Aboriginal Cultural Heritage Assessment Report

Razorback Quarry, Running Stream NSW

August 2022

Project Number: 21-448

NSW • ACT • QLD • VIC
W. www.nghconsulting.com.au

Document verification

Project Title:	Razorback Quarry, Running Stream NSW
Project Number:	21-448
Project File Name:	21-448 – Addendum Aboriginal Cultural Heritage Due Diligence and Archaeological Survey Report

Revision	Date	Prepared by	Reviewed by	Approved by
DRAFT	27/06/2022	Layne Holloway, Bronwyn Partell	Ingrid Cook	
FINAL – sensitive information redacted	19/08/2022	Bronwyn Partell		

NGH Pty Ltd is committed to environmentally sustainable practices, including fostering a digital culture and minimising printing. Where printing is unavoidable, NGH prints on 100% recycled paper.

W. www.nghconsulting.com.au

E. ngh@nghconsulting.com.au

BEGA - ACT & SOUTH EAST NSW
Suite 11, 89-91 Auckland Street
(PO Box 470) Bega NSW 2550
T. (02) 6492 8333

NEWCASTLE - HUNTER & NORTH COAST
Level 1, 31-33 Beaumont Street
Hamilton NSW 2303
T. (02) 4929 2301

BRISBANE
T3, Level 7, 348 Edward Street
Brisbane QLD 4000
T. (07) 3129 7633

SYDNEY REGION
Unit 17, 21 Mary Street
Surry Hills NSW 2010
T. (02) 8202 8333

CANBERRA - NSW SE & ACT
Unit 8, 27 Yallourn Street
(PO Box 62) Fyshwick ACT 2609
T. (02) 6280 5053

WAGGA WAGGA - RIVERINA & WESTERN NSW
35 Kincaid Street (PO Box 5464)
Wagga Wagga NSW 2650
T. (02) 6971 9696

GOLD COAST
19a Philippine Parade
Palm Beach QLD 4221
(PO Box 466 Tugun QLD 4224)
T. (07) 3129 7633

WODONGA
Unit 2, 83 Hume Street
(PO Box 506) Wodonga VIC 3690
T. (02) 6067 2533

NSW • ACT • QLD • VIC
W. www.nghconsulting.com.au
ABN 31 124 444 622 ACN 124 444 622

Table of contents

Figures

Tables

Appendices

Acronyms and abbreviations

ACHA	Aboriginal Cultural Heritage Assessment
ACHCRP	*Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
ARAS	Archaeological Risk Assessment Services
CoC	Conditions of Consent
DECCW	Department of Environment, Climate Change, and Water
DP	Deposited Plan
EIS	Environmental Impact Statement
ha	Hectares
Heritage NSW	Heritage NSW of the NSW Department of Premier & Cabinet
IBRA	Interim Biogeographic Regionalisation for Australia
km	Kilometres
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
m	Metres
NGH	NGH Pty Ltd
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
PAD	Potential Archaeological Deposit
RAPs	Registered Aboriginal Parties
SHR	State Heritage Register
SSD	State Significant Development

Executive Summary

Background

NGH Pty Ltd (NGH) was commissioned by Space Urban Pty Ltd on behalf of Plantation Pine Products Australia Pty Ltd (PPPA) to undertake an Aboriginal Cultural Heritage Assessment Report (ACHAR) for the proposed Razorback Quarry in Running Stream, NSW. ARAS (2020) completed an aboriginal cultural heritage due diligence and archaeological survey report for the proposed works that was used to inform an initial scoping report for the project. Utilising predictive models from both the Hunter regions and the central Tablelands, the 2020 assessment determined that surface archaeological evidence is probably located on elevated creek terraces to the north and south-west of the proposed development area where 3rd or 4th order streams such as Two Mile Creek intersect with spring areas (i.e. Black Springs). A pedestrian sample survey of archaeologically sensitive landforms (ridgetops and alluvial flats) was conducted as part of the 2020 (ARAS) assessment, which noted variable survey conditions with some low surface visibility due to vegetation and grass cover. No Aboriginal objects or areas of archaeological sensitivity were identified. The results of the survey concluded all landforms within the Project Area have been subject to significant disturbance because of furrow ploughing for pine developments and recent bushfires have damaged mature native trees.

As the proposed Razorback Quarry is being assessed as a Designated Development under Part 4 of the NSW *Environmental Planning and Assessment Act 1979*, the proposal is subject to the Secretary's Environmental Assessment Requirements (SEARs), which have dictated the need for consultation with the local Aboriginal community. This had not been completed within the prior assessment (ARAS 2020). The purpose of this addendum Aboriginal Cultural Heritage Assessment Report is to therefore document the consultation with the local Aboriginal community and assess the potential impacts to Aboriginal objects as a result of the proposed works.

Archaeological Survey Results

Archaeological survey was undertaken on March 17th 2022, with NGH Senior Heritage Consultant Bronwyn Partell and a representative from Mingaan Aboriginal Corporation. No Aboriginal Objects were identified during the survey of the proposed works. One area of Potential Archaeological Deposit (PAD) was identified outside the proposed works footprint and will not be subject to harm as a result of the proposed works.

Recommendations:

The recommendations are based on the following information and considerations:

- Results of the current archaeological survey of the project area;
- Prior (ARAS 2020) archaeological survey of the project area;
- Consideration of results from other local archaeological studies;
- Results of consultation with the registered Aboriginal parties;
- The assessed significance of the sites;
- Appraisal of the proposed development; and
- Legislative context for the development proposal.

It is recommended that:

1. The proposed works for the Razorback Quarry may proceed with caution within the project area as assessed by this addendum report.
2. If any items suspected of being Aboriginal in origin are discovered during the work, all work in the immediate vicinity must stop and Heritage NSW notified, and the Unexpected Finds Protocol (Appendix B) must be followed.
3. In the unlikely event that human remains are discovered during the proposed works, all work must cease in the immediate vicinity. The appropriate heritage team within Heritage NSW and the local police should be notified. Further assessment would be undertaken to determine if the remains were Aboriginal or non-Aboriginal. If the remains are deemed to be Aboriginal in origin the Registered Aboriginal Parties (RAPs) should be advised of the find as directed by the appropriate heritage team within Heritage NSW. Heritage NSW would advise the Proponent on the appropriate actions required.
4. Further archaeological assessment would be required if the proposal activity extends beyond the area assessed in this report. This would include consultation with the registered Aboriginal parties and may include further field survey.

1. Introduction

1.1 The Project

NGH Pty Ltd (NGH) was commissioned by Space Urban Pty Ltd on behalf of Plantation Pine Products Australia Pty Ltd (PPPA) to undertake an Aboriginal Cultural Heritage Assessment Report (ACHAR) for the proposed Razorback Quarry in Running Stream, NSW. The proposal involves the development and operation of an open pit sand and gravel quarry, requiring a built area of approximately 24.7 hectares for operation as shown in Figure 1-3. The quarry plans to extract up to 200,000 tonnes per annum over a period of up to 30 years.

ARAS (2020) conducted a due diligence assessment of the Project Area to inform a scoping report for the proposed works and concluded that due to the disturbance which has previously occurred within the project area, Aboriginal objects are unlikely to be present. As the proposed Razorback Quarry is being assessed as a Designated Development under Part 4 of the NSW *Environmental Planning and Assessment Act 1979*, the proposal is subject to the Secretary's Environmental Assessment Requirements (SEARs), which have dictated the need for consultation with the local Aboriginal community. This had not been completed within the prior assessment (ARAS 2020).

The purpose of this addendum Aboriginal Cultural Heritage Due Diligence and Archaeological Survey Report is to therefore document the consultation with the local Aboriginal community and assess the potential impacts to Aboriginal objects as a result of the proposed works, in accordance with the following guidelines:

- *Guide to investigation, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011)
- *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010)
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010)
- *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW 2010).

1.2 Running Stream Quarry Location

The proposed Running Stream Quarry project is located at 39 Razorback Road, Running Stream, NSW 2850, approximately 65 kilometres northwest of Lithgow (refer to Figure 1-1 and Figure 1-2) within the Mid-Western Regional Council Local Government Area (LGA) (Parish of Warrangunia, County of Roxburgh), and within the boundary of the Bathurst Local Aboriginal Land Council (LALC).

The Project Area is entirely within Lot 2, DP569979.

1.3 Report Format

This report is intended as an addendum to the Aboriginal Cultural Heritage Due Diligence and Archaeological Survey report completed by Archaeological Risk Assessment Services Pty Ltd (ARAS), 2020 (Appendix C).

The project is being assessed as a Designated Development under Part 4 of the NSW *Environmental Planning and Assessment Act 1979.* The 2020 Scoping Report prepared for the project by ARAS concluded that due to the disturbance which has previously occurred within the

project area, Aboriginal objects are unlikely to be present, and as such an Aboriginal Heritage Due Diligence Assessment for the project area would be sufficient.

The Secretary's Environmental Assessment Requirements (SEARs) issued for the project post the ARAS (2020) report include the following with regard to Aboriginal heritage:

- *An assessment of the potential impacts on Aboriginal heritage (cultural and archaeological) including evidence of appropriate consultation with relevant Aboriginal communities/parties and documentation of the views of these stakeholders regarding the likely impact of the development on their cultural heritage…. having regard to the policies and guidelines listed in Attachment 1.*

A Due Diligence Assessment was prepared by Archaeological Risk Assessment Services (ARAS) in December 2020 (ARAS 2020). The assessment provided the following conclusions and recommendations:

- *The assessment area is considered to have low Aboriginal heritage potential.*
- *The above conclusion is reached based on background archaeological/historical research, field assessment and land-use history.*
- *The assessment was undertaken using information provided to the consultant by Borg Manufacturing Pty Ltd in June 2020.*
- *Any new modifications to the proposed development's design may require additional due diligence assessment before the development may proceed.*
- *No further archaeological work is required as a result of this assessment.*

NGH considers that the due diligence assessment meets the first part of the requirements for Aboriginal heritage assessment in relation to the development. This report therefore includes documentation of the completion of Aboriginal stakeholder consultation and results of the archaeological survey conducted with RAP representatives, in order to meet the requirements of the SEARs.

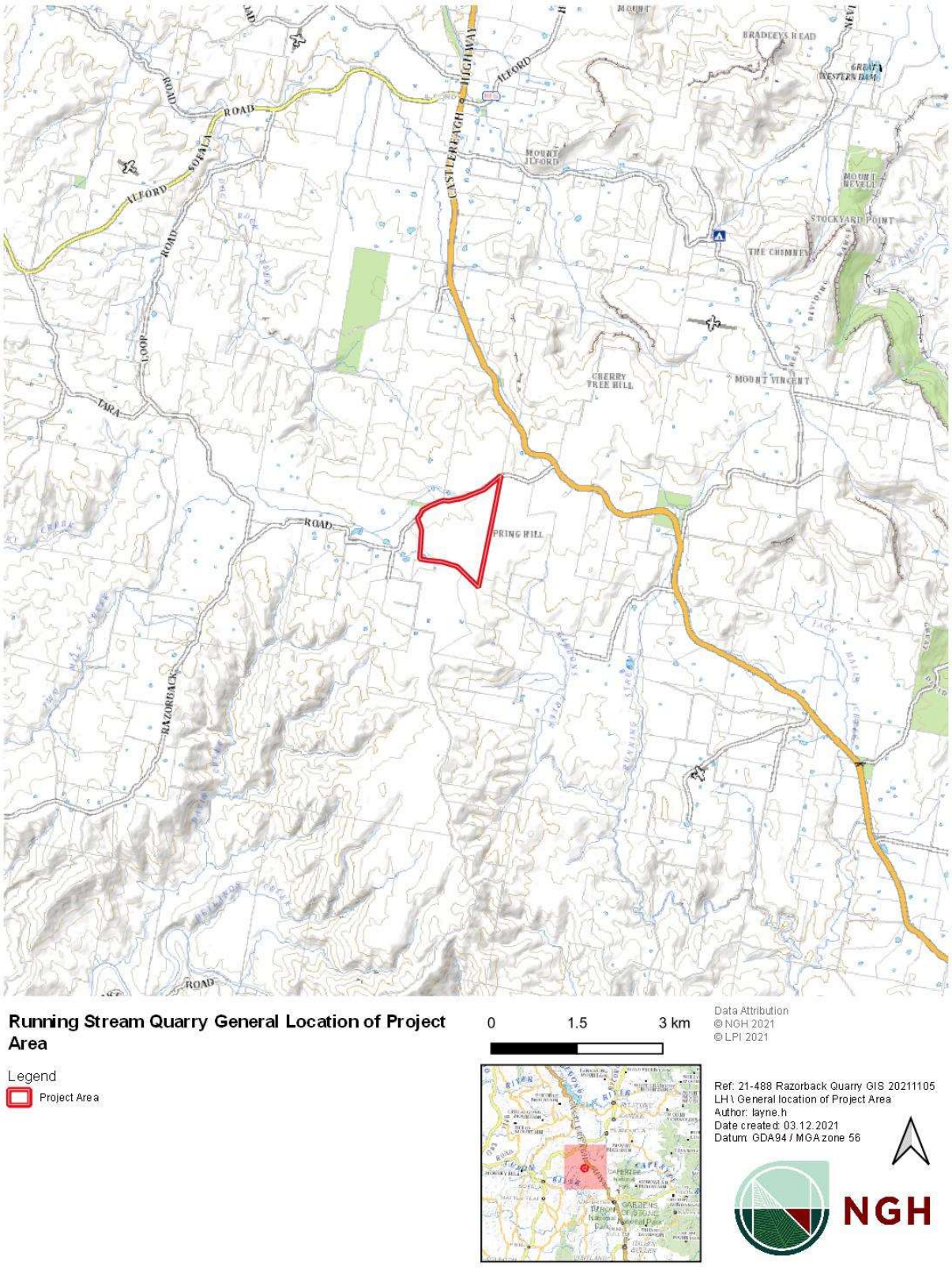


Figure 1-1 General Project Area at Running Stream NSW

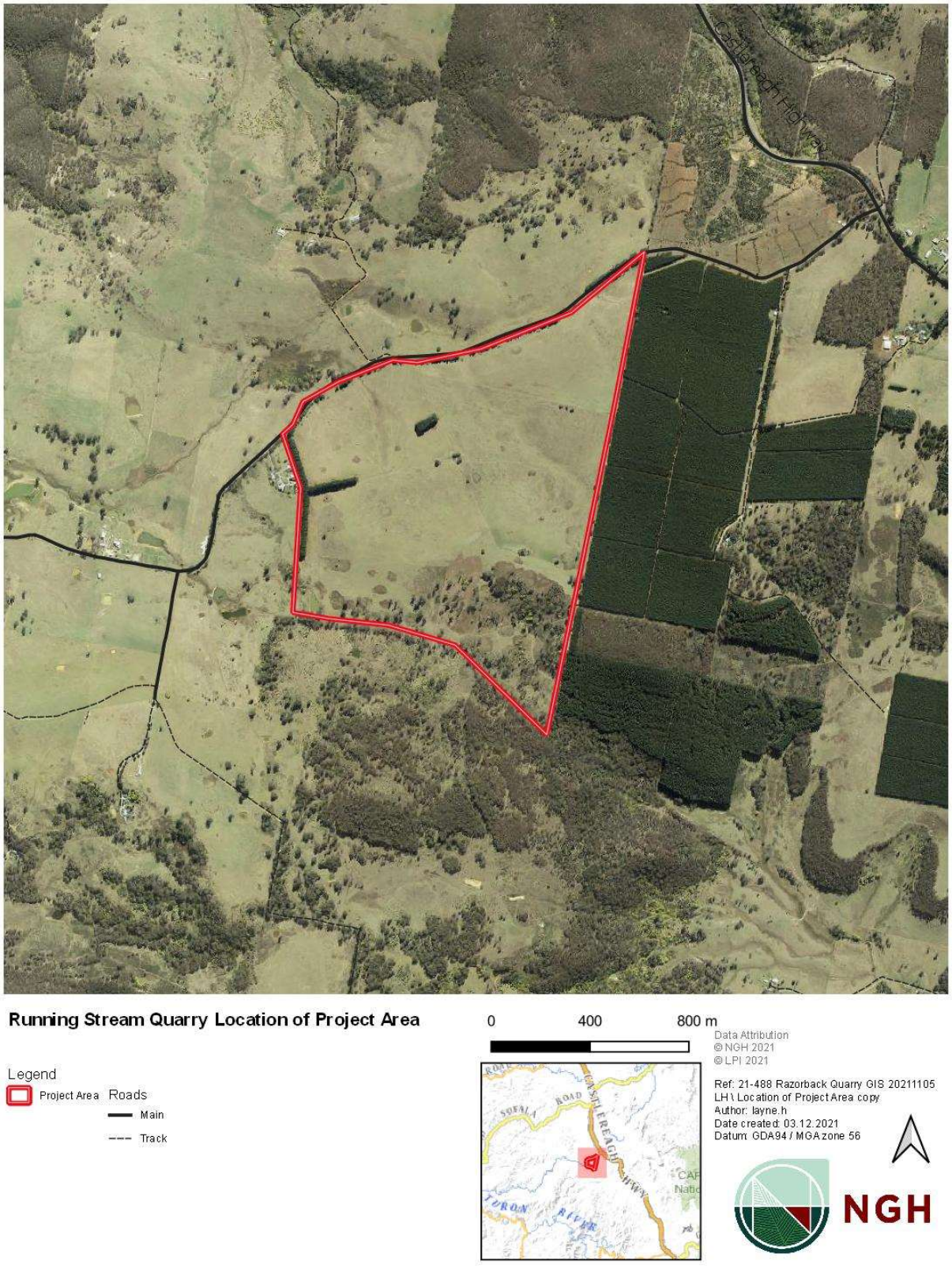


Figure 1-2 Location of the Project Area

Figure 1-3 Proposed Works.

2. Aboriginal community consultation

The consultation with Aboriginal stakeholders for this project was undertaken in accordance with Section 60 of the *National Parks and Wildlife Amendment (Aboriginal Objects and Aboriginal Places) Regulation 2019* and following the process outlined in the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRP). The guide outlines a four-stage process of consultation as follows:

- Stage 1 – Notification of project proposal and registration of interest.
- Stage 2 – Presentation of information about the proposed project.
- Stage 3 – Gathering information about cultural significance.
- Stage 4 – Review of draft cultural heritage assessment report.

In accordance with the requirements outlined above, NGH has consulted with Registered Aboriginal Parties throughout the project. To date this has included the following consultation steps:

- Advertising for interested parties by placing a public notice advertisement in the Mudgee Guardian on 26 November 2021;
- Writing to required agencies, including Heritage NSW, advising of the project, and seeking known interested parties; and
- Writing to any additional identified parties from Heritage NSW and/or other organisations seeking their interest; and
- Drafting and sending an ACHA Methodology to RAPs for review; and
- Completing Fieldwork with RAP representative(s); and
- Drafting and sending the ACHA report for RAP review.

The full list of consultation steps, including those groups and individuals who were contacted, and a consultation log is provided in Appendix D. A summary of actions carried out in following these stages are as follows.

Stage 1 - Letters outlining the development proposal and the need to carry out an ACHA were sent statutory authorities including Heritage NSW, as identified under the ACHCRP on the 8th November 2021. An advertisement was placed in the local newspaper, *The Mudgee Guardian*, on the 26th November 2021 seeking registrations of interest from Aboriginal people and organisations. A further series of letters was sent to other organisations identified by Heritage NSW in correspondence with NGH on the 25th November 2021. In each instance, the closing date for submission was 14 days from receipt of the letter.

As a result of this process, 8 Aboriginal groups registered their interest in the proposal. Notification of Registered Aboriginal Parties was provided to Heritage NSW on the 14th November 2021.

These were:

- Bathurst Local Aboriginal Land Council
- Wellington Valley Wiradjuri Aboriginal Corporation
- Gallanggabang Aboriginal Corporation
- Corroboree Aboriginal Corporation
- Woka Aboriginal Corporation
- Mingaan Aboriginal Corporation
- Warrabinga Native Title Claimants Aboriginal Corporation
- North East Wiradjuri Company Ltd

Stage 2 - On the 25th January 2022, an *Aboriginal Cultural Heritage Assessment Methodology* document for the proposal was sent to all 8 Registered Aboriginal Parties (RAPs) listed above (all 8 by email) This document provided details of the background to the proposal, a summary of previous archaeological surveys, and the proposed heritage assessment methodology for the proposal. The document invited comments regarding the proposed methodology and sought any information regarding known Aboriginal cultural significance values associated with the Project area and/or any Aboriginal objects contained therein. A minimum of 28 days was allowed for a response to the document.

None of the registered parties raised any objections to the methodology and many expressed an interest in participating in the fieldwork.

Stage 3 - The *Assessment Methodology* outlined in Stage 2 included a written request to provide any information that may be relevant to the cultural heritage assessment of the Project area. It was noted that sensitive information would be treated as confidential.

No responses regarding cultural information were received in response to the methodology however comments were made regarding the treatment of any cultural materials located during the assessment.

The survey fieldwork was organised, and one of the eight registered groups were selected for fieldwork participation by the Proponent. The survey fieldwork was carried out on the 17th May 2022 by one archaeologist from NGH and one Aboriginal RAP, Sharon Riley representing Mingaan Aboriginal Corporation.

Stage 4 - A draft version of this *Aboriginal Cultural Heritage Assessment Report* for the proposal (this document) was forwarded to the RAPs on 29/06/2022 inviting comment on the results, the significance assessment and the recommendations post completion of the testing program. A minimum of 28 days was allowed for responses to the document, for a summary of the responses received refer to Table 2-1 below.

2.1 Aboriginal Community Feedback

Three comments were received in response to the draft ACHAR. These comments are summarised in Table 2-1 below, with the full details available in the consultation documents (Appendix E).

Table 2-1. Aboriginal community feedback of the draft ACHAR.

RAP Group	Date received	Summary of comments received
Wellington Valley Wiradjuri Aboriginal Corporation	06/07/2022	“We trust in Sharon’s experience and what is recorded in the report is a true and accurate reflection of what was seen on the day. As such we agree to the findings of the report.”
Corroboree Aboriginal Corporation	06/07/2022	"We have reviewed and agree with your report. "
Gallanggabang Aboriginal Corporation	19/07/2022	Response in pdf form (Appendix E), in summary Gallanggabang AC commented on the cultural sensitivity of the region, however agreed with the assessment of the area as being largely disturbed and modified. Gallangabang has commented that they agreed with the methodology undertaken and the findings of the assessment.

3. Archaeological background

3.1 Aboriginal Heritage Information Management System (AHIMS)

The purpose of the ACHA is to investigate the presence and extent of any Aboriginal sites within or adjacent to the Project Area and to assess their significance and any possible impacts resulting from the proposed works. As part of the desktop assessment for this project, an extensive search was undertaken of the Aboriginal Heritage Information Management System (AHIMS). The AHIMS register is maintained by Heritage NSW and provides a database of previously recorded Aboriginal heritage sites. An extensive search provides basic information about any sites previously identified within a search area. However, an AHIMS search is not conclusive evidence of the presence or absence of Aboriginal heritage sites, as it requires that an area has been inspected and details of any sites located have been provided to Heritage NSW to add to the database. As a starting point, the search will indicate whether any sites are known within or adjacent to the investigation area. A search of the AHIMS database was conducted during a map search over Running Stream and the surrounding area. A copy of this search is provided in Appendix A.

The parameters for this search were as follows:

- Client Service ID: 643235
- Date:30/11/2021
- From: -33.2 (Latitude), 149.63 (Longitude)
- To: -32.92 (Longitude), 150.12 (Longitude)
- Approximate search area: 40 x 30km
- Number of Aboriginal sites and Aboriginal objects found: 112
- Number of declared Aboriginal Places found: 0

The results of this search confirmed that no recorded AHIMS sites are located within the Project Area. David Gordon (AHIMS) confirmed that the restricted site will not be impacted by the proposed works.

Table 3-1 outlines the site types previously recorded in the region. Figure 3-1 AHIMS sites within the region and Figure 3-2 AHIMS sites within proximity to the Project Area at Running Stream show the location of AHIMS sites in relation to the Project Area.

Table 3-1 Breakdown of previously recorded Aboriginal sites in the region

Site Type	Number
Artefact	78
Art (pigment or engraved)	7
Modified Tree (Carved or Scarred)	7
Grinding Groove	6
Potential Archaeological Deposit (PAD)	3
Art (pigment or engraved), Artefact	2
Artefact, Conflict	1
Artefact, Habitation structure	1

Site Type	Number
Artefact, Habitation structure, Potential Archaeological Deposit (PAD)	1
Art (pigment or engraved), Habitation structure	1
Art (pigment or engraved), Artefact	1
Modified Tree (Carved or Scarred), Ceremonial Ring (Stone or Earth)	1
Ceremonial Ring (Stone or Earth)	1
Aboriginal Resource and Gathering, Art (Pigment or Engraved), Artefact, Grinding Groove, Hearth, Potential Archaeological Deposit (PAD)	1
Restricted sites	1
TOTAL	112

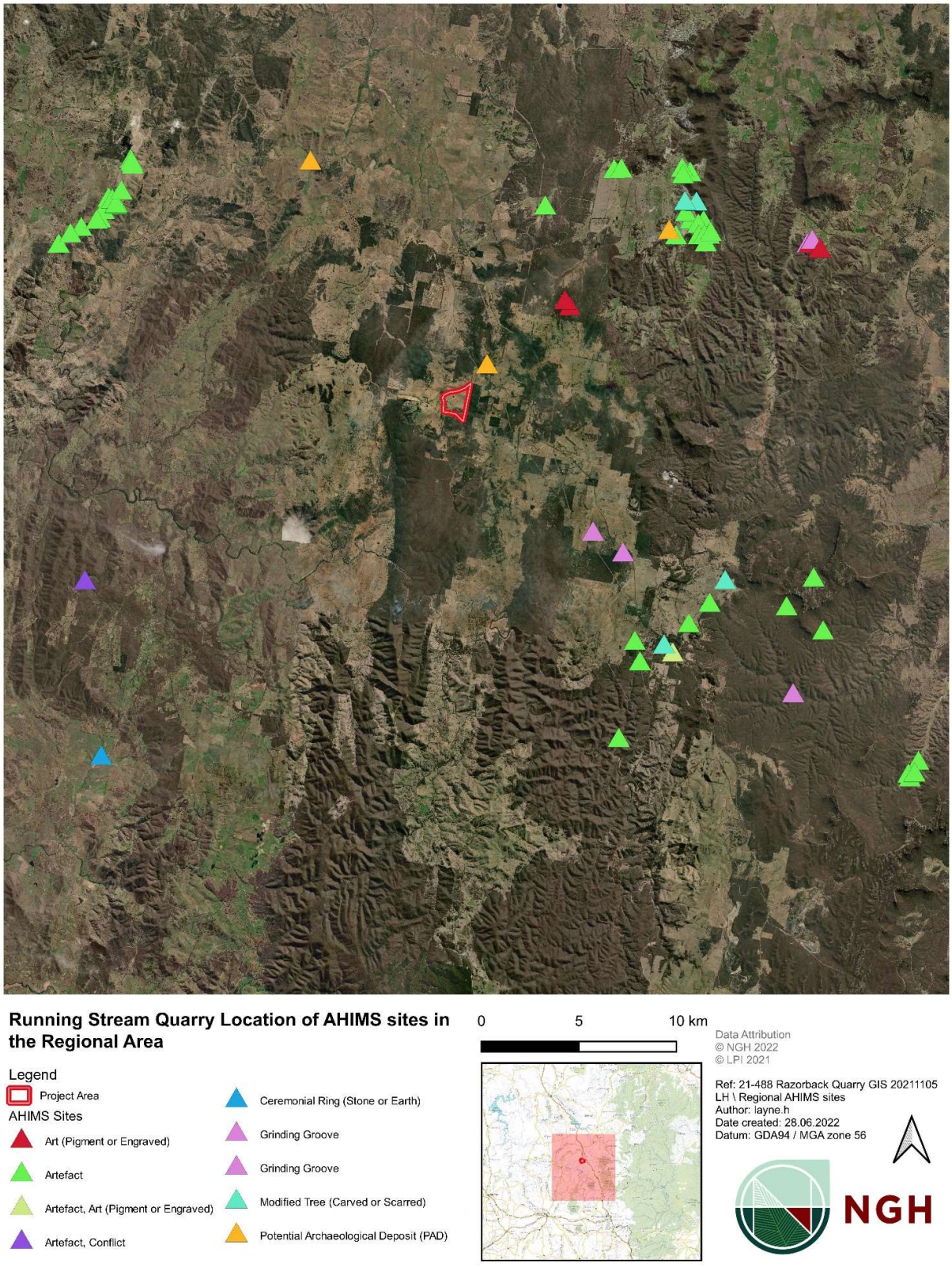


Figure 3-1 AHIMS sites within the region

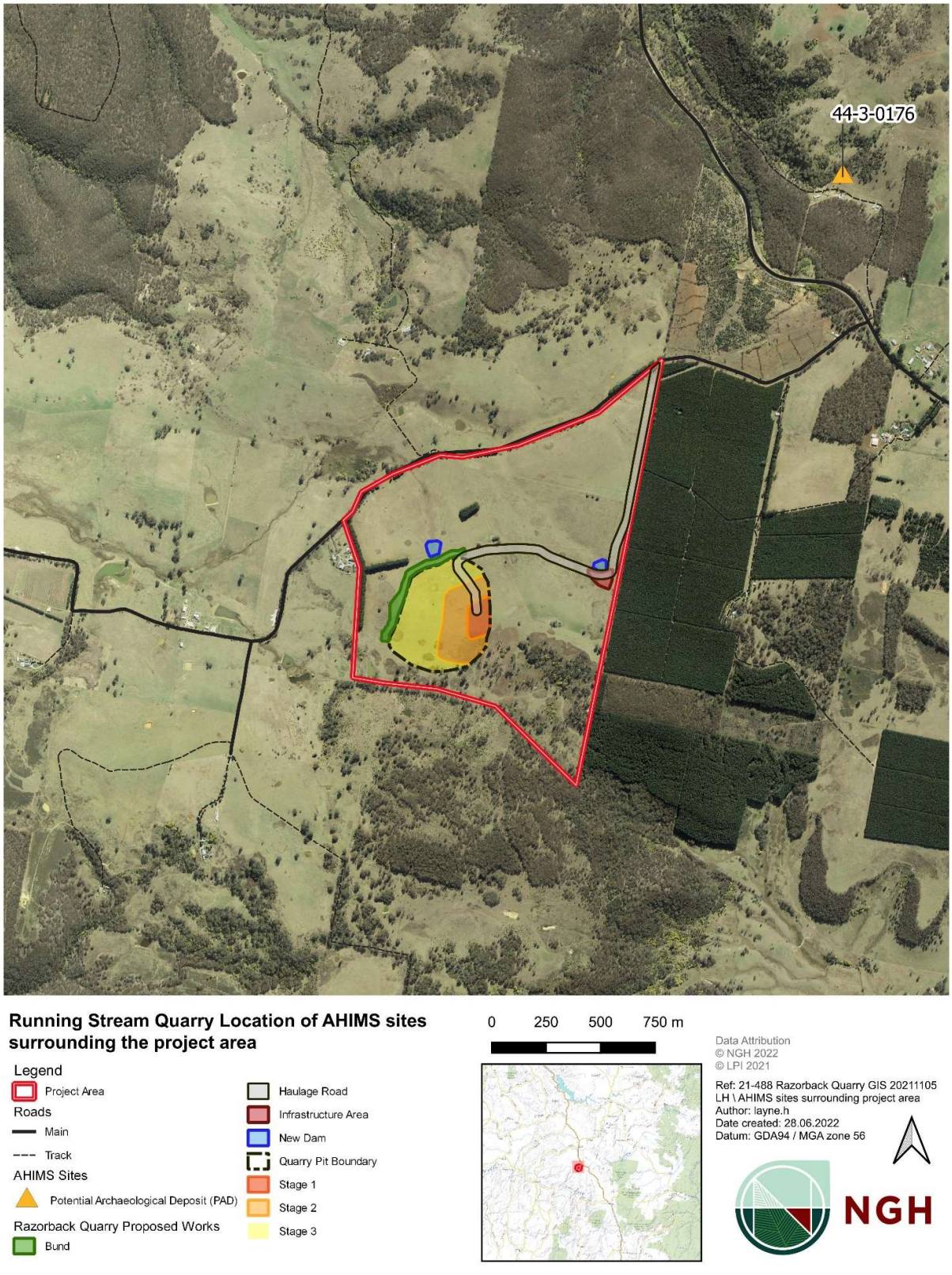


Figure 3-2 AHIMS sites within proximity to the Project Area at Running Stream

3.2 Other heritage register searches

No Aboriginal heritage sites were identified within the following databases. A single historic heritage item was identified within the searches, the Wishing Well on the southeast bound lane of the Castlereagh Highway 750m north of the Project Area. This item is valued for its historical associations with the pioneering travel through this region. It consists of a relic water well-constructed over a natural spring. While the item has no known Aboriginal cultural heritage values, the presence of a permanent potable water source was likely utilised by local Aboriginal people. The lands surrounding the spring may contain archaeological potential.

3.2.1 Australian Heritage Database

A search of the Australian Heritage Database identified no registered Aboriginal Places located within the Project Area. However, the Wishing Well, off Castlereagh Highway, Running Stream approximately 750m north of the Project Area, is listed on the Register of the National Estate (Non-statutory Archive).

3.2.2 State Heritage Inventory

The State Heritage Inventory includes a database of heritage items in New South Wales which include:

- Declared Aboriginal Places;
- Items listed on the State Heritage Register (SHR);
- Listed Interim Heritage Orders items on State Agency Heritage Registers, and,
- Items of local heritage significance listed on a local council's Local Environmental Plan (LEP).

A search of the NSW Heritage register identified no Aboriginal Places or state heritage items within 1km of the Project Area. The closest state heritage listed item is the Wallerawang-Gwabegar railway, Ben Bullen (SHR# 01082), located 24km southwest of the Project Area.

3.2.3 Mid-Western Regional Local Environmental Plan 2012

The Project Area is located within the area covered by the Mid-Western Regional LEP 2012. Schedule 5 of the LEP 2012 details the environmental heritage items encompassed by the plan. While no Aboriginal sites or places are identified within close proximity to the Project Area in the Mid-Western Regional LEP, the listing for the Wishing Well in the road reserve adjacent to Castlereagh Highway (ID: I33R) is located 750m north of the Project Area.

3.3 Environmental background

Understanding the landscape context of the Project Area may assist us to better understand the archaeological modelling of the area and assist to identify local resources which may have been utilised by Aboriginal people in the past. This landscape assessment is based on a number of classifications that have been made at national and regional levels for Australia.

3.3.1 General description

The landscape context of the Project Area is based on a number of classifications that include the National Interim Biogeographic Regionalisation for Australia (IBRA) system, Mitchell landscapes,

NSW soil landscapes and geological maps. The combination of these differing resolutions of landform data provides a comprehensive and multi scaled understanding of the landscape within the Project Area and its immediate surroundings.

The National Interim IBRA system identifies the Project Area as being located within the Capertee subregion of the Sydney Basin (SB) Bioregion (DE&E, 2016). It covers a portion of NSW from Newcastle in the north, Lithgow in the west, encompasses the Blue Mountains, and extends south past Ulladulla. Further landscape modelling as part of the Mitchell landscapes system (DECC, 2002) shows the Project Area is located in the Capertee Plateau. The Mitchell landscape description of the *SB Capertee – Capertee Plateau* is provided in Table 3-2 below. This soil profile suggest that the Project Area contains potential for subsurface Archaeological deposits in shallow soil profiles in locations where Aboriginal occupation may have occurred adjacent to water resources. The presence of swampy and clay rich soils may impact on the potential of organic materials to be present. The presence of sandstone and basalt suggest with quartzite inclusions suggest the regional area contains suitable stone resources for stone tool manufacture, therefore presenting potential for artefacts and grinding grooves in locations of intact landscapes.

Further landscape information of the Project Area that has contributed to the development of our predictive statements is included in section 3.5.

Table 3-2 Mitchell Soil Landscape Descriptions (DECCW 2002:107)

Soil Landscape	Description
SB Capertee - Capertee Plateau	Wide valleys, low rolling hills below sandstone cliffs on Permian conglomerates, sandstones, and shales with coal at the base of the Sydney Basin and exposure of underlying Devonian shale, siltstone or quartzite. Small areas of Tertiary basalt. General elevation 800–1000m, local relief 100–120m. Isolated flat top mountains in the valleys formed as pinnacles or remnant pieces of plateau. Shoulder slopes with stone pillars or 'pagodas' above steep canyons on tributary streams falling into gorges. Low gradient swampy streamlines. Shallow stony texture-contrast profiles, usually with gritty well drained A-horizons, over tough yellow or grey poorly drained clays. Boulder debris with clay matrix below cliffs (talus). Organic sand in swamps. Red brown structured loams on basalt.

3.3.2 Past land use

Aerial photography as described by Archaeological Risk Assessment Services (ARAS) (2020) details that image from 1964, 1973, 1982, and 1989 clearly illustrates the development of the land with some pasture improvement (native vegetation clearing) and cropping taking place prior to pine plantations being introduced to the east of the Project Area since the 1990s.

Plate 3-1 Earliest historical aerial imagery available of the Project Area from 1964, depicting the Project Area had already been previously cleared of native vegetation. Red outline identifying the approximate location of the Project Area. Sourced from Borg (2020).

Colonial chronology of the region

The below colonial chronological timeline provides insight into the settlement of Europeans within the region and impacts to Aboriginal occupation and natural landscapes. The below information has been sourced from Borg (2021) and Mid-Western Regional Council, via Mudgee District History (accessed 1/12/21).

1813 – Gregory Blaxland, William Lawson, and William Charles Wentworth led the first successful crossing by Europeans through the Blue Mountains.

1821 – First European contact was likely made when James Blackman explored the route from Bathurst to the Cudgegong River in which he was occupied by a local Wiradjuri man.

1822 - Blackman and Lawson trace a route from Wallerawang to Dabee, near Rylstone. George and Henry Cox, William Cox the road builder's sons, settled on the Camping Tree site west of Mudgee at Old Menah.

1848 – Lithgow-Mudgee Road (current Castlereagh Highway) was formed in its present location.

1939 – 1939 the former Rylstone Shire Council sealed the Lithgow-Mudgee Road.

1882 – The land surrounding the assessment area was originally taken up in the late 1890s with the original grant for the village of Capertee being established in as part of the western rail line development (Parkes et al 1979).

1890s - The assessment area was farmed from the late with extensive native tree clearing making way for sheep grazing.

1899 – First parish map of the Project Area identifies the land of the Project Area and its surrounds was owned by John Swien Fraser.

1960s - A gradual transferal to state forestry was undertaken in the and then to private commercial pine plantations.

3.3.3 Current land use of the Project Area

The 327ha property is currently comprised of the following land uses defined by Borg (2020):

- 68% is planted out as pine plantation at various stages of progression, from recently planted tube stock to mature plantations through to areas that have been recently harvested and not yet re-planted.
- 19% is other wooded or remnant vegetation, comprising both native and non-native species and includes the dwelling and yard area.
- 13% is comprised of access tracks and grassland areas through and surrounding the plantation area that are not planted as plantation. This includes a former pasture areas and fire breaks.

In summary, the Project Area and surrounding region has been impacted by past vegetation clearing, grazing and pine plantation activities which has likely resulted in moderate to high disturbance of the Project Area. If any cultural deposits are present within the Project Area, the past land use has likely impacted their natural depositional environments, reducing archaeological value.

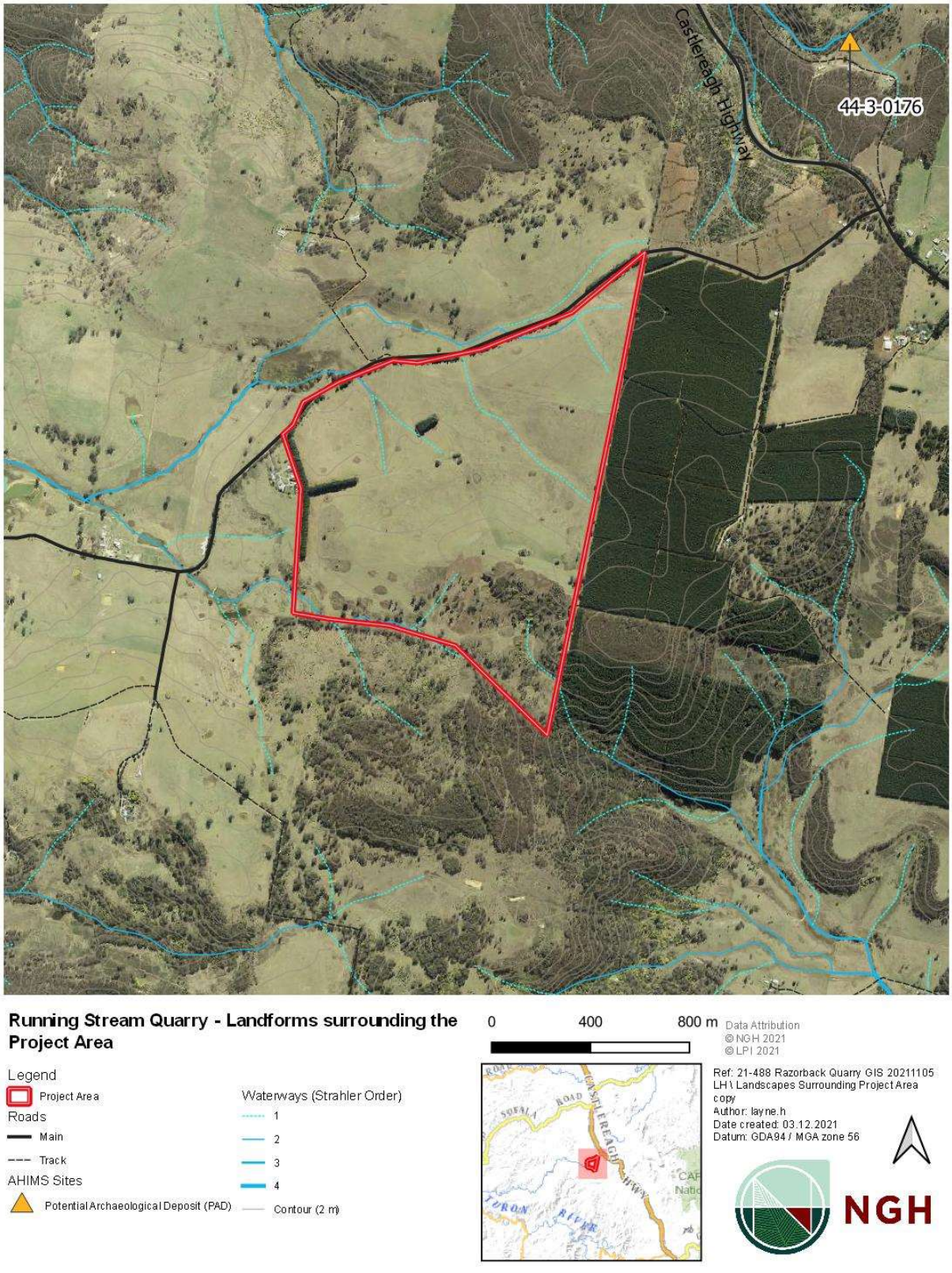


Plate 3-2 Landforms surrounding the Project Area

3.4 Previous archaeological studies

A significant number of studies have been undertaken in Running stream, NSW and the wider region which provide a sound archaeological context for the Project Area. In summary, archaeological research suggests that the Blue Mountains were not routinely inhabited by people during the Last Glacial Maximum (LGM), which lasted from 31,000–16,000 years ago and are likely to have been a barrier to humans during this time (Barry et al. 2020; Mooney and Martin 2009). Archaeological evidence from nearby sites in the Blue Mountains suggests that the earliest evidence for people in the Blue Mountains is approximately 17,500 years ago. As a result, current archaeological knowledge suggest that tablelands region was sparsely occupied during the LGM due to the arid and colder conditions that are likely to have characterised the hinterland region of Running Stream (Mooney and Martin 2009:29). Aboriginal occupation through the landscape was likely opportunistic and associated with the procurement of valuable materials (Barry et al. 2020). It is also likely to have occurred through the riverine corridors, which remained a vital travel route for Wiradjuri Aboriginal communities before and after the Blue Mountains were crossed by Europeans in 1813. The Blue Mountains region and areas further west are likely to have been Increasingly occupied after the LGM during the Holocene, where climactic conditions allowed for more hospitable landscapes to emerge (Mooney and Martin 2009:29).

ARAS (2020) completed a due diligence assessment of the Project Area to inform a scoping report for the proposed works. Utilising predictive models from both the Hunter regions and the central Tablelands, the assessment determined that surface archaeological evidence is probably located on elevated creek terraces to the north and south-west of the proposed development area where 3rd or 4th order streams such as Two Mile Creek intersect with spring areas (i.e. Black Springs). A pedestrian sample survey of archaeologically sensitive landforms (ridgetops and alluvial flats) was conducted in variable survey conditions with some low surface visibility due to vegetation and grass cover. No Aboriginal objects or areas of archaeological sensitivity were identified. The results of the survey concluded all landforms within the Project Area have been subject to significant disturbance because of furrow ploughing for pine developments and recent bushfires have damaged mature native trees.

No other previous archaeological studies have been undertaken within the current Project Area. However, a series of studies have been conducted within the surrounding region; these are summarised in Table 3-3 below.

Table 3-3 Summary of the previous archaeological studies that have taken place within the region and within proximity to waterways

Name of Study	Location	Surface Artefacts	Subsurface Artefacts	Other Aboriginal Sites	Landform	General Observations
McCarthy (1964)	Several locations of archaeological potential throughout the Capertee Valley	Not noted	Yes – several artefacts with differing tool technologies	Hearths and rock and mammal bones	The study area includes a selection of six shelter sites, four of which are situated on the southern bank of the Capertee River in a gorge with a PADs situated under a sandstone cliff, other sites are located in shelter overhangs high on ridgetops.	Shelter sites were used as a hub of occupation and have provided an excellent archaeological record for stone tool technology for the regional area and the development of worked stone techniques has slowly developed over time. Mammals and Lizard bones, emu egg and crayfish shell were represented in excavated materials, however fish remains were absent.
Silcox (1998)	State Highway NO.5 near Wallerawang (Great Western Highway). Approximately 1600m south of the current Project Area.	Yes – four artefact scatters	None	None	Located within several landforms: a gently sloping southern margin of an unnamed minor creek, within the hillslope associated with a creek, within the uphill side of shallow contour drain on a moderate slope l	The dominant raw material type was quartz. Silcox suggested that all of the sites recorded during the survey are likely to have been impacted by historical disturbances, likely causing surface displacements of artefacts in the process. The main drivers of these disturbances were suggested as being the creation of small dams, vehicle tracks, constructed contour banks, and eroded gutters.
OzArk Cultural Heritage Management	Along Castlereagh Highway approximately 30km south-east of the	None	Yes – a total of 416 artefacts were recovered from 28 test pits	None	Possible scar tree located north of Capetree, north of the Project Area. the study area, located on sloping plains no closer than 300m from	The dominant raw material type was quartz and was closely followed by siliceous tuff; quartzite, granular quartz, igneous type, sandstone,

Name of Study	Location	Surface Artefacts	Subsurface Artefacts	Other Aboriginal Sites	Landform	General Observations
(2003)	current Project Area.		within two PADs		permanent water source was determined to contain low to moderate archaeological potential, due to its unfavourable land morphology for permanent occupation and moderate past disturbance from farming and land clearance.	and fine-grained types were also recorded. A variety stone artefact types were observed. Second order creeks may indicate focused activity of camping, and flat plains over 200m from water may present sporadic occupation, if at all present.
Navin Officer Heritage Consultants Pty Ltd (2005)	Pipers Flat Rail Loop Modification. Approximately 35km south of the current Project Area.	One isolated artefact	Seven PADs	None	Located within a series of spur crests, creek flats, gentle slopes, elevated terraces, and gentle basal hillslopes which are associated with Pipers Flat Creek, Thompsons Creek, Irondale Creek, Winters Creek.	While the area was largely cleared of its native vegetation and historical disturbances were present, the area had significant subsurface potential due to the sensitive landforms present within proximity to major regional waterways.
OzArk Environmental & Heritage Management, (2017)	Transgrid transmission easement line located between Cullen Bullen and Capertee 14km south of the Project Area	Small artefact scatter	Yes – four artefacts	No	Located on an undulating plain landform west of Capertee.	Quartz, quartzite and mudstone and volcanic raw materials were present in the collection of flaked artefacts. All artefacts being within the tertiary and secondary stages of reduction.
RPS (2018)	Archaeological salvage excavations and surface collection for the Charbon Colliery located	Yes	Yes - 4503 artefacts recovered from three PADs	Yes – quantity unknown	Valley floor landform, within 200m of at the base of steep ridgelines.	Quartz was the most common material used. Fine grained siliceous rock, chert, tuff, quartzite, volcanic rocks (basalt), mudstone, chalcedony, petrified wood and

Name of Study	Location	Surface Artefacts	Subsurface Artefacts	Other Aboriginal Sites	Landform	General Observations
	approximately 12km north of the Project Area					modern glass were also present. The artefact assemblage demonstrates secondary and tertiary stone tool reduction in the 'Small Tool Tradition' within a valley floor occupation within 200m of second order streams, likely dating from the Later Holocene.
OzArk Environment and Heritage (2019)	Wallerawang Quarry Extension Project. Approximately 35kmsouth of the Project Area.	Yes (partial relocation from previous study)	None	None	Located along an eroded and unsurfaced vehicle track on a moderate slope in association with an unnamed tributary of Coxs River.	OzArk were only able to relocate 16 of the 22 artefacts originally record by Silcox (2000 as cited in OzArk Environment and Heritage 2019). Silcox noted that it was unclear whether the artefact scatter had eroded from an *in-situ* deposit or whether it had been historically redeposited. The site was salvaged by OzArk and reburied on the western bank of Coxs River approximately 700m north-west by west of its original location.
ARAS (2020)	Previous due diligence assessment of the Project Area	No	No – no text excavations	None	Ridges crests, Ridge slopes, Alluvial Flats largely disturbed by planation and bushfires.	Surface archaeological evidence is probably located on elevated creek terraces to the north and south-west of the proposed development area where 3rd or 4th order streams such as Two Mile Creek intersect with spring areas.

Name of Study	Location	Surface Artefacts	Subsurface Artefacts	Other Aboriginal Sites	Landform	General Observations
NGH Pty Ltd (2021)	Pipers Flat Rail Loop Modification. Approximately 30km north south-east of the current Project Area.	None	Yes During test excavations – 219 artefacts During salvage excavations – 648 artefacts	None	Located within a series of spur crests, creek flats, gentle slopes, elevated terraces, and gentle basal hillslopes which are associated with Pipers Flat Creek	Argued that the subsurface potential was confined to the top 20cm of the soil deposits, with little being found below.

3.5 Aboriginal site prediction

The Aboriginal site modelling for the region to date suggests that Aboriginal sites are common in proximity to second order creeks and rock overhang shelters. These studies also suggest that the majority of site types in the region are comprised of isolated artefacts and artefacts scatters, with some landforms also containing potential for shelters with art, grinding grooves in locations where sandstone outcropping is present, as well as subsurface PADs on elevated valley flats and terraces. The previously recorded AHIMS sites in the region support this conclusion.

Historical land use associated with pastoralism and pine plantations has caused significant surface disturbances to the ground surface ASRS (2020) sample site inspection of the Project Area identified furrow ploughing for pine developments and recent bushfires have damaged mature native trees and impacts to potential intact Aboriginal objects and subsurface deposits would be significant.

It is noted that the Project Area is not located in such areas of archaeological sensitivity defined by landscape, however the presence of Two Mile Creek and the possible potential of associated natural springs and soaks nearby to the Project Area pose moderate likelihood of encountering Aboriginal heritage sites within undisturbed landscapes in the current Project Area.

The likely archaeological site types for the local area, and the potential for their presence within the Project Area, is outlined in **Error! Reference source not found.** below.

Table 3-4 Aboriginal site prediction statements

Site Type	Site Description	Potential
Stone artefact scatters and isolated artefacts	Artefact scatter sites can range from high-density concentrations over a large area to isolated finds within discrete landforms	Low potential to occur on the surface due to historical vegetation clearance, natural erosion processes, and historical land use.
Potential Archaeological Deposits (PADs)	Potential subsurface deposits of archaeological material	Low to moderate potential to occur in flat, elevated flat, or gentle slope undisturbed landforms within 200m of Two Mile Creek or natural springs.
Grinding Grooves	Long straight groove intents on flat sandstone bedrock in proximity to water sources	Low potential to occur due to the lack of any identified or sandstone outcrops in the Project Area.
Aboriginal Art (pigment or engraved)	An engraved or painted piece of art/ These are often found vertically or horizontally on sandstone outcrops or shelves	Low potential to occur due to the lack of any identified shelters or sandstone outcrops in the Project Area.
Modified Trees	Trees that have undergone cultural modification	Low potential to occur due to the historical vegetation clearance and fire damage that took place in the Project Area. However, modified trees may be present were old growth native vegetation remains.

4. Archaeological Investigation Results

4.1 Survey Strategy and Methodology

The survey fieldwork, as assessed in this report, was undertaken by the team over a single day on 17th March 2022. The survey team consisted of NGH Senior Heritage Consultant Bronwyn Partell and RAP representative Sharon Riley of Mingaarn Aboriginal Corporation. During the survey, notes were made about visibility, photographs were taken, and any possible Aboriginal objects or features identified were inspected, assessed, and recorded if deemed to be Aboriginal in origin.

The survey strategy objective during the current assessment was to cover as much of the ground surface as possible within the project area. As only certain sections of the project area (see above) will be subject to development as part of the three-stage construction approach, only these areas were targeted by the survey. The survey was undertaken to identify whether Aboriginal sites or PADs were present within the project area.

Where possible, transects were walked with the survey team spread apart at approximately 20m intervals. The survey team consisted of two people (one representative from the Aboriginal community and one archaeologist) which allowed for a 40 m wide tract of the project area to be surveyed with each transect. At the end of the transect, the team repositioned along a new transect line at the same spacing and walked back along the same bearing. The nature of the project area made this an ideal survey strategy allowing for maximum survey coverage and opportunity to identify any heritage objects. The survey was impeded by a variety of factors, namely the thick grass cover or developed nature of the project area.

NGH believes that the survey strategy was comprehensive and the most effective way to identify the presence of Aboriginal heritage objects within the Proposal Area. Discussions were held in the field during and after the survey between the archaeologist and Aboriginal community representative to ensure all were satisfied and agreed with the spacing and methodology.

The landforms within the Proposal Area have been determined based on topographic identification through the inspection of contour data and Digital Elevation Modelling of the project area. The result of this was that the entire project area was deemed to be comprised of an ‘artificial landform’ due to the level of modification that has taken place due to historical land use.

4.2 Survey Coverage

The survey was impeded by poor visibility due to a low dense grass cover and the pre-existing disturbances and erosion present throughout the project area. As a result, both ground surface visibility (GSV) and exposure visibility were low ranging from 10-35% with an average of 12% across the entire area that was surveyed.

The approximate areas surveyed are shown in Figure 4-1 below while Plate 4-1 to Plate 4-16 show the conditions present within the project area during the survey. Table 4-1 below shows the calculations of the effective survey coverage for the survey. As the project area had been subject to prior survey and disturbances and GSV was impeded, the survey was targeted to the proposed works area and other surrounding sensitive landforms.

Over the course of the survey, approximately 2.812 km of transects were walked across the project area by each of the two participants. Allowing for an effective view width of 5 m for each person, this equates to a total surface area examined of 2.812 ha of the project area. Due to the poor GSV present it is considered that 0.85% of the project area was effectively surveyed, however 20.34%

of the proposed development footprint was effectively surveyed. NGH considers that the effective survey coverage of the project area was sufficient for the purposes of this assessment as the factors that impeded more 'effective' survey coverage have clearly removed the overwhelming majority of the Aboriginal archaeological record within the project area. The results identified during the survey are a true reflection of the nature of the Aboriginal archaeological record present within the project area.

4.3 Survey Results

Despite the low GSV and effective survey coverage, the landforms present within the project area were assessed during the survey in order to determine whether any PADs were present. While low GSV may prevent the identification of Aboriginal sites, the levels of disturbance evident during this and prior (ARAS 2020) archaeological surveys of the project area is consistent with the previous conclusion that it is unlikely that the proposed works at the Razorback Quarry will harm any Aboriginal Objects.

The location of the quarry pit for the proposed Razorback Quarry sits across a slight saddle that leads into a spur, with the bund located along the sloping edges of the landform. The area has been subject to pine plantation and general farming disturbances, with furrows for sapling pines present across the area. Sheet erosion is present in varying degrees, with visibility approximately 20% in eroded areas and 10% outside the exposures. Exposures provided visibility into the soil profile, showing a very shallow to non-existent sandy loam topsoil overlying a sandy subsoil (to be the target of the quarrying operations). The area had been extensively cleared with no mature vegetation remaining. The proposed roadway will lead adjacent to the existing track through flats that have been subject to pine plantation and a history of farming, crossing a small drainage line that is to be modified to house a new dam, before leading up the slope directly to the quarry pit. The GSV across the sloping area and majority of roadway was 0-5%, with some exposures towards the north reaching 30% GSV. The proposed location of the new infrastructure intersects with the roadway and sits on a flat above the drainage line. This area was inspected and found to be visibly disturbed by vegetation planting and clearing, and general use of farming equipment. The eroding exposures highlighted clays underlying the remaining sandy topsoil.

A significant amount of infrastructure or services were also observed during the survey, including drainage, fencing, transmission lines, cleared internal roads and tracks, fire safety infrastructure, retaining walls, and other agricultural disturbances associated with the pine plantation present on site. The historic land use is likely to have significantly disturbed or destroyed Aboriginal heritage within the project area.

No Aboriginal objects were identified by the participants during the survey. One area of Potential Archaeological Deposit (PAD) was identified during the survey (refer to Figure 4-1 and Plates 4-18 to 4-21). The PAD is in an area that presented less disturbance that the remainder of the project area, within a saddle landform that leads into a gentle slope down towards the creek line. There were no surface artefacts identified within the gravels exposed, however the silty topsoil was preserved along the majority of the landform indicating potential for subsurface archaeological material. This PAD has been identified and documented, however will not be subject to any ground disturbing activities as a result of the proposed works.

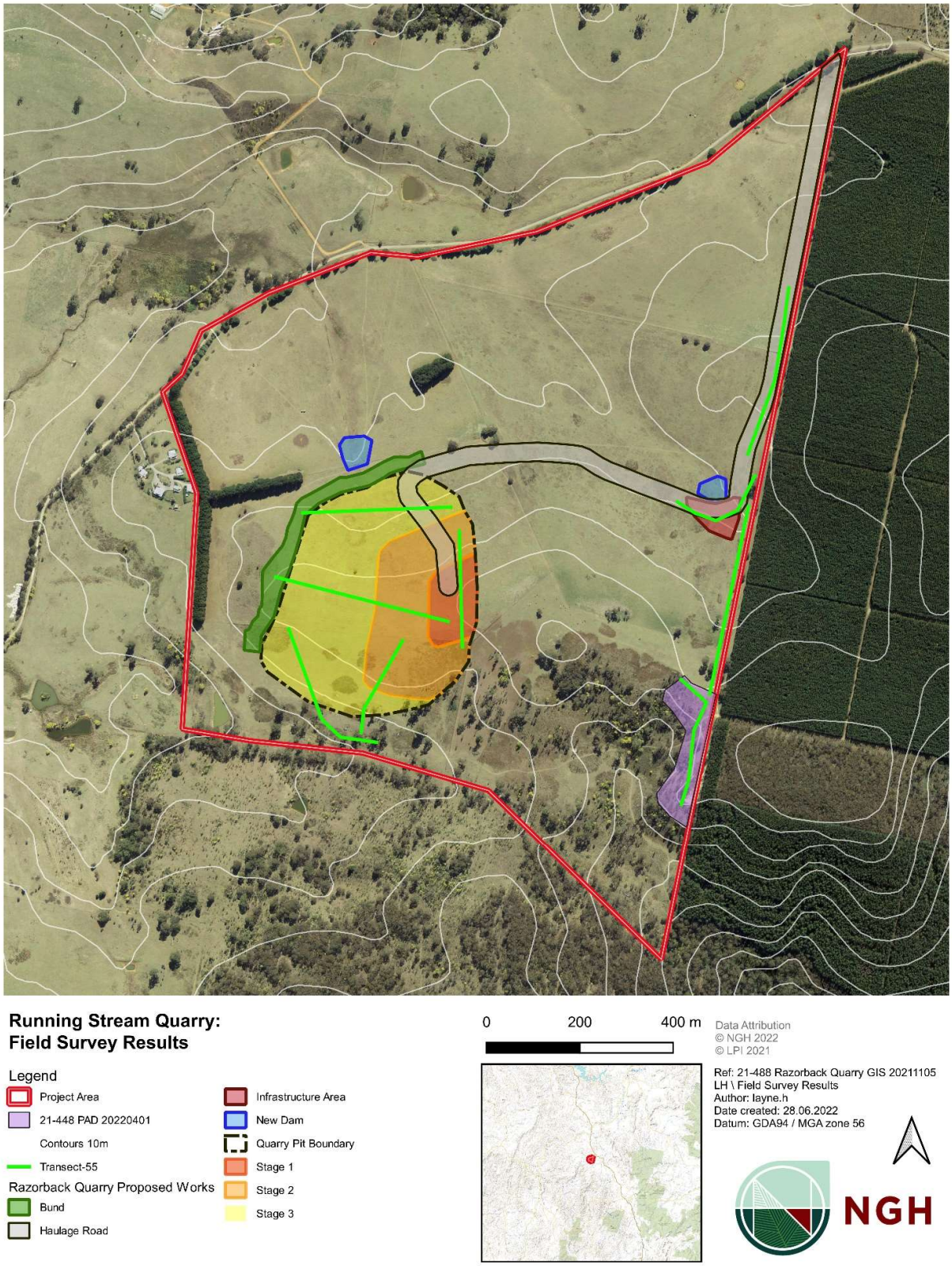


Figure 4-1 Survey results.

	
Plate 4-1 View north east along the eastern boundary of the project area. Note the artificially level service and gutter present.	Plate 4-2 View south west over along the eastern boundary of the project area.
	
Plate 4-3 View west from the eastern boundary of the project area towards an artificial bank.	Plate 4-4 View north over one of the car parks within the eastern portion of the project area.
	
Plate 4-5 View facing north across the Stage 1 area of the proposed quarry pit.	Plate 4-6 View facing east across the Stage 1 area of the proposed quarry pit.

	
Plate 4-7 View facing south from the proposed Stage 2 area towards Two Mile Creek, showing outcropping of sedimentary rock.	Plate 4-8 View south west across the proposed Stage 2 area showing low visibility and lowered sections of vegetation where topsoil has been removed.
	
Plate 4-9 View west over the proposed bund area from the Stage 3 section of the quarry pit.	Plate 4-10 View east over the proposed quarry pit from the western edge of Stage 3.
	
Plate 4-11 View facing east along Two Mile Creek, south of the proposed development area.	Plate 4-12 View facing east through pine plantation, showing typical visibility within the plantation areas.

	
Plate 4-13 View north east over the area of PAD within the Project Area.	Plate 4-14 View south east over the area of PAD with Two Mile Creek behind the row of trees in the image.
	
Plate 4-15 View east over the area of PAD, with Two Mile Creek behind the row of trees to the left of the image.	Plate 4-16 Evidence of water erosion through area of PAD, showing sandy loam topsoil over clays with gravels eroding from the topsoils and upper transition phase of the clays.

Table 4-1 Transect information.

Survey Unit	Number of Survey Transects	Exposure Type	Project Area (ha)	Surveyed Area (length m x width m)	Survey Area (m^2)	Visibility	Effective Coverage m^2 (area x visibility)	Project Area Surveyed (ha)	Percentage of Project Area effectively surveyed	Archaeological Result
Spur	1	Exposures from the furrowing for young (baby) pines, erosion, animal tracks.	6.3509	381m x 40m	15,240 m^2	15%	2,286 m^2	0.2286	3.59%	No Aboriginal sites or PADs identified.
Saddle	2	Exposures from vehicle tracks (dirt), erosion and animal tracks.	7.5526	249m x 40m 300m x 20m	9,960 m^2 6,000 m^2	20% 35%	1,992 m^2 2,100 m^2	0.4092	5.42%	One PAD identified.
Side Slope	3	Exposures from the furrowing for pine plantations, erosion, animal tracks.	14.3783	317m x 40m 340m x 40m 220m x 40m	12,680 m^2 13,600 m^2 8,800 m^2	10%	3,508 m^2	0.3508	2.44%	No Aboriginal sites or PADs identified.
Gentle Slope	1	Exposures from vehicle (dirt) track, clearing, animal tracks (wild boars), kangaroos and hares.	1.9129	410m x 20m	8,200 m^2	15%	1,230 m^2	0.123	6.43%	No Aboriginal sites or PADs identified.
Undulating Flats	2	Exposures from vehicle (dirt) track, clearing, animal tracks (wild boars), kangaroos and hares.	6.6718	369m x 20m 226m x 40m	7,380 m^2 9,040 m^2	10%	1,642 m^2	0.1642	2.46%	No Aboriginal sites or PADs identified.
TOTALS	9		151			12% (av.)	12,758 m^2	1.2758	0.85%	One area of PAD identified.

5. Analysis and Discussion

The predictions based on the modelling for the project area and previous assessment (ARAS 2020) were that Aboriginal sites and PADs were unlikely to occur within the project area due to the level of historical disturbance that was described in the area. Furthermore, while the results of previous archaeological surveys within the project area and wider region show that there are Aboriginal sites and PADs present across the landscape, the majority of the project area that was surveyed displayed varying degrees of disturbances that resulted in removal of topsoil across archaeologically sensitive landforms. No Aboriginal objects were recorded during the survey, however one area of PAD (outside of the project footprint) was identified.

It is likely that the primary reason for the absence of Aboriginal objects within the project area is due to the historical land use and disturbances that have taken place throughout. The majority of these disturbances (including agricultural and farming practices, landform alterations, creek redirection and dam construction, and pine plantation) have occurred since the mid-1900s across the project area. These disturbances, which were well documented and verified during the survey, are highly likely to have destroyed or significantly disturbed any Aboriginal sites or PADs that may have been present within the development footprint in the past. The potential for *in situ* archaeological material is also low for the same reasons, however one PAD (refer to Figure 4-1) was identified as having potential for subsurface archaeological material to remain within the landscape. Overall, the lack of sites identified within the project area is not unusual given the previous ground disturbing works and historic land use. Due to the disturbances observed during the survey and the lack identifiable Aboriginal sites within the proposed development footprint, NGH consider that a subsurface testing programme is not warranted to assess the potential Aboriginal and archaeological heritage impacts of the proposed works as assessed in this report.

Based on the results of this investigation and the land use history of the project area, there is negligible potential for the presence of Aboriginal heritage or intact PADs within the proposed development footprint of the Razorback Quarry in Running Stream, NSW.

6. Cultural Heritage Values and Statement of Significance

6.1 Assessment Criteria

The assessment of the significance of Aboriginal archaeological sites is currently undertaken largely with reference to criteria outlined in the ICOMOS Burra Charter (Marquis-Kyle and Walker 1994). Criteria used for assessment are:

- ***Social or Cultural Value***: In the context of an Aboriginal heritage assessment, this value refers to the significance placed on a site or place by the local Aboriginal community –either in a contemporary or traditional setting.
- ***Scientific Value***: Scientific value is the term employed to describe the potential of a site or place to answer research questions. In making an assessment of scientific value issues such as representativeness, rarity and integrity are addressed. All archaeological places possess a degree of scientific value in that they contribute to understanding the distribution of evidence of past activities of people in the landscape. For example, flaked stone artefact scatters, larger sites or those with more complex assemblages are more likely to be able to address questions about past economy and technology, giving them greater significance than smaller, less complex sites. Sites with stratified and potentially in situ sub-surface deposits, such as those found within rock shelters or depositional open environments, could address questions about the sequence and timing of past Aboriginal activity, and will be more significant than disturbed or deflated sites. Groups or complexes of sites that can be related to each other spatially or through time are generally of higher value than single sites.
- ***Aesthetic Value***: Aesthetic values include those related to sensory perception and are not commonly identified as a principal value contributing to management priorities for Aboriginal archaeological sites, except for art sites.
- ***Historic Value***: Historic value refers to a site or places ability to contribute information on an important historic event, phase or person.
- ***Other Values***: The Burra Charter makes allowance for the incorporation of other values into an assessment where such values are not covered by those listed above. Such values might include Educational Value.

All sites or places have some degree of value, but of course, some have more than others. In addition, where a site is deemed to be significant, it may be so on different levels or contexts ranging from local to regional to national, or in very rare cases, international. Further, sites may either be assessed individually, or where they occur in association with other sites the value of the complex should be considered.

6.2 Significance Assessment

Social or Cultural Value

While the true cultural and social value of Aboriginal sites can only be determined by local Aboriginal people, as a general concept, all sites hold cultural value to the local Aboriginal community. An opportunity to identify cultural and social value was provided to all the registered Aboriginal stakeholders for this proposal through the draft reporting process.

No social or cultural connections to the project area were raised by the Aboriginal parties who attended the survey or during the reporting process.

Scientific (Archaeological) Value

As described in this report, no Aboriginal sites and one area of PAD were identified within the project area. As the PAD is not within the proposed development footprint it will not be investigated further as there is no assessed impact to the area. As is the nature with subsurface sites, the level of scientific value cannot be adequately assessed until an archaeological testing program has been completed.

It should be noted, however, that even in these conditions it is possible to encounter unexpected finds (such as isolated artefacts). Any unexpected finds that are encountered are likely to be located within highly disturbed contexts or may have been introduced with the fill material and therefore may not provide any further information about Aboriginal occupation of the area other than their existence within the landscape.

Aesthetic Value

There are no aesthetic values associated with the project area. However, it is clear from discussions with the RAPs that the natural landscape holds aesthetic values that are linked into the cultural values of the wider landscape.

Historic Value

While the region in which the project area is located in is associated with the conflicts that occurred between the Aboriginal communities and early European settlers of the area, no specific site within the project area has been identified as being associated with these values. As a result, it can be considered that there are no Aboriginal historic values associated with a specific site within the project area.

Other Values

There are no other known heritage values associated with the project area.

7. Proposed Activity

7.1 History and Land Use

It has been noted above (Section 3.3.2) that historically the project area has been impacted through land use practices, removal of topsoil, landscaping, ploughing, and the construction and planting of the current pine plantation.

The implications for this activity are that the archaeological record has been comprised in terms of the potential for scarred trees to remain within the project area due to the previous vegetation clearances that have taken place. Despite these localised impacts, Aboriginal sites and cultural material are present within the broader area, with 112 AHIMS registered sites in the immediate region, 11 of which are located within 1 km. The presence of these sites show that the region was used by Aboriginal people in the past and provide examples to how they used the landscape.

7.2 Proposed Development Activity

The proposal involves the development and operation of an open pit sand and gravel quarry at Running Stream, NSW. The Quarry operation would require a built area of approximately 24.7 hectares of land within the broader Project Area as shown in Plate 7-1 and

Figure 7-1. The location and configuration of the final built form of the proposal would be confirmed as part of further design developments and detailed within the EIS (Environmental Impact Statement). The quarry plans to extract up to 200,000 tonnes per annum over a period of up to 30 years.

The proposal would include the following key built form features:

- 18.8ha of Quarry extraction area
- 1.9 of Quarry Bunds
- 2.5ha of access roads
- 0.9ha for office, workshops and hardstand areas
    - 20 x 30 demountable office buildings
    - Weight bridge site
    - Toilet facilities with on-site septic
    - Lighting Plants
    - 10,000L diesel storage take
    - 2 x 200,000L water tanks
- 0.6ha for establishment of dams with in-pump sumps

The proposal will involve the following key construction activities :

- Site enabling work to prepare the Project Area and provide protection to the public, and surrounding environment, including:
    - Vegetation clearance.
    - Earthworks, levelling, and other civil and ground preparation activities for preparation of dams and site offices and access roads.
    - Construction of support buildings and infrastructure
    - Additional geotechnical and environmental monitoring/ sampling, where required.
- Delivery, installation and electrical fit-out for the quarry and support buildings.
- Removal of construction equipment and rehabilitation of construction area.
- Operation of Quarry site planning to operate between
    - Extraction 8am to 3.30pm Monday to Friday and Saturday 8am – 1pm.
    - Haulage Monday to Saturday 8am to 3.30pm.

7.3 The resource

The targeted resource is a weathered Triassic conglomerate sandstone extending from 10 to 30 metres below the ground surface. Quarried materials will be transported direct to customers or transported off site for processing.

The Quarry has the potential to provide a local gravel and sand resource in the Mid-Western and Lithgow LGAs. However, at a distance of less than 200km from Sydney, the sand and gravel products generated by the proposed quarry are expected to meet a variety of needs for landscaping and concrete sands within the Sydney and broader catchments.

Plate 7-1 Example of the targeted resource (Borg 2020)

7.4 Extraction method

The quarried materials are soft enough to be dug free, therefore no blasting will be required. Minimal overburden removal will be required before accessing the proposed product materials. Top soil and overburden will be stripped and stockpiled along and out of the pit emplacement, along the western side of the quarry. These stockpiles will eventually be reused for quarry rehabilitation where needed.

The expected equipment to be used on the sites includes:

- Bulldozer (D6 or D8);
- Excavators;
- Front end loader;
- Mobile screens;
- Site dump truck; and
- Water carts.

The quarry will be progressively rehabilitated to pasture and pine plantation with potential future use of the facilities area for forestry related activities.

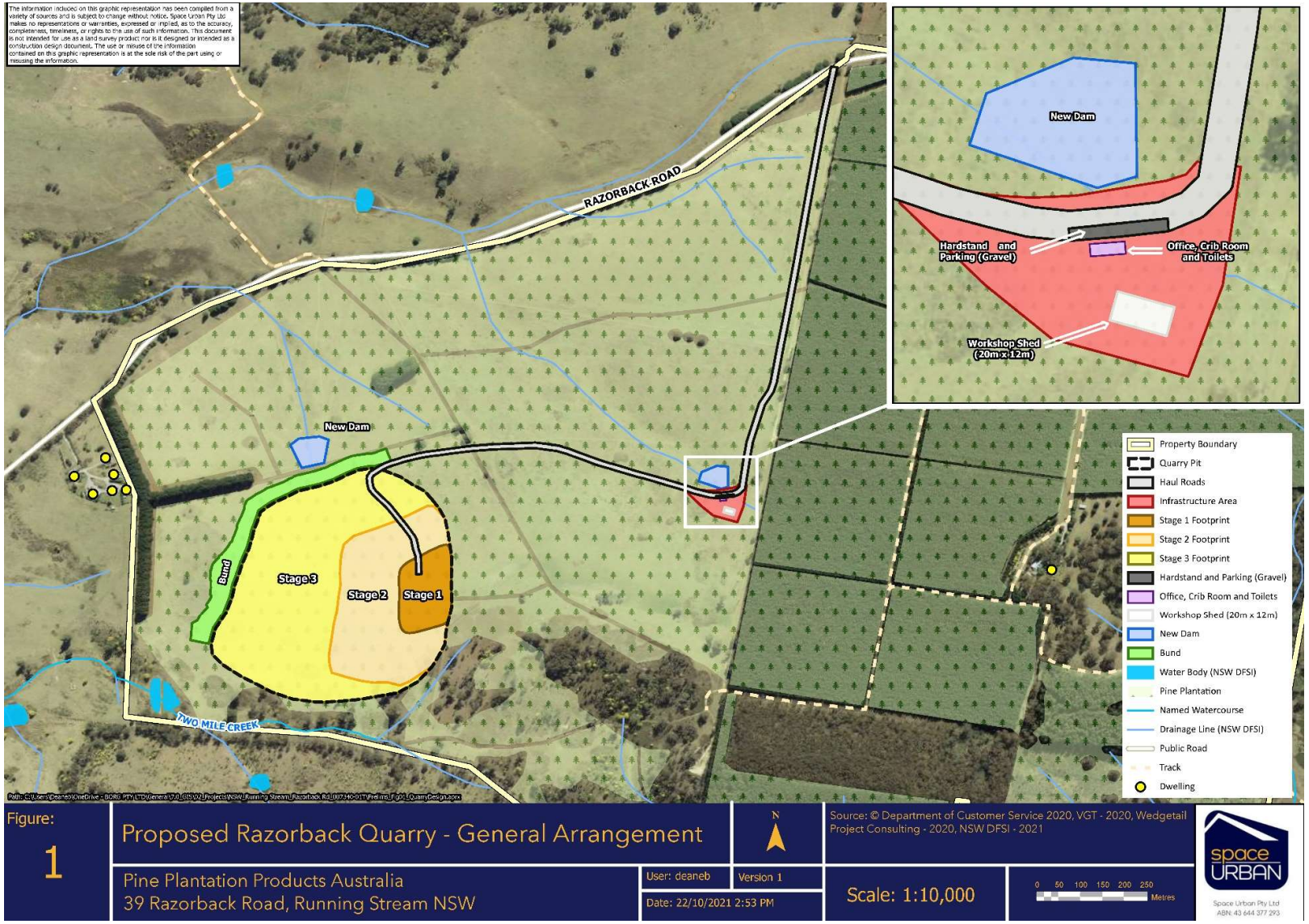


Figure 7-1 Construction activities for the Proposed Razorback Quarry in Running Stream, NSW (Space Urban 2021).

7.5 Assessment of Harm

As described in this report, no Aboriginal sites were identified during the assessment, however one PAD was identified outside of the project footprint. Furthermore, no previously recorded AHIMS sites are located within the project area. As a result, the assessment of harm for the project is nil.

7.6 Consideration of ESD Principles

The consideration of the principles of Ecologically Sustainable Development (ESD) and the use of the precautionary principle was not required to be undertaken when assessing the harm on Aboriginal heritage within the proposed ACEP project area given that no previously identified AHIMS sites are present and no new Aboriginal sites or PADs were identified within the project footprint. As a result, the ESD principles do not apply to this assessment.

We therefore argue that the overall cumulative impact on the archaeological record for the region is nil given that no Aboriginal sites or PADs will be impacted by the proposed ACEP.

8. Avoiding or Mitigating Harm

8.1 Measures to Avoid Harm

No previously identified AHIMS sites are located within the project area and no new Aboriginal sites or PADs were identified within the proposed works areas. As a result, no measures are required to avoid the harm of Aboriginal heritage.

8.2 Mitigation of Harm

Mitigation of harm to cultural heritage sites generally involves some level of detailed recording to preserve the information contained within the site (or within the portion of the site to be impacted) or setting aside areas as representative samples of the landform to preserve a portion of the site. Mitigation can be in the form of minimising harm, through slight changes in the development plan or through direct management measures for the Aboriginal objects.

As no physical Aboriginal heritage is present within the development area, the proposed works – as assessed in this report – will avoid any impacts to physical Aboriginal heritage. Therefore, no further mitigation measures are required for the proposed Razorback Quarry in Running Stream, NSW.

9. Recommendations

Recommendations:

The recommendations are based on the following information and considerations:

- Results of the current archaeological survey of the project area;
- Prior (ARAS 2020) archaeological survey of the project area;
- Consideration of results from other local archaeological studies;
- Results of consultation with the registered Aboriginal parties;
- The assessed significance of the sites;
- Appraisal of the proposed development, and
- Legislative context for the development proposal.

It is recommended that:

1. The proposed works for the Razorback Quarry may proceed with caution within the project area as assessed by this addendum report.
2. If any items suspected of being Aboriginal in origin are discovered during the work, all work in the immediate vicinity must stop and Heritage NSW notified, and the Unexpected Finds Protocol (Appendix B) must be followed.
3. In the unlikely event that human remains are discovered during the proposed works, all work must cease in the immediate vicinity. The appropriate heritage team within Heritage NSW and the local police should be notified. Further assessment would be undertaken to determine if the remains were Aboriginal or non-Aboriginal. If the remains are deemed to be Aboriginal in origin the Registered Aboriginal Parties should be advised of the find as directed by the appropriate heritage team within Heritage NSW. Heritage NSW would advise the Proponent on the appropriate actions required.
4. Further archaeological assessment would be required if the proposal activity extends beyond the area assessed in this report. This would include consultation with the registered Aboriginal parties and may include further field survey.

10. References

Archaeological Risk Assessment Services, 2020. Aboriginal Cultural Heritage Due Diligence and Archaeological Survey Report for Razorback Sand Quarry Proposal, Lot 2 DP 569979 39 Razorback Road Running Stream.

Barry, L., Graham, I.T., Mooney, S.D., Toms, P.S., Wood, J.C., and Williams, A.N. (2020). Tracking an Exotic Raw Material: Aboriginal Movement through the Blue Mountains, Sydney, NSW during the Terminal Pleistocene, *Australian Archaeology*, 87(1): pp1-12.

DECC, 2002. Descriptions for NSW (Mitchell) Landscapes: Based on Descriptions compiled by Dr. Peter Mitchell. NSW National Parks and Wildlife Service, A Report prepared for the Department of Environment and Climate Change.

DECCW NSW (2010a). *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*, DECCW NSW, Sydney.

DECCW NSW (2010b). *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, DECCW NSW, Sydney.

DECCW NSW (2010c). *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*, DECCW NSW, Sydney.

DE&E, 2016. Interim Biogeographic Regionalisation for Australia (IBRA), Version 7 (Subregions). Department of the Environment and Energy.

McCarthy, F., 1964. The Archaeology of the Capertee Valley, New South Wales. Rec. Aust. Mus. 26, 197–246.

OEH, 2010a. Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales.

OEH, 2010b. Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010.

OzArk Cultural Heritage Management (2003). *Archaeological Test Excavation of PADS 1 And 2 (Site L2: NPWS # 45-1-2573 & 45-1-2574): Proposed Corridor of the New Castlereagh Highway 86, Lidsdale, NSW*. Report to RTA – Western Region.

OzArk Environmental & Heritage Management, 2017. ENACTION OF AHIP – WORKS COMPLETED – NEAR CULLEN BULLEN AND CAPERTEE, NSW.

RPS, 2018. Charbon Archaeological Excavation Report.

Mooney, S.D. and Martin, H.A. (2009). Environmental Conditions of the Past in the Blue Mountains, in Stockton, E. and Merriman, J (eds.), *Blue Mountains Dreaming*, Blue Mountain Education and Research Trust, Lawson, pp23-40.

Navin Officer Heritage Consultant (2005, updated 2018). *Western Coal Unloader Pipers Flat, NSW: Cultural Heritage Assessment*. Report for EnergyAustralia Pty Ltd.

NGH Pty Ltd (2021). *Aboriginal Archaeological Investigations: Pipers Flat Rail Corridor Unloader Project*. Report to Lycopodium on behalf of EnergyAustralia Pty Ltd.

Silcox, R (1988). *An Archaeological Survey of a Proposed Deviation on State Highway NO. 5, Near Lithgow, NSW*. Report to the Department of Main Roads.

Appendix A AHIMS search (redacted)

Appendix B Unexpected Finds Protocol

This unexpected find protocol has been developed to provide a method for managing unexpected Aboriginal heritage items identified within the region. The unexpected find protocol has been developed to ensure adherence to the NSW *National Parks and Wildlife Act 1974* (NPW Act).

All Aboriginal heritage objects are protected under Part 6 of the NPW Act. There are some circumstances where, despite undertaking appropriate heritage assessment prior to the commencement of works, Aboriginal cultural heritage items or places are encountered that were not anticipated which may be of scientific and/or cultural significance.

Therefore, it is possible that unexpected heritage items may be identified during construction, operation and maintenance works. If this happens the following unexpected find protocol should be implemented to avoid breaching obligations under the NPW Act. This unexpected find protocol provides guidance as to the circumstances under which finds may occur and the actions subsequently required.

What is an Aboriginal Heritage Unexpected Find?

An unexpected heritage find is defined as any possible Aboriginal heritage object or place, that was not identified or predicted by the Project's heritage assessment and may not be covered by appropriate permits or development consent conditions. Such finds have potential to be culturally significant and may need to be assessed prior to development impact.

Unexpected heritage finds may include:

- Aboriginal stone artefacts, shell middens, modified trees, mounds, hearths, stone resources and rock art;
- Human skeletal remains; and
- Remains of historic infrastructure and relics.

Aboriginal Heritage Places or Objects

All Aboriginal objects are protected under the NSW *National Parks and Wildlife Act 1974* (NPW Act).

An Aboriginal object is defined as:

Any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with the occupation of that area by persons on non-Aboriginal extraction and includes Aboriginal remains.

All Aboriginal objects are protected, and it is an offence to harm or desecrate an Aboriginal object or place.

Unexpected Find Management Procedure

In the event that any unexpected Aboriginal heritage places or are unexpectedly discovered during the Project, the following management protocols should be implemented.

Note: this process does not apply to human or suspected human remains. Follow the Section referring to *Human Skeletal Remains* below if human remains or suspected human remains are encountered.

1. Works within the immediate area of the identified Aboriginal object will cease and no further harm to the object will occur.
2. A 10m 'no-go' buffer zone is to be established.
3. Establish whether the unexpected find is located within an area covered by an approved Aboriginal Heritage Impact Permit or not.
4. If the find it is determined to be covered under an approved permit, then undertake the following steps;
    a. Maintain an appropriate buffer zone of at least 10 metres to allow for the assessment and management of the find. All site personnel will be informed about the buffer zone with no further works to occur within the buffer zone. The area will be secured to avoid any further harm to the Aboriginal object.
    b. A heritage specialist or the project archaeologist will be engaged to assess the Aboriginal place or object encountered and undertake appropriate salvage of the site in line with the mitigation methods and approval requirements of the AHIP. An AHIMS site card will be completed on the discovery of the newly identified Aboriginal objects. Data concerning the AHIMS site should be entered into the Archaeological Sensitivity data, following the *'Procedure for adding new AHIMS sites to archaeological sensitivity data'*.
5. If the unexpected find is not covered under an existing approved AHIP, then undertake the following steps;
    a. All works at this location must cease and no further harm to the object will occur.
    b. An appropriate buffer zone of at least 10 metres to allow for the assessment and management of the find must be established. All site personnel will be informed about the buffer zone with no further works to occur. The area will be secured to avoid any further harm to the Aboriginal object.
    c. A heritage specialist or the project archaeologist will be engaged to assess the Aboriginal place or object encountered. Further assessment may be required to assess the cultural significance of the place or object.
    d. The discovery of an Aboriginal object will be reported to Heritage NSW and as soon as practical on 131 555 and works will not recommence at the heritage place or object until advised to do so in writing by Heritage NSW and/or DPIE. A site card will be completed and submitted to AHIMS for registration and the details of the site and its location will be provided to Heritage NSW and DPIE. Data concerning the AHIMS site should be entered into the Archaeological Sensitivity data, following the *'Procedure for adding new AHIMS sites to archaeological sensitivity data'*.
    e. If the unexpected find can be managed *in situ*, works at the location will not recommence until appropriate heritage management controls have been implemented, such as protective fencing.
    f. If the unexpected find cannot be managed *in situ*, works at the heritage location will not recommence until further assessment is undertaken and appropriate approvals to impact Aboriginal cultural heritage are confirmed and authorised in writing by Heritage NSW and/or DPIE.
6. Depending on the nature of the discovery, additional assessment may be required prior to the recommencement of work in the area. At a minimum, any find should be recorded by an archaeologist, and data concerning the AHIMS site should be entered into the

Archaeological Sensitivity data, following the *'Procedure for adding new AHIMS sites to archaeological sensitivity data'*.

Human Skeletal Remains

If any human remains or suspected human remains are discovered during any works, all activity in the immediate area must cease immediately. The following plan describes the actions that must be taken in instances where human remains, or suspected human remains are discovered. Any such discovery at the activity area must follow these steps.

Discovery:

- If any human remains or suspected human remains are found during any activity, works in the **immediate vicinity must** cease and the Project Manager must be contacted immediately.
- The remains must be left in place and protected from harm or damage.
- All personnel should then leave the immediate vicinity of the area.

Notification:

- The NSW Police must be notified immediately. Details of the location and nature of the human remains must be provided to the relevant authorities.
- If there are reasonable grounds to believe that the remains are Aboriginal, the following must also occur;
    a. Heritage NSW must be contacted as soon as practicable and provide any available details of the remains and their location. The Environment Line can be contacted on 131 555;
    b. The relevant project archaeologist may be contacted to facilitate communication between the police, Heritage NSW and Aboriginal community groups. Aboriginal community groups must be notified throughout the process once the remains are confirmed to be Aboriginal in origin.

Process:

- If the remains are considered to be Aboriginal by the Police and Heritage NSW no work can recommence at the particular location of the find unless authorised in writing by Heritage NSW.
- Recording of Aboriginal ancestral remains must be undertaken by, or be conducted under the direct supervision of, a specialist physical anthropologist or other suitably qualified person.
- Archaeological reporting of Aboriginal ancestral remains must be undertaken by, or reviewed by, a specialist physical anthropologist or other suitably qualified person, with the intent of using respectful and appropriate language and treating the ancestral remains as the remains of Aboriginal people rather than as scientific specimens.

If the remains are considered to be Aboriginal by the Police and Heritage NSW, an appropriate management and mitigation, or salvage strategy will be implemented following further consultation with the Aboriginal community and Heritage NSW.

Appendix C ARAS (2020) Report

ABORIGINAL CULTURAL HERITAGE DUE DILIGENCE & ARCHAEOLOGICAL SURVEY REPORT

For

Razorback Sand Quarry Proposal, Lot 2 DP 569979

39 Razorback Road Running Stream

DRAFT REPORT

A Report to Borg Manufacturing Pty Ltd

By

Dr. Giles Hamm

Cultural Heritage Consultant

December 2020

ARCHAEOLOGICAL RISK ASSESSMENT SERVICES PTY LIMITED

| M 0438 757 606 | ✉ arasgileshamm@gmail.com

ABN: 71 106 520 290 | PO Box 67, Katoomba NSW 2780

Project Name	Razorback Sand Quarry Proposal.		
Document Description	Aboriginal Cultural Heritage Due Diligence & Archaeological Survey Report of Lot 2 DP 569979 39 Razorback Road Runnning Stream		
	Name	**Signed**	**Date**
ARAS Project Manager(s)	Dr. Giles Hamm		18th December 2020
Document Manager	Dr. Giles Hamm		
Authors	Dr. Giles Hamm		
External Review	Sam Coles Development Planner –Borg Manufacturing Pty Ltd		
Document Status	Draft		
Date	18th December 2020		
Prepared for:	Borg Manufacturing Pty Ltd		

Executive Summary

Plantation Pine Products Australia Pty Ltd proposes to develop a sand quarry within a property known as Lot 2 DP 569979 39 Razorback Road Running Stream area located approximately 14 kilometers north-west of Capertee town-ship in the Central West of New South Wales (Figure 1:Appendix 1) . The forestry land is bounded by Razorback Road to the north and west, pine forest plantation land to the east and farmland to the south (Figure 2: Appendix 1). The development is part of a proposed sand quarry which involves some minor vegetation clearing, development of a quarry pit and a number of haul roads.

The assessment area is located within the City of Lithgow local government area and is currently zoned rural and Crown land having an area of approximately 160 hectares (See Figures 1 & 2: Appendix 1).

An Aboriginal Cultural Heritage Due Diligence and Archaeological Survey assessment was undertaken by Archaeological Risk Assessment Services Pty Ltd (ARAS) in July 2020 for the assessment area (Lot 2 DP 569979). The assessment identified no new or existing Aboriginal sites/objects within the proposed development area.

The Archaeological Due Diligence Survey assessment found that the proposed sand quarry development had no potential to harm any Aboriginal objects and the risk of disturbing unknown Aboriginal deposits or objects was considered low. As a result of the due diligence assessment it is recommended that no further archaeological investigation is required.

Overview of survey assessment results

- No existing or new Aboriginal sites and objects were identified as a result of the due diligence assessment.
- The proposed development area contains heavy disturbed plantation impact zones which are likely to have destroyed any previously known Aboriginal sites or objects.
- The survey area contained good ground surface visibility which showed heavily disturbed ploughed land as well as some impacts from vehicle tracks and historic agricultural land-use.
- As a result of the above natural and man-made landscape impacts, the proposed sand quarry development will not impact any existing or unknown Aboriginal sites or objects.

Recommendations

The following recommendations are made:

- As a result of the due diligence assessment it is recommended that no further archaeological investigation is required.
- The assessment was undertaken using information provided to the consultant by Borg Manufacturing Pty Ltd in June 2020.
- Any new modifications to the proposed development's design may require additional due diligence assessment before the development may proceed.

Table of Contents

List of Tables

List of Appendices

1 Introduction & Background

Archaeological Risk Assessment Services Pty Ltd (ARAS -the consultant) was engaged by Borg Manufacturing Pty Ltd to carry out an Aboriginal Cultural Heritage Due Diligence Assessment for Lot 2 DP 569979 39 Razorback Road Runnning Stream area located approximately 14 kilometers north-west of Carpertee town-ship in the Central West of New South Wales. The assessment was required in order to prepare an Aboriginal Cultural Heritage Due Diligence Report to determine any likely Aboriginal heritage constraints and opportunities for a proposed sand quarry on Lot 2 DP 569979 39 Razorback Road near Running Stream in the Central West of New South Wales (See Figure 1: Appendix 1) .

The proposed sand quarry development project is being carried out on behalf of Plantation Pine Products Australia Pty Ltd, identified as the proponent. ARAS has prepared the due diligence report in accordance with the OEH 'Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales' (DECCW 2010).

The land where the proposed development is taking place uses semi-rural landscapes. The land is located within the City of Lithgow Local Government Area (Figures 1 -2: Appendix 1.). The assessment area (Lot 2) covers an area of 16 hectares of land of which at least more than 90 % is considered significantly disturbed.

The aims of the current survey assessment were to:

- review any relevant existing Aboriginal heritage information and relevant Department of Planning, Industry and Environment(DPIE) data-bases;
- carry out an archaeological survey field assessment to identify likely Aboriginal heritage issues on the ground and make an assessment of likely Aboriginal heritage potential;
- assess the Aboriginal cultural heritage values of the study area, including archaeological and community cultural values, and the significance of identified values.
- identify Aboriginal cultural heritage values that may be impacted by the proposed works, including consideration of cumulative impacts, and measures to avoid significant impacts.
- ensure appropriate Aboriginal community consultation in the assessment process.
- identify any recommended further investigations, mitigation and management measures required, should the project proceed.

- provide advice as to the likely land use restrictions posed by known Aboriginal heritage objects or potential Aboriginal heritage objects;
- provide appropriate risk management advice in order to reduce any likely impacts on identified Aboriginal heritage places or sites as a result of the sand quarry proposal; and
- determine whether or not further archaeological investigation is required.

The Due Diligence report has been prepared in accordance with the relevant guide-lines issued by DPIE:

- 'Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales' (herein referred to as the Code of Practice).
- 'Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010' (herein referred to as the Consultation Requirements).
- Secretary's Environmental Assessment Requirements (SEARs), NSW Department of Planning, Industry and Environment.

This report includes:

- A description of the scope of the project and the extent of the study area.
- A significance assessment of the study area addressing archaeological values.
- A description of the statutory requirements for the protection of Aboriginal heritage.
- An impact assessment for recorded Aboriginal sites and areas of archaeological potential.
- Provision of measures to avoid, minimise, and if necessary, offset the predicted impacts on Aboriginal heritage values

1.1 Project Description

The project location which is described as Lot 2 DP 569979 is situated at 39 Razorback Road near Running Stream in the Central West of New South Wales (14 kms north-west of Carpertee) and covers an area of approximately 16 hectares (Figure 2: Appendix 1). Detail on the project's development design was provided to the consultant in June 2020 and it is expected that some minor clearing of vegetation will occur around ridgeline landforms to provide a quarry pit for sand extraction. A number of haul roads are expected to be built to support the transport of the sand material to and from the quarry site.

1.2 Authorship

This report was written by Dr Giles Hamm. Mr Sam Coles (Development Planner –Borg Manufacturing Pty Ltd) reviewed the report and provided management input.

2 Legislative Framework

2.1 Project assessment designation, Planning Issues and State Government Approvals Process

The project is defined as "designated development" under the Environmental Planning & Assessment Act 1979 (EP&A Act) and requires an application to the Department of Planning Industry and Environment (DPIE) to seek Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS). The Planning Secretary must consult relevant public authorities and have regard to the need for the requirements to assess any key issues raised by those public authorities (see SEAR's requirements: Appendix 4). Aboriginal Cultural Heritage has been identified by the SEARS process as a XXXX. This document provides assessment information to determine the likely hood of impacts to Aboriginal Cultural Heritage by the project.

2.2 The National Parks and Wildlife Act 1974 (NSW)

The Due Diligence Report has been prepared in accordance with relevant legislative requirements, policies and procedural guide-lines applicable to Aboriginal heritage and its protection in New South Wales. These are summarised below.

The *National Parks and Wildlife Act 1974* (NSW) (the 'NPW Act') is the primary piece of legislation for the protection of Aboriginal cultural heritage in New South Wales. The Office of Environment and Heritage (OEH) administer the NPW Act. The NPW Act provides statutory protection for Aboriginal objects by making it illegal to harm Aboriginal objects and Aboriginal places, and by providing two tiers of offence against which individuals or corporations who harm Aboriginal objects or Aboriginal places can be prosecuted. The NPW Act defines Aboriginal objects and Aboriginal places:

> *Aboriginal object means any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.*
>
> *Aboriginal place means any place declared to be an Aboriginal place under section 84.*

The highest tier offences are reserved for knowledgeable harm of Aboriginal objects or knowledgeable desecration of Aboriginal places. Second tier offences are strict liability offences—that is, offences regardless of whether or not the offender knows they are harming an Aboriginal object or desecrating an Aboriginal place—against which defences may be established under the *National Parks and Wildlife Regulation 2009* (NSW) (the 'NPW Regulation').

Section 87 of the NPW Act establishes defences against prosecution under s.86 (1), (2) or (4). The defences are as follows:

- An Aboriginal Heritage Impact Permit (AHIP) authorising the harm (s.87(1))
- Exercising due diligence to establish Aboriginal objects will not be harmed (s.87(2)) Due diligence may be achieved by compliance with requirements set out in the National Parks and Wildlife Regulation 2009 (the NPW Regulation) or a code of practice adopted or prescribed by the NPW Regulation (s.87(3))
- Undertaking "low impact" activities (s.87 (4)).

This report follows the Due Diligence Code and aims to establish whether Aboriginal objects would be harmed by a sand quarry extraction proposal in accordance with S.87(2) of the NWP Regulation.

2.3 The National Parks and Wildlife Regulation 2009 (NSW)

The NPW Regulation 2009 (cl.80A) assigns the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (NSW Department of Environment, Climate Change and Water 2010)(the Code) as one of the codes of practice that can be complied with pursuant to s.87 of the NPW Act.

In addition the NPW Regulation describes "certain low impact activities" in s.80B. Disturbed land is defined by cl.80B (4) as "disturbed if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable". Examples

given in the notes to cl.80B (4) include "construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure)".

2.4 The Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales 2010

The Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (the Code) describes the process that must be followed and the actions that must be taken by a proponent, and the site conditions that must be satisfied, to show due diligence in the consideration of potential harm to Aboriginal objects.

The Due Diligence Code sets out a basic framework with the following steps followed in order to make an assessment of whether or not proposed activities may impact Aboriginal objects:

Step 1. Will the activity disturb the ground surface?
Step 2a. Search the AHIMS database and use any other sources of information of which you are already aware
Step 2b. Activities in areas where landscape features indicate the presence of Aboriginal objects
Step 4: Desktop assessment and visual inspection
Step 5. Further investigations and impact assessment

The process set out in the Code involves consideration of harm to Aboriginal objects at increasing levels of detail, with additional information incorporated at each step and used to support the decisions being made. If the proposed activities are not "low impact activities" (a defence for which is provided under the Regulation) the considerations result in a determination of whether or not:

- further approval (an AHIP) under the NPW Act is required, or;
- Due Diligence obligations for the protection of Aboriginal objects are discharged by the process under the Code.

2.5 Native Title (New South Wales) Act 1994

The Native Title (New South Wales) Act 1994 was introduced to work in conjunction with the Commonwealth *Native Title Act 1993*. Native Title claims, registers and Indigenous Land

Use Agreements are administered under this Act. The subject area is held under freehold title and therefore cannot be subject to a determined Native Title claim under this Act.

2.6 The NSW Aboriginal Land Rights Act 1983

The *NSW Aboriginal Land Rights Act 1983* is administered by the NSW Department of Human Services - Aboriginal Affairs. This Act established Local Aboriginal Land Councils (at State and Local level). These bodies have a statutory obligation under the Act to; (a) take action to protect the culture and heritage of Aboriginal persons in the council's area, subject to any other law, and (b) promote awareness in the community of the culture and heritage of Aboriginal persons in the council's area. The Act also provides for a Land Council to claim certain unused Crown Land within its boundary.

The assessment area lies within the boundary of the Mudgee Local Aboriginal Land Council. The assessment area is held under freehold title and therefore cannot be subject to a claim under this Act.

2.7 Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The Commonwealth Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (ATSHIP Act), deals with Aboriginal cultural property (intangible heritage) in a wider sense. Such intangible heritage includes any places, objects and folklore that 'are of particular significance to Aboriginals in accordance with Aboriginal tradition'. These values are not currently protected under the NPW Act.

There is no cut-off date and the ATSHIP Act may apply to contemporary Aboriginal cultural property as well as ancient sites. The ATSHIP Act takes precedence over state cultural heritage legislation where there is conflict. The Commonwealth Minister who is responsible for administering the ATSIHP Act can make declarations to protect these areas and objects from specific threats of injury or desecration. The responsible Minister may make a declaration under Section 10 of the Commonwealth Act in situations where state or territory laws do not provide adequate protection of intangible heritage.
Where an Aboriginal individual or organisation is concerned that intangible values within the proposal are not being adequately protected they can apply to the Minister for a declaration over a place.

3 Background Aboriginal Cultural Heritage Research

Through the NSW Office of Environment and Heritage (OEH) an extensive Aboriginal Heritage Information Management System (AHIMS) search was conducted by ARAS Pty Ltd on 22nd of July 2020 (AHIMS search ID 522074). The search covered an area of approximately 3 km^2 that encompassed the project area. There are a number of registered Aboriginal archaeological sites that are located near the search area; approximately 1 are listed by the AHIMS search (Appendix 3). The AHIMS search results are presented in Table 1 below and Figure 3: Appendix 1.

Table 1. AHIMS search results (ID#522074) for sites located within 3kms of the project area.

OEH Site ID No.	Site name	Eastings	Northings	Site Type
44-3-0176	Wombat Cottages 1	768629	6343468	Potential Archaeological Deposit (PAD -

The above Aboriginal site distribution list is only a small portion of what is known for the entire Running Stream/Cherry Tree Hill region in the Central West of New South Wales . Aboriginal occupation sites have been recorded along the following major riverine landforms, creek catchments and associated forest/wetlands but are not necessarily registered:

- Carpertee River terraces and valleys;
- Glen Alice Gorges ;
- Round Swamp Creek;
- Oaky Creek;
- Turon River ;
- Running Stream ;and
- Crudine River.

The land is located traditionally within the boundary area of the Wiradjuri Aboriginal language groups (Tindale 1974, Horton 1994). Contemporary Aboriginal communities within the Bathurst and Mudgee areas are represented by:

- the Bathurst Local Aboriginal Land Council (LALC) based in Bathurst ; and
- a range of Native Title and Registered Aboriginal Party groups.

Other Wiradjuri and non-Wiradjuri Aboriginal groups living in the Central West region may or may not express an interest in this type of assessment and have the potential to do so through the processes outlined in the *DECCW's Aboriginal Consultation requirements for proponents 2010* (DECCW 2010).

All the above Aboriginal groups are interested in development projects within the Singleton Council area and any likely impacts on land that could contain Aboriginal Sites and Objects. DECCW/OEH has advised that Aboriginal groups should be involved in any project that could impact on known Aboriginal Sites or Objects.

3.1 Previous Archaeological Research and Predictive Modelling

Chronology of Aboriginal occupation within the broader region is known to be at least 29,000–34,000 years Before Present (BP) (Kamminga & Mulvaney 1999). The Pleistocene sites of Cuddie Springs and Tambar Springs provide some evidence of early human exploitation of open plain landforms which also contain megafaunal species (i.e. Diprotodonts). Attenbrow (2003) reports a date of 11,050 +/- 135 years BP for a rock-shelter site occupation (Loggers Rock-shelter Site) within the Upper Mangrove catchment.

In 1994, Patrick Gaynor obtained a date of 20,000 years BP from Crazy Man Rock-shelter in the Warrumbungles National Park. In 1970 David Moore completed excavation of a small rock-shelter at Bobadeen. This excavation site adjoins but is not within the Moolarben Coal Mine exploration license (EL). The Bobadeen shelter excavation produced a basal occupation date of 5500 years BP (Moore 1970, 1981).

In 1961, Tindale completed an excavation at Noola Rock-shelter in the Rylstone area and suggested a date of approximately 12,000 years BP for basal occupation. Another site, Botobolar 5 has been dated to 5770 +/- 100 years BP. Excavations within the Ulan Mine Lease are limited to a salvage excavation and several test excavations. The age of occupation of the sites has been assessed as less than 5000 years old. Technological attributes of stone artefacts present at sites in Ulan have not been the subject of comparison with other sites in the Central Tablelands or Hunter Valley regions, with the exception of Moore's (1970) excavation at Bobadeen.

Moore's (1970) investigations also provide a date of 7000-8000 years BP for the Ulan region, while Pearson (1981) recovered an occupation date of 5500 BP at a shelter site at Botobolar (Kuskie & Clarke 2005).

Haglund's archaeological surveys, test excavations of rock-shelters and open sites and surface collection of stone artefacts were all completed within the Ulan mine lease area in the early 80s. A salvage of shelter site 36-3-177 was the first major sub-surface investigation within Ulan Coal Mine Lease areas.

In 2005 and 2006 Hamm (2006) undertook an assessment of Aboriginal cultural heritage values for the proposed Moolarben Coal Project Stage 1, located in the western coal fields of NSW, 40km north-east of Mudgee and 25km east of Gulgong. The study covered an area of approximately 35km^2 of low undulating hills and hillslopes from 400-680m above sea level on sandstone plateaus with extensive rock outcrop. Narrabeen Sandstone is the dominant parent rock. Parts have lower colluvial slopes of sandstone plateaus escarpments with low undulating rises and creek flats. Moolarben Creek flows through part of the study area. The landscape is heavily vegetated with some clearing for pastoral activity around the village of Ulan, and the locality of Moolarben along the Moolarben Creek. Approximately 4.2km^2 of land was foot surveyed from approximately 6.8km^2 of land available to be surveyed due to available surface visibility.

The assessment located and recorded a total of 1598 Aboriginal objects (302 sites). This cultural record was made up of: 63 open stone artefact scatter sites of varying densities, 219 individual stone artefact isolated finds, 18 rock-shelter sites, a grinding groove site and a scarred tree site. A majority of this record (87%) is made up of exposed stone artefactual material eroding from areas of bare soil exposure with less than five artefacts in density.
The most concentrated occupation areas located within the Stage 1 study area were:

- Central Moolarben Creek Alluvial Flats: Mayberry Property at Open Cut 3
- Southern Moolarben Creek Alluvial Creek Flats and Ridges: Stokes Property Open Cut 3 Extended
- Underground No. 4 Northern Ridge Lines: Westwood Property
- Bora Creek Alluvial Flats: Ulan Coal Mines Property.

The principal Aboriginal objects recorded in the assessment were stone artefacts. A total of 1597 stone artefacts were recorded. Quartz raw material dominated all assemblage components for MCP Stage 1 sites, accounting for 81.6% of the total raw material count.

The next most commonly used raw material was Tuff, accounting for 10.6% of the total assemblage count. Silcrete was also used, but in much lower proportions.

A majority of surface assemblages recorded were made up of Broken Flakes, followed by Flaked Pieces and Complete Flakes. Retouched or used items only accounted for 2.2% of the total assemblage contents. Cores made up approximately 8.5% of the total assemblage content. A majority of cores were multi-platform type made from quartz and tuff materials. A total of four backed pieces (i.e. geometrics) were identified with three being recorded, within Transect 4 Underground No. 4. All three backed pieces are made from Tuff material.

A majority of flakes (Complete and Broken Proximal) contained approximately 75% broad platforms with 18% containing focal platforms. Cortex is found on approximately 12% of all stone artefact items. A comparison was made of the size of Complete Flakes. Graphing shows that a majority of quartz Complete Flakes recorded were between 10-40mm in length and 10-25mm wide. Whilst the Complete Flake size distribution for Tuff was much broader, showing a more diverse flake selection process operating.

Of a total of 302 sites recorded for the Stage 1 project area, eight sites (i.e. S1MC: 103, 230, 264, 280 (36-3-0042), 282, 283, 286, 287 are considered to be of high archaeological significance. The remaining 294 sites were considered to be of medium or low archaeological significance. From an Aboriginal cultural assessment point of view, the most sensitive Aboriginal cultural landscape is located within the northern area of Underground No. 4 (i.e. near 'The Drip'). However, general Aboriginal community consultation advice has stated that all sites (archaeological or cultural) are of value, but none of the community members interviewed objected to the mining proposal going ahead.

A significant percentage of open alluvial plains and flats assessed in MCP Stage 1 have been disturbed due to historic farming practices, especially broad acre clearing for ploughing and pasture improvement. As a result of this activity, approximately 80% of Moolarben Creek's modern day channel has been heavily affected by sheet erosion as a result of agriculture. It is argued that this long-term impact may also be responsible for a lack of intact rich open sites which are more common along Murragamba and Wilpinjong Creeks. The presence of natural springs and soaks is likely to have heavily influenced the location of major open space Aboriginal sites occupation for the Moolarben Creek catchment and surrounding ridgelines. Although rock-shelters were

used by Aboriginal people in the MCP Stage 1 study area they were more specific in their purpose (i.e. to carry out rock art and ceremony) and less likely to contain significant long term occupation evidence.

3.2 Archaeology of the Carpertee Valley

McCarthy(1948, 1964)recorded and excavated four rock shleter sites in the Glen Alice gorges area in the 1950s and 1960s. The Capertee River flows eastward through a deep and narrow gorge, in which the four rockshelter sites are located. This gorge has cut through the local Hawkesbury and Narrabeen sandstones. The gorge is over 1,000 feet high, and at the base of it Permian Lithgow coal measures, in which cherts are also present. Rock shelter sites numbered I to 4 were situated in a rugged gorge in which steep-sided walls alternate with high and low terraces. These were inhabited by swamp wallabies and other game (McCarthy 1964). The most important of these rock shleters was Carpertee 3 (Hiscock 2008). A radiocarbion basal date of 10,000 years BP was produced as a result of the McCarthy excavations.

Most of the rock shelters lay adjacent to semi permananet water in the gorges and valleys of this area have been inhabited by the Aborigine people , some for a long period of time. The shelters occur at all levels on the ridges, at the top of the talus slopes, and even on the tops. McCarthy argued that Aboriginal people had a forest economy adapted to a mountain environment which yielded ample food and shelter. The local population was dense enough to make it necessary for groups of people to occupy both the rugged gorges and the broad valleys nearby, where better hunting and camping conditions prevailed(McCarthy 1964).

The arhcaeological evidence showed that the animals identified from the bones found in the excavated sites indicated that Aborigial people living in the gorges depended chiefly upon the swamp wallaby and possums for their flesh food, and in the open valleys they added the grey kangaroo and the emu (McCarthy 1964)

Later Johnson(1979) excavated Carpertee 3 rock shleter and recovered radio carbon dates of 3,000 years BP and argued that most of the backed artefacts he found were no older than 3,000 years. He suggested that some specimens located lower in the profile were likely to have moved as a result of disturbance. This view has since been overturned by Hiscock and Attenbrow (2004, 2005) who have investigated the Carpertee artefact assemblage in detail. They found that previoulsy unrecognized

backed artefacts existed in layers more than 6,000 years old and were not falsey assocaited with early chrcoal evidence because they were highly weathered (Hiscokc and Attenbrow 2004). They found that the production rate of backed artefacts had increased subsbtantially around 3,5000 years ago several thousand years after those tools were first used at the site with an intense period of site use between 3,500 and 1,700 years BP (Hiscock 2008).

3.3 Terrain and Topography

Foremost in the minds of hunter-gatherer peoples for selecting occupation areas are the requirements of camp-site locations. Some ethno-historical researchers have commented that some Aboriginal cultural groups in Australia have a ruled based system for selecting camp-site locations (Fison & Howitt 1991).

Brayshaw, (1986) writing on site selection factors from her ethno-historical work only quotes the observations of J.W. Fawcett (1898) saying that in " choosing the site [for their camps], proximity to fresh water was one essential, some food supply a second, whilst a vantage ground in case of attack from an enemy was a third" (1898: 152).

Considerable scepticism has to be applied to claims of large numbers of people at Aboriginal gatherings throughout certain landscapes. Early historic accounts are either skewed towards observer bias or a lack of understanding of the impacts of European settlement and the consequences of disease and conflict.

Many groups, including Carpertee Valley Aboriginal people would have modified their settlement patterns significantly after the early 1800's due to a negative reaction by white pastoralists who were rapidly taking over the best country in many districts. It is well known throughout the Bathurst area and Mudgee districts, that groups such as the Wiradjuri and Gundungurra were combining their efforts to harass white settlers. There is some evidence that this may have been occurring with Kamilaroi and Wonnarua groups in the Hunter Valley.

Terrain and topography can limit choices for hunter-gatherer occupation. Within a survey area there may be a range of topographic and relief types. This landform or medium scale environmental context is likely to determine the patterns of soils and biological resources (Butzer, 1994). It is important to understand the variations in these patterns and what they may mean. Variables such as slope classes eg. Flat: <2°, Gentle:

2-5^{o}, Moderate: 6-15^{o} or Steep 15-40^{o}) and relief types (eg. plains, hills, tablelands mountains) are all important in determining how a site fits within a spatial framework or pattern.

Hunter Valley researchers such Dean Jones & Mitchell (1993) argue that many of the sites recorded in the Hunter Valley have been distributed along drainage lines. They observe that far fewer sites have been recorded on landforms remote from watercourses. This, they argue is due in part to how surface erosion processes are concentrated along drainage features and the historical focus of archaeological assessment. Less is known about how Aboriginal occupation may have been structured in higher altitude locations especially areas that contain a range of relief types.
In her analysis of site location across the Hunter Valley, Koettig argues that:
"sites in the Central Lowlands often comprise discrete concentrations of artefacts distributed in a continuous, but apparently unpatterned way across creek flats. These concentrations varied in frequency, size, content and association, possibly representing different activities (manufacturing, maintenance and or tool production)" (Koettig 1994: 7).

3.4 Site Predictive Models

Site selection factors can be broadly classified as factors that influence hunter-gatherer prehistoric land-use patterns. Significant among these factors are environmental and social parameters for settlement. Environmental factors can be summarised as involving access to permanent water, availability of flat dry ground, avoidance of cold air drainage, access to a variety of resource zones, visible aspect across variable terrain, protection from prevailing winds and terrain or topography providing access to other settlement areas.

Social or cultural factors can be summarised as involving territorial boundaries, social grouping and family size, ceremonial and ritual requirements, mobility networks and seasonal resource requirements.

According to Vinnicombe (1980), Attenbrow (1987, 2003, 2004), Pearson (1981), Haglund (1981, 1997) Kuskie and Clarke (2001) and more recently Navin and Officer (2005) at Wilpinjong, Hamm (2006) MCP Stage 1 and Kuskie and Clarke (2007) at Ulan, several topographic and landform factors will influence where sites are likely to be found within or near the study area. These can be summarised accordingly:

- The presence of water with extensive artefact scatters close to relatively permanent water (springs, soaks, rivers and permanent creeks) and sparse artefact scatters adjacent to the intermittent streams is important.
- Following Attenbrow (2004) and Vinnicombe's (1980) example: Rock-shelters without archaeological evidence, but with particular dimensions and characteristics, are likely to contain archaeological materials. These rock-shelters are called potential archaeological deposits (PAD shelters). A rock-shelter was deemed to be a PAD if it had dimensions of 2 m x 1 m or space for at least two people to gain 'adequate shelter'. The following criteria were used in the field:

1. floor space: suitable for two people to sleep in a curled-up position, that is, flat and horizontal with a minimum area of 2 m x 1 m
2. height: sufficient for two people to stand or stoop in a comfortable working position, that is at least 1.2 m high;
3. protection: the overhang is deep enough (from dripline to back wall) to protect the floor area from weather, that is, 1 m minimum
4. dryness: the floor (or part of it), and inside the rock-shelter generally, must be dry
5. accessibility: the rock-shelter must be easily accessible.

- Campsites are likely to be well above flood levels while minor sites will tend to be on well-drained areas such as minor spurs, low hills or the banks of deeply incised streams
- Sites within forest landscapes are likely to occur within 150 m of water sources.
- Valley floor and basal valley slope landforms are likely to contain the greatest diversity of occupational materials with upper valley slopes the least likely to contain site potential.

It is clear from the above archaeological review, that site locations within the Central West such as the Goulburn River and its tributaries like Wilpinjong, Moolarben Creek and Murragamba Creek floodplains are significantly influenced by elevated ground which can provide a safe haven from flood waters and access to ecological resources. The density and quality of spring-fed stream systems is another important site location factor. The shape and width of open and closed valleys is also likely to be important, especially when winter and summer weather conditions are considered.

Rich ecotones are likely to be found where lowlands dissect floodplain land units producing rich wetlands and swamps. These places are more than likely to have been favoured by Aboriginal people living in pre-European landscapes. Another important site location factor is likely to be access to stone tool raw material resources. As a

majority of reported artefacts are made from quartz, cherts and tuffs and some of these raw materials may outcrop on some ridge systems.

The frequency of occupation at a given location is likely to have been related to the availability of subsistence resources (e.g., food, water, lithic raw materials).Some locations may have been foci for Aboriginal occupation owing to the presence of particular resources (e.g., sandstone exposures suitable for grinding hatchet-heads); and

The duration of occupation at a given location may be evidenced by levels of disturbance to associated archaeological deposits, with sites occupied for shorter duration potentially having more intact deposits, as the length of stay may have been insufficient to disperse artefacts or mask the original form of knapping floors.

Haglund (1992) based on her work from Warkworth salvages (Doctors Creek) argues that kangaroos, wallabies, and other large and small game would have been abundant in the area during dry periods, and would have been hunted by small hunting parties of men who would prepare and repair their hunting equipment in close proximity to watercourses. Larger family groups likely visited the area during wetter periods when watercourses would be flowing more reliably and moisture dependent plants occurred in greater abundance.

Women and children would procure and process plant foods, such as ferns, yams and other tubers, in the vicinity of creeks and watercourses. Sporadic visits would have resulted in debris left behind being incorporated into the turf or buried by leaf litter and Casuarina needles more quickly than more intensive, long term visits.While some equipment such as grindstones may have been retained and carried throughout the landscape, flakes and other implements were likely manufactured, utilised and discarded on an "as needed" basis.

Kuskie (2000) provides a number of broader occupation models for the Upper Hunter Valley based on the Mt Arthur North and South coal mine assessment. He argues that the Mount Arthur North area was likely utilised and occupied by Aboriginal people at varying intensities on a seasonal basis. Occupation was most intensive within 50m of the main watercourses (3rd and 4th order streams). Aboriginal people had a strong preference for camping on level ground adjacent to reliable water sources and potentially more abundant subsistence resources. Individual campsites were mainly

occupied by single nuclear family groups and multiple faniily groups (bands).Larger campsites from broader gatherings of people likely took place along the nearby Hunter River flats.

A greater range and frequency of activities were undertaken at camp sites, rather than in the surrounding landscape. Camp sites along the major watercourses were occupied by small groups of people for varying lengths of time, during both the course of the seasonal round and in different years. Occupation of camp sites throughout the entire Mount Arthur north area was predominantly sporadic rather than continuous. Occupation, such as focussed camping, likely also occurred along level to very gentle drainage depressions (particularly 3rd and 2nd order streams). These water sources were likely to be intermittent and occupation along these lower order streams may only have occurred when standing water was available.

Most camp sites involved overnight visits of small hunting parties rather than entire family groups. Other than focussed camping, activities engaged in across the Hunter involved hunting activities (larger game) by small hunting parties of men, and gathering activities by small parties of women and children, along with transitory movement, procurement of lithic resources, and cultural activities.

The utilisation of areas such as simple slopes, ridge crests, spur crests and minor watercourses was less intense than the valley flats where base camps were situated.
Simple slopes were used during hunting or gathering activities in the course of the normal daily or seasonal round, to access higher ground or stone resources, or to move between camp sites.

Ridge and spur crests were also used for these purposes and for accessing vantage points or moving to special ceremonial sites. Vantage points were important to the Aboriginal occupants of the area, particularly gentle to steep upper slopes adjacent to several ridges, which were mainly accessed by groups of men on hunting expeditions, or for security and/or cultural purposes.

3.4.1 Site Prediction Model

The following sites are likely to be found within the proposed assessment area:
Artefact scatters will occur in association with creek-lines. **Artefact Scatters** are also likely to occur on hillslopes and ridge crests, often at a vantage point over the

surrounding landscape. Open surface scatters along creeklines, slopes and ridgetops will exhibit varying degrees of archaeological integrity, depending on the effects of erosion.

The majority of **Isolated Finds** will occur within and in association with creeklines. The majority of isolated finds will comprise flaked stone artefacts. Isolated finds will exhibit varying degrees of integrity. **Archaeological deposits** are likely to occur along higher order creeklines. Archaeological deposit will likely comprise of chipped stone artefacts. Hearths may also be present. Archaeological deposits will have varying degrees of integrity, particularly along creeklines, which experience significant erosion.

Scarred trees may occur where original remnant vegetation remains.Scarred trees will likely be eucalypts i.e. box. Scarred trees are likely to be extremely old, dying or dead.
Axe grinding grooves on sandstone bedrock will occur in direct association with creeklines. Most sites will exhibit more than one groove.The majority of axe grinding groove sites will exhibit moderate to high archaeological integrity as such sites are more resistant to impacts.

The presence of water with extensive artefact scatters close to relatively permanent water (springs, soaks, rivers and permanent creeks) and sparse artefact scatters adjacent to the intermittent streams is important. Another important issue for understanding site location factors in the Hunter Valley is the importance of water and access to biological and physical resources.

A number of researches have concluded that access to water is critical in the understanding of the frequency and scale of Aboriginal prehistoric occupation (See Brayshaw & MacDonald 1992, Rich 1993, Koettig 1994). However, Dean Jones (1992), Dean Jones & Mitchell (1993) question the standard assumption that water is the single most important site location factor for Hunter Valley Aboriginal occupation. They maintain that the distribution and quality of available water in the Hunter valley in prehistoric times may be difficult to predict.

Issues such as the volume of water flowing in the Hunter River is assessed to be highly variable. Flow in the Hunter River has ceased on several occasions, whilst smaller tributaries like Whites Creek and Swamp Creek can cease to flow up to 29 months (Dean-Jones & Mitchell 1993). The impact of this on Aboriginal people could have caused a seasonal pulse-reserve effect (See Noy-Meir 1973).

Chains of ponds were known to have been reported for smaller streams and as Dean Jones & Mitchell remark (1993: 60), some of these chains of ponds were quite deep. These ponds are likely to have been fed by shallow ground water flowing through basal gravels and may have been a reliable water resource.

3.5 Previous Local Archaeological Investigations of Lot 2 569979-39 Razorback Road Running Stream.

No previous archaeological investigations have been carried out for Lot 2 569769. The most relevant archaeological work is that of McCarthy (1964), Johnson (1979) and Hiscock (2008) near Glen Davis. A Potential Archaeological Deposit (**AHIMS-44-3-0176**) was recorded to the north of the assessment area for Wombat Cottages (Figure 3). No other Aboriginal sites or objects have been recorded near the assessment area.

3.6 Regional Modelling, Site Distribution and Cultural Landscape Values.

Whilst no regional or local Aboriginal heritage study is available for the Central West region, it is acknowledged that evidence of Aboriginal occupation is widespread and in some locations particularly abundant. A regional study completed for the Upper Hunter which covers parts of the Central Tablelands (see ERM 2004) tried to model which areas of landscape might contain highly unique potential for Aboriginal archaeological resources. In their base-line report on behalf of the Upper Hunter Heritage Trust (ERM) states that:

*The overwhelming majority of archaeological sites recorded in the study area are stone artefact scatters and isolated artefacts. These sites are common in most regions, have been recorded and many (in the Central Lowlands) have been salvaged and the assemblages are available for archaeologists for further investigation. Most other site types are quite rare and have not been well recorded studied or salvaged (*ERM 2004:74*).*

These rarer site types include: Burials, Scarred Trees, Carved Trees, Stone Arrangements and estuarine Shell Middens.

In addition to the above site type assessment, some landscapes and geomorphic units contain potential for unique archaeology or Pleistocene Age cultural remains. Some of these landform types are also considered to be poorly understood for the region.

These landform features include:

- sand dunes;
- sand sheets; and
- Hunter River terraces.

As well as these rarer landforms which could contain significant cultural resources, other local landscapes may contain cultural landscape values which are important to Aboriginal people. Examples of these cultural landscapes in the Central Tablelands region may include: fringe campsites and mission sites, pristine wetlands, riverine corridors, untouched woodlands, forested landscapes and prominent scenic escarpments, all having a natural and cultural heritage quality.

3.7 Stone Technology and its Variability

The importance of understanding the variability in the assessment of stone artefact assemblages in the Central West is critical and has involved a considerable amount of work over the last 30 years. Analysis of lithic materials can provide information about activities that occurred at a site.

The activities may involve inferences about stone tool raw material use, the specific stages of tool manufacture, use of tools and their discard. Hopefully by analysing this data the archaeologist may develop a real understanding of the range of activities present on any one particular site.

Hunter gatherer occupation sites or campsites (i.e. rock shelter or open space) are likely to have a broad range of tool types due to the variety of activities undertaken at a site over a certain period of time. These types of sites are contrasted to the more specialized sites where food gathering or hunting required a more restricted range of tool kit. Tools that were broken or exhausted are often found at these types of sites as well as resharpening flakes from a tool user carrying out tool maintenance (Kooyman 2000).

Lithic analysis can also lead to information about where a tool may have been manufactured and why it was discarded. The analysis of lithic debitage can also provide information on whether the tool was manufactured close to a quarry site or transported from a distance. Evidence such as the amount of decortification flakes, unmodified or broken flakes or flakes with specific types of platform can all lead to an understanding of the stages of tool manufacture.

Modelling of prehistoric hunter gather behaviours using lithic analysis has led some researchers to speculate on the level of sedentism or mobility. The assumption that mobility of a group limits the type of the toolkit has been put forward by a number of researches (Walker 1978, Bleed 1986, Bamforth 1986). Conversely, greater sedentism usually means groups will have a greater range of resources to choose from at one site and thus their toolkits will contain more variety (Odell 1994). The more mobile a group is the more likely the members are to standardize their core technology (Odell 1994).

Curation of tools is another important consideration in assessing lithic variability. Odell (1996) argues that curation will usually reduce the need for raw material supply. This leads on to the concept of gearing up or preparing tools in advance of use. This further raises the question of the functionality and versatility of tool types that may or may not tell us something about how prehistoric hunters maximised opportunity when using a range of landscape in the past.

As discussed previously, archaeological work in the Upper and Lower Hunter Valley has led to a number of important lithic studies being undertaken (Hiscock 1984, 1985, 1986; Haglund 1989; Baker & Gorman 1992; Koettig 1994.

These studies have led to hypotheses concerning stone tool technology (reduction sequences) and:

- chronology (Hiscock 1986, Hiscock & Attenbrow 1988);
- stone raw material use and procurement (Hughes 1984, Hiscock 1986, Baker 1992, Koetigg 1994, Haglund & Rich 1995, Rowney 1992);
- technological attributes (Hiscock 1984; Baker 1992; Koettig 1992, 1994; Kuskie & Kamminga 2000; Baker 2001 & Witter 1992, 2002);
- variability of assemblages and the activities that produced them (Koettig 1992 & 1994; Kuskie & Kamminga 2000; Baker 2001; Witter 2002); and
- limitations of sample sizes (Hiscock 2001).

3.8 Site detection factors

One of the most important factors in locating sites or artefacts on the ground is whether they can be detected or discovered easily. A number of discovery factors will affect how well sites or artefacts are located within a survey area. Schiffer, Sullivan and Klinger (1978) provide a useful summary of what the most important factors are likely to be in detecting sites or artefacts on the ground (see Table 2 below, taken from Dancey, 1981).

Table 2: Site detection factors that may affect an archaeological survey (after Dancey 1981)

General Factors	Definition	Specific Examples
Abundance	The frequency or prevalence of site or artefact type in the study area	Sites and artefacts occur in highly variable quantities, from rare to abundant
Clustering	The degree to which archaeological materials are spatially aggregated	Various degrees of clustering may be found between dispersed and clustered
Obtrusiveness	The probability that particular archaeological material can be discovered by a specific technique	Artefact size, composition, surface morphology, heat retention, and other physical, chemical and Biological properties
Visibility	The extent to which an observer can detect the presence of archaeological materials at or below a given place	Site area, artefact density, artefact size, surface area of exposure, frequency of exposure
Accessibility	The effort required to reach a particular place	Climate, biotic environment, terrain, roads, land holding patterns

3.9 Definition of a 'site'

The NSW Office of Environment & Heritage (OEH) advises developers and consultants that the term 'site' is used to group Aboriginal Objects or define a location where an Aboriginal Object or cultural item occurs.

They propose general criteria to assist in the classification of a site. *Sites* can be defined as:

- exposures where archaeological evidence is revealed;
- a topographic or land form unit where occupation evidence has been recorded. This may be an entire landform unit (ridge, creek, valley) or part of a landform unit (saddle on ridge, creek bank);
- sites which have physical boundaries defined by rocks (stone arrangement), earthworks (mounds) or cleared land (ceremonial ground);
- sites defined by Aboriginal community groups as culturally significant;
- arbitrary or the assignation of a boundary for the convenience of recording (in cases where the site would probably be much larger if based on the criteria above). Arbitrary criteria include the use of a fence-line, dirt track or gully as a boundary. In

some cases the area may simply be designated as 50m x 50m, or as a smaller sample plot, on the basis of convenience;

- artefact density. (In some cases a site boundary may be defined by the average number of flakes per square metre.) This is a specialised type of arbitrary criterion and justification of the rules used must be made explicit; and
- the chosen definition of a site or isolated find needs to be specified for the study. It is the consultant's responsibility to decide on an appropriate definition, suited to the particular project, the research goals and comparability with other regional studies. OEH requires site forms to be completed for isolated finds.

3.10 Aboriginal Site Types likely to be found in the general assessment area.

Aboriginal site types that have been typically recorded in the general region include:

- Open campsites made up of stone artefacts dominated by tuff, silcrete and quartz assemblages and sometimes containing hearth material in the form of burnt or cracked sandstone heat retainers. These sites vary in complexity and density depending on their physical condition in the modern landscape and their proximity to major resource zones;
- Isolated Find representing a single isolated artefact located on its own in the landscape;
- Artefact Scatter representing a collection or scatter of stone artefacts exposed by erosion that appear to be defined by their spatial relationship to one another and the land unit they are located on;
- Archaeological Deposit representing a buried surface which has some soil depth and structure likely to contain archaeological remains;
- Scarred Trees representing Aboriginal removal of bark material to make shelters, dishes, canoes, string, shields, boomerangs and carved trees. Within the study area most Aboriginal scars are found on River Red Gum (Eucalyptus camaldensis) or Blakely's Red Gum (Eucalyptus blakelyi), White Box (Eucalyptus albens) and Grey Box (Eucalyptus largiflorens). There is a strong correlation between large canoe type scars and more permanent river;
- Carved Trees represent important Aboriginal ceremonial or burial marker locations. They are usually carved on high quality timber such as Red Gum. A slab of bark is removed and then the inner wood tissue is carved using a stone axe or heavy duty cutting tool. Common designs found on carved trees are diamond or linear cross hatching motifs;

- Burial sites are sites that show evidence of Aboriginal burial in discrete locations. Burials in the study region are usually associated with major areas of occupation found next to rivers, lagoons, lakes, waterholes and some creeks. Skeletal material is normally discovered eroding out of sandy deposits, where interment is easiest. Burials may occur in an isolated context or they may be part of a larger cemetery;
- Bora rings are sites containing an arrangement of natural stone to represent ceremonial or ritual practice. They are often found near traditional ceremonial grounds in areas of abundant surface rock. Rocks may be arranged in a circular fashion or oval shapes signifying important ritual meaning for a ceremony. Often bora rings are found isolated on ridge tops or flat hilltops overlooking a significant stretch of country;
- Art sites. These types of sites reflect Aboriginal use of sandstone outcrops for the purpose of painting, engraving or drawing traditional designs. Art sites are often found in areas where people are using country that has good sources of sandstone in the form of rock-shelters, which offer cover from the elements or may be located next to a stream or river;
- Common symbols found in art sites are hand stencils, figurative art representing animal or human forms, tracks of animals and patterns of lines or circles that may represent landscape elements to a traditional story;
- Axe grinding grooves. These types of sites are associated with Aboriginal people using sandstone outcrops to sharpen stone implements and in particular stone axes. Grinding grooves are usually 5–20cm in length and 2–3cm in depth depending on how often the person is using the groove section. Grooves may be found in clusters and are usually concentrated around a surface rock pool where people use water to assist them in sharpening an edge;
- Contact sites. A contact site is site where there is evidence of Aboriginal people living traditionally in close proximity to European settlement. Aboriginal people may be using European items in traditional hunting and gathering practices, for instance bottle glass as a substitute for stone, or metal as a substitute for bone or stone;
- Sites may be associated with Aboriginal people working for European settlers, such as gathering bark sheeting for bark slab huts. Often historic items associated with that contact would be found in certain traditional campsites; and
- Waterhole/well. These types of sites, as well as being important places for obtaining water, may also be sacred places and of religious significance to living Aboriginal people.

Hunter Valley researchers such Dean Jones & Mitchell (1993) argue that many of the sites recorded in the Hunter Valley have been distributed along drainage lines. They observe that far fewer sites have been recorded on landforms remote from watercourses. This, they argue is due in part to how surface erosion processes are concentrated along drainage features and the historical focus of archaeological assessment. Less is known about how Aboriginal occupation may have been structured in higher altitude locations especially areas that contain a range of relief types.

In her analysis of site location across the Hunter Valley, Koettig argues that:

"sites in the Central Lowlands often comprise discrete concentrations of artefacts distributed in a continuous, but apparently unpatterned way across creek flats. These concentrations varied in frequency, size, content and association, possibly representing different activities (manufacturing, maintenance and or tool production)" (Koettig 1994: 7).

In the Hunter Valley, a number of researchers have expressed concern with the effectiveness of surveying for sites, which are constantly obscured due to a lack of ground visibility. In their overview of methodological issues for the assessment of Hunter Valley archaeological resources, Dean-Jones and Mitchell summarise the most important site detection issues as factors affecting site visibility which include:

- The original size and pattern of the deposit;
- The present vegetation cover;
- Post depositional processes causing artefact burial and/or erosion; and
- Artefact density and clustering, and presumably the increasing age of the site (Dean Jones & Mitchell 1993: 46).

4 Environment & Land Use History

4.1 Environmental Features of Lot 2

4.1.1 Land Systems, Landforms and Geomorphic Description

The assessment area is located within the Central Tablelands geographic region and Capertise Rise geological zone containing Upper Devonian, Ordovician and Silurian rocks such as Andesites, greywackes, shales and limestones. Lot 2 DP 569979 39 Razorback Road Runnning Stream is classified within the 'Soil Landscapes of Bathurst 1 : 2500,000 Sheet' (Kovac, Murphy and Lawrie 1990) as part of the Carpertee Soil Landscape. All the

soils are described as Yellow Podzolics formed insitu as alluvial and colluvium materials derived from Permian Shale, Siltstone, Conglomerate, Chert, Coal, and torbanite streams. Yellow Podzolics are found on on midslopes with red and brown podzoilics on upper slopes and red earths and yellow sodilics soils found on lower slopes.

The general landform is described as undulating low hills ranging in elevation from 730m -940m with most slope lengths ranging from 1000-2000m but up to 3000m(Kovac, Murphy and Lawrie 1990: 88).

The local native vegatation is defined as narrow leaved ironbark and yellow box comprising tall open woodland which merges with a savannah woodland containing apple box as well as Blakelys Red gum.

The assessment area consists of a series of low ridges which have been cleared of vegetation for sheep grazing and forestry agriculture and are now open paddocks containing pasture grasses. Apart from small pockets of native regrowth trees acting as wind breaks along fence-lines and southern open woodland; the upper ridge landsurfaces have been heavily ploughed for pine plantation harvesting (see Figure 2).

4.1.3 Surface Water

The main surface water feature of the assessment area is the Two Mile Creek catchment which is located in the extreme south-west corner of the assessment area. The creek contains a shallow flat channel which is likely to have been only ephemeral in nature. There are no obvious well developed springs within the assessment area however, minor runoff along exposed gullies has caused some ephemral wetland areas to appear.

4.1.4 Historic Land-use

The land surrounding the assessment area was originally taken up in the late 1890s with the original grant for the village of Capertee being estbalished in 1882 as part of the western rail line development (Parkes et al 1979). The assessment area was farmed from the late 1890s with extensive native tree clearing making way for sheep grazing. A gradual transferal to state foresty was undertaken in the 1960s and then to private commercial pine plantations.

4.2 Current Land use impacts and landforms within the proposed Lot 2 development area.

The assessment area consists of a series of low ridges which have been cleared of vegetation and are now open paddocks containing pasture grasses (Figure 4: Appendix 2). Small pockets of native regrowth trees acting as wind breaks are found along fence-lines and within the south-west corner where some remanent tall woodland remains. The land in the upper ridges has been heavily ploughed for pine plantation purposes (Figures 2 & 5 Appendix 1 and Plates 1-6 Appendix 2). There is a farm dam located within the south western portion of the assessment area (Plates 9-10: Appendix 2). A powerline also crosses a small section of the northern portion of the assessment area. Several farm tracks criss- cross the assessment area causing sheet erosion

Aerial photography from 1964, 1973, 1982 and 1989 (J. Berry pers comm) clearly shows the development of the land with some pasture improvement (native vegetation clearing) and cropping taking place prior to pine plantations being introduced to the east at Turanfels. Limited development has taken place on the land since the 1990s.

5 ABORIGINAL CONSULTATION

As this project aims to avoid any culturally sensitive areas, it did not require consultation with Aboriginal community stakeholders.

6 Archaeological Survey Assessment Methods

An archaeological survey of the assessment area was conducted on foot in accordance with the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (OEH Code of Practice) on 23rd of July 2020. The survey was undertaken by Dr. Giles Hamm (ARAS).

The subject area was surveyed as a single survey transects: Transect 1 (See Figure 6: Appendix 1). Grass and vegetation coverage, made inspection of the ground surface in some places difficult. In accordance with the *OEH Code of Practice* requirements, the sample survey targeted every landform which would potentially be impacted by the proposed sand quarry development, with an emphasis on landforms that were likely to have archaeological potential (i.e. ridge tops, alluvial flats).

The consultant walked the survey unit in systematic transects where the terrain allowed. Dense pasture grass cover inhibited the survey assessment in some places. Any areas of surface exposure or old growth trees were inspected in detail. Overall surface visibility was generally good in most places, meaning that the opportunity for identification of exposed stone artefacts on the ground surface was also good.

A handheld Global Positioning System (GPS) device was used to track the path of the survey assessment and record the coordinates of the survey transect, including the locations of any areas of archaeological potential identified in the field. The coordinate system projection used for all site recording was GDA94 MGA 56. A photographic record was kept of the survey transect unit. Photographs were taken to record aspects including surface exposures, vegetation, disturbance and areas of archaeological potential. Scales were used for photographs where appropriate.

All ground exposures were examined for Aboriginal objects (stone artefacts, or other traces of Aboriginal occupation). Old growth trees were examined for signs of cultural scarring and marking.

7 Assessment Coverage & Survey Results

A total of one foot transect was completed and is listed below in Table 3 (Figure 6: Appendix 1, Plates 1-6: Appendix 2).

Table 3. Summary of Survey Coverage undertaken for proposed Lot 2 DP 569979.

Subject Area Assessment	Landforms	Area (m2)	Visibility	Exposure	Effective Coverage
Lot 2 ,DP 569979	Ridges crests, Ridge slopes, Alluvial Flats	1519000	25%	50%	12.5%

Average visibility across the assessment area would have been approximately 25%. Foot coverage across the subject area was 100 %. Orange flags were used to mark potential cultural features for detailed recording (i.e. Aboriginal objects).

Field conditions were fine and all areas were accessible by four-wheel drive. The main method of survey assessment was foot transects. The survey team consisted of a single person walking slowly across the assessment area. Areas that contained evidence of ground surface exposure were investigated thoroughly. The original vegetation community can be described as open forest/woodland with narrow leaved iron bark and yellow box dominant and blakelys red gum and apple box found in the southern part of the assessment area. There are no outcrops of sandstone present within the assessment area. There are no obvious outcrops of flakeable stone within the assessment area; local quartz gravels are too small to be any use in stone tool manufacture.

8 Results & Discussion

No known Aboriginal sites or potential Aboriginal sites were identified within the area proposed for development as a result of this due diligence assessment. The proposed development area is located on a series of low ridges and narrow gullies. All the landforms have been subjected to significant ground disturbance as a result of furrow ploughing for pine plantations. Recent bushfires have also caused some mature native trees to be badly damaged (Plate 11: Appendix 2).

There are no obvious sources of stone raw materials to manufacture stone tools. There are no culturally significant Aboriginal landscape features located anywhere near the proposed development site.

In terms of predictive modelling as argued by Kuskie (2000) and Hamm (2006), the likely surface archaeological evidence is probably located on elevated creek terraces to the north and south-west of the proposed development area where 3rd or 4th order streams such as Two Mile Creek intersect with spring areas (i.e. Black Springs).

9 Recommendations

The following recommendations are made in light of the above archaeological due diligence survey assessment results based on the existing and proposed legal requirements of the *NSW National Parks and Wildlife Act (1974*), and the lack of archaeological evidence found within Lot 2 DP 569979 39 Razorback Road Runnning Stream.

It is recommended that:

- The assessment area is considered to have low Aboriginal heritage potential.
- The above conclusion is reached based on background archaeological/historical research, field assessment and land-use history.
- The assessment was undertaken using information provided to the consultant by Borg Manufacturing Pty Ltd in June 2020.
- Any new modifications to the proposed development's design may require additional due diligence assessment before the development may proceed.
- No further archaeological work is required as a result of this assessment.

Acknowledgements

The Consultant would like to thank the following people for their support and positive attitude in preparing this document: Mr Sam Coles, Mr Mark Daniels and Mr Jonathan Berry.

Bibliography

Attenbrow, V. 2004 What's Changing: Population size or Land-Use Patterns? The Archaeology of Upper Mangrove Creek, Sydney Basin. *Terra Australis* 21.

Attenbrow, V. 2003 Potential Archaeological Deposits In The Storage Areas Of The Mangrove Creek Dam In The NSW Central Coast, *Australian Association of Consulting Archaeologists Inc (AACAI) Newsletter* No. 94 December 2003

Attenbrow, V. 1981 *Mangrove Creek Dam Salvage Excavation Project*. 2 vols. Unpublished report to NSW National Parks and Wildlife Service on behalf of NSW Department of Public Works.

Attenbrow, V. 1982 The archaeology of Upper Mangrove Creek catchment: research in progress. In S. Bowdler (ed.), *Coastal Archaeology in Eastern Australia. Proceedings of the 1980 Valla Conference on Australian Prehistory*, pp. 67-78. Department of Prehistory, Research School of Pacific Studies, Australian National University, Canberra.

Backhouse, J. 1843 *A Narrative of a Visit to the Australian Colonies* Hamilton Adams & Co.: London.

Baker, N. 1992 New South Wales National Parks and Wildlife Service Hunter Valley Aboriginal Sites Assessment Project: Stone Artefact Assessment and Analysis – Recording Techniques and Methodology. Unpublished report to NSW NPWS.

Baker, N. 1996 Part 2, in Effenberger, S. & Baker, N. Archaeological Test Excavation and Significance Assessment: F3 Freeway, Black Hill NSW. Unpublished report to NSW Roads and Traffic Authority (Major Projects, Newcastle).

Baker, N. and Gorman, A. 1992 Volume 4, technological studies. In Brayshaw McDonald Pty Ltd, Narama Salvage Project, Lower Bayswater Creek, Hunter valley, NSW. Unpublished report to Envirosciences Pty Ltd for Narama Joint Venture.

Brayshaw, H. 1986b Aborigines of the Hunter Valley: A Study of Colonial Records. Scone & Upper Hunter Historical Society: Scone.

Byrne, D, Brayshaw, H & Ireland, I. 2001 Social significance a discussion paper. NSW National Parks and Wildlife Service Research Unit, Cultural Heritage Division.

Burton, C., Koettig, M. and Thorpe, W. 1990 Overview and Recommendations. Regional Study of Heritage Significance, Central Lowlands Hunter Valley Electricity Commission Holdings. Volume 1. Unpublished report to Electricity Commission of NSW.

Collins, D.1975 *An account of an English Colony in New South Wales* (2 vols) A.H. Reed and A.W. Reed, Sydney

Connell Wagner 1992a Ulan Coal Mines Limited. *Stage 3 Development and extension of Ulan Coal Mine. Environmental Impact Statement*. Prepared for Ulan Coal Mines Ltd.

Connell Wagner 1992b *Ulan Coal Mines Heritage Management Plan*. Prepared for Ulan Coal Mines Ltd.

Corkill, T.F.1991 *Survey for archaeological sites at Ulan Colliery, New South Wales*. Report to Connell Wagner Pty Ltd.

Cunningham, P. 1827 Two Years in New South Wales. London.

Davidson, G.F. 1846 Trade and Travel in the Far East. Madden & Malcolm: London.

Dawson, R. 1830 The Present State of Australia; A Description of the Country, its Advantages and Prospects, With Reference to Emigration: and a Particular Account of the Manners, Customs and Condition of its Aboriginal Inhabitants. Smith, Elder and Co.: London.

Dean-Jones, P.1992. Archaeological Investigations of Aboriginal Sites, Proposed North Western Open Cut Area. Unpublished report for Lemington Coal Mines Ltd.

Dean-Jones, P., & Mitchell, P.1993. Environmental Modelling for Archaeological Site Potential in the Central Lowlands of the Hunter Valley. Hunter Valley Aboriginal Sites Assessment Project. Report to unknown.

Department of Mines. (n.d.). Singleton 1:250,000 Geological Series Sheet SI 56-1.

Dyall, L.1977. Environmental Studies - Mt Arthur Project (Hunter Valley): Full Report on Aboriginal Relics (p. 15). Report to Electricity Commission of NSW.

Dyall, L.1980. Aboriginal Relics on the Drayton Coal Lease, Muswellbrook. Unpublished report. Dyall, L.1981. Aboriginal Relics on the Mt Arthur South Coal Lease. Unpublished report.

Edgar, J. 1997 *Survey for Aboriginal archaeological sites at Ulan Coal Mines Ltd., NSW: Proposed Longwalls 13–17 and service corridor*. Report to Ulan Coal Mines Ltd.

Effenberger, S. 1995 Archaeological Monitoring National Highway Interim Connections: Construction between Stockrington Road and Beresfield, Cessnock LGA, NSW. Unpublished report to RTA Major Projects (Northern Region).

Effenberger, S. 1996 Parts 1 and 3, in Effenberger, S. and Baker, N. Archaeological Test Excavation and Significance Assessment: F3 Freeway, Black Hill NSW. Unpublished report to NSW Roads and Traffic Authority (Major Projects, Newcastle).

Effenberger, S. and Baker, N. 1996 Archaeological Test Excavation and Significance Assessment: F3 Freeway, Black Hill NSW. Unpublished report to NSW Roads and Traffic Authority (Major Projects, Newcastle).

Fanning, P. C., & Holdaway, S. J. (2004). Artifact Visibility at Open Sites in Western New South Wales, Australia. Journal of Field Archaeology, 29,255-271.

Fanning, P. C., Holdaway, S. J., Rhodes, E. J., & Bryant, T. G. (2009). The Surface Archaeological Record in Arid Australia: Geomorphic Controls on Preservation, Exposure, andVisibility. Geoarchaeology, 24(2), 121-146.

Fawcett, J.. 1898a. Notes on the Customs and Dialect of the Wonnah-ruah Tribe. Science of Man, /(8), 180-181.

Fawcett, J.. 1898b. Notes on the Customs and dialect of the Wonnah-Ruah Tribe. Science of Man, 1(7), 152- 154.

Flenniken, J.J. and White, J.P. 1983 Heat treatment of siliceous rocks and its implications for Australian prehistory. Australian Aboriginal Studies 1:43-48.

Foley, R. 1981 A model of regional archaeological structure. *Proceedings of the Prehistoric Society*. 47: 1-17.

Gibb, J. 1992 Ulan Coal Mines Ltd. *Subsidence report: Longwalls 1, 2 and 3* in Connell Wagner 1992a.

Gunson, N. (ed) 1974 Australian Reminiscences and Papers of L.E. Threlkeld: Missionary to the Aborigines 1824-1859. Volumes 1 and 2. Australian Aboriginal Studies No. 40. AIAS: Canberra.

Haglund, L. 1989. Technological Change: a comparison of developments in the Goulburn and Hunter River Valleys. Report to AIAS Canberra, ACT.

Haglund, L.1992. Archaeological Investigations at Doctors Creek, Warkworth, NSW: Salvage Excavation and Surface Collection in Compliance with NPWS Salvage Requirements. Unpublished report for Warkworth Mining Ltd.

Haglund, L. 1980 *Ulan Coal Mine: Archaeological investigations in connection with proposed changes in development plans*.Report to Longworth and McKenzie Pty Ltd.

Haglund, L. 1981a *Archaeological survey and sampling at the site of the Ulan Coal Mine, Ulan, NSW*. Report to Longworth and McKenzie Pty Ltd.

Haglund, L. 1981b *Ulan Coal Mine: Archaeological investigations in connection with proposed changes in development plans*. Report to Kinhill Pty Ltd.

Haglund, L. 1981c *Archaeological investigations in the area of the proposed Kerrabee Dam*. Report to the Water Resources Commission.

Haglund, L. 1992 *Sample surveys in relation to proposed mine extension in the Ulan area, NSW: Aboriginal archaeological sites*. Report to Connell Wagner Pty Ltd.

Haglund, L. 1996 *Salvage excavation completed for Ulan Coal Mines Ltd: NPWS site 36-3-177, Ulan Heritage Identifier 116*. Report to Ulan Coal Mines Ltd.

Hamm, G.2006 *Moolarben Coal Project Aboriginal Cultural Heritage Assessment Stage 1 Report*. A report to Moolarben Coal Mines Pty Ltd.

Hamm, G. 2008 *Moolarben Coal Project Aboriginal Cultural Heritage Assessment Stage 2 Report*. A report to Moolarben Coal Mines Pty Ltd.

Hiscock, P. 1984 An Analysis of the Prehistoric Stone Working Technology Represented at Sites 5, 12 and 13 at Redbank Creek, United Collieries Coal Lease, Hunter Valley, NSW. Unpublished report to Anutech Pty Ltd for United Collieries Pty Ltd.

Hiscock, P. 1986a Technological change in the Hunter River Valley and the interpretation of Late Holocene change in Australia. Archaeology in Oceania. 21:40-50.

Hiscock, P. 1986b NSW National Parks and Wildlife Service Hunter Valley Region Archaeology Project Stage 1: A Technological Analysis of Stone Artefact Assemblages from *the Hunter* River Valley Region. Volume 4. Unpublished report by Anutech Pty Ltd to NSW NPWS.

Hiscock, P. 1993 Bondaian technology in the Hunter Valley, New South Wales. Archaeology in Oceania 28:65-76.

Hiscock, P. and Attenbrow, V. 1998 Early Holocene Backed Artefacts from Australia. Archaeology in Oceania 28:65-76.

Hiscock, P. and Koettig, M. 1985 Archaeological Investigations at Plashett Dam, Mount Arthur North, and Mount Arthur South in the Hunter Valley, New South Wales. Vol. 3. Unpublished report by Anutech Pty Ltd to Electricity Commission of NSW and Mount Arthur South Coal Pty Ltd.

Hiscock, P. 2000 'Sizing up prehistory. Sample size and the composition of artefact assemblages.' Australian Aboriginal Studies 1: 48–62.

Hiscock, P.2008 The Archaeology of Ancient Australia. Rutledge.

Horton, D. 1994 Encyclopaedia of Aboriginal Australia. Aboriginal Studies Press, Canberra.

Hughes, P.1984. Hunter Valley Region Archaeology Project Stage 1, Volume 1: An overview of the archaeology of the Hunter Valley, its environmental setting and the impact of development. Report to National Parks and Wildlife Service.

Hughes, P., Hiscock, P., & Watchman, A. 2011. Terminological Debate in the Upper Hunter Valley: Indurated Mudstone versus Tuff. Australian Archaeology, 72.

Kamminga, J. 1980 A functional investigation of Australian microliths. The Artefact 5 (1): 1-18.

Koettig, M. 1987 Monitoring Excavations at Three Locations along the Singleton to Glennies Creek Pipeline Route, Hunter Valley, NSW. Unpublished report to Public Works Department, NSW.

Koettig, M. 1989 Test Excavations at Portion 147 Pokolbin, Near Cessnock. Unpublished report to the McInnes Group.

Koettig, M.1990. Regional Study of Heritage Significance. Central Lowlands: Hunter Valley. Electricity Commission Holdings. Vol. 1. Assessment of Aboriginal Sites. Unpublished report for Electricity Commission of NSW.

Koettig, M. 1992 Salvage Excavations of Aboriginal Sites on the Camberwell Lease. Volumes 1-3. Unpublished report to Camberwell Coal Pty Ltd.

Koettig, M. 1994 Bulga Lease Authorisation 219 Salvage Excavations. Volumes 1-5. Unpublished report to Saxonvale Coal Pty Ltd.

Kooyman, B. 2000 *Understanding Stone tools and Archaeological Sites*. University of Calgary Press, University of New Mexico Press.

Kovac, Murphy and Lawrie 1990. Soil Landscapes of the Bathrust 1:250 000 Sheet. Sydney: Soil Conservation Service ofNSW.

Kuskie, P.J. 2000 An Aboriginal Archaeological Assessment of the Proposed Mount Arthur North Coal Mine, near Muswellbrook, Hunter Valley, New South Wales. Report to URS (Australia) Pty Limited.

Kuskie, P. J., & Clarke, E.2004. Salvage of Aboriginal Heritage Sites in the Mount Arthur North Coal Mine Lease: Volume A. Report to BHP Billiton-Hunter Valley Energy Coal.

Kuskie, P and Clarke, E. 2006 Sub-Surface Archaeological Investigation of Part Lot 12 DP 603613, Raymond Terrace Road, Thornton North, Lower Hunter Valley, New South Wales, In Relation to a Proposed Residential Development .Unpublished report to Beechwood Homes.

Kuskie, P. & Clarke, E.2005 *Proposed Open Cut Mine Extension and Additional Infrastructure at Ulan Coal Mine, New South Wales: Aboriginal Heritage Assessment.* Unpublished Report to Ulan Coal Mines Pty Ltd.

Kuskie, P. & Clarke, E.2007 *Aboriginal Heritage Assessment: SMP Application Area (Longwall Panels W2-W3) of Mining Lease 1468, Ulan Coal Mine, Central Tablelands, New South Wales*. A report to Ulan Coal Mines Ltd.

Kuskie, P.J. and Kamminga, J. 2000 Salvage of Aboriginal Archaeological Sites in Relation to the F3 Freeway near Lenaghans Drive, Black Hill, New South Wales. Volumes 1-3. Unpublished report to NSW Roads and Traffic Authority (Major Projects, Newcastle).

Kuskie, P. & Webster, V.2001 *Archaeological Survey of Aboriginal Heritage Within Longwall Panels 18-22, Mining Leases 1468 and 1341, Ulan Coal Mine, Central Tablelands, New South Wales*. Volumes 1 & 2. Unpublished report to Ulan Coal Mines Limited.

McCarthy, F. 1948 The Lapstone Creek Excavation. *Rec. Aust. Mus.,* 22, 1-34. ---42

McCarthy, F. 1964 The archaeology of the Capertee Valley, New South Wales. *Records of the Australian Museum* Vol. 26 (6):197-246.

McDonald, J. 1994. *Dreamtime Superhighway: An Analysis of Sydney Basin Rock Art and Prehistoric Information Exchange*. Unpublished PhD thesis, Australian National University, Canberra.

McDonald, R.C., Isbell, R.F., Speight, J.G., Walker, J. and Hopkins, M.S. 1984 Australian Soil and Land Survey Field Handbook. Inkata Press: Melbourne.

McDonald, K., & Davidson, I.1998. Bayswater Archaeological Research Project - Volume One. School of Human and Environmental Studies, University of New England.

McKiernan, B. (1911). Some Notes on the Aborigines of the Lower Hunter River. Anthropos, 6, 885-892.

McNiven, I. 2000 Backed to the Pleistocene. Archaeology in Oceania. 35 (1):48-52.

Miller, R. 1887. The Hunter River. The Wonnarua Tribe and Language. In E. M. Curr (Ed.), The Australian Race (pp. 352-357). Melbourne: Government Printer.

Mills, R.2000. An Archaeological Survey for a Feasibility Study for Saddlers Creek Mine, near Muswellbrook. Unpublished report for Shell Coal.

Moore, D. 1970 Results of an archaeological survey of the Hunter River Valley, New South Wales, Australia. *Records of the Australian Museum* Vol. 28 (2):25-64.

Moore, D.1981 Results of an Archaeological Survey of the Hunter River Valley, NSW, Australia. Part 2: Problems of the lower Hunter and contacts with the Hawkesbury Valley. *Records of the Australian Museum*, Vol. 33, No. 9, pp. 388-442Mulvaney, D.J. and Kamminga, J. 1999 Prehistory of Australia. Allen and Unwin: Sydney.

Needham, W. 1981 A Study of the Aboriginal Sites in the Cessnock – Wollombi Region of the Hunter Valley, N.S.W. Bill Needham: Adamstown.

NSW Heritage Office 1996 Regional Histories of New South Wales. NSW Government Printer.

NSW Office of Environment & Heritage 2010 – Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW.

NSW Office of Environment & Heritage 2010 – Aboriginal Cultural Heritage Community Consultation Requirements for Proponents.

NSW Office of Environment & Heritage 2010 – Code of Practice for Archaeological Investigation in NSW.

Odell, G. 1994 Assessing hunter-gatherer mobility in the Illinois valley: Exploring ambiguous results. In The Organization of North American Prehistoric Chipped Stone Tool Technologies, Archaeology Series No7, ed. Phillip J Carr Ann Arbour: International Monographs in Prehistory.

Odell, G. 1996 'Economizing behaviour and the concept of curation.' In Stone Tools: Theoretical Insights into Human Prehistory, ed. George Odell.

Officer, K. & Navin, K.2005 Wilpinjong: Aboriginal Heritage Assessment. A report prepared for Wilpinjong Coal Pty Ltd.

Orton, C. 2000 Sampling in Archaeology, Cambridge Manuals in Archaeology.

OzArk Environmental & Heritage Pty Ltd. 2013. Aboriginial Archaeological Values Assessment Bulga Optimisation Project.

Pearson, M. 1981 *Seen through different eyes: changing land use land settlement patterns in the upper Macquarie River region of NSW from prehistoric times to 1860*. PhD thesis, Sydney University.

Pearson, M., & Sullivan, S.1995. Looking After Heritage Places: The Basics of Heritage Planning for Managers, Landowners and Administrators. Carlton: Melbourne University Press.Pritchard, L. and Lough, J.C. 1980 Archaeological Report on the Proposed Route of the Maitland City By-Pass. Unpublished report to Bergensteiner, McInnes and Rigby Pty Ltd.

Tindale, N.B. 1974 Aboriginal Tribes of Australia. ANU: Canberra.

Vinnicombe, P.1980 *Predilection and Prediction: a study of Aboriginal sites in the Gosford-Wyong region*. A report to NPWS.

Vinnicombe, P.1984 Single sites or site complexes? A case study from north of theHawkesbury, New South Wales. In S. Sullivan and S. Bowdler eds, *Site Surveys and Significance Assessment in Australian Archaeology*, pp. 107-18. Department of Prehistory, Research School of Pacific Studies, Australian National University, Canberra.

Vita-Finzi C. 1978 *Archaeological Sites in their settings*. Thames and Hudson.

Walker, P.L. 1978 Butchering and stone tool function. *American Antiquity* 43: 710-715.

Witter, D. 1992 *Region and Resources*. Unpublished PhD thesis, ANU.

Witter, D. 1995 *A classification of Australian Stone Artefact and Principles of Taxonomy*. Draft research report. Unpublished report notes.

APPENDIX 1
Figures

List of Figures

APPENDIX 2
Plates

Plate 1: Looking north-east across the proposed development area. Pine plantations are located to the east

Plate 2: Looking north across heavily ploughed development area.

Plate 3: Access track into proposed development area (hillock landform) showing some ground visibility.

Plate 4: Gully landform showing areas of ephemeral soakage potential.

Plate 5. Northern part of the assessment area showing power-line easement and historic pine vegetation.

Plate 6. Showing areas of sheet erosion providing ground surface exposure near soakage.

Plate 7. Burnt European stockpile evidence showing burnt local sandstone fragments.

Plate 8.Quartz pebble exposed within gravel layer. Poor quality material.

Plate 9: South –west sample area showing native vegetation, vehicle track and Two Mile Creek catchment.

Plate 10: Local dam within Two Mile Creek catchment south-west of assessment area.

Plate 11: Mature native vegetation recently burnt by bush fires surrounded by plough zone.

Plate 12: Gully landforms showing potential soakage areas.

APPENDIX 3
AHIMS Site Searches

Office of Environment & Heritage
NSW GOVERNMENT

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : Jerrys Plain Weir
Client Service ID : 496907

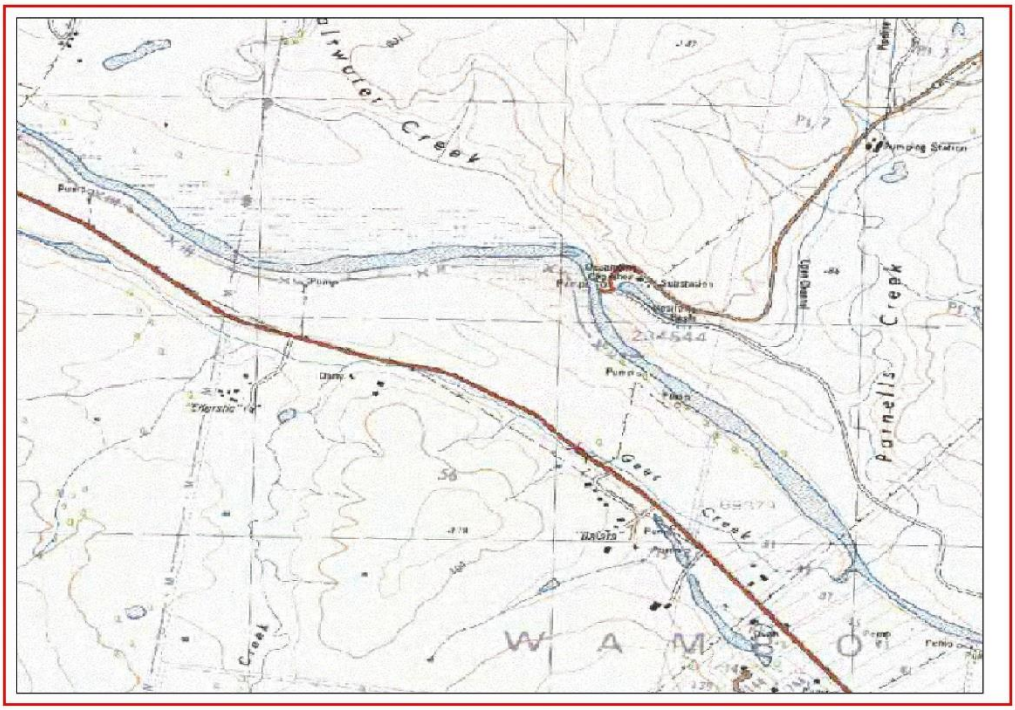
Archaeological Risk Assessment Services (ARAS)
Po Box 67
Katoomba New South Wales 2780
Attention: Giles Hamm
Email: arasgileshamm@gmail.com

Date: 09 April 2020

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -32.4848, 150.8756 - Lat, Long To : -32.4639, 150.9086 with a Buffer of 50 meters. Additional Info : Due Diligence Assessment, conducted by Giles Hamm on 09 April 2020.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

16	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AIIIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AIIIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AIIIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AIIIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AIIIMS.
- This search can form part of your due diligence and remains valid for 12 months.

3 Marist Place, Parramatta NSW 2150
Locked Bag 5020 Parramatta NSW 2220
Tel: (02) 9585 6380 Fax: (02) 9873 8599

ABN 30 841 387 271
Email: ahims@environment.nsw.gov.au
Web: www.environment.nsw.gov.au

Office of Environment & Heritage
NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Jerrys Plain Weir
Client Service ID : 496907

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-0135	Jerry's Plains;	AGD	56	302100	6405200	Open site	Valid	Burial : -	Burial/s	313
	Contact	Recorders	Len Dyall,W.H Reynolds					Permits		
37-2-2736	Maggen Pump Station	GDA	56	302579	6405370	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	Mr.Rick Bullers					Permits		
37-2-5691	HVO-2020	GDA	56	303443	6404495	Open site	Valid	Artefact : -		
	Contact	Recorders	Yancoal Australia Ltd,Miss.Jessica Blackman					Permits		
37-2-5692	HVO-2021	GDA	56	303389	6404456	Open site	Valid	Artefact : -		
	Contact	Recorders	Yancoal Australia Ltd,Miss.Jessica Blackman					Permits		
37-2-5693	HVO-2022	GDA	56	303390	6404458	Open site	Valid	Artefact : -		
	Contact	Recorders	Yancoal Australia Ltd,Miss.Jessica Blackman					Permits		
37-2-5694	HVO-2023	GDA	56	303411	6404507	Open site	Valid	Artefact : -		
	Contact	Recorders	Yancoal Australia Ltd,Miss.Jessica Blackman					Permits		
37-2-5695	HVO-2024	GDA	56	303350	6404464	Open site	Valid	Artefact : -		
	Contact	Recorders	Yancoal Australia Ltd,Miss.Jessica Blackman					Permits		
37-2-5696	HVO-2025	GDA	56	303331	6404479	Open site	Valid	Artefact : -		
	Contact	Recorders	Yancoal Australia Ltd,Miss.Jessica Blackman					Permits		
37-2-5704	HVO-2028	GDA	56	303399	6404553	Open site	Valid	Artefact : -		
	Contact	Recorders	Yancoal Australia Ltd,Miss.Jessica Blackman					Permits		
37-2-5705	HVO-2027	GDA	56	303399	6404584	Open site	Valid	Artefact : -		
	Contact	Recorders	Yancoal Australia Ltd,Miss.Jessica Blackman					Permits		
37-2-5706	HVO-2026	GDA	56	303365	6404575	Open site	Valid	Artefact : -		
	Contact	Recorders	Yancoal Australia Ltd,Miss.Jessica Blackman					Permits		
37-2-5722	HVO-2011	GDA	56	303316	6404455	Open site	Valid	Artefact : -		
	Contact	Recorders	Yancoal Australia Ltd,Miss.Jessica Blackman					Permits		
37-2-5723	HVO-2012	GDA	56	303489	6404393	Open site	Valid	Artefact : -		
	Contact	Recorders	Yancoal Australia Ltd,Miss.Jessica Blackman					Permits		
37-2-5724	HVO-2013	GDA	56	303500	6404357	Open site	Valid	Artefact : -		
	Contact	Recorders	Yancoal Australia Ltd,Miss.Jessica Blackman					Permits		
37-2-5725	HVO-2014	GDA	56	303507	6404366	Open site	Valid	Artefact : -		
	Contact	Recorders	Yancoal Australia Ltd,Miss.Jessica Blackman					Permits		
37-2-5726	HVO-2015	GDA	56	303513	6404363	Open site	Valid	Artefact : -		
	Contact	Recorders	Yancoal Australia Ltd,Miss.Jessica Blackman					Permits		

Report generated by AHIMS Web Service on 09/04/2020 for Giles Hamm for the following area at Lat, Long From : -32.4848, 150.8756 - Lat, Long To : -32.4639, 150.9086 with a Buffer of 50 meters. Additional Info : Due Diligence Assessment. Number of Aboriginal sites and Aboriginal objects found is 16

This information is not guaranteed to be free from error omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

Page 1 of 1

APPENDIX 4
SEARS REQUIREMENTS

APPENDIX 5
Glossary of Terms

Aboriginal heritage impact permits	A permit issued by the Director-General of DECC allowing a person to harm Aboriginal objects (i.e. to destroy, deface, damage or desecrate objects or to move objects)
Aboriginal object	A statutory term defined under the National Parks and Wildlife Act 1974 meaning, 'any deposit, object or material evidence (not being handicraft made for sale) relating to Aboriginal habitation of the area comprising NSW, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes human remains
Aboriginal place (as defined in the NPW Act)	A place declared under s.84 of the NPW Act that, in the opinion of the Minister, is or was of special significance to Aboriginal culture.
Activity	A project, development, activity or work (this term is used in its ordinary meaning, and does not just refer to an activity as defined by Part 5 EP&A Act).
Additional surface disturbance	Clear, observable disturbance of existing ground surface or obvious changes to existing ground surface – e.g. removal of vegetation; construction of new fire trail, construction of new dam or contour banks, ploughing a previously grazed paddock.
Analysis	Evaluation of archaeological data to determine the archaeological significance of sites recorded within an impact area.
Analytical recording	A process of site recording which obtains detailed archaeological data useful in archaeological analysis.
Archaeological comparability	The evaluation of whether archaeological sites are uniformly different or similar across an impact area.
Archaeological data	Archaeological information that is recorded as a result of an archaeological investigation.
Archaeological deposit	A layer of soil material containing archaeological remains.
Archaeological investigation	The process of assessing the archaeological potential of an impact area by a qualified archaeologist.
Archaeological survey	A method of data collection for Aboriginal heritage assessment. It involves a survey team walking over the land in a systematic way, recording information about how and where the survey is conducted, recording information about the landscape and recording any archaeological sites or materials that are visible on the land surface. The activities undertaken by a survey team do

	not involve invasive or destructive procedures, and are limited to note taking, photography and making other records of the landscape and archaeological sites (e.g. sketching maps or archaeological features).
Artefact scatter	A collection of artefacts usually lying as a lag deposit on an eroding surface.
Artefact	• Any object made by human agency (e.g. stone artefacts). • For the purposes of this Code, 'artefact' has the same meaning as object, (excluding the extension of the term to 'deposits') as defined in the NPW Act.
Assemblage	• A group of stone artefacts found in close association with one another; and • Any group of items designated for analysis - without any assumptions of chronological or spatial relatedness (Witter 1995).
Avoidance	A management strategy which protects Aboriginal Sites within an impact area by avoiding them totally in development.
Broken flake	A flake which is either a distal fragment, medial fragment or proximal fragment.
Campsite	A site which contains a variety of artefactual data not specific to one type of stone tool reduction sequence.
Code of practice	A set of guidelines to be followed by members of a particular occupation or organisation; does not normally have the force of law.
Complete flake	A flake which is whole and not broken.
Conflict site	A site where confrontation occurred between Aboriginal and non-Aboriginal people or between different Aboriginal groups.
Contact site	A site relating to the period of first contact between Aboriginal and non-Aboriginal people.
Core	A lump or nodule of stone from which flakes have been removed
Culturally modified tree	A tree that has been scarred, carved or modified by an Aboriginal person by: • the deliberate removal, by traditional methods, of bark or wood from the tree; or • the deliberate modification, by traditional methods, of the wood of the tree.

Debitage	Unmodified flakes or fragments of stone material removed as a result of stone tool manufacture or modification
Declared Aboriginal place	A statutory concept, meaning any place declared to be an Aboriginal place (under s.84 of the NPW Act) by the Minister administering the NPW Act, by order published in the Gazette, because the Minister is of the opinion that the place is or was of special significance with respect to Aboriginal culture. It may or may not contain Aboriginal objects.
Disturbed land	For the purposes of this clause, land is disturbed if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable. Note 1. Examples of activities that may have disturbed land include the following: • soil ploughing; • construction of rural infrastructure (such as dams and fences); • construction of roads, trails and tracks (including fire trails and tracks and walking tracks); • clearing of vegetation; • construction of buildings and the erection of other structures; • construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, storm water drainage and other similar infrastructure); • substantial grazing involving the construction of rural infrastructure; and • construction of earthworks associated with anything referred to in paragraphs (a)–(g). The Low Impact Activities prescribed by the NPW Regulation do not apply in relation to any harm to an Aboriginal culturally modified (scarred) tree.
Due diligence	The degree of care and caution required before making a decision.

Exposed in section	• The vertical exposure of a soil that reveals the stratigraphy or the profile of the soil and any objects it may contain. Sections may: • be revealed during archaeological excavations (formed by the walls of the excavation); • occur naturally in creek and river banks, land slips, wind-eroded dune faces or other such naturally formed vertical profiles; or • be formed artificially, for example in road and railway cuttings.
Exposure	Is different to visibility because it estimates the area with a likelihood of revealing buried artefacts or deposits rather than just being an observation of the amount of bare ground. It is the percentage of land for which erosion and exposure was sufficient to reveal archaeological evidence on the surface of the ground. Put another way, exposure refers to 'what reveals' (see also Burke and Smith 2004: 78–80, NPWS 1999).
Exposure type	Refers to the results of erosional processes: sheet wash, gullying, blowouts, salt scalds, tracks or animal pads. As well as erosional processes, ground exposure may be caused by earth-moving machinery (e.g. bulldozers and graders, vehicle traffic etc.).
Flake	A piece of stone detached from a core, displaying a bulb of percussion and striking platform
Flaked piece	A fragment of stone where negative flake scarring is visible but no obvious striking platforms are present
Full coverage survey	A survey conducted on foot in which all surfaces within the subject area are systematically observed and recorded.
Hand tools	Include spades, trowels, shovels, pans and brushes.
Harm an Aboriginal object as defined in the NPW Act 1974 and Wildlife Act 1974)	• Destroy, deface, damage or desecrate an object; • Move an object from the land on which it is situated; or • Cause or permit an object to be harmed.
Hearth	The site of a campfire represented by charcoal, burnt earth, ash and sometimes stones used as heat retainers.
Impact area	An area that requires archaeological investigation and management assessment.
In situ	Latin words meaning 'on the spot, undisturbed'.

Isolated find	A single artefact found in an isolated context.
Knapping floor	A location on a site which normally represents a stone artefact reduction episode.
Landforms	Are the units (or similar) of land description explained and defined as 'landform elements' in The National Committee on Soil and Terrain (eds) Australian Soil and Land Survey Field Handbook. Landforms have a characteristic dimension of about 40 m. There are 70 landform elements defined in the Australian Soil and Land Survey Field Handbook (Speight 1990: 16; 17–44). Landforms are the primary subdivisions for the survey stratification.
Land system	An area, or group of areas, commonly delineated on a map, throughout which there is a recurring pattern of topography, soils, and vegetation.
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.
Landscape	That part of the land's surface, more or less extensive being viewed or under study, that relates to all aspects of its physical appearance, including various vegetation associations and landforms.
Management plans	Conservation plans which identify short and long term management strategies for all known sites recorded within an impact area.
Material traces	Of past Aboriginal land use has the same meaning as 'Aboriginal object' in the NPW Act. See 'Aboriginal object'.
Methodology	The procedures used to undertake an archaeological investigation.
Minimum requirements	The minimum standard for which OEH will accept the reporting of an archaeological investigation.
Mitigation	To address the problem of conflict between land use and site conservation.
Objects	Has the same meaning as 'Aboriginal object' in the NPW Act. See 'Aboriginal object'.

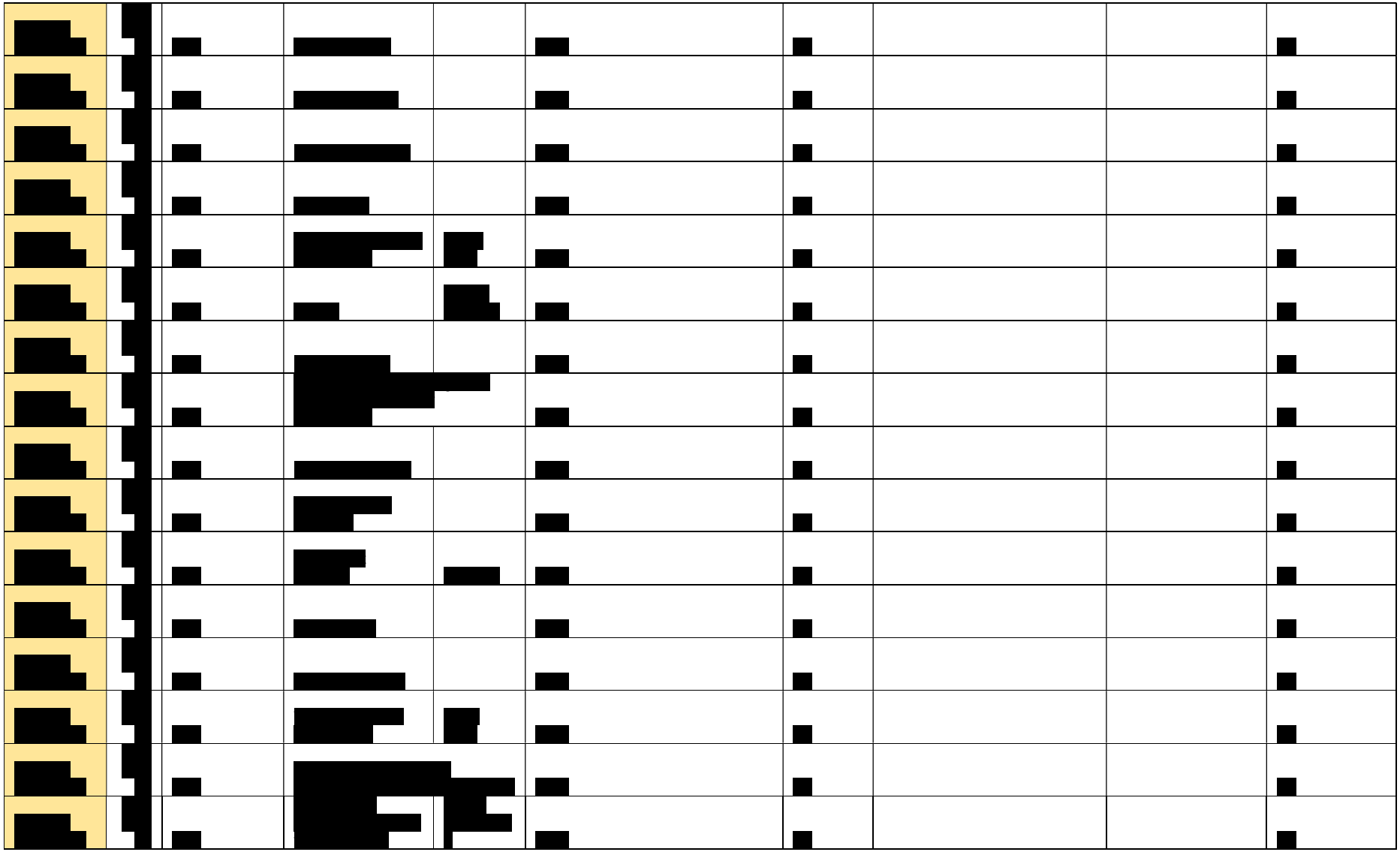
Open area excavation	A method of excavation where large areas of an archaeological site are open at any one time. A horizontal representation of Aboriginal occupation of different archaeological features is considered to be more important than vertical stratigraphic relationships.
Open site	An archaeological site situated within an open space (e.g. archaeological material located on a creek bank, in a forest, on a hill etc.).
Potential archaeological deposit (PAD)	Is an area where sub-surface stone artefacts and/or other cultural materials are likely to occur (DEC 2005: 67)?
Research design	A research strategy for carrying out an intensive archaeological investigation and analysis.
Rock shelters	Are vertical or overhanging rock formations, including any flat or not steeply inclined ground surface below the overhang or at the base of the vertical face, which contain, or may be reasonably expected to contain, material traces of past Aboriginal land use (objects).
Salvage	A method by which an archaeological site or group of sites may be fully investigated before they are totally destroyed by a development.
Sample unit	An area of investigation which is uniform size or density and which can be quantified for analytical reasons.
Sampling	The process of selecting part of an area under archaeological investigation as a basis for generalising about the whole.
Site recording	The systematic process of collecting archaeological data for an archaeological investigation.
Site	A place where past human activity is identifiable
Sites	Is sometimes used as another name for Aboriginal objects and material traces of past Aboriginal land use. The term is commonly used in archaeological assessments and discourse.
Spatial significance	A site which may contain potential sub-surface deposits or in situ material useful in the analysis of human use of land and site formation process.

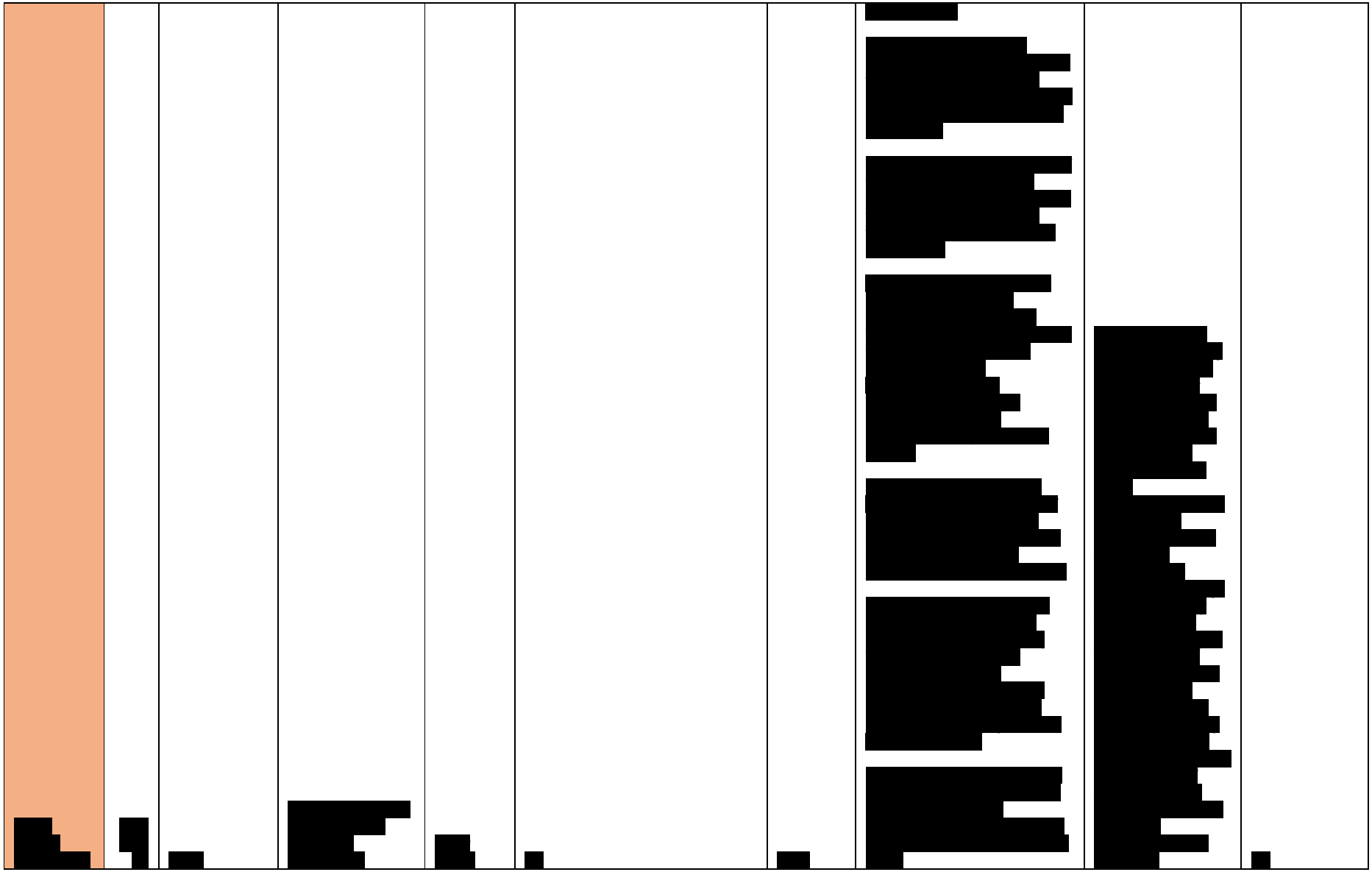
Subject area	Refers to the area that is the subject of archaeological investigation. Ordinarily this would include the area that is being considered for development approval, inclusive of the proposed development footprint and all associated land parcels. To avoid doubt, the subject area should be determined and presented on a project-by-project basis.
Summary recording	A process of site recording where archaeological data is collected on a summary level only.
Survey coverage	A graphic and statistical representation of how much of an impact area was actually surveyed and therefore assessed.
Survey units	Are strictly defined by OEH to include only units of land that have been surveyed on foot. A survey unit may include more than one landform unit, correspond to a landform unit or be smaller than a landform unit depending on how the sampling strategy is structured. The survey unit is the minimum analytical or descriptive unit for the survey, and may be the same as the landform. A single survey unit should not cross the boundaries of different landforms, but there may be more than one survey unit within a landform. Sometimes survey units are also referred to as 'sampling units'.
Technological significance	Artefactual material which may contain types or items, although not unique, may be included in a sample to demonstrate an aspect of stone artefact variability.
Test excavation	A process of exploratory excavation carried out on a small scale and used to determine site extent, site condition and excavation potential.
Trivial or negligible acts	• Actions which have minimal impact on the environment; • Examples of what may be "trivial or negligible acts" given in the OEH Code are "picking up and replacing a small stone artefact, breaking a small Aboriginal object when you are gardening or crushing a small Aboriginal object when you walk on a track, picnicking, camping or other similar recreational activities".
Types of sites or types of features	Refers to the particular characteristics of material traces of past Aboriginal land use. For example, a rock shelter site is a type of site distinct from a scared tree. In addition, a rock

	shelter site (and indeed many sites) may contain multiple archaeological or cultural features: rock art, stone artefacts, and archaeological deposits.
Vehicle traverses	Activities involving the archaeological observation of a subject area from a vehicle.
Visibility	The amount of bare ground (or visibility) on the exposures which might reveal artefacts or other archaeological materials. It is important to note that visibility, on its own, is not a reliable indicator of the detectability of buried archaeological material. Things like vegetation, plant or leaf litter, loose sand, stony ground or introduced materials will affect the visibility. Put another way, visibility refers to 'what conceals' (see also Burke and Smith 2004: 78–80, NPWS 1999).

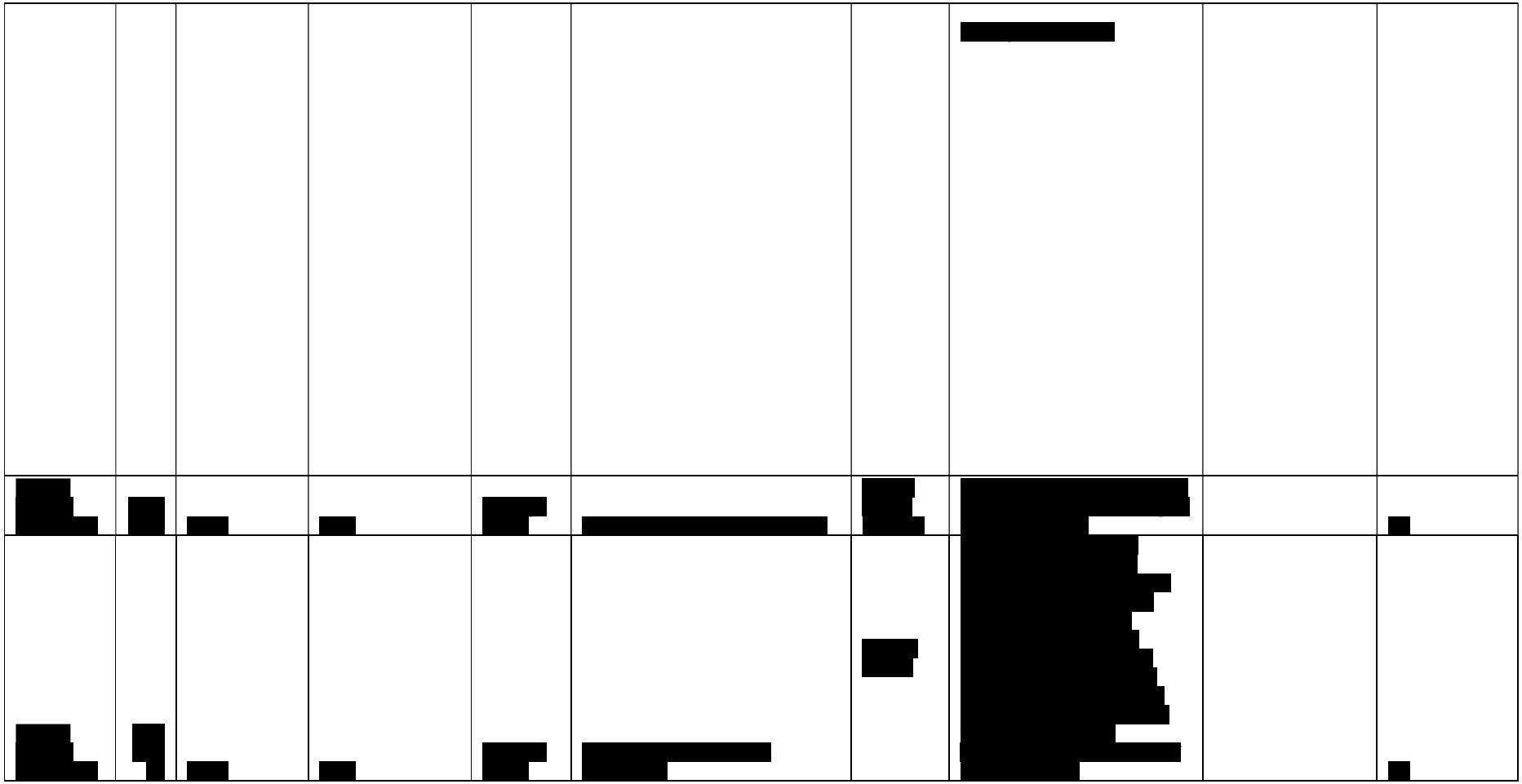
Appendix D Consultation Log (redacted)

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]	[redacted]		[redacted]
[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]	[redacted]		[redacted]
[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]	[redacted]		[redacted]





							[redacted]		



Appendix E Consultation Documents (redacted)