the RAOs, to ensure its protection from inadvertent impacts during construction and remain in place until an approved CMP has been established (see below). A report detailing these measures have been implemented prior to works commencing should be submitted to ACT Heritage A Conservation Management Plan should be established to manage the long term conservation and maintenance of this tree.

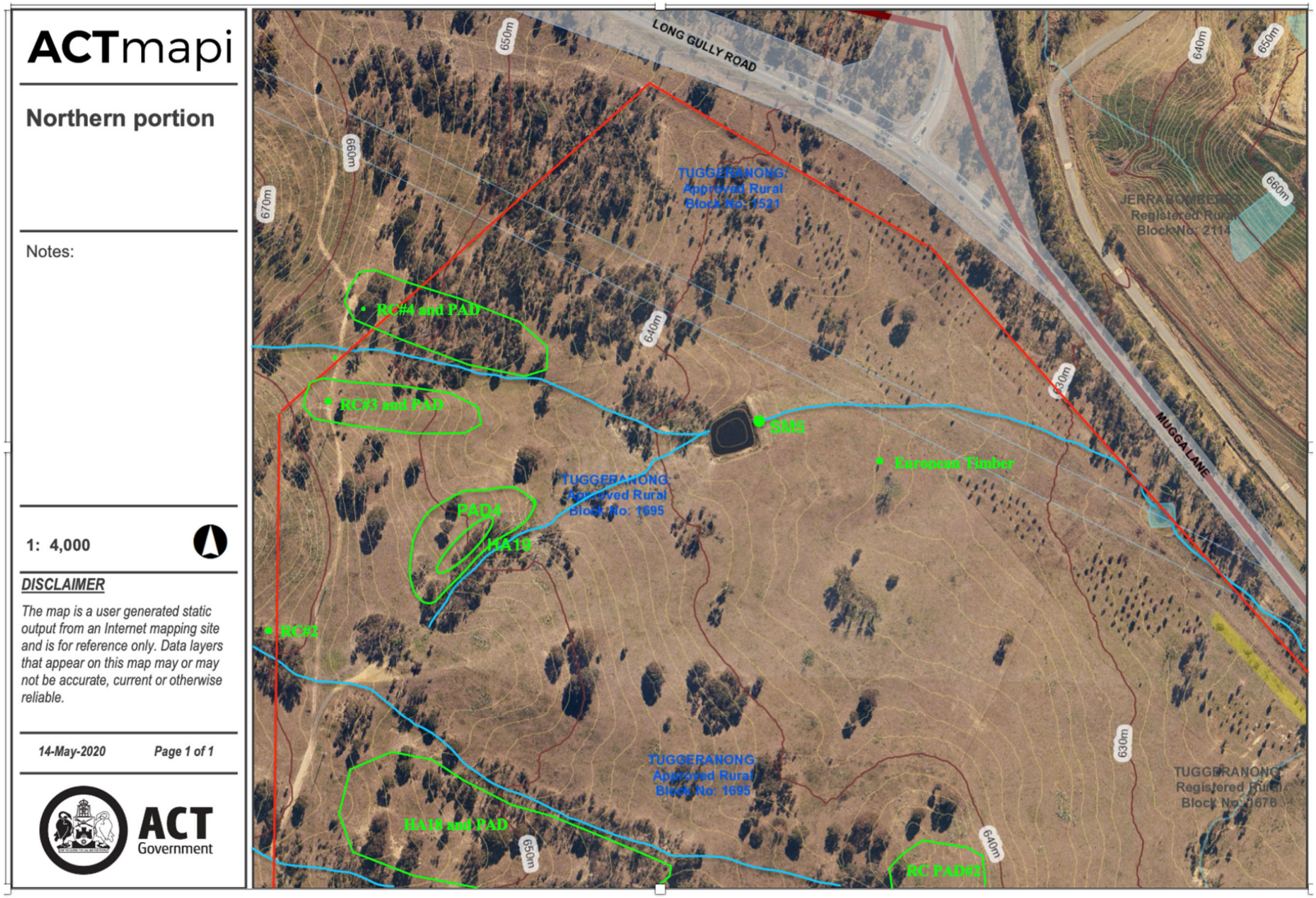

Figure 19. Finalised boundaries for Existing Sites in the Northern Portion of the Study Area

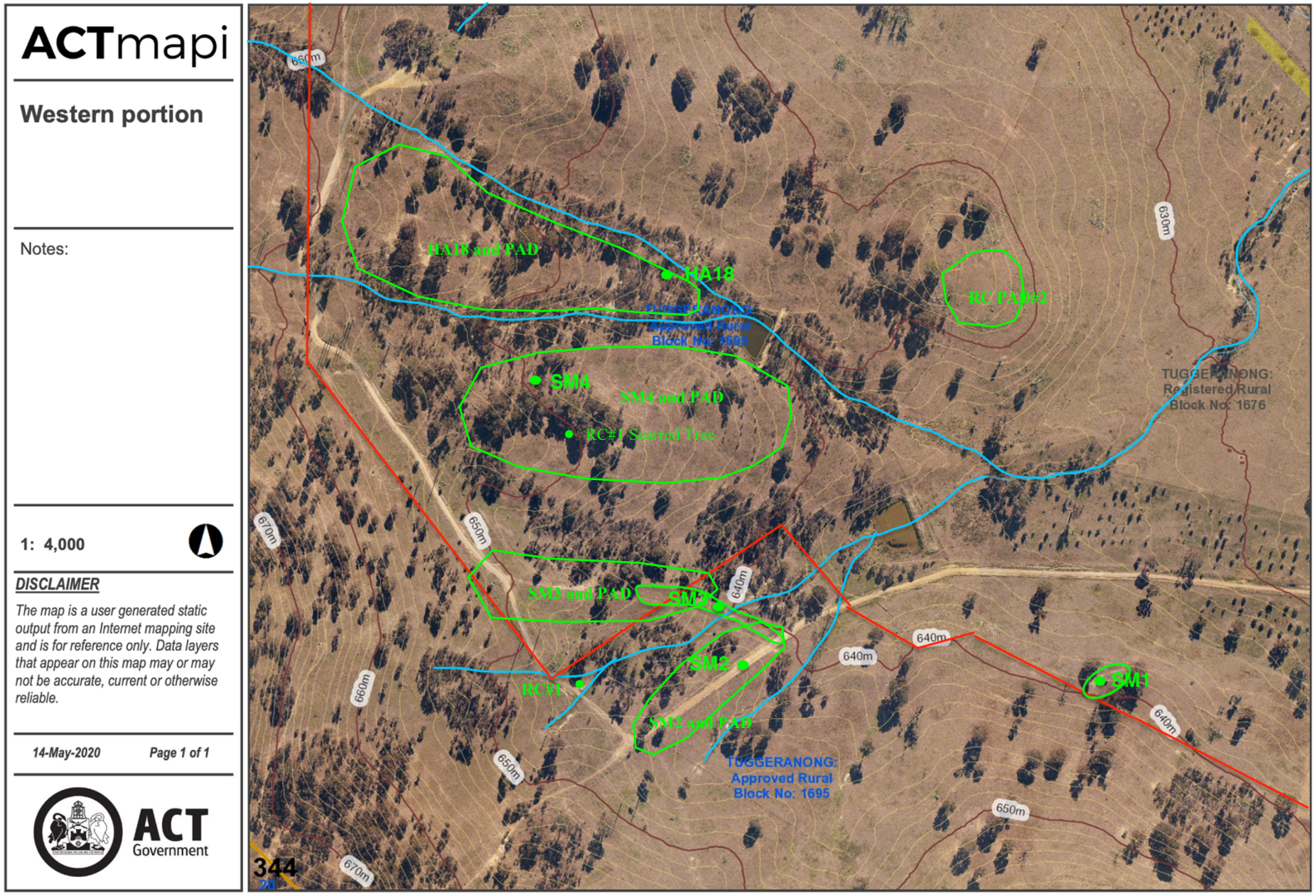

Figure 20. Finalised boundaries for sites within Western/Central Portion of Study Area

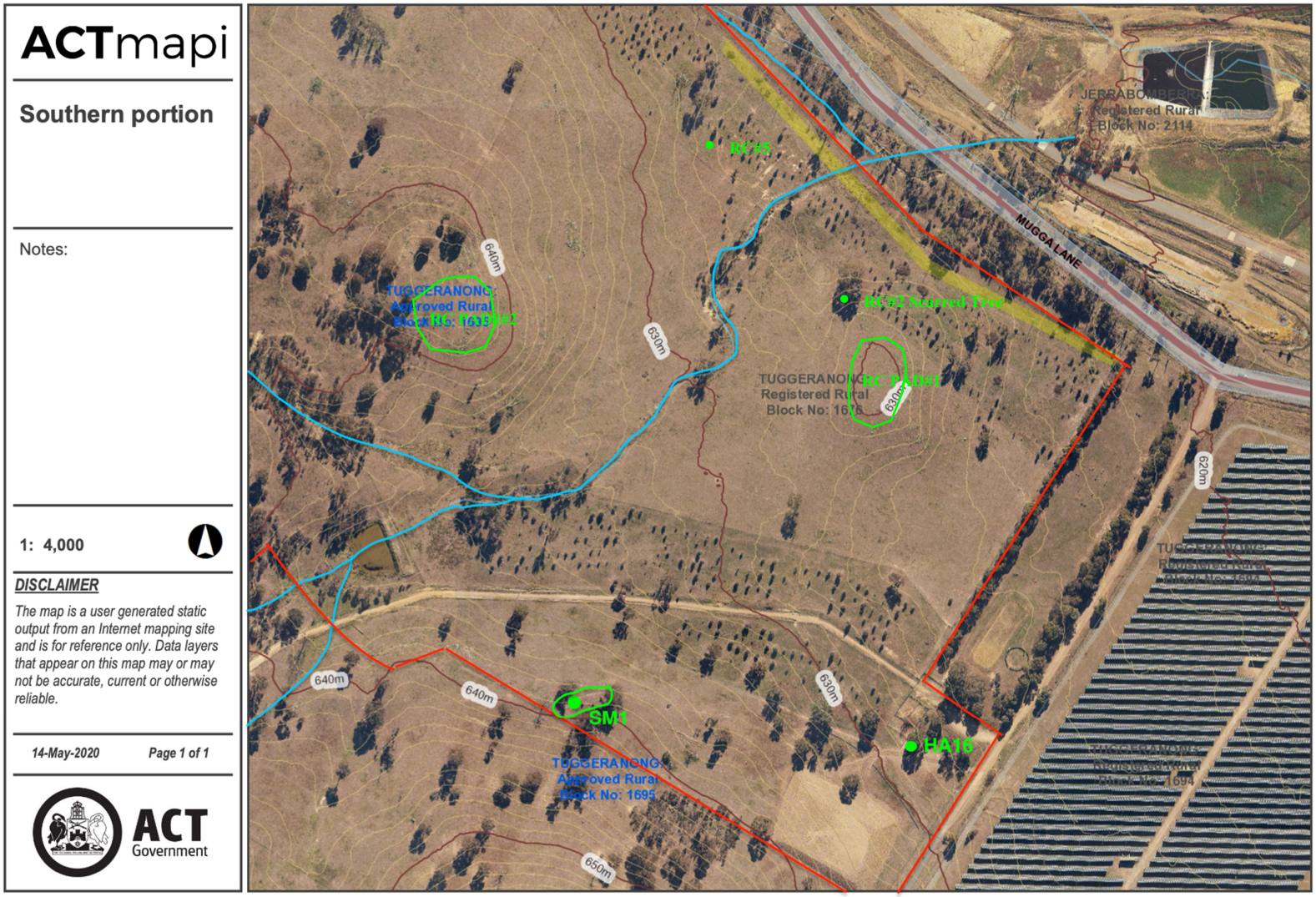

Figure 21. Finalised boundaries for sites within Southern Portion of the Study Area.

12.0 Unanticipated Discovery Plan

The following text describes the proposed method for dealing with unanticipated discoveries of Aboriginal archaeological materials on this project. The plan provides guidance to project personnel so that they may meet their obligations with respect to heritage in accordance with the Heritage Act 2004.

Unanticipated discoveries include all Aboriginal site types with the exception of isolated artefacts and low-density artefact scatters. This includes (but may not be limited to) moderate to high-density artefact scatters, scarred trees, stone procurement (quarry) sites, ochre deposits, hearths, scarred trees and skeletal remains (burials).

Please Note: There are two different processes presented for the mitigation of these unanticipated discoveries. The first process applies for the discovery of cultural heritage sites or features, which include all of the site types, mentioned above, with the exception of skeletal remains, burials. The second process applies exclusively to the discovery of skeletal remains (burials).

Discovery of Cultural Heritage Items

Step 1

If any project personnel, contractors or subcontractors believe that they have discovered or uncovered Aboriginal cultural heritage materials, the individual
should notify machinery operators that are working in the general vicinity of the area that earth disturbance works should stop immediately. Remember health and safety requirements when approaching machinery operators.

Step 2

A buffer protection zone of 20m x 20m should be established around the suspected cultural heritage site or items. No unauthorised entry or earth disturbance will be allowed within this ‘archaeological zone’ until such time as the suspected cultural heritage items have been assessed, and appropriate mitigation measures have been carried out.

Step 3

An archaeologist, in consultation with the RAOs should carry out an assessment of the cultural heritage find.

Step 4

Based on the findings of the assessment, appropriate management recommendations should be developed for the cultural heritage find. These recommendations should be submitted to the ACT Heritage Unit and Heritage Council for review and endorsement.

Step 5

Once endorsement has been obtained, the prescribed management recommendations should be carried out by the appropriate personnel.

Step 6
On the completion of the prescribed works, the relevant authorities (ACT Heritage Unit and Heritage Council) should advise the Site Supervisor (or other Project Personnel) that construction works may recommence in the 'archaeological zone'. If there are further constraints to construction works in the 'archaeological zone', then the Site Supervisor should be informed of these. It is the responsibility of the Site Supervisor to inform construction crews of these constraints.

Discovery of Skeletal Material

Step 1
Under no circumstances should the suspected skeletal remains be touched or disturbed. If these are human remains, then this area potentially is a crime scene. Tampering with a crime scene is a criminal offence.

Step 2
Any person discovering suspected skeletal remains should notify machinery operators that are working in the general vicinity of the area that earth disturbing works should stop immediately. Remember health and safety requirements when approaching machinery operators.

Step 3
A buffer protection zone of 50m x 50m should be established around the suspected skeletal remains. No unauthorised entry or earth disturbance will be allowed with this buffer zone until such time as the suspected skeletal remains have been assessed.

Step 4
The relevant authorities (police) will be contacted and informed of the discovery. If the skeletal remains are suspected to be of Aboriginal origin, the authorities may decide to seek the advice of an archaeologist or appropriate expert in relation to the discovery.

Step 5
Should the skeletal remains be declared an Indigenous burial site, the following procedures will be implemented.

- An archaeologist, in consultation with the RAOs should carry out an assessment of the skeletal remains.
- Based on the findings of the assessment, appropriate management recommendations should be developed for the cultural heritage find. These recommendations should be submitted (in the form of a Conservation and Management Plan) to the ACT Heritage Unit and the Heritage Council for review and endorsement.

- Once endorsement has been obtained, the prescribed management recommendations should be carried out by the appropriate personnel.

On the completion of the prescribed works, the relevant authorities (ACT Heritage Unit/Heritage Council) should advise the Site Supervisor (or other Project Personnel) that construction works may recommence in the 'archaeological zone'. If there are further constraints to construction works in the 'archaeological zone', then the Site Supervisor should be informed of these. It is the responsibility of the Site Supervisor to inform construction crews of these constraints.

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APPENDIX A - Site Types and Definitions

Artefact Scatters

Definition

These sites are usually identified as a scatter of stone artefacts lying on the ground surface. For the purposes of this project, artefact scatters are defined as at least 2 artefacts within 50 linear metres of each other. Artefacts spread beyond this can be best defined as Isolated Finds (see below). It is recognised that this definition, while useful in most instances, should not be strictly prescriptive. On some large landscape features for example, sites may be defined more broadly. In other instances, only a single artefact may be visible, but there is a strong indication that others may be present in the nearby sediments. In such cases it is best to define the site as an Isolated Find/Potential Archaeological Deposit (PAD).

Artefact scatters can vary in size from two artefacts to several thousand, and may be representative of a range of activities, from sporadic foraging through to intensive camping activity. In rare instances, camp sites which were used over a long period of time may contain stratified deposits, where several layers of occupation are buried one on top of another.

Predictive Statement:

Previous archaeological research in the ACT has identified the following pattern of distribution for this site type.

- The majority of artefact scatters are located in close proximity to a water course, on relatively level and well drained ground;
- The larger open artefact scatters (representing more intensive activity, such as regular camp areas), tend to be located on level, elevated landscape features, close to (within 100m) of major water courses. The most common areas are the elevated basal slopes of hills, the level spines of spurs (around the termination point of the spur), the flat summits of low relief knolls or hills, or the elevated sand ridges that represent the banks of ancient river courses;
- Site and artefact densities are also comparatively high on the spines of major ridge lines. These ridge lines are thought to have been utilised as favoured travelling routes through the landscape, and these sites are generally assumed to be representative of this activity;
- Site and artefact densities on the lower lying flood plains of water courses tend to be comparatively lower. This may be reflective of the fact these low lying areas were less favoured as camp locations, due to such factors as rising damp and vulnerability to flooding; and
- Site and artefact densities also tend to be comparatively lower in areas away from water courses, and on moderate to steeply sloping terrain.

Isolated Finds

Definition

These sites are defined as single stone artefacts. Where isolated finds are closer than 75 linear metres to each other they should generally be recorded as an Artefact Scatter.

Predictive Statement:
Isolated finds are generally considered to be representative of sporadic Aboriginal activity. As such, these site types can be expected to occur anywhere throughout the landscape. It is therefore generally not feasible to predict where this site type may be encountered along the route easement.

Scarred Trees
Definition
Aboriginal people procured bark from trees for a variety of purposes, including the construction of shelters, canoes, shields and containers. Scars on trees also resulted from Aboriginal people cutting toeholds for the purpose of climbing the trees to procure honey or capture animals such as possums. Very rarely trees have had motifs carved into them by Aboriginal people. Such sites are of great importance. In some instances these carved trees are associated with burials. There are natural processes that also cause scarring on trees. These include branch loss, fire, lightening strike and fungal attack. However, scars resulting from these processes will seldom have the distinctive morphology of Aboriginal scarred trees.

Predictive Statement
As with open artefact scatters scarred trees are most commonly located in close proximity to water courses where Aboriginal activity tended to be focused. However, it is not uncommon for these site types to occur well away from water. The study area has been entirely cleared of native vegetation, and as a consequence this site type will no longer be present.

Burials
Definition
Aboriginal burial grounds may consist of the burial of single or multiple individuals. The remains present at burial sites are often fragmentary and qualified professionals must undertake such identification. It is also important to note that newly discovered burials must be assessed by the police as a potential crime scene.

Predictive Statement
In the ACT region burials most often occur where soft sediments are present, such as alluvial deposits, or in caves and rock shelters. It should be noted that the survival of bones in the soil is very much dependent on the acidity of the soil. If the soil is too acidic, the bone material will deteriorate quickly.

The most likely location for this site type to be present is along the margins of the creek line, where softer sediments occur. However, given the rarity of this site type it is very unlikely that burials will be encountered within the study area.

APPENDIX B – Log of RAO Consultation

Consultation Process	Date	Location	Outcomes
Introduction to project and invitation to participate in field program	8th May 2020	Phone calls made to all four RAOs	Ngarigu Currawong Clan did not respond to call, text, facebook message or email Wally Bell – accepted invitation Paul House – accepted invitation Tina Brown – accepted invitation
Letters of invitation for fieldwork	10th May 2020	Emailed to all four RAOs	Signed copy returned by email Buru Ngunnawal 11th May Signed by Bella and Bo House – 12th May in person Signed by Justin Brown – 12th May in person
Fieldwork participation	12th May 2020	Southern Memorial Park	Attended by: Wally Bell – Buru Ngunnawal Indigenous Corp Bo and Belle House – Mirrabee Justin Brown – King Brown Tribal Group No attendance: Ngarigu Currawong Clan
Revision of Draft Report	21st May 2020-4th June 2020	Email	No written responses received
Feedback on Criterion G		Email	Several previous discussions have been held with the RAOs on their thoughts about recent changes to 'Criterion G'. Copies of this correspondence are included in Appendix D of this report.
Update on outcomes of meeting with ACT Heritage 20th August 2020	1st and 2nd September	Face to face conversations with Paul House and Wally Bell	Both agreed that the two areas of PAD identified by Grinbergs did not accord with their interpretation of the site during fieldwork and that neither was a PAD.

Consultation Process	Date	Location	Outcomes
Update on outcomes of meeting with ACT Heritage 20th August 2020	1st and 2nd October	Face to face conversations Adrian Brown and James Mundy	Both agreed that the two areas of PAD identified by Grinbergs did not accord with their interpretation of the site during fieldwork and that neither was a PAD.
Revision of modified report following ACT Heritage meeting	12th October 2020	Revised copies of the current report were issued via email	No written responses received

APPENDIX C – RAO Sign Off for Management Recommendations Herein

ACT Project Sign Off Sheet

Date: 12th May 2020

Project Name: Southern Cemetery and Crematorium, Mugga Lane Hume

Recommended Management Options*:

- ☐ No cultural heritage sites identified. No further cultural heritage action required
- ☐ Salvage Collect artefacts associated with sites, prior to construction commencing
- ☑ Further detailed archaeological research required at site.
- ☑ Implement measures to protect heritage site(s), prior to construction commencing.

Further Comments Avoid impacts if possible to Areas of PAD, need subsurface testing if impacts cannot be avoided.
Scarred trees to be protected.
Surface salvage where necessary ahead of impacts. + Return to Country

Signed by Archaeologist:
Dr Sophie Collins

RAO's

Buru Ngunawal Aboriginal Corporation

King Brown Tribal Group

Mirrabee

Ngarigu Currawong Clan

Scanned with CamScanner

N.B. Justin Brown left early this day before the sign off sheet was completed, however all contents were discussed with him in full.

APPENDIX D - RAO Comments on Site Significance

ABN : 24 059 704 833

Dr Sophie Collins
Senior Archaeologist, Lithics Specialist
Cultural Heritage Management Australia
M: 0414 306 762
E: sophcollins@me.com
website: chma.com.au

Traditional Aboriginal cultural practice is becoming a declining resource. For centuries now, European settlement has acted to stifle all manner of traditional activities and behaviours to the extent that archaeological material is one of only a few remaining representations of many aspects of our traditional cultural practice and way of life. The suggestion that one site may be more or less significant than another does not correlate with cultural values of our past, which places the same value on all surviving elements of our culture as it is slowly destroyed by modern Australian industrial expansion. To suggest that one site is more valuable than another is incongruent with the values we place on all remnants of our traditional cultural practice. Site MV167, as do all Aboriginal sites, holds high levels of cultural significance to our community as a teaching resource, as an indicator of our traditional pathways, our connection to the land and its tangible evidence of the thousands of years of our occupation of this region.

If you have any queries in relation to this matter, please contact me.

Yours sincerely,

Wally Bell
Director/Chair

PO Box 255, KIPPAX ACT 2615 Mb: 0419 425347 Email: wally@buru-ngunawal.com http://www.buru-ngunawal.com/

From: Paul House <Paul.House@environment.nsw.gov.au>
Subject: **RE: Significance Assessment**
Date: 19 May 2020 at 4:38:01 pm AEST
To: SOPHIE MCLEAN <sophcollins@me.com>

Hi Sophie,
It's very disappointing that Mirrabee and other groups were never consulted or given the opportunity to discuss new criterion inclusion guidelines with the ACT government. Mirrabee and the broader Ngambri nation consider the Majura site to sit well 'above the ordinary' so called classification. Given the damage and extensive changes to the landscape, the Majura site is a highly significant site that has survived and forms part of a rich collective landscape that holds important tangible and non-tangible values, in particular the traditional sanctuary for emus and traditional farming and harvesting of native grasses (I found a grinding stone on site and placed under gum tree for safe keepings). Every where we look in the Majura landscape there is a story that reflects our connection to country e.g. gooroobung (place of many stones) a site of significance connecting Majura with a broad base of responsibilities and rights associated with lore and customs.

The non-First Nation and government classification of sites and cultural heritage values is offensive and inappropriate as it seeks to undermine and de-value First Nation identity and continued connection to sovereign lands and waters. Archaeology itself is non-First Nation construct that attempts to direct and in-directly (control) sideline First Nation peoples in the name of development and capitalism etc. The ACT's current approach is clearly a breach of their own ACT Human Rights Act 2004. Under Section 27 'cultural and other rights of aboriginal and Torres Strait Islander peoples and other minorities'.

1. Anyone who belongs to an ethnic religious or linguistic minority must not be denied the right with other members of the minority to enjoy his or her culture to declare and practise his or her religion or to use his or her language. **(nil consultation by ACT Government)**
2. Aboriginal and Torres Strait Islander peoples hold distinct cultural rights and must not be denied the right
    a. to maintain control protect and develop their –
        i. cultural heritage and distinctive spiritual practises observances beliefs and teachings and (
        ii. language and knowledge
        iii. kinship ties and
        iv. to have their material in economic relationships with the land and waters and other resources with which they have a connection under traditional laws and customs recognised and valued.

Happy to discuss
Paul House
Mirrabee