APPENDIX F

# Aboriginal Cultural Heritage Assessment Report

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# Aboriginal Cultural Heritage Assessment Report
# Appin Mine Ventilation and Access Project
# Menangle, NSW

**Wollondilly LGA**

**Prepared for South32 Illawarra Metallurgical Coal**

Prepared by Niche Environment and Heritage | 26 May 2021

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## Document control

| Project number | Client | Project manager | LGA |
|---|---|---|---|
| 6152 | South32 Illawarra Metallurgical Coal | Sarah McGuinness | Wollondilly |

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# Executive summary

***Project outline***

Niche Environment and Heritage (Niche) was engaged by South32 Illawarra Metallurgical Coal (IMC) (hereafter referred to as 'the Proponent'), to conduct an Aboriginal Cultural Heritage Assessment (ACHA) for the proposed Appin Mine Ventilation and Access Project including project construction, operation and closure (here on referred to as 'the Project') located within the Wollondilly Local Government Area, at Lot 20A DP 4450, at 345 Menangle Road, Menangle, NSW (hereafter referred to as 'the Subject Area'). This ACHA is required to accompany a proposed modification application to Project Approval 08_0150, under section 4.55 of the *Environmental Planning and Assessment Act 1979*.

Consultation was undertaken with twenty-one (21) Aboriginal stakeholders (including groups and individuals) who identified themselves as Registered Aboriginal Parties (RAPs) through the consultation process following the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010b). Consultation with these parties has been ongoing through the development of this ACHA report.

In addition to a survey of the Subject Area, this ACHA includes a review of previous surveys and assessments from within the Subject Area and surrounds.

The Subject Area has been previously investigated within the wider Bulli Seam Operations Cultural Heritage Assessment (Biosis Research 2009). The survey undertaken for that assessment identified one isolated artefact site within the Subject Area; Bulli Site 7 (AHIMS ID#52-2-3687) (Biosis Research 2009: 94). The assessment also identified areas of Potential Archaeological Deposit (PAD) within the Menangle Region that are likely to contain subsurface archaeological deposits. It was concluded that PADs within the Menangle area are generally located adjacent to watercourses in depositional soil landscapes (Biosis Research 2009: 29). The predictive model developed in the Bulli Seam Operations Assessment indicates that the eastern edge of the Subject Area along Foot Onslow Creek, has the potential to contain subsurface Aboriginal objects.

A cultural heritage survey and archaeological test excavation of the Subject Area identified that Bulli Site 7 (AHIMS ID#52-2-3687) is a low-density open camp site that extends to the south of the originally recorded location and across to the eastern bank of Foot Onslow Creek. Part of Bulli Site 7 (AHIMS ID#52-2-3687) falls within the proposed Ventilation Shaft footprint and will be directly impacted as a result of the works program. The site is assessed to hold low scientific (archaeological) significance. The Registered Aboriginal Parties (RAPs) have advised that all sites have cultural significance.

Detailed avoidance, mitigation and management measures have been developed to reduce potential impacts on Aboriginal heritage. These are outlined in Section 13 of this report.

***Summary of potential impacts***

This assessment has determined that the Project would partially impact a single Aboriginal cultural heritage site (AHIMS ID 52-2-3687, see Figure 4) registered on Aboriginal Heritage Management System (AHIMS).

**Table 1: AHIMS registered site within the Subject Area**

| AHIMS ID# | Site name | Site type |
|---|---|---|
| 52-2-3687 | Bulli Site 7 | Isolated artefact |

The following recommendations have been made in consultation with the RAPs:

**Table 2: Recommendations**

| Recommendations | |
|---|---|
| 1. | An Aboriginal Cultural Heritage Management Plan (AHMP) should be developed for the Project that details and schedules (for the life of the Project) the mitigation and management measures presented in the report. The AHMP should be developed in consultation with the RAPs and relevant regulatory authorities and in compliance with the requirements of the BSO HMP 2017.<br>The AHMP should include the following:<br>• Protocols for the involvement of the RAPs in cultural heritage works conducted under the AHMP. This protocol should focus on members of the RAPS identified during this ACHA's consultation process.<br>• A communications protocol that describes clear methods of communication, including expectations of suitable notification and response time, between the proponent and the RAPs.<br>• A protocol for the discovery and management of Unexpected Finds, including stop work provisions and notification protocols.<br>• A protocol for the discovery and management of human remains, including stop work provisions and notification protocols, as per Recommendation 7.<br>• Procedures for the management and reporting of previously unknown Aboriginal heritage sites that may be identified during the life of the Project.<br>• Protocols for heritage awareness training to be incorporated into the Project site inductions for both employees and sub-contractors who may be conducting works that have the potential to impact on any Aboriginal heritage sites. Consideration should be given to involving the RAPs in the development and presentation of the cultural awareness training.<br>• A regular review process for the AHMP (in accordance with Condition 5 of Schedule 6 of the Appin Mine Approval, or every three years unless otherwise stipulated).<br>• AHIMS Site impact forms to be submitted for any sites subject to impact.<br>• Copies of the final report should be made available to each RAP, the Department of Planning, Industry and Environment and Heritage NSW. |
| 2. | A surface collection of the isolated surface artefact at Bulli Site 7 (AHIMS ID#52-2-3687) be undertaken in consultation with the Project RAPs under the above AHMP. |
| 3. | A Care and Control Agreement be developed for the long-term management of recovered artefacts. |
| 4. | The five artefacts recovered during the test excavation, and the surface artefact to be collected as per Recommendation 2 be reburied on site outside of the area of impact. The reburial to be conducted under the AHMP and in accordance with the Care and Control Agreement. |
| 5. | All site personnel should be inducted into the Subject Area, so they are made aware of their obligations under the *National Parks and Wildlife Act 1974* as to their responsibilities in the conservation of Aboriginal Heritage. |
| 6. | Site Card information for Bulli Site 7 (AHIMS ID#52-2-3687) should be updated in the AHIMS database with revised site descriptions (i.e. Aboriginal Site Impact Form (ASIFs). |
| 7. | In the unlikely event that suspected human remains are encountered during construction, all work in the area that may cause further impact, must cease immediately and:<br>• The location, including a 20 m curtilage, should be secured using barrier fencing to avoid further harm.<br>• The remains must be left in place and protected from harm or damage.<br>• The NSW Police and Coroners Office must be contacted immediately.<br>• No further action is to be undertaken until the NSW Police confirm the origin of the remains as non-human and provide a case number for South32's records.<br>• If the skeletal remains are identified as Aboriginal, South 32 or their agent must contact:<br>▪ the Heritage NSW's Enviroline on 131 555; and representatives of the RAPs. |

| Recommendations | |
|---|---|
| | ▪ No works are to continue until the Heritage NSW provides written notification to the Proponent or their Agent. |

# Glossary and list of abbreviations

| Term or abbreviation | Definition |
|---|---|
| Aboriginal cultural heritage | The tangible (objects) and intangible (dreaming stories, legends and places) cultural practices and traditions associated with past and present-day Aboriginal communities. |
| ACHA | Aboriginal Cultural Heritage Assessment. |
| Aboriginal object(s) | The legal definition for material Aboriginal cultural heritage under the NSW *National Parks and Wildlife Act 1974.* |
| Aboriginal stakeholders | Members of a local Aboriginal land council, registered holders of Native Title, Aboriginal groups or other Aboriginal people who may have an interest in the Project. |
| AHIMS | Aboriginal Heritage Information Management System. |
| AHIP | Aboriginal Heritage Impact Permit. |
| AR | Archaeological Report. |
| Archaeology | The scientific study of material traces of human history, particularly the relics and cultural remains of past human activities. |
| Archaeological deposit | A layer of soil material containing archaeological objects and/or human remains. |
| Archaeological investigation | The process of assessing the archaeological potential of an impact area by a qualified archaeologist. |
| Archaeological site | An area that contains surface or sub-surface material evidence of past human activity in which material evidence (artefacts) of past activity is preserved. |
| Artefact | An object made by human agency (e.g. stone artefacts). |
| Assemblage | A group of artefacts found in close association with one another<br>Any group of items designated for analysis that exist in spatial and/or vertical context – without any assumptions of chronological or spatial relatedness. |
| Avoidance | A management strategy which protects Aboriginal sites within an impact area by avoiding them totally in development. |
| Catchment | The area from which a surface watercourse or a groundwater system derives its water. |
| Code of Practice | *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales.* |
| Cumulative impacts | Combination of individual effects of the same kind due to multiple actions from various sources over time. |
| DECCW | The Department of Conservation, Climate Change and Water, replaced by the Biodiversity and Conservation Division (BCD) of the Department of Planning, Industry and Environment (DPIE) and now Heritage NSW of the Department of Premier and Cabinet (DPC). |
| DG | Director General. |
| DPC | Department of Premier and Cabinet. |
| DPIE | The Department of Planning, Industry and Environment. |

| Term or abbreviation | Definition |
|---|---|
| Drainage | Natural or artificial means for the interception and removal of surface or subsurface water. |
| EP&A Act | NSW *Environmental Planning and Assessment Act 1979.* |
| Flake | A piece of stone detached from a core, displaying a bulb of percussion and striking platform. |
| Harm | With regard to Aboriginal objects this has the same meaning as the NSW *National Parks and Wildlife Act 1974*. |
| HMP | Heritage Management Plan. |
| Heritage NSW | Aboriginal cultural heritage regulator in the Department of Premier and Cabinet. Responsible for the management of Aboriginal Cultural Heritage (ACH) regulation functions under the National Parks and Wildlife Act 1974. Formerly BCD of DPIE. |
| Impact | Influence or effect exerted by a project or other activity on the natural, built and community environment. |
| Impact area | An area that requires archaeological investigation and management assessment. |
| In situ | Latin words meaning 'on the spot, undisturbed'. |
| Isolated artefact / find | A single artefact found in an isolated context. |
| Landscape character | The aggregate of built, natural and cultural aspects that make up an area and provide a sense of place. Includes all aspects of a tract of land – built, planted and natural topographical and ecological features. |
| Land unit | An area of common landform, and frequently with common geology, soils and vegetation types, occurring repeatedly at similar points in the landscape over a defined region. It is a constituent part of a land system. |
| Landform | Any one of the various features that make up the surface of the earth. |
| LALC | Local Aboriginal Land Council. |
| LEP | Local Environmental Plan. |
| LGA | Local Government Area. |
| Management plans | Conservation plans which identify short and long term management strategies for all known sites recorded within a (usually approved) Subject Area. |
| Methodology | The procedures used to undertake an archaeological investigation. |
| Mitigation | To address the problem of conflict between land use and site conservation. |
| NPW Act | National Parks and Wildlife Act 1974. |
| NPW Regulation | National Parks and Wildlife Regulation 2009. |
| OEH | Office of Environment and Heritage, replaced by the Biodiversity and Conservation Division (BCD) of the Department of Planning, Industry and Environment (DPIE) and now Heritage NSW of the Department of Premier and Cabinet. |
| Open camp site | An archaeological site situated within an open space (e.g. archaeological material located on a creek bank, in a forest, on a hill, etc.). |
| PAD | Potential Archaeological Deposit.<br>A location considered to have a potential for subsurface archaeological material. |
| Palimpsest | Having diverse layers or aspects |
| RAP | Registered Aboriginal Party. |

| Term or abbreviation | Definition |
|---|---|
| Site recording | The systematic process of collecting archaeological data for an archaeological investigation. |
| Site | A place where past human activity is identifiable. |
| Spit | A unit of archaeological excavation with an arbitrary assigned measurement of depth and extent. |
| Survey coverage | A graphic and statistical representation of how much of an impact area was actually surveyed and therefore assessed. |

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# 1. Introduction

This report presents the findings of an ACHA undertaken for the proposed Appin Mine Ventilation and Access Project ) located at Lot 20A DP 4450, at 345 Menangle Road, Menangle, NSW Menangle, NSW (Figure 1 and Figure 2).

The Appin Mine (the Mine) is an existing underground coal mine situated in the Southern Coalfield of NSW approximately 25 kilometres north-west of Wollongong. The Mine is owned and operated by Endeavour Coal Pty Ltd, a subsidiary of Illawarra Coal Holdings Pty Ltd, which is a wholly owned subsidiary of South32 Limited. Appin Mine, Cordeaux Colliery and Dendrobium Mine (and associated facilities) collectively operate as South32 Illawarra Metallurgical Coal IMC.

IMC received Project Approval 08_0150 (the Appin Mine approval) from the Planning Assessment Commission of NSW under delegation of the Minister for Planning and Infrastructure on 22 December 2011 for current and proposed mining of the Bulli Seam Operations (BSO). The Appin Mine approval was gazetted as a State Significant Development (SSD) for the purposes of future modifications on 23 November 2018.

IMC is seeking to modify the existing Appin Mine approval, pursuant to Section 4.55(2) of the NSW *Environment Planning and Assessment Act 1979* (EP&A Act), to incorporate the construction and operation of infrastructure critical to the ongoing viability of the Mine referred to as the Appin Mine Ventilation and Access Project (hereafter referred to as the Project).

The Subject Area has been previously investigated within the wider Bulli Seam Operations Cultural Heritage Assessment (Biosis Research 2009). The survey undertaken for the Bulli Seam Operations ACHA identified one isolated artefact site within the Subject Area; Bulli Site 7 (AHIMS ID#52-2-3687) on a highly disturbed dam edge (Biosis Research 2009: 94).

The Bulli Seam Operations ACHA found that the Menangle region contains areas of PAD that are likely to contain subsurface archaeological deposits. PADs within the Menangle area are generally located adjacent to watercourses in depositional soil landscapes (Biosis Research 2009: 29). The predictive model developed in the Bulli Seam Operations ACHA indicates that the eastern edge of the Subject Area situated along Foot Onslow Creek has the potential to contain subsurface Aboriginal objects.

Figure 4 depicts the location of Bulli Site 7 (AHIMS ID#52-2-3687) in relation to the proposed works.

**Table 3: Aboriginal cultural heritage site within the Subject Area**

| AHIMS ID | Site Name | Site Description |
|---|---|---|
| 52-2-3687 | Bulli Site 7 | Open camp site |

## 1.1 Scope and Objectives

Niche Environment and Heritage Pty Ltd (Niche) was commissioned by IMC to prepare an ACHA to inform the development process and to manage and mitigate harm to Aboriginal objects and cultural heritage values of the Project.

## 1.2 Statutory and regulatory framework

The EP&A Act, administered by the NSW Department of Planning, Industry and Environment (DPIE), provides planning controls and requirements for environmental assessment in the development approval process. It also establishes the framework for formal assessment of Aboriginal cultural heritage values in

land-use planning and development consent processes. Developments that require development consent (from a council or the Minister for Planning and Infrastructure) are assessed under Part 4 of the EP&A Act. Part 4 developments are not exempt from the Aboriginal cultural heritage provisions and offences of the *National Parks and Wildlife Act 1974* (NPW Act).

As noted above, the Project is a modification of the approved Appin Mine works for the current Appin Mine approval (SSD) (08_0150).

In compliance with the Appin Mine approval, a Heritage Management Plan (HMP) has been developed for the Project, which includes the current Subject Area. Section 9.2 of the HMP outlines that additional heritage investigations are to be undertaken to address any knowledge gaps including supplementary surveys to identify new and relocate previously recorded sites. Therefore, in accordance with the management plan, an ACHA has been undertaken to address the proposed Project and the potential impacts on known and unknown Aboriginal cultural heritage sites within the Subject Area. This report aims to mitigate and manage said impacts in consultation with the Aboriginal community.

All archaeological assessments and reporting for this project have been undertaken in accordance with the following regulatory and advisory documents and guidelines:

- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales* (OEH, 2011).
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010a) [hereafter referred to as the 'Code of Practice'].
- *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (Part 6 National Parks and Wildlife Act, 1974) (DECCW, 2010b) [hereafter referred to as the 'Consultation Requirements'].
- *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance* (Australia International Council on Monuments and Sites [ICOMOS], 1999).
- *Bulli Seam Operations Heritage Management Plan* (Biosis 2020).

## 2. Site Location and Investigation Area

The Subject Area is approximately 35 km northwest of Wollongong and 8 km northwest of Appin (Figure 1). The township of Menangle is located approximately 1.3 km to the northeast of the Subject Area. The Subject Area is located on land owned by IMC, within the BSO Project Longwall Mining Area and within the South Campbelltown Mine Subsidence District in the Southern Coalfield of NSW. The Project is located within the Cumberland Plain biogeographic region, with the Razorback Range to the north-west. The major river system of the Nepean Gorge is situated nearby to the Project in the east, with an associated tributary Foot Onslow Creek located within the Subject Area.

The Subject Area will incorporate Ventilation Shaft 7, Ventilation Shaft 8, mine access facilities and additional areas for associated works and infrastructure, such as the construction site access and the provision of services to the Site. The boundary of the Subject Area and the extent of the Subject Area are shown on (Figure 2). The 'Project Area' referenced in the figures in this assessment is considered to include everything within the Construction Footprint, as designated by the Proponent. For the purpose of this assessment, 'Subject Area' and 'Project Area' are synonymous.

Infrastructure that will be developed within the Subject Area will be positioned to align with the approved layout of the underground workings for Appin Area 7, to be proximal to required services and to minimise the potential impacts on the environment and/or communities of Menangle and Douglas Park

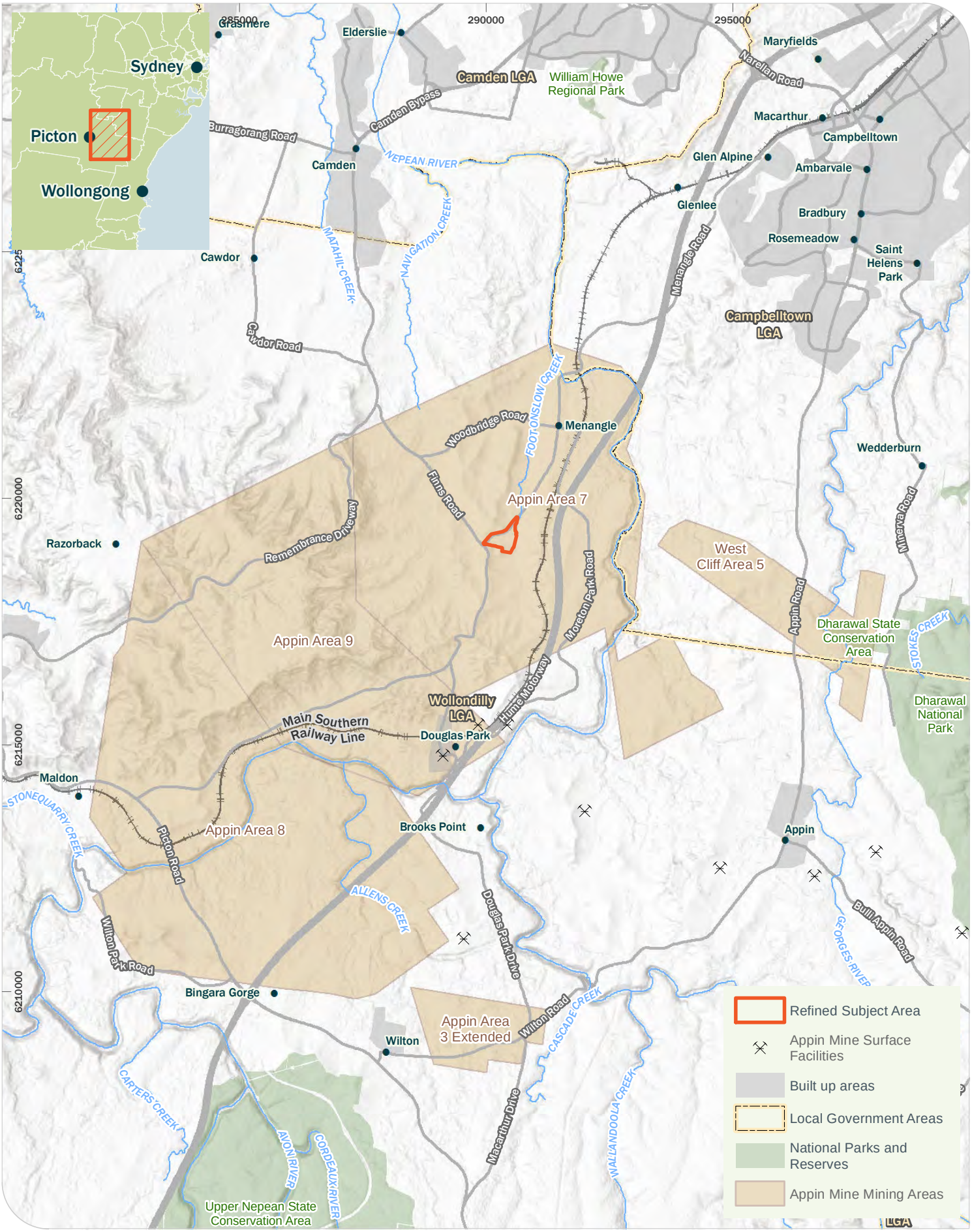
For the initial stages of this assessment, including the development of the Project Methodology and field survey, the Subject Area included a strip of land to the east of Foot Onslow Creek and a small hill along the southern boundary (Plate 1). This Subject Area was refined by IMC in December 2020 to exclude the eastern bank of Foot Onslow Creek and the hill (Plate 2). The test excavation methodology and conclusions and recommendations of this assessment are related to the amended Subject Area only (Figure 2 and Plate 2).


**Plate 1: Initial Subject Area included in the initial stages of assessment and Project Methodology. The entirety of this Subject Area was surveyed (Source: Niche, IMC and LPI).**


**Plate 2: Refined Subject Area, as amended by IMC in December 2020 following the field survey. The test excavation and conclusions and recommendations of this assessment are in relation to this amended Subject Area.**

The Subject Area for this ACHA includes approximately 25.5 ha of land that was considered during this assessment as potential locations for the proposed Ventilation Shaft site that may be impacted by the

Project (Figure 2). The Subject Area extends from some moderately sloping hills in the west, across pastoral flats and toward Foot Onslow Creek in the north.

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N

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km

GDA 1994 MGA Zone 56

Niche PM: Matt Richardson
Niche Proj. #: 5948
Client: South32

# Regional Location

## Appin Mine Ventilation and Access Project ACHA

Figure 1


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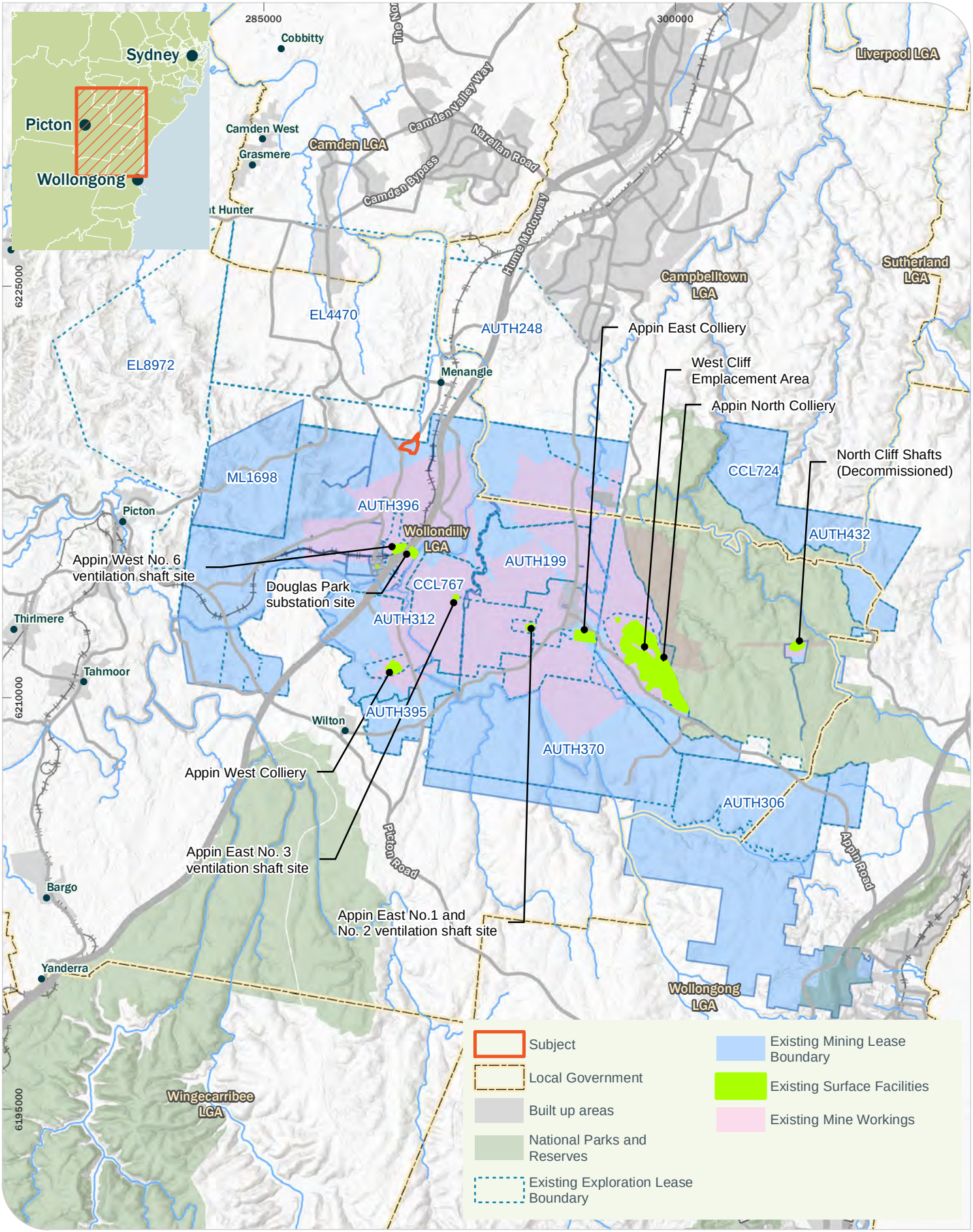
0 100
m
GDA 1994 MGA Zone 56

Niche PM: Matt Richardson
Niche Proj. #: 5948
Client: South32

# Refined Subject Area

## Appin Mine Ventilation and Access Project ACHA

Figure 2

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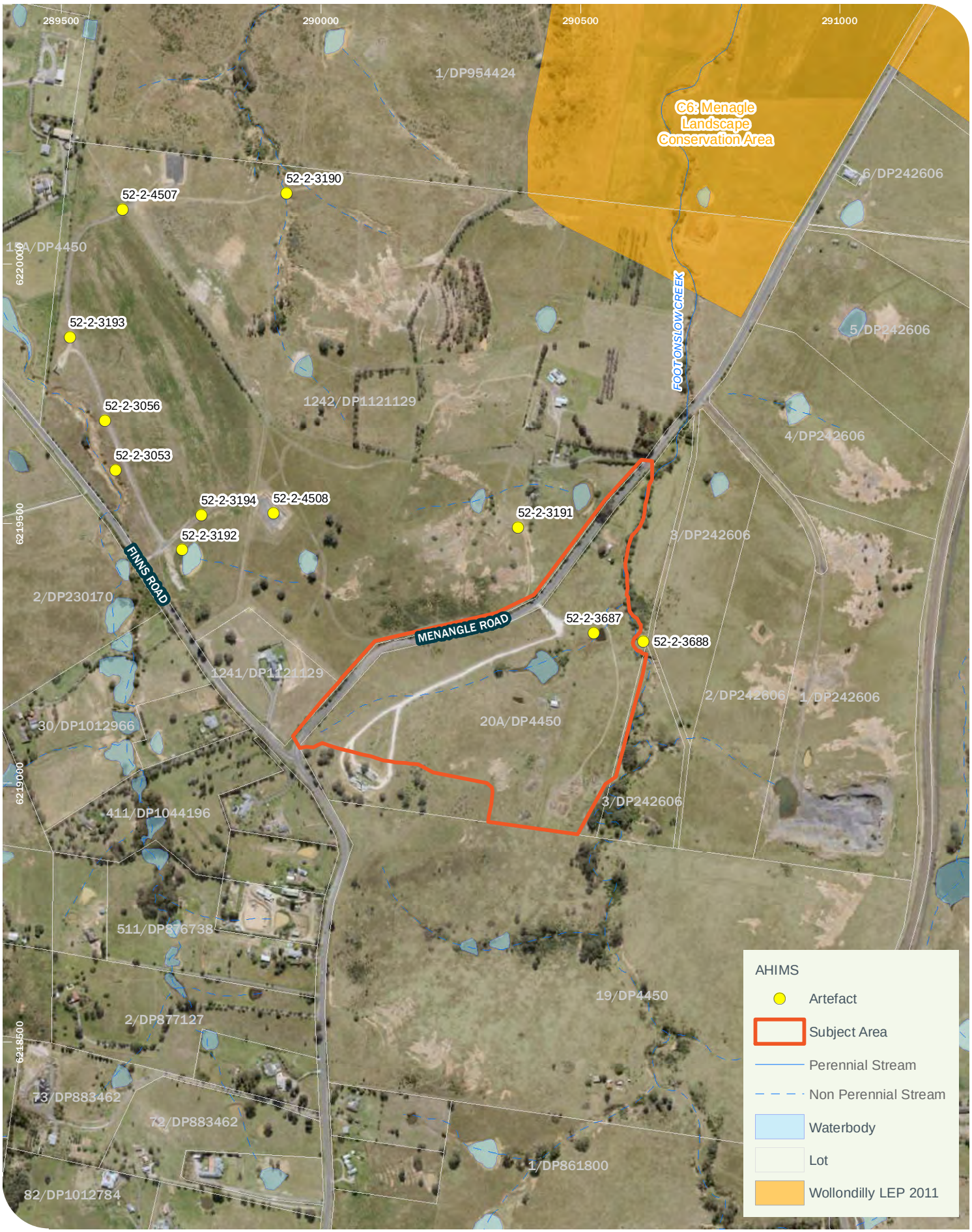
GDA 1994 MGA Zone 56

# Bulli Seam Operations Project Overview

## Appin Mine Ventilation and Access Project ACHA

Niche PM: Matt Richardson
Niche Proj. #: 5948
Client: South32

Figure 3

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GDA 1994 MGA Zone 56

# Subject Area with AHIMS and Heritage Items

## Appin Mine Access and Ventilation Project ACHA

Niche PM: Sarah McGuinness
Niche Proj. #: 6152
Client: South32

Figure 4

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# 3. Description of the Development Proposal

## 3.1 Proposed Activities

An integral requirement of underground mining is adequate ventilation infrastructure and mine access facilities to ensure a safe and efficient underground working environment. Appin Mine operations are progressing further away from the existing surface infrastructure located in the Appin and Douglas Park areas, and additional infrastructure is required to support the ongoing operations.

The Project involves the construction and operation of a downcast ventilation shaft (Ventilation Shaft 7), an upcast ventilation shaft (Ventilation Shaft 8), three (3) extraction fans, ducting and evases and associated ancillary infrastructure. Based on the current mining schedule, the additional ventilation shafts are required to be operational prior to 2025 to maintain continuity of safe underground operations.

The Project also involves the development of mine access facilities including a headframe and personnel and materials winder (within Ventilation Shaft 7) and surface facilities consisting of offices, stores, bathhouse facilities and car parking areas. The establishment of these facilities would provide access for personnel and consumable materials to the Mine and will increase the safety and efficiency of transporting personnel and consumable materials underground.

To support the key infrastructure noted above, the Project will also include the following activities:

- installation of temporary and permanent site access arrangements, including upgrade or improvement to the Menangle Road intersection, internal roadways, associated hardstand and car parking areas.
- site preparation, including clearing of vegetation, demolition of existing structures and earthworks.
- installation of appropriate security (e.g. fencing) to prevent unauthorised access to the site.
- installation of a power supply and transmission and associated electrical switch rooms, transformers and ancillary infrastructure.
- shaft material/spoil handling and emplacement activities. Associated revegetation and landscaping activities to minimise visual impact of the site.
- installation of personnel amenities such as bathhouses (e.g. changerooms), administration facilities and mines rescue facilities.
- installation of diesel storage tanks and associated pipelines.
- progressive development of sumps, pumps, pipelines, water storages and other water management infrastructure including fire protection and sewerage treatment facilities.
- installation of bulk materials storage facilities and warehouses.
- installation of communications equipment including fibre optic cable and wireless infrastructure.
- installation of a service borehole to provide underground services.
- controlled release of excess water and/or re-use or water where practicable.
- progressive revegetation of disturbed areas post construction.
- installation of erosion and sediment control infrastructure, where required; and
- other associated minor infrastructure, plant, equipment and activities.

The Project would be similar to previously approved ventilation and mine access infrastructure of the Appin Mine and will not increase the volume of coal produced. Coal handling infrastructure is not proposed as part of the Project.

The shafts would be constructed from the surface down to the underground workings using conventional shaft sinking methods (mechanical excavation and controlled blasting) with material from the excavation being removed from the top of the shaft. The excavated material resulting from the construction of the shafts would be used as engineered fill and for construction of earth screening bunds and sediment dams. Where practicable, excess material would be stockpiled on-site, revegetated and used for future rehabilitation of the shaft site upon decommissioning. The two shafts would be constructed simultaneously and lined progressively during excavation.

The Project will comprise two main phases; the construction phase and the operational phase. Once the shaft sinking is complete and the ventilation infrastructure is installed, the operational phase for the ventilation shafts will immediately commence. The construction of the mine access facilities would occur subsequent to the ventilation infrastructure, due to the priority requirement for mine ventilation air supply.

Activities associated with sinking the shafts would occur 24 hours per day, seven days per week. The remainder of construction activities associated with the facility (e.g. installation of surface infrastructure) would generally be limited to daytime construction hours. Once operational, the site would be required to operate 24 hours per day, seven days per week, consistent with other similar facilities of the Mine.

This ACHA assesses the additional disturbance areas associated with the proposed activities of the Project that have the potential to harm Aboriginal heritage sites.

## 3.2 Project Phasing

The Project is proposed to commence as soon as practicable after all the necessary approvals have been obtained and any prerequisite conditions fulfilled.

# 4. Aboriginal Community Consultation Process

In administering its statutory functions under Part 6 of the NPW Act, Heritage NSW requires that proponents consult with Aboriginal people about the Aboriginal cultural heritage values (cultural significance) of Aboriginal objects and/or places within any given development area, in accordance with Clause 80c of *NSW National Parks and Wildlife Regulation 2009*.

Heritage NSW maintains that the objective of consultation with Aboriginal communities about the cultural heritage values of Aboriginal objects and places is to ensure that Aboriginal people have the opportunity to improve ACHA outcomes (DECCW 2010b). This is ensured by:

- Providing relevant information about the cultural significance and values of Aboriginal objects and/or places.
- Informing the design of the methodology to assess cultural and significance of Aboriginal objects and/or places.
- Actively contributing to the development of cultural heritage management options and recommendations for any Aboriginal objects and/or places within the proposed Subject Area.
- Commenting on draft assessment reports before they are submitted by the Proponent to Heritage NSW.

Consultation, in the form outlined in the Consultation Requirements (DECCW 2010b), is a formal requirement in cases where a proponent is aware that their development activity has the potential to harm Aboriginal objects or places. Heritage NSW also recommends that these requirements be used when the certainty of harm is not yet established but a proponent has, through some formal development mechanism, been required to undertake a cultural heritage assessment to establish the potential harm their proposal may have on Aboriginal objects and/or places.

The Consultation Requirements outline a four-stage consultation process that includes detailed step-by-step guidance as to the aim of the stage, how it should be proceed, and what actions are necessary for it to be considered successfully completed. The four stages are:

- Stage 1 – Notification of project proposal and registration of interest.
- Stage 2 – Presentation of information about the proposed project.
- Stage 3 – Gathering information about the cultural significance of the project area.
- Stage 4 – Review of the draft Aboriginal Cultural Heritage Assessment report.

The Consultation Requirements also outline the roles and responsibilities of Heritage NSW, RAPs including Local and State Aboriginal Land Councils, and proponents throughout the consultation process.

To meet the requirements of consultation it is expected that the proponent will:

- Bring the RAPs (or their nominated representatives) together and be responsible for ensuring appropriate administration and management of the consultation process.
- Consider the cultural perspectives, views, knowledge and advice of the RAPs involved in the consultation process when they assess cultural significance and work together to develop any heritage management outcomes for Aboriginal abject(s) and/or place(s).
- Provide evidence to Heritage NSW of consultation by including information such as cultural perspectives, views, knowledge and advice provided by the RAPs.

- Accurately record and clearly articulate all consultation findings in the final cultural heritage assessment report.
- Provide copies of their final cultural heritage assessment report to the RAPs who have been consulted.

The consultation process undertaken to seek active involvement from appropriate Aboriginal representatives for the project followed the current NSW statutory guidelines – the Consultation Requirements. Section 1.3 of the Consultation Requirements describes the guiding principles of the document, which have been derived directly from the Principles section of the Australian Heritage Commission's *Ask First: A guide to respecting Indigenous heritage places and values* (Australian Heritage Commission, 2002). Both documents share the aim of creating a system where advice can be sought from the Aboriginal community.

The following sections outline the process and results of the consultation conducted during this assessment to ascertain and reflect the Aboriginal cultural heritage values of the Subject Area. Further detail regarding the Aboriginal community consultation process is outlined in Appendix 1.

## 4.1 Stage 1 – Notification of project proposal and registration of interest

### 4.1.1 Notification of agencies

Notification was initiated on 30 September 2020 to all relevant organisations named under Section 4.1.2 of the Consultation Requirements. This was done to identify Aboriginal people who may have cultural knowledge relevant to the Subject Area and whom may have an interest in the proposed Project. The list of the contacted organisations is provided in Table 4 below and a copy of the notification letter is provided in Appendix 1.

**Table 4: List of contacted organisations**

| Name of Organisation | Date of notification sent | Date of response received |
|---|---|---|
| **Heritage NSW / DPIE** | 30 September 2020 | 30 September 2020 |
| **Tharawal LALC** | 30 September 2020 | No response received |
| **Office of the Registrar** | 30 September 2020 | No response received |
| **National Native Title Tribunal** | 30 September 2020 | 30 September 2020 |
| **NTS Corp** | 30 September 2020 | No response received |
| **Wollondilly Shire Council** | 30 September 2020 | No response received |
| **Greater Sydney Local Land Services** | 30 September 2020 | No response received |

### 4.1.2 Advertisement

In accordance with Section 4.1.3 of the Consultation Requirements, a newspaper advertisement was placed in Wollondilly Advertiser on Wednesday 14 October 2020 with a close date of 5 pm on the 28 October 2020 (14 days) to provide additional opportunity for Aboriginal people who may be interested in the project to come forwards. A copy of the advertisement is included in Appendix B.

### 4.1.3 Notification of potential stakeholders

A list of potential cultural knowledge holders was compiled from submissions and information collected during the notification and registration periods. A list of the potential stakeholders is provided in Table 5 below.

**Table 5: List of potential Aboriginal stakeholders**

| Potential Aboriginal stakeholders | |
|---|---|
| A1 Indigenous Services | Garrara Aboriginal Corporation |
| Amanda Hickey Cultural Services | Ginninderra Aboriginal Corporation |
| Aragung Aboriginal Cultural Heritage Site Assessments | Goodradigbee Cultural & Heritage Aboriginal Corporation, |
| B.H. Heritage Consultants | Guntawang Aboriginal Resources Incorporated |
| Barking Owl Aboriginal Corporation | Jarmbi Aboriginal Cultural Heritage |
| Barraby Cultural Services | Kamilaroi Yankuntjatjara Working Group |
| Butucarbin Aboriginal Corporation | Mura Indigenous Corporation, |
| Confidential | Murra Bidgee Mullangari Aboriginal Corporation |
| Confidential | Ngambaa Cultural Connections |
| Cubbitch Barta | South Coast People |
| D'harawal Mens Aboriginal Corporation | Tharawal Local Aboriginal Land Council |
| Darug Booroobergongal Elders Aboriginal Corporation | Thoorga Nura |
| Darug Land Observations | Waawaar Awaa |
| Didge Ngunawal Clan | Wori Wooilywa |
| Freeman&marx PtyLtd | Wurrumay Pty Ltd |
| Galamaay Cultural Consultants | Yulay Cultural Services |
| | Yurrandaali |

A copy of the notification letter that was sent to the above organisations and individuals on 14 October 2020 is included in Appendix B.

### 4.1.4 Registered Aboriginal Parties

As a result of the Stage 1 enquiries, the following twenty one (21) organisations and/or individuals became RAPs for this project (see Table 6), and a consultation log of all correspondence included in Appendix 1.

**Table 6: RAP organisations and contacts**

| Organisation | Contact Name |
|---|---|
| A1 Indigenous Services | Ms Carolyn Hickey |
| Amanda Hickey Cultural Services | Ms Amanda Hickey |
| Aragung Aboriginal Cultural Heritage Site Assessments | Mr Jamie Eastwood |
| Barking Owl Aboriginal Corporation | Ms Jody Kulakowski |
| Barraby Cultural Services | Ms Lee Field |
| Butucarbin Aboriginal Corporation | Ms Jennifer Beale |
| Confidential | Confidential |
| Confidential | Confidential |
| Cubbitch Barta Native Title Claimants | Ms Glenda Chalker |
| Didge Ngunawal Clan | Ms Lillie Carroll and Mr Paul Boyd |

| Organisation | Contact Name |
|---|---|
| Freeman&marx PtyLtd | Mr Clive Freeman |
| Ginninderra Aboriginal Corporation | Mr Steven Johnson and Ms Krystle Carroll |
| Guntawang Aboriginal Resources Incorporated | Ms Wendy Morgan |
| Kamilaroi Yankuntjatjara Working Group | Mr Phil Khan |
| Ngambaa Cultural Connections | Ms Kaarina Slater |
| Tharawal Local Aboriginal Land Council | Ms Rebecca Jarvis |
| Waawaar Awaa | Mr Rodney Gunther |
| Wori Wooilywa | Mr Daniel Chalker |
| Wurrumay Pty Ltd | Ms Vicky Slater |
| Yulay Cultural Services | Ms Arika Jalomaki |
| Yurrandaali | Mr Bo Field |

#### 4.1.5 Notification of OEH and LALC

Notification of RAPS to Heritage NSW and the Local Aboriginal Land Council, as per Section 4.1.6 of the Consultation Requirements (DECCW 2010a) was sent initially on the 29 October 2020 with an updated version sent on the 23 November 2020.

### 4.2 Stage 2 and 3 – Presentation of project information, assessment methodology and gathering information about the cultural significance of the Subject Area

#### 4.2.1 Project information and assessment methodology

The RAPs were provided with a letter outlining information about the project and an assessment methodology in accordance with the Consultation Requirements (DECCW 2010a) and the Code of Practice (DECCW, 2010b). The project information was provided on 28 October 2020.

The purpose of the provided documents was to:

- Describe the project, outline the project scope, time frame and proposed works.
- Describe the environment of the Subject Area and information relevant to the ACHA process.
- Provide an opportunity for the RAPs to understand the process and comment on the proposed methodology.
- Set a time frame for providing feedback and comments on the methodology and project information.

The draft methodology was submitted to the RAPs on 28 October 2020 and the closing date for comments was at 5 pm, 26 November 2020 (to meet the minimum 28 days review period). A copy of the cover letter and methodology is included in Appendix 1.

A number of RAPs provided feedback on the project information and assessment methodology. Their comments and/or review are outlined in Table 7, and copies of all submissions made are included in Appendix 1.

### 4.2.2 Test Excavation and assessment methodology

The RAPs were provided with a letter outlining the test excavation methodology in accordance with the Consultation Requirements and the Code of Practice. The test excavation methodology was provided on 22 December 2020.

The purpose of the provided documents was to:

- Describe the test excavation process.
- Provide an indication of the proposed test pit locations.
- Provide an opportunity for the RAPs to understand the process and comment on the proposed test excavation methodology.
- Set a time frame for providing feedback and comments on the methodology and project information.

The draft methodology was submitted to the RAPs on 22 December 2020 and the closing date for comments was at 5 pm, 28 January 2021 (to meet the minimum 28 days review period). A copy of the cover letter and methodology is included in Appendix 1.

A number of RAPs provided feedback on the project information and assessment methodology. Their comments and/or review are outlined in Table 8, and copies of all submissions made are included in Appendix 1.

**Table 7: Details of RAP feedback on the project information and assessment methodology**

| Registered Aboriginal Party | Stakeholder | Comment made | Response from Niche |
|---|---|---|---|
| **Aragung Aboriginal Cultural Heritage Site Assessments** | Jamie Eastwood | *Thank you for your recent email concerning Appin Mine Ventilation and Access Project ACHA Project Information and Methodology. ARAGUNG Aboriginal Cultural Heritage Site Assessments has review the above documentation, and supports and agrees with all methodology project information put fourth. As an organisation we would like to be involved in all aspects of this project, and would like to add further cultural information orally upon a Archaeological Field survey.* | Thank you for your email and feedback. In addition, if you would like to be involved with fieldwork please ensure that you send through a copy of your certificate of currency and workers compensation insurance. |
| **Amanda Hickey Cultural Services** | Amanda DeZwart | *I have reviewed the document and support the project information and Methodology. Thank you* | Thank you for your feedback. In addition, if you would like to participate in fieldwork please ensure that you send through a copy of your certificate of currency and workers compensation insurance. |
| **A1 Indigenous Services** | Carolyn Hickey | *I have reviewed the information and support the alteration to the Subject Area.* | Thank you for your feedback and insurance information. We will be in touch regarding upcoming work soon. |
| **Barraby Cultural Services** | Lee Field | *I on behalf of Barraby have read and agrees with the methodology for this project. I have attached my insurances as I would like to be considered for the upcoming field work.* | Thank you for your feedback and insurance information. We will be in touch regarding upcoming work soon. |
| **Cubbitch Barta Native Title Claimants** | Glenda Chalker | *Thank you for the opportunity of commenting on the proposed project on Menangle Road, Menangle. There have been two identified and recorded sites along the creek line, and a previous excavation further downstream identified artefact bearing deposits, despite no surface visible artefacts. Therefore the potential for there to be subsurface material is very high. If the project can completely avoid any impacts to the surrounding areas of the creek line then there should be no other real issues.* | Thank you for your response. We have noted your feedback regarding sub-surface potential across the Subject Area. |
| **Yurrandaali Pty Ltd** | Bo Field | *I Bo Field of Yurrandaali Pty Ltd, agrees with the methodology associated with this project. I would like to express my interest in participating in the upcoming field work. Please see our insurances attached.* | Thank you for your feedback and insurance information. We will be in touch regarding upcoming work soon. |

**Table 8: Rap feedback on Test Excavation Methodology**

| Registered Aboriginal Party | Stakeholder | Comment made | Response from Niche |
|---|---|---|---|
| **Aragung Aboriginal Cultural Heritage Site Assessments** | Jamie Eastwood | *Thank you for supplying Aragung Aboriginal Cultural Heritage Site Assessments with a draft copy of the project information and methodology RE: Appin Mine Ventilation and Access Project Menangle NSW Archaeological Test Excavation Methodology .*<br>*Aragung has review the before mention project information , and agrees and supports all information stated in the draft copy of the Test Excavation Methodology and method for assessing heritage significance of the project area.*<br>*Aragung Aboriginal cultural heritage Site assessments would like to be involved in all future aspects of this project including Archaeological field work - meeting etc. should one of our experience Aboriginal Site Officers (RAP) be required to participate in on site field work please find attach to this email up to date insurance details and pay rate* | Thank you for your feedback. We are looking forward to working with you on site. |
| **Cubbitch Barta Native Title Claimants** | Glenda Chalker | *In my opinion the proposed methodology for the test excavation should be changed to sieving through 3 mm instead of 5 mm. Any artefacts should be reburied within the proposed conservation area.* | Thankyou Glenda. We have noted your concerns and will consider the applicability of the 3 mm during the excavations. |
| **DNC** | Lilly Carroll | *DNC Agrees to the methodology/ Test excavation for the Appin mineshaft ventilation project.* | Thank you for your feedback. We are looking forward to working with you on site. |
| **Freeman & Marx** | Clive Freeman | *We would like to support the methodology. It is great that it has included some of the recommendations spoken about on the initial site visit.*<br>*We look forward to assisting in the excavation tests.* | Thank you for your feedback. We are looking forward to working with you on site. |
| **KYWG** | Phil Kahn | *Thank you for your report, we agree and support you test excavation methodology regarding Appin Mine Shaft Ventilation Project.* | Thankyou Phil. We will be in touch shortly with logistics for the project. |

| Registered Aboriginal Party | Stakeholder | Comment made | Response from Niche |
|---|---|---|---|
| **Yulay Cultural Services** | Arika Jalomaki | *I have read and agree with the methodology for upcoming test excavations and look forward to working with you.* | Thankyou Arika, we look forward to working with you on site. |

### 4.2.3 Aboriginal Cultural Heritage Assessment Survey

#### 4.2.3.1 Survey Engagement Application Process

Due to a high volume of potential participants, six RAPs were invited to participate in the field survey. The invitation described the requirements that the Proponent needed applicants to satisfy for engagement in regard to fitness for work, drugs and alcohol policy, and personal insurance and protective equipment.

#### 4.2.3.2 Aboriginal Cultural Heritage Survey

An Aboriginal cultural heritage survey was conducted over one day, 7 December 2020. Table 9 summarises the representatives of the RAPs who attended the survey. Table 10 details the feedback of RAPs during the survey.

**Table 9: Aboriginal cultural heritage survey attendance**

| Representative | Registered Aboriginal Party |
|---|---|
| **7 December 2020** | |
| Nick DeZwart | A1 Indigenous Services |
| Phil Boney | Barraby Cultural Services |
| Rebecca Chalker | Cubbitch Barta Native Title Claimants |
| Joanne Smith | Didge Ngunawal Clan |
| Clive Freeman | Freeman& Marx Pty Ltd |
| Adam Gunther | Kamilaroi Yankuntjatjara Working Group |

**Table 10: Details of RAP feedback during the Aboriginal heritage survey**

| Registered Aboriginal Party | RAP | Comment made | Response from Niche |
|---|---|---|---|
| **All RAP groups involved in the field assessment** | RAPs involved in the field assessment | RAPs involved survey noted the sub-surface potential of both sides of Foot Onslow Creek. The poor visibility of the Subject Area was also noted. | This was noted and considered during this assessment. The Test Excavation Methodology developed for the Subject Area considered the discussions regarding sub-surface potential, with test pits located accordingly. |
| **Cubbitch Barta and Freeman & Marx** | Rebecca Chalker and Clive Freeman | A discussion between Rebecca, Clive and Sarah McGuinness (Niche) identified the often-over-looked sub-surface potential of hill tops and ridge lines, as situated in the original Subject Area. | This was noted and considered during this assessment. The southern hilltop was excluded from the revised Subject Area and thus will not be impacted by the proposed works. |

### 4.2.4 Archaeological Test Excavation

#### 4.2.4.1 Test Excavation Engagement Process

Due to a high volume of potential participants, 11 RAPs were invited to participate in the test excavation. The invitation described the requirements that the Proponent needed applicants to satisfy for engagement in regard to fitness for work, drugs and alcohol policy, and personal insurance and protective equipment.

#### 4.2.4.2 Archaeological Test Excavation

The archaeological test excavation was undertaken over 10 days, between 1 and 12 February 2021. Table 11 summarises the representative of RAPs who attended during the course of the test excavation. Table 12 details the RAP feedback over the course of the test excavation.

**Table 11: Archaeological test excavation participants**

| Participant | Organisation |
|---|---|
| Nick De Zwart | A1 Cultural Services |
| Wayne Kennedy | A1 Cultural Services |
| Jayden Reid | Aragung |
| Lee Field | Barraby Cultural Services |
| Kirsty-Lee Chalker | Cubbitch Barta Native Title Claimants |
| Glenda Chalker | Cubbitch Barta Native Title Claimants |
| Rebecca Chalker | Cubbitch Barta Native Title Claimants |
| Kiarni Chalker | Cubbitch Barta Native Title Claimants |
| Peter Markovic | Freeman & Marx |
| Jamie Currell | KYWG |
| Kaarina Slater | Ngambaa CC |
| Hannah Matagia | Wurrumay |
| Bree Slater | Yulay Cultural Services |
| Arika Jalomaki | Yulay Cultural Services |
| Bo Field | Yurrandaali |

**Table 12: RAP feedback during the test excavation**

| Registered Aboriginal Party | RAP | Comment made | Response from Niche |
|---|---|---|---|
| **RAP groups involved in the field assessment** | RAPs involved in the field assessment | RAPs involved in the test excavation were surprised at the low density of artefacts recovered during the excavation. The erosion and agricultural disturbances within the Subject Area were noted. | This was noted and considered during this assessment. |
| **Cubbitch Barta** | Glenda Chalker | Glenda reiterated her comments from the field survey and requested that the 3 mm sieve be used for wet sieving and additional pits be excavated around the artefact bearing pits. | Glenda's recommendation from the field survey was considered and employed during the test excavation. All sieving was conducted on the 3 mm sieve and an additional 6 pits were excavated around the artefact bearing pits. |

## 4.3 Stage 4 – Review of draft Aboriginal cultural heritage assessment report

A draft of this report was provided to the RAPs for their review and comment on 26 March 2021 in accordance with the Consultation Requirements (DECCW 2010b). A statutory timeframe of a minimum of 28 days for responses was provided to all RAPs, with a request for comments to be provided by 5 pm 27 April 2021.

The responses in Table 13 detail the comments made by the RAPs, as well as Niche's response, and copies of all submissions made and received are included in Appendix 1.

**Table 13: Details of RAP feedback on the draft ACHA**

| Registered Aboriginal Party | RAP | Comment made | Response from Niche |
|---|---|---|---|
| **Aragung** | Jamie Eastwood | Thank you for your email and invitation to provide comment on the Aboriginal Cultural Heritage Assessment Report Apin Mine Ventilation and access project.<br><br>Aragung Aboriginal Cultural Heritage Site Assessments has review the above mention report which has been papered by NICHE and agrees to and Supports all information stated in the reports presentation of information and methodology use in archaeological investigations.<br><br>Aragung Considers archaeological investigations such as the Apin project to be exceedingly important for First Nations Darug and Tharawal People, as such investigations provides direct tangible evidence to our ancestral heritage and also allows our people to continue our cultural practice of caring for country and our Aboriginal places of significance.<br><br>Aragung also considers such archaeological investigations as exceedingly important to the wider existing community , and future residing residence of the Apin area Tharawal Country , as such investigation provide a important bridging tool to reconciliation and education in the informing to these local communities of Indigenous and Australian local histories.<br><br>Having work as a Aboriginal cultural Site officer on Tharawal and Darug lands for many years , as a Indigenous person who has traditional connections to the project area - through trade , ceremony , marriage and song line - and as a known member of the greater Sydney Aboriginal Community I have obtain a deep understanding of cultural knowledge to the country in which the report was prepared for . Should you require any more assistance in future or ongoing archaeological investigation I would only be to happy to impart my cultural knowledge towards country and country associated to Darug Tharawal lands, via email phone conversation or onsite meetings. | Thank you for your response and for your assistance on the project to date. |

| Registered Aboriginal Party | RAP | Comment made | Response from Niche |
|---|---|---|---|
| | | should Aragung Aboriginal Cultural Heritage Site Assessments be considered for future involvements or field works towards the Apin Mine ventilation and Access project please do not hesitate to enquirer about the availability of myself or one of our three experience Aboriginal Site Officer . Copies of all up to date insurance certificates can be found attach to this email. | |
| **Guntawang Aboriginal Resources Incorporated** | Wendy Morgan | Thanks for providing the ACHA for the Appin Mine Ventilation and Access Project. Guntawang has nothing more to offer at the moment. We look forward to working with you in the near future. | Thank you for your response and for your assistance on the project to date. |
| **KYWG** | Kadibulla Khan | Thank you for your ACHA regarding Appin Mine Ventilation and Access Project. A long time ago before the Europeans arrived, the land would have been very different from today. The flora and fauna would have been thriving, there would have been many water ways flowing, today they have been used for drainage. Aboriginal people would have used their environment to their advantage, utilising what they needed and never wasting or taking too much. This was a part of our lore looking after mother nature as she provides for us Aboriginal people and we give back to her. Hunting and gathering would have taken place along with camping and ceremonial practices. There is always the potential for Aboriginal sites or PADs, even in the historic fill layers. I would like to mention Aboriginal interpretation within the development as it is just as important to recognise the Aboriginal people. This can be achieved through native gardens, artwork, signage, 3D replicas of artefacts on display and an app could be created. We look forward to working with you on this project further. | Many thanks for your reply detailing how the landscape would have been used by Aboriginal people and emphasising the symbiotic relationship they maintained with their environment. We look forward to working with you further on this project as well. |
| **DNC** | Lilly Carroll | DNC has reviewed the documents and is Happy from our end. | Thank you for your response and for your assistance on the project to date. |

## 4.4 Stage 5 – Care and Control Agreement

Due to the collection of the five Aboriginal objects during the test excavation program, and the recommended collection of the surface artefact located at Bulli Site 7 (AHIMS ID#52-2-3687), the long term management of the six Aboriginal objects is required. Under section 85A(1)I of the NPW Act, the Director General of the Department of Premier and Cabinet may transfer control of Aboriginal objects to a person or persons for safekeeping.

Initial discussions on site with the RAPs during the test excavation indicate a preference for the Aboriginal objects to be reburied on site, outside of the proposed area of impact. Following RAP review of the draft ACHA, reburial of artefacts on site is identified as the preferred option.

As such, reburial on site under a Care and Control Agreement is recommended as per Recommendations 3 and 4. Details of RAP consultation regarding the long-term management of the Aboriginal objects is outlined in Table 14 below.

**Table 14: Details of care and control consultation**

| Registered Aboriginal Party | Stakeholder | Preference of location for long term care | Method of Contact |
|---|---|---|---|
| **Cubbitch Barta Native Title Claimants** | Glenda Chalker | Reburial on site in area of excavated trenches outside of impact area. | Phone |

# 5. Investigator and Contributors

## 5.1 Research and Reporting

This investigation was managed by Sarah McGuinness (BA). The Aboriginal community consultation, research, field assessment and report writing was undertaken by Sarah McGuinness, Wade Goldwyer (BA - Hons) and Yolanda Pavincich (BArch GradDip CHM). GIS for this investigation was undertaken by Greg Tobin and Yin Hua (Niche).

The ACHA was reviewed internally by Niche Aboriginal Heritage Team Leader Renée Regal (BA Hons).

## 5.2 Fieldwork

In addition to the representatives of the RAPs listed in Table 9 and the test excavation participants listed in Table 20, the individuals listed in Table 15 attended and/or supported the surveys and assessment in various capacities.

**Table 15: Aboriginal cultural heritage surveys and assessment – other participants or support personnel**

| Name | Representing | Role |
|---|---|---|
| Nick DeZwart | A1 Indigenous Services | RAP |
| Wayne Kennedy | A1 Indigenous Services | RAP |
| Jayden Reid | Aragung | RAP |
| Lee Field | Barraby Cultural Services | RAP |
| Phil Boney | Barraby Cultural Services | RAP |
| Kirsty-Lee Chalker | Cubbitch Barta Native Title Claimants | RAP |
| Glenda Chalker | Cubbitch Barta Native Title Claimants | RAP |
| Kiarni Chalker | Cubbitch Barta Native Title Claimants | RAP |
| Rebecca Chalker | Cubbitch Barta Native Title Claimants | RAP |
| Joanne Smith | Didge Ngunawal Clan | RAP |
| Peter Markovic | Freeman & Marx Pty Ltd | RAP |
| Clive Freeman | Freeman & Marx Pty Ltd | RAP |
| Jamie Currell | Kamilaroi Yankuntjatjara Working Group | RAP |
| Adam Gunther | Kamilaroi Yankuntjatjara Working Group | RAP |
| Nicola Curtis | IMC | Principal Mining Approvals |
| Steve Groen | IMC | Lead Studies - Illawarra Metallurgical Coal |
| Tracy Connolly | IMC | Exploration Field Assistant |
| Jerom Fox | IMC | Project Manager of Pre-feasibility Assessment |
| Marika Low | Niche | Artefact Analysis |
| Sarah McGuinness | Niche | Site Director |
| Sam Ward | Niche | Field Assistant |

| Name | Representing | Role |
|---|---|---|
| Wade Goldwyer | Niche | Field Assistant |
| Kosta Contas | Niche | Field Assistant |
| Chelsea Freeman | Niche | Field Assistant |
| John Gillen | Niche | Field Assistant |
| Matthew Richardson | Niche | Company Director |
| Kaarina Slater | Ngambaa CC | RAP |
| Hannah Matagia | Wurrumay | RAP |
| Bree Slater | Yulay Cultural Services | RAP |
| Arika Jalomaki | Yulay Cultural Services | RAP |
| Bo Field | Yurrandaali | RAP |

# 6. Landscape Context

## 6.1 Overview

Understanding the past and present environmental contexts of an area is requisite in any Aboriginal archaeological and cultural heritage investigation (DECCW 2010a). The nature and distribution of Aboriginal archaeological sites are closely related to the environmental context. This section provides a broad overview of the environmental setting of the Subject Area, before describing each of the soil landscapes that are contained within it. Soil landscapes, when considered with the levels of past land use and modification, are a useful tool in identifying environmental proxies for the likely preservation and burial of Aboriginal objects in a landscape and resources that may have been available to Aboriginal people in the past; such as the presence of rock outcrops to provide surfaces for art or to sharpen and prepare implements, stone for the manufacture of stone tools and plant species.

## 6.2 The Landscape

The Subject Area is located on the southern margins of the Cumberland Plain, which is characterised by low lying, gently undulating plains and hills (Hazelton and Tille 1990). The Subject Area is also located on the peripheries of the Woronora Plateau, as defined by the gorges and sandstone plateaus found to the east and the incised Nepean Gorge.

There are two soil landscapes present within the Subject Area which are defined by Hazelton and Tille (1990) as the Blacktown and Theresa Park soil landscapes. The Blacktown Soil Landscape makes up 10% of the Subject Area (Figure 5 and Plate 3) is characterised by gently undulating hills, with relief up to 30m and slopes of usually less than 5% gradient. Crests of hills and ridges are broad and rounded, with convex upper slopes. Lower slopes of this soil landscape are generally concave with broad drainages lines and valley flows. The dominant vegetation of this soil landscape prior to historic clearing would have been open-forest and woodland with denser vegetation in the riparian zone. Small pockets of residual Cumberland Plain Woodland are located within the Subject Area. Pastoral grasses now dominate the areas of cleared vegetation. The underlying geology within the Blacktown Soil Landscape is Wianamatta Shale, with overlying, generally shallow podzolic loam soils and clay. The Blacktown soils have formed in situ through weathering of the shale geology, and as such have the potential to preserve Aboriginal objects wherever they occur.

The Theresa Park soil landscape comprises approximately 90% of the Subject Area. This soil landscape is formed from fluvial processes associated with the Foot Onslow Creek and the Nepean River (Figure 5 and Plate 4). It is characterised by its undulating slopes, floodplains and terraces with local relief up to 60m and slope gradients <5%, except on edges of terraces where gradients exceed 10%. Prior to historic clearing, the dominant vegetation of the Theresa Park soil landscape would have been tall open wet-sclerophyll forest, which would have contained cabbage gum and broad-leaved apple. The portion of the Subject Area where the Theresa Park soil landscape occurs has been cleared of all native vegetation, with some regrowth occurring on the banks of the Foot Onslow Creek. Soils within this landscape are generally podzolic on the terraces with Prairie Soils within current floodplains. The soil profile is relatively deep (>250cm) consisting of sandy loams overlying sandy clay, within landforms associated with floodplains and terrace edges. This profile is moderately deep (>150cm) towards drainage lines and consisting predominately of sandy clay deposits. The Theresa Park soils are often subject to post depositional movement as a result to the seasonal waterlogging/ flooding as well as soil erosion as such, Aboriginal objects may not be preserved in their original archaeological context.

**Plate 3: Example of the Blacktown Soil Landscape within the Subject Area.**

**Plate 4: Example of the Theresa Park Soil Landscape within the Subject Area, with the low rolling hills of the Blacktown Soil landscape in the rear of the photo.**

The Subject Area can be further divided into various landform units that can be used to inform predictive models for the potential occurrence of Aboriginal objects. The landforms within the Subject Area are defined as flat, lower slope and upper slopes and crests. The characteristics of these landforms and their location within the Subject Area are summarised below.

**Flat**

The northern part of the Subject Area near Foot Onslow Creek is situated within the flat landform unit (Plate 5). This unit is covered with pastoral grasses with regrowth vegetation and weeds along the watercourse. This landform sits within the Theresa Park soil landscape and is intersected by low drainage lines associated with Foot Onslow Creek. Modern vehicle tracks, vegetation clearance and stockpiled material along with a single storey dwelling and shed have all impacted upon this landform unit.

**Plate 5: An example of flat landforms within the Subject Area with Foot Onslow Creek in the mid ground; facing south-west.**

**Lower slopes**

The lower slope landform unit is characterised within the Subject Area by gentle hill slopes leading into cleared pasture and ultimately draining into Foot Onslow Creek (Plate 6). This landform has been

extensively cleared of native vegetation. This soil landscape unit is part of the Theresa Park soil landscape. Aboriginal site Bulli Site 7 (AHIMS ID# 52-2-3687) is situated within this landform unit.

**Plate 6: An example of lower slope landform unit within the Subject Area; facing north-west.**

### Upper slopes and crests

The upper slope and crest landform unit is characterised within the Subject Area by partially cleared, heavily grassed steep slopes with some remnant Cumberland Plain Woodland vegetation (Plate 7 and Plate 8). This unit is situated around the southern and western end of the Subject Area and is located within both the Blacktown and Theresa Park soil landscapes. The upper slope and crest landform unit is particularly susceptible to erosion and soil slumping due to vegetation clearance and soil exposure.

**Plate 7: An example of upper slope and crest landform, within the Subject Area; facing south.**

**Plate 8: An example of upper slope and crest landform with remnant Cumberland Plain Woodland along the rear crest; facing south.**

## 6.3 Hydrology

The primary hydrological feature of the Subject Area is Foot Onslow Creek, a small drainage tributary of the Nepean River that intersections the Subject Area at the northern end, running north- south through the boundary of the Subject Area (Figure 5). Foot Onslow Creek would have been a reliable water source,

particularly following rains where water would have pooled in the channel and ponds. The Nepean River itself is fed by a large catchment area and would have been a reliable, year-round source of fresh water.

## 6.4 Disturbance and Modification

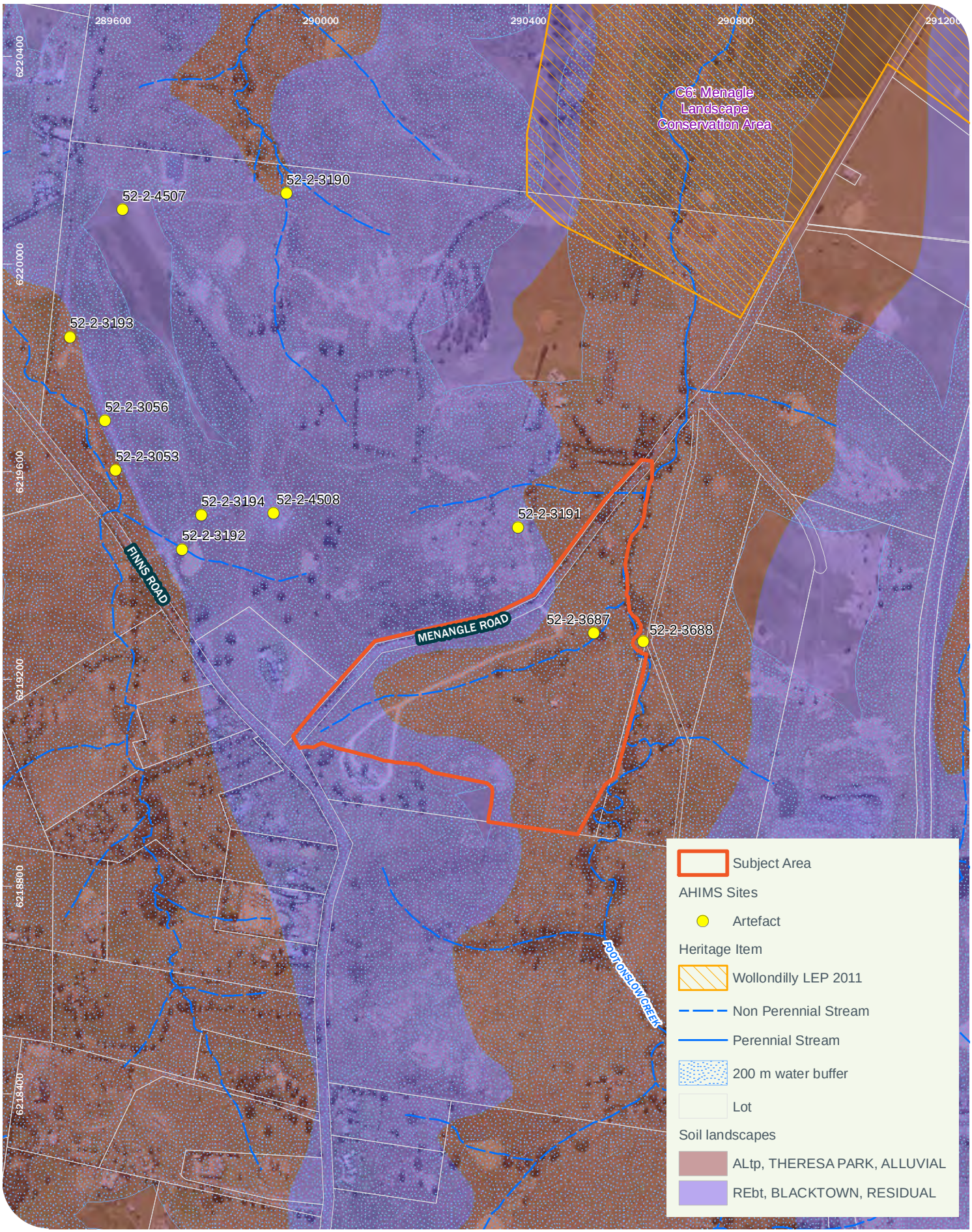
The Subject Area is located in the south west region of Sydney where the general use of the land is characterised by small rural holdings, light industrial, commercial premises and local road networks. The first land grants in the district were issued between 1810 and 1820 and in the following decades the district established an agricultural and pastoral industry, including wheat and maize crops, and dairying (Whitaker 2005). The district has maintained its rural roots through to the present day, and mining has become an important regional industry. More recently the establishment of the southern suburbs of the Sydney urban area has begun to encroach further into the area, as former farmland is transformed into residential housing.

The Subject Area is currently zoned as RU2 – Rural landscape comprising of undeveloped land. There is a single-story dwelling located towards the northeast side of the property fronting Menangle Road, as well as a large shed situated towards the centre of the property. Unsealed tracks connect the property.

The landforms within the Subject Area have been subject to significant land uses that may impact upon the preservation and visibility of the archaeological record of the Subject Area. These include widespread clearing of native vegetation and subsequent erosion, as well as major pastoral and agricultural utilisation. The impacts of earthworks associated with the construction of dams and vehicle tracks as well as, cattle grazing can be seen across the Subject Area.

## 6.5 Summary

The Subject Area generally consists of low lying and gently undulating plains, with areas in the west of the Subject Area comprising steeper hills of greater local relief. Vegetation has been largely cleared across the wider area, with introduced pastoral grasses the current dominant vegetation, with isolated pockets of residual Cumberland Plain Woodland. The soil landscapes of the Subject Area are moderately deep and have the potential to contain Aboriginal objects in situ. The Subject Area is also in close proximity of reliable water sources, making it a suitable location for year-round occupation by Aboriginal people.

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## Soil landscapes and hydrology in the local area

### Appin Mine Access and Ventilation Project ACHA

Niche PM: Sarah McGuinness
Niche Proj. #: 6272
Client: South32 Illawarra Coal

Figure 5



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## Historical aerial photographs
### Appin Mine Access and Ventilation Project ACHA

Niche PM: Sarah McGuinness
Niche Proj. #: 6152
Client: South32

Figure 6

# 7. Aboriginal Archaeological Context

The Subject Area is located in the Cumberland Plain, a physiographic region of western Sydney characterised by its open undulating hilly landscape with alluvium rich soil underlain by the sedimentary geology. While the region is characterised by a rich Aboriginal archaeological record, the reconstruction of past land use of Aboriginal people in the Cumberland Plain and the structure of their society is an extremely difficult task often relying on biased historical documents and archaeological evidence resulting from environmental impact assessments rather than research-driven projects (see AMBS 1997 for more detailed discussion of current limitations). Despite these inherent limitations, archaeologists have built up a picture of Aboriginal settlement patterns for the region, establishing a foundation for the testing of predictive models and the refinement of knowledge. The past Aboriginal land use indicated by the results of previous archaeological work in the region (reviewed in Subsection 7.3 of this Section) suggests that certain areas nearby major creeks were used as locations for the intensive manufacture of silcrete and quartz artefacts (as suggested by the high-density artefacts recovered in association with knapping floors) as well as locations of artefact processing, use and/or maintenance.

## 7.1 Ethnography and History

The Menangle area is the traditional country of the Tharawal people. Tindale (1974) identified the Tharawal boundaries as being from the south side of Botany Bay to north of the Shoalhaven River, and running inland to the Campbelltown and Camden area (Attenbrow 2010: 34, SA Museum 2010). RAP Glenda Chalker describes the Appin and Douglas Park area as being 'Gundungurra and Tharawal tribal country' as the area is a transitional boundary between the Tharawal and their westerly neighbours, the Gundungara (Attenbrow 2010: 23, DEC 2007: 7). Attenbrow (2010:35) points out that such boundary mapping, undertaken as it was in the nineteenth century is indicative at best, however there appears to be reasonably strong agreement between those who have mapped language boundaries that the Douglas Park area is indeed a transitional boundary between the Tharawal and Gundangara.

The records and histories of the Tharawal and their country at the time of contact with Europeans are subject to bias and are generally fragmented, providing nothing like a complete picture of the way Aboriginal people were living prior to European interference. Nevertheless, we know the Tharawal regularly communicated, moved, traded and participated in ceremonies between their country and neighbouring areas. It is most likely family groups or clans would 'intermingle and interact along both physical and social boundaries' rather than be strictly confined to the 'tribal' borders that were to be artificially imposed by European anthropologists (Organ 1990: xliii).

The arrival of the First Fleet in Sydney Cove in 1788 was followed the next year by a smallpox epidemic, which spread to the neighbouring regions and, although the exact effects are not known, killed over half the Aboriginal population of the areas effected (Organ 1990: 5).

Early in the nineteenth century European graziers began taking land in the south of the Cumberland Plain and the coastal plains around Wollongong, with cedar getting being conducted in the narrower northern coastal plain and rainforest areas of the escarpment (DEC 2005b). Access to traditional and everyday resources (such as water) and clearing the land of trees would have had a major impact on the ways in which Aboriginal people would have been living, and also caused significant social disruption between Aboriginal groups, and pressure between Aboriginal people and the ever increasing European population. This period was a time of drought, and the competition for resources between the Europeans and the Tharawal, who were adapting to the massive changes that were so quickly upon them, led to several years of conflict. Organ (1990) documents the various skirmishes, killings and reprisals between Europeans and

the Tharawal during the 1814 – 1815 period in the Cowpastures, Camden and Appin districts. Eventually this sporadic bloodshed would lead to larger scale conflict, with Governor Macquarie implementing a sustained punitive action against the Aboriginal population in the district. This resulted in the Appin Massacre of 17 April 1816, in which Aboriginal people were shot and driven over the steep cliffs (probably near Broughtons Pass) to their death during a surprise attack by a detachment of the 46th Regiment, in the middle of the night.

Despite the massive changes that were so quickly brought to the Aboriginal people of the region, they maintained a sense of community, traditional customs and practices, cultural knowledge and continued to care for significant sites and the land in general. The Tharawal continue as custodians of the land, and many continue to live in the Gundungara and Tharawal tribal country today.

## 7.2 Heritage Register Searches

### 7.2.1 AHIMS Register

A search of the Aboriginal Heritage Information Management System (AHIMS) was conducted of the Subject Area on 13 August 2020 (AHIMS Search ID# 527254); results listed in Table 16. There were 11 previously recorded Aboriginal cultural heritage sites in and around the Subject Area. Of these Aboriginal cultural heritage sites, one is situated within the Subject Area boundary (Bulli Site 7 AHIMS ID# 52-2-3687).

The Aboriginal cultural heritage sites recorded within 4km of the Subject Area were found to be comprised of open sites containing either isolated finds or an open camp site (Table 16).

**Table 16: Details the AHIMS sites that are within 4km of the Subject Area**

| AHIMS ID | Site Name | Site Features |
|---|---|---|
| 52-2-3190 | WG1 | Isolated Find |
| 52-2-3191 | WG6, Wandinong | Isolated Find |
| 52-2-3192 | WG5, Wandinong | Open camp site |
| 52-2-3053 | WG4 Wandingong (Unavailable) | Isolated Find |
| 52-2-3194 | Wandinong 5 | Isolated Find |
| 52-2-3056 | WG4 AFT | Open camp site |
| 52-2-3193 | Wandinong 6 | Open camp site |
| 52-2-3687 | Bulli Site 7 | Isolated Find |
| 52-2-3688 | Bulli Site 8 | Open camp site |
| 52-2-4507 | WG7 | Isolated Find |
| 52-2-4508 | WG8 | Isolated Find |

### 7.2.2 Other Registers

In addition to AHIMS, searches of the World Heritage Database, the Commonwealth Heritage List, National Heritage List, State Heritage Register, State Heritage Inventory, the Wollondilly LEP (2011) and the Wollondilly Development Control Plan (DCP) (2016) were conducted on the 30 October 2020. Clause 5.10 of the Wollondilly LEP (2011) outlines the controls for heritage conservation including the conservation of Aboriginal objects and Aboriginal Places of heritage significance.

**Table 17: Listed heritage items in proximity to the Subject Area**

| Heritage Register | Items in the Activity Area | Items within wider region of the Activity Area |
|---|---|---|
| **World Heritage Database** | • N/A | • N/A |
| **Commonwealth Heritage List** | • N/A | • N/A |
| **National Heritage List** | • N/A | • N/A |
| **State Heritage Register** | • N/A | • Upper Nepean Scheme – Upper Canal (SHL ID # 4580004) |
| **Schedule 5 of LEP** | • N/A | • Menangle Landscape Conservation Area (ID# C6)<br>• Slab Hut (ID#I79)<br>• Old Razorback Road (ID# A1)<br>• Mount Hercules Homestead (ID #A12)<br>• Upper Nepean Scheme – Upper Canal (ID #I16)<br>• Cawdor Dairy (ID #I85) |
| **DCP** | • N/A | • An Aboriginal Heritage assessment must be completed if there is a proposed impact or disturbance to, or within the immediate vicinity (100 metres) of an Aboriginal Object, Aboriginal Place of significance, an existing or former ceremonial ground, a burial ground or cemetery, a story place or mythological site, a former Aboriginal reserve or historic encampment, or an archaeological site of high significance. |

## 7.3 Local Archaeological Assessments

Archaeological studies provide material evidence of Aboriginal use of the landscape at times both before and after written history and complements the oral histories and cultural knowledge held by the Aboriginal community. A number of archaeological assessments have been undertaken in the Subject Area, including the following:

- Biosis (2009) Bulli Seam Operations Aboriginal Cultural Heritage Assessment. An unpublished report prepared for BHP Billiton Illawarra Coal.
- Biosis Research (2012) Appin Mine Heritage Management Plan. An unpublished report for South32 Illawarra Metallurgical Coal.
- Niche Environment and Heritage (2020) Menangle Road Geotechnical Investigations Aboriginal Objects Due Diligence Assessment. An unpublished report prepared for South32 Illawarra Metallurgical Coal.

### 7.3.1 Summary of Local Archaeological Assessments

A summary of local archaeological assessments undertaken in the vicinity of the Subject Area is provided in Table 18.

**Table 18: Summary of Archaeological Assessments within and in close proximity to the Subject Area**

| Assessment and date | Summary of findings |
|---|---|
| **AHMS (2015) Greater Macarthur Investigation Area: Aboriginal and** | AHMS undertook an investigation for the wider Macarthur region to assess the potential for development in the growth areas, encompassing the Subject Area. The assessment identified a high likelihood of extensive and/or significant Aboriginal sites |

| Assessment and date | Summary of findings |
|---|---|
| **Historic Heritage- Gap Analysis and Future Direction** | occurring along the large river systems and their riparian corridors. In particular, the tributaries of the Nepean River were identified as key area of high potential, with Aboriginal sites likely to be clustered around the upper reaches of tributaries where sandstone shelters begin to form. This investigation is of relevance as it contributes to the archaeological record of the region and assists in establishing a predictive model for the nature and distribute of Aboriginal sites for the region. |
| **Biosis Research (2006b) Douglas Area 7 Project Environmental Impact Statement Appendix H: Impacts on Indigenous and Historical Archaeology- Revised report** | This assessment was undertaken to characterise the cultural heritage resources in the predicted subsidence area of Appin Colliery Longwalls 701 to 704. This project assessed a large area of land approximately three kilometres to the south of the Subject Area, in a similar landscape of creek flats and gentle slopes. Biosis Research's survey took in sandstone environments that flanked the Nepean River and some of its westerly tributaries, but crucially this survey also investigated the cleared landscapes of the Cumberland Lowlands in the Douglas Park area. It was one of the first surveys to do so, and discovered eight (8) previously unknown stone artefact sites in the area, including on the Mountbatten property (Mountbatten 1 AHIMS ID # 52-2-3674, Harris Creek Scar Tree and Harris Creek 2).<br><br>Biosis Research noted that stone artefact sites in the local area were generally under-represented in AHIMS records due to a lack of previous survey effort to find them (with most previous survey focusing on finding sandstone shelters). The report concluded that the landform with the most archaeological sensitivity in the region were tributaries and gullies, as these contained sandstone shelter sites with rock art and archaeological deposit; in addition stone artefacts were likely to occur in all parts of the undulating hills of the lowlands (the discontinuous "background scatter" of stone artefacts) as has been documented elsewhere on the Cumberland Plain |
| **Biosis Research 2009 Bulli Seam Operations (BSO) Aboriginal Cultural Heritage Assessment** | Biosis were commissioned to conduct an Aboriginal Cultural Heritage Assessment of the Bulli Seam Operations including Appin Mine and the Subject Area. A total of 632 known sites were recorded within the study area including an additional 44 as a result of the assessment. The majority of these sites were found to consist of sandstone shelters and platforms followed by stone artefacts and Potential Archaeological Deposits (PADs), which were found to predominately occur on the Blacktown soil landscape, within paddock grasses and open woodland vegetation across the Cumberland lowlands. These finds are associated with upper hill slopes, ridgelines and in close proximity to water sources including swamps and water lines. This report is of relevance as it contributes to the archaeological record of the region and assists in establishing a predictive model for the nature and distribute of Aboriginal sites for the region. |
| **Jo McDonald Cultural Heritage Management Pty Ltd 2009 Test Excavation Report Howes Creek Menangle Park** | Jo McDonald Cultural Heritage Management Pty Ltd were commissioned to undertake an archaeological test excavation of an area of high archaeological potential on the southern bank of Howe's Creek, situated approximately 6km north of the Subject Area. This is the only excavation that has occurred in the local area. The excavation identified that proximity of the test pits to Howe's Creek was an important factor to artefact density and that pits with pale sandy soil were generally found to have a higher density of artefacts to pits with dark loamy soil. A total of 113 artefacts were recovered during the test excavation, with an additional 70 artefacts recovered during a targeted excavation of an area of high potential within 200m south of Howe's Creek. |
| **Jo McDonald Cultural Heritage Management Pty Ltd 2010** | Jo McDonald Cultural Heritage Management Pty Ltd were commissioned by Landcom and Campbelltown City Council to prepare an assessment of Indigenous heritage values in the Menangle Park area, approximately 1 km north of the Subject Area. The assessment identified 22 open surface Aboriginal cultural heritage sites and a number |

| Assessment and date | Summary of findings |
|---|---|
| **Assessment of Indigenous heritage values Menangle Park** | of areas of PAD through survey and sensitivity mapping. The assessment identified first order tributary creek lines as one of three high value landscapes with the potential to contain sub-surface archaeological objects.<br>The assessment noted the limited archaeological investigations in the Menangle area, and recommended investigation and salvage for zones identified to be of high Indigenous sensitivity prior to development. |
| **Kelleher Nightingale 2012** | Kelleher Nightingale were commissioned to conduct a Due Diligence assessment to inform a Review of Environmental Factors for the Douglas Park Environmental Waste Water Scheme, situated approximately 3km south of the Subject Area. This report is of relevance as it contributes to the archaeological record of the region and assists in establishing a predictive model for the nature and distribute of Aboriginal sites for the region. |
| **Niche 2020** | Niche were commissioned to undertake a Due Diligence assessment for geotechnical investigations within the Subject Area. The assessment concluded that further investigation was warranted due to the presence of known and potential unknown Aboriginal cultural heritage sites. The assessment identified high archaeological potential along the terraces either side of Foot Onslow Creek. |

## 7.4 Regional Archaeological Studies

The local archaeological studies detailed above fit broadly into the wider Cumberland Plain area, which encompasses the entire Subject Area. The antiquity of Aboriginal occupation in the region is demonstrated through a number of archaeological excavations that have been undertaken across the Cumberland Plain.

It is now proposed that Aboriginal occupation of Australia dates back at least 65,000 years based on results from Madjedbebe, a rockshelter located in northern Australia (Clarkson et al. 2017). The greater Sydney region has been inhabited by Aboriginal people for at least 35,000 years. The earliest known occupational site of the Cumberland Plain and generally in the Sydney Basin is located north of Pitt Town, south of the Hawkesbury and the cultural deposits have been dated by optically stimulated luminescence (OSL) to 36,000+/-3000 BP (Williams et al. 2012). While there is early evidence that the Sydney region has been occupied for over 35,000 years (Williams et al. 2012), archaeological research indicates the earliest evidence for occupation in the eastern Blue Mountains to the west of the Sydney Basin is 12,000 years Before Present (BP) from Walls cave, Lyre Bird dell and Kings Table. The earliest date recorded at King Table of 22,000 years BP (Stockton and Holland 1974) has been rejected due to a lack of clarity on associated taphonomic processes (Johnson 1979). The late Holocene (5,000-0 years BP) sees extensive increased occupation of the Cumberland Plain with the vast majority of the 12,000 or so sites recorded from this period. The result of this extensive and continued occupation has left a vast amount of accumulated depositional evidence.

## 7.5 Synthesis and Predictive Model

On the Cumberland Plain at Rouse Hill, west of Sydney, White and McDonald (2010) have analysed the distribution of stone artefacts across the Rouse Hill Development Area, which measures around 5 km x 5 km. This is the first such peer reviewed and published analysis and predictive model. White and McDonald analysed several landscape variables against the results of sub-surface investigations (a database containing 4429 stone artefacts) and concluded that the stream order (the size of a drainage line) and landform were the most important factors in determining artefact density and distribution. In summary they conclude that factors influencing artefact density include:

1. stream order, with higher order streams tending to have higher artefact densities and more continuous distributions than lower order streams.
2. landform, with higher densities occurring on terraces and lower slopes, and with sparse discontinuous scatters on upper slopes.
3. aspect on lower slopes associated with larger streams, with higher artefact densities occurring on landscapes facing north and northeast.
4. distance from water, with higher artefact densities occurring 51–100m from 4th order streams, and within 50m of 2nd order streams (White and McDonald 2010: 36).

Although the Menangle area is one of greater relief than Rouse Hill, White and McDonald's observation about the importance of landform is noteworthy and aptly describes the known distribution of stone artefact sites in the Menangle area. Jo McDonald Cultural Heritage Management also undertook a study of Indigenous heritage values at Menangle Park, just north of the Subject Area (JMCHM 2010). This study identified three high value landscapes with the potential to contain sub-surface Aboriginal objects, including creek terraces like that of Foot Onslow Creek.

Using data from regional and local archaeological studies, as well as environmental contexts such as geography, topography, hydrology and proximity to resources- a predictive model can be developed to make an informed calculation about the likelihood of specific site types, raw material occurrence and site distribution within the Subject Area.

The Subject Area is located on mostly cleared flats and low to steep hills. There are no landforms within the Subject Area which will produce rock shelters. The Subject Area contains no previously documented or known evidence of use by the Aboriginal community in the times since European contact. The types of Aboriginal archaeological site which were considered likely to occur within the Subject Area are open stone artefact sites. The Subject Area is on the low hills and gentle slopes of the Blacktown Soil Landscape as well as the floodplain and terraces of Theresa Park Soil landscape (Hazelton and Tille 1990). The Blacktown Soil Landscape has the potential to preserve traces of past Aboriginal land use wherever they occurred on the landscape. The Theresa Park Soil Landscape also has the potential to contain Aboriginal objects and/or features due to its moderately deep soil profile, increasing the likelihood to preserve artefacts at depth.

Considering the characteristics of the Cumberland Plain in general, and the specific results of previous investigations in the Subject Area and the surrounding Menangle area the following predictive statements can be made:

- Open Camp Sites (consisting of surface artefact scatters and/or isolated artefacts) are the most likely Aboriginal site types to occur, being commonly found in water-related landforms and gentle slopes <200 m from waterways. This includes flats, lower slopes and hill crests. High density artefact sites are usually located within 50 m – 100 m proximity to upper reaches of larger drainage lines.
- Potential Archaeological Deposits (PADs) are likely to occur where intact soil profiles are present in association with well drained flats and lower slopes. The occurrence of sub-surface material does not necessarily correlate with Aboriginal objects found upon the surface.
- Modified trees (scarred or carved) are unlikely to occur within the Subject Area due to historic clearing of vegetation and the fact that the practice of utilising wood and bark from trees by Aboriginal people decreased after European contact.
- Rockshelters, art (pigment and engraved), middens, quarries, stone arrangements and axe grinding grooves will not be located within the Subject Area due to the absence of suitable food water resources (shells and molluscs) and/or suitable geology (i.e. sandstone formations and outcrops).

- Aboriginal burials are unlikely to be present within the landscape due to the shallow soil profile. These sites tend to occur within deep, sandy and/or soft soil contexts within sand dune formations, often in association with midden materials.
- Aboriginal places are places of cultural significance to Aboriginal people. No Aboriginal places have been declared within the Subject Area (November 2020) or listed on AHIMS (http://www.environment.nsw.gov.au/conservation/AboriginalPlacesNSW.htm ).

The predictive statements are limited to the open stone artefact and scarred tree site types, as these are the only site types with a predictable likelihood to occur in the Subject Area.

# 8. Field Methods

## 8.1 General Information

The following methods were used to identify archaeological resources, heritage values and significant cultural themes for the Subject Area:

- Aboriginal community input- this was sought throughout the project via the consultation process, participation in archaeological fieldwork and other correspondence.
- Archaeological research- this included landscape characterisation, analysis of previous archaeological works in the region and field survey.
- Archaeological test excavation.

A proposed methodology for the Project ACHA was developed by Niche. A copy of the proposed methodology is available in Appendix 5. The proposed methodology follows the:

- *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DEC 2005).*
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010a).*
- *Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010b); and*
- *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH 2011).*

## 8.2 Cultural Heritage Survey

The cultural heritage survey covered all of the initial Subject Area (Plate 1) for the proposed Project, including the land along the eastern bank of Foot Onslow Creek. A brief discussion of the results of the survey in the excluded Subject Area is included below.

The cultural heritage survey was undertaken on Monday 7 December 2020. The list of fieldwork participants is provided in Table 19 below.

**Table 19: Cultural Survey Participants**

| Representative | Registered Aboriginal Party |
|---|---|
| **7 December 2020** | |
| Nick DeZwart | A1 Indigenous Services |
| Phil Boney | Barraby Cultural Services |
| Rebecca Chalker | Cubbitch Barta Native Title Claimants |
| Joanne Smith | Didge Ngunawal Clan |
| Clive Freeman | Freeman & Marx Pty Ltd |
| Adam Gunther | Kamilaroi Yankuntjatjara Working Group |
| Sarah McGuinness | Niche |
| Yolanda Pavincich | Niche |
| Nicola Curtis | IMC |

Previously registered AHIMS sites that fall within the Subject Area were relocated.

The survey was conducted through a systematic meander across the Subject Area, with survey participants walked a series of transects generally spaced between 10 m and 20 m apart. Areas of greater visibility and

higher potential (exposures, ridgelines, terraced flats etc) were targeted during the survey. Sites were recorded using pre-prepared forms and handheld GPS with an average accuracy of ± 7 m.

The results of the survey are presented in Section 9.

## 8.3 Archaeological Test Excavation

The purpose of the archaeological test excavation was to increase visibility of deposits and provide further information on the Aboriginal cultural heritage values of the Subject Area. The data gathered contributed to our understanding of site characteristics and local and regional prehistory. The results assisted the formalisation of appropriate management recommendations for the proposed works and any archaeological material recovered.

Test excavation was completed under the BSO Aboriginal Cultural Heritage Management Plan (South32, 2012) and in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010a) and was undertaken by Niche along with representatives from the RAP groups. The methodology for the test excavation was provided to the RAPs as part of the Stage 2 consultation process outlined in the Consultation Requirements.

The archaeological test excavation was carried out between Monday 1 and Friday 12 February 2021. The list of fieldwork participants is provided in Table 20 below. The test excavation was undertaken in accordance with the sampling methodology outlined below.

**Table 20: List of fieldwork participants, organisation and dates**

| Participant | Organisation | Dates |
|---|---|---|
| Nick De Zwart | A1 | 8 February 2021 |
| Wayne Kennedy | A1 | 9 February 2021 |
| Jayden Reid | Aragung | 8 -12 February 2021 |
| Lee Field | Barraby Cultural Services | 1 – 4 February 2021 |
| Kirsty-Lee Chalker | Cubbitch Barta Native Title Claimants | 2 and 4 February 2021 |
| Glenda Chalker | Cubbitch Barta Native Title Claimants | 3 and 12 February 2021 |
| Rebecca Chalker | Cubbitch Barta Native Title Claimants | 1 February 2021 |
| Kiarni Chalker | Cubbitch Barta Native Title Claimants | 11 and 12 February |
| Peter Markovic | Freeman & Marx | 4, 8, 9 and 12 February 2021 |
| Jamie Currell | KYWG | 1, 2, 3 and 5 February 2021 |
| Kaarina Slater | Ngambaa CC | 5, 9 and 10 February 2021 |
| Hannah Matagia | Wurrumay | 5, 9, 10, 11 and 12 February 2021 |
| Bree Slater | Yulay Cultural Services | 5, 10, 11 and 12 February 2021 |
| Arika Jalomaki | Yulay Cultural Services | 8 February 2021 |
| Bo Field | Yurrandaali | 1 – 4 February 2021 |
| Sarah McGuinness | Niche | 1- 12 February 2021 |
| Sam Ward | Niche | 1- 12 February 2021 |

| | | |
|---|---|---|
| Wade Goldwyer | Niche | 1- 12 February 2021 |
| Kosta Contas | Niche | 2, 3, 4, 8, 9, 19 and 11 February 2021 |
| Chelsea Freeman | Niche | 1, 5 and 12 February 2021 |
| John Gillen | Niche | 1 February 2021 |
| Matthew Richardson | Niche | 5 and 12 February 2021 |
| Nicola Curtis | South32 IMC | 1, 3, 4, 8, 11 and 12 February 2021 |
| Steve Groen | South32 IMC | 1, 5 and 12 February 2021 |

It is important to note that the first priority in test excavations, and recording Aboriginal objects, must always be to avoid or minimise, as far as practicable, the risk of harm to the objects under investigation. This means due care must be taken when excavation and collecting objects.

The test excavation was located in the area associated with a known registered Aboriginal site; (AHIMS ID# 52-2-3687) (Figure 4). The aim of the test excavation was to:

1. Test the area surrounding the registered Aboriginal cultural heritage site.
2. Increase ground surface visibility in the Subject Area.
3. Provide further information on the nature, significance and extent of any sub-surface archaeological deposit within the Subject Area.
4. Test the nature, significance and extent of any sub-surface archaeological deposit in relation to archaeologically sensitive landforms within the Subject Area (i.e. with distance from water).

A total of 52 test pits were excavated, including the 46 pits proposed in the Project Methodology and an additional six test pits (Table 23).

The original 46 pits were aligned along three transects following the contours of Foot Onslow Creek (Figure 7).

- **Transect 1** - This transect was located approximately 20m west of the Foot Onslow Creek bank. A total of 17 test pits were proposed along Transect 1.
- **Transect 2** - This transect was located approximately 30m west of Transect 1, and 50m west of the Foot Onslow Creek bank. A total of 16 test pits were proposed along Transect 2.
- **Transect 3** - This transect was located approximately 30m west of Transect 2, and 80m west of the Foot Onslow Creek bank. A total of 13 test pits were proposed along Transect 3.

Following completion of the original 46 test pits, an additional six test pits were excavated in the central portion of the site. The location of the additional test pits was decided in consultation with RAPs on site and were placed in proximity to artefact bearing test pits TP9, TP26, TP29 and TP38 (Figure 7).

The addition of extra test pits assisted in determining the extent of subsurface archaeological deposits.

### 8.3.1 Test Excavation Methods

The high pastoral grasses were machine slashed prior to excavation.

The test pits were excavated according to Requirements 16 and 17 of the Code of Practice.

- Test excavation pits measured 50 cm x 50 cm.
- The excavation pits were hand excavated.
- Test pits were be excavated using 5 cm spits for the first test pit within each transect, and 10 cm spits for each test pit thereafter to:
  - the base of artefact bearing layers.
  - a viable B horizon indicating a base of artefact layer.
  - rock, should this occur in the absence of B horizon or base of artefact layer.
  - groundwater, where present.
  - where it would be considered that digging any deeper would be unsafe.
  - where sufficient information has been recovered to understand the extent, nature and significance of the archaeological deposits; or
  - a depth of 100 cm (for safety compliance).

## 8.4 Recording and Photography

The location of each excavation pit was recorded using a non-differential GPS. Excavation was recorded on spit sheets for each pit and diagnostic and/or representative archaeological features were sketched and photographed. Upon completion, the stratigraphy of all test pits were scale drawn and photographed.

## 8.5 Sieving

All excavated material was wet sieved through 3 mm aperture wire mesh.

## 8.6 Artefact Collection

All artefacts recovered during test excavations are temporarily held by Niche in a locked cupboard located at Niche's office on 2/19 Ralph Black Drive, North Wollongong.

Following completion of the test excavation, a full record and catalogue of the artefacts was prepared in accordance with Requirement 26 of the Code of Practice and described below in Section 9.2.3.

## 8.7 Long-term management of artefacts

The long-term management of artefacts will be determined following consultation with RAPs following Project approval. Discussion on site with RAPs indicates that the preferred long-term deposition of the artefacts recovered during the test excavation is their reburial on site, outside of the impact footprint.

## 8.8 Artefact Analysis and Cataloguing

The analysis, recording and cataloguing of artefacts was completed by Niche Heritage Consultant Marika Low in accordance with Requirement 19 of the Code of Practice and as per the methods described in Section 9.

## 8.9 Sensitive Cultural Information- Management Protocol

During the consultation process the proponent and Niche provided the opportunity for the RAPs to provide cultural information, including a statement of the value of identified sites and other matters. The input points were listed within the survey methodology that has been included in Appendix 5, information will be accepted at any point during the project prior to the finalisation of the ACHA.

RAPs were made aware that the Proponent and Niche staff would seek cultural information and supporting evidence in regard to matters of cultural value.

In the event that a stakeholder had sensitive or restricted public access information it was proposed that the proponent and Niche would manage this information (if provided by the Aboriginal community) in accordance with a sensitive cultural information management protocol. It is anticipated that the protocol will include making note of and managing the material in accordance with the following key limitations as advised by Aboriginal people at the time of the information being provided:

- Any restrictions on access to the material.
- Any restrictions on communication of the material (confidentiality).
- Any restrictions on the location/storage of the material.
- Any cultural recommendations on handling the material.
- Any names and contact details of persons authorised within the relevant Aboriginal stakeholder to make decisions concerning the Aboriginal material and the degree of authorisation.
- Any details of any consent given in accordance with customary law.
- Any access and use by the RAPs of the cultural information in the material.

There was sensitive material provided by the RAPs to Niche, and accordingly any restricted information is marked as *confidential* in this report.

# 9. Results

## 9.1 Cultural Heritage Survey

The survey area consisted primarily of flat to gentle sloping landforms, with some areas of steep slope and ridgeline. The survey covered the entire original Subject Area, including the later excluded section. For the purpose of Section 9.1, Subject Area refers to the initial unrefined size (Plate 1).

A summary of survey coverage by landform categories across the Subject Area is provided in Table 21 and Table 22.

**Table 21: Survey coverage across Subject Area by landform category**

| Landform category | Landform area (sq. m) | Visibility | Exposure | Effective coverage area (sq. m) | Effective coverage % |
|---|---|---|---|---|---|
| Creek terrace | 70000 | 10% | 10% | 700 | 1 |
| Gentle slope | 100000 | 10% | 10% | 1000 | 1 |
| Steep slope | 39500 | 10% | 10% | 395 | 1 |
| Upper slope and crest | 15500 | 20% | 20% | 620 | 4 |

**Table 22: Landform summary**

| Landform category | Landform area (sq.m) | Area effectively surveyed (sq.m) | % of landform effectively surveyed | Number of sites | Number of artefact features |
|---|---|---|---|---|---|
| Creek terrace | 7000 | 700 | 1 | 2 | 6 |
| Gentle slope | 100000 | 1000 | 1 | 0 | 0 |
| Steep slope | 39500 | 395 | 1 | 0 | 0 |
| Upper slope and crest | 15500 | 620 | 4 | 0 | 0 |

The Subject Area is currently characterised by high, dense grass cover, with scattered areas of low regrowth vegetation (Plate 9 Plate 10 and Plate 11). Visibility was generally poor across the Subject Area. Areas of exposure are scattered and generally consist of vehicle tracks, areas of erosion and dam banks (Plate 14).

Areas of disturbance were noted in the form of:

- General land clearance across the Subject Area.
- Prolonged agricultural and pastoral use.
- Significant earthwork construction of two dams.
- Well used vehicle tracks.
- Compaction and erosion of soils in the southern half of the Subject Area where heavy machinery had been used and stored.
- Soil and rubbish stockpiling (Plate 12); and
- Natural erosion and weathering of the banks of Foot Onslow Creek (Plate 13).

Plate 9: General photo of the Subject Area facing south-west.

Plate 10: General photo of the Subject Area facing south.

Plate 11: General photo of the Subject Area facing north showing high dense grass cover and poor visibility.

Plate 12: General photo of the Subject Area showing disturbances of soil and rubbish stockpiling.

Plate 13: General photo of the Subject Area facing west showing disturbance through dam construction.

Plate 14: General photo of the Subject Area showing soil erosion along bank of Foot Onslow Creek.

### 9.1.1 Previously recorded sites within the Subject Area

Two previously recorded sites were located within or immediately adjacent to the Subject Area; two were registered on AHIMS; Bulli Site 7 (AHIMS ID # 52-2-3687) and Bulli Site 8 (AHIMS ID# 52-2-3688). Details of these sites are listed below;

#### 9.1.1.1 AHIMS ID# 52-2-3687 (Bulli Site 7)

Previously recorded isolated artefact site AHIMS ID#52-2-3687 was not relocated during the initial cultural heritage survey. The site is located on an area of exposure adjacent to the northern dam in the property, within the paddock between Foot Onslow Creek and Menangle Road (Plate 15 and Figure 4).

This site is likely to have been subject to significant disturbance through land clearing, cattle grazing, vehicular movement, rubbish dumping and natural disturbances of erosion and soil slumping.

**Plate 15: Location of Bulli Site 7 (AHIMS ID #52-2-3687), facing east.**

**Site identification during Test Excavation**

While Bulli Site 7 (AHIMS ID#52-2-3687) was not able to be reidentified during the original field survey in December 2020, a secondary inspection of the site during the test excavation program identified an artefact on the northern dam wall (Plate 15). The artefact is unlikely to be in situ, with the bank of the dam artificially constructed as clearly identified in nearby TP 24.

The red silcrete flake (Plate 16 and Plate 17) was eroding from an area of exposure that had been subject to additional disturbances of erosion and bioturbation caused by cattle accessing the dam water.


**Plate 16: Red silcrete flake identified at Bulli Site 7 (AHIMS ID#52-2-3687) during the test excavation.**

**Plate 17: location of flake eroding from dam bank.**

#### 9.1.1.2 AHIMS ID# 52-2-3688 (Bulli Site 8)

Previously recorded open camp site, Bulli Site 8 (AHIMS ID#52-2-3688), was relocated during the cultural heritage survey, and was found to extend north of the original recorded boundary (Figure 8). The site is located on the eastern side of Foot Onslow Creek and extends approximately 100 m north along the fence line, in an area of eroding exposure. Eight artefacts were recorded along the exposure (Plate 18, Plate 22 and Plate 23). Consensus among the RAPs and Niche on site was that the scatter is likely to continue outside of the surveyed area to the east.

This site has been subject to significant disturbance through land clearing, cattle grazing, vehicular movement, construction of powerline easement, rubbish dumping and natural disturbances of erosion and soil slumping. Some of the identified artefacts were noted eroding from the bank (Plate 20).

Following the revision of the Subject Area (Section 2), this location is no longer within the boundary and will not be impacted by the proposed works.

**Plate 18: Red silcrete core at Bulli Site 8 (AHIMS ID#52-2-3688).**

**Plate 19: Bulli Site 8 (AHIMS ID#52-2-3688) area of eroding exposure along fence line. Facing north.**

Plate 20: Bulli Site 8 (AHIMS ID#52-2-3688) showing erosion of bank. Facing east.

Plate 21: Area of exposure along fence line at Bulli Site 8 (AHIMS ID#52-2-3688). Facing south.


Plate 22: Red silcrete flake at Bulli Site 8 (AHIMS ID#52-2-3688).


Plate 23: Red silcrete flake at Bulli Site 8 (AHIMS ID#52-2-3688).

## 9.2 Archaeological Test Excavation

### 9.2.1 Test Pit Locations

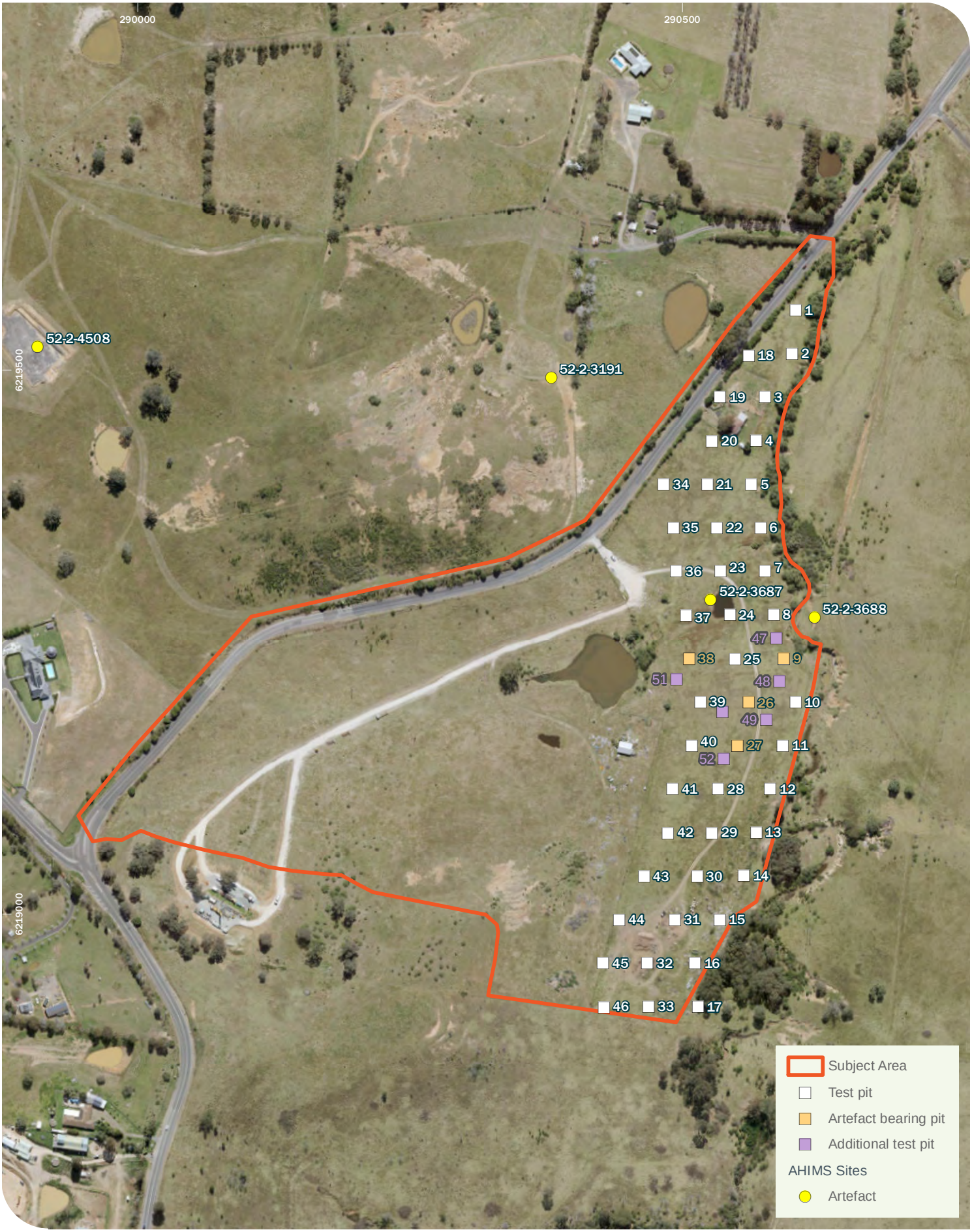
A total of 52 test pits were excavated over the ten-day excavation program (Figure 7). All of the 46 test pits proposed in the Excavation Methodology were positioned according to the projected transects, with the additional six test pits positioned in the central portion of the site, around artefact bearing pits (Table 23).

All test pits measured 50 by 50 cm. A summary of the excavated test pits is presented below in Table 23. Excavation records, section drawings and photographs of each individual test pit are provided in Annex 3, with an analysis and discussion of the test excavation results outlined in Section 10.

**Table 23: Test Pit Summary**

| Test pit ID | Landform | Datum | Zone | Easting | Northing | Transect | Final depth (cm) | Aboriginal objects |
|---|---|---|---|---|---|---|---|---|
| TP01 | Creek terrace | GDA | 56 | 290603 | 6219555 | 1 | 65 | |
| TP02 | Creek terrace | GDA | 56 | 290600 | 6219515 | 1 | 40 | |
| TP03 | Creek terrace | GDA | 56 | 290575 | 6219475 | 1 | 60 | |
| TP04 | Creek terrace | GDA | 56 | 290567 | 6219435 | 1 | 40 | |
| TP05 | Creek terrace | GDA | 56 | 290563 | 6219395 | 1 | 50 | |
| TP06 | Creek terrace | GDA | 56 | 290571 | 6219355 | 1 | 50 | |
| TP07 | Creek terrace | GDA | 56 | 290575 | 6219315 | 1 | 50 | |
| TP08 | Creek terrace | GDA | 56 | 290583 | 6219275 | 1 | 60 | |
| TP09 | Creek terrace | GDA | 56 | 290593 | 6219235 | 1 | 60 | 1 X Spit 4 |
| TP10 | Creek terrace | GDA | 56 | 290603 | 6219195 | 1 | 40 | |
| TP11 | Creek terrace | GDA | 56 | 290592 | 6219155 | 1 | 60 | |
| TP12 | Creek terrace | GDA | 56 | 290580 | 6219115 | 1 | 40 | |
| TP13 | Creek terrace | GDA | 56 | 290567 | 6219075 | 1 | 40 | |
| TP14 | Creek terrace | GDA | 56 | 290556 | 6219035 | 1 | 40 | |
| TP15 | Creek terrace | GDA | 56 | 290534 | 6218995 | 1 | 50 | |
| TP16 | Creek terrace | GDA | 56 | 290511 | 6218955 | 1 | 50 | |
| TP17 | Creek terrace | GDA | 56 | 290514 | 6218915 | 1 | 40 | |
| TP18 | Gentle slope | GDA | 56 | 290560 | 6219513 | 2 | 25 | |
| TP19 | Gentle slope | GDA | 56 | 290534 | 6219475 | 2 | 60 | |
| TP20 | Creek terrace | GDA | 56 | 290527 | 6219435 | 2 | 50 | |
| TP21 | Creek terrace | GDA | 56 | 290522 | 6219395 | 2 | 50 | |
| TP22 | Creek terrace | GDA | 56 | 290531 | 6219355 | 2 | 50 | |
| TP23 | Creek terrace | GDA | 56 | 290534 | 6219315 | 2 | 40 | |
| TP24 | Creek terrace | GDA | 56 | 290543 | 6219275 | 2 | 100 | |
| TP25 | Creek terrace | GDA | 56 | 290547 | 6219235 | 2 | 30 | |
| TP26 | Creek terrace | GDA | 56 | 290560 | 6219195 | 2 | 40 | 1 X Spit 1<br>1 X Spit 2 |

| Test pit ID | Landform | Datum | Zone | Easting | Northing | Transect | Final depth (cm) | Aboriginal objects |
|---|---|---|---|---|---|---|---|---|
| TP27 | Creek terrace | GDA | 56 | 290550 | 6219155 | 2 | 60 | 1 X Spit 2 |
| TP28 | Creek terrace | GDA | 56 | 290532 | 6219115 | 2 | 50 | |
| TP29 | Creek terrace | GDA | 56 | 290527 | 6219075 | 2 | 70 | |
| TP30 | Creek terrace | GDA | 56 | 290513 | 6219035 | 2 | 20 | |
| TP31 | Creek terrace | GDA | 56 | 290493 | 6218995 | 2 | 40 | |
| TP32 | Creek terrace | GDA | 56 | 290467 | 6218955 | 2 | 30 | |
| TP33 | Creek terrace | GDA | 56 | 290469 | 6218915 | 2 | 40 | |
| TP34 | Gentle slope | GDA | 56 | 290482 | 6219395 | 3 | 40 | |
| TP35 | Creek terrace | GDA | 56 | 290491 | 6219355 | 3 | 50 | |
| TP36 | Creek terrace | GDA | 56 | 290494 | 6219315 | 3 | 50 | |
| TP37 | Creek terrace | GDA | 56 | 290503 | 6219275 | 3 | 50 | |
| TP38 | Creek terrace | GDA | 56 | 290506 | 6219235 | 3 | 40 | 1 X Spit 4 |
| TP39 | Creek terrace | GDA | 56 | 290516 | 6219195 | 3 | 30 | |
| TP40 | Creek terrace | GDA | 56 | 290508 | 6219155 | 3 | 50 | |
| TP41 | Creek terrace | GDA | 56 | 290490 | 6219115 | 3 | 60 | |
| TP42 | Creek terrace | GDA | 56 | 290486 | 6219075 | 3 | 60 | |
| TP43 | Creek terrace | GDA | 56 | 290464 | 6219035 | 3 | 50 | |
| TP44 | Creek terrace | GDA | 56 | 290442 | 6218995 | 3 | 30 | |
| TP45 | Creek terrace | GDA | 56 | 290427 | 6218955 | 3 | 40 | |
| TP46 | Creek terrace | GDA | 56 | 290427 | 6218915 | 3 | 50 | |
| TP47 | Creek terrace | GDA | 56 | 290586 | 6219254 | Additional pits | 40 | |
| TP48 | Creek terrace | GDA | 56 | 290589 | 6219214 | Additional pits | 40 | |
| TP49 | Creek terrace | GDA | 56 | 290577 | 6219179 | Additional pits | 30 | |
| TP50 | Creek terrace | GDA | 56 | 290537 | 6219186 | Additional pits | 30 | |
| TP51 | Creek terrace | GDA | 56 | 290495 | 6219216 | Additional pits | 40 | |
| TP52 | Creek terrace | GDA | 56 | 290538 | 6219143 | Additional pits | 40 | |

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# Test Excavation Results

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Figure 7

### 9.2.2 Soil Profile

The soil profile identified within the test pits was found to be consistent with the Theresa Park soil landscape within agricultural landforms. Topsoil across the Subject Area generally consisted of a brown to reddish brown sandy loam that varied from moderately loose to heavily compacted. The topsoil depth averaged approximately 20 cm across the test pits.

The subsoil was generally noted to be a reddish brown hard-setting sandy clay loam that ranged from approximately 20 cm to 40 cm in depth. This deposit contained occasional ironstone gravel inclusions.

The subsoil was found to overlie a red brown crumbly, sandy clay profile that averaged approximately 20 cm in depth. The crumbly clay layer generally had a diffuse transition onto heavily compact yellowish-brown clay. Excavation of test pits ceased at this sterile layer.

#### 9.2.2.1 Disturbance to Soil Profile

Past agricultural land use of the Subject Area was observed within the soil profile in the form of poor soil development through land clearance, ploughing, cattle movement and soil erosion. The top 40 cm of deposit was found to be largely unstratified across the Subject Area and showed evidence of churning and poor deposition.

The southern half of the Subject Area in particular was noted to have heavily compact and thin topsoil profiles, which was consistent with the ongoing use of the area for machinery pads and agricultural storage as evidenced on the site.

The construction of an earthen dam in the central portion of the Subject Area was also evident within the soil profile. TP24 was situated 15 m from the southern bank of the dam and was excavated to a depth of 100 cm. The soil profile was found to be heavily impacted by the dam's construction, and consisted of a very thin topsoil above 90 cm of mixed, unstratified clay loam. No natural soil profile was identified within the test pit.

#### 9.2.2.2 Typical Soil Profile

The typical soil profile observed within the Subject Area is presented below.

- **Reformed topsoil:** brown to reddish-brown sandy loam with grass root inclusions.
- **A Horizon:** Reddish-brown hard setting sandy clay loam, with a diffuse transition onto a red brown brittle sandy clay. Some occasional ironstone gravel inclusions. Not always a clear transition between A1 or A2 horizons.
- **B Horizon:** Compact yellowish-brown clay, waxy when wet.

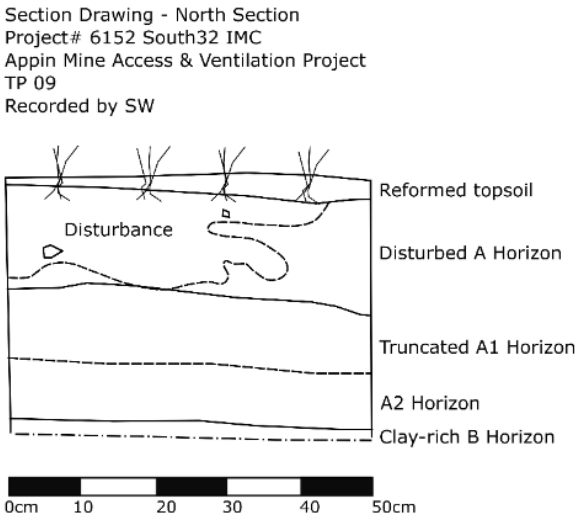



**Plate 24: Example of the typical soil profile identified across the Subject Area (TP9).**

**Plate 25: Section Drawing of a typical soil profile (TP9).**

### 9.2.3 Artefact Analysis

Artefact analysis and the preparation of a catalogue was conducted by Niche prior to the long-term management of the artefacts. The analysis, recording and cataloguing of artefacts was completed by Niche heritage consultant Marika Low in accordance with Requirement 19 of the Code of Practice and as per the methods described below. Full details of the artefact catalogue can be found in Annex 4.

Artefacts were sorted and given a unique ID number, individually analysed and entered into an excel spreadsheet, thus creating a comprehensive typological, technological and metrical analysis of the excavated assemblage. The location of the excavated artefacts was also recorded by site, spit/depth and excavation square. Analysis was aided by the use of a 10x hand lens and a standard digital vernier calliper. Measurements were made in millimetres to one decimal place.

The attributes recorded for each artefact are dependent on the technological class (i.e. if a complete flake, core or retouched flake/tool etc). Artefacts such as cores and tool generally represent a small fraction of an assemblage but can offer the greatest amount of information. An overview of the attributes and measurements recorded is provided in Table 24 below.

**Table 24: Overview of attributes and measurements recorded for stone artefact assemblage**

| Attribute/ measurement | Categories/ description | Conditions of recording |
|---|---|---|
| ID | Unique identification number | All artefacts |
| Context details | Site name/ Test Pit #/ Spit # | All artefacts |
| Technological class | Core, Flake, Retouched flake, Flaked piece (also referred to as angular fragment/lithic fragment), Other | All artefacts |
| Artefact sub-type | Adze, Anvil, Axe, Backed blade, Backed flake, Bondi point, Irregular Retouched Flake, Geometric Microlithic, Core tool, Elouera, Scraper, Flake tool, Grindstone, Hammerstone, Manuport, Milling slab, Mortar, Muller, Nuclear tool, Pirri, Tula, Other, Modified, Unworked | All artefacts |

| Attribute/ measurement | Categories/ description | Conditions of recording |
|---|---|---|
| Flake form | Blade, Expanding, Elongated, Irregular | All complete flakes and retouched flakes |
| Raw material type | Basalt, Chert, Fine Grained Siliceous (FGS), Granite, Quartz, Quartzite, Sandstone, Silcrete, Siltstone, Mudstone, Tuff, Other, Indurated Mudstone | All artefacts |
| Colour | Raw material colour | All artefacts |
| Cortex type | Water-rolled/cobble, Quarried/weathered, Indeterminate | All artefacts |
| Cortex amount | 0, 1-25, 26-50, 51-75, 76-99, 100 | All artefacts |
| Completeness | Complete or Broken | All artefacts |
| Fragmentation | Proximal, Medial, Distal, Marginal, Left Longitudinal Cone Split (Left-LCS), Right Longitudinal Cone Split (Right-LCS), Indeterminate | All broken flakes and retouched flakes |
| Platform type | Cortical, Plane (single flaked surface), Flaked (2 flake scars), Facetted (3 or more small, systematic flake removals), Ground, Bipolar, Retouched, Indeterminate | All complete and proximal flakes and retouched flakes |
| Initiation type | Bending, Hertzian, Bipolar, Wedging, Indeterminate | All complete and proximal flakes and retouched flakes |
| Platform shape | Wide, Focal, Shattered, Bipolar, Indeterminate | All complete and proximal flakes and retouched flakes |
| Termination type | Feather, Hinge, Step, Plunge (aka. Outrepasse), Bipolar, Retouched, Indeterminate | All complete and distal flakes and retouched flakes |
| Percentage of margin retouched | Square, Rectangular, Lenticular, Conical, Trapezoidal, Triangular, Irregular, NA | All complete retouched artefacts |
| Retouch type per quadrant (1, 2, 3, 4) | Scalar, Backing, Stepped, Notch, Use-wear, Other | All complete retouched artefacts |
| Core type (based on scar direction) | Unidirectional, bidirectional, bifacial, multiplatform, prismatic, burin-blade core, test, bipolar | Complete cores |
| Core scar count | Number of core scars | Complete cores |
| Core platform number | Number of platforms on the core from which flakes were removed | Complete cores |
| Weight | Weight of the artefact in grams to 1dp | All artefacts |
| Max dimension | Maximum length of artefact measured in mm to 1dp | All artefacts |
| Length | Axial length of the complete flake/complete tool or percussion length of complete core measured in mm to 1dp | All artefacts |
| Width | Width of the complete flake/tool/core at mid-point at right length to the width measured in mm to 1dp | All artefacts |
| Thickness | Thickness of the complete flake/tool/core at mid-point at right angles to the width measured in mm to 1dp | All artefacts |
| Palimpsest | Various layers or diverse aspects | |

#### 9.2.3.1 Artefact Counts

A total of five (5) stone artefacts were recovered during the test excavation program from four artefact-bearing test pits within the Subject Area. Two artefacts were recovered from TP 26 with the remaining test pits recording only one stone artefact each. Artefacts were recovered from a range of spits/depths across the Subject Area (Plate 26). One artefact was recovered from the upper 10 cm (TP26), two artefacts were recovered from a depth of 10-20 cm (TP26 and TP29) and the remaining two stone artefacts were recovered from depths of 30-40 cm (TP9 and TP38).

The frequency and distribution of Aboriginal objects are representative of transient land-use resulting in low-density occupation.

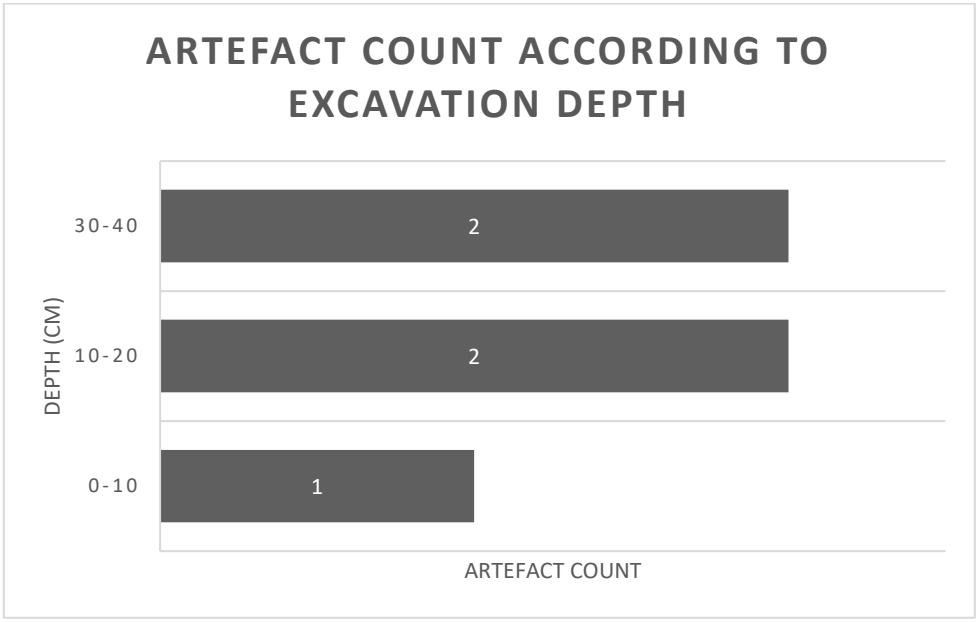



**Plate 26: Number of artefacts recovered according to excavation depth/ spit (spit 1=0-10 cm; spit 2=10-20 cm; spit 3=20-30 cm and spit 4=30-40 cm)**

#### 9.2.3.2 Artefact Assemblage Description

Due to the small number of the recovered artefacts it is not possible to identify temporal changes in technology and behaviour between spits or spatial patterning within the Subject Area. As such the excavated assemblage will be analysed as a whole for the Subject Area to gain a general impression of the palimpsest of activities that resulted in the accumulation of these Aboriginal objects within the Subject Area. The raw material type, artefact technological class and size (maximum dimension and weight) of the excavated artefacts are summarised in Table 25, Table 26 and Table 27 below respectively.

The excavated assemblage is characterised by a range of raw material types with red fine silcrete making up the 40% (n=2) of the artefacts recovered from the excavation. Cortex type can be used to provide information regarding the likely source of the raw materials used to manufacture stone artefacts. Only two artefacts (40%) in the excavated assemblage retained cortex. A grey siltstone retouched flake and a milky quartz bipolar flake both retained water-rolled cobble/pebble cortex indicative of a creek/cobble bed as the likely source.

The majority of artefacts consist of complete or broken flakes (n=3; 60%) with two complete retouched artefacts making up the remaining assemblage (Table 27, Plate 27 and Plate 30). A single asymmetrical backed artefact (aka. Bondi point) was recovered from a depth of approximately 10-20 cm (TP26). The

backed artefact was manufactured on yellow indurated mudstone and contains uni-directional backing retouch on the left margin to form the point. The second retouched artefact in the assemblage was recovered from spit 4 and is an irregular shaped grey siltstone flake with discontinuous scalar retouch on the ventral surface and situated across quadrants 1 and 4. The two retouched artefacts likely represent accidental loss or discard while passing through the area. Most flakes are characterised by hertzian initiation type. A single bipolar flake manufactured from white milky quartz was recovered from a depth of approximately 30-40 cm (TP38) and provides evident for bipolar technology in the assemblage. No cores or evidence for the on-site manufacture of stone artefacts was identified.

A wide size range of flaked stone artefacts is represented in this assemblage, with artefacts ranging between 11.8 mm to 58.8 mm and weighting from 0.12 g up to 20.5 g. The average artefact size of artefacts in the excavated assemblage is relatively small with mean maximum dimension of 24.2 mm and an average weight of just over 1.3 g (Table 27).

Although the assemblage is very small, the presence of a backed artefact and evidence for bipolar technology is consistent with the character of assemblages associated with the mid-to-late Holocene (ca 5,000-1,600 years ago) which are typically referred to as the "Bondaian" phase of the Eastern Regional Sequence (McCarthy 1967).

**Table 25: Raw material composition of excavated assemblage**

| Raw material | Frequency | Percentage of total |
|---|---|---|
| Silcrete | 2 | 40% |
| Siltstone | 1 | 20% |
| Indurated mudstone | 1 | 20% |
| Milky quartz | 1 | 20% |
| **Total** | **5** | **100%** |

**Table 26: Technological class composition of excavated assemblage**

| Technological class | Frequency | Percentage of total |
|---|---|---|
| Complete flake | 1 | 20% |
| Marginal flake | 1 | 20% |
| Distal flake | 1 | 20% |
| Complete retouched flake | 2 | 40% |
| **Total** | **5** | **100%** |

**Table 27: Artefact size – maximum dimension and weight**

| Measurement | Maximum | Minimum | Average |
|---|---|---|---|
| Maximum dimension | 58.8 mm | 11.8 mm | 24.2 mm |
| Weight | 20.50 g | 0.12 g | 1.33 g |

**Plate 27: AFT#001 – ventral surface of retouched flake manufactured from grey siltstone.**

**Plate 28: AFT#001 – ventral surface of retouched flake manufactured from grey siltstone.**

**Plate 29: AFT#002 – ventral surface of red silcrete marginal flake fragment.**

**Plate 30: AFT#003 – ventral surface of yellow indurated mudstone backed artefact/ Bondi point.**

**Plate 31: AFT#003 – dorsal surface of yellow indurated mudstone backed artefact/ Bondi point.**

**Plate 32: AFT#003 – backed margin of yellow indurated mudstone backed artefact/ Bondi point.**

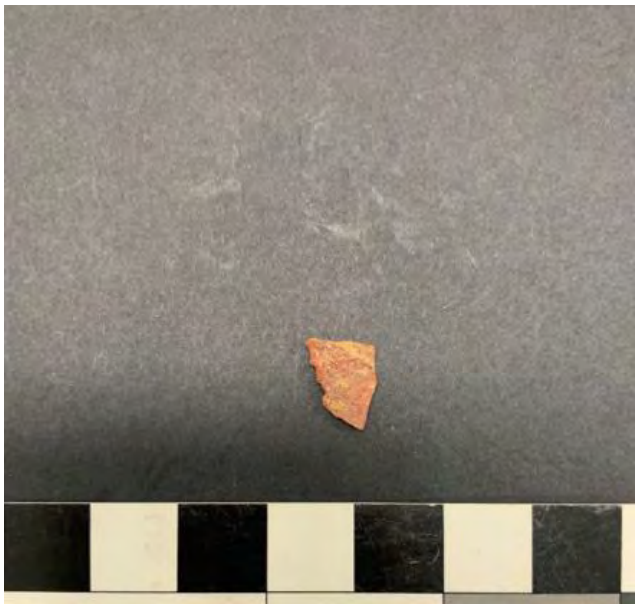


**Plate** 33**: AFT#004- dorsal surface of red silcrete distal flake.**

**Plate 34: AFT#005- dorsal surface of milky quartz flake.**

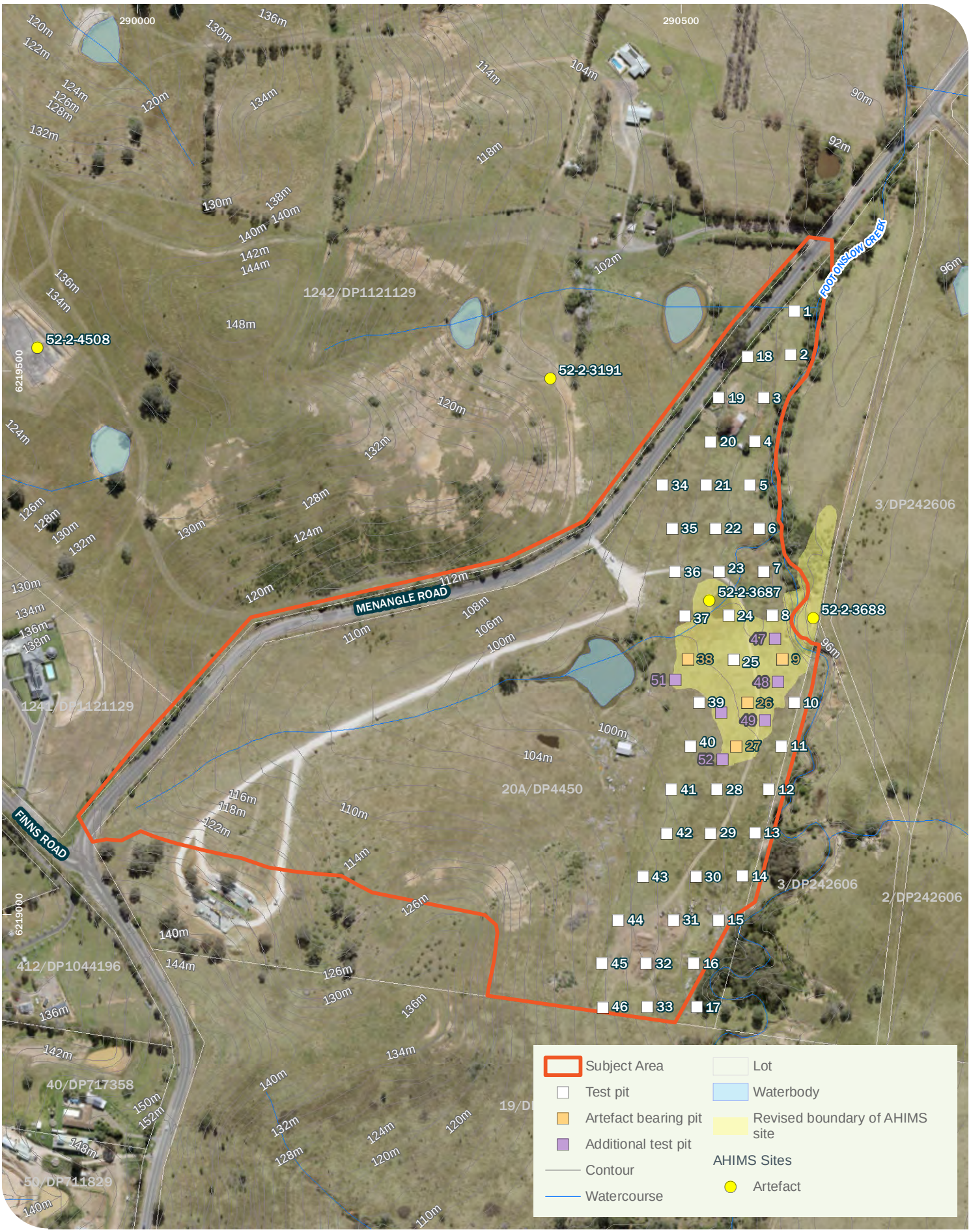
### 9.2.4 Nature and Extent of Sub-Surface Archaeological Profile

The strategic placement of test pits along the entirety of the raised creek terrace and surrounding the known Aboriginal cultural site Bulli Site 7 (AHIMS ID# 52-2-3687) aimed to assist in understanding the extent of these sites as well as the stratigraphic context and potential subsurface deposits.

Of the 52 test pits excavated, four contained Aboriginal cultural material and none contained any in situ archaeological features. Of the four artefact bearing pits, the highest number of artefacts from a single pit was two. All artefacts identified during the excavation were situated in the top 40 cm of deposit, which showed evidence of disturbances through land clearance, working of the soil and erosion. The disturbed context of the pits indicate that the recovered sub-surface artefacts and the artefact identified at Bulli Site 7 (AHIMS ID # 52-2-3687) are unlikely to be in situ.

Based on the results of the test excavation, the boundary of Bulli Site 7 (AHIMS ID # 52-2-3687) has been revised to include all artefact bearing pits (TP9, TP26, TP29 and TP26) and site Bulli Site 8 (AHIMS ID # 52-2-3688) that is situated on the eastern bank of Foot Onslow Creek (Figure 8 and Section 9.1.1.2). The AHIMS site cards will be updated to reflect these results, following finalisation of this report.

Overall, the results from the test excavation program demonstrate that the Subject Area was likely associated with a low- intensity occupation and use by Aboriginal people in the past. The broad association between artefact bearing test pits, the locations of Bulli Site 7 (AHIMS ID # 52-2-3687) and Bulli Site 8 (AHIMS ID # 52-2-3688) and the low number of subsurface artefacts recovered suggest that the entire area may best be considered as a whole with Aboriginal objects resulting not from isolated behavioural events but rather as a result of sporadic use of and/or movement through the Subject Area over a long period of time.

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# Revised AHIMS Site

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Niche Proj. #: 6152
Client: South32

Figure 8

# 10. Analysis and Discussion

## 10.1 Analysis and Discussion of Results

The Subject Area is located on the southern margins of the Cumberland Lowlands region, a physiographic region of western Sydney characterised by low lying, gently undulating plains and hills with alluvium rich soil underlain by sedimentary geology. While the region is characterised by a rich Aboriginal archaeological record, the reconstruction of past land use of Aboriginal people in the Cumberland Plain and the structure of their society is an extremely difficult task often relying on biased historical documents and archaeological evidence resulting from environmental impact assessments rather than research-driven projects. Despite these inherent limitations, archaeologists have built up a picture of Aboriginal settlement patterns for the region, establishing a foundation for the testing of predictive models and the refinement of knowledge. The past Aboriginal land use indicated by the results of previous archaeological work in the region (reviewed in Section 7 of this report) suggests that certain areas nearby major creeks were used as locations for the intensive manufacture of silcrete and quartz artefacts (as suggested by the high-density artefacts recovered in association with knapping floors) as well as locations of artefact processing, use and/or maintenance.

The results of the survey and test excavation undertaken for the Subject Area, the recovery of five sub - surface Aboriginal objects and identification of additional surface artefacts associated with registered sites Bulli Site 7 (AHIMS ID # 52-2-3687) and Bulli Site 8 (AHIMS ID # 52-2-3688), provide a small glimpse into Aboriginal land-use practices within a small part of the Cumberland Plain. The presence of Foot Onslow Creek along the eastern boundary of the Subject Area would have provided seasonal access to water and the environment within and surrounding the Subject Area would have offered a diverse range of additional natural resources.

The Aboriginal objects identified and recovered during the test excavation program are considered representative of low-intensity background scatters, providing evidence of infrequent and periodic occupation or use of the Subject Area by Aboriginal people. Discard of artefacts is likely to have resulted from activities undertaken while moving between locations of more consistent and repeated occupation such as in closer proximity to the Nepean River as the closest permeant source of water and resources in the immediate area. The nature of the archaeological assemblage, while very small, is consistent with the character of assemblages associated with the mid-to-late Holocene (ca 5,000-1,600 years ago). This is consistent with the general intensification of occupation of the Cumberland Plain in this period (McDonald 1998).

The paucity of other archaeological investigations in the local area allows a limited scope for comparative analysis. Of most relevance to the Subject Area, are the test excavations undertaken at Howe's Creek Menangle Park in 2009, located approximately 6 km to the north (Jo McDonald CHM). The investigations found that repeated land cultivation and use resulted in a disturbed upper 20-30cm of deposit, and that pale sandy soils were most likely to contain a higher density of Aboriginal objects in comparison to pits with a dark loamy deposit. Proximity to Howe's Creek (a tributary of the Nepean River) was also found to be a factor to artefact density. When compared to the archaeological results of this assessment, the following similarities can be seen:

- Repeated cultivation and agricultural use have disturbed the upper soil deposits resulting in erosion and likely artefact movement from original locations.
- Test pits with dark loamy deposits generally contain a low density of artefacts.

## 10.2 Results summary

- Test excavation resulted in a total of five Aboriginal objects excavated within the Subject Area, and an additional single artefact identified on the ground surface within Bulli Site 7 (AHIMS ID # 52-2-3687).
- The low density of artefacts is indicative of infrequent and sporadic occupation/use of the area by Aboriginal people. The presence of a backed artefact and evidence for bipolar technology is consistent with the character of assemblages associated with the mid-to-late Holocene (ca 5,000-1,600 years ago) which are typically referred to as the "Bondaian" phase of the Eastern Regional Sequence.
- The boundary of Bulli Site 7 (AHIMS ID # 52-2-3687) has been revised to include all artefact bearing pits (TP9, TP26, TP29 and TP26) and site Bulli Site 8 (AHIMS ID # 52-2-3688) (Figure 8).
- Raw material for stone artefacts would likely have been sourced from outside the Subject Area, most likely from sources of silcrete and siltstone that are available from across the Cumberland Plain or from within gravel beds in the form of river cobbles.
- Evidence of disturbance to the upper soil deposits were observed across the Subject Area as a result of vegetation clearance and past agricultural land use including earthworks for dam construction. This has impacted the integrity of the soil profile and artefact bearing deposit.

# 11. Cultural heritage values and statement of significance

## 11.1 The Burra Charter

The Burra Charter (Australia ICOMOS 2013) defines the basic principles and procedures to be observed in the conservation of important heritage places. It provides a primary and 'best-practice' framework within which decisions about the management of heritage sites in Australia should be made. The Burra Charter (ICOMOS 2013) and the OEH policy *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011) define cultural significance as being derived from the four values presented in Table 28.

**Table 28: Definition of heritage values of the Burra Charter (Australia ICOMOS 2013)**

| Value | Description |
|---|---|
| **Aesthetic** | This 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 material of the fabric; the smells and sounds associated with the place and its use. |
| **Historic** | This value encompasses the history of aesthetics, science and society, and therefore to a large extent underlies all of the terms set out in this section. 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. |
| **Scientific** | The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality or representativeness, and on the degree to which the place may contribute further substantial information. |
| **Social** | This value embraces the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a majority or minority group. |

## 11.2 Scientific (Archaeological) Significance Assessment of Aboriginal Heritage Sites

The categorisation into aesthetic, historic, scientific and social values is one approach to understanding the concept of cultural significance. However, more precise categories may be developed as an understanding of a particular place or site increases.

The NSW Aboriginal cultural heritage regulatory framework supports the significance assessment of Aboriginal archaeological sites and provides guidelines for this ACHA within OEH 2011. OEH 2011 outlines two main themes in the overall Aboriginal cultural heritage significance assessment process, namely, the identification of the cultural/social significance of Aboriginal objects and/or places to Aboriginal people and the identification of the scientific (archaeological) significance to the scientific/research community. These themes encapsulate those aspects of the Burra Charter that are of particular relevance to Aboriginal objects and places.

OEH 2011 specifies that information about scientific values will be gathered through archaeological investigation carried out according to the Code of Practice. The Code of Practice itself does not specify criteria for assessment of Aboriginal objects, but rather suggests to "identify the archaeological values and assess their significance." The assessment must be supportable, and the assessment criteria must reflect best practice assessment processes as set out in the Burra Charter.

Notwithstanding the circularity of this advice, the scientific values described in the Burra Charter (Section 11.1) were considered further by the then NSW National Parks and Wildlife Service in their *Aboriginal Cultural Heritage Standards and Guidelines Kit* (DEC 1997).

In lieu of specific criteria, the advice from DEC (1997) is summarised and paraphrased in Table 29 below to provide guidance to the assessment of scientific values.

**Table 29: Criteria for Assessing Scientific Significance**

| Scientific value | Description |
|---|---|
| **Research Potential** | It is the potential to elucidate past behaviour which gives significance under this criterion rather than the potential to yield collections of artefacts. Matters considered under this criterion include the intactness of a site, the potential for the site to build a chronology and the connectedness of the site to other sites in the archaeological landscape. |
| **Representativeness** | As a criterion, representativeness is only meaningful in relation to a conservation objective. Presumably all sites are representative of those in their class or they would not be in that class. What is at issue is the extent to which a class of sites is conserved and whether the particular site being assessed should be conserved in order to ensure that we retain a representative sample of the archaeological record as a whole. The conservation objective which underwrites the 'representativeness' criteria is that such a sample should be conserved. |
| **Rarity** | This criterion cannot easily be separated from that of representativeness. If a site is 'distinctive' then by definition, it will be part of the variability which a representative sample would represent. The criteria might best be approached as one which exists within the criteria of representativeness, giving a particular weighting to certain classes of site. The main requirement for being able to assess rarity is to determine what is common and what is unusual in the archaeological record, but also the way that archaeology confers prestige on certain sites because of their ability to provide certain information. The criterion of rarity may be assessed at a range of levels including local, regional, state, national, and global. |
| **Educational Potential** | This criterion relates to the ability of the cultural heritage item or place to inform and/or educate people about one or other aspects of the past. It incorporates notions of intactness, relevance, interpretative value and accessibility. Where archaeologists or others carrying out cultural heritage assessments are promoting/advocating the educational value of a cultural heritage item or place it is imperative that public input and support for this value is achieved and sought. Without public input and support the educative value of the items/places is likely to not ever be fully realised. |
| **Aesthetics** | In relation to heritage places, aesthetic significance is generally taken to mean the visual beauty of the place. Aesthetic value is not inherent in a place but arises in the sensory response people have to it. The guidelines provide no expectation for archaeologists to consider aesthetic values, it is often the case that the aesthetics including the physical setting of an archaeological site or a landscape contributes to its cultural heritage significance. Examples of archaeological sites that may have high aesthetic values include rock art sites or sites located in environments that evoke strong sensory responses. |

Educational potential and aesthetic values are not considered to be criteria against which scientific values and significance can be assessed. Aesthetic values should be considered as a distinct category (rather than a criterion that contributes to scientific value) in accordance with the Burra Charter and OEH 2011. Educational potential is considered to be a criterion that contributes to social value, rather than scientific value, and hence this is considered below in the overall cultural significance assessment.

**Table 30: Scientific (Archaeological) Significance Assessment**

| AHIMS ID | Site Name | Features | Significance Statement | Research Potential | Representativeness | Rarity | Scientific Significance Rating |
|---|---|---|---|---|---|---|---|
| 52-2-3687 | Bulli Site 7 | Open Camp Site | Bulli Site 7 is assessed to be low scientific significance due to the low-density nature of the identified artefacts as well as the highly disturbed context of the site, impacting the archaeological integrity of the site and limiting the data that can be contributed to the archaeological record at a local and regional level. | Limited | Low | Low | Low |

## 11.3 Cultural Significance Assessment of Aboriginal Heritage Sites

OEH 2011 requires that a "clear description of the heritage values present across the area of the proposed activity" be presented, and be articulated back to the information collected during the assessment process, in particular to any submissions received from RAPs. OEH 2011 advises that "the assessment of values is a discussion of what is significant and why". The purpose of the statement of significance is to create a comprehensive assessment of values and significance by considering and stating the values identified under each of the value categories defined by the Burra Charter, namely, social values, historic values, scientific values, and aesthetic values. OEH 2011 states:

*The assessment and justification in the statement of significance must discuss whether any value meets the following criteria (NSW Heritage Office 2001):*

- *does the subject area have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons? – social value.*
- *is the subject area important to the cultural or natural history of the local area and/or region and/or state? – historic value.*
- *does the subject area have potential to yield information that will contribute to an understanding of the cultural or natural history of the local area and/or region and/or state? – scientific (archaeological) value.*
- *is the subject area important in demonstrating aesthetic characteristics in the local area and/or region and/or state? – aesthetic value.*

### 11.3.1 Grading Values and Significance

The following gradations, where a site or zone satisfies at least one criterion, have been applied to provide a measure of the values/significance for Aboriginal objects identified within the Subject Area, and to provide an overall assessment of the significance of each of the zones used that define the Subject Area.

**Table 31: Grades of values and significance**

| Grade of value | Description of grade |
|---|---|
| **Low** | The site or object contains only a single or limited number of features, and has no potential to meaningfully inform our understanding of the past beyond what it contributes through its current recording (i.e. no or low research potential). The site or object is a representative but unexceptional example of the most common class of sites or objects in the region. Many more similar examples can be confidently predicted to occur within the Subject Area, and in the region. |
| **Moderate** | The site or object derives value because it contains features, both archaeological and contextual, which through further investigation may contribute to our understanding of the local past. These features include, but are not limited to: the relationship with landscape features or other Aboriginal archaeological sites or areas of identified heritage importance; diagnostic archaeological or landscape features that inform a chronology; and a relatively large assemblage of stone artefacts. The presence of a diverse artefact and feature assemblage, and connectedness with landscape features and other notable sites provide relatively higher representative and rarity values than sites of low significance. |

| Grade of value | Description of grade |
|---|---|
| **High** | The site or object has value because it contains archaeological and/or contextual features which through further investigation may significantly contribute to our understanding of the past, both locally and on a regional scale. These features include, but are not limited to: Aboriginal ancestral remains; the site's relationship with landscape features or other Aboriginal archaeological sites or areas of identified heritage importance; diagnostic archaeological or landscape features that inform a chronology; and a very large assemblage of stone artefacts associated with other features such as oven remains or shell midden. Such sites will be relatively rare, and will be representative of a limited number of similar sites that make up this class; hence they derive high representative and rarity values. |

## 11.4 Statement of Significance

Statements of significance for the Subject Area are presented in the following sub-sections. These statements of significance have been prepared in consideration of comments received from the RAPs during the consultation process, including those comments relating to the cultural significance of all sites and the interrelationships between the cultural and spiritual values with the natural landscape. All comments received from RAPs are considered in Section 4.3.

### 11.4.1 Social Value

The Subject Area is of high social significance to the Aboriginal community because it contains landscapes and resources that help define the communities' identity. Kadibulla Kahn of KYWH expressed that high cultural and social value exists within the wider cultural landscape.

*A long time ago before the Europeans arrived, the land would have been very different from today. The flora and fauna would have been thriving, there would have been many water ways flowing, today they have been used for drainage. Aboriginal people would have used their environment to their advantage, utilising what they needed and never wasting or taking too much. This was a part of our lore looking after mother nature as she provides for us Aboriginal people and we give back to her.*

The Aboriginal objects associated with the AHIMS registered site is valued for providing a tangible link to the past.

### 11.4.2 Aesthetic Value

The Subject Area has low aesthetic values as much of the surrounding environment have been significantly modified, however natural landforms still remain along with the presence of Foot Onslow Creek which adds to the strong sense of beauty and Aboriginal connectivity to the landscape.

### 11.4.3 Historic Value

The Subject Area contains no identified historic values relating to Aboriginal heritage.

### 11.4.4 Scientific (Archaeological) Value

The Subject Area contains one identified Aboriginal cultural heritage open camp site Bulli Site 7 (AHIMS ID # 52-2-3687). This archaeological site within the Subject Area is predominately of low scientific (archaeological) value. The Subject Area has the potential to yield information that would contribute to a further understanding of the cultural history of the local area and region. In particular, the nature of past Aboriginal land-use of the Cumberland Plain, and the relationship between past Aboriginal land use and the use of available resources –including the Nepean River – as expressed through archaeological sites and their context.

### 11.4.5 Summary

The Aboriginal cultural heritage site assessed during this Project (Bulli Site 7 (AHIMS ID # 52-2-3687)) was identified as having low scientific (archaeological) significance. A summary of scientific (archaeological) significance ratings is presented in Table 31.

# 12. Impact Assessment

## 12.1 Overview of Potential Impacts

OEH 2011 requires that both direct and indirect harm to Aboriginal objects and Aboriginal places be considered. Generally direct harm refers to occasions where an activity physically impacts a site or objects and therefore affects the heritage values possessed by the site or objects. Indirect harm is usually taken to mean harm stemming from secondary consequences of the activity, and may affect sites or objects as an indirect consequence of the activity. Examples of such indirect harm are increased visitors to a site, or increased erosion in an area as a result of an activity.

As described in Section 9, a total of one (1) Aboriginal heritage site was identified within the Subject Area.

The potential impacts of the Project have been evaluated in consideration of comments received from the RAPs during the consultation process. These comments include those relating to the archaeological potential of landforms and the likelihood of occurrence and distribution of sites. All comments received from the RAPs are considered in Section 4.3.

## 12.2 Potential Impacts

A detailed description of the surface components of the Proposed Project is provided in Section 3 of this report.

Disturbance associated with the Project will only occur within a specified footprint (Figure 2) and not all parts of the Subject Area would be subject to disturbance. For the purposes of this ACHA it is conservatively assumed that the development of surface infrastructure for the Project would be wholly within the determined footprint and would be of a nature that would cause direct harm to any Aboriginal objects or areas of cultural value located within the footprint (Figure 3).

The direct harm associated with surface disturbance activities is anticipated to cause either a total or partial loss of heritage value at effected sites and would have a cumulative or landscape impact of partial loss of values for the area as a whole. The activities that may cause harm to Aboriginal objects or areas of cultural value would include:

- Vegetation clearance and topsoil stripping.
- Disturbance of soil units or the ground surface with Aboriginal objects on the surface or within the soil profile.
- Changes to a site or place's context that has secondary impacts to the site or place, resulting in the loss of cultural values.
- Excavation works and the removal and redistribution of soil by heavy machinery during site regrading or development of suitable surface conditions for various construction activities.

The proposed Project will directly impact Bulli Site 7 (AHIMS ID # 52-2-3687).

## 12.3 Potential for harm

One AHIMS registered Aboriginal cultural heritage site was identified within the Subject Area (Bulli Site 7 (AHIMS ID # 52-2-3687). The proposed works would impact the soil profile and thus the integrity of the site through direct and indirect disturbances. Table 32 below provides a summary of the type, degree and consequence of harm to Aboriginal objects identified within the Subject Area.

**Table 32: Impact assessment summary**

| AHIMS ID# | Site name | Type of harm | Degree of harm | Consequence of harm |
|---|---|---|---|---|
| 52-2-3687 | Bulli Site 7 | Direct | Partial | Partial loss of value |

The results of a previous Aboriginal Cultural Heritage Assessment (Biosis 2009) for the greater Bulli Seams Operations (including the ongoing longwall mining operations and West Cliff Stage 4 Coal Wash Emplacement) led to the registration of Aboriginal cultural heritage site Bulli Site 7 (AHIMS ID# 52-2-3687). This site is located within the Subject Area and will be directly impacted as a result of the proposed activities.

**Table 33: Details of the Aboriginal objects within the Subject Area**

| Portion of site to be impacted | AHIMS ID# | Site Name | Site Features | Easting (GDA 94, Zone 56) | Northing (GDA 94, Zone 56) |
|---|---|---|---|---|---|
| Western half of the revised site extent | 52-2-3687 | Bulli Site 7 | Open camp site | 290526 | 6219289 |

## 12.4 Project justification

An integral requirement of underground mining is adequate ventilation infrastructure and mine access facilities to ensure a safe and efficient underground working environment. Appin Mine operations are progressing further away from the existing surface infrastructure located in the Appin and Douglas Park areas, and additional infrastructure is required to support the ongoing operations.

The Project will ensure the continued usability of the Appin mine operations as well as its associated local employment and IMC support for local and regional communities.

## 12.5 Considerations for Ecological Sustainable Development

Section 5(vii) of the EP&A 1979 requires proponents to consider the key principles of Ecologically Sustainable Development (ESD) in the design of their projects. The principles of ESD are defined within the *Protection of the Environment Administration Act 1991*. This Act defines the precautionary principle and the principles of inter-generational equity, conservation of biological diversity and ecological integrity. The precautionary principle is defined as:

"*if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation*".

Australia's National Strategy for ESD (1992) defines ecologically sustainable development as: 'using, conserving and enhancing the communities' resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased.' Aboriginal heritage programs which seek to address indigenous concerns in relation to the land, heritage, economic and cultural development include the Commonwealth Indigenous Protected Areas Initiative, Land Acquisition and Maintenance, and Heritage Protection Programs; the Victorian Aboriginal Capital Projects and Aboriginal Cultural Heritage Programs; and the South Australian Aboriginal Tourism Strategy.' (Australian Government 1992: Chapter 22).

ESD in regard to the aforementioned Aboriginal cultural heritage sites needs to consider intergenerational equality; this is fundamental to identifying Aboriginal culture and identity into the future. Though Bulli Site 7 (AHIMS ID#52-2-3687) and Bulli Site 8 (AHIMS ID#52-3-3688) are significant to the Aboriginal community,

due the disturbed context and its similarities to a number of other sites in the greater region; any harm to these sites will not cause harm to Aboriginal communities' connection to country or cultural development within the community.

Table 34 considers the key principles of ESD with respect to the results of the literature review, Aboriginal heritage survey and archaeological test excavation results and significance assessment contained within this report.

**Table 34: Assessment of ESD**

| Principles of the EIA and ESD Guidelines | ESD Assessment |
|---|---|
| A fundamental consideration for conservation of biological diversity and ecological integrity | This assessment takes into account consideration of the conservation of cultural heritage. The Proponent has undertaken an ACHA with test excavation proposed in consultation with the RAPs and determined that there is one site present with the Subject Area. The proposed activity would result in irreversible damage to the cultural heritage environment and result in intergenerational loss of cultural heritage items to the Aboriginal cultural heritage site. |
| Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment | The proponent has undertaken an ACHA and has provided consideration of options to avoid, where practical harm to Aboriginal objects. In the case of this assessment, avoidance was not considered warranted based on the significance assessment outlined in Section 11 and the consideration of harm and mitigation strategies in Sections 12 and 13. |
| Consideration of intergenerational equity | ESD in regard to Bulli Site 7 (AHIMS ID# 52-2-3687) is a significant Aboriginal cultural heritage site to the Aboriginal community, however due to low educational value and its similarity to a number of other sites within the Cumberland Plain; any harm suffered at this site will not cause significant harm to the Aboriginal communities' connection to country or cultural development within the community |
| Where risk of serious or irreversible harm and lack of scientific knowledge of the nature of environmental harm combine, the precautionary principle applies.<br>Where there is risk of serious or irreversible harm, it is necessary to establish whether there is adequate scientific knowledge of the subject to evaluate the perceived threat. | This assessment has considered a review of all Aboriginal heritage items and their associated scientific report identified in heritage searches of a 2 km radius of the Subject Area. An archaeological test excavation in accordance with the Code of Practice for Archaeological Investigation in NSW (OEH 2011) has been proposed to assess the subsurface potential for Aboriginal objects. Consultation with the RAPs has been undertaken in accordance with the Aboriginal Consultation Requirements (DECCW 2010b). The assessment was sufficient to identify Aboriginal objects, their likelihood and significance. Significance and impact assessments are outlined in Sections 11 and 12. |
| An assessment of the risk-weighted consequences of various options | A consideration of harm and mitigation is provided in Section 13. Avoidance is always preferred, however given the low archaeological value of Bulli Site 7 (AHIMS ID# 52-2-3687) and the overall purpose of the development, there is no justification for avoidance which would require IMC to redesign the proposed works. |

# 13. Management and Mitigation Measures

## 13.1 Conservation Principles and Management Framework

The two founding principles behind the OEH 2011 are ESD and intergenerational equity. These principles hold that "the present generation should make every effort to ensure the health, diversity and productivity of the environment – which includes cultural heritage – is available for the benefit of future generations".

The strong emphasis, as in the Burra Charter, is to quantify and understand the heritage values of a place, a site, or an object and exhaust avenues of avoiding harm to those values. If harm cannot be avoided, then there must be consideration and implementation of strategies to minimise harm (OEH 2011:13).

It follows that the hierarchy for consideration in terms of the management strategies available for surface stone artefacts and subsurface stone artefacts and areas of archaeological potential, fall into four general categories, in order of preference from a conservation perspective:

avoidance and in-situ conservation.
partial avoidance and partial in-situ conservation (includes partial harm).
harm caused with mitigating circumstances such as collection or salvage; and
unmitigated harm.

The four general categories (described above) have been considered in the following subsections with regard to both direct impacts (e.g. surface disturbance) and indirect impacts (e.g. monitoring activities).

The management and mitigation measures have been prepared in consideration of comments received from the RAPs during the consultation process. These comments include those related to cultural considerations surrounding salvage works and the handling of artefactual materials, as well as the cultural significance of all sites. All comments received from the RAPs are considered in Section 4.3.

## 13.2 Detailed Design to Avoid Harm

During detailed design of the Project location, it is recommended the proponent give consideration to the known Aboriginal cultural heritage sites identified by this ACHA. This process should include a consideration of whether or not surface infrastructure can be designed in a way that avoids harm, and if harm cannot be avoided that harm be caused to as few sites as possible, within existing design and operational constraints.

This approach is consistent with the Heritage NSW requirements of ESD and intergenerational equity. If harm cannot be avoided, then there must be consideration and implementation of strategies to minimise harm (OEH 2011:13).

The archaeological test excavation was undertaken to understand the nature and extent of Bulli Site 7 (AHIMS ID # 52-2-3687) and other unknown Aboriginal cultural sites, and to evaluate the harm and impact of the Project on the sites.

At present, given the low archaeological significance of the identified Aboriginal cultural heritage site Bulli Site 7 (AHIMS ID # 52-2-3687), the approval of the Project and the consent to destroy Aboriginal objects in part through a program of salvage surface collection of remaining Aboriginal objects, is considered to be the appropriate way forward and should be in place prior to the Project works taking place.

The Proponent may also wish to consider mitigating cumulative impacts by undertaking positive actions to improving awareness of Aboriginal cultural heritage such as:

- Undertaking cultural heritage awareness as part of site inductions for employees, site visitors and contractors and making them aware of the presence of Aboriginal sites and their obligations under the National Parks and Wildlife Act 1974.
- Naming features of the development in consultation with the RAPs.
- Exploring means to promote awareness of the Aboriginal history of the region.

Several management and mitigation measures have been considered for this project and are presented in Table 35.

**Table 35: Consideration of management and mitigation strategies**

| Management Risk / Impacted Value | Strategies considered | Response |
|---|---|---|
| **Management Risk - Compliance** | Aboriginal Cultural Heritage Management Plan (AHMP) | • An AHMP to be in place for the life of the project to help mitigate any potential Aboriginal cultural heritage constraints and impacts encountered. This is to be developed in consultation with the RAPs and relevant regulatory authorities. |
| **Management Risk - Compliance** | Entering into a Care and Control Agreement with the Registered Aboriginal Parties to determine the keeping place of Aboriginal objects collected during the Archaeological assessments undertaken as part of the ACHA. | Long term storage and care of Aboriginal Objects recovered during the ACHA and outlined within the AHMP as part of the ongoing management of the Aboriginal Objects, as required under S.89 of the National Parks and Wildlife Act through a Care and Control Agreement.<br>• Provision should be made to rebury Aboriginal objects on site, or return Aboriginal objects to RAPs entitled to, and willing to accept possession, custody or control of the Aboriginal object in accordance with Aboriginal tradition. |
| **Management Risk - Compliance** | Completion of Aboriginal Site Impact Recording Forms | • Aboriginal site impact recording forms (ASIFS) will need to be completed and submitted to the AHIMS register for AHIMS ID# 52-2-3687 when harm has occurred as a result of the proposed activity under and the completion of any salvage requirements under any AHMP. |
| **Management Risk – Compliance and Unexpected Finds (excluding human remains)** | Communication to employees, site visitors, contractors and landowners | • All site personnel should be inducted into the Subject Area, so they are made aware of their obligations under the *National Parks and Wildlife Act 1974* and any conditions of any future AHMP prior, during and after construction activities. |
| **Management Risk – Unexpected Finds – human remains** | Stop work and follow procedure for discovery of suspected human remains | • All site personnel should be inducted into the Subject Area, so they are made aware of their obligations under the *National Parks and Wildlife Act 1974* and any conditions of any future AHMP prior, during and after construction activities.<br>• In the unlikely event that suspected human remains are encountered during construction, all work in the area that may cause further impact, must cease immediately.<br>• The location, including a 20 m curtilage, should be secured using barrier fencing to avoid further harm.<br>• The NSW Police must be contacted immediately.<br>• No further action is to be undertaken until the NSW Police provide approval via provision of a case number.<br>• If the skeletal remains are identified as Aboriginal, Public Works Advisory Developments or their agent must contact:<br>• the Heritage NSW's Enviroline on 131 555; and representatives of the RAPs.<br>• No works are to continue until the Heritage NSW provides written notification to the proponent or their Agent. |

| Management Risk / Impacted Value | Strategies considered | Response |
|---|---|---|
| **Impacted Cultural/ Education Value** | Avoidance/Conservation | • Considering the low educational value of the identified Aboriginal sites AHIMS ID# 52-2-3687, and its similarity to a number of other sites within the Cumberland Plain; any harm suffered at this site will not cause significant harm to the Aboriginal communities' connection to country or cultural development within the community. Avoidance as a management option is unjustified and unfeasible at this stage. |
| | Mitigating harm through salvage surface collection of the remaining Aboriginal object located in the Subject Area | • Surface collection of remaining Aboriginal objects associated with AHIMS ID# 52-2-3687is recommended as a management option to mitigate impacts to cultural/educational value as all Aboriginal objects hold cultural value to the community. |
| | Ongoing consultation | • Registered Aboriginal Parties should continue to be consulted in accordance with the guidelines and any future AHMP. |
| **Impacted Scientific (archaeological) / Research Value** | Avoidance/Conservation | • Considering the low conservation and scientific/ research value of the identified Aboriginal sites AHIMS ID# 52-2-3687, and its similarity to a number of other sites within the Cumberland Plain; any harm suffered at these sites will not cause significant harm to the Aboriginal communities' connection to country or cultural development within the community. Avoidance as a management option is unjustified and unfeasible at this stage. |
| | Subsurface salvage excavation | • Considering the low scientific value of the identified Aboriginal sites AHIMS ID# 52-2-3687, and its similarity to a number of other sites within the Cumberland Plain; any harm suffered at these sites will not cause significant harm to the Aboriginal communities' connection to country or cultural development within the community. Salvage excavation as a management option is unjustified and unfeasible. |
| | Mitigating harm through salvage surface collection of the remaining Aboriginal objects | • This strategy will be undertaken as part of the AHMP. |
| **Impacted Representativeness/ Conservation Value** | Avoidance/Conservation | • Considering the low conservation and representative value of the identified Aboriginal sites AHIMS ID# 52-2-3687, and its similarity to a number of other sites within the Cumberland Plain; any harm suffered at these sites will not cause significant harm to the Aboriginal communities' connection to country or cultural development within the community. Avoidance as a management option is un justified and unfeasible at this stage. |
| | Subsurface test excavation | • Considering the low conservation and representative value of the identified Aboriginal sites AHIMS ID# 52-2-3687, and its similarity to a number of other sites within the Cumberland Plain; any harm suffered at these sites will not cause significant harm to the Aboriginal |

| Management Risk / Impacted Value | Strategies considered | Response |
|---|---|---|
| | | communities' connection to country or cultural development within the community. Salvage excavation as a management option is unjustified and unfeasible at this stage |
| | Mitigating harm through salvage surface collection of the remaining Aboriginal objects located on the dam. | • This strategy will be undertaken as part of the AHMP. |
| **Impacted Aesthetic Value** | Avoidance/Conservation | • Considering the low-medium conservation and aesthetic value of the identified Aboriginal sites AHIMS ID# 52-2-3687, and its similarity to a number of other sites within the Cumberland Plain; any harm suffered at these sites will not cause significant harm to the Aboriginal communities' connection to country or cultural development within the community. Avoidance as a management option is unjustified and unfeasible at this stage. |
| | Subsurface salvage excavation | • Considering the low-medium conservation and aesthetic value of the identified Aboriginal sites AHIMS ID# 52-2-3687, and its similarity to a number of other sites within the Cumberland Plain; any harm suffered at these sites will not cause significant harm to the Aboriginal communities' connection to country or cultural development within the community. Salvage excavation as a management option is unjustified and unfeasible at this stage |
| | Mitigating harm through salvage surface collection of the remaining Aboriginal objects located on the dam. | • This strategy will be undertaken as part of the AHMP. |
| **Impacted Conservation value – rarity/ threatened resource** | Avoidance/Conservation | • Considering the low conservation and rarity value of the identified Aboriginal sites AHIMS ID# 52-2-3687, and its similarity to a number of other sites within the Cumberland Plain; any harm suffered at these sites will not cause significant harm to the Aboriginal communities' connection to country or cultural development within the community. Avoidance as a management option is unjustified and unfeasible at this stage. |
| | Subsurface test excavation | • Considering the low conservation and rarity value of the identified Aboriginal sites AHIMS ID# 52-2-3687, and its similarity to a number of other sites within the Cumberland Plain; any harm suffered at this site will not cause significant harm to the Aboriginal communities' connection to country or cultural development within the community. Salvage excavation as a management option is unjustified and unfeasible at this stage |
| | Mitigating harm through salvage surface collection of the remaining Aboriginal objects located on the dam. | • This strategy will be undertaken as part of the AHMP. |

# 14. Recommendations

This ACHA was carried out in accordance with the Code of Practice and OEH 2011. It included consultation with RAPs in accordance with the Consultation Requirements (details of which are in Appendix 1).

Based on the scientific significance of the Aboriginal heritage sites presented in Section 11, the impact assessment presented in Section 12 and the suggested management and mitigation measures outlined in Section 13, the following recommendations are made regarding the Aboriginal heritage site within the Subject Area (Table 36).

**Table 36: Recommendations**

| **Recommendations** | |
|---|---|
| 1. | An Aboriginal Cultural Heritage Management Plan (AHMP) should be developed for the Project that details and schedules (for the life of the Project) the mitigation and management measures presented in the report. The AHMP should be developed in consultation with the RAPs and relevant regulatory authorities and in compliance with the requirements of the BSO HMP 2017.<br>The AHMP should include the following:<br>• Protocols for the involvement of the RAPs in cultural heritage works conducted under the AHMP. This protocol should focus on members of the RAPS identified during this ACHA's consultation process.<br>• A communications protocol that describes clear methods of communication, including expectations of suitable notification and response time, between the proponent and the RAPs.<br>• A protocol for the discovery and management of Unexpected Finds, including stop work provisions and notification protocols.<br>• A protocol for the discovery and management of human remains, including stop work provisions and notification protocols, as per Recommendation 7.<br>• Procedures for the management and reporting of previously unknown Aboriginal heritage sites that may be identified during the life of the Project.<br>• Protocols for heritage awareness training to be incorporated into the Project site inductions for both employees and sub-contractors who may be conducting works that have the potential to impact on any Aboriginal heritage sites. Consideration should be given to involving the RAPs in the development and presentation of the cultural awareness training.<br>• A regular review process for the AHMP (in accordance with Condition 5 of Schedule 6 of the Appin Mine Approval, or every three years unless otherwise stipulated).<br>• AHIMS Site impact forms to be submitted for any sites subject to impact.<br>• Copies of the final report should be made available to each RAP, the Department of Planning, Industry and Environment and Heritage NSW. |
| 2. | A surface collection of the isolated surface artefact at Bulli Site 7 (AHIMS ID#52-2-3687) be undertaken in consultation with the Project RAPs under the above AHMP. |
| 3. | A Care and Control Agreement be developed for the long-term management of recovered artefacts. |
| 4. | The five artefacts recovered during the test excavation, and the surface artefact to be collected as per Recommendation 2 be reburied on site outside of the area of impact. The reburial to be conducted under the AHMP and in accordance with the Care and Control Agreement. |
| 5. | All site personnel should be inducted into the Subject Area, so they are made aware of their obligations under the *National Parks and Wildlife Act 1974* as to their responsibilities in the conservation of Aboriginal Heritage. |

| Recommendations | |
|---|---|
| 6. | Site Card information for Bulli Site 7 (AHIMS ID#52-2-3687) should be updated in the AHIMS database with revised site descriptions (i.e. Aboriginal Site Impact Form (ASIFs). |
| 7. | In the unlikely event that suspected human remains are encountered during construction, all work in the area that may cause further impact, must cease immediately and:<br>• The location, including a 20 m curtilage, should be secured using barrier fencing to avoid further harm.<br>• The remains must be left in place and protected from harm or damage.<br>• The NSW Police and Coroners Office must be contacted immediately.<br>• No further action is to be undertaken until the NSW Police confirm the origin of the remains as non-human and provide a case number for South32's records.<br>• If the skeletal remains are identified as Aboriginal, South 32 or their agent must contact:<br>▪ the Heritage NSW's Enviroline on 131 555; and representatives of the RAPs.<br>▪ No works are to continue until the Heritage NSW provides written notification to the Proponent or their Agent. |

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# Appendix 1: Aboriginal Community Consultation Logs

# Appendix 2: AHIMS Extensive Search

# Appendix 3: Excavation Records

**Test Pit 1**

Test Pit 1 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-5cm | Grass roots, and vegetation | Loose medium brown silty loam topsoil |
| 2 | 5-10cm | Grass roots, and vegetation | Friable medium reddish brown silty sandy clay |
| 3 | 10-15cm | Grass roots still present | Friable medium reddish brown silty sandy clay |
| 4 | 15-20cm | Low amounts of grass roots | Transition to a light reddish brown silty sandy clay, friable in compaction |
| 5 | 20-25cm | Low amounts of grass roots | Friable, light reddish brown silty sandy clay |
| 6 | 25-30cm | Low amounts of grass roots | Friable, light reddish brown silty sandy clay, transition layer |
| 7 | 30-35cm | Very low amounts of grass roots. Infrequent flecks of ironstone and manganese | Transition to a dark reddish brown silty sandy clay. Friable in compaction |
| 8 | 35-40cm | Black clay mottles, infrequent ironstone and manganese | Friable, dark reddish brown sandy clay. |
| 9 | 40-45cm | Black clay mottles | Friable, dark reddish brown sandy clay. Poorly sorted, coarse |
| 10 | 45-50cm | Black clay mottles | Friable, dark reddish brown sandy clay. Poorly sorted, coarse |
| 11 | 50-55cm | infrequent ironstone and manganese | Friable, dark reddish brown sandy clay. Poorly sorted, coarse |
| 12 | 55-60cm | infrequent ironstone and manganese | Friable, dark reddish brown sandy clay. Poorly sorted, coarse |
| 13 | 60-65cm | Clay mottles and infrequent ironstone and manganese | Dark reddish brown sandy clay. Poorly sorted, coarse. Plastic mostly but slightly friable |

Photo of end of excavation of TP1

**Test Pit 2**

Test Pit 2 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Moderately compact, reddish brown sandy clay loam |
| 2 | 10-20cm | Grass roots, and manganese flecks | Moderately compact, reddish brown sandy clay loam, increasing clay content |
| 3 | 20-30cm | Manganese flecks | Reddish brown sandy clay |
| 4 | 30-40cm | Infrequent manganese flecks | Reddish brown sandy clay onto cemented clay |


Photo of end of excavation of TP2

**Test Pit 3**

Test Pit 3 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil, moist from previous rainfall |
| 2 | 10-20cm | Manganese, clay mottles | Friable, transition to a light yellowish brown silty loam in southern section. Northern section transition to orange-brown clay loam |
| 3 | 20-30cm | Charcoal flecks (5%) | Friable/firm, light yellowish brown silty loam in southern section. Orange-brown clay loam continuing in northern section. |
| 4 | 30-40cm | Burnt clay nodules, plant roots | Friable/firm, orange-brown clay with burnt patches around roots |
| 5 | 40-50cm | Large tree root at 45cm, charcoal in centre | Friable/compact, orange-red brown clay |
| 6 | 50-60cm | Charcoal depression in centre | Compact, orange-red brown clay |

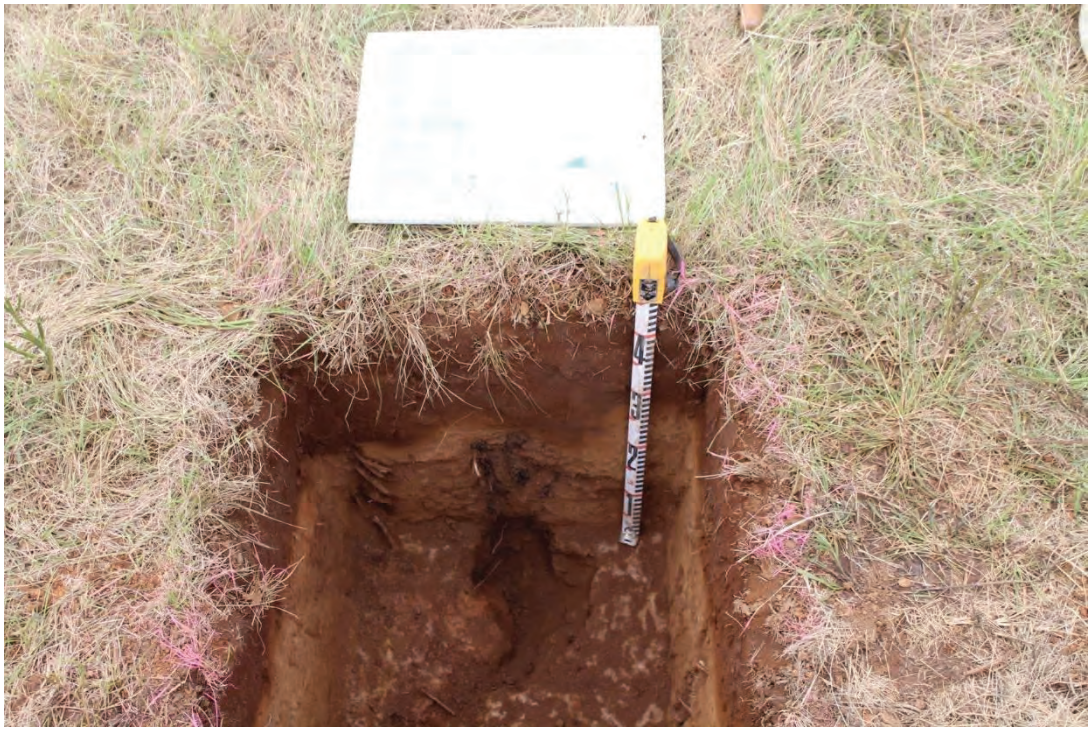

Photo of end of excavation of TP3

**Test Pit 4**

Test Pit 4 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Ironstone, grass rootlets | Friable, transition in lightness of colour with depth, orange brown silty loam |
| 3 | 20-30cm | Ironstone and charcoal flecks (5%) | Friable/compact, orange brown silty loam |
| 4 | 30-40cm | Grass rootlets (1%), | Friable/compact, orange clay with darker red clay mottles |

Photo of end of excavation of TP4

**Test Pit 5**

Test Pit 5 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown silty loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, transition to a light brown-orange sandy loam, medium grained |
| 3 | 20-30cm | Grass rootlets | Firm, light brown-orange silty sandy loam, medium grained |
| 4 | 30-40cm | Manganese flecks, ironstone (5%) | Firm, light brown-orange silty clay loam, fine to medium grained |
| 5 | 40-50cm | Red clay mottles | Compact, orange clay |


Photo of end of excavation of TP5

**Test Pit 6**

Test Pit 6 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown loamy topsoil |
| 3 | 20-30cm | Ironstone and manganese Grass rootlets | Friable, Brown silty loam |
| 4 | 30-40cm | Manganese flecks, ironstone (5%) | Compact, brown silty loam |
| 5 | 40-50cm | Manganese flecks, ironstone | Compact, orange brown clay, mostly plastic |

Photo of end of excavation of TP6

**Test Pit 7**

Test Pit 7 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown silty loam |
| 3 | 20-30cm | Ironstone and manganese (5%) (<2mm) | Firm, brown silty clay loam |
| 4 | 30-40cm | Manganese flecks, ironstone (5%) | Firm, orange-brown silty clay loam |
| 5 | 40-50cm | Clay mottling | Compact, orange clay |


Photo of end of excavation of TP7

**Test Pit 8**

Test Pit 8 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown silty loamy topsoil |
| 2 | 10-20cm | Grass rootlets, willow ceramic fragment | Friable, dark brown silty loamy topsoil |
| 3 | 20-30cm | Ironstone and manganese flecks | Firm, brown silty clay loam |
| 4 | 30-40cm | Manganese flecks, ironstone (10%) | Friable/firm, transition to a light brown-orange silty clay loam |
| 5 | 40-50cm | Ironstone and manganese flecks (5%) | Friable/compact, orange-brown silty clay loam |
| 6 | 50-60cm | Ironstone and manganese flecks (5%) | Friable/compact, orange-brown clay |

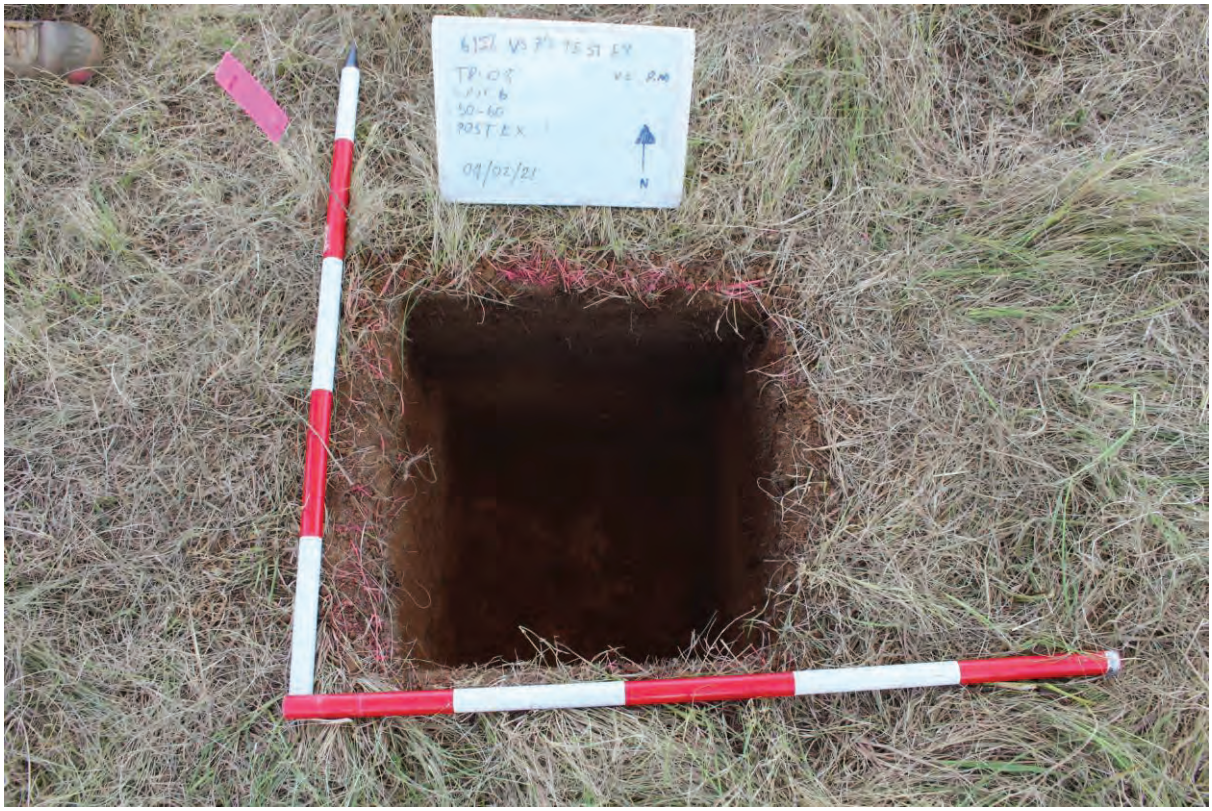

Photo of end of excavation of TP8

**Test Pit 9**

Test Pit 9 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown silty loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown silty loamy topsoil |
| 3 | 20-30cm | Grass rootlets (1%) | Firm, transition to a light brown silty clay loam |
| 4 | 30-40cm | Manganese flecks, ironstone (5%) | Firm, light yellowish brown silty clay loam, fine to medium grained |
| 5 | 40-50cm | Manganese flecks, ironstone (10%) (<10mm) | Friable/compact, light yellowish brown silty clay |
| 6 | 50-60cm | Red clay mottles | Friable/compact, light yellowish brown clay |


Photo of end of excavation of TP9

**Test Pit 10**

Test Pit 10 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets, orange burnt clay mottling (1%), charcoal flecks | Friable, dark brown loamy topsoil |
| 3 | 20-30cm | Charcoal flecks | Friable, dark brown loamy soil, sharp transition to orange clay at base of spit |
| 4 | 30-40cm | Compacted | Friable, orange clay |


Photo of end of excavation of TP10

**Test Pit 11**

Test Pit 11 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil, on eastern section “pottins mix” soil is present |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown loamy topsoil |
| 3 | 20-30cm | Charcoal flecks | Friable, dark brown loamy soil |
| 4 | 30-40cm | Charcoal flecks | Friable/compact, light greyish brown silty loam |
| 5 | 40-50cm | Charcoal and orange clay flecks | Compact, light greyish brown silty loam |
| 6 | 50-60cm | Compaction | Firm, transition to orange clay at base |


Photo of end of excavation of TP11

**Test Pit 12**

Test Pit 12 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown loamy topsoil |
| 3 | 20-30cm | Grass rootlets | Friable/firm, dark brown loamy topsoil, transitioning to clay at bottom of spit |
| 4 | 30-40cm | Charcoal fleck (1%) | Compact, orange clay natural layer |


Photo of end of excavation of TP12

**Test Pit 13**

Test Pit 13 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, brown silty loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown loamy topsoil |
| 3 | 20-30cm | Charcoal and clay flecks | Compact, dark brown loamy topsoil |
| 4 | 30-40cm | Charcoal flecks | Compact, orange clay natural layer |


Photo of end of excavation of TP13

**Test Pit 14**

Test Pit 14 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Firm, dark brown loamy topsoil |
| 3 | 20-30cm | Ironstone/manganese flecks | Compact, transition to light grey soil |
| 4 | 30-40cm | Compaction | Compact, orange clay natural layer |


Photo of end of excavation of TP14

**Test Pit 15**

Test Pit 15 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets, mottled clay | Compact, dark brown topsoil |
| 2 | 10-20cm | Mottled clay, ant holes | Compact, dark brown loamy topsoil |
| 3 | 20-30cm | Mottled clay | Compact, orange clay, decreasing mottling of dark brown topsoil. Lens of light grey soil midway through the spit. |
| 4 | 30-40cm | Clay mottles, iron/manganese flecks | Compact, light grey soil |
| 5 | 40-50cm | Tree roots, iron/manganese flecks | Light grey soil, transitioning to orange clay natural layer |


Photo of end of excavation of TP15

**Test Pit 16**

Test Pit 16 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, brown topsoil |
| 2 | 10-20cm | Iron/manganese flecks | Firm, dark brown loamy topsoil, transitioning to light grey soil |
| 3 | 20-30cm | Iron/manganese flecks | Firm, light grey soil |
| 4 | 30-40cm | Iron/manganese flecks, (20%) | Compact, light grey soil |
| 5 | 40-50cm | Iron/manganese flecks (5%) | Compact, transition to orange clay |


Photo of end of excavation of TP16

**Test Pit 17**

Test Pit 17 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, light brown silty sandy loam, fine to medium grained |
| 2 | 10-20cm | Iron/manganese flecks, scattered orange clay mottles | Compact, light greyish brown silty loam, fine to medium grained |
| 3 | 20-30cm | Iron/manganese flecks, orange clay mottles | Compact, light greyish brown silty loam, fine to medium grain |
| 4 | 30-40cm | Iron/manganese flecks, orange clay mottles | Compact, transition to orange-red brown clay |


Photo of end of excavation of TP17

**Test Pit 18**

Test Pit 18 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-5cm | Grass roots | Firm, medium brown red silty sandy clay, poorly sorted |
| 2 | 5-10cm | Grass rootlets | Firm, medium brown red silty sandy clay, poorly sorted |
| 3 | 10-15cm | Grass roots still present | Firm, medium brown red silty sandy clay, poorly sorted |
| 4 | 15-20cm | Iron/manganese flecks | Firm, medium brown red silty sandy clay, poorly sorted |
| 5 | 20-25cm | Compaction | Firm, dark red brown silty clay, poorly sorted, plastic |

Photo of end of excavation of TP18

**Test Pit 19**

Test Pit 19 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-5cm | Grass roots, and vegetation | Friable/firm, dark red brown silty clay, poorly sorted |
| 2 | 5-10cm | Grass roots | Friable/firm, light yellow brown silty clay, poorly sorted |
| 3 | 10-15cm | Iron/manganese flecks | Friable/firm, light yellow brown silty clay, poorly sorted |
| 4 | 15-20cm | Iron/manganese flecks | Friable/firm, light yellow brown silty clay, poorly sorted |
| 5 | 20-25cm | Iron/manganese flecks | Friable/firm, light yellow brown silty clay, poorly sorted |
| 6 | 25-30cm | Iron/manganese flecks | Friable/firm, light yellow brown silty clay, poorly sorted |
| 7 | 30-35cm | Infrequent flecks of ironstone and manganese | Friable/firm, light yellow brown silty clay, poorly sorted |
| 8 | 35-40cm | Infrequent ironstone and manganese | Friable/firm, light yellow brown silty clay, poorly sorted |
| 9 | 40-45cm | Infrequent ironstone and manganese | Friable/firm, light yellow brown silty clay, poorly sorted |
| 10 | 45-50cm | Charcoal flecks | Friable/firm, light brown-orange silty clay loam, fine to medium grained |
| 11 | 50-55cm | Charcoal flecks | Friable/firm, light brown-orange silty clay loam, fine to medium grained |
| 12 | 55-60cm | Clay mottles | Firm, transition to yellow orange clay |
| 13 | 60-65cm | Red clay mottles | Compact, yellow orange clay |

Photo of Spit 10 of TP19

**Test Pit 20**

Test Pit 20 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Loose, dark brown sandy loam |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown sandy loam, transitioning to a lighter colour |
| 3 | 20-30cm | Grass rootlets | Friable/firm, dark brown-orange silty loam, fine to medium grained |
| 4 | 30-40cm | Rootlets, charcoal flecks | Friable/firm, brown-orange silty clay loam, fine to medium grained |
| 5 | 40-50cm | Compaction | Friable/firm, orange-brown clay |


Photo of end of excavation of TP20

**Test Pit 21**

Test Pit 21 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Loose, dark brown silty topsoil |
| 2 | 10-20cm | Grass rootlets | Friable/firm, dark brown silty loam, transitioning to an orange brown silty loam |
| 3 | 20-30cm | Grass rootlets | Firm, dark brown loamy topsoil |
| 4 | 30-40cm | Compaction | Firm/compact, dark brown loamy topsoil transitioning to compacted orange clay |
| 5 | 40-45cm | Compaction | Compact, orange clay |


Photo of end of excavation of TP21

**Test Pit 22**

Test Pit 22 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Loose, dark brown silty loam |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown silty loam, transitioning to a lighter colour |
| 3 | 20-30cm | Grass rootlets | Friable, light brown transitioning to orange sandy loam |
| 4 | 30-40cm | Rootlets, black clay mottles, burnt branch | Friable/firm, orange sandy loam |
| 5 | 40-50cm | Compaction | Friable/firm, light orange-brown sandy clay |


Photo of end of excavation of TP22

**Test Pit 23**

Test Pit 23 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Loose, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown loamy topsoil |
| 3 | 20-30cm | Red clay mottles | Friable, dark brown loamy topsoil, transition to clay in SE corner |
| 4 | 30-40cm | Rootlets, black clay mottles, burnt branch | Compact, transition to clay in SE corner, topsoil still present |

**Test Pit 24**

Test Pit 24 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Loose, dark brown sandy loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown sandy loamy topsoil |
| 3 | 20-30cm | Grass rootlets | Friable, dark brown sandy loamy topsoil |
| 4 | 30-40cm | Charcoal and iron/manganese flecks, orange clay mottles | Friable, end of dark brown sandy loamy topsoil, start of brown-orange sandy loam, fine to medium grained |
| 5 | 40-50cm | Orange clay mottles | Friable/firm, orange sandy loam, fine to medium grained |
| 6 | 50-60cm | Orange clay mottles | Friable/firm, orange sandy loam, fine to medium grained |
| 7 | 60-70cm | Orange clay mottles | Friable/firm, orange sandy loam, fine to medium grained, light grey soil channel midway through spit |
| 8 | 70-80cm | Mottled clay | Firm, dark brown clay/loamy topsoil |
| 9 | 80-90cm | Mottled clay | Firm, orange clay mottled with dark brown loamy topsoil |
| 10 | 90-100cm | Compaction | Compact, orange clay base |


Photo of end of excavation of TP24

**Test Pit 25**

Test Pit 25 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown loamy topsoil with sharp transition to orange clay at base of spit |
| 3 | 20-30cm | Compaction | Compact, orange natural clay layer |


Photo of end of excavation of TP25

**Test Pit 26**

Test Pit 26 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets, orange clay mottling | Friable, dark brown loamy topsoil |
| 3 | 20-30cm | Compaction | Friable, dark brown loamy topsoil, transitioning into orange clay |
| 4 | 30-40cm | Compaction | Orange clay continues with depth |

Photo of end of excavation of TP26

**Test Pit 27**

Test Pit 27 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown sandy loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown sandy loamy topsoil, transitioning into a lighter colour |
| 3 | 20-30cm | Grass rootlets | Friable/firm, light orange-brown loam |
| 4 | 30-40cm | Black clay mottles | Friable/firm, light orange-brown loam |
| 5 | 40-50cm | Black and red mottled clay | Friable/firm, light orange-brown loam |
| 6 | 50-60cm | Black and red mottled clay | Friable/firm, light orange-brown loam, increased clay content |


Photo of end of excavation of TP27

**Test Pit 28**

Test Pit 28 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown loamy topsoil |
| 3 | 20-30cm | Grass rootlets, charcoal flecks | Friable, dark brown loamy topsoil, transitioning to orange clay layer |
| 4 | 30-40cm | Charcoal flecks | Compact, orange clay soil layer |
| 5 | 40-50cm | Compaction | Orange natural clay layer |


Photo of end of excavation of TP28

**Test Pit 29**

Test Pit 29 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets, orange clay mottles | Friable, dark brown loamy topsoil |
| 3 | 20-30cm | Charcoal flecks | Compact, dark brown loamy topsoil, transitioning to orange and red clay layer |
| 4 | 30-40cm | Charcoal patches | Compact, orange and red clay layer, layer of dark brown loamy soil at base |
| 5 | 40-50cm | Tree root | Compact, orange clay layer, mottled with dark brown loamy soil |
| 6 | 50-60cm | Compaction, tree roots | Compact, orange clay layer, mottled with dark brown loamy soil |
| 7 | 60-70cm | Compaction | Orange natural clay layer |


Photo of end of excavation of TP29

**Test Pit 30**

Test Pit 30 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil, transitioning to orange clay |
| 2 | 10-15cm | Charcoal flecks | Orange natural clay layer |


Photo of end of excavation of TP30

**Test Pit 31**

Test Pit 31 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Compact, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets, orange clay mottles | Friable, dark brown loamy topsoil |
| 3 | 20-30cm | Compaction | Compact, dark brown loamy topsoil, transitioning to orange layer |
| 4 | 30-40cm | Compaction | Compact, orange clay natural layer |


Photo of end of excavation of TP31

**Test Pit 32**

Test Pit 32 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Compact, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets, orange clay mottles, ironstone (<5%) | Compact, dark brown loamy topsoil |
| 3 | 20-30cm | Compaction, red clay mottles | Compact, orange clay |


Photo of end of excavation of TP32

**Test Pit 33**

Test Pit 33 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets, ironstone | Friable, dark brown loamy topsoil |
| 3 | 20-30cm | Ironstone, burnt clay | Friable, dark brown loamy topsoil, transitioning to orange clay |
| 4 | 30-40cm | Compaction, ironstone | Compact, orange clay |


Photo of end of excavation of TP33

**Test Pit 34**

Test Pit 34 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Grass roots | Loose, dark brown sandy loam |
| 2 | 10-15cm | Grass roots | Loose, dark brown sandy loam |
| 3 | 15-20cm | Grass roots | Loose, dark brown sandy loam |
| 4 | 20-25cm | Grass roots, charcoal flecks | Friable/firm, dark brown orange silty sandy loam, medium grained |
| 5 | 25-30cm | Iron/manganese flecks, grass rootlets | Friable/firm, dark brown orange silty sandy loam, medium grained |
| 6 | 30-35cm | Iron/manganese flecks, grass rootlets | Friable/firm, light brown orange silty sandy loam, medium grained |
| 7 | 35-40cm | Iron/manganese flecks, clay mottles | Friable/firm, light brown orange silty sandy loam, medium grained |
| 8 | 40-45cm | Iron/manganese flecks, clay mottles | Friable/firm, light yellow orange silty sandy loam, medium grained |

Photo of end of excavation of TP34

**Test Pit 35**

Test Pit 35 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Loose, dark brown sandy loamy topsoil |
| 2 | 10-20cm | Charcoal flecks, orange mottled clay, grass rootlets | Friable, light orange brown silty sandy loam |
| 3 | 20-30cm | Charcoal flecks, grass rootlets | Friable, light orange brown sandy clay loam |
| 4 | 30-40cm | Ironstone/manganese flecks, red mottled clay | Compact, light brown orange mottled clay |


Photo of end of excavation of TP35

**Test Pit 36**

Test Pit 36 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Loose, dark brown sandy loamy topsoil |
| 2 | 10-20cm | Charcoal flecks, orange mottled clay, grass rootlets | Friable, light greyish white silty chalk, possible disturbance from nearby track |
| 3 | 20-30cm | Ironstone/manganese flecks (10%) | Friable, light greyish white silty chalk |
| 4 | 30-40cm | Ironstone/manganese flecks | Compact, light orange brown clay |
| 5 | 40-50cm | Compaction | Compact, orange red mottled clay |


Photo of end of excavation of TP36

**Test Pit 37**

Test Pit 37 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Loose, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown loamy topsoil, orange clay in SE corner |
| 3 | 20-30cm | Compaction | Friable, dark brown loamy topsoil transitioning to an orange clay loam |
| 4 | 30-40cm | Clay mottles | Friable/firm, brown orange clay loam |
| 5 | 40-50cm | Compaction | Compact, orange clay natural layer |


Photo of end of excavation of TP37

**Test Pit 38**

Test Pit 38 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Loose, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets, orange clay mottles | Friable, dark brown loamy topsoil |
| 3 | 20-30cm | Grass roots, orange clay mottles | Friable, dark brown loamy topsoil |
| 4 | 30-40cm | Clay mottles | Friable/firm, transition to light grey clay loam |
| 5 | 40-50cm | Ironstone/manganese flecks, clay mottles | Friable/firm, light grey clay loam |
| 6 | 50-60cm | Compaction, ironstone/manganese pebbles | Compact, orange mottled clay |


Photo of end of excavation of TP38

**Test Pit 39**

Test Pit 39 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Loose, dark brown sandy loamy topsoil |
| 2 | 10-20cm | Grass rootlets, orange clay mottles | Friable, dark brown sandy loamy topsoil |
| 3 | 20-30cm | Black clay mottles | Compact, transition to orange red clay |


Photo of end of excavation of TP39

**Test Pit 40**

Test Pit 40 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Loose, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown loamy topsoil, starting transition to orange-brown silty sandy loam |
| 3 | 20-30cm | Grass rootlets | Friable/firm, orange brown sandy silty loam, medium grained |
| 4 | 30-40cm | Grass rootlets, orange mottled clay | Friable/firm, orange brown sandy silty loam, medium grained |
| 5 | 40-50cm | Orange black mottles of clay | Compact, orange clay |


Photo of end of excavation of TP40

**Test Pit 41**

Test Pit 41 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Firm, medium brown orange loamy topsoil |
| 2 | 10-20cm | Grass rootlets, orange clay mottles | Firm, medium brown orange sandy loam |
| 3 | 20-30cm | Orange clay mottles | Firm, medium brown orange sandy loam |
| 4 | 30-40cm | Orange clay mottles | Firm, medium brown orange sandy loam |
| 5 | 40-50cm | Red, orange and black clay mottles | Firm/compact, orange sandy silty loam |
| 6 | 50-60cm | Red, orange clay mottles | Firm/compact, orange silty clay |


Photo of end of excavation of TP41

**Test Pit 42**

Test Pit 42 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, brown sandy silty soil, medium grained |
| 3 | 20-30cm | Iron/manganese (<2mm) | Firm, brown orange sandy silty clay |
| 4 | 30-40cm | Iron/manganese (<2mm) | Firm, light brown orange sandy silty clay |
| 5 | 40-50cm | Scattered black clay mottles | Firm, light brown orange silty clay loam |
| 6 | 50-60cm | Black clay mottles | Firm/compact, light brown orange silty clay, transitioning to orange natural clay |


Photo of end of excavation of TP42

**Test Pit 43**

Test Pit 43 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown sandy loamy topsoil |
| 2 | 10-20cm | Grass rootlets, flecks of baked clay | Friable, brown orange sandy silty clay, medium sand grains |
| 3 | 20-30cm | Ironstone/manganese, mottled clay | Firm, brown orange-yellow sandy silty clay |
| 4 | 30-40cm | Ironstone/manganese (<10mm), mottled clay | Firm, orange brown sandy clay |
| 5 | 40-50cm | Black clay mottles | Firm/compact, reddish brown sandy silty clay, transitioning on red clay |


Photo of end of excavation of TP43

**Test Pit 44**

Test Pit 44 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets, orange and black clay mottles | Friable, light brown orange sandy silty loam |
| 2 | 10-20cm | Red, orange and black clay mottles | Friable/firm, orange clay silty loam brown orange sandy silty clay, medium sand grains |
| 3 | 20-25cm | Red and black clay mottles, ironstone/manganese (10%) | Compact, orange mottled clay |


Photo of end of excavation of TP44

**Test Pit 45**

Test Pit 45 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets, ironstone/manganese (<10mm), scattered clay mottles | Friable, light orange brown silty sandy clay, fine grained |
| 3 | 20-30cm | Ironstone/manganese, mottled clay | Friable/firm, orange brown silty sandy clay, fine grained |
| 4 | 30-40cm | Ironstone/manganese (<10mm), mottled clay | Compact, orange clay |

Photo of end of excavation of TP45

**Test Pit 46**

Test Pit 46 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets, flecks of ironstone/manganese | Friable, light brown orange sandy silty clay, fine to medium sand grains |
| 3 | 20-30cm | Ironstone/manganese, mottled clay | Friable, light brown orange sandy silty clay, fine to medium sand grains |
| 4 | 30-40cm | Ironstone/manganese flecks (<5mm) | Firm, orange silty clay loam, with additional yellow silty loam |
| 5 | 40-50cm | Ironstone/manganese flecks (<5mm) | Firm/compact, orange mottled clay |


Photo of end of excavation of TP46

**Test Pit 47**

Test Pit 47 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown loamy topsoil |
| 3 | 20-30cm | Compaction | Friable, dark brown loamy topsoil, transitioning to orange clay |
| 4 | 30-40cm | Compaction | Compact, natural orange clay layer |


Photo of end of excavation of TP47

**Test Pit 48**

Test Pit 48 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, light brown silty sandy loam, fine to medium sand grains |
| 3 | 20-30cm | Ironstone/manganese, scattered | Friable, greyish brown orange silty loam |
| 4 | 30-40cm | Ironstone/manganese flecks (<5mm) | Firm, light greyish orange silty clay loam |
| 5 | 40-50cm | Ironstone/manganese flecks (<5mm) | Compact, transition to yellowish brown natural clay at base |


Photo of end of excavation of TP48

**Test Pit 49**

Test Pit 49 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown loamy topsoil transitioning to orange clay |
| 3 | 20-30cm | Compaction | Compact, orange clay |


Photo of end of excavation of TP49

**Test Pit 50**

Test Pit 50 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets | Friable, dark brown loamy topsoil |
| 3 | 20-30cm | Compaction | Compact, transition to orange clay at base of spit |


Photo of end of excavation of TP50

**Test Pit 51**

Test Pit 51 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets, red clay mottles | Friable, brown sandy clay, medium sand grains |
| 3 | 20-30cm | Ironstone/manganese, scattered, red clay mottles | Friable/firm, brown sandy clay, transitioning to orange clay |
| 4 | 30-40cm | Ironstone/manganese flecks (<5mm), clay mottles | Firm, medium orange brown sandy clay |
| 5 | 40-50cm | Ironstone/manganese flecks (<5mm) (20%), black clay mottles | Firm, medium orange brown sandy clay |
| 6 | 50-60cm | Mottled clay, ironstone/manganese (20%) | Firm, medium orange brown sandy clay, transition to a light grey silt |
| 7 | 60-70cm | Ironstone/manganese | Compact, transition to yellowish brown mottled clay |


Photo of end of excavation of TP51

**Test Pit 52**

Test Pit 52 Summary

| Spit | Depth | Disturbance | Unit Description |
|---|---|---|---|
| 1 | 0-10cm | Abundance of grass rootlets | Friable, dark brown loamy topsoil |
| 2 | 10-20cm | Grass rootlets, ironstone/manganese | Friable, dark brown loamy topsoil |
| 3 | 20-30cm | Mottled clay | Friable, dark brown loamy topsoil |
| 4 | 30-40cm | Ironstone/manganese flecks (<5mm) | Compact, dark brown loamy topsoil transitioning to orange clay |


Photo of end of excavation of TP52

## Appendix 4: Artefact Catalogue

| AFT ID# | Test Pit # | Spit | Depth (cm) | Techno-class | Type | Raw material | RM quality | Colour | Complete-ness | Cortex % | Cortex type | Flake form |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AFT#001 | 9 | 4 | 30-40 | Retouched flake | Irregular ret flake | siltstone | medium | grey | complete | 1-25 | water-rolled | irregular |
| AFT#002 | 26 | 1 | 0-10 | Marginal flake | | silcrete | fine | red | broken | 0 | NA | NA |
| AFT#003 | 26 | 2 | 10-20 | Retouched flake | Bondi point/ backed artefact | indurated mudstone | fine | yellow | complete | 0 | NA | elongate |
| AFT#004 | 29 | 2 | 10-20 | Distal flake | | silcrete | fine | red | broken | 0 | NA | NA |
| AFT#005 | 38 | 4 | 30-40 | Complete flake | | milky quartz | fine | white | complete | 26-50 | water-rolled | elongate |

| AFT ID# | Plat type | Initiation type | Plat shape | Plat width | Plat thick | Termination | % retouched edge | Quad 1 retouch | Quad 2 retouch | Quad 3 retouch | Quad 4 retouch | Scar count | Scar direct-ion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AFT#001 | multi-flake | bending | wide | 21.7 | 5.5 | feather | 1-25% | scalar | NA | NA | scalar | 4 | uni |
| AFT#002 | NA | NA | NA | | | | | | | | | | |
| AFT#003 | plain | hertzian | wide | 5.4 | 1.7 | feather | 26-50% | NA | NA | backed | backed | 2 | uni |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AFT#004 | NA | NA | NA | | | feather | | | | | | | |
| AFT#005 | crushed | bipolar | bipolar | 2.6 | 0.3 | crushed | | | | | | 2 | bi-dir |

| AFT ID# | Max dim (mm) | Axial length (mm) | Width (mm) | Thick-ness (mm) | Weight (g) | Comments |
|---|---|---|---|---|---|---|
| AFT#001 | 58.8 | 53 | 35.9 | 9.8 | 20.5 | scalar retouch on ventral surface initiated from left margin |
| AFT#002 | 16.6 | | | | 0.18 | |
| AFT#003 | 21.3 | 20 | 8.5 | 3.8 | 0.64 | uni-directional backing on the left margin |
| AFT#004 | 11.8 | | | | 0.2 | |
| AFT#005 | 12.3 | 12 | 4.4 | 2.4 | 0.12 | small bipolar flake |

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