

WAMBO COAL PTY LIMITED



WAMBO COAL MINE LONGWALL 24 TO 26 MODIFICATION

MODIFICATION REPORT

For the Modification of DA 305-7-2003 (MOD 19)
Optimisation and Continued Operation
of the Approved South Bates Extension Underground Mine

APPENDIX D

Aboriginal Cultural Heritage Assessment

**WAMBO COAL MINE,
HUNTER VALLEY, NEW SOUTH WALES:
SOUTH BATES EXTENSION UNDERGROUND MINE
LONGWALLS 24-26 MODIFICATION -
ABORIGINAL CULTURAL HERITAGE ASSESSMENT**



A report to

Wambo Coal Pty Limited

100 Melbourne Street
SOUTH BRISBANE QLD 4101

by

Peter Kuskie

SOUTH EAST ARCHAEOLOGY Pty Limited

ACN 091 653 048

24 Bamford Street
HUGHES ACT 2605

May 2022

EXECUTIVE SUMMARY

Wambo Coal Pty Limited (WCPL), a subsidiary of Peabody Energy Australia Pty Limited, owns and operates the Wambo Coal Mine ("Wambo"), an underground coal mining operation located approximately 15 kilometres west of Singleton in the Hunter Valley of New South Wales.

Development Consent DA 305-7-2003 for the Wambo Coal Mine was granted in 2004 and has since been modified on a number of occasions. Both open cut and underground mining operations have been approved and operated on site under DA 305-7-2003 until December 2020, with earlier operations having commenced in 1969. From December 2020 Wambo transitioned into Phase 2 operations which includes underground mining and coal handling and processing of coal from both underground operations and the adjacent United Wambo Open Cut Coal Mine.

WCPL is investigating an opportunity for the continuation and improved efficiency of the approved South Bates Extension Underground Mine, including the reorientation of existing longwall panels and mining of one additional longwall panel in the Whybrow Seam. If WCPL elects to proceed, a Modification to Development Consent (DA 305-7-2003) for the Wambo Coal Mine would be sought under Section 4.55(2) of the NSW *Environmental Planning & Assessment Act 1979* (EP&A Act), referred to herein as the Longwalls 24-26 Modification (LW24-26 Modification).

The proposed Modification involves reorientation of the approved Longwalls 24 and 25, and the addition of Longwall 26. The longwalls would use the existing approved infrastructure at the South Bates Extension Underground Mine.

South East Archaeology Pty Ltd has been engaged by WCPL to prepare an Aboriginal Cultural Heritage Assessment for the proposed Modification. As subsidence associated with Longwalls 24-26 will extend into a new area outside of the current Aboriginal Heritage Impact Permit (AHIP) areas, WCPL may apply for a new AHIP subsequent to completion of the assessment.

The investigation area for the assessment measures approximately 238 hectares in area. It includes the area in which conventional subsidence impacts may occur, along with some buffer land. Subsidence impacts have already been approved within approximately 35% of this area (the southern portion) in association with the approval of the South Bates Extension Underground Mine Modification. This area (the southern portion) has previously been surveyed to current heritage standards for the South Bates Extension Modification assessment, following an identical methodology to the current project, with AHIP #C0003213 subsequently issued. Consequently, additional survey coverage was not proposed for this area, however the potential impacts of the Modification would be considered within this assessment.

The current heritage survey has focused on the 154 hectares (the central and northern portions of the overall Modification area) that had not previously been subject to heritage survey coverage to current standards (referred to herein as the *heritage study area*).

The principal aims of this assessment were to identify and record any Aboriginal heritage evidence or cultural values within the investigation area, assess the potential impacts of the Modification on this evidence, assess the significance of this evidence, and formulate recommendations for the conservation and management of this evidence, in consultation with the local Aboriginal community.

The investigation proceeded by recourse to the archaeological, cultural and environmental background of the locality, followed by consultation with the Aboriginal community and a field survey undertaken with the assistance of representatives of the Registered Aboriginal Parties (RAPs), in accordance with relevant Department of Planning and Environment and Heritage NSW guidelines. Primarily this involved reference to the Heritage NSW *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010, Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* and *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*.

A comprehensive program of consultation has been undertaken with the Aboriginal community consistent with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy. A total of 70 RAPs were identified for the Modification.

A field survey of the *heritage study area* was undertaken over seven days in February 2022 by qualified archaeologists from South East Archaeology accompanied on every day by representatives of the RAPs.

Systematic archaeological survey coverage was obtained across the geographic extent of the *heritage study area* of 154 hectares. The total survey coverage (ground physically inspected for heritage evidence) equated to approximately 15.1% of the *heritage study area*. As this coverage only refers to an area of several metres width directly inspected by each member of the survey team, the actual coverage for obtrusive site types (for example, rock shelters and scarred trees) was significantly greater than this. The total effective survey coverage (*visible* ground surface physically inspected with potential to host heritage evidence) equated to around 0.7% of the *heritage study area*.

Prior to this survey, 24 Aboriginal sites had previously been recorded within the Modification area, all open artefact sites (artefact scatters and isolated artefacts). Nineteen of these sites are located in areas covered by an existing AHIP, with nine sites having been subject to total salvage and three sites partially salvaged under the relevant AHIP and Wambo Heritage Management Plan (HMP).

The present survey resulted in the identification of another 14 open artefact sites within the Modification area. Several of the previously recorded sites were re-recorded and found to be larger in extent. A total of 64 stone artefacts were recorded in detail during the survey.

Hence, a total of 38 open artefact sites are known to occur directly within the LW24-26 Modification investigation area. The newly identified open artefact sites are all small, low density artefact scatters with six or less artefacts (six sites) or isolated finds (seven occurrences), apart one site with 17 artefacts.

Contemporary cultural values have also been identified by the Aboriginal stakeholders, including those associated with the investigation area (relating to traditional land use and ongoing cultural and spiritual connections to the land and resources of the area), use of subsistence and other resources, pathways including the potential access from North Wambo Creek to Jerrys Plains Ridge, and in relation to the Aboriginal objects/sites.

The evidence identified during the survey is consistent with the occupation model for the locality developed by South East Archaeology.

The investigation results and occupation model indicate that while there is potential for stone artefacts to occur in a widespread distribution of variable density across virtually all landform units, this resource will predominantly comprise a low to very low density distribution consistent with background discard.

The potential for sub-surface deposits of artefacts that may be of high research value to occur is generally low, apart from a zone comprising low gradient ground within close proximity of North Wambo Creek, which may represent a secondary resource zone and could exhibit a higher artefact density and potentially deposits of some research significance if more focused occupation and/or repeated occupation has occurred.

Other types of heritage evidence (for example rock shelters, grinding grooves or scarred trees) were not identified within the investigation area despite the comprehensive survey, and have been reassessed as having a very low or negligible potential to occur within the Modification area.

In broad terms, the evidence from the Modification area is typical of that from the Central Lowlands of the Hunter Valley. No specific aspects of the evidence appear to be rare or unusual or not replicated elsewhere within a regional context.

The significance of the Aboriginal heritage sites, cultural values and potential deposits within the Modification area has been assessed against criteria widely used in Aboriginal heritage management, derived from the relevant aspects of the ICOMOS *Burra Charter*.

Nine previously recorded open artefact sites have been subject to total salvage and the significance level is now reported as 'not applicable'. One site is assessed as being of moderate significance within a local context, and two sites of low to possibly moderate significance, although all have been partially salvaged under the existing approval and AHIPs. The remaining 26 open artefact sites are assessed as being of low significance within a local context, due to low representative value, low research potential, low integrity and/or isolated occurrences.

The Aboriginal representatives disclosed a number of associations with the investigation area of contemporary cultural significance, and it is important to observe that all heritage evidence tends to have some contemporary significance to Aboriginal people, because it represents an important tangible link to their past and to the landscape. Several RAPs are of the view that all identified sites and cultural values, along with the Modification area itself, are of cultural significance.

The primary potential impacts of the Modification on Aboriginal heritage (comprising both the identified Aboriginal objects, the potential resource and cultural areas/values) relate to indirect impacts to the ground surface associated with underground mining induced subsidence, within an area of about 238 hectares. Approximately 35% of this area (the southern portion) has previously been assessed and approved for subsidence impacts (along with minor surface impacts) for the South Bates Extension Modification, and management actions (including heritage salvages) have been completed for many Aboriginal sites within this area. Minimal direct surface impacts (potentially limited to small areas from continued use of existing access tracks, exploratory drilling, subsidence remediation and environmental monitoring) are proposed or anticipated.

No Aboriginal site types have been identified in the underground mining area that may be susceptible to subsidence impacts and their potential to occur has been reassessed as very low or negligible. The potential for subsidence impacts to occur to the open artefact sites within the underground area has been assessed as very low or negligible. Although minor cracking of soil may occur, any effects are likely to be short-term in duration, minimal in extent and confined to the context of the sites (sediments in which the artefacts are located) rather than direct impacts or damage to the artefacts themselves.

In the absence of appropriate management and mitigation measures, it is concluded that the impacts of the LW24-26 Modification on Aboriginal heritage would be very low within a local context and negligible within a regional context. With the implementation of mitigation measures, the impacts of the Modification on Aboriginal heritage would be reduced to negligible within both local and regional contexts.

Strategies for the management of the identified and potential Aboriginal heritage resources and cultural values within the Modification area have been considered in relation to various criteria such as the nature of the heritage evidence, its significance, the nature of the potential impacts, existing approved strategies and actions, and the views of the RAPs. Copies of the draft report were provided to each of the RAPs and responses were received from three organisations endorsing the draft report.

The southern portion of the Modification area is already covered by AHIP #C0003213, and the eastern margin is covered by AHIP #2222, therefore any sites within these areas can be managed under the existing AHIPs. However the central and northern portions of the Modification area are not covered by any AHIP and a new AHIP would be required for this area prior to any works being undertaken that may cause any impacts to any identified Aboriginal sites. The *Wambo Coal Heritage Management Plan* specifies detailed procedures for the management of Aboriginal heritage under the existing AHIPs at Wambo, and would provide a suitable basis for the management of Aboriginal heritage under any new AHIP for the central and northern portions of the Modification area.

The following recommendations are made on the basis of legal requirements under the EP&A Act and *National Parks and Wildlife Act 1974*, the results of the investigation and consultation with the RAPs:

- 1) Management of all Aboriginal heritage within the portion of the LW24-26 Modification area covered by AHIP #C0003213 and AHIP #2222 and the *Wambo Coal Heritage Management Plan* should continue in accordance with the relevant AHIP, HMP and Table 11 of this report;
- 2) WCPL should obtain from Heritage NSW a Section 90 AHIP for the central and northern portions of the LW24-26 Modification area that are not covered by an existing AHIP. The primary elements of the AHIP should comprise:
 - a) Consistent with the existing AHIPs at Wambo, management of all identified and potential Aboriginal heritage within the AHIP application area in accordance with the *Wambo Coal Heritage Management Plan*, along with Table 11 of this report.

The *Wambo Coal Heritage Management Plan* contains detailed strategies and procedures of relevance to this portion of the LW24-26 Modification area, including for:

- i) Aboriginal community involvement, including participation in heritage salvages;
- ii) A surface disturbance permit process, to identify and manage heritage actions required in relation to specific ground disturbance works;
- iii) Systematic surface collection of identified artefact evidence (relevant for Wambo Sites 319 and 528);
- iv) Artefact analysis and recording;
- v) Management of salvaged Aboriginal objects;
- vi) Heritage salvage reporting, including provision of copies of reports to RAPs and Heritage NSW;

- vii) Management of any previously unrecorded Aboriginal heritage evidence that might be identified;
 - viii) Management of any human remains that may be identified;
 - ix) Subsidence management and monitoring of Aboriginal sites;
 - x) Aboriginal community access for cultural purposes;
 - xi) Ongoing maintenance of the Wambo Aboriginal Site Database; and
 - xii) Heritage inductions and an Aboriginal cultural education program for all personnel working at Wambo;
- 3) Aboriginal Site Recording Forms should be lodged in a timely manner with Heritage NSW for any previously unrecorded Aboriginal heritage evidence that is identified within the Modification area during the course of operations and/or further heritage assessments, or that is subject to salvage or impact (Aboriginal Site Impact Recording Form);
- 4) Under the terms of the *National Parks and Wildlife Act 1974* it is an offence to harm or desecrate an object that the person knows is an Aboriginal object, or to harm an Aboriginal object ('strict liability offence'). Therefore, no activities or work should be undertaken within the Aboriginal site areas as described in this report without approval of an AHIP and subsequent implementation of any relevant approval conditions;
- 5) Copies of this final report should be made available to each RAP and the Department of Planning and Environment and Heritage NSW.

TABLE OF CONTENTS

	Page
1. Introduction	1
1.1 Background and Overview of Proposed Modification	1
1.2 Study Purpose	2
1.3 Authorship	3
2. Environmental Context	8
2.1 Location	8
2.2 Topography	8
2.3 Geology and Soils	10
2.4 Climate, Flora and Fauna	12
2.5 Geomorphological History	14
2.6 Land Use History	15
3. Aboriginal Archaeological Context	17
3.1 Heritage Register Searches	17
3.2 Previous Archaeological Research	21
3.2.1 Wambo	21
3.2.2 United Collieries and United Wambo	49
3.2.3 Lemington	50
3.2.4 Warkworth	51
3.2.5 Synthesis	52
3.3 Local Aboriginal Culture	54
3.3.1 Group Identity and Boundaries	54
3.3.2 Subsistence Resources	57
3.3.3 Material Culture	58
3.3.4 Other Aspects of Society	60
3.3.5 Population	61
3.3.6 Relationship with Settlers	62
3.3.7 Recent Aboriginal History	62
3.3.8 Ethnohistorical References to Aboriginal Sites	64
3.4 Occupation Model	66
3.5 Predictive Model of Site Location	77
4. Methodology	83
5. Results and Discussion	89
5.1 Survey Coverage	89
5.2 Aboriginal Heritage Evidence	91
5.2.0 Overview	91
5.2.1 Open Artefact Sites	95
5.2.2 Cultural Values	99

	Page
5.3 Discussion	99
5.3.1 Integrity of Evidence	99
5.3.2 Lithic Assemblage	100
5.3.2.1 Stone Materials	101
5.3.2.2 Lithic Item Types	105
5.3.3 Spatial Distribution, Site Interpretation and Reassessment of Occupation Model	107
5.3.4 Chronology	111
5.3.5 Regional Context	112
5.3.6 Reassessment of Predictive Model	113
6. Aboriginal Consultation	117
7. Significance Assessment	124
7.1 Criteria	124
7.2 Significance of Heritage Evidence Within the LW24-26 Modification Area	127
8. Statutory Obligations	133
8.1 Commonwealth	133
8.2 State	134
8.3 Local	142
9. Potential Impacts	143
9.1 Potential Subsidence Impacts	143
9.2 Potential Surface Impacts	145
9.3 Regional Context and Cumulative Impacts	146
10. Potential Mitigation and Management Strategies	152
10.1 General Strategies	152
10.1.1 Strategy A: Further Investigation	152
10.1.2 Strategy B: Conservation	153
10.1.3 Strategy C: Mitigated Impact	154
10.1.4 Strategy D: Unmitigated Impact	154
10.1.5 Strategy E: Monitoring	155
10.2 Assessment of Specific Management Options for Aboriginal Sites, Potential Resources and Cultural Values	156
10.2.1 Management of Small-Scale Low to High Level Impacts	158
10.2.2 Management of Continuing Land-Use Impacts	159
10.2.3 Management of Subsidence Impacts	159
11. Recommendations	160

	Page
References	166
Acknowledgements	180
Disclaimer	180
Appendix 1: Glossary	181
Appendix 2: Relevant Previously Recorded Aboriginal Site Records	194
Appendix 3: Archaeological Survey Coverage Database	394
Appendix 4: Detailed Mapping of Archaeological Survey Areas and Aboriginal Heritage Sites	400
Appendix 5: Aboriginal Heritage Site Data	409
Appendix 6: Plates	448
Appendix 7: Aboriginal Community Consultation	463
Appendix 8: Subsidence Impact Assessment	510

FIGURES

	Page
Figure 1: Location of Wambo Coal Mine	4
Figure 2: General arrangement of approved Wambo Coal Mine	5
Figure 3: Wambo Coal Mine proposed South Bates Extension Underground Mine Longwalls 24-26 Modification	6
Figure 4: Wambo Coal Mine AHIP areas and proposed South Bates Extension Underground Mine Longwalls 24-26 Modification investigation area	7
Figure 5: Topographic context of South Bates Extension Underground Mine Longwalls 24-26 Modification investigation area	9
Figure 6: Previous archaeological survey coverage and recorded Aboriginal heritage sites within and adjacent to the proposed South Bates Extension Underground Mine Longwalls 24-26 Modification investigation area	20
Figure 7: Previous heritage survey coverage of White (2003) at Wambo	23
Figure 8: Potential access routes identified by White (2003)	26
Figure 9: Montrose East Underground Modification investigation area of RPS (2011)	30
Figure 10: South Wambo Underground Mine Modification investigation area of RPS (2016b)	31
Figure 11: Previous heritage due diligence investigation areas within the Longwalls 24-26 Modification area (Kuskie 2016c, 2016d, 2020a, 2020b, 2020d and 2021a)	35
Figure 12: South Bates Modification archaeological survey areas (Kuskie 2017a, 2017g)	37
Figure 13: Potential Aboriginal access routes and secondary resource zone around North Wambo Creek in the vicinity of the LW24-26 Modification investigation area	40
Figure 14: Location of Aboriginal sites salvaged by Kuskie (2019b) in December 2018 and January 2019	43
Figure 15: Wambo Site 239 showing location of surface scrape, localised hand excavations HE1 and HE2 within the scrape, Test Unit Transects A and B and artefacts subject to surface collection in May 2019 (Kuskie 2020c:26)	46
Figure 16: Cultural group boundaries after Tindale (1974)	55

	Page
Figure 17: Approximate location of GPS recorded transects within the LW24-26 Modification <i>heritage study area</i>	87
Figure 18: Archaeological survey coverage of the LW24-26 Modification investigation area, including coverage for the South Bates Modification Extension portion of this area (Kuskie 2017a, 2017g) and the present survey of the <i>heritage study area</i>	88
Figure 19: Location of Aboriginal heritage sites within the LW24-26 Modification investigation area	92

TABLES

	Page
Table 1: List of known Aboriginal sites within the Modification investigation area	18
Table 2: Personnel involved in the Longwalls 24-26 Modification heritage survey	84
Table 3: Environmental contexts, class of slope and landform elements - summary of survey coverage and artefact density for the LW24-26 Modification <i>heritage study area</i>	90
Table 4: Summary of Aboriginal sites within the LW24-26 Modification investigation area	93
Table 5: Summary of open artefact sites recorded during the LW24-26 Modification survey	96
Table 6: Summary of stone artefacts recorded during the present heritage survey	98
Table 7: Summary of Registered Aboriginal Parties involvement in the Modification	121
Table 8: Summary of Registered Aboriginal Parties key comments and how they have been addressed by the Modification	123
Table 9: Significance assessment of Aboriginal sites, cultural areas/values and potential deposits within the LW24-26 Modification area	130
Table 10: Potential impacts to Aboriginal sites, cultural areas/values and potential deposits within the LW24-26 investigation area from the Modification prior to the implementation of mitigation measures	149
Table 11: Summary of recommended management strategies and consequent potential impacts to Aboriginal sites, cultural areas/values and potential deposits within the LW24-26 Modification area after the implementation of mitigation measures	162

PLATES (APPENDIX 6)

	Page
Plate 1: View from south-eastern corner of LW24-26 Modification investigation area south across the southern portion of the investigation area that was previously surveyed for the South Bates Extension Modification (Kuskie 2017a), including Survey Area 3 (moderate simple slope), Survey Area 11 (North Wambo Creek), Survey Area 12 (valley flats) and Survey Area 37 (gently inclined slopes), to the moderately and steeply inclined slopes descending from the cliff-lined Southern Mountains south-west of the LW24-26 Modification investigation area	449
Plate 2: View north-east across the southern portion of the LW24-26 Modification investigation area, including portions that were previously surveyed for the South Bates Extension Modification (Kuskie 2017a), and the prominent ridgeline and associated spurlines descending from the Southern Mountains to North Wambo Creek and representing a probable corridor for movement	449
Plate 3: View south-west of LW24-26 Modification Survey Area 1 (level to very gentle drainage depression), the third order section of Waterfall Creek on the northern boundary of the Modification investigation area	450
Plate 4: LW24-26 Modification Survey Area 2 (moderate simple slope) adjacent to the third order section of Waterfall Creek on the northern boundary of the Modification investigation area, showing exposed sandstone bedrock	450
Plate 5: Sandstone boulders in Survey Area 3 (moderate drainage depression), a small section of a second order tributary of Waterfall Creek	451
Plate 6: View south across a large farm dam in Survey Area 3 (moderate drainage depression), a second order tributary of Waterfall Creek, and adjacent moderate and steep simple slopes (Survey Areas 5 and 12)	451
Plate 7: Survey Area 4 (moderate drainage depression), comprising first and second order headwater tributaries of Waterfall Creek, highlighting the dense grass cover at the time of the survey in February 2022	452
Plate 8: View south-west across Survey Area 6 (moderate simple slope) and northern portion of LW24-26 Modification investigation area	452
Plate 9: View north across Survey Area 6 (moderate simple slope) to Survey Area 7 (steep simple slope) in the northern portion of LW24-26 Modification investigation area	453
Plate 10: View north across Survey Area 6 (moderate simple slope) to the Hunter River 2-3 kilometres north of the LW24-26 Modification investigation area	453
Plate 11: View south-west from Survey Area 9 (level to very gentle ridge crest) across the northern portion of the LW24-26 Modification investigation area (foreground) to the Southern Mountains	454

	Page
Plate 12: View south-west across Survey Area 11 (gentle ridge crest), highlighting the dense grass cover at the time of the survey in February 2022	454
Plate 13: Survey Area 13 (moderate simple slope) in northern portion of the LW24-26 Modification investigation area	455
Plate 14: Major spur and ridgeline in north-central portion of investigation area, with Survey Areas 8, 14, 25 and 53	455
Plate 15: Survey Area 17 (moderate drainage depression) in north-western portion of the LW24-26 Modification investigation area	456
Plate 16: Survey Area 18 (gentle spur crest) in north-western portion of the LW24-26 Modification investigation area	456
Plate 17: Survey Area 20 (moderate spur crest) in north-western portion of the LW24-26 Modification investigation area	457
Plate 18: View west of Survey Areas 19 (moderate drainage depression), 24 (moderate simple slope) and 22 (moderate spur crest) in north-western portion of the LW24-26 Modification investigation area	457
Plate 19: View north of Survey Areas 23 (moderate spur crest), 24 (moderate simple slope) and 19 (moderate drainage depression) in north-western portion of the LW24-26 Modification investigation area	458
Plate 20: Survey Area 26 (moderate simple slope) in north-central portion of the investigation area	458
Plate 21: Survey Area 28 (gentle ridge crest), a potential pathway between the mountains and Hunter River, in the north-central portion of the investigation area	459
Plate 22: Survey Area 36 (steep simple slope) on the sides of the ridgeline (Survey Area 28) that is a potential pathway between the mountains and Hunter River, in the north-central portion of the investigation area	459
Plate 23: View north of Survey Areas 41 (gentle spur crest), 55 (moderate drainage depression) and 43 (moderate spur crest) in central portion of the LW24-26 Modification investigation area	460
Plate 24: Survey Area 43 (moderate spur crest) in central portion of the LW24-26 Modification investigation area	460
Plate 25: Survey Area 46 (moderate ridge crest) in central portion of the LW24-26 Modification investigation area	461
Plate 26: Survey Area 47 (moderate simple slope) in central portion of the LW24-26 Modification investigation area	461
Plate 27: Survey Area 49 (moderate simple slope) in central portion of the LW24-26 Modification investigation area	462

	Page
Plate 28: Survey Area 52 (moderate simple slope) in central portion of the LW24-26 Modification investigation area	462

ABBREVIATIONS

Term	Definition
ACHA	Aboriginal Cultural Heritage Assessment
ACHAR	Aboriginal Cultural Heritage Assessment Report
ACHMP	Aboriginal Cultural Heritage Management Plan
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
AHMP	Aboriginal Heritage Management Plan
BP	Before Present
CCL	Consolidated Coal Lease
CL	Coal Lease
DA	Development Approval
DEC	Department of Environment and Conservation
DECCW	Department of Environment, Climate Change and Water
DPE	Department of Planning and Environment (NSW)
DP&I	Department of Planning and Infrastructure (NSW)
DPIE	Department of Planning, Industry and Environment (NSW)
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EL	Exploration Licence
EP	Extraction Plan
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GDA	Geodetic Datum of Australia
GIS	Geographic Information System

Term	Definition
GPS	Global Positioning System
HMP	Heritage Management Plan
ICOMOS	International Council on Monuments and Sites
LALC	Local Aboriginal Land Council
LGA	Local Government Area
MGA	Map Grid of Australia
ML	Mining Lease
mm	millimetre
Mtpa	Million tonnes per annum
NP&W Act	<i>National Parks and Wildlife Act 1974</i>
NPWS	National Parks and Wildlife Service
NSW	New South Wales
OEH	Office of Environment and Heritage (NSW)
PAD	Potential Archaeological Deposit
RAP	Registered Aboriginal Party
RWEP	Remnant Woodland Enhancement Program
SEA	South East Archaeology
SMP	Subsidence Management Plan

1. INTRODUCTION

1.1 Background and Overview of Proposed Modification

Wambo Coal Pty Limited (WCPL), a subsidiary of Peabody Energy Australia Pty Limited, owns and operates the Wambo Coal Mine ("Wambo"), an underground coal mining operation located approximately 15 kilometres west of Singleton, near the village of Warkworth, in the Hunter Valley of New South Wales (NSW) (refer to Figure 1). The Wambo Coal Mine is located within the Singleton Local Government Area (LGA).

Development Consent DA 305-7-2003 for the Wambo Coal Mine was granted in 2004 and has since been modified on a number of occasions. Both open cut and underground mining operations have been approved and operated on site under DA 305-7-2003 until December 2020 (refer to Figure 2), with earlier operations having commenced in 1969. From 1 December 2020, the Wambo Coal Mine transitioned into Phase 2 operations which includes underground mining and coal handling and processing of coal from both underground operations and the adjacent United Wambo Open Cut Coal Mine.

WCPL is investigating an opportunity for the continuation and improved efficiency of the approved South Bates Extension Underground Mine, including the reorientation of existing longwall panels and mining of one additional longwall panel in the Whybrow Seam (refer to Figure 3). If WCPL elects to proceed, a Modification to Development Consent (DA 305-7-2003) for the Wambo Coal Mine would be sought under Section 4.55(2) of the NSW *Environmental Planning & Assessment Act 1979* (EP&A Act), referred to herein as the "proposed Modification" or "Longwalls 24-26 Modification" (LW24-26 Modification).

The proposed Modification involves reorientation of the approved Longwalls 24 and 25, and the addition of Longwall 26. The longwalls would use the existing approved infrastructure at the South Bates Extension Underground Mine.

South East Archaeology Pty Ltd has been engaged by WCPL to prepare an Aboriginal Cultural Heritage Assessment for the proposed Modification. As subsidence associated with Longwalls 24-26 will extend into a new area outside of the current Aboriginal Heritage Impact Permit (AHIP) areas (refer to Figure 4), WCPL may apply for a new AHIP subsequent to completion of the Aboriginal Cultural Heritage Assessment.

The investigation area for the Aboriginal Cultural Heritage Assessment for the Modification measures approximately 238 hectares (2.38 square kilometres) in area. It includes the area in which conventional subsidence impacts may occur, along with some buffer land (refer to Figure 4). Subsidence impacts have already been approved within approximately 35% of this area (the southern portion) in association with the approval of the South Bates Extension Underground Mine Modification.

1.2 Study Purpose

This Aboriginal Cultural Heritage Assessment is intended to support any potential application for an AHIP that may be required to Heritage NSW¹ and as such, has been completed with reference to the:

- ❑ *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011a);
- ❑ *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b);
- ❑ *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy (DECCW 2010c); and
- ❑ International Council on Monuments and Sites (ICOMOS) *Burra Charter* - relevant to the assessment of heritage significance (refer to Section 7 of this report).

The primary aims and tasks of this Aboriginal Cultural Heritage Assessment have therefore been to:

- ❑ Undertake heritage register searches, research, Aboriginal community consultation and an archaeological survey, and where required excavations, to identify and record any Aboriginal heritage evidence or areas of potential evidence or cultural values within the Modification investigation area;
- ❑ Assess the potential impacts of the Modification upon any identified or potential Aboriginal heritage evidence or cultural values;
- ❑ Assess the significance of any Aboriginal heritage evidence or cultural values identified;
- ❑ Provide details of any Aboriginal heritage evidence in accordance with the Heritage NSW requirements;
- ❑ Consult with the Aboriginal community as per the Heritage NSW policy entitled *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010c);
- ❑ Present recommendations for the management of any identified Aboriginal heritage evidence and potential heritage resources or cultural values; and
- ❑ Prepare an Aboriginal Cultural Heritage Assessment Report to meet the requirements of WCPL and Heritage NSW, primarily with reference to the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011a), *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010b) and *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010c).

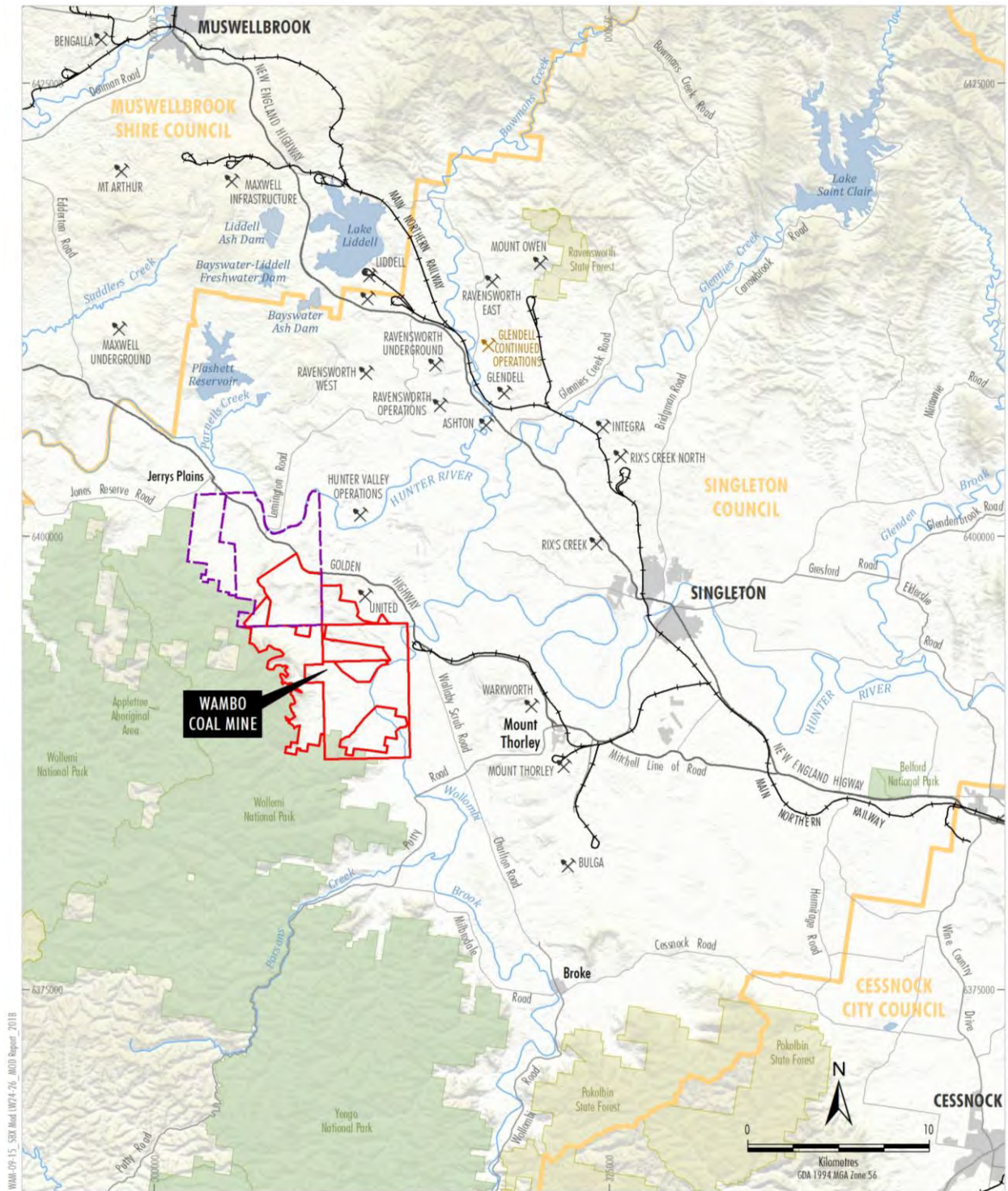
¹ Prior to 1 July 2020 the NSW government department/agency responsible for administration of Aboriginal cultural heritage and the National Parks and Wildlife (NP&W) Act was briefly known as the Biodiversity and Conservation Division (BCD) within the Department of Planning, Industry and Environment, and between 2011 and 2019 as the NSW Office of Environment and Heritage (OEH). Prior to April 2011 these functions were administered by the Department of Environment, Climate Change and Water (DECCW), previously also known as the Department of Environment and Climate Change (DECC), Department of Environment and Conservation (DEC) and the National Parks and Wildlife Service (NPWS).

1.3 Authorship

This assessment has been prepared by Peter Kuskie, an archaeologist with a Bachelor of Arts (BA) Honours degree in Aboriginal archaeology and over 32 years experience in the conduct of Aboriginal cultural heritage assessments throughout Australia, including 23 years experience in the immediate locality of the investigation area.

The field investigation was undertaken by Michael Marsh and Annette Backshall assisted by representatives of the Registered Aboriginal Parties (RAPs). Michael Marsh holds a BA degree in archaeology from the University of New England and has over 20 years experience in the conduct of Aboriginal heritage surveys, excavations and assessments. Annette Backshall holds a BA degree in archaeology from the University of Sydney and a Masters of Archaeological and Evolutionary Science degree from the Australian National University and has over six years experience in the conduct of archaeological surveys and excavations.

Analysis and reporting was completed by Peter Kuskie. Quality review was completed by Peter Kuskie and staff of Resource Strategies and WCPL.



- LEGEND**
- Exploration Licence Boundary (AUTH, EL)
 - Mining and Coal Lease Boundary (ML, CL, CCL)
 - Local Government Area
 - National Parks and Wildlife Estate
 - State Forest
 - ✕ Mining Operation
 - ✕ Proposed Mining Operation (Under Assessment)

Source: NSW Spatial Services (2022)

Peabody
WAMBO COAL MINE
Regional Location

Figure 1: Location of Wambo Coal Mine (courtesy WCPL).

- LEGEND**
- National Park
 - SSD 7142 Operational Area #
 - WCPL Owned Land
 - Wambo Coal Mine
 - Exploration Licence Boundary (AUTH, EI)
 - Mining and Coal Lease Boundary (ML, CL, CCL)
 - Proposed Mining Lease Application Area
 - Remnant Woodland Enhancement Program (RWEPP) Area
 - Existing/Approved Wambo Coal Mine Surface Development Area
 - Existing/Approved Underground Development
 - Approved Orientation of Longwalls 24 and 25
 - Existing/Approved Underground Development (First Workings only)
 - Modification 19
 - Modified Longwall Layout

Under Phase 2 of mining at Wambo Coal Mine (commenced 1 December 2020), this area is operated by United Collieries Pty Ltd under the United Wambo Joint Venture Project.

Source: WCPL (2022); NSW Spatial Services (2022)
Orthophoto: WCPL (2021)

Peabody
W A M B O C O A L M I N E
Approved and Modified Wambo Coal Mine
General Arrangement

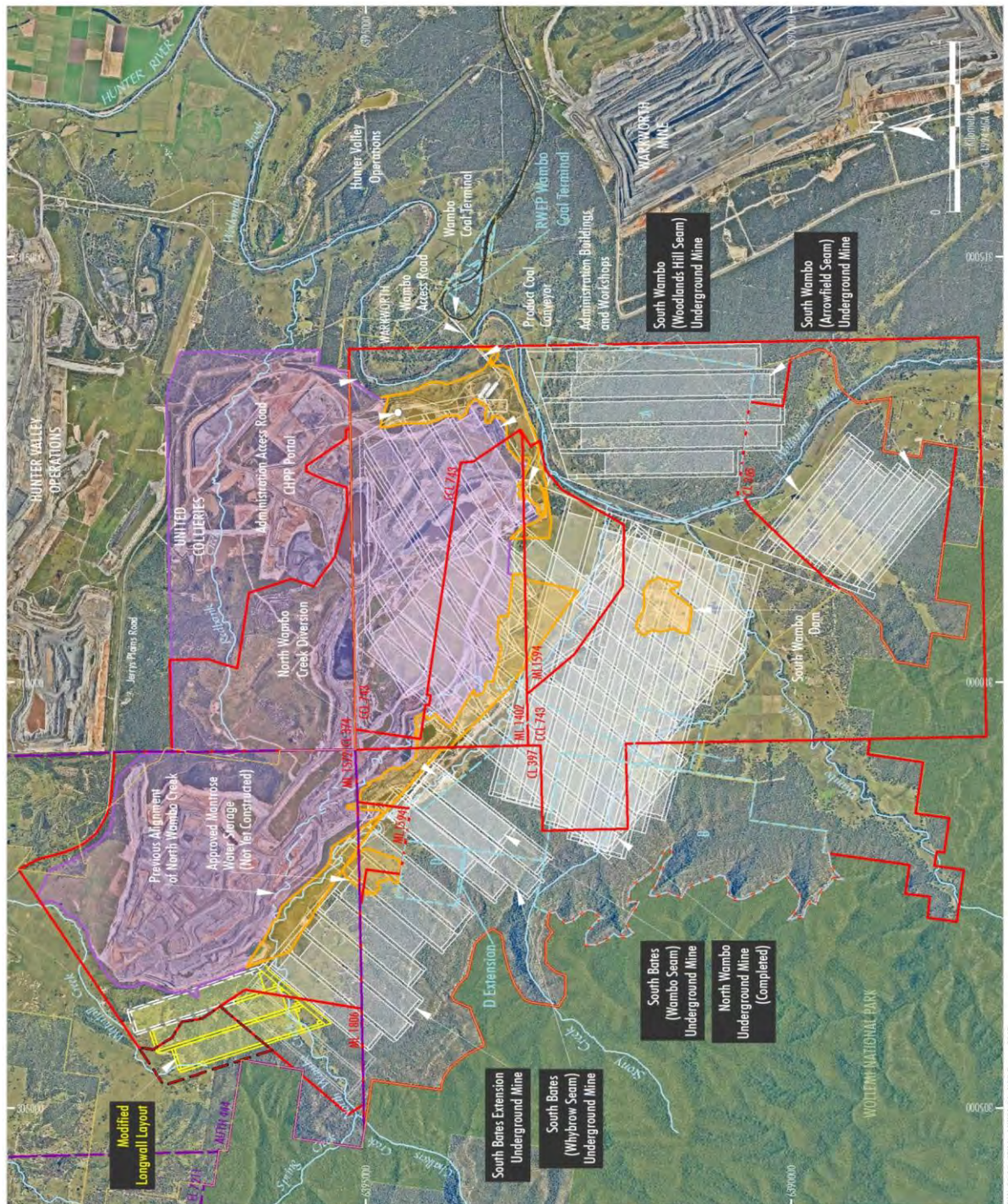



Figure 2: General arrangement of approved Wambo Coal Mine (courtesy WCPL).

- LEGEND**
-  National Park
 -  Wambo Coal Mine
 -  Exploration Licence Boundary (AULH, EL)
 -  Mining and Coal Lease Boundary (ML, CL, CCL)
 -  Proposed Mining Lease Application Area
 -  Remnant Woodland Enhancement Program (RWEP) Area
 -  Existing/Approved Wambo Coal Mine Surface Development Area
 -  Ventilation Shaft
 -  Existing/Approved Underground Development
 -  Approved Orientation of Longwalls 24 and 25
 -  Existing/Approved Underground Development (First Workings only)
 -  Modification 19
 -  Modified Longwall Layout

* Under Phase 2 of mining at Wambo Coal Mine (commenced 1 December 2020), this area is operated by United Collieries Pty Ltd under the United Wambo Joint Venture Project.

Source: WCPL (2022); NSW Spatial Services (2022)
 Orthophoto: WCPL (April 2021)

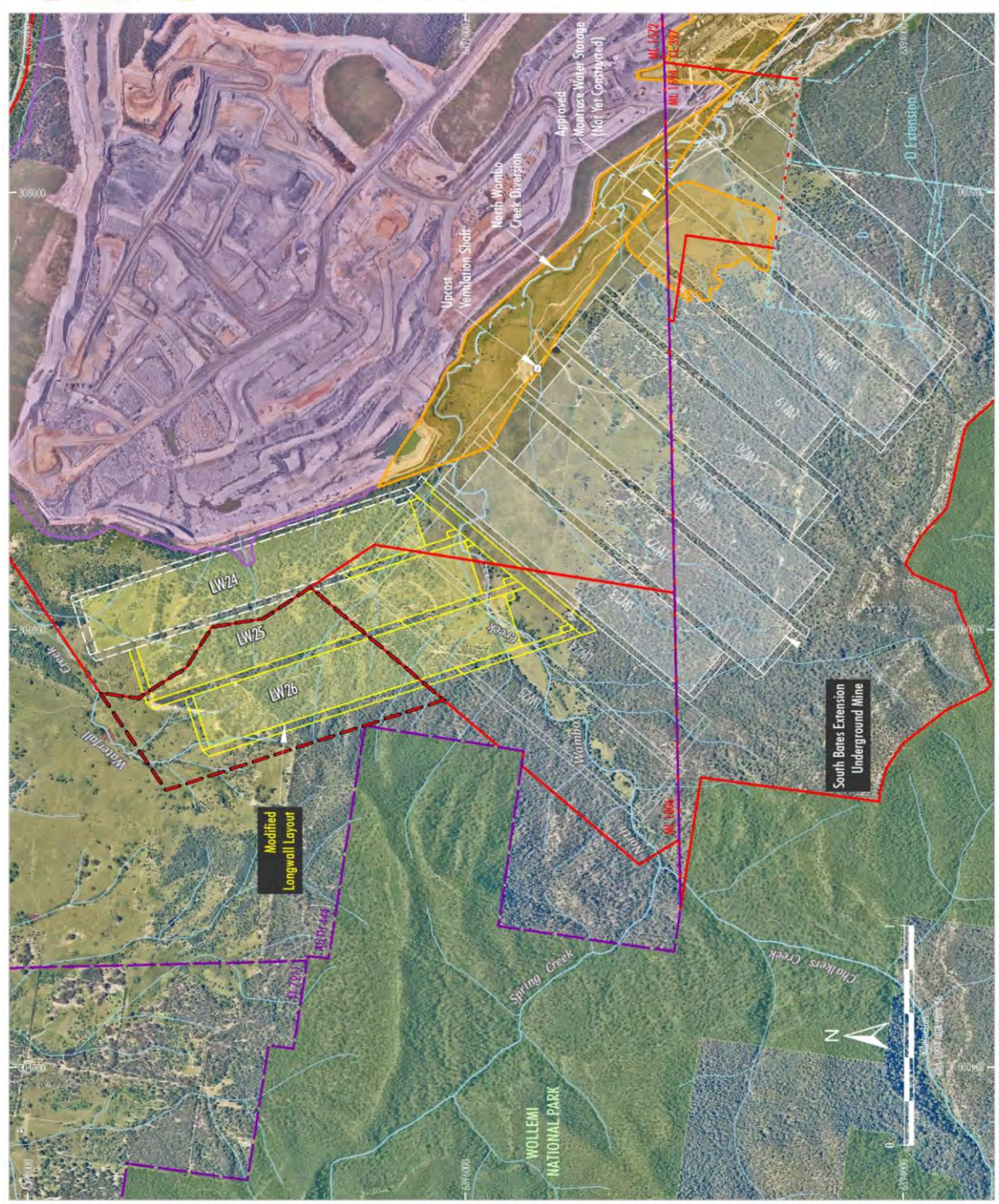


Figure 3: Wambo Coal Mine proposed South Bates Extension Underground Mine Longwalls 24-26 Modification (courtesy WCPL).



Figure 4: Wambo Coal Mine AHIP areas and proposed South Bates Extension Underground Mine Longwalls 24-26 Modification investigation area (aerial photograph courtesy WCPL; one kilometre MGA grid).

2. ENVIRONMENTAL CONTEXT

2.1 Location

The investigation area comprises land owned by WCPL that is partially the subject of existing Mining and Coal Leases (Figure 3). Wollemi National Park fringes the western margin of the investigation area (Figure 3).

The investigation area for the heritage assessment extends between MGA (GDA 94) grid reference eastings 305270 and 306770 and northings 6395250 and 6397950 on the Doyles Creek 9032-1-N 1:25,000 topographic map (Figure 5). The investigation area forms a rectilinear shape measuring in the order of 2.2 kilometres by 1.2 kilometres, with a total area of 238 hectares (Figures 4 and 5).

The village of Warkworth is located approximately eight kilometres east of the investigation area, and the urban area of Singleton is located approximately 20 kilometres to the east.

2.2 Topography

The topographical context of the investigation area is discussed to identify factors potentially relevant to patterns of Aboriginal land use. Land systems, along with other environmental information, are used in the construction of occupation models and predictive models of Aboriginal site location (refer to Sections 3.4 and 3.5). Predictive models are based upon the assumption that environmental factors provided distinctive sets of constraints which influenced Aboriginal land use patterns. Following from this is the expectation that Aboriginal land use patterns may differ between each environmental zone, because of differing environmental constraints, and that this may result in the physical manifestation of different spatial distributions and forms of archaeological evidence (Kuskie 2000a).

The investigation area is located in the upper Hunter Valley, on the margin of the region defined by Galloway (1963) as the Central Lowlands. The Central Lowlands region is described as a belt of lowlands extending through the centre of the Hunter Valley between Newcastle and Murrurundi, developed on relatively weak sedimentary rocks. It comprises an undulating or gently hilly landscape, with an abrupt transition to the steeper Southern Mountains to the south and North-Eastern Mountains to the north (Galloway 1963:92).

The ranges in Wollemi National Park (Southern Mountains region) extend into the investigation area (refer to Figure 5 and detailed mapping in Appendix 4). The lower reaches of Wollombi Brook traverse the Wambo locality (seven kilometres east of the Modification area), and its higher order tributaries (South) Wambo Creek, Stony Creek and North Wambo Creek are located within Wambo.

The investigation area for the Modification generally comprises elevated steep to gently undulating terrain associated with a prominent ridge (Jerrys Plains Ridge) and its side-slopes and spurs. White (2003) and Kuskie (2017a) have identified that the Jerrys Plains Ridge and other nearby ridges may have formed access routes for Aboriginal people from the lower valleys of Wambo, Stony and North Wambo Creeks and Wollombi Brook, into the higher sandstone country to the west of Wambo, whereas elsewhere nearby substantial cliffs presented a significant barrier to human movement.



Figure 5: Topographic context of South Bates Extension Underground Mine Longwalls 24-26 Modification investigation area (Doyles Creek 9032-1-N 1:25,000 topographic map, reduced).

A broad valley flat associated with the higher order North Wambo Creek is present in the southern portion of the investigation area. Minor ephemeral lower order watercourses drain towards North Wambo Creek in the south, the former Splitters Hollow to the east of the investigation area (since removed by open cut mining), and Waterfall Creek on the northern margin of the investigation area.

The investigation area lies within the catchments of the Hunter River and Wollombi Brook. The Hunter River approaches to within 2.3 kilometres of the northern boundary and is situated no further than five kilometres from any part of the Modification area. The confluence of the Hunter River and Wollombi Brook is located 11 kilometres east of the investigation area. Apart from the higher-order North Wambo Creek, many of the un-named drainage depressions within the investigation area are ephemeral first or second order drainages.

A heritage survey was undertaken that sampled all 154 hectares of the Modification investigation area that had not been recently surveyed for the South Bates Extension Modification assessment (Kuskie 2017a, 2017g). This area was subdivided into a total of 56 archaeological survey areas, each representing a specific combination of landform unit and class of slope (refer to Appendices 3 and 4 and Table 3; definitions as per McDonald *et al* 1984).

In terms of the surface area of the sampled area (as derived from two-dimensional base mapping), level to very gently inclined gradients (<1.45°) comprise 2.4% of the total area, gently inclined slopes (1.45-5.45°) 6.5%, moderately inclined slopes (>5.45° - <18 °) 82.6% and steeply inclined slopes (>18°) 8.6%. Simple slopes occupy 53.5% of the area sampled, drainage depressions 21.1%, spur crests 18.3% and ridge crests 7%.

2.3 Geology and Soils

The nature of the local geological formations has several implications for Aboriginal land use, primarily concerning the procurement of stone materials for manufacturing and modifying stone tools.

The underlying geology of the locality generally consists of sandstone, shale, mudstone, conglomerate and coal of the Permian era Wittingham and Newcastle Coal Measures, with adjacent more elevated terrain comprising sandstone, conglomerate, red and green claystone and shale of the Triassic era Narrabeen Group. Quaternary Alluvium is located along the higher order watercourses.

Mapping and descriptions presented by White (2003) for the Wambo Environmental Impact Statement (EIS), based on the Doyles Creek 1:25,000 geological map, identify North Wambo Creek as comprising Quaternary Alluvium (silt and sandy silt). The remainder of the Modification investigation area comprises (White 2003):

- Jerrys Plains Subgroup of the Whittingham Coal Measures (coal seams with fine sandstone, siltstone, conglomerate and tuffaceous claystones);
- Watts Sandstone (massive medium to coarse grained quartz lithic sandstone);
- Undifferentiated Wollombi Coal Measures (coal seams, carboniferous shale, siltstone, sandstone and tuffaceous claystone); and
- Widden Brook Conglomerate of the Narrabeen Group (conglomeritic quartz sandstone and minor shale).

Minor conglomerate and sandstone rock formations occur in the investigation area, typically open surface bedrock and occasional boulders, including on simple slopes, ridge and spur crests and in drainage depressions (refer to Plates in Appendices 5 and 6). However, major rock formations (such as scarps or cliffs) are not present. Sandstone rock formations can host evidence of Aboriginal occupation, such as deposits of artefacts and cultural material in rock shelters or overhangs, rock art on surfaces of shelters or overhangs, and grinding grooves on exposed bedrock (open surfaces) or on isolated cobbles/boulders.

Direct sources of suitable stone materials such as silcrete (eg. cobbles or boulders) were not identified within the investigation area during the heritage surveys, in contrast to other nearby lower elevation areas, such as at Lemington (Brayshaw *et al* 1996, Dean-Jones 1992, Kuskie in prep.) and along the Hunter River (eg. Raggatt 1938). White (2003) also made this observation during the initial comprehensive investigation of Wambo.

Similarly, direct sources of suitable quality of indurated rhyolitic tuff, another material favoured for manufacturing stone artefacts, were not observed within the investigation area during the heritage surveys, although conditions of surface visibility tended to be very low.

However, numerous pebbles were observed in North Wambo Creek (but also in a lower frequency across the slopes and other landform units), which have derived from the eroded conglomerate (Kuskie 2017a). Pebbles of chert, petrified wood, rhyolite, quartz and quartzite were observed, all materials that may have been procured and utilised for manufacturing artefacts. White (2003) presents a comprehensive discussion of the nature of stone material procurement and use across the wider Wambo area.

Soils present within the investigation area, along with the processes affecting them, are described to identify their nature and their relationship to the survival, location and antiquity of evidence of Aboriginal occupation.

Kovac and Laurie (1991) describe soil units based on the now superseded Great Soil Group system:

- ❑ The Bulga Soil Landscape occupies the lower elevation terrain of the southern portion of the investigation area, including around North Wambo Creek, and is characterised by yellow soloths on upper and mid-slopes, with yellow and brown solodic soils and brown earths on lower slopes;
- ❑ The Lees Pinch Soil Landscape occupies the steeper gradient and most elevated central-western portion of the investigation area, with siliceous shallow loams in the rocky area, yellow podzolic soils and earthy sands on some upper slopes, some yellow and brown earths on foot slopes, yellow soloths at breaks in slope and grey soloths in mid-slope areas;
- ❑ The Benjang Soil Landscape occupies the central-eastern portion of the investigation area, with red, yellow and brown solodic soils on steeper benched country; and
- ❑ The Jerrys Plains Soil Landscape occupies the northern portion of the investigation area, with soloths on the crests to midslopes and solodic soils on lower slopes and in drainages.

In the vicinity of the investigation area it is likely that North Wambo Creek consisted of a chain-of-ponds prior to non-indigenous settlement, as noted on Dangar's (1828) map of the Hunter Valley (White 2003, Hughes 2003, Dean-Jones and Mitchell 1993). The creek and associated flats and terraces contain deep deposits of alluvial and colluvial soil, and are a generally a depositional environment in which evidence of Aboriginal occupation is more likely to be buried than exposed. Further downstream and outside of the Modification area however, post-European erosion has formed a deeply incised channel, with the down-cutting probably removing previous ponds (White 2003). In many of the first and second order drainages in the investigation area, gully erosion and similar down-cutting was also noted and is inferred to primarily relate to changes after European settlement.

Some of the soils within the investigation area (excluding the alluvial/colluvial soils around North Wambo Creek) are duplex (texture contrast) soils, with a colluvial topsoil (A unit) overlying unrelated pedal clays formed by *in situ* weathering of bedrock (B unit or horizon). Mitchell (2005) observes that in such texture-contrast soils the A unit is not related to the B unit, as it is a biomantle formed from colluvial processes (bioturbation and rainwash).

The investigation area comprises areas that are anticipated to be depositional contexts (for example, the flats, valley flats, terraces and lower portions of slopes) and areas that are erosional contexts (for example, the mid and upper portions of slopes and moderate to steeply inclined drainages), however it is noted that soil formation processes are complex and can vary over time in any locality (for example, episodes of major erosion in a typically depositional context). These processes can both remove, obscure or affect the integrity of archaeological evidence (particularly stone artefacts).

Sheet erosion was evident during the heritage survey in a number of locations. Gully erosion was also observed along a number of drainage depressions (refer to survey coverage data in Appendix 4 and Plates in Appendices 5 and 6). The widespread removal of native vegetation since European settlement has led to severe gully and stream bank erosion in the region, accompanied by rapid deposition of sediment on the middle and lower reaches of drainages. Consequently, along the middle and lower reaches of higher order watercourses, sediment deposition in historical times may have obscured any evidence of Aboriginal occupation. In contrast, evidence may have been removed in areas subject to sheet erosion (such as upper slopes and around drainage depressions). Gully and stream bank erosion may also have removed evidence, although with these processes, other evidence may be uncovered.

2.4 Climate, Flora and Fauna

A warm temperate climate prevails in the locality. Summers are warm to hot and winters are cool to mild. In winter, the region has north-westerly winds and frosts form regularly. In summer, winds tend to be south-easterly or easterly. Autumn and spring are transitional periods with considerable rain in autumn from low-scale pressure systems in the Tasman Sea (Bridgman and Oliver 1995).

The distribution of vegetation, subsistence resources and potable water are primary factors influencing patterns of Aboriginal land use, the preservation of evidence after its deposition and the ability to detect that evidence by surface inspection.

North Wambo Creek and Waterfall Creek are the key features in the investigation area and represent sources of at least ephemeral potable water and zones for multiple subsistence resources. However, water was probably available only on an ephemeral basis from the lower order drainages within the remainder of the investigation area.

European settlers extensively cleared the original native vegetation in the 1800s. Land holdings in the Wambo locality were first granted in the 1820s and cleared for wheat crops. After problems with rust, the primary land use changed to grazing, vineyards and orchards. Presently, much of the investigation area is covered by grass, including native and improved pasture varieties, and areas regenerating with native trees (including Box and Ironbark; refer to Plates in Appendices 5 and 6). Large, mature native trees are generally uncommon and extensive timber harvesting and clearing has evidently occurred across much of the investigation area.

Originally, much of the locality is likely to have been vegetated by a Eucalypt savannah woodland, dominated by Box, Gum and Ironbark. Species such as Grey Box (*Eucalyptus moluccana*), White Box (*E. albens*), Slaty Box (*E. dawsonii*), Yellow Box (*E. melliodora*), Forest Red Gum (*E. tereticornis*), Spotted Gum (*E. maculata*), Broad-Leaved Ironbark (*E. fibrosa*), oaks (*Casuarina* spp.) and Kurrajong (*Brachychiton populneum*) probably were present. A ground cover of grasses, including species such as Kangaroo Grass (*Themeda australis*), Wiregrass (*Aristida* spp.), Wallaby Grass (*Danthonia* spp.), *Chloris* spp., *Dicanthium* spp. and *Stipa* spp. (Story 1963:33), would have dominated the surface, with few shrubs.

Brayshaw (1986) documents a number of early ethnohistorical observations relating to the vegetation of the region and the Wambo locality. White (2003) summarises the potential Aboriginal uses of many of the plants in the locality, including:

- ❑ Kurrajong trees - seeds were gathered, roasted and eaten (Cunningham in Brayshaw 1986), roots of saplings were eaten, and bark was used to make string for fishing lines, nets and binding for spear shafts (Brayshaw 1986:61-63);
- ❑ *Macrozamia* sp. - seeds were collected, cracked, soaked, ground and then baked and eaten (Low 1989, Brayshaw 1986);
- ❑ Long-leaf mat rush (*Lomandra longifolia*) - basal core could be chewed and the leaves could be used for making baskets (Low 1989); and
- ❑ Native cherry (*Exocarpus cupressiformis*) - fruits eaten.

The cover of vegetation within the study area acts to reduce ground surface visibility and thereby reduces the potential to identify archaeological evidence solely by surface inspection. Most artefact occurrences within the Hunter Valley have only been identified when visible on exposures created by sheet erosion or ground disturbance (Dean-Jones and Mitchell 1993).

The preservation of archaeological evidence can also be affected by the vegetation cover, through processes known as bioturbation. Bioturbation is important in three ways: through mineral turnover in the nutrient cycle, physical movement of soil by mixing and mounding, and the creation of micro-relief (ant and termite mounds, tree-fall pits and mounds) (Mitchell 1988:52). Rainsplash on bioturbated soils can facilitate sheet erosion, the movement of fine material downslope. These processes can affect archaeological sites in several ways:

- ❑ By altering the horizontal and vertical relationship of artefacts;
- ❑ By altering assemblage contents through the effects of sheetwash erosion on small artefact size classes or by the dispersal of features such as hearths;
- ❑ By changing artefact densities through decreasing or increasing the volume of sediments; and
- ❑ By deposition of sediments burying (and therefore obscuring evidence of) archaeological deposits.

Consequently, conditions of surface visibility were expected to be generally low throughout the investigation area, apart from in exposures created by erosion scours or ground disturbance.

There would have existed a variety of faunal resources available for exploitation by the local Aboriginal inhabitants. Enright (1914) listed species that may have been present, including various birds, snakes, wombat, grey kangaroo, wallaroo, red wallaby, koala, bandicoot, possum, fruit bat, lizards, goanna, pademelon, flying squirrel and native cats. Freshwater fish would have been present in the watercourses, particularly the Hunter River and Wollombi Brook, along with freshwater mussels and crayfish. Brayshaw (1986) reports on early settlers observations of many of these animals.

From the sources discussed above it is evident that a range of plants and animals would have been available for exploitation by Aboriginal occupants of the locality, many on a seasonal basis.

2.5 Geomorphological History

Reconstructing the landscape prior to European settlement assists with understanding the nature of Aboriginal occupation in the region and the post-depositional processes that may have affected any evidence of occupation. As archaeological evidence indicates that Aboriginal people were present in the region within at least the past 20,000 years (Koettig 1987, Kuskie in prep.), information relating to changes to the regional climate, landforms and floral and faunal resources is relevant.

The Hunter Valley is a mature riverine estuary. Formation of the estuary is closely related to glacio-eustatic fluctuations in sea level that have occurred many times over the past million years. These cycles have frequencies of 100,000 years and amplitudes of 100-120 metres. The last commenced 125,000 years ago in a period of high sea levels and warm temperatures (Roy *et al* 1995). Slow cooling of temperatures and falling sea levels followed, culminating in the last glacial maximum about 24,000 to 17,000 years ago (Roy *et al* 1995:70-71, Thom *et al* 1981). The climate was much cooler and drier than at present.

Deglaciation and melting of ice sheets occurred rapidly from 18,000 years ago and the Hunter River slowly incised its valley. Most, if not all, of the upper soil units present within the moderate to steeply inclined portions of the investigation area were probably also removed from the predominantly erosive landscape during periods of high runoff. Post-glacial sea levels rose quickly up to 8,000 years Before Present (BP), before slowing between 8,000 and 6,500 BP and then stabilising (Roy and Boyd 1996:11).

This information highlights the dynamic nature of environmental conditions in the locality over the possible time period of human occupation. During the last glacial maximum, 24,000 to 17,000 years ago, the climate was cooler (possibly 6-10° Celcius) and drier than at present and winds may have been strong. Potable water was probably not frequently available. In terms of subsistence resources and potable water, the immediate study area probably did not represent an environment conducive to Aboriginal occupation (although nearby, the Hunter River and Wollombi Brook may have, as water was more likely to have been available).

From 18,000 years ago as temperatures rose and precipitation increased, the investigation area may have been more suitable for occupation (with a greater occurrence of ephemeral water). During the past 5,000 years the climate has been generally similar to that of the present.

Since non-indigenous settlement, the nature of the investigation area has again been transformed, largely revolving around changes in vegetation and hydrology. Grassy or swampy meadows or 'chains of ponds' that may have been present within the investigation area prior to European settlement along the upper and mid-sections of North Wambo Creek may have been removed, and the incised channels present in a number of drainages have probably only arisen since land clearing and subsequent erosion (White 2003). Nevertheless, incised channels may also have previously formed locally and temporarily from time to time in response to local changes in hydrological regime triggered by events such as storm floods or de-vegetation by severe bushfires.

2.6 Land Use History

The Hunter region was identified by Lieutenant John Shortland of HMS *Reliance* on 16th September 1797. Shortland observed coal seams present in the cliff face at the mouth of the Hunter River. The river was named 'Coal River', which was changed to the 'Hunter River' in 1804, in honour of Captain John Hunter, second Governor of New South Wales (Windross and Ralston 1897).

A penal station, initially known as 'King's Town', was established at Newcastle in 1804. From the early 1800s convicts continually escaped from Newcastle, with the aim of making their way overland to settlements on the Hawkesbury River. Convicts were chiefly employed securing cedar, coal, salt and lime (Goold 1981).

Settlements were established at various points along the river between 1812 and 1824. These included the placement of convicts, to produce maize, butter, poultry and eggs for Newcastle (Hartley 1995). Newcastle became an important port as the valley subsequently flourished through timber, wool, beef, dairy and coal mining industries (Wood 1972).

Free selecting of land commenced on a small scale on the Hunter River in 1821 or 1822 (Windross and Ralston 1897). After the penal settlement of Newcastle was transferred to Port Macquarie in 1823, Assistant Surveyor Henry Dangar was instructed to survey the Hunter Valley with the view to opening it to settlement (Hartley 1995).

Initial settlement around Wollombi Brook and the Central Lowlands was generally confined to the main valleys, up until the 1830s. From the 1840s to 1870s settlement extended into the hilly terrain (Dean-Jones and Mitchell 1993:2). Grazing sheep and cattle were the primary activities, but along the floodplain of Wollombi Brook, maize, potatoes, wheat, barley and later tobacco were cultivated (Dean-Jones and Mitchell 1993:2). The focus of settlement shifted from Wollombi to the Hunter River, after the railway was constructed from the lower Hunter through Singleton and Muswellbrook in the 1850s and 1860s, coinciding with a period of major flooding and hardship at Wollombi Brook in 1857 (Dean-Jones and Mitchell 1993:2).

Land holdings in the Wambo locality were first granted in the 1820s and cleared for wheat crops. After the problems with rust, the primary land use changed to grazing, vineyards and orchards.

Matthew Hindson originally owned the 2,000 acres (809 hectares) of land on which the Wambo Homestead was later built. James Hale purchased this land and other properties in the lower Wollombi district from 1825. Hale was a former convict, an innkeeper and a farmer whose primary residence was at Windsor. By 1837, his land holdings around Warkworth had grown to 4,480 acres. Hale named this property 'Lemington Grange' (EJE Architecture 1991).

Wambo Homestead, approximately six kilometres south-east of the investigation area, was built by James Hale around 1844. Hale's stepson William Durham resided in the Homestead from about 1847. The property was sold to Ben Richards of Richmond in 1892. By then it was known as 'Wambo'. After Richards' death in 1898, Wambo was sold to R. C. Allen and Frank MacDonald who used it as a horse stud (EJE Architecture 1991).

Timber getting was an important industry from the initial European settlement (Windross and Ralston 1897:17). In the 1820s, when Major Morisset ruled the settlement, cedar gangs were working 110 kilometres up the Hunter River (Goold 1981). Extensive tree clearing, ringbarking and sapping, to improve grazing capacity, occurred in the upper Hunter from 1862 (Dean-Jones and Mitchell 1993:2). Improved pastures were widely established on river flats and irrigation was used to develop the dairy cattle industry (Dean-Jones and Mitchell 1993:2).

Coal mining was one of the first industries, commencing in 1798 in the lower Hunter Valley (Windross and Ralston 1897). In the upper Hunter region, coal mining was undertaken on a limited scale from the early 1900s and expanded rapidly with open cut mining after the 1950s (Dean-Jones and Mitchell 1993:2). Commercial operations began at Wambo Mine in 1969, with a small open cut known as 'Charlie's Hole' (Envirosciences Pty Ltd 1991). The quality of this sample led to the development of a box cut, from which underground mining commenced in 1972. While this operation finished in 1977, open cut mining that began in 1974 continued.

Several underground mining operations began in the late 1970s. The Ridge Underground Mine was commenced in the Whybrow Seam from a highwall in the Western Open Cut. It ceased operation in 1982. The Homestead Underground Mine, commenced in 1979 from the Eastern Open Cut highwall (Envirosciences Pty Ltd 1991). More recently, underground mining has continued at the South Bates Underground Mine.

The modern landscape itself is in a sense a relic of non-indigenous settlement. It reflects a sequence of occupation over the past two centuries, including initial settlement, land clearance and stock management. Recent land use practices/impacts to the investigation area include:

- ❑ The widespread clearing of native vegetation (much of the area is cleared or hosts regenerating vegetation);
- ❑ Pastoral and possibly agricultural activities (including the grazing of sheep and cattle, excavation of farm dams, provision of watering troughs, windmills/wells and stockyards, residences, fencing, establishment of pasture improved grasses and erosion control measures such as contour banks);
- ❑ Erosion of hill-slopes and watercourses and the subsequent deposition of soils on the middle and lower portions of drainage lines (subsequent to the removal of native vegetation and introduction of hooved animals);
- ❑ Essential services and transport (formed roads and unformed vehicle tracks and electricity transmission lines);
- ❑ Recreational activities; and
- ❑ Mining (exploratory drilling).

Hence, the survival and integrity of Aboriginal heritage evidence may have been affected to varying extents by these activities and their subsequent effects on natural processes such as erosion.

3. ABORIGINAL ARCHAEOLOGICAL CONTEXT

3.1 Heritage Register Searches

Searches #639897 and #645408 were undertaken on 18 November and 7 December 2021 of the Heritage NSW Aboriginal Heritage Information Management System (AHIMS), between MGA grid coordinates 304000 and 308000 east and 6395000 and 6400000 north.

A total of 132 sites are listed on the AHIMS register within this area, which encompasses the present Modification investigation area, including 125 open artefact sites, three open Potential Archaeological Deposits (PADs), two scarred trees and two grinding grooves. Most of these sites were recorded by White (2003) for the Wambo EIS and heritage consultants RPS Australia East Pty Ltd ('RPS') during subsequent investigations at Wambo (refer to Section 3.2).

A total of 24 Aboriginal sites have previously been recorded directly within the Modification investigation area, all open artefact sites (artefact scatters and isolated artefacts). These sites are listed in Table 1 and their locations are shown on Figure 6. Full descriptions of these previously recorded sites are presented in Appendix 2 and they are discussed further in Section 5.

Nineteen of these sites are located in areas covered by an existing AHIP (refer to Figure 6). Nine of these sites have been subject to total salvage and a further three sites have been subject to partial salvage (with portions remaining *in situ*) under the relevant AHIP and Wambo Heritage Management Plan (HMP; WCPL 2019) (refer to discussion in Section 3.2).

No Aboriginal heritage sites are listed within the investigation area on any other heritage registers or planning instruments, including the *Singleton Local Environmental Plan 2013*, *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*, NSW State Heritage Register, or the Commonwealth Heritage List or National Heritage List under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Greater Blue Mountains Area is listed under the *EPBC Act* on the National Heritage List for natural values and is also a declared World Heritage Property and fringes the western margin of the investigation area (Figure 3).

Table 1: List of known Aboriginal sites within the Modification investigation area (based on Wambo site data and AHIMS searches #639897 and #645408).

AHIMS#	Site Name	Site Type	Comments
37-5-0358	Wambo Site 239	Open Artefact Site	Within AHIP #2222 area. Only western most edge borders Modification study area. Surface collection completed by South East Archaeology in December 2018 and salvage excavation completed in May 2019 (Kuskie 2019b, 2020c).
37-5-0359	Wambo Site 240	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by White (2003) and re-recorded by Kuskie (2017a). In situ with AHIP.
37-5-0360	Wambo Site 241	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by White (2003) and re-recorded by Kuskie (2017a). In situ with AHIP.
37-5-0605	Wambo Site 311	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by RPS and re-recorded by Kuskie (2017a). Surface collection of whole site completed by South East Archaeology in May 2018 (Kuskie 2018d).
37-5-0659	Wambo Site 317	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by RPS and re-recorded by Kuskie (2017a). In situ with AHIP.
37-5-0661	Wambo Site 318	Open Artefact Site	Initially recorded by RPS. In situ, no AHIP.
37-5-0662	Wambo Site 319	Open Artefact Site	Initially recorded by RPS. In situ, no AHIP.
37-5-0663	Wambo Site 320	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by RPS and re-recorded by Kuskie (2017a). In situ with AHIP.
37-5-0664	Wambo Site 321	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by RPS and re-recorded by Kuskie (2017a). Surface collection of portion of site along road completed by South East Archaeology in May 2018 (Kuskie 2018d). Portion of site off road in situ with AHIP.
37-5-0668	Wambo Site 327	Open Artefact Site	Initially recorded by RPS. In situ, no AHIP.
37-5-0692	United IF-5	Open Artefact Site	Within AHIP 2222 area. Recorded by OzArk (2016). Salvaged by OzArk in 2021.
37-5-0767	Wambo Site 483	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by Kuskie (2017a). Surface collection of portion of site along road completed by South East Archaeology in May 2018 (Kuskie 2018d). Portion of site off road in situ with AHIP.
37-5-0782	South Bates Soil Test 2/A	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by Kuskie (2017a). Surface collection of whole site completed by South East Archaeology in May 2018 (Kuskie 2018d).
37-5-0783	South Bates Soil Test 6/A	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by Kuskie (2017a). Surface collection of portion of site along road completed by South East Archaeology in May 2018 (Kuskie 2018d). Portion of site off road in situ with AHIP.
37-5-0786	Wambo Site 484	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by Kuskie (2017a). In situ with AHIP.
37-5-0787	Wambo Site 485	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by Kuskie (2017a). Surface collection of whole site completed by South East Archaeology in May 2018 (Kuskie 2018d).

Table 1 (continued):

AHIMS#	Site Name	Site Type	Comments
37-5-0788	Wambo Site 486	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by Kuskie (2017a). Surface collection of whole site completed by South East Archaeology in May 2018 (Kuskie 2018d).
37-5-0789	Wambo Site 487	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by Kuskie (2017a). Surface collection of whole site completed by South East Archaeology in May 2018 (Kuskie 2018d).
37-5-0790	Wambo Site 488	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by Kuskie (2017a). Surface collection of whole site completed by South East Archaeology in May 2018 (Kuskie 2018d).
37-5-0791	Wambo Site 489	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by Kuskie (2017a). Surface collection of whole site completed by South East Archaeology in May 2018 (Kuskie 2018d).
37-5-0792	Wambo Site 490	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by Kuskie (2017a). In situ with AHIP.
37-5-0793	Wambo Site 491	Open Artefact Site	Within AHIP #C0003213 area. Initially recorded by Kuskie (2017a). In situ with AHIP.
pending	Wambo Site 513	Open Artefact Site	Initially recorded by Kuskie (2020a) and submitted to AHIMS 7 May 2020 but not yet listed on AHIMS. In situ, no AHIP.
pending	Wambo Site 514	Open Artefact Site	Initially recorded by Kuskie (2020d) and submitted to AHIMS 27 October 2020 but not yet listed on AHIMS. In situ, no AHIP.

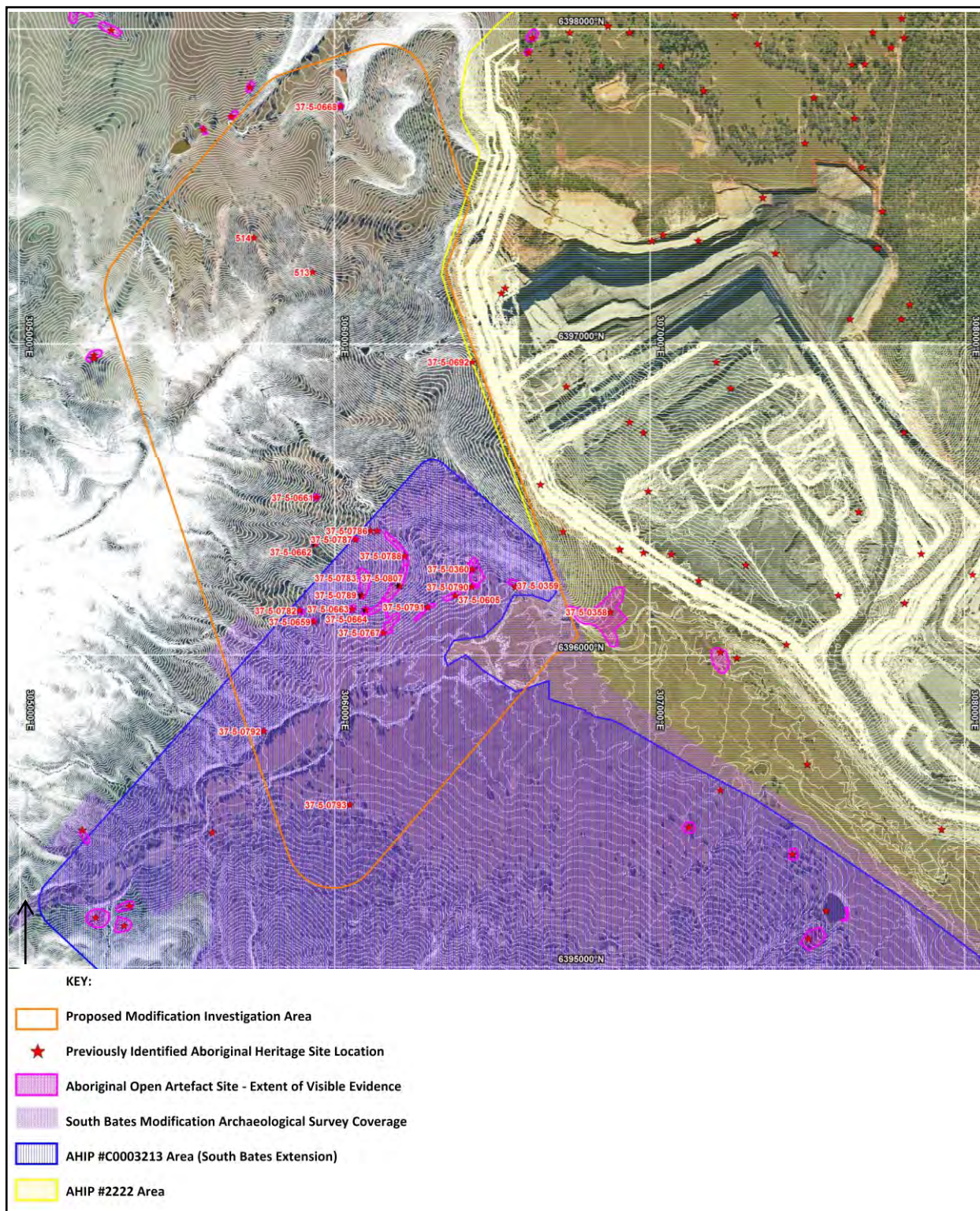


Figure 6: Previous archaeological survey coverage and recorded Aboriginal heritage sites within and adjacent to the proposed South Bates Extension Underground Mine Longwalls 24-26 Modification investigation area (aerial photograph and one metre contours courtesy WCPL; one kilometre MGA grid; site data courtesy AHIMS and WCPL but not guaranteed to be free from error or omission - refer to Appendix 4 for latest version of Aboriginal site locations incorporating current survey results).

3.2 Previous Archaeological Research

Numerous archaeological surveys and excavations have been undertaken in the vicinity of Wambo, principally in relation to environmental assessments for the coal mining industry. Brief discussion of the most relevant investigations will highlight the range of site types and variety of site contents in the region, identify typical site locations, and assist with the construction of a predictive model of site location for the investigation area. For a more comprehensive discussion, refer to White (2003).

3.2.1 Wambo

Most of the Wambo Coal Lease has previously been subject to heritage surveys during investigations by Dyall (1980), Brayshaw (1984a), Corkill (1990) and Rich (1991a, 1991b, White 2003) and more recently by RPS and South East Archaeology (refer below).

Dyall (1980) surveyed the northern part of the Wambo Coal Lease, recording six artefact scatters and one grinding groove site. Four of the sites contained between 20 and 50 flakes, and were located near minor gullies. One site along North Wambo Creek contained three 'Bulga knives', an uncommon tool type.

Brayshaw (1984a) surveyed the north-eastern part of the Wambo Lease. Three small artefact scatter sites were located.

Corkill (1990) conducted a preliminary survey along South Wambo Creek and Stony Creek within the Wambo Lease, sampling within an area of about 550 hectares. Six artefact scatters and nine isolated artefacts were recorded. Most sites contained less than 30 artefacts. Rich (1991b) undertook further survey and test excavations within this area.

White (nee Rich, 1991a, 1991b) undertook survey sampling within an area of four kilometres length and 0.5 to 1.5 kilometres width along North Wambo Creek and within an area of 1.5 kilometres length and 0.25 to 0.45 kilometres width along Stony Creek, in relation to an EIS prepared by Envirosciences Pty Ltd (1991) into the expansion of Wambo Mine. Test excavations were also undertaken at two sites on Wambo Creek.

Rich (1991a) identified 16 artefacts scatters, two isolated artefacts, a possible scarred tree and a grinding groove site along North Wambo Creek. The artefact scatters tended to be eroding from the upper A horizon soil, or were exposed on the surface of an eroded B horizon. Several hearths were recorded, along with a possible heat treatment oven. A number of knapping floors were also identified. Rich (1991a) recorded most sites along the banks of North Wambo Creek or its tributary gullies. 'Indurated mudstone' (tuff) was reported as the dominant stone material, with 'silicified tuff' and silcrete also occurring (Rich 1991a). Variety in content occurred both within and between sites. Very few backed implements were found (1.3% of the combined site assemblages). However, an unusually high frequency of artefacts with retouch and/or use-wear was identified (26% of the combined site assemblages).

Brayshaw (1981), Silcox (1998) and Kuskie (1998a) have investigated the Jerrys Plains Coal Terminal and Rail Line, which included a then proposed balloon loop and rail loading facility within Wambo, west of Wollombi Brook. The 16 kilometre rail route extended between the Mount Thorley rail spur and a proposed coal terminal within the United Colliery and Wambo Mine leases. The rail line traversed terraces bordering Wollombi Brook at Wambo. Seventy-one locations containing Aboriginal archaeological evidence were identified by Silcox (1998), comprising 43 stone artefact scatters and 28 isolated artefacts. Conditions of surface visibility were variable, but generally high, within the study area.

Kuskie (1998b) investigated a proposed haulage road, stockpile area and conveyor route within the Wambo mine lease. Most of the study area had been impacted by previous mining activity. An isolated artefact and two small artefact scatters were located, the larger one containing 34 artefacts. Tuff was the dominant stone type, with very low frequencies of silcrete and other materials.

Kuskie (2000b) investigated proposed haul road routes from Wambo Mine to Lemington Mine, in relation to links to the Jerrys Plains Coal Terminal. One route extended from the Wambo Coal Preparation Plant (CPP) to the Lemington CPP, and two route options existed at United Colliery (Options A and B). Six Aboriginal heritage sites were identified, all scatters of stone artefacts, within 19 separate loci along the 7.4 kilometres of road routes. A total of 55 artefacts were recorded.

White (2003) Wambo EIS:

White (2003) undertook a comprehensive assessment for the Wambo Coal Mine EIS. The assessment encompassed an area of 60 square kilometres, and involved sample surveys, community consultation and detailed reporting, with thorough research and discussion about the environmental and cultural context of the area, occupation models and interpretations of the identified evidence.

White's (2003) assessment provided the foundation for WCPL to obtain AHIP #2222, which covers a broad portion of the Wambo area and extends into the south-eastern portion of the present Modification investigation area (refer to Figures 4 and 7).

The approximate extent of White's (2003) direct survey coverage, which also extends into the present investigation area, is shown on Figure 7. Surveys were conducted over 11 days in late 2002, with approximately 604 hectares of direct survey coverage achieved within the 2,443 hectare impact area (ie. 25% of this area), and an additional 181 hectares of coverage beyond the impact area (White 2003).

White (2003) reported that a total of 292 sites had at that time been identified in the Wambo study area or in proximity to the proposed rail line. Notably, on the eastern edge of the study area was the carved tree "Site 2" (AHIMS #37-6-56), part of the 'Bulga bora ground'. Brayshaw (2003) conducted research to re-establish the location of the bora ground (Attachment D1 of White 2003). Although the trees were no longer identifiable, since the site was recorded in 1918, White (2003) reports that the site is of considerable value as a ceremonial area to the Aboriginal community.

Other site types reported by White (2003) as occurring in the Wambo study area included grinding grooves (two sites and two other possible sites), a probable scarred tree, and two sites with glass artefacts (and two other sites that may also include historical materials indicating they may be contact sites).

White (2003) identified two locations as having potential for datable geomorphic contexts, a red sand body on which Wambo Sites 30 and 31 were located, and a yellow sand dune east of Wollombi Brook. A geomorphological assessment was undertaken by Hughes (2003; Attachment D2 of White 2003). Proposed surface impacts were redesigned to avoid these geomorphological features.

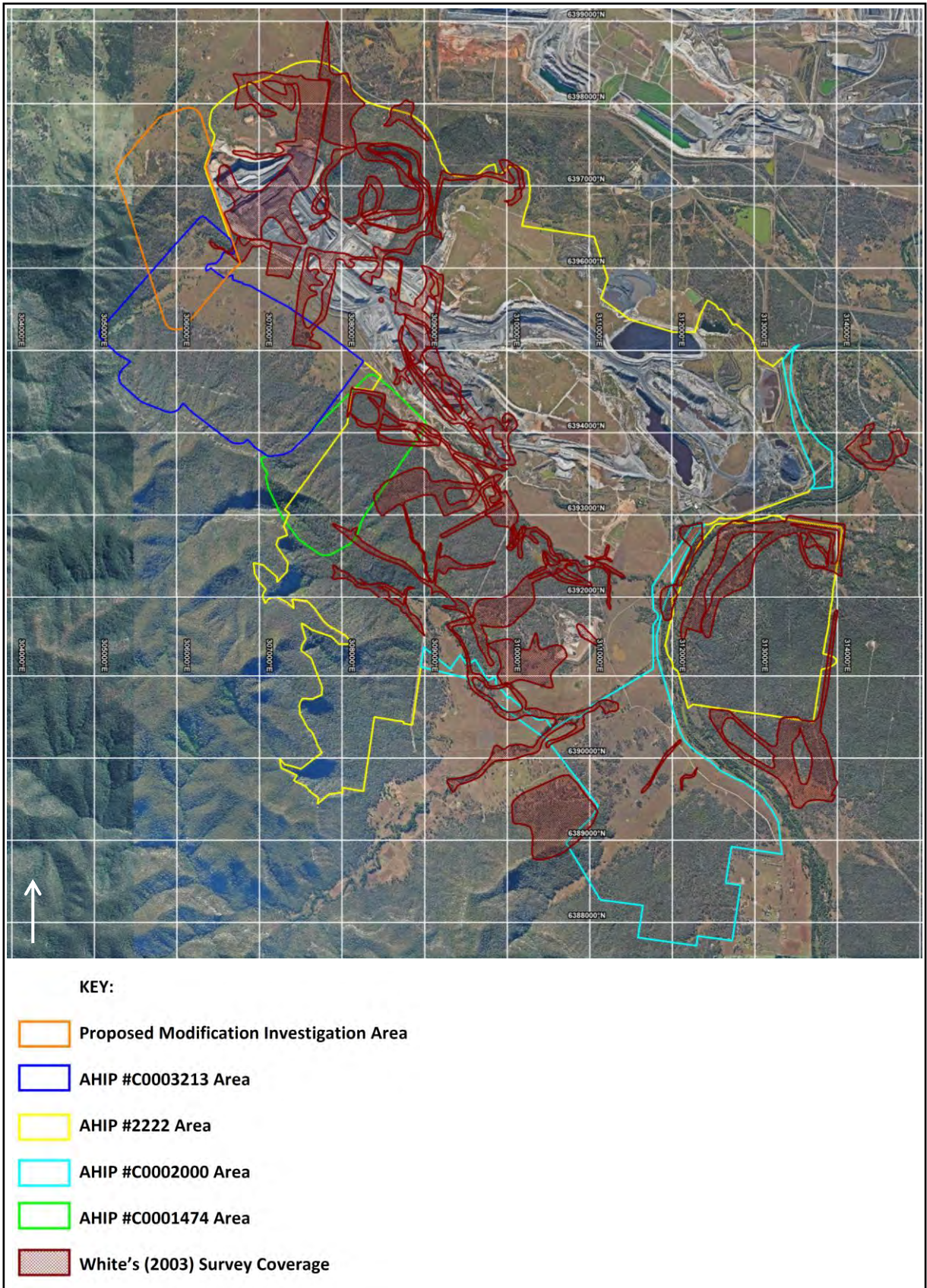


Figure 7: Previous heritage survey coverage of White (2003) at Wambo (one kilometre MGA grid; aerial photograph and survey data courtesy WCPL).

The remaining sites reported by White (2003) were open artefact scatters and isolated finds. Most of the open artefact sites were very small, with 110 being isolated finds, and 69 containing between two and four visible artefacts. Only 18 sites had more than 50 visible artefacts and White (2003) identified that all those occurred below 125 metres Australian Height Datum (AHD) and were generally associated with higher order watercourses.

White (2003) recorded 2,826 artefacts within the 2,433 hectare project impact area, along with another 1,108 artefacts in areas beyond the impact area. White's (2003) detailed analysis of mean surface artefact densities found that the highest densities occurred on crests, simple slopes and waning lower slopes above fourth order (or higher) creeks, crests within 100 metres of second order creeks, and simple slopes and waning lower slopes within 50 metres of second order creeks. Based on the analysis of artefact distributions, White (2003) identified 20 potential Aboriginal site locations (PADs) in areas in which artefacts had not been found, either because of low visibility or other "survey constraints".

White's (2003) analysis of artefact assemblages identified variations in the distribution of stone materials across the Wambo study area, particularly silcrete. White (2003) hypothesised that some variation could be related to stone material rationing, as people moved away from known silcrete sources near the Hunter River. Along the western part of North Wambo Creek, in the vicinity of the Modification investigation area, only 13% of recorded artefacts were silcrete, the lowest frequency identified by White (2003) in the locality. However, White (2003) noted that this low frequency of silcrete, at sites only five to seven kilometres from known sources, could not be explained as stone rationing due to a great distance from the source, rather a social boundary or barrier may have existed.

Variation in the use of materials, especially silcrete, was also identified by White (2003) within different parts of the Wambo study area, in relation to landscape variables such as stream order, distance from water and landform type. Silcrete occurred more frequently close to larger creeks, close to water and on flats and waning lower slopes. Silcrete was also more frequent at larger sites than smaller sites. Quartz and quartzite occurred in low frequencies, and tended to be more frequent at sites associated with first order creeks and at sites more distant from water. White (2003) interpreted this as variation in technological organisation across the landscape, with silcrete not often carried into the hilly hinterland areas surrounding sites on the larger creeks.

White (2003) noted that in the southern part of the Wambo area, along Wambo and Stony Creeks and along 'Wambo Ridge 1', these trends, particularly in the use of silcrete, did not occur. This area is most distant (eight to ten kilometres) from known silcrete sources yet silcrete comprised 23% of these assemblages (more than assemblages along the eastern end of North Wambo Creek closer to the silcrete sources). Further, White (2003) noted that the relative frequencies of silcrete artefacts in the southern part of the area did not vary with stream order, and if anything, became more frequent at sites distant from water. In this southern area, the relative frequencies of silcrete artefacts were also the same at sites, regardless of site size. White (2003) postulated that in this southern area, silcrete was carried equally across the landscape, possibly partly for the reason that Wambo Ridge and other ridges north and south of Wambo Creek could have been used as access routes by people travelling between the lowlands and the mountains. People may have carried silcrete with them on their trips, using it in a variety of landscape settings on the way (White 2003).

White's (2003) analysis of artefact sizes showed that sites in areas closest to the Hunter River and its stone sources tended to have larger artefacts than those further away, with Wambo Site 13 at the eastern end of the rail spur and closest to the stone sources being an exception. Apart from Wambo Site 13, sites along Wambo and Stony Creeks and Wambo Ridge tended to have overall the smallest artefacts. This finding supported the hypothesis that stone in this part of the area was transported the furthest distances.

White's (2003) analysis of artefact types was constrained by limited sample sizes. Summary analyses indicated slightly increased discard of cobble tools at sites associated with first order streams and at elevations above 95 metres AHD. Backed artefacts were least frequent at sites associated with first order streams and none were found above 125 metres AHD. Small tools (under 50 millimetres in size) were also least frequent above 125 metres AHD. White (2003) interpreted these variations in relation to different ways stone technology was organised in relation to use of the landscape.

White (2003) reached five main conclusions from the analyses:

- 1) *General use of the landscape* - Variation in site size and artefact density, stone material use and artefact types indicates variation in the nature and/or repetition of artefact discard activities. Some of this variation could relate to the differing use of residential sites, use of meal-time sites and/or locations occupied by small numbers of people for over-night stays, resource processing sites and resource extraction.
- 2) *Change over time in use of the landscape* - The survey data revealed minimal datable evidence, but more could be achieved by excavation. It is known that the study area was used in the historic period, as two sites (Wambo Sites 62 and 207) had flaked glass tools, and two others (Wambo Sites 17 and 31) had scatters of historic materials associated with stone artefacts and may also have been occupied in the historic period. The carved tree site (bora ground) was reportedly used in 1852. There is also the report that Aboriginal groups met in the historic period at the Greenhault house near Wollombi Brook. It is possible that the main phase of backed artefact production and use occurred during the Middle Bondaian phase, which dates to about 1,000 - 4,000 years BP. Geomorphic contexts such as the red sand body on which Wambo Sites 30 and 31 are located, and the yellow sand dune east of Wollombi Brook (PAD D) might contain datable materials.
- 3) *Wambo Ridge as an access route* - Wambo Ridge may have formed an access route from the lower valleys of Wambo, Stony and North Wambo Creeks and Wollombi Brook, into the higher sandstone country to the west of the study area (refer to Figures 8 and 13). At the western end of the surveyed section Wambo Site 89 was located in a saddle, the largest site at higher altitude found during the survey. The ridge was probably used as an access route, to foraging areas such as that presented by the *Macrozamia* plants and/or as a route into the sandstone mountains. Other ridges south of Stony Creek might also have formed access routes, and may have been important for people attending ceremonies such as that held at the bora ground, but these were not surveyed.
- 4) *The eastern end of Jerrys Plains Ridge* - Jerrys Plains Ridge, like Wambo Ridge, leads into the sandstone mountains west of Wambo, and it forms the watershed between creeks flowing north into the Hunter River and creeks flowing south into North Wambo Creek. However, sections of the eastern extension of the ridge are dissected and include several steep climbs, and the artefact evidence was not conclusive.
- 5) *Low frequency of silcrete along the western part of North Wambo Creek* - The distribution of silcrete varied across the study area, most notably along the western end of North Wambo Creek where just 13% of recorded artefacts were of silcrete. White (2003) hypothesised that some kind of "porous" social boundary existed in this part of the Wambo area through which only limited amounts of silcrete were transported, with one possibility being that it represented a boundary between different groups.

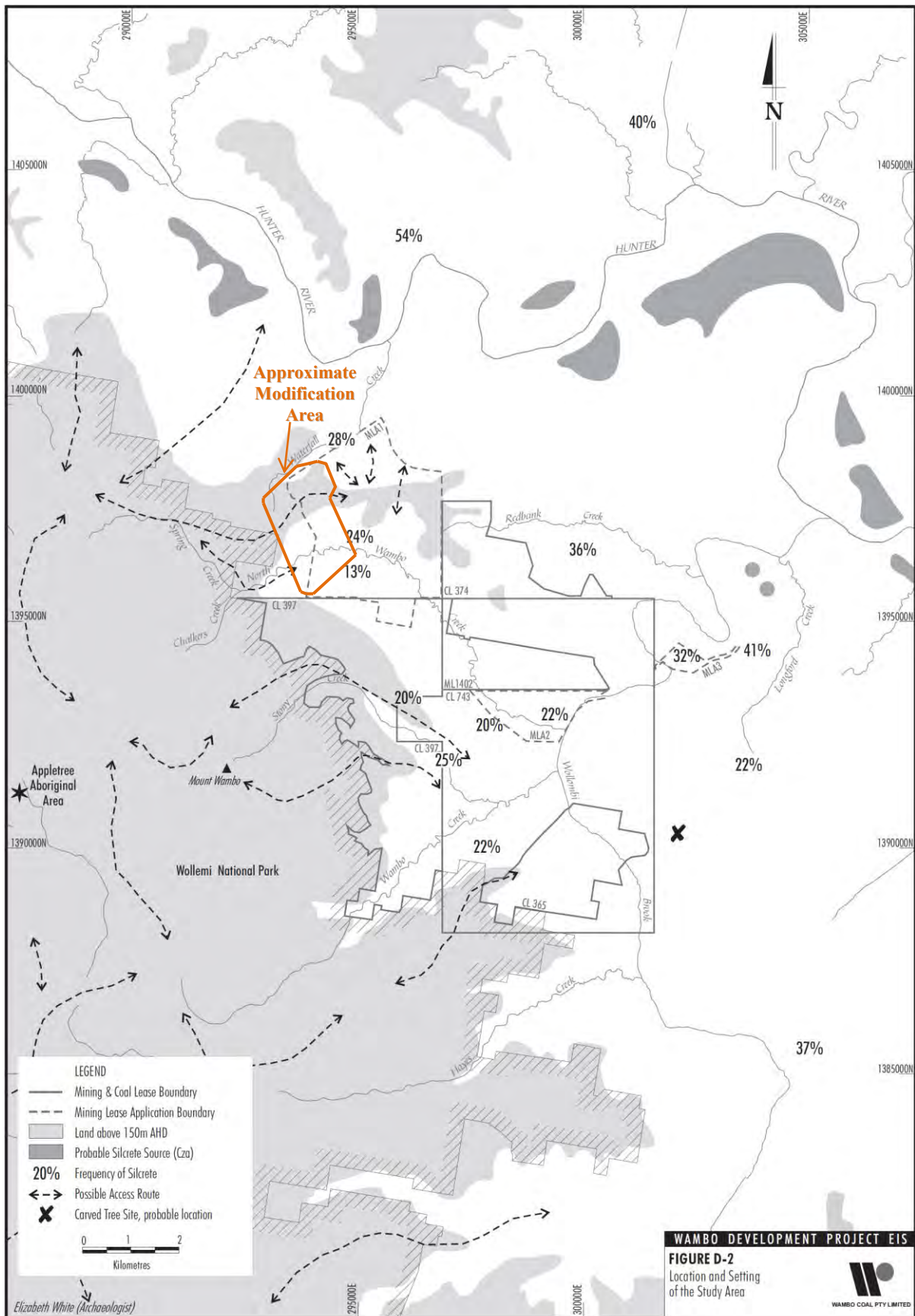


Figure 8: Potential access routes identified by White (2003: Figure D-2).

White (2003) presented a number of key recommendations which have subsequently been addressed through AHIP #2222, including that WCPL:

- 1) Set aside an area to 'off-set' the loss of Aboriginal sites resulting from the proposed expansion of the open cut mine.
- 2) Conduct an archaeological survey along the routes of the proposed rail line and Wallaby Scrub Road diversion. Any sites or potential site locations should be assessed and if impacts cannot be avoided, salvage may be appropriate. Sites which are close to the proposed routes should be temporarily fenced to avoid accidental damage.
- 3) Apply for an AHIP (formerly "Section 90 Consent") in relation to Aboriginal sites within the proposed surface impact area to cover the life of the mining operations in this area.
- 4) Provide for the excavation, analysis and reporting of Wambo Sites 154, 168/PAD N, 239, PAD R, 247, 248, 258, 259, 263, 268, 286 and 287, and collection of a representative sample artefact from other sites within the proposed surface impact area.
- 5) Apply for an AHIP in relation to Aboriginal sites within the proposed underground mining subsidence Zones A, B1 and B2 to cover the life of the underground mining, so that ongoing site management and remedial works could be carried out as necessary.
- 6) Provide for re-recording of sites in Zone A prior to underground mining to provide an up-to-date record of the sites.
- 7) Provide for monitoring of selected sites and areas in Zones A, B1 and B2, to assess ground disturbance related to subsidence (eg. changing surface contours, ponding, cracking, erosion). If any damage to the ground occurs it should be assessed for its possible damage to Aboriginal sites (whether sites are known or not), with a view to either doing nothing, or carrying out further investigations, which may include temporarily retrieving artefacts and then replacing them later.
- 8) Ensure that the process of temporary artefact collection, recording and return would be carefully documented so that in the future it would be possible to determine which artefacts and sites had been disturbed by these activities and which had not.
- 9) Ensure that subsidence mitigation works are carried out in a manner sensitive to the nature of the Aboriginal sites and their landscape settings, without causing undue damage to sites.
- 10) Consider setting up a secure 'Keeping Place' for Aboriginal artefacts and other materials recovered from the study area.
- 11) Consider the feasibility of an alternative route to the existing road which runs parallel to North Wambo Creek and through the area in which Wambo Sites 100 - 124 occur.
- 12) Consider closing the vehicle track along Wambo Ridge on which Wambo Sites 82 - 89 occur.
- 13) Consider closing the road which runs across the red sand body through Wambo Sites 30 and 31.
- 14) Consider removing stock from the vicinity of Wambo Sites 98 - 125 near North Wambo Creek.
- 15) Prepare an Aboriginal Cultural Heritage Management Plan which sets out how these recommendations or other management strategies would be implemented.

AHIP #2222:

Subsequent to the detailed investigations by White (2003) and additional consultation in relation to the then recently introduced *Interim Community Consultation Requirements for Applicants* policy (DEC 2004), AHIP #2222 was issued by the then Department of Environment and Conservation (DEC; now Heritage NSW) to WCPL on 20 June 2005. AHIP #2222 allows for the disturbance and/or salvage of all known and unknown Aboriginal objects within the 'Application Area' (refer to Figure 7), excluding Aboriginal skeletal remains, in accordance with the Terms and Conditions of the AHIP.

Attachment 3 of the AHIP Application, prepared by Navin Officer Heritage Consultants (*Wambo Development Project - Aboriginal Heritage Research Design and Study Plan {Incorporating Salvage Programme}*) formed the basis of the initial AHIP #2222 application and methodology for subsequent heritage salvages until late 2017.

AHIP #2222 has been varied on a number of separate occasions including:

- ❑ Variation approved 7 May 2010 to extend the timeframe of AHIP #2222 by five years to 19 June 2015;
- ❑ Variation approved 2 August 2013 to marginally extend the boundary of AHIP #2222 to allow for disturbance and potential impacts associated with the development of Longwalls 9 and 10 at the North Wambo Underground Mine for a very small area at the southern end of the panels that had not been included in the original AHIP #2222;
- ❑ Variation approved 29 April 2015 to extend the timeframe of AHIP #2222 to 1 March 2025 (ie. in line with the approved life of Wambo) and to marginally extend the boundary of AHIP #2222 to allow for disturbance and potential impacts associated with the development of Longwall 10A of the North Wambo Underground Mine for a very small area at the edge of the panel that had not been included in the original AHIP #2222; and
- ❑ Variation approved 4 September 2017 to include reference to the Wambo HMP instead of the previous Attachment 3 *Wambo Development Project – Aboriginal Heritage Research Design and Study Plan (Incorporating Salvage Programme)*.

Salvages of sites and other management actions have occurred under AHIP #2222 by Navin Officer Heritage Consultants, Kayandel Archaeological Services, RPS and South East Archaeology (refer below).

In accordance with Section 85 of the NP&W Act, WCPL also obtained a Care and Control Permit #3130 for the temporary storage of salvaged artefacts until they can be returned to the landscape after the completion of mining and rehabilitation activities. The Care and Control Permit #3130 has been varied to extend its life until 1 March 2025.

AHIP #2085:

An additional AHIP #2085 was granted to WCPL on 14 December 2004, with Aboriginal sites salvaged under this permit in advance of construction of the rail loop. AHIP #2085 has since expired and further actions are not required.

RPS (2009 - 2016):

RPS (2009 - 2016) undertook several due diligence surveys, surveys for mine expansion constraints studies, and surface collections and excavations under the relevant AHIPs.

RPS (2011) assessed the proposed Montrose East Underground Modification, a plan for three new longwall panels and associated facilities in an area of approximately 250 hectares, which is located immediately to the south of the present Modification investigation area (Figure 9). The application for a Modification was subsequently withdrawn by WCPL following public exhibition, but prior to approval.

RPS (2011) undertook consultation with the Aboriginal community in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy (DECCW 2010c), which resulted in the identification of 31 RAPs. Participation of RAPs in the field investigation was arranged in accordance with a "roster system" established on 12 February 2009 to provide "for the equitable distribution of fieldwork between the various Aboriginal stakeholder groups registered for fieldwork at the Wambo Mine" (RPS 2011:21). The RPS (2011) survey was undertaken over three days in 2010 and involved subdivision of the area into four 'survey units'. Several sites recorded by White (2003) were re-located and a 'scarred tree' (Wambo Site 324) recorded. "PAD L" of White (2003) was re-located and assessed as being of minimal potential.

RPS (2012a) assessed the North Wambo Underground Mine Modification (Modification 13), a proposal to develop two additional longwall panels (Longwalls 9 and 10) in the Wambo Seam, several kilometres south-east of the present Modification investigation area. An archaeological survey was undertaken over six days in 2011 and 2012 with an area of about 200 hectares subject to survey sampling within six 'survey units'. A number of previously recorded sites existed within the investigation area, and 16 new sites were identified, predominantly artefact scatters and one 'possible scarred tree'.

RPS (2012b) conducted a due diligence assessment of an approximate 24 hectare area in which a water storage area and related surface facilities were proposed for the Montrose Water Storage Modification (Modification 11). The location of this now approved, but yet to be constructed area, is approximately one kilometre south of the present Modification investigation area (refer to Figure 10). A survey was undertaken over three days in 2012, sampling within two 'survey units', and no new Aboriginal sites were identified. Wambo Site 497 was subsequently identified within this area (Kuskie 2017a).

RPS (2014a) conducted an assessment for the North Wambo Underground Mine Longwall Panel 10A Modification (Modification 14), adjacent to Wollombi Brook. An archaeological survey was undertaken over two days in 2014 with an area of about 50 hectares subject to survey sampling within three 'survey units'. Several previously recorded sites existed within the investigation area, and four new isolated artefacts were identified.

RPS (2014b) analysed site distribution patterns at Wambo in relation to environmental variables such as landforms and catchments, using data from previous surveys and salvages, including those undertaken but not reported by Navin Officer under AHIPs #2085 and #2222, and Kayandel (2007, 2009).

RPS (2015) conducted an assessment for the South Bates (Wambo Seam) Underground Mine Modification (Modification 15), two kilometres south-east of the present investigation area (refer to Figure 10). The investigation area approximately corresponds to that shown as the AHIP #C0001474 area on Figure 7. The Modification included the addition of three longwall panels (Longwalls 14 to 16) in the Wambo Seam below the three approved longwall panels in the Whybrow Seam (Longwalls 11 to 13) at the South Bates Underground Mine.

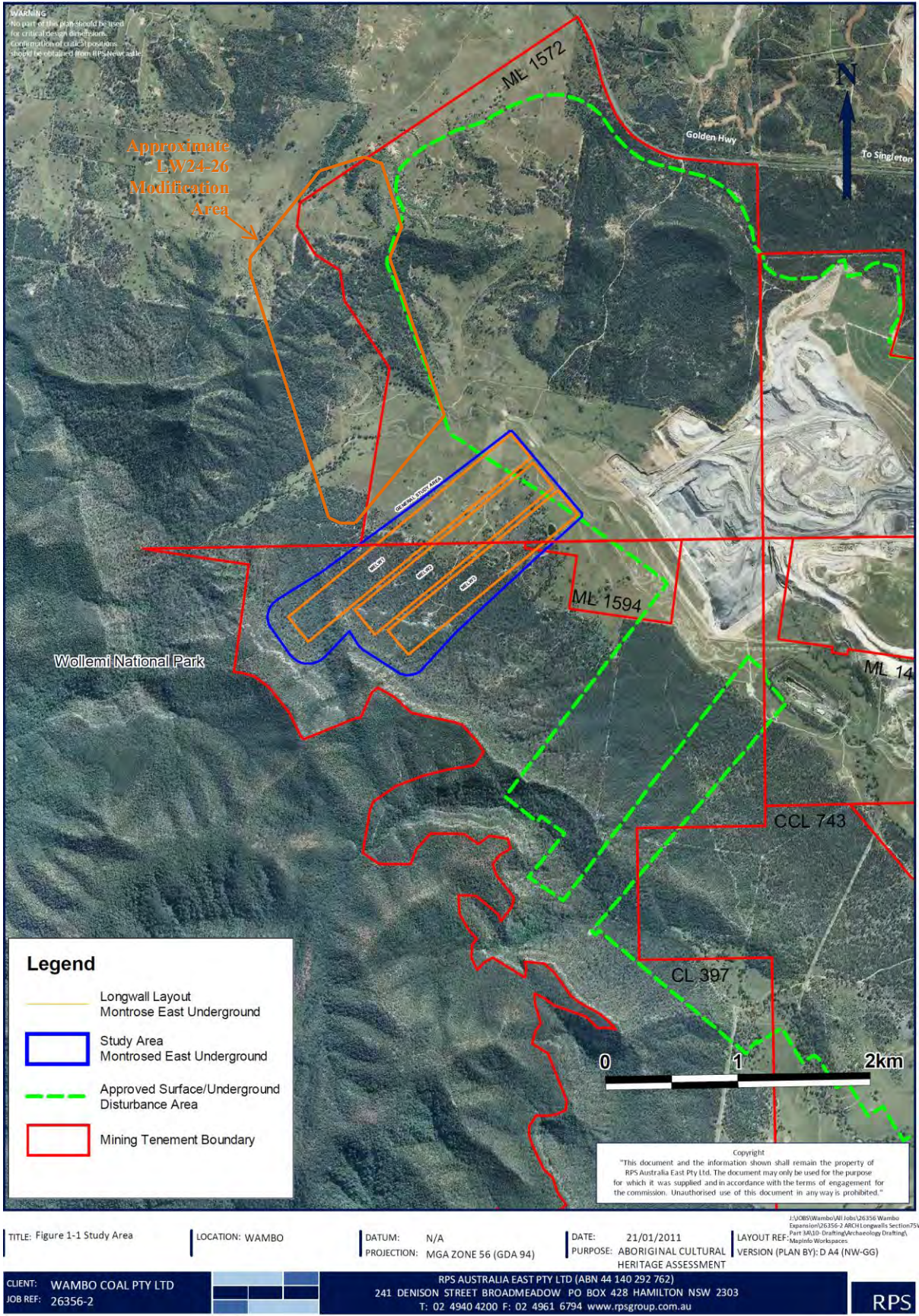
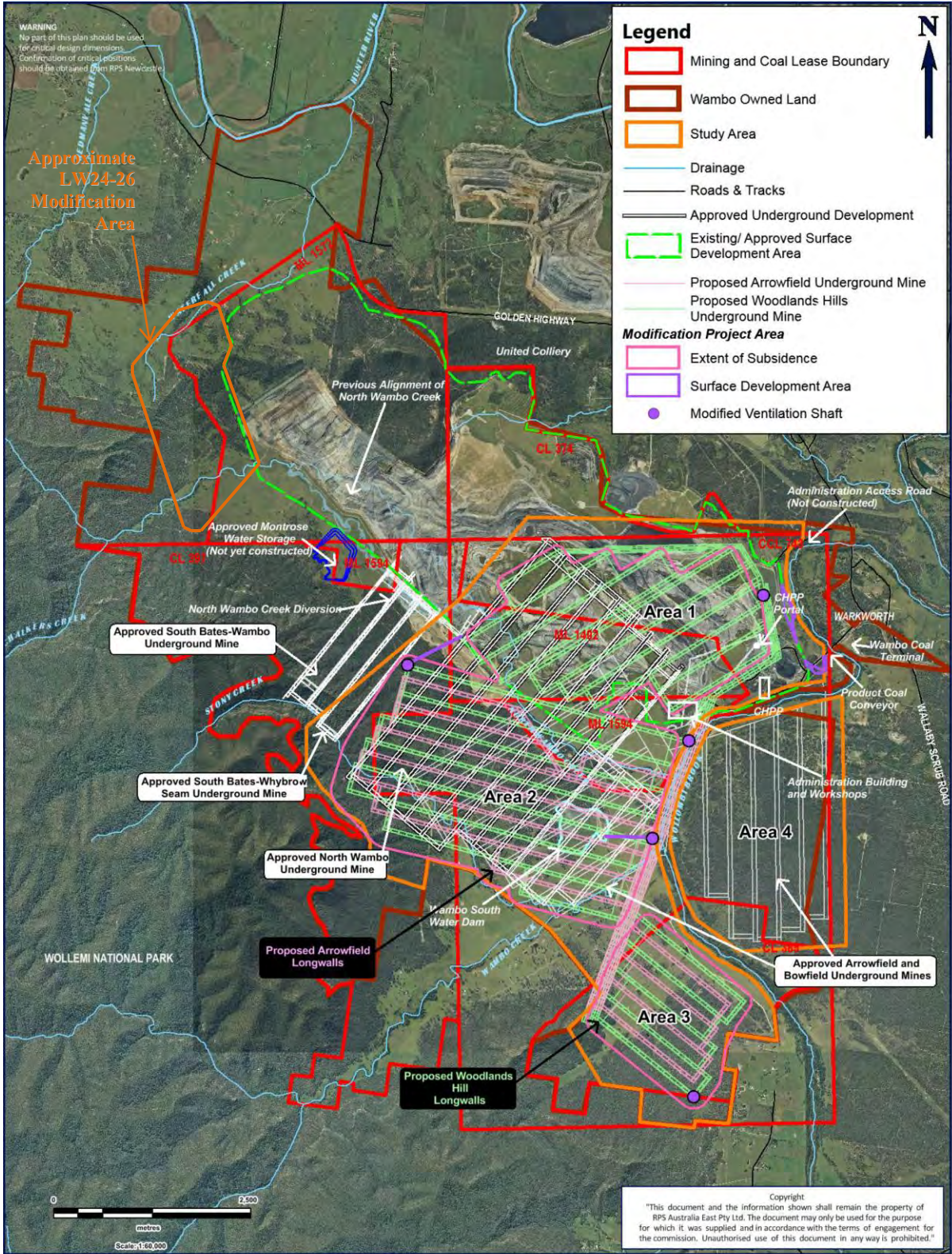


Figure 9: Montrose East Underground Modification investigation area of RPS (2011).



TITLE: FIGURE 3: PROPOSED SOUTH WAMBO UNDERGROUND MINE MODIFICATION	LOCATION: WAMBO MINE	DATUM: (GDA 94) PROJECTION: MGA ZONE 56	DATE: 15/01/2016 PURPOSE: HERITAGE	LAYOUT REF: <small>\\J:\085\Wambo\Wambo Mapping Database\Archaeology\128871 Survey Results\Report Figure</small> VERSION (PLAN BY): B A4 (NW-GG)
CLIENT: WAMBO COAL PTY LTD JOB REF: 128871	RPS AUSTRALIA EAST PTY LTD (ABN 44 140 292 762) 241 DENISON STREET BROADMEADOW PO BOX 428 HAMILTON NSW 2303 T: 02 4940 4200 F: 02 4961 6794 www.rpsgroup.com.au			RPS

Figure 10: South Wambo Underground Mine Modification investigation area of RPS (2016b).

Through implementation of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy (DECCW 2010c) and acceptance of previously registered parties at Wambo, a total of 66 RAPs had been identified for the assessment. An archaeological survey was undertaken over three days in 2015 with an area of about 230 hectares subject to survey sampling within five 'survey units'. Two previously recorded sites existed within the investigation area, and seven new sites were identified, bringing the total within the area to nine (five open artefact sites and four 'grinding grooves') (RPS 2015). The four grinding groove 'sites' have subsequently been reassessed and determined to be of non-Aboriginal origin (refer below).

AHIP #C0001474 was issued by the then OEH to WCPL on 19 November 2015 for the development of the South Bates Underground Mine. AHIP #C0001474 is valid until 19 November 2025 (refer to Figure 7).

RPS (2016a) reported on the salvages undertaken between 2004 and 2006 by Navin Officer under AHIPs #2085 and #2222 for the Wambo rail loop and rail spur and within the approval area for the Mine, that were not reported on by Navin Officer. The report was constrained by the limited information available about the salvaged artefacts, beyond data recorded on individual artefact bag labels. RPS (2016a) report that Navin Officer salvaged 3,695 artefacts between 2004 and 2006, including 2,255 under AHIP #2085 and 1,440 under AHIP #2222. Of these, most (2,711) were retrieved by surface collections, with 984 retrieved from sub-surface grader scrapes and test excavations.

RPS (2016b) conducted an assessment for the South Wambo Underground Mine Modification (Modification 12), a large area further than three kilometres south-east of the present investigation area (Figure 10). The Modification involved a realignment and extension/relocation of the approved South Wambo (Arrowfield Seam) Underground Mine longwall panels and the mining of the Woodlands Hill Seam rather than the Bowfield Seam.

Through implementation of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy (DECCW 2010c) and acceptance of previously registered parties at Wambo, a total of 66 RAPs had been identified for the assessment. An archaeological survey was undertaken over eight days in October 2015 with survey sampling within 11 'survey units'. The survey aimed to identify new sites, inspect previously recorded sites, and determine the visible extent of artefact sites, and targeted areas that had not been comprehensively surveyed previously or had been surveyed prior to 2012 but where it was considered that there was potential for impacts from the proposed Modification (RPS 2016b).

During the survey a total of 83 previously unrecorded Aboriginal sites were identified, including open artefact sites, grinding grooves, scarred trees and 'earth mounds'. Management recommendations were presented by RPS (2016b) to manage sites within the existing AHIP areas in accordance with those AHIPs, and to obtain a new AHIP for potential impact areas outside of the existing AHIP areas.

South East Archaeology (2016 - 2022):

South East Archaeology (Stephenson and Kuskie 2016a, 2016b) reassessed 12 reported grinding groove locations at Wambo (Wambo Sites 117, 296, 304, 329, 330, 331, 332, 377, 386, 387, 388 and 473). Multiple independent lines of evidence were used to re-examine the *in-situ* surfaces previously reported to be Aboriginal grooves. The available evidence supported the unequivocal conclusion that the ten groove locations reported by RPS are the consequence of natural erosion and weathering processes (with several features also associated with recent land-use impacts) and are not of Aboriginal origin or associated with Aboriginal occupation.

The evidence also supported the conclusion that the grooves reported by White (2003) at Wambo Site 117 are not of Aboriginal origin or associated with Aboriginal occupation, rather they are the consequence of natural erosion and weathering processes. The groove at Wambo Site 473, recorded by Besant and Wyatt (2008), was also assessed to be of non-Aboriginal origin and related to previous farming practices.

South East Archaeology (Kuskie 2016a) reassessed Wambo Site 312, reported by RPS as being a scarred tree of Aboriginal origin. Based on characteristics such as the young estimated age of the tree and scar (Urban Tree Management 2011), irregular, long and narrow shape and size of the scar and absence of axe marks, Kuskie (2016a) concluded that there was no basis for a conclusion that the scar was of Aboriginal cultural origin, and most likely relates to natural branch tear.

Kuskie (2016b, 2017f) undertook a due diligence assessment in relation to Aboriginal heritage for the proposed 66 kV Electricity Transmission Line (ETL) easement realignment on the eastern margin of the Mine near Wollombi Brook. The realignment extended for a total length of 980 metres and was to involve the construction of six new power poles. Proposed impacts would be minimal and largely associated with very small impact areas at the new pole locations. A survey undertaken with a representative of the RAPs for Wambo.

Two sites reported by RPS (Wambo Sites 304 and 325) within the area covered by AHIP #2222 were salvaged by South East Archaeology in accordance with the AHIP conditions (Kuskie 2016e). A previous reassessment by South East Archaeology (Stephenson and Kuskie 2016a) identified that the reported groove feature at Wambo Site 304 was the consequence of natural erosion and weathering processes and not of Aboriginal origin, hence only inspection for and collection of the reported 'red and yellow ochre pieces' was required.

Kuskie (2017e) undertook a reinspection of 50 Aboriginal sites within the potential subsidence impact area of Longwall Panels 8A to 10A (LW8A-10A) at the North Wambo Underground Mine, to identify whether any indirect impacts from subsidence or direct impacts from surface works relating to the Mine had occurred to these sites. Direct surface impacts were identified at six sites, comprising possibly minor impacts at two sites and total impacts at four sites (three of which had been subject to surface collection prior to impacts occurring). Indirect impacts associated with subsidence were identified at 24 sites. For 20 of these sites, the impacts were assessed as minor (typically minor cracking of soils), and confined to the context of the sites. At three sites indirect impacts were assessed as low to moderate, where larger cracks were present. One site (Wambo Site 99) was assessed as having moderate indirect subsidence impacts, which relate to major soil cracking near the banks of North Wambo Creek and some associated soil slumping, along with at least three fallen trees due to the cracking and gradient of the banks. This had affected the context of the site, but it was uncertain if any impacts had occurred to the artefacts themselves, as the site had been subject to surface collection prior to impacts occurring (Kuskie 2017e).

Kuskie (2017b) undertook a due diligence assessment in January 2017 for a program of drilling involving approximately four drill holes (two alternative locations were investigated for two drill holes, along with access routes where relevant), two within existing mine leases and the area covered by AHIP #2222, and two outside of the mine lease and AHIP areas north of Wambo near the Golden Highway. An isolated artefact ("Wambo 444EX06/A") was identified during the survey along an existing access track.

Kuskie (2017c) undertook a due diligence assessment in February 2017 for a program of drilling involving five drill holes (ELA-B4, ELA-B6, ELA-C6, ELA-C7 and ELA-C8) located within Exploration Lease (EL) 7211, north-west of the mine lease outside of the existing AHIP areas. No Aboriginal heritage evidence was identified within any of the five drilling areas or had been previously reported in these immediate locations.

Kuskie (2017d) undertook a due diligence assessment in May 2017 for a program of drilling involving two drill holes (444EX10 and 444EX11) located within Authorisation A444, north-east of the mine lease and outside of the area covered by existing AHIPs. One open artefact site, "444EX10/A", was identified during the survey near the initially proposed location of borehole 444EX10, which was subsequently relocated.

Kuskie (2018a) reported on the attempted salvage on 16 February 2018 of an isolated artefact "United IF-6" (AHIMS #37-5-0693) reported by OzArk (2016) within the area covered by AHIP #2222.

Kuskie (2018b) salvaged a small portion of Wambo Site 31 (AHIMS #37-5-0034) under AHIP #C0002000 and the Wambo HMP, that may be impacted by geological exploration works. Six artefacts were collected.

Kuskie (2018c) undertook a due diligence assessment in May 2018 for a program of drilling involving five drill holes, three located within existing mine leases (PT_081E, PT_131E and PT_181E) and the area covered by AHIP #2222, and two located outside of the mine lease and area covered by any AHIPs (Hunter 1 and Hunter 2). No Aboriginal heritage evidence was identified during the survey.

Kuskie (2018e) undertook a due diligence assessment in June 2018 for a drill hole in EL7211, outside of the mine lease and area covered by any AHIPs. No Aboriginal heritage evidence was identified during the survey.

Kuskie (2019a) undertook a due diligence assessment in January 2019 for a program of drilling involving five drill holes (NCM_C1 – NCM_C5) located within EL7211, north-west of the mine lease outside of the existing AHIP areas. No Aboriginal heritage evidence was identified within any of the five drilling areas or had been previously reported in these immediate locations.

Kuskie (2019c) reported on the salvage of eight open artefact sites (Wambo Sites 382, 384, 385, 449, 450, 451, 452 and 471) under AHIPs #C0001474 and #2222 and the Wambo HMP, in February 2019. A total of 66 artefacts were salvaged. Most of these artefacts recovered from Wambo Site 451 (37 artefacts) and Wambo Site 385 (12 artefacts).

Kuskie (2019d) undertook a due diligence assessment in May 2019 for a program of drilling involving two drill holes (EX09 and EX12) located within Authorisation A444, north-east of the mine lease and outside of the area covered by existing AHIPs. Two open artefact sites, "444EX09/A" and "444EX09/B", were identified during the survey near the initially proposed location of borehole EX09, which was subsequently relocated.

South East Archaeology – South Bates Extension Modification – Due Diligence:

Kuskie (2016c) undertook a due diligence assessment in relation to Aboriginal heritage for a proposed program of soil investigation, involving the excavation of shallow soil test pits in 15 locations within the South Bates Extension Modification area, incorporating the southern portion of the present LW24-26 Modification investigation area and adjacent land immediately to the south (refer to Figure 11). An area of around 30 x 30 metres was assessed at each test pit location, including through a survey undertaken with a representative of the RAPs for Wambo. Two previously unreported open artefact scatter sites were identified and recorded during the survey on 1 August 2016 ("South Bates Soil Test 2/A" and "South Bates Soil Test 6/A"). The soil test pits were subsequently relocated to avoid this evidence.

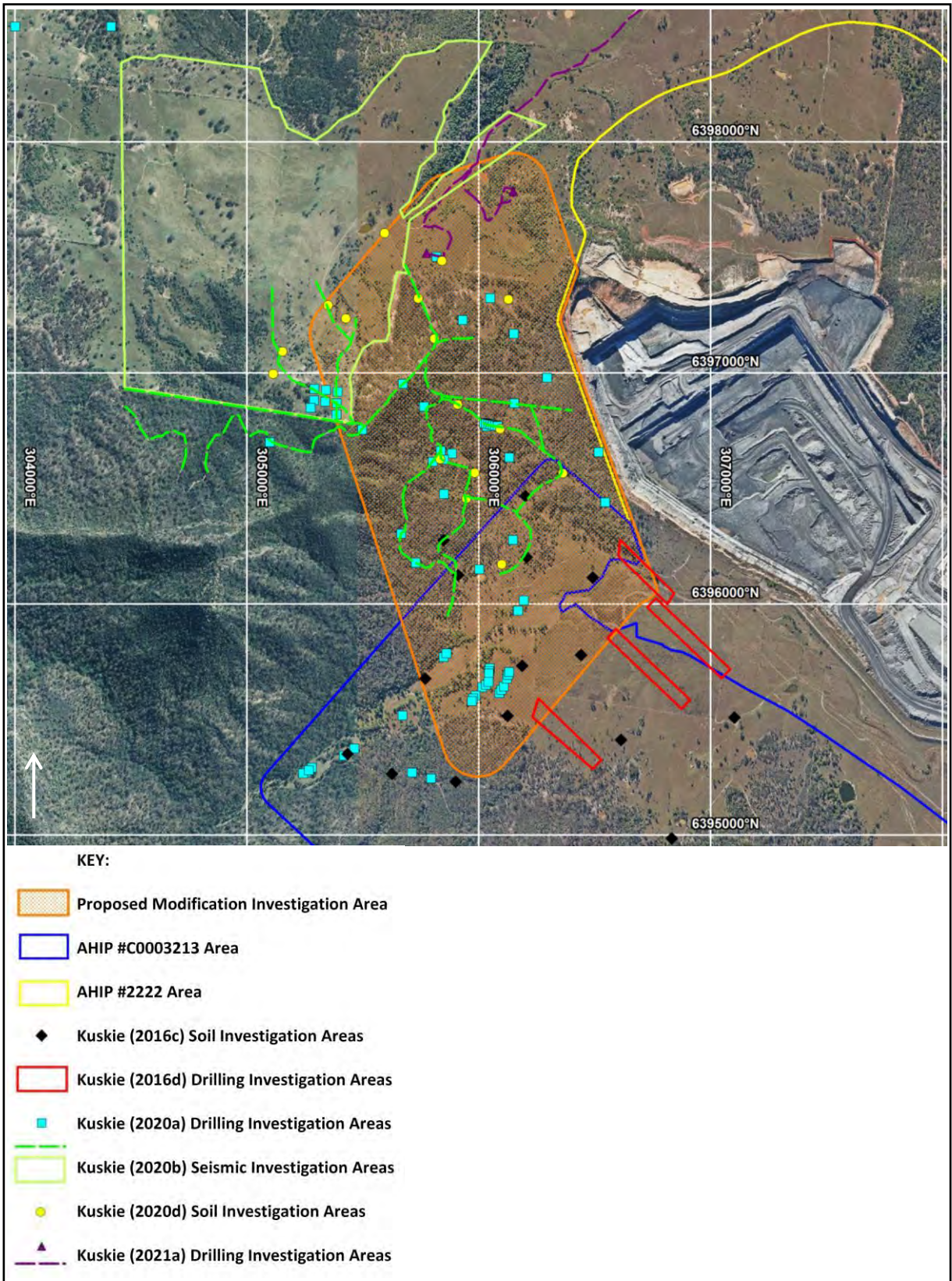


Figure 11: Previous heritage due diligence investigation areas within the Longwalls 24-26 Modification area (Kuskie 2016c, 2016d, 2020a, 2020b, 2020d and 2021a) (one kilometre MGA grid; aerial photograph courtesy WCPL).

Kuskie (2016d) undertook a due diligence assessment in relation to Aboriginal heritage for a proposed program of drilling, which would involve the excavation of a number of drill holes and in-ground sumps within the South Bates Extension Modification area, incorporating the southern portion of the present LW24-26 Modification investigation area and adjacent land immediately to the south (refer to Figure 11). Approximately eight drilling locations, each with two sumps were proposed within four separate areas of between 1.7 and 2.4 hectares each (total of 8.9 hectares). No Aboriginal heritage evidence was identified during the survey on 8 September 2016 or had previously been reported directly within the drilling investigation areas.

South East Archaeology – South Bates Extension Modification - Survey:

Kuskie (2017a) conducted an assessment of the South Bates Extension Modification, which involves an extension of mining in the Whybrow Seam to the north-west of the previously approved South Bates (Whybrow Seam) Underground Mine, to include nine additional longwall panels. The Modification utilises the existing approved infrastructure at the South Bates Underground Mine, with the addition of two new ventilation shafts (within the current approved surface development area at Wambo) and other ancillary infrastructure, including gas drainage.

The investigation area for the heritage assessment for the Modification measured approximately 508 hectares in area and included the area in which conventional subsidence impacts may occur, but excluded minor areas within the existing approved surface disturbance area (Kuskie 2017a). It encompassed the southern portion of the present Longwalls 24-26 Modification investigation area and additional land immediately adjacent to the south (refer to Figure 12).

A comprehensive program of consultation was undertaken with the Aboriginal community consistent with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy. A total of 69 RAPs were identified. A field survey of the investigation area was undertaken over nine days in November 2016 by qualified archaeologists from South East Archaeology accompanied on every day by representatives of the RAPs (Kuskie 2017a).

Comprehensive archaeological survey coverage was obtained across a 486 hectare area (referred to as the *heritage study area*), comprising 472 hectares within the underground investigation area and minor additional areas (totalling 14 hectares) outside of the final investigation area (refer to Figure 12). Approximately 93% of the total investigation area of 508 hectares was subject to systematic archaeological survey sampling. Minor areas totalling approximately 34 hectares or 7% of the investigation area could not be sampled due to logistical constraints, and two hectares were identified as totally modified ground with negligible heritage potential (Kuskie 2017a).

This *heritage study area* of approximately 486 hectares was subdivided into a total of 163 archaeological survey areas, each representing a specific combination of landform unit and class of slope. Each archaeological survey area was inspected for Aboriginal heritage evidence (Kuskie 2017a).

The total survey coverage (ground physically inspected for heritage evidence) equated to approximately 10.1% of the heritage study area (or 9.7% of the Modification heritage investigation area). As this coverage only refers to an area of several metres width directly inspected by each member of the survey team, the actual coverage for obtrusive site types (for example, scarred trees and rock shelters) was significantly greater than this. The total effective survey coverage (*visible* ground surface physically inspected with potential to host heritage evidence) equated to around 0.6% of the heritage study area (or 0.55% of the Modification heritage investigation area) (Kuskie 2017a).

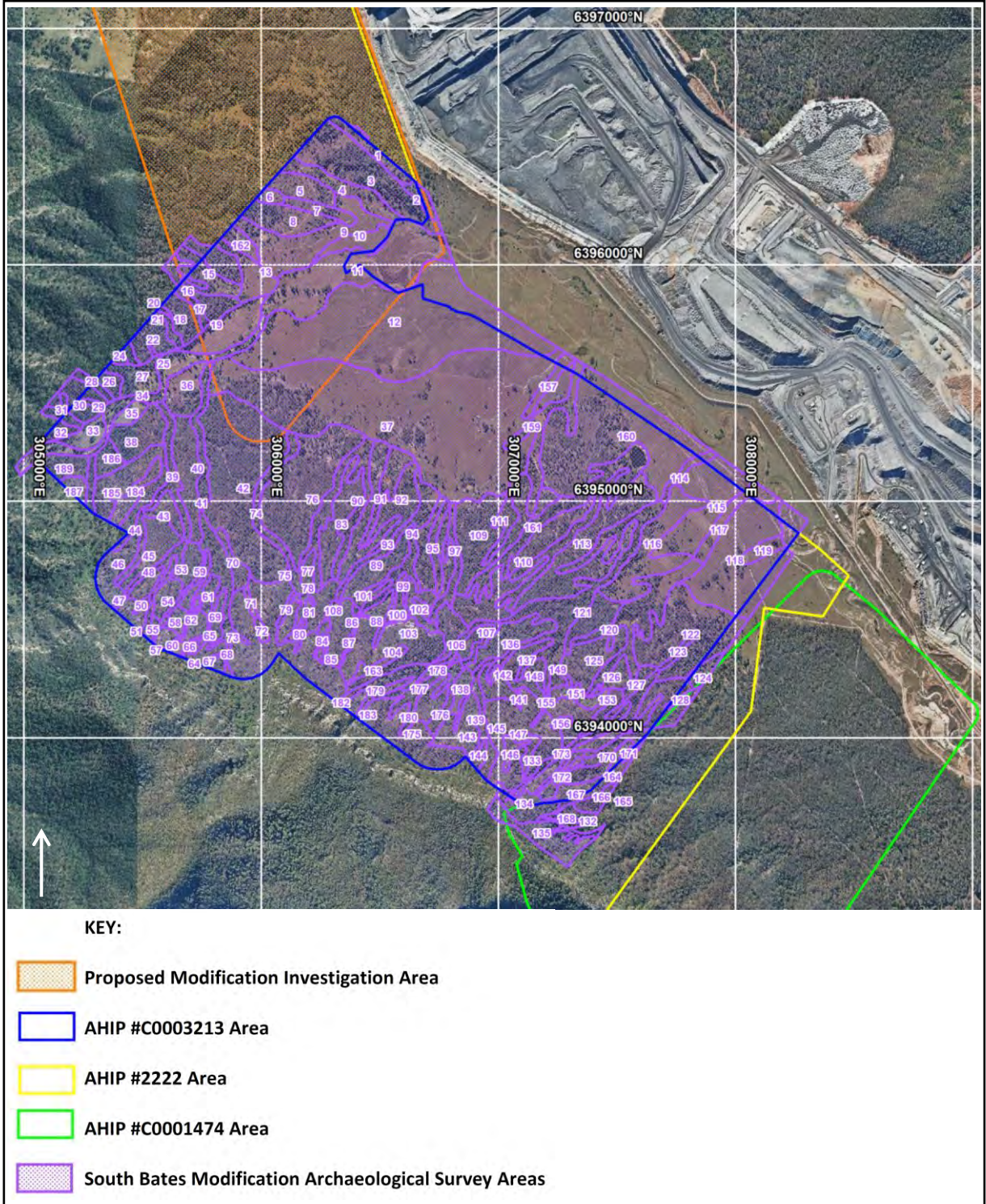


Figure 12: South Bates Modification archaeological survey areas (Kuskie 2017a, 2017g) (one kilometre MGA grid; aerial photograph courtesy WCPL).

Prior to this survey, 20 Aboriginal sites had previously been recorded directly in or within approximately 50 metres of the South Bates Modification heritage investigation area, comprising 15 open artefact sites, four open PADs and one scarred tree. The survey resulted in the identification of another 15 open artefact sites and six rock shelters with PADs (Kuskie 2017a). Several of the previously recorded sites were re-recorded and typically found to be larger in extent. A total of 414 stone artefacts were recorded in detail during the survey. Hence, a total of 30 open artefact sites, four open PADs, one scarred tree and six rock shelters with PADs were known to occur directly within or immediately adjacent to the investigation area (Kuskie 2017a).

Contemporary cultural values were also identified by the Aboriginal stakeholders, including those associated with the investigation area (relating to traditional land use and ongoing cultural and spiritual connections to the land and resources of the area), use of subsistence and other resources, pathways including the potential access from North Wambo Creek to Jerrys Plains Ridge, and in relation to the Aboriginal objects/sites (Kuskie 2017a).

The evidence identified during the survey was consistent with the occupation model for the locality developed by South East Archaeology (refer to Section 3.4). Much of the area comprises moderate to steep gradients, distant from higher order watercourses, and portions comprise gentle gradients that are also distant from higher order watercourses, in which it was inferred (and supported by the survey results) that there is limited potential for evidence of focused occupation. These contexts do not conform to primary or secondary resource zones under the model of occupation. The survey results supported predictions that the artefact evidence in these areas would typically be of a low to very low density consistent with background discard, and although a low frequency of activity areas (with consequent higher artefact density) may be present, will not represent focused occupation. Occupation of these portions of the investigation area was more likely to have related to hunting and gathering activities, along with transitory movement between locations and procurement of stone materials, and have been of a generally low intensity (Kuskie 2017a).

However, a small portion of the investigation area comprised the higher-order watercourse of North Wambo Creek and associated flats/terraces, which may comprise a secondary resource zone. Within this area of about 55 hectares (located largely within the southern portion of the present Longwalls 24-26 Modification investigation area), comprising low gradient ground within close proximity of the creek (typically within 100 to 200 metres), the occupation model indicated that a higher artefact density and potentially deposits of research significance may occur, where more focused occupation (eg. encampments, or events of longer duration or involving larger numbers of people) and/or repeated Aboriginal occupation may have occurred (in addition to hunting and gathering and transitory movement). This is a depositional environment and was also densely vegetated with grass, resulting in a very low sample of effective survey coverage and consequent identification of few artefacts during the survey. Notably however, where exposures were present, artefacts were often identified (Kuskie 2017a).

Consequently, the survey revealed limited evidence to fully test the occupation and predictive models in this secondary resource zone. Without systematic excavation of a representative sample of these contexts (both within and outside of the secondary resource zone), including at varying distances from North Wambo Creek, verification of this modelling and identification of the true nature and distribution of sub-surface evidence within these areas is not possible. However, in the context of limited potential impacts from the Modification, further investigation to test the model (eg. sub-surface test excavation) was not considered to be warranted (Kuskie 2017a).

White (2003) reported on various potential access routes between the lower valleys of Wambo, Stony and North Wambo Creeks and Wollombi Brook, and the higher sandstone country to the west. Potential access routes exist in the South Bates Modification area (and the present Longwalls 24-26 Modification investigation area; refer to Figure 13) and notably, many of the open artefact sites, hosting the vast majority of the recorded artefacts, were located on the lower portions of these areas. The relatively broad range of evidence in these sites, and relatively low densities (with potentially an accumulation of evidence through superimposition), supported the hypothesis that these spurs/ridges were access routes between the lower valleys (such as North Wambo Creek, which leads into Wollombi Brook) and the mountainous terrain to the west (Kuskie 2017a).

In view of the survey results, the predictive model of site location for the investigation area was reassessed, both in relation to the 7% of the investigation area that was not sampled, along with areas within the sampled zone that were not directly inspected. Other than additional stone artefact evidence as outlined above, the potential for other site types to occur was generally very low or negligible. Minor survey coverage gaps totalling approximately 34 hectares were subject to an additional survey over three days in June and July 2017 with three previously recorded sites (Wambo Sites 308, 309 and 310) relocated and recorded in detail and two previously unrecorded isolated artefacts and a rock shelter with PAD also identified (Kuskie 2017g).

In broad terms, the evidence from the Modification area was typical of that from the Central Lowlands of the Hunter Valley. No specific aspects of the evidence appeared to be rare or unusual or not replicated elsewhere within a regional context (Kuskie 2017a).

The significance of the Aboriginal heritage sites, cultural values and potential deposits was assessed against criteria widely used in Aboriginal heritage management, derived from the relevant aspects of the ICOMOS *Burra Charter*. One open artefact site was assessed as being of moderate significance within a local context, eight as being of low to possibly moderate significance and 21 as being of low significance. The six rock shelters with PADs, four open context PADs and single scarred tree were assessed as being of low significance within a local context. The Aboriginal representatives disclosed a number of associations with the investigation area of contemporary cultural significance, and it is important to observe that all heritage evidence tends to have some contemporary significance to Aboriginal people, because it represents an important tangible link to their past and to the landscape (Kuskie 2017a).

The primary potential impacts of the Modification on Aboriginal heritage related to indirect impacts to the ground surface associated with underground mining induced subsidence, within an area of about 508 hectares. Direct impacts from surface works would be minimal. With the implementation of mitigation measures, it was concluded by Kuskie (2017a) that the impacts of the Modification on Aboriginal heritage would be reduced to very low to negligible within both local and regional contexts.

Recommendations were presented to obtain an AHIP over the impact area, with key mitigation measures and further investigation including (Kuskie 2017a):

- ❑ Specific management strategies for identified Aboriginal sites and values as listed in Table 11 of Kuskie (2017a);
- ❑ Systematic heritage survey of all potential impact areas that were not subject to survey sampling (subsequently completed by Kuskie 2017g);
- ❑ Detailed recording of several open artefact sites that had not been fully recorded (subsequently completed by Kuskie 2017g, 2018d);

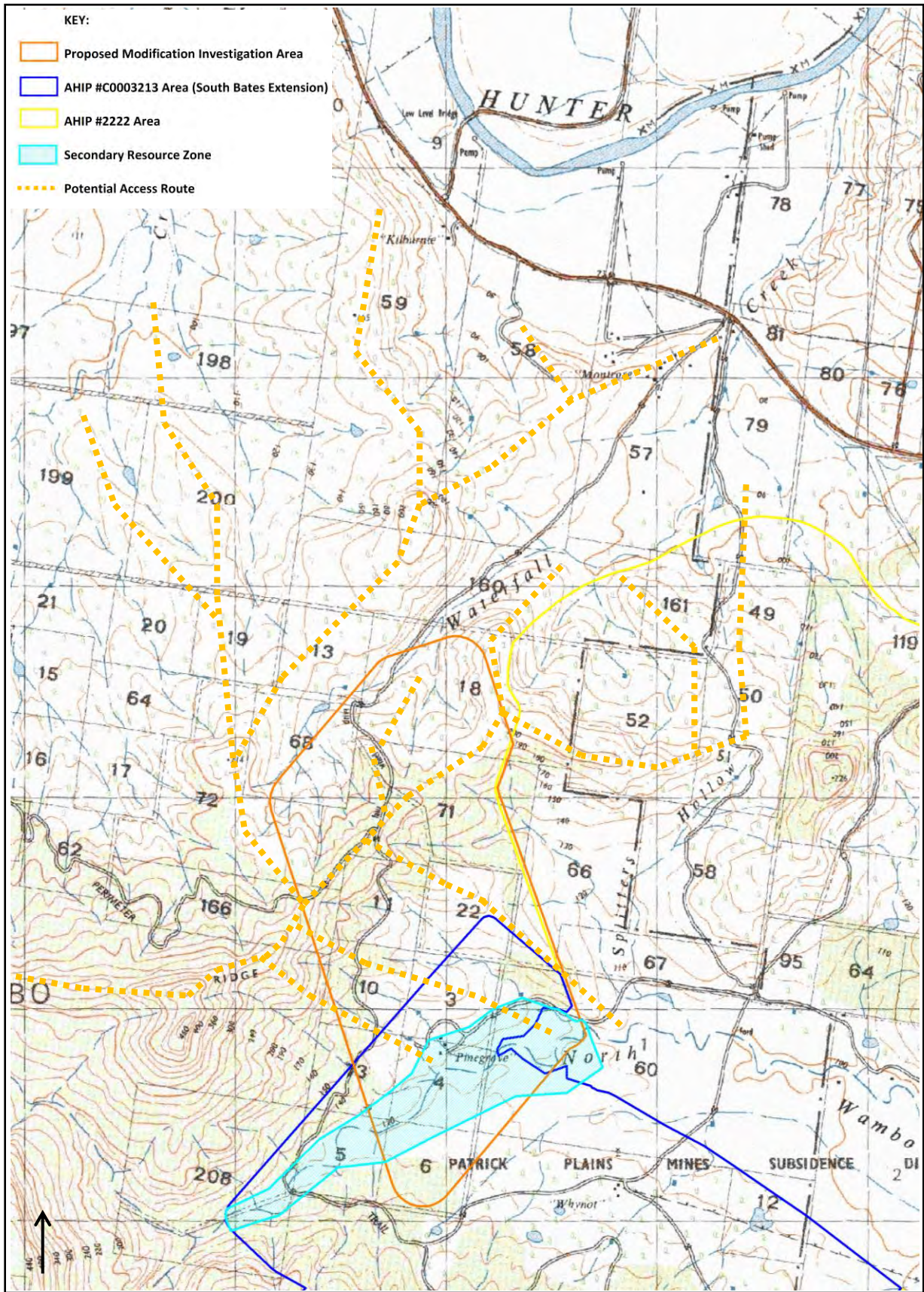


Figure 13: Potential Aboriginal access routes and secondary resource zone around North Wambo Creek in the vicinity of the LW24-26 Modification investigation area (Doyles Creek 9032-1-N AMG topographic map, reduced).

- ❑ Systematic surface collection of the identified evidence from a number of artefact sites (subsequently completed by Kuskie 2018d, 2019b, 2020c);
- ❑ Monitoring of subsidence impacts for the rock shelter with PAD Wambo Site 499 after undermining has occurred to assess and document any impacts; and
- ❑ Provisions to guide the management of any previously unrecorded Aboriginal heritage sites within the AHIP area that may be identified during future investigations or works.

AHIP #C0003213 – South Bates Extension Modification:

Subsequent to the detailed investigations by Kuskie (2017a, 2017g), on 27 February 2018 AHIP #C0003213 was issued by the then OEH to WCPL for the development of the South Bates Extension Underground Mine Modification. AHIP #C0003213 is valid until 27 February 2040. The area covered by AHIP #C0003213 is shown on Figures 4 and 12.

Salvages of sites and other management actions have occurred under AHIP #C0003213 and the Wambo HMP by South East Archaeology (refer below).

South East Archaeology – South Bates Extension Modification – Initial Salvage:

Kuskie (2018d) reported on the salvage of Wambo Sites 311, 321, 483, 485-489 and 498, South Bates Soil Test 2/A and South Bates Soil Test 6/A in the South Bates Extension area under AHIP #C0003213 and the Wambo HMP, that were anticipated to be subject to potential impacts from continued vehicle access, in accordance with the AHIP #C0003213 conditions and the Wambo HMP and South Bates Extension Modification assessment recommendations.

Surface collections were undertaken on 7 and 8 May 2018 by South East Archaeology with a representative of the RAPs for Wambo. All visible artefacts from within the potential impact areas were salvaged from sites Wambo Sites 311, 321, 483, 485-489 and 498, South Bates Soil Test 2/A and South Bates Soil Test 6/A. For Wambo Site 321, Wambo Site 483 and South Bates Soil Test 6/A, only artefacts along the existing roads were subject to collection, and numerous artefacts remained off the roads in areas that were not anticipated to be subject to impacts (Kuskie 2018d).

A total of 1,089 artefacts were salvaged by surface collection from these open sites (Kuskie 2018d). The combined assemblage was dominated by tuff (72%), with a lower frequency of silcrete (20%) and very low frequencies of other materials. The combined assemblage was dominated by flakes (15.3%), flake portions (27.4%), cores (18.6%) and lithic fragments (11.2%). Several microblades, microblade cores and microblade portions were identified (69 items or 6.3% of the combined assemblage) and a number of backed artefacts (including bondi points) and portions of backed artefacts, along with utilised backed artefacts (and portions) were identified (27 items or 2.5% of the combined assemblage). A moderate frequency of utilised flakes, flake portions and pieces, utilised retouched flakes and pieces and utilised microblades and portions were identified, comprising 152 items or 13.9% of the combined assemblage (Kuskie 2018d).

Differences in assemblages (for the same site) recorded at different times often occur and typically relate to changing conditions of surface visibility and sampling issues. The intensity of inspection during a salvage collection is typically higher than during a surface survey, resulting in the identification of more artefacts, particularly smaller items. Hence it was not unexpected that for the 11 previously recorded sites that were subject to collection, it was estimated that (Kuskie 2018d):

- ❑ At six sites (Wambo Sites 311, 485, 486, 488 and 489 and South Bates Soil Test 2/A), possibly all of the original artefacts were relocated and collected and new artefacts were identified and collected;
- ❑ At one site (Wambo Site 498), the original artefact was relocated and collected, with no new artefacts identified;
- ❑ At three sites (Wambo Sites 321 and 483 and South Bates Soil Test 6/A), possibly all of the original artefacts along the vehicle track were relocated and collected and new artefacts were identified and collected, while originally recorded artefacts off the track remain *in situ* and were not salvaged; and
- ❑ At one site (Wambo Site 487), most of the original artefacts were relocated and collected and one was unable to be relocated and collected, with one new artefact also identified and collected.

White (2003) reported on various potential access routes between the lower valleys of Wambo, Stony and North Wambo Creeks and Wollombi Brook, and the higher sandstone country to the west (refer to Figures 8 and 13). Almost all of the open artefact sites subject to salvage were located on the lower portions of these spurs. The relatively broad range of evidence in these sites, and relatively low densities (with potentially an accumulation of evidence through superimposition), supported the hypothesis that these spurs/ridges were Aboriginal access routes between the lower valleys (such as North Wambo Creek, which leads into Wollombi Brook) and the mountainous terrain to the west (Kuskie 2018d).

In consideration of the results of the investigation and mitigation measures implemented, along with the relevant provisions of the Wambo HMP and AHIP #C0003213, Kuskie (2018d) reported that no further action was required in relation to the proposed impacts to Wambo Sites 311, 321, 483, 485, 486, 487, 488, 489 and 498, South Bates Soil Test 2/A and South Bates Soil Test 6/A, other than that:

- ❑ For Wambo Site 321, Wambo Site 483 and South Bates Soil Test 6/A, only artefacts along the existing roads were subject to collection and numerous artefacts remain off the roads in areas that were not anticipated to be subject to impacts. Impacts cannot occur to these sites off the immediate road surfaces unless prior surface collection is undertaken in accordance with AHIP #C0003213 and the procedures in the Wambo HMP;
- ❑ All other provisions of the Wambo HMP and AHIP #C0003213 need to be implemented where relevant, including moving the artefacts as soon as practical to the temporary storage location (HMP Section 4.10) and submitted ASIRFs to AHIMS (HMP Section 4.5); and
- ❑ Copies of the report should be forwarded to Heritage NSW (former OEH) and made available to all RAPs (HMP Section 4.5).

South East Archaeology – Other Wambo Salvages:

Kuskie (2019b) reported on the salvage of 24 open artefact sites (Wambo Sites 23-26, 239, 369, 383, 401, 454-464 and newly identified sites 508-512) under AHIPs #C0002000 and #2222 and the Wambo HMP, in December 2018 and January 2019. One of these sites (Wambo Site 239, AHIMS #37-5-0358) is located on the margin of the present LW24-26 Modification investigation area, within the South Bates Extension area (refer to Figures 6 and 14). All apart from one of the remaining sites are located on the eastern side of Wambo adjacent to Wollombi Brook (Figure 14).

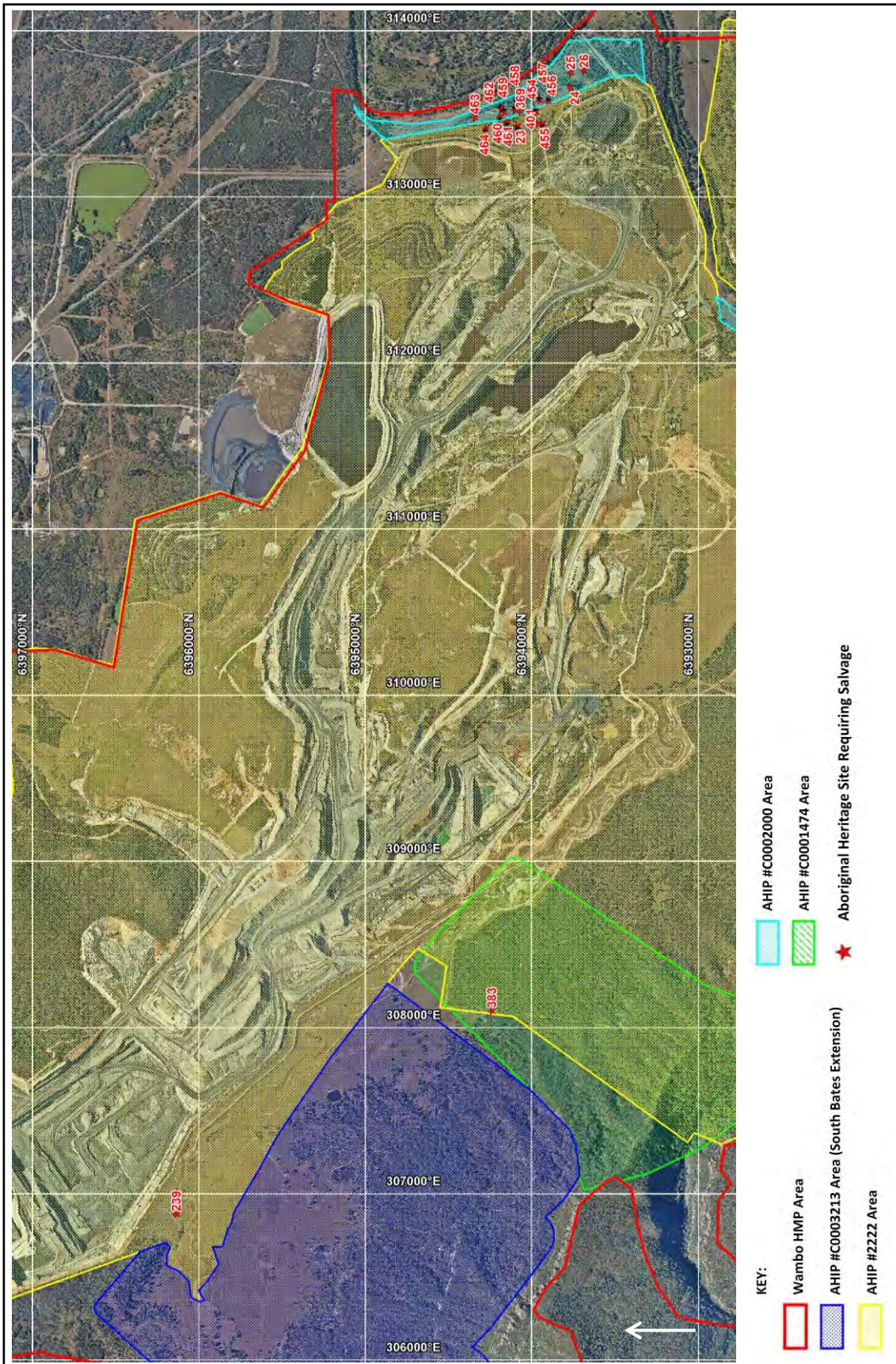


Figure 14: Location of Aboriginal sites salvaged by Kuskie (2019b) in December 2018 and January 2019 (aerial photograph courtesy WCPL; one kilometre MGA grid).

Surface collection of the sites was undertaken on 3-4 and 20-21 December 2018 and 24 January 2019 by South East Archaeology with a representative of the RAPs for Wambo. For the locality of Wambo Sites 23-26, 369, 401, 454-464 and the newly identified sites 508-512, given inconsistencies and uncertainties regarding previously reported site details, intensive sampling on foot occurred across the AHIP areas adjacent to Wollombi Brook for the purpose of thoroughly inspecting this area and retrieving any visible surface artefacts (Kuskie 2019b).

A total of 1,296 artefacts were salvaged from the open sites. Most of these artefacts (95%) were recovered from three sites, Wambo Site 239 (772 artefacts) on the margin of the present LW24-26 Modification investigation area, Wambo Site 454 (309 artefacts) and Wambo Site 25/JP38 (148 artefacts) (Kuskie 2019b).

The combined assemblage was dominated by tuff (66.5%), with a modest frequency of silcrete (28.4%) and very low frequencies of quartz (2.2%) and other materials. The combined assemblage was dominated by flakes (23.6%), flake portions (21.1%), lithic fragments (21.1%), cores (4.7%) and core fragments (5.6%). Microblades, microblade cores and microblade portions were also identified (5.3% of the combined assemblage). A number of backed artefacts and portions of backed artefacts, along with utilised backed artefacts (and portions) and preforms were identified (1.1% of the combined assemblage). A moderately high frequency of utilised flakes, flake portions and pieces, utilised retouched flakes and pieces and utilised microblades and portions were identified, comprising 15.7% of the combined assemblage. Other retouched flakes and pieces were identified (1.4% of the combined assemblage) (Kuskie 2019b).

Differences in assemblages (for the same site) recorded at different times often occur and typically relate to changing conditions of surface visibility and sampling issues. The intensity of inspection during a salvage collection is typically higher than during a surface survey, resulting in the identification of more artefacts, particularly smaller items. Hence it is not unexpected that for the 19 previously recorded sites that were subject to collection, it was estimated that:

- ❑ At two sites (Wambo Sites 455 and 456), all of the originally identified artefacts were re-located and salvaged;
- ❑ At six sites (Wambo Sites 25/JP38, 239, 369, 454, 457 and 461) it appears that many, if not all of the originally identified artefacts were collected, and new items were identified and collected;
- ❑ At four sites (Wambo Sites 458, 459, 460 and 463) several, but not all, of the originally reported artefacts were collected;
- ❑ At three sites (Wambo Sites 383, 401 and 462), none of the original artefacts could be relocated and collected (although it is possible that at least Wambo Site 383 had previously been salvaged by RPS);
- ❑ At three sites (Wambo Sites 23, 24 and 26), no artefacts could be relocated and collected in the reported locations, however it is inferred that these sites equate to Wambo Sites 461, 25/JP38 and 510 respectively, for which it appears that many, if not all of the originally identified artefacts were collected, and new items were identified and collected; and
- ❑ At one site (Wambo Site 464), originally recorded by RPS (2016b), it was identified that the RPS “artefact” and similar adjacent pieces of electrical insulator were not Aboriginal artefacts and hence Wambo Site 464 can be reclassified as a ‘non-site’ (Kuskie 2019b).

The broad range of evidence and potential activities at the three larger sites (Wambo Sites 239, 454 and 25/JP38), including the relatively high frequency of utilised items, indicated that potentially more focused occupation occurred (such as encampments by parties of hunters/gatherers and possibly nuclear/extended family groups), in addition to transitory movement through the landscape, hunting/gathering of resources and procurement of stone materials.

Wambo Site 239 is located on the western side of the Mine adjacent to the higher order watercourse of North Wambo Creek, a secondary resource zone under the model of Aboriginal occupation, and on the lower portion of a spur that represents a potential Aboriginal access route between the mountainous terrain to the west and the valleys of North Wambo Creek, leading into Wollombi Brook and the Hunter River. The salvage results supported these hypotheses (Kuskie 2019b). Although RPS (2014b) had reported that “RPS excavated this site and undertook surface salvage...no artefacts remain”, no evidence of any excavation or reporting could be identified. Hence it was considered likely that the excavation required under AHIP #2222 remained to be undertaken in accordance with the AHIP and Section 4.3 of the HMP.

Newly identified sites 509, 511 and 512 were assessed as being of potentially moderate to high archaeological significance, as there is a moderate or high potential for sub-surface deposits of artefacts to occur, including deposits that may be *in situ* and of research value (Kuskie 2019b). These sites are located on Pleistocene age terraces in close proximity to the major watercourse of Wollombi Brook, approximately five kilometres south-west of its confluence with the Hunter River, and can be characterised as being within a primary resource zone or secondary resource zone under the model of occupation. In such zones, more focused Aboriginal occupation may have occurred and typically a moderate or high potential for sub-surface deposits of artefacts (including deposits that may be of research value) may exist. Further investigation and excavation was recommended for Wambo Sites 509, 511 and 512 should any substantial impacts be proposed (Kuskie 2019b).

South East Archaeology – South Bates Extension Modification – Additional Salvages:

Kuskie (2020c) reported on the salvage excavation of Wambo Site 239 (#37-5-0358) and surface collection of Wambo Site 232 (#37-5-0355), Wambo Site 234 (#37-5-0443) and Wambo Site 235 (#37-5-0442) under AHIP #2222 and the Wambo HMP, in April and May 2019. Wambo Site 239 is located on the margin of the present LW24-26 Modification investigation area, and the other sites were situated nearby within the South Bates Extension area. These sites were anticipated to be subject to potential impacts from approved activities.

Salvage investigations were undertaken over 13 days in April and May 2019 by South East Archaeology and representatives of the RAPs for Wambo. All visible artefacts from within the potential impact areas were salvaged. Wambo Site 239 was subject to surface collection as a final stage of the salvage in order to retrieve artefacts that had been exposed by heavy rainfall, erosion and vehicular and machinery traffic in the intervening five month period since an earlier collection (Kuskie 2019b). A total of 141 artefacts were salvaged from the sites by surface collection, most (120) from Wambo Site 239, with 21 from Wambo Site 235 and nil recovered from either Wambo Site 232 or 234 (Kuskie 2020c).

Two transects of test units (Transect A and Transect B), each 70 metres in length and originating at the same point but perpendicular to each other, were excavated at Wambo Site 239 (refer to Figure 15). The transects were located near vehicle tracks where numerous surface artefacts had previously been collected, but in areas of lower ground disturbance and higher potential for deposits of research value. This enabled sampling of a cross-section of areas closer to and further from North Wambo Creek, and more broadly across the spur crest and the main portion of the site (Kuskie 2020c).

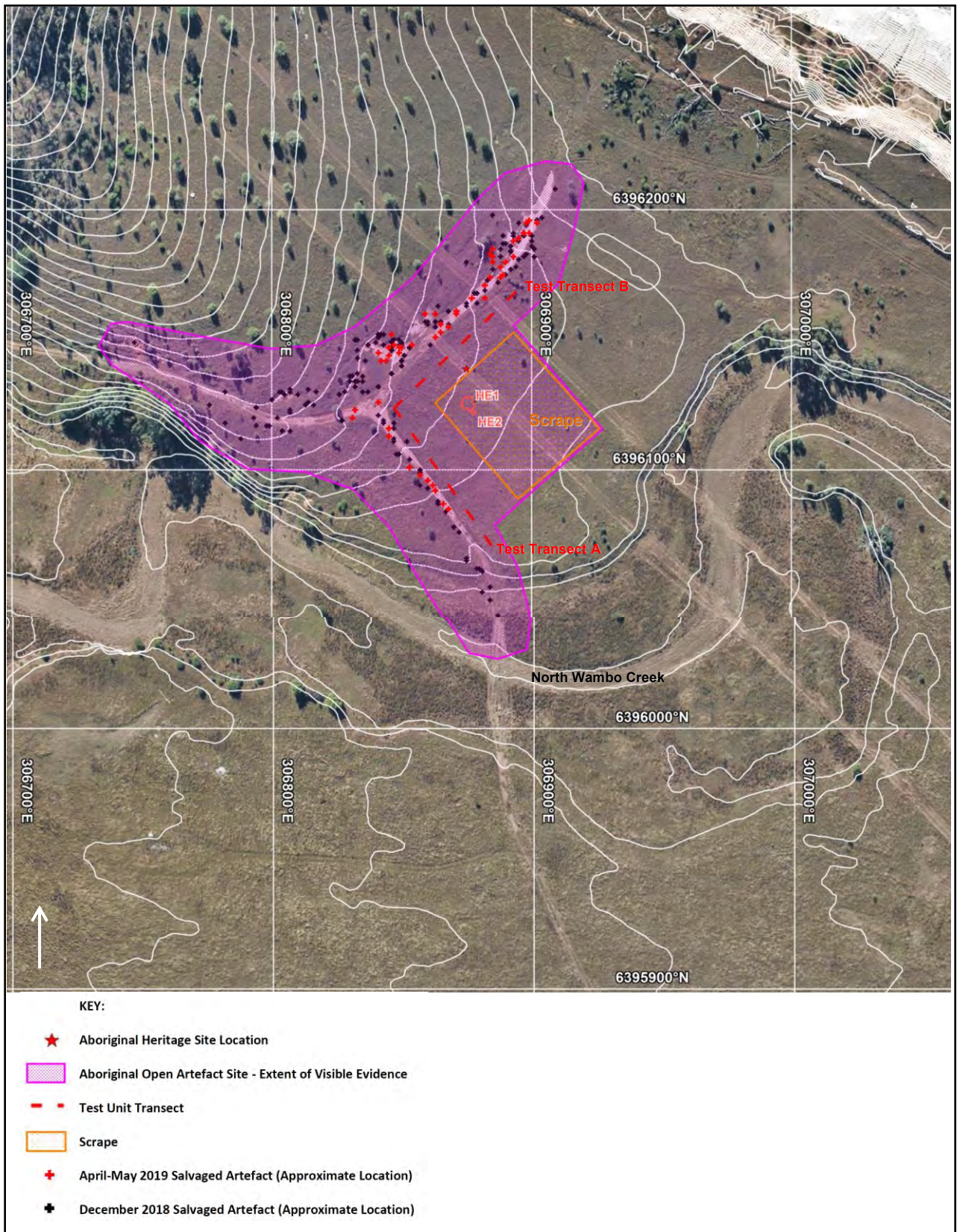


Figure 15: Wambo Site 239 showing location of surface scrape, localised hand excavations HE1 and HE2 within the scrape, Test Unit Transects A and B and artefacts subject to surface collection in May 2019 (Kuskie 2020c:26) (aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid).

In total, 29 test units, each measuring 0.5 x 0.5 metres in area, were excavated by shovel and trowel at five metre intervals along the two 70 metre length transects. A total area of 7.25 m² was excavated and a total volume of deposit of 2.915 m³ was excavated and sieved. A total of 300 artefacts were retrieved from the initial test excavations, with artefacts occurring at a mean density of 41.4 per conflated m² or 102.9 artefacts per m³ (Kuskie 2020c).

The second stage of the salvage excavations at Wambo Site 239 comprised further controlled hand excavation, with extensions of excavation at test units where the initial results indicated potential activity areas were present that may be of research value. A total of 10.25 m² was excavated by extensions around Test Units A5, A30, A45-A50, A60, B30 and B35, with 3.768 m³ of deposit sieved and 523 artefacts retrieved at a mean density of 51 per conflated m² or 138.8 per m³ (Kuskie 2020c).

The third stage of salvage at Wambo Site 239 comprised a mechanical surface scrape across an area measuring 50 x 40 metres (2,000 m²), with a dozer used to systematically expose the A unit soil by progressively removing thin layers of soil. After each layer was removed, the surface was inspected on foot and any visible evidence collected. The process was repeated, with up to 26 separate spits in the deeper portions of the scrape area, until the B unit clay was exposed. A total of 225 artefacts were identified and collected from the scrape, with artefacts occurring at a mean density of 0.112 artefacts per conflated m² (Kuskie 2020c).

Two localised hand excavations were conducted around features of potential significance (artefact clusters representative of activity areas) that were identified within Spit 5 of the scrape, each involving excavation of contiguous one metre square units. A total of 19 m² was excavated in Hand Excavation 1 (HE1) and 2 m² was excavated in Hand Excavation 2 (HE2), which by completion had becoming adjoined. A total of 1,829 artefacts were retrieved from HE1, with artefacts occurring at a mean density of 96.3 per conflated m² or 1,862.5 per m³. A total of 23 artefacts were retrieved from HE2, with artefacts occurring at a mean density of 11.5 per conflated m² or 793.1 per m³ (Kuskie 2020c).

The combined salvage assemblage of 3,020 artefacts from Wambo Site 239 was dominated by tuff (84.7%), with a low frequency of silcrete (10.8%) and very low frequencies of other materials. The combined assemblage was dominated by flakes (46.4%), flake portions (32.8%) and lithic fragments (11.6%), with a low frequency of cores (2.6%) and core fragments (0.9%). Microblades, microblade cores and microblade portions were also identified (3.2% of the combined assemblage), along with low frequencies of backed artefacts (1.5%) and utilised non-microlith tools (0.7%) (Kuskie 2020c).

Generally, artefact counts in many of the test excavation units and extensions and across the surface scrape were relatively low and artefacts could not readily be associated as part of activity areas, even when there were slightly higher counts. However, the localised hand excavation HE1 contained a high concentration of artefacts and represents an activity area in which tuff and silcrete backed artefact production occurred (Kuskie 2020c).

Overall, artefact counts and distributions across the Wambo Site 239 salvage area were consistent with low density background discard interspersed by a low number of discrete activity areas in which more focused activity has occurred, typically in relation to the production of backed artefacts. Minor food processing and/or equipment maintenance tasks may have been undertaken, but no tools or activity areas indicative of encampments were identified. The salvage evidence was consistent with occupation involving transitory movement and hunting/gathering with or without camping (Kuskie 2020c).

Given the widespread, but generally dispersed nature of evidence, it is certain that numerous sporadic episodes of occupation occurred. The episodes of occupation appear to have involved small groups of people and been for relatively short individual episodes of time. Although encampments by small hunting/gathering parties or nuclear/extended families for short periods of time may have occurred, specific evidence was not identified within the salvage excavation. While the salvage evidence may be consistent with Wambo Site 239 being situated along a previously proposed access route between the mountainous terrain to the west and the valley of North Wambo Creek, it was not conclusive with respect to the issue of whether this portion of North Wambo Creek conforms to a secondary resource zone under the model of Aboriginal occupation for the locality (Kuskie 2020c).

South East Archaeology – Longwalls 24-26 Modification Area:

Kuskie (2020a) undertook a due diligence assessment in January 2020 for a program of drilling comprising three components (refer to Figure 11):

- Three exploration boreholes (ELA_B8, ELA_C17 and ELA_E50) in EL7211, outside of the area covered by any AHIPs, north-west of the present LW24-26 Modification investigation area;
- 39 drilling locations north-west of the existing mine (SBXX_20_CQ01 to CQ03 and CQ05, SBXX_20_GT01 to GT12 and GT14 to GT17, and SBXX_20_ST01 to ST03, ST05 to ST07, ST09, ST11, and ST13 to ST23), all apart from two situated outside of the area covered by any AHIPs, almost entirely within the present LW24-26 Modification investigation area; and
- 28 drilling locations relating to seismic investigations in the South Bates Extension within the area covered by AHIP #C0003213, labelled SBX_20_ST01 to ST28, partially within the southern portion of the LW24-26 Modification investigation area.

A due diligence field inspection of all apart from two of the drilling investigation areas outside of the area covered by any AHIP was undertaken on 20 and 30 January 2020. Wambo Site 513, an open artefact scatter, was identified during the inspection around the location of SBXX_20_GT17. No other evidence was identified during the survey or had been previously reported in the immediate locations of the drilling areas. Recommendations were present to avoid impacts to the identified sites, apart from where they had been salvaged under AHIP #C0003213 (Kuskie 2020a).

Kuskie (2020b) undertook a due diligence assessment in January 2020 for a program of seismic investigation within the present LW24-26 Modification investigation area and adjacent land immediately to the north-west (refer to Figure 11). The seismic investigation area was located almost entirely outside of the area covered by any AHIPs, apart from approximately 1,100 metres of 2D seismic lines along vehicle tracks within the area covered by AHIP #C0003213 (Figure 11). A reconnaissance inspection was undertaken on 20 January 2020 which confirmed that virtually the entire area fell within the Heritage NSW (DECCW 2010a) definition of 'disturbed land or land already disturbed by previous activity'. A total of 14 previously recorded open artefact scatters were located within the proposed seismic areas and recommendations were present to avoid impacts to these sites, apart from where they had been salvaged under AHIP #C0003213 (Kuskie 2020b).

Kuskie (2020d) undertook a due diligence assessment in July 2020 for a program of soil testing within the present LW24-26 Modification investigation area (refer to Figure 11). The soil testing would involve the excavation of shallow soil test pits (W1-W16) at up to approximately 16 locations. All apart from Test Pits W1 and W7 were located outside of the area covered by any AHIPs. A due diligence inspection of the soil test pits was undertaken on 21 July 2020 and an open artefact site (Wambo Site 514) was identified near the location of soil test pit W15. Recommendations were present to avoid impacts to the identified sites (Kuskie 2020d).

Kuskie (2021a) undertook a due diligence assessment in November 2021 for two drilling locations (SBX_21_LW24-26_ST01 and SBXX_20_GT01_ALT1) and associated access (refer to Figure 11). Recommendations were present to avoid impacts to identified sites in the vicinity of sections of the vehicle access (Kuskie 2021a).

3.2.2 United Collieries and United Wambo

Koettig and Hughes (1983) recorded 66 sites within the nine square kilometre area of the United Collieries Lease, immediately north of Wambo Mine. Within this area, low broad ridges form an undulating terrain with low to moderate gradient slopes. A texture-contrast soil overlies Permian Singleton Coal Measures.

Of these sites, 90% were located within 50 metres of a watercourse and most contained less than 100 artefacts (Koettig and Hughes 1983). Mean artefact densities ranged from one artefact per 180 m² to 17 artefacts/m². Most sites were identified as 'knapping floors'. 'Indurated mudstone' (tuff) was the dominant stone material and silcrete was also common. Backed blades were the dominant form of retouched flake. All artefacts were identified as eroding from the A horizon soil. Hiscock (1984) undertook one of the first specific technological analyses in relation to an Environmental Impact Assessment project through analysis of assemblages from sites RBC 5 and 12 along Redbank Creek.

More recently, Canning (2016) undertook a cultural heritage assessment for the United Wambo Open Cut Coal Mine Project, a proposal to combine the existing open cut operations at Wambo with a proposed new open cut coal mine at United. The Project included open cut mining operations in two areas, the proposed United Open Cut and modified operations in the approved Wambo Open Cut. The Project modifies the approved mine plan for the Wambo Open Cut to access additional resources from within existing mining and exploration tenements held below the Wambo Open Cut. The investigation area included the eastern portion of the present Modification investigation area, but largely comprised areas further to the east where surface impacts were proposed.

A separate archaeological assessment for the United Wambo Open Cut Coal Mine Project was undertaken by OzArk (2016), with Canning's (2016) comprehensive report focused on cultural values, including the archaeological values. The report included an extensive submission from Tocomwall (2015) for the registered Native Title Claimants, the Plains Clans of the Wonnarua People.

A total of 83 RAPs were identified for the United Wambo Open Cut Coal Mine Project. Field surveys focusing on the potential impact area were undertaken over 19 days in 2015 and resulted in the identification of 59 open artefact sites and extensions to 20 previously recorded open artefact sites (OzArk 2016). Sub-surface test excavations were undertaken in six localities, with a total of 153 test units, each measuring 0.5 x 0.5 metres in area, dug for a total of 38.25 m². A total of 192 artefacts were recovered from the excavations. An additional 63 'auger probes' were also dug in nine locations to verify soil depth and archaeological potential (OzArk 2016).

3.2.3 Lemington

Dean-Jones (1992) re-investigated the north-western portion of the Lemington Mine Lease, north of Warkworth and Wambo Mine. The area had previously been investigated by Brayshaw (1982, 1984b) who had recorded nine artefact scatters. Twenty artefact occurrences were located by Dean-Jones (1992). Dean-Jones (1992) reports that some sites were very large in area (up to 50,000 m²), extending over entire hill slopes and low ridges, but with variable artefact densities.

Dean-Jones (1995) salvaged sites LC1/BBC5, LC2, LC3 and LC9 in this portion of the Lemington Mine Lease. Methods involved surface collection, large-scale excavation of a 140 metre long trench and detailed excavation of a smaller area, along with surface scrapes. Baker analysed the assemblage and concluded that the flaking strategies were generally opportunistic, but evidence for backed blade manufacturing was also present (Dean-Jones 1995).

Brayshaw, Haglund and Rich (1996) investigated the Southern Open Cut Extension of the Lemington Coal Mine. Four artefact scatters, four isolated artefacts and a possible silcrete source were recorded by Brayshaw during the initial survey. An intensive re-survey resulted in the location of another 13 sites, with 1,045 artefacts recorded. Artefact totals in individual sites ranged up to 181 artefacts. The recorded assemblages occurred in areas of ground exposure and represented 'windows' of visibility into the potential archaeological resource (Brayshaw *et al* 1996).

While artefacts classified as debitage dominated the assemblages (88%), lower frequencies of various core types, backed artefacts, core tools and tools exhibiting retouch/usewear were present. A variety of raw materials were recorded, including 'indurated mudstone/chert' (67% of total assemblages) followed by silcrete (28%) and other materials such as petrified wood, chalcedony, quartz, quartzite, basalt and other volcanics (Brayshaw *et al* 1996).

Present among the assemblages were relatively uncommon anvils, hammerstones and edge-ground axes, a low number of cobble tools, core tools of varying sizes and raw materials, retouched/utilised items varying widely in size, used items without retouch, an elouera and other backed artefacts, cores mostly of tuff and debitage mostly less than 50 millimetres in size (Brayshaw *et al* 1996). Most reduction involved unifacial flaking from cortical or previously flaked surfaces. Bifacial reduction was less common and bipolar reduction was rare. Hiscock's Redbank A strategy was identified as being prominent (Brayshaw *et al* 1996).

Ethnohistorical and oral information was uncovered which indicates that part of the area near the confluence of Wollombi Brook and the Hunter River was an Aboriginal meeting place.

Kuskie (in prep.) has undertaken salvage collections and excavations to mitigate the impacts of the South Lemington Mine extension to 14 Aboriginal sites. Surface collections were undertaken at every site, while six sites were excavated (WB1 - AHIMS# 37-6-402, WB5 - #37-6-645, WB7 - #37-6-715, WB8 - #37-6-714, WB11 - #37-6-642 and WB14 - #37-6-710).

Site WB1 (#37-6-402) was located on the south-eastern end of a former terrace of Wollombi Brook, 250 metres south of the channel. Kuskie (in prep.) identified artefacts in the B horizon clay of the terrace. The artefacts were initially identified through careful stripping of the surface with a dozer. Hand excavations were undertaken in three areas where artefacts were identified in clay, with 20 m² excavated. Direct dating was not possible, but the project geomorphologist, Dr Wayne Erskine, confirmed beyond reasonable doubt that:

- ❑ The artefacts definitely occur in clay;
- ❑ The artefacts have not worked their way into the clay through any post-depositional processes;
- ❑ The clay has major cracking that could only have occurred during very cold conditions of the last glacial maximum; and
- ❑ The clay and associated artefacts are almost certainly between 18,000 and 30,000 years of age.

Site WB1 represents one of only few known Pleistocene age sites in the Hunter Valley (Glennies Creek and Moffats Swamp being others) and may be the oldest archaeological evidence of Aboriginal occupation of the valley (Glennies Creek is at least 20,200 years old: Koettig 1986).

At site WB8, where silcrete boulders were present on a ridge crest, a surface collection was undertaken over 20,100 m² and a 19 m² trench was excavated. Definite evidence of extraction and primary reduction was present, confirming that this source of silcrete was exploited by Aboriginal people. However, recent land use practices had caused a severe decline in the integrity of the site.

A total of 15 m² was excavated at site WB7, located on a Pleistocene-age former river terrace. Very few artefacts were identified in the A horizon aeolian sand and none in the B horizon clay. Site WB5 was situated on the same terrace, but adjacent to Wollombi Brook. A 21 m² excavation was undertaken and numerous artefacts were identified in the upper soil horizon, most probably relating to late Holocene occupation of the site.

A total of 16 m² was excavated at site WB11, situated on a ridge crest, with a low number of artefacts recovered from the shallow A horizon soil. A total of 20 m² was excavated at site WB14, adjacent to Redbank Creek, to reveal a relatively low number of artefacts.

Kuskie (1999) surveyed an additional parcel of land adjacent to the northern boundary of the South Lemington lease area. This area measured 38 hectares and encompassed the airstrip and Hunter Valley Gliding Club. The survey resulted in the location of six small artefact scatters, within eight separate loci. Of the total of 23 artefacts, silcrete was the dominant stone material.

3.2.4 Warkworth

The Warkworth Mt Thorley Mining complex is located east of Wambo, across Wollombi Brook and mostly east of Wallaby Scrub Road. Dyall (1979a, 1979b) had initially reported on surveys for the Warkworth Mine Lease, with a number of artefact scatter sites, along with scarred trees and grinding groove sites identified.

Haglund and Rich (1995) salvaged site W4 (#37-6-155), located on Sullivans Creek within the Warkworth Mining Lease, just west of the junction of Jerrys Plains Road and the Putty Road. Previous test excavations had been undertaken at site W4, with Areas A and B of the site selected for salvage. Salvage involved the excavation of a 5 x 5 metre area, along with several smaller areas. A total of 1,279 artefacts was recovered, including 1,075 tuff, 156 silcrete and lesser quantities of quartzite, quartz, igneous, chalcedony, petrified wood and other materials. The assemblage comprised 1,208 pieces of debitage, 21 cores, 14 used pieces, 13 retouched tools, 11 backed pieces, and low numbers of core tools, cobble tools, hammerstones and anvils (Haglund and Rich 1995).

Haglund and Rich (1995) emphasise that large numbers of artefacts do not necessarily equate to lots of activity. Also, the number of artefacts does not necessarily indicate the importance of the site. High numbers of artefacts may result 'simply from backed blade knapping floors' (Haglund and Rich 1995). Sites with low numbers of artefacts but varied raw materials may have been used more often by various people, or by people carrying out a variety of tasks. (Haglund and Rich 1995).

More recent studies of the Warkworth Mine expansion have been undertaken by AMBS (2002), AECOM (2009), Godwin (2010) and Scarp Archaeology (2009a, 2009b), that have resulted in the recording of numerous open artefact sites, along with a number of scarred trees and several grinding grooves.

3.2.5 Synthesis

Numerous heritage surveys have been undertaken within the Central Lowlands, often in relation to development proposals. Typically these surveys have:

- ❑ Involved a wide range of study area sizes, which are often very small but also include many relatively large areas (for example 3,600 hectares at Mount Arthur North, Kuskie 2000a); and
- ❑ Resulted in the location of numerous artefact occurrences, primarily only when exposed by erosion or other forms of ground disturbance (for example 1,188 spatially separate loci of artefact evidence at Mount Arthur North, Kuskie 2000a).

Artefact scatters in the region are typically dominated by two stone materials, tuff and silcrete, and it appears that dominance is generally related to the local availability, abundance and quality of these materials. Preferences of stone materials for manufacturing of backed artefacts appears to be equally variable and dependant on availability and quality of materials (Kuskie and Clarke 2006).

Artefact occurrences tend mostly to be identified near watercourses, particularly on level or gently inclined landform units and close to higher order streams. Fewer instances are reported of artefacts along ridgelines. However, the majority of surveys have obtained a disproportionate sample of watercourses in relation to other environmental contexts. Relatively little evidence has been identified along recent alluvial flats (Kuskie and Clarke 2006).

Individual open sites can range in artefact quantity from one to many hundreds or even thousands of artefacts. Typically many exposures of evidence contain fewer than ten artefacts. Artefact density in the surface assemblages varies, but is generally low (less than one artefact per square metre). Where sub-surface testing or salvage excavation has been undertaken, it has often resulted in the location of artefacts within the upper (A horizon or unit) soil. These deposits can include dense concentrations of artefacts, along with other features such as hearths and heat-treatment pits (Kuskie and Clarke 2004, 2006).

Flakes, flaked pieces (lithic fragments) and cores relating to general stone flaking and the production of microblades and microliths are items typically found in open artefact scatters. Artefacts that have been retouched or utilised typically comprise less than 5% of overall assemblages. Often bondi points (spear barbs) or other microliths ('backed artefacts') comprise much of the retouched/utilised category. Tools relating to other activities also comprise a very small proportion of most assemblages (Kuskie and Clarke 2006).

Three basic patterns of site structure have been identified:

- ❑ Low density 'background discard';
- ❑ Isolated knapping floors/artefact concentrations, with minimal other evidence apart from 'background discard'; and
- ❑ Denser concentrations of artefacts extending over large areas, but without distinct knapping floors or clear spatial structure (Koettig and Hughes 1985:48).

Other site types have been recorded in the Hunter Valley, including grinding grooves, middens, bora and ceremonial sites, burials, scarred trees, stone arrangements, rock shelters with art, rock shelters with artefacts and/or deposits, fish traps and places of contemporary or traditional Aboriginal significance. These provide evidence of the diverse range of Aboriginal behaviour reflected in the heritage resource, including subsistence, technology, material culture, spiritual practices and social behaviour.

Key research themes involved in archaeological analyses of the Hunter Valley have arisen from the large quantity of Environmental Impact Assessment driven work, particularly within the Central Lowlands region. These include (refer to Kuskie and Clarke 2004, 2006):

- ❑ Analysis of stone working technology by technical attributes, conjoining and discard events;
- ❑ Spatial patterning of artefact distributions and arrangement of activity areas;
- ❑ Heat treatment;
- ❑ Age of occupation;
- ❑ Models of occupation;
- ❑ Artefact and site functions, including use-wear and residue analysis;
- ❑ Methodological issues; and
- ❑ Site integrity and post-depositional disturbance.

Aboriginal occupation within the Central Lowlands of the Hunter Valley commenced at least 20,000 years ago. Koettig (1987) obtained a date of >20,200 years BP from a hearth at Glennies Creek, 35 kilometres north of Branxton. Kuskie (in prep.) identified at least one site of Pleistocene age, WB1 (#37-6-402) at the South Lemington mine near Singleton, on the basis of geomorphological evidence. In surrounding regions, Aboriginal occupation has been dated to at least 19,000 years ago on the Liverpool Plains (Gorecki *et al* 1984), 11,000 years ago in the upper Mangrove Creek catchment of the Hawkesbury River (Attenbrow 1987) and 17,000 years ago at Moffats Swamp near Raymond Terrace (Baker 1994). However, the majority of dated archaeological sites in the Hunter Valley are less than 4,000 years of age (Brayshaw 1994:15, Kuskie and Clarke 2004).

Approximately 84 hectares or 35% of the LW24-26 Modification investigation area (the southern portion) has previously been surveyed to current heritage standards for the South Bates Extension Modification assessment (Kuskie 2017a, 2017g) (refer to Figures 6 and 12). Although other minor portions of the LW24-26 Modification investigation area have been inspected for due diligence assessments (eg. Kuskie 2016c, 2016d, 2020a, 2020b, 2020d, 2021a), effectively the central and northern portions totalling approximately 154 hectares have not been subject to heritage survey to current standards.

AHIP #C0003213, issued on 22 February 2018 for the South Bates Extension Modification, covers much of the southern portion of the LW24-26 Modification investigation area and AHIP #2222 covers a small portion of the eastern margin (Figure 3). The remainder of the LW24-26 Modification investigation area is not covered by any existing AHIP.

A total of 24 Aboriginal sites have previously been recorded directly within the LW24-26 Modification investigation area, all open artefact sites. Nineteen of these sites are located in areas covered by an existing AHIP, with nine sites having been subject to total salvage and three sites partially salvaged (Kuskie 2018d, 2019b, 2020c).

3.3 Local Aboriginal Culture

3.3.1 Group Identity and Boundaries

Traditional Aboriginal culture in south-eastern Australia was complex and varied. The present state of knowledge is based partially on studies of contemporary Aboriginal communities in northern and central Australia and on observations of the south-eastern communities after the immense disruption caused by European settlement (Thompson 1985).

Peterson (1976) describes Aboriginal society as being comprised of a hierarchy of organisational levels and groups, with fluid boundaries between them. The smallest group in the hierarchy are 'families'; a man with one or more wives, their children and frequently some of their parents. The second level are bands; small groups consisting of members of several nuclear families, who perform the normal hunting and gathering tasks together for most of the year (Peterson 1976).

At the next level are regional networks consisting of a number of bands. Members of these regional networks usually share beliefs in a common ancestor and/or have a common language dialect. Network members assemble for specific ceremonies, when the subsistence resources of a locality are plentiful enough to support a large number of people over a period of time. The 'tribe' is at a higher level in the organisational hierarchy. 'Tribes' are generally recognised as a linguistic unit with flexible territorial boundaries. At the broadest level of social organisation, or the pinnacle of the hierarchy, is the 'cultural area'. All groups within a 'cultural area' share cultural characteristics, such as a common initiation ceremony, and speak closely related languages (Peterson 1976).

The nature of organisation of Aboriginal groups within the Hunter Valley is unclear, due to the limited ethnohistorical records and the immense disruption to traditional culture that had already occurred by the time these observations were made. Earlier observers used the term 'tribe' to refer to anything from ten to 500 people. Aboriginal people themselves used a variety of names which might have referred to dialects, territories of other groups, local bands or regional networks (Brayshaw 1986).

According to Tindale (1974), the investigation area lies within the territory of the Wonnarua people (refer to Figure 16). Tindale (1974) describes the territory of the Wonnarua as comprising the Upper Hunter region, from a few miles above Maitland west to the Dividing Range and south to the Darkinjung on the divide north of Wollombi, across an area of 5,200 km² (Tindale 1974).

A resident of the valley in the 1840s, Mr Robert Miller, reported that the Wonnarua occupied "the Hunter and all its tributaries from within ten miles of Maitland to the apex of the Liverpool Ranges" and numbered around 500 people.



Figure 16: Cultural group boundaries after Tindale (1974).

Other authors (Enright 1932, Howitt 1904) report different descriptions of group names and boundaries, although Howitt (1904:83) professes to knowing very little about this region. The reliability of both Howitt's and Enright's evidence is questionable, due to the late period in which it was obtained.

Brayshaw (1986) suggests that ethnohistorical accounts indicate that much of the upper Hunter (particularly the tributaries of the Goulburn River west of Denman) was occupied by the Kamilaroi tribe, possibly as far south as Wollombi Brook. Both Threlkeld (1892, in Gunson 1974) and Mathews (1903) described the Kamilaroi territory as extending south to Jerry's Plains.

Breton (1833:203-204) described the burial of four men and two women, of the "Kamilaroi tribe", who were killed near Wollombi Brook. Their remains were covered with mounds of earth, the men buried in the shape of a cross and the women in the shape of a cone. Four waddies were placed in the centre of the men's burial. A circle ten metres in diameter was cleared around the site, and a second circle made around that. Pieces of bark were laid end to end in the intervening ground. The surrounding trees were carved with figures representing kangaroos, emus, possums and weapons (Breton 1833:203-204).

The fact that this burial involved creation of a mound, rather than interment within an excavated trench, indicates that the burial may have taken place on hard ground, rather than the softer sands typical of the Wollombi Brook terraces. The exact location of this burial is unknown but there is no evidence to suggest it is located within Wambo.

'Coomery Roy' or variations thereof was the name applied by early settlers to this tribe (Wood 1972). The unreliability associated with these accounts are highlighted by an article in *The Australian* of 21 September 1827 in which the 'Comnaroy' territory is described as only extending along the Hunter River between the Wollombi Brook and Goulburn River (Wood 1972:10).

Edward Ogilvie, son of William Ogilvie of Merton (near Denman), described four clans of the Kamilaroi in the Upper Hunter/Goulburn River area (Wood 1972). They were described as 'warlike' and a 'buffer tribe, whose land extended down the river to the Cockfighter' (Wollombi Brook) (Wood 1972:137).

After review of ethnohistorical accounts, White (2003) concluded that the evidence for the number, distribution and boundaries of groups is not clear, but raised the possibility that the lower Wollombi Brook and the Wambo area may have been at the intersection of at least three groups: the Geawegal to the east, a Wollombi group to the south, and the Comnaroy to the west. A fourth group may have occupied the sandstone mountain country south-west of the Wambo study area (White 2003). The area around the confluence of Wollombi Brook and the Hunter River was noted as being conveniently located for meetings of these groups (White 2003).

James Miller (1985), a member of the Gringai clan of the Wonnarua, suggests that the Wonnarua were closely affiliated with the Kamilaroi, but formed a separate tribe that occupied a territory including the present investigation area (and much of the Hunter Valley). Miller (1985) believes that the Gringai and Geawegal are clans of the Wonnarua and also raises the possibility that the Awabakal people, who inhabited the coast around Newcastle and Lake Macquarie, were a sub-group of the Wonnarua.

Interestingly, the traditional Aboriginal burial dated to just prior to European settlement at Mount Arthur North (Donlon and Kuskie 2003) near Muswellbrook, was of a man whose diet was dominated in relatively equal proportions by terrestrial foods and marine and freshwater foods (the closest marine source being 95 kilometres distant as the crow flies) and who had auditory meatus (possibly related to repeated immersion in water as a result of swimming and diving), providing archaeological evidence supporting this hypothesis.

Professor S. A. Wurm (in Gunson 1974:30) argues that 'Awabakal' was probably a clan (or 'regional network') name, not a tribal name, because that is what the suffix '-gal' or '-kal' usually meant. However, it is also possible that the name applied to the largest clan (or 'regional network') of a tribe in the Lake Macquarie region, which became the name by which the entire tribe was subsequently known (Wurm in Gunson 1974:30). Reverend Threlkeld observed that the Awabakal language was similar to the neighbouring Wonnarua, Darkinjung and Worimi languages (Gunson 1974:4). Gunson (1974) suggests linguistic evidence indicates that the Awabakal may have had most in common with the Wonnarua and also associated frequently with the Worimi.

From these accounts it is evident that the identification of names and boundaries of Aboriginal groups within the Hunter region is unclear and may never be resolved. The dramatic changes wrought on Aboriginal society before the time of the first ethnohistorical observations, combined with the lack of anthropological expertise of the recorders, has limited the usefulness of much of the information. Attributions of various names by early observers to perceived aggregations of people are unlikely to accurately reflect the true distribution of bands or regional networks or tribes. Peterson's (1976) advice about the fluid nature of Aboriginal group boundaries is pertinent. Boundaries may have fluctuated within both short-term and long-term periods.

3.3.2 Subsistence Resources

As discussed in Section 2.4, a wide variety of subsistence resources were available to the local Aboriginal population from the woodland/forest zone and the nearby riparian zones along the Hunter River and other watercourses such as Wollombi Brook.

Ethnohistorical and other evidence suggests that the diet of the local Wonnarua people would have included kangaroos, wallabies, echidna, emu, possum, bandicoot, fruit bat, koala, birds, wild fowl, goanna, snakes, lizards, fish, eel, freshwater mussel, tortoise, yam, ferns, macrozamia, berries, native orange, cabbage palm heart and wild honey (Brayshaw 1986).

No references are reported by Brayshaw (1986) of the seeds of kangaroo grass (*Themeda australis*) being ground, although their occurrence is widespread in the valley. The seeds are normally ground and baked and are available from December to March (Isaacs 1987:229). However, Wood (1972:112) reports that William Ogilvie, the settler of 'Merton' (near Denman) and on friendly terms with the Aboriginal people, observed grass seeds being gathered in wooden vessels and ground on the slightly concave surface of a flattish stone.

Several observations were also made of the use of Kurrajong seeds, which were reportedly ground and roasted (Cunningham 1825 in the Jerrys Plains area, cited in Brayshaw 1986, and Enright 1937).

Several other ethnohistorical observations have been recorded of the use of plants and animals in the Hunter region (Brayshaw 1986; refer to Section 2.4). While these observations have tended to focus on visible activities, they have often omitted details of less visible (and predominantly female) plant gathering activities (Brayshaw 1986).

With few exceptions to these references, there is little specific ethnographic information regarding Aboriginal resource use in the upper Hunter Valley. This has been attributed to the speed of European settlement into the area, in conjunction with marked population losses through illness/disease, physical dislocation and violence (Brayshaw 1966, 1986, Wood 1972, Miller 1985, MacDonald and Davidson n.d.).

Inferences however have been made which suggests that hunting and fishing also comprised a substantial portion of the Wonnarua diet (Miller 1985, Davidson and Lovell-Jones 1993). Land management practices through the use of fire have also been assessed as a key economic activity (Miller 1985, Davidson and Lovell-Jones 1993).

While not specifically related to the Wonnarua, ethnographic accounts of the adjacent Awabakal have some pertinence. Several observations were made of the methods of obtaining food. Fishing, more prevalent in the coastal zone, was observed as angling with hook and line, diving, spearing from a canoe or bank, entrapment by hand nets (Miller 1985), and use of elaborate fish traps (Threlkeld in Gunson 1974). Bandicoots were observed being hunted and killed using waddies. 'High grassy bushy places' were first beaten to make them appear (Threlkeld in Gunson 1974:54). Dawson (1830:119) described the use of fire to trap a group of kangaroos, which if enclosed in a nook or bend in the river or by some other obstacle, were then killed.

Special mention is made in the ethnohistorical literature about the dependence of estuarine dwelling Aboriginals on 'fern roots', which presumably refers to bracken fern (*Pteridium esculentum*) or swamp fern (*Blechnum* spp.), but possibly bulbs and roots of swamp and marsh plants (Barrallier 1802:81, Ebsworth 1826:71, Moore 1981, Threlkeld in Gunson 1974:55, *Wallsend and Plattsburg Sun* 3/1/1891).

The processing and consumption of *Macrozamia* seeds (available in the upper Hunter, including the Modification investigation area) was also reported (David 1890, Reverend C. P. N. Wilton in NSW Legislative Council 1846, Threlkeld in Gunson 1974:55). These also had to be prepared by a special process to remove toxins, involving soaking the seeds in water for a week or two, then roasting.

3.3.3 Material Culture

The material culture of the local Aboriginal population would have included a range of items relating to subsistence, cultural and social activities and shelter. Ethnohistorical observations of some of these items are discussed below. However, in the archaeological record, few of these items are preserved. Notable exceptions include small marsupial bones reported by Donlon and Kuskie (2003) in the Mt Arthur burial, possibly used to secure a small pouch or bag in which various artefact and ochre grave goods were placed, and worked mussel shell identified in a rock shelter at Wallaby Rocks, Mangoola, by Umwelt (2006). Stone, and to a far lesser extent, bone and shell, are the materials most frequently represented in archaeological sites.

From ethnohistorical, archaeological and other evidence it is apparent that the material culture of the local Wonnarua people would have included a range of items other than stone tools, such as possum skin cloaks and belts, waddies, digging sticks, wooden bowls, water carriers, wooden shields, spears, spear-throwers (woomeras), clubs, hafted stone hatchets, boomerangs, baskets, dilly bags, bark huts, bone awls, and possibly message sticks, clapping sticks, bark and vine cords, canoes, fishing lines, fish nets and fish hooks.

Ethnohistorical observations of material culture are reported by Brayshaw (1986) and Kuskie and Kamminga (2000). The most pertinent observations to the current investigation relate to stone implements and spears. Threlkeld (in Gunson 1974:67), as described below, mentions the use of quartz flakes and later broken glass, to form serrated edges along fighting spears. Barrallier (1802:81 in Brayshaw 1986) also noted fighting spears with 'pieces of sharp quartz stuck along the hard wood joint on one side so as to resemble the teeth of a saw'.

Stone hatchets were observed by Threlkeld (1834, in Gunson 1974), Barrallier (1802) and Dawson (1830). Dawson (1830:202) observed grooved heads with a handle fastened by adhesive gum. Dawson (1830) states that gum obtained from wattle (*Acacia* spp.) and grass trees was used in the manufacture of much equipment. The stone was mainly basalt or diorite and ground at the edge. Hatchets were used to cut saplings for building gunyahs, for stripping bark from trees, cutting notches in trees for climbing, and cutting toe-holds in trees to procure animals or honey from bees nests (Mathews 1894).

However, apart from quartz spear barbs and stone hatchets, no mention is made in the ethnohistorical literature of other types of stone artefacts. None of the ethnohistorical accounts explain the profusion of microliths (backed artefacts) within archaeological sites, nor do they identify the large core and flake component as having been used within the historical period (Brayshaw 1986:68).

Brayshaw (1986) suggests that this may be due to these items having escaped the attention of observers, or that they were not in use at the time of contact, having been replaced by shell, wood or bone. Dawson's (1830:135) observation of trade involving shells used to 'scrape and sharpen spears' is pertinent. Dean-Jones (1990:68) argues that it was because most observations were made from a distance and the stone tools were too small to be seen. For whatever reason, the manufacture or use of stone artefacts, which make up the majority of evidence in archaeological sites, is scantily documented.

As reported by White (2003), some historical references compiled by Brayshaw (1986) to the use of plant materials for equipment are relevant to the Wambo area. In the "Comleroi" district above the junction of Wollombi Brook and the Hunter River bark was cut from box or stringybark trees and straightened with fire, to make huts (White 2003). Cunningham reported that Paperbark (*Melaleuca quinquenervia*) was also used (Brayshaw 1986:59). Paperbark (tea tree bark) was also used to make small baskets and drinking vessels (Brayshaw 1986:63). Bark, including that of Kurrajong trees, was soaked and beaten with a wooden mallet, and twisted and rolled with the palm of the hand on the leg to make chord or string. This in turn was used for fishing lines, nets and bags, binding spear points to shafts (Brayshaw 1986:60-63). Box, Kurrajong and Paperbark trees occur within the Wambo area (White 2003).

As mentioned previously, there is little specific direct ethnographic evidence of the Wonnarua available, however analogy may be made with that of the Awabakal people to the east. Reverend Threlkeld (in Gunson 1974:67) provides detail of the manufacture of fishing, hunting and fighting spears among the Awabakal people:

The fish spear ('Kul-là-ra' and 'Mo-ting') are made 'from the stem of the grass tree², at the end there are four pieces of hard wood, about two feet long, (which) are fastened with a bark thread covered with the grass tree gum, heated in the fire until at a melting point, when it is worked round the thread fastening it ... The three or four shorter spears thus fastened to the long stem of the grass tree, of about six feet length, becomes thus somewhere nigh eight feet in the total length... Small wooden wedges are inserted betwixt the attached short spears just at their base where they are tied, and likewise gummed over firmly... The points of each skewer is hardened in the fire, by charring; and when hot, covering it with a coating of the grass tree gum, fastening at the same time a barb of bone at the point'.

² Grass trees (*Xanthorrhoea* sp.) were observed within the investigation area.

'The hunting spear, 'wa-rai', is likewise made from the stem of the grass tree, but having only one hardened joint of wood inserted at the end, as already described. The battle spear is made of the same material, but often with the addition of pieces of sharp quartz stuck along the hard wood joint on one side so as to resemble the teeth of a saw. The march of intellect directed the blacks, latterly, to use fragments of broken glass bottles instead of quartz, thus inflicting fearfully lacerated wounds ...'

All spears are thrown by a throwing stick ('wom-mur-rur') generally four foot long by half an inch thick, tapering to a point at one end where a barb is fixed (Threlkeld in Gunson 1974:67). Threlkeld observed the trade of spears with populations further inland, in return for possum skin cloaks and 'hanks of line, spun by hand from the fur of animals of the opossum tribe' (Threlkeld in Gunson 1974:42, 61). Mrs Ellen Bundock observed the leader of the Aboriginal group who attacked Merton (near Denman) in April 1826 as being clothed in a possum skin rug (Brayshaw 1986:67).

Threlkeld describes a variety of items including waddies, often made of ironbark wood (Ebsworth 1826:77 in Brayshaw 1986); yamsticks, up to two metres long and four centimetres in diameter; fish hooks made of shell ground down on stone; wooden bowls cut from tree burls; water carriers of sheets of bark, tied at each end with a bent twig handle; oval wooden shields, three feet long by eighteen inches wide, painted with a white coloured earth resembling pipe-clay and crossed with two red bands or stripes; two forms of canoes made of bark from trees, one which measured 12-14 foot long by 3-4 foot wide; hand nets used for fishing; and fishing lines (Threlkeld in Gunson 1974:42, 54, 67, 190).

The ethnohistorical evidence reveals that a broad range of items were part of the local Aboriginal material culture. Other items not mentioned above but also likely to be present include message sticks, clapping sticks, bark and vine cords, netted and woven dilly bags, shell pendants and fur belts (Brayshaw 1986).

3.3.4 Other Aspects of Society

Other aspects of Aboriginal culture and society were noted by the early settlers and explorers. Threlkeld (in Gunson 1974) for example, described a burial, initiation ceremonies, cosmological beings and corroborees among the nearby Awabakal people.

Burials were noted as tending to occur in any soft ground. When not buried, the body can be wrapped in two sheets of bark, secured with cords of kurrajong and placed in a hollow tree (Fraser 1882, Wood 1972:145). As discussed in Section 3.3.1, Breton (1833:203-204) described the burial of four men and two women, of the 'Kamilaroi tribe', who were killed near Wollombi Brook.

Threlkeld (in Gunson 1974: 46) recorded a typical hunting expedition, one of many on which he accompanied the Awabakal people who lived on the coast adjacent to the Wonnarua:

At sun rise the whole tribe prepares for the hunt by taking their spears, throwing-sticks, hatchets and fire-brands, proceeding to the hills, they scatter themselves so as to surround a valley, leaving the entrance guarded by several good marksmen armed with spears. The surrounding party then begin to enclose shouting with all their might, but still in regular time. The kangaroos and other animals become alarmed and make towards the entrance of the valley, where a shower of spears transfix them in their endeavour to escape... A fire is kindled on the spot and the animals are grilled...

Dyall (1971) and Sokoloff (1978b, c, d) note the importance of fire. Fire was used to burn scrub in winter, which encouraged early growth of spring grasses to attract kangaroos and wallabies, and cleared the ground to make hunting easier (Dyall 1971). Fire was also used for cooking, warmth, in signalling between groups, initiation ceremonies, disposal of corpses, mourning, making weapons and canoes, fishing and hunting (Sokoloff 1978c).

Trade with other Aboriginal groups was noted by several observers. Dawson (1830) referred to communication between Aborigines of the interior and coast in which possum skins, belts of yarn and headbands were exchanged for European hatchets, shells and glass. Threlkeld (in Gunson 1974:42, 61) also observed that possum skin rugs and fur cord made by the inland people were traded with the coastal Awabakal for reed spears.

The selection of locations for camp sites is a critical issue in the study of archaeological evidence. However, few ethnohistorical observations were made of this process. One notable account is by Fawcett (1898:152), of the Wonnarua:

In choosing the site, 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.

Topographic features may also have been an important part of the Wonnarua cosmology. Mulvaney and Kamminga (1999:77) and Miller (1985) suggest that a variety of links between topographic features, as well as plants and animals, were integral parts of the Dreaming.

3.3.5 Population

Early European settlers and visitors reported several observations about the nature and size of the local Aboriginal population. In 1819, Howe observed five people on the river at Jerry's Plains (Campbell 1928) and Breton (1833:90-92) observed a group of 60 or more people, an aggregation of 'tribes' from 'Illarong' and 'Wollombi', apparently travelling to fight with another group.

Surveyor Felton Mathew observed an Aboriginal camp on Wollombi Brook, near Broke, in 1830, and reported there were 60 people present. This observation was made some time after contact, and Mathew's report indicates the effects already caused by starvation and disease (Brayshaw 1986).

Wood (1972) reports that a settler at Patrick's Plains (Singleton) in 1824 counted 300 healthy Aboriginal men in the district. Twenty years later, less than three dozen could be found and they no longer camped in the bush but lived on the properties of settlers who would permit them. One of these survivors was reputedly Galmarra (Jackey Jackey), taken by Edmund Kennedy on his expedition to Cooper Creek and Cape York, along with Merton Aboriginals Jimmy and Tommy Ogilvie (Wood 1972, Blyton *et al* 2004).

In the returns of Aborigines from selected blanket distributions, the following populations were recorded at Merton, near Denman (Brayshaw 1986:58):

- In 1839, 40 adult males, 14 adult females and five or more children; and
- In 1844, 18 adult males, seven adult females and eight or more children.

Wood (1972) reports that 60 blankets were issued to the Merton Aboriginals in 1854, but an influenza epidemic in the Hunter in 1860 caused many deaths, and by this year only 30 blankets were issued.

Due to the probable effects of the first smallpox epidemic in 1789, it is unlikely that the Europeans ever gained an accurate understanding of traditional population sizes. What is certain is that from the time of early settlement the number of Aboriginal people declined rapidly (Brayshaw 1986, Hartley 1986:48, NSW Legislative Council 1846).

3.3.6 Relationship with Settlers

Observations have been recorded of encounters between Aboriginal people and the early settlers and about the relationship between these groups. A number of initial encounters in the Hunter Valley were relatively friendly (Dawson 1830, Miller 1985, Needham 1981, NSW Legislative Council 1846, Threlkeld in Gunson 1974:44, Wood 1972). These were often between Aboriginals and escaped convicts and timber getters, but also free settlers.

The use of Aboriginal people as guides and trackers is well documented (eg. Blyton 2012, Dunn 2016). When Chief Constable of Windsor, John Howe, set out in October 1819 to establish an overland route from the Hawkesbury to the Hunter, his party included an Aboriginals named Myles and Mullaboy (Blyton 2012). Further guidance in the Hunter Valley was provided by other Aboriginal persons such as Murphy, Whirle and Bandagran (Dunn 2016). In 1822, James Mudie asked Henry Dangar for instructions to find his way through the bush to Singleton, with the assistance of Aboriginal guides.

However, serious conflict in the region quickly arose over the mistreatment of Aboriginal women by the settlers, and misunderstandings with pastoral settlers, which became more common. Convicts were often brutal to the Aboriginal people (Dawson 1830, Gunson 1974:4-5). As a result, whenever a tracker was required to search for an escaped prisoner, there was always an Aboriginal person ready for service and often the prisoner was speared when captured (Turner and Blyton 1995). The behaviour of timber getters in cutting down trees (believed to house the souls of Aboriginal people awaiting rebirth) and shooting fauna (totem animals to the local Aboriginals) were also causes of conflict (Needham 1981).

In the region, from the 1830s groups of Aboriginal people raided settlers' properties and stole food and attacked people. Wonnarua people organised a concerted campaign of violent resistance against the white settlers/invasers (Gollan 1993, Miller 1985). Many offenders were captured and tried before the Supreme Court in Sydney. Some were acquitted and others were sentenced to death (Turner and Blyton 1995). Settlers conducted various atrocities against the Aboriginal people. For instance, in March 1827, shepherds murdered 12 Wonnarua people along the Hunter River (Miller 1985:41).

Opinions of the settlers varied, with some viewing the Aborigines as "savages ... with no homes, no occupation beyond procuring food for the day, and think nothing of tomorrow ... they resist labour' and wander 'from place to place as the game grows scarce" (Davidson 1846:144-6). However, other settlers, such as the Ogilvies of Merton, viewed the Aborigines from a different perspective, and treated the Aboriginal people with respect and likewise earned their respect. Missionaries such as the Reverend Threlkeld were also genuinely interested in and spent considerable time and effort observing and recording Aboriginal life.

3.3.7 Recent Aboriginal History

The arrival of non-indigenous people had disastrous effects for the local Aboriginal people. The observations of early settlers give pertinent insights into the main causes of this event.

The rapid spread of European diseases, which the Aboriginal population had not hitherto been exposed to or developed immunity to, was a major factor. Smallpox, typhoid, influenza, scarlet fever, measles, diphtheria, whooping cough and croup contributed to the deaths of many Aboriginal people (Wood 1972). Major smallpox epidemics occurred between April and May 1789 and again from 1829 to 1831 (Butlin 1983). The first epidemic was reported to have decimated half of the Aboriginal population between Botany Bay and the Hawkesbury (Butlin 1983). E. M. McKinlay of Dungog and Joseph Docker of Scone stated that an epidemic of smallpox swept through the Aboriginal population in the upper Hunter in 1835 (Miller 1985).

Reverend Threlkeld noted in 1828 the effects of influenza and in 1837 the effects of measles, whooping cough and influenza (Turner and Blyton 1995). In a reply by various Ministers of the Church of England in the Hunter Valley, to a circular issued in 1846 by the NSW Select Committee on the Condition of the Aborigines requesting information on the state of the local Aborigines, responses highlighted the effects of diseases and a rapid recent decrease in the Aboriginal population. Reverend C. P. N. Wilton, Minister of the Church of England in Newcastle, reported smallpox and measles to be factors in the rapid decrease in the local population (by half in the previous ten years) (Wilton in NSW Legislative Council 1846). Reverend George Augustus Middleton, Minister of the Church of England at Morpeth, partially attributed the population decline to native pox and influenza (Middleton in NSW Legislative Council 1846).

Factors other than disease contributed to the rapid decimation of the Aboriginal population and traditional life, including the loss of traditional hunting grounds and a decrease in abundance of the game that populated them. Again, the Church of England Ministers highlighted this factor. Reverend Wilton observed that the ordinary means of subsistence for the Aboriginal people was greatly diminished: 'Emu, kangaroo, wallibi and opossum almost disappeared from their hunting grounds', fish and 'Kon-je-voi' were the only abundant foods left' (Wilton in NSW Legislative Council 1846). Reverend Middleton also observed that the ordinary means of subsistence were seriously diminished, due to clearance of brushes and draining of lagoons. No kangaroos were present, but rivers, lagoons and forests continued to supply some food (Middleton in NSW Legislative Council 1846). Lieutenant Breton (1833) observed at Wollombi a great reduction in the number of kangaroos within several years in the early 1830s.

Turner and Blyton (1995) argue that violence perpetrated by non-Aboriginal men against Aboriginal women was a major cause of the decline in population, at least in the Lake Macquarie region, but possibly elsewhere. Violent encounters and abuse have been documented ethnohistorically and were a source of early conflict (Miller 1985). The effects of rape on Aboriginal women included the transmission of diseases, some of which may have led to infertility and/or death, and the production of offspring of mixed Aboriginal and European blood, which may have been very undesirable for the Aboriginal parent. However, Miller (1985) argues that the Wonnarua were possibly the first Aboriginal group to allow the children of mixed parentage to live, a factor that contributed to their survival.

The rapid deaths of many Aboriginal people through disease also acted to destroy the complex structure of their traditional society. Systems of kinship, marriage, order and subsistence were thrown into disarray.

By the 1840s, many of the remaining local Aboriginal people were dependent upon the settlers for old clothing, money and rations (Wilton in NSW Legislative Council 1846). Aboriginal people were employed by settlers as hewers of wood, drawers of water (Backhouse 1843:389), about the house, to run errands, or on farms to gather maize or burn off (NSW Legislative Council 1846).

The annual distribution of blankets conducted by the Government was ended in 1844, to the anger of the local Aborigines who could no longer obtain traditional possum skin cloaks due to the reduction in animal numbers and possible loss of knowledge and trading networks.

The destruction of their traditional society and the increasing reliance on the settlers led some Aborigines into a life of alcohol abuse. Increased hostility among Aboriginal people resulted from these pressures on their society, the integration of groups which historically had hostile relationships, and the effects of alcohol (Hartley 1995, Wood 1972).

In the latter part of the 1800s there was growing concern in NSW about the plight of the Aboriginal people. The Aborigines Protection Association was formed and in 1881 a Protector of Aborigines appointed. In 1883 the Government established a Board for the Protection of Aborigines to achieve a 'more systematic and enlightened treatment of Aborigines'. Rural stations were created so that Aborigines could remain on tribal territory (Turner and Blyton 1995). One such station was established on 23 hectares (later to become 33 hectares) at St. Clair, 20 kilometres north of Singleton. However, the Protection Board became one of the organisations most feared by the Wonnarua people, who were systematically oppressed by its actions (Miller 1985).

By the 1940s people moved to the urban areas to escape the oppression of the Aboriginal Protection Board and to find employment. Singleton and Muswellbrook became the main centres for Aboriginal people in the central to upper Hunter Valley. Thousands of Aboriginal children in NSW were removed from their families between 1909 and 1967 and placed in institutions. Aboriginal people outside of the missions lived in shanty settlements on the fringes of European communities or in tent villages alongside railway lines (Turner and Blyton 1995).

A vibrant Aboriginal population remains in the region today, and takes an active interest in their heritage. Consultation with the local Aboriginal community has formed an integral part of the assessment (refer to Section 6). As discussed in Section 3.5, consultation with the Aboriginal community is essential to identify certain site types and cultural values.

3.3.8 Ethnohistorical References to Aboriginal Sites

Several ethnohistorical accounts exist of Aboriginal sites and activity within the vicinity of Wambo.

As discussed in Section 3.3.1, Breton (1833:203-204) described the burial of four men and two women, of the 'Kamilaroi tribe', who were killed near Wollombi Brook. The fact that this burial involved creation of a mound, rather than interment within an excavated trench, indicates that the burial may have taken place on hard ground, rather than the softer sands typical of the Wollombi Brook terraces. The exact location of this burial is unknown but there is no evidence to suggest it is located within Wambo, and it is unlikely to be situated in close proximity of the Modification area.

Brayshaw (*et al* 1996:21-22) report on oral accounts of Aboriginal activity within the Warkworth area. Mr Puck King, former owner of the Appleyard Farm near the Wollombi Brook/Hunter River confluence, recalled ploughing up mussel shells near Wollombi Brook. Mr King stated that the shells were the marine, not fresh water, variety. His impression was that this area, close to Wambo, was a meeting place where coastal dwelling Aborigines met those from inland areas and that the shells had been brought as items for trade/exchange.

Mr King's beliefs were apparently based on discussions with Mr W. Greenhalgh (or Greenhault), former owner of a vineyard (Greenhalgh Farm) in the eastern part of the Wambo Mine Lease, who had lived there all 86 years of his life (Brayshaw *et al* 1996:21-22). Dyall (1980) had interviewed Mr Greenhalgh during a survey of the Wambo Mining lease. The account of Dyall (1980) and analysis of Brayshaw (*et al* 1996:22) is reproduced below:

Dyall (1980b) interviewed Mr Greenhalgh during his survey of the Wambo Mining lease. His report of this is reproduced here in full.

Only two residents remain on the lease, and one of these (living at 093,945) is a newcomer. The other, Mr W Greenhalgh, of Greenhalgh Farm has lived there all his 86 years and was able to contribute some interesting information, as follows:

i. He vividly recalls, as a four-year-old, being frightened by blacks carrying spears and boomerangs. This is hard to believe at a date as recent as 1898; whilst there is no precise date for the demise of traditional Aboriginal life at Warkworth, it is my impression that 1898 is a generation too late. The incident may have happened to his father, who took up the selection in either 1884 or 1886 and would have been a four-year-old around 1860.

ii. As a boy, he heard the "old hands" state that the local tribe used to meet the coastal tribe outside the Greenhalgh house (134,939) on the bank of Wollombi Brook, to barter and do battle.

iii. Mr Greenhalgh has an orchard and vineyard, and as a young man he ploughed up stone axes, "probably 30 of them". He showed me one fine basalt specimen, and gave me a basalt pebble axe, as well as two basalt pebbles with flaked cutting edges. The other axes he has given away. In 1954 (actually I think he means 1955) a particularly heavy flood of Wollombi Brook washed away part of the alleged "meeting place" and buried the rest of the orchard/vineyard area (which covers about 15 hectares) under a metre of silt. Mr Greenhalgh does not recall exactly where any of the axes come from.

I showed this informant some typical stone flakes, and he insisted that they did not occur in company with the axes. He collects pebbles for lapidary work and must surely have noticed flakes on his ploughed land if they had been present. Nevertheless I did find some 20 flakes and flaking cores (at 136,936) on a low knoll in the vineyard. On balance the evidence points to this Aboriginal camp being a special place: it appears to have little of the waste flake material which litters normal campsites, and the number of axes is surprisingly high. The "meeting place" story may well be true.

This site #37-6-135, was inspected by Brayshaw (1981a) in July 1981 in association with the proposed Mt Thorley rail loop. By that time more flaked artefacts were exposed in a central section of the vineyard than the 20 noted by Dyall.

Information reported by Dyall (1980) appears to confirm the story that this site (AHIMS #37-6-135, Wambo Site 24) was a 'meeting place' (Brayshaw *et al* 1996:22). The site is located near a bend in Wollombi Brook adjacent to the Wambo Mine entrance road and Wambo Coal Handling and Preparation Plant, about seven kilometres south-east of the Modification investigation area.

The 'Bulga bora ground' is located approximately eight kilometres south-east of the Modification investigation area. Brayshaw (2003) conducted research to re-establish the location of the bora ground (Attachment D1 of White 2003) for the Wambo EIS. The site had initially been recorded by Australian Museum staff (Anderson, Thorpe and Clutten) in 1918, following information given to them by Mr Alex Eather of Bulga. This site consisted, in 1918, of about 12 carved trees, clearing and intact mounds, and was described as a bora ground. The site was located in "open forest country on a slight eminence or plateau" and it was noted that "the ground is exceptionally level and sandy" (Brayshaw 2003). A map sketched by Museum staff from memory showed it just east of a "stock route" and just north of a creek, which flows into Wollombi Brook to the west (Brayshaw 2003).

Four of the carved trees were photographed by the Museum staff. Mounds of heaped earth were present amongst the trees, along with a crescent-shaped mound about two feet high and 15 feet long. At the time it was thought that the carvings had been carried out about 60 years earlier, dating the site to the late 1850s (Brayshaw 2003). An extract of an article written by Mr Alex Eather of Bulga and published in the December 1993 issue of the Singleton Times Newsletter stated that this Bora ceremony was held in the year 1852, and "on reliable authority of residents of the locality was attended by between 500 and 600 Aborigines from various tribes from as far as Mudgee and Goulburn" (Brayshaw 2003). The Museum recording also noted the presence of a large "campsite" on both sides of a creek between the bora ground and Wollombi Brook. A total of 47 artefacts were collected from this site by W. W. Thorpe in 1918 (White 2003). During the survey of White (2003), several artefact locations (Wambo Sites 3-8) and a grinding groove site (Wambo Site 4) were identified in the immediate locality.

3.4 Occupation Model

In order for any investigation to contribute effectively to the management of the heritage resource, the following key elements of a research design (Boismier 1991) are essential:

- 1) Identification of the specific environmental and cultural characteristics of the area;
- 2) Construction of a model of Aboriginal occupation for the locality;
- 3) Definition of the expected nature and distribution of evidence;
- 4) Formation of a methodology to test the predictive model and relevant research questions, in consideration of the expected nature and distribution of evidence; and
- 5) Analytical techniques for the evidence recovered that are appropriate to address the research questions and project objectives.

The environmental context of the investigation area has been outlined in Section 2, and the proposed methodology and analytical techniques are discussed in Section 4. The model of Aboriginal occupation for the locality and expected nature and distribution of evidence are discussed below and in Section 3.5.

White (2003) presents a discussion of models of occupation considered during the assessment for the Wambo EIS. Broader models of occupation for the Hunter Valley region have been proposed by Kuskie and Clarke (2004) for the central to upper valley and by Kuskie and Kamminga (2000) for the lower valley, based on ethnographic, ethnohistorical, oral historical and archaeological evidence. These models have been refined through subsequent excavations and analysis (eg. Kuskie and Clarke 2006). Elements of the regional models that are of particular relevance to the investigation area are outlined below, with the nature of expected *archaeological* evidence to test the individual elements specified in *italics*:

- Occupation predominantly focused on the relatively more abundant and diverse resource rich zones within the tribal territory (for example, the junction of multiple resource zones) particularly along the Hunter River and its former estuarine margins and around wetlands, swamps and lakes. Within the *primary resource zones*, such occupation could include nuclear/extended family base camps, community base camps and occasional larger congregations of groups where resources permitted. Encampments in more favourable locations (for example, abundant resources and water) may have been the subject of stays of longer duration and more frequent episodes of occupation than in other areas (for example, secondary resource zones, refer below);

- *Substantially higher counts and densities of artefacts and numbers of activity areas, along with a greater range of stone material and artefact types may occur in the primary resource zones than in other areas.*
 - *Encampments in more favourable locations used for longer durations and more often may exhibit greater superimpositioning of activity areas, greater quantity and density of evidence, and evidence of different episodes in the form of in situ deposits with stratified or vertically separated evidence of activity events and datable material.*
 - *Refer below for discussion of expected evidence for different occupation types.*
- Outside of the primary resource zones sporadic occupation of *secondary resource zones*, focused on the watercourses, particularly within close proximity (for example, 50 metres) of higher order watercourses and associated level to very gently inclined valley flats. These zones were utilised for encampments by small parties of hunters/gatherers and nuclear/extended family groups during the course of the seasonal round. There was a strong preference for camping on level ground, adjacent to reliable water sources and more abundant subsistence resources. A greater range and frequency of activities were undertaken at the encampments, rather than in the surrounding landscape. Camp sites along the watercourses were occupied by these small groups of people for varying lengths of time (but of typically short duration), during both the course of the seasonal round and in different years. Occupation of these camp sites was predominantly sporadic, rather than continuous;
- *Moderately higher counts and densities of artefacts and numbers of activity areas, along with a relatively broad range of stone material and artefact types may occur in the secondary resource zones than in other areas, but to a much lesser degree than in the primary resource zones.*
 - *Refer below for discussion of expected evidence for different occupation types and identifying whether occupation is sporadic or continuous.*
- Notwithstanding the points above, widespread, generally low intensity, usage of the entire tribal territory. Occupation outside of the primary resource zones and secondary resource zones tended to involve hunting and gathering activities by small parties of men and/or women and children, along with transitory movement between locations and procurement of stone materials. However, the utilisation of these areas (for example, simple slopes, ridge crests, spur crests and lower order watercourses) was far less intense than areas such as valley flats and higher order watercourses where encampments were situated and potable water and more abundant resources were present. These areas were probably typically exploited during the course of the normal daily round by inhabitants of encampments located in the primary or secondary resource zones that foraged within an area of up to ten kilometres radius from their campsites;
- *Evidence of low intensity occupation that may include low to very low artefact counts and densities and low numbers of activity areas, along with dates/stratigraphy indicating sporadic occupation over time, not continuous occupation.*
 - *Refer below for discussion of expected evidence for different occupation types.*
- Occupation outside of the primary and secondary resource zones also involved special purpose journeys (for example, to procure stone from a known source or to access an area for ceremonial/spiritual purposes) and non-secular activities (for example, ceremonial activities);
- *Evidence of lithic or quarry sites may occur at stone/ochre sources. More abundant evidence at a particular location may indicate repeated and special-purpose visits, as may the absence of evidence associated with other occupation types.*
 - *Refer below for discussion of expected evidence associated with ceremonial activities.*

- Thus, occupation extended over the entire tribal territory, with varying intensities and involving different activities, and occurring at different times of the year and different periods within the overall time-span of occupation;
 - *Evidence of occupation at different times of year may be tested only if specific seasonal plant/food evidence and/or associated tool types involved in their processing can be identified in association with occupation.*
 - *Identification of different episodes of occupation over time would require in situ deposits with stratified or vertically separated evidence of activity events and datable material.*

- Occupation (or at least the evidence that survives of that occupation) predominantly occurred within the mid to late Holocene (past 5,000 years), after climatic change and rising sea-levels transformed the environment of the region, although sporadic occupation of the Hunter Valley may have extended as far back as 30,000 to 40,000 years;
 - *Charcoal in a cultural context may be radiocarbon dated or other forms of dating may be used to establish the age of occupation.*
 - *Specific artefact types may also provide evidence on the age of occupation.*

- Activities such as food procurement (hunting, gathering and land management practices such as burning-off), food processing, food consumption, maintenance of wooden and stone tools, production of stone tools (including systematic production of types such as backed artefacts, as well as hafting of implements and casual, opportunistic production of other items on an as needed basis), production of wooden tools and other implements, procurement of stone, erection of shelters, children's play, ceremonial activity, spiritual activity, human burials and social and political activity are among the types of pursuits engaged in by the local Aboriginal people across the tribal territory;
 - *Food procurement (including hunting, gathering and land management): minimal evidence expected for most types of food procurement, apart from the presence of stone artefacts such as eloueras, wooden implements where preserved, such as digging sticks, or food refuse (eg. shell and bone) in sites.*
 - *Food processing and consumption: evidence expected includes tools with specific use-wear/residues on cutting/chopping/pounding edges, specific tools that are related to processing certain foods (eg. eloueras, seed grinding slabs), evidence associated with hearths or ovens, and food refuse (eg. shell and bone) in sites.*
 - *Production and maintenance of wooden implements: expected evidence includes stone and shell tools with design and/or use-wear/residues consistent with working wood, and the presence of wooden implements in sites.*
 - *Production of stone tools: evidence expected includes hammerstones, anvils and most abundantly knapping debitage (eg. cores, flakes, flake portions, microblades, etc), along with some of the finished tools themselves.*
 - *Production of backed artefacts: evidence expected includes finished microliths (unused), bondi point preforms, backing flakes, chimblers/hammerstones, high quantities of debitage including a high frequency of elongated flakes (microblades);*
 - *Maintenance of stone tools: expected evidence includes cutting-edge rejuvenation flakes (eg. flakes from utilised edges of eloueras or other tools), portable whetstones, and axe-grinding grooves in sandstone.*
 - *Procurement of stone: presence of stone sources and evidence for procurement at those sources (lithic quarry sites).*
 - *Ceremonial activity: presence of ochre in sites, and evidence of ceremonial sites (bora grounds, stone arrangements, carved trees, rock engravings, etc).*
 - *Spiritual, social and other activity: presence of ochre in sites, evidence of ceremonial sites (bora grounds, stone arrangements, carved trees, etc) and rock art and engravings.*

- Activities varied in frequency and occurrence within the landscape (and between the different occupation site types - refer below), probably in relation to numerous variables such as topography, distance to resource zones, distance to water, aspect, slope and cultural choice. However, few activities are evident within the archaeological record other than those involving the use of stone, or where preservation conditions permit, other materials such as bone, shell and wood. The majority of evidence within an archaeological context will relate to reduction of stone, but some evidence will exist of encampments, food processing, food procurement and ceremonial and other activities;
 - *Predominance of stone artefacts as the surviving physical evidence of occupation.*
 - *Occasional evidence of hearths and other activities (refer elsewhere in this section).*
- The stone materials silcrete and tuff were favoured for stone working activities, with the relatively intensity of use of each material dependent upon the proximity of local sources. Tuff was primarily procured from exposed bedrock in hills, along drainage depressions and along the coastline where this rock type exists. It is available in many locations due to its abundance in the local coal measures. Silcrete was also procured from local sources (alluvial and terrace gravels). Other stone materials such as porcellanite and petrified wood were also preferentially employed for manufacturing small implements such as backed artefacts. Again, selection and use of these materials also related to their relative availability from local sources in various locations within the landscape;
 - *Dominance of these stone types within most archaeological assemblages. Evidence of nature and location of stone sources and attributes on individual artefacts that can potentially be linked to sources (eg. cortex, size, extent of reduction).*
- Stone was typically procured during the course of normal daily and seasonal movements, without the need for special purpose trips. The conservation of the most commonly used stone materials such as silcrete and tuff was not a priority. However, high quality less commonly utilised materials may have been procured from more distant sources by special purpose journeys and/or trade;
 - *Presence of stone sources and evidence for procurement at those sources (lithic quarry sites). More abundant evidence at a particular location may indicate repeated and special-purpose visits, as may the absence of evidence associated with other occupation types. Particular stone materials may be traced by chemical/physical tests.*
- Minimal use was made of other stone materials. Several of those that were utilised (quartz, quartzite, acidic volcanics, chalcedony and chert) were probably obtained from local sources such as alluvial and terrace gravels, terrestrial outcrops and weathered conglomerate rock. However, other types such as dacite and rhyodacite (used for grindstones) may have been obtained from sources on the coast north of Newcastle (around Birubi Point) by either trade or exchange, special purpose trips, or visits during the normal seasonal round;
 - *Relatively low frequencies of these types within archaeological assemblages.*
- Heat treatment of silcrete was undertaken to improve flaking qualities and possibly to obtain desired colours. Heat treatment involved both cobbles and large primary flakes of silcrete. Tuff was not deliberately heat treated. A reasonably high proportion of silcrete used in knapping was treated, and some of the products include bondi points that were hafted to spear heads. Kuskie and Kamminga (2000) speculate that colours had important symbolic meaning in Aboriginal society, and part of the reason for heat treatment may have been to obtain a desired colour as well as to improve the flaking properties of the stone. This may have been especially important for armatures of fighting and hunting spears;

- *Presence of stone in an archaeological context that has been thermally altered (and deliberate heating is inferred), along with heat treatment pits.*
- Ochre was used for ceremonial purposes and is likely to have been procured from relatively local sources;
 - *Presence of ochre in association with areas where preparation occurred for ceremonial activities and evidence of ochre procurement (quarries) at local sources.*
- Backed artefact production occurred widely, with the primary goal of producing microliths (such as bondi points) that could be hafted onto hunting or fighting spears made of grass tree stems or other wood, with the use of resin. It was more likely to be a planned and organised activity, but it did not necessarily occur only at nuclear family base camps or hunting party camps. Microblade production may also have occurred in places traversed during the course of hunting expeditions, such as resting places along travel corridors. When the production of microblades occurred away from camps, it may have involved more casual or opportunistic behaviour, such as backing a microblade to replace a spear barb when needed;
 - *Evidence expected includes microblades, microblade cores, microblade portions, microlith backing flakes, bondi point preforms and preform portions, complete and broken microliths and other debitage associated with their production, in association with sites interpreted as being nuclear family base camps or hunting-party camps. Also, some evidence (including microlith backing flakes and broken and utilised bondi points) would be expected away from these locations.*
- Production of backed artefacts was time-consuming and resulted in a considerable quantity of stone debitage at localities where it was undertaken. It is speculated that the end purpose (hunting or fighting spears armed with stone barbs) must have been highly desirable and socially valuable (Kuskie and Kamminga 2000). Hunting larger animals with spears was also a high-risk subsistence activity (in terms of invested time, energy and the price of failure), whereas most dietary requirements could be adequately met through low-risk means (ie. more reliable in terms of time, energy and return). Global scale analyses have demonstrated that in lower latitudes (in which the Hunter Valley is situated), with longer plant-growing seasons, plants and small land fauna are prominent in the economy of hunter-gatherer people (Binford 1980, Torrence 1983). The investment of considerable time and energy in the production and hafting of backed artefacts to hunting and fighting spears may well have been undertaken as much in relation to the social value of these items and tasks as strictly utilitarian need (Kuskie and Kamminga 2000);
 - *Problematic to identify through archaeological evidence.*
- Casual and opportunistic reduction of stone or selection of flakes to meet requirements on an 'as needed' basis was a widespread occurrence. Suitable flakes (sometimes after being retouched) were used in domestic tasks such as fashioning or repairing a wooden implement, while a higher proportion of flaked products were simply discarded at the site of their manufacture, without use;
 - *Presence of artefacts relating to non-specific knapping in a wide variety of contexts in the landscape, with only a low proportion of items possessing retouch or use-wear.*
- A low frequency of items was knapped using bipolar technology. This technology is largely, although not entirely, restricted to the reduction of quartz. It is likely that this technology was employed to reduce small pebbles rather than as strategy to prolong the life-use of an existing core;

- *Presence of artefacts associated with bipolar knapping in relatively low frequencies and mostly on quartz.*
- Exposed sandstone bedrock was used for the shaping and/or maintenance of ground-edge hatchets and axes, and potentially for seed-grinding, processing of other plant foods, animal foods and/or ochre, or preparation of medicines. These activities may have been occasional and incidental to transitory movement or short-term occupation during the course of the normal daily hunting/gathering round, or as a result of special purpose visits;
- *Sites with grinding grooves may exhibit evidence consistent with transitory movement or hunting/gathering without camping, particularly where this activity occurred during the course of the normal daily round;*
 - *Sites with moderate to extensive evidence of grinding and limited evidence of other activities may occur, in association with ceremonial sites, where this activity occurred as a result of special purpose visits;*
 - *Residue and use-wear analysis may enable identification of the uses of individual grooves.*
- Special tools such as worimi cleavers and grindstones were large and heavy and may have been deliberately cached at base camps in readiness for return visits;
- *Presence of specific tools (such as grindstones) at sites where evidence is present for repeated episodes of occupation. These tools and other types may be present in multiple numbers.*
- Plant foods were processed and consumed at temporary hunter/gatherer encampments, at family base camps, and where larger groups of people congregated, as well as at the sites of procurement. A range of plant resources was available in the locality. Women played a much larger role than men in obtaining and processing plant foods. Macrozamia kernels were collected and prepared by a special process to remove toxins, involving soaking the kernels for up to two weeks, then pounding and roasting them (David 1890, Backhouse in Gunson 1974);
- *Evidence relating to food processing and consumption occurring in association with evidence representative of these site types.*
 - *A suitable environmental context for the plants to exist, implements for pounding and a possible focus of this evidence around freshwater sources where the Macrozamia toxins could be extracted.*
- Ferns may have been a staple of the local diet, along with the bulbs and roots of other wetland plants. It is uncertain if swamp fern (*Blechnum* spp.) and/or bracken fern (*Pteridium esculentum*) was consumed. Notwithstanding its importance in the Maori diet, bracken fern, which grows in wet sclerophyll forest, is less likely since it is not reported ethnohistorically as being a preferred food (Beth Gott, *pers. comm.*). Worimi cleavers were used to pound the starch-rich rhizomes of bracken fern and/or swamp fern and possibly the roots of other plants obtained from the wetlands (Kammainga 1974). Eloueras may have been used for extracting the perennial herb cumbungi (*Typha australis*), abundant in the freshwater parts of wetlands, or less likely tall spike rush (*Eleocharis sphacelata*). Fibre from the cumbungi rhizome and leaf was used for string, baskets and nets (Beth Gott, *pers. comm.*);
- *Suitable environmental context for the presence of such plants, presence of tools used in cutting and pounding them (eg. worimi cleavers, eloueras, pebble choppers) and presence of products made from plants (eg. string, baskets and nets).*

- Animal foods were processed and consumed at temporary hunter/gatherer encampments, at family base camps, and where larger groups of people congregated, as well as at the sites of procurement. Men hunted for larger game, while women played a key role in obtaining smaller game. Hunting was a planned and coordinated event, as evidenced by the capture of kangaroos 'enclosed in a nook or bend in the river or some other obstacle' (Dawson 1830:119) and the use of fire to burn-off and promote fresh grass growth (Sokoloff 1978a-b). Birds, such as swans and ducks, were caught around the swamps and lakes (Threlkeld in Gunson 1974); and
 - *Evidence for consumption and processing of animal food located in association with evidence interpreted as representing these occupation types.*
- Fish were obtained by several methods. People used bark canoes on lakes, wetlands and rivers, and angled with shell fish-hooks and line. Fish were also obtained directly by spearing, while standing in a canoe or on a bank, or by the use of hand nets to form a circle in shallow waters and enclose the fish. Another group activity was the planting of sprigs of bushes in streams, with some men frightening the fish towards an opening, at which point others stood ready with nets to catch them (Threlkeld in Gunson 1974). Eels were also caught in an organised manner, with small trenches being dug in the swamps, particularly near the narrower outlet (David and Etheridge 1890:46). Managing resources by the use of facilities (eg. fish and eel traps) and fire (encourages new grass to attract kangaroos or manage macrozamia) were additional strategies aimed at increasing the reliability and productivity of food resources (Rich 1995:4).
 - *Presence of fish remains in deposits, shell fish-hooks and fish-hook files, fishing line, fishing spears and hand nets. Fish traps would be expected in suitable watercourses (although only stone arrangements would survive), however evidence for procurement of eels is not expected within an archaeological context.*

Notwithstanding arguments largely underpinned by material culture, environmental factors and resource variation, in relation to other locations, Boot (2002:334) observes that *"the economy was secondary to the sacred and that, ultimately, the primary purpose of economic life was to sustain the sacred worlds" of the Aboriginal people.*

Most of the Longwalls 24-26 Modification investigation area is located in contexts that do not conform to primary or secondary resource zones. According to the modelling above, occupation of these portions of the investigation area is therefore more likely to have related to hunting and gathering activities, along with transitory movement between locations and procurement of stone materials, and have been of a generally low intensity. White (2003) and Kuskie (2017a) have identified that the Jerrys Plains Ridge and other nearby ridges may have formed access routes for Aboriginal people from the lower valleys of Wambo, Stony and North Wambo Creeks and Wollombi Brook, into the higher sandstone country to the west of Wambo, whereas elsewhere nearby substantial cliffs presented a significant barrier to human movement. The Jerrys Plains Ridge also provides an access route north through the investigation area towards the nearby Hunter River (refer to Figure 13).

However, a small portion of the Longwalls 24-26 Modification investigation area comprises the higher-order watercourse of North Wambo Creek and associated flats/terraces, which may comprise a secondary resource zone. Within this area, additional types of occupation involving encampments, events of longer duration or involving larger numbers of people may have occurred (although the salvage evidence from Wambo Site 239 was inconclusive with respect to this issue; Kuskie 2020c).

In general terms, the nature of occupation at each Aboriginal site identified within the investigation area could represent a variety of circumstances (Kuskie and Kamminga 2000), for example:

- ❑ Transitory movement;
- ❑ Hunting and/or gathering (without camping);
- ❑ Camping by small hunting and/or gathering parties;
- ❑ Nuclear/extended family base camp;
- ❑ Community base camp;
- ❑ Larger congregation of groups; or
- ❑ Ceremonial activity.

The evidence could represent a single episode or multiple episodes of one or more of the above types of occupations. The episodes of occupations could have occurred at different times over the entire time-span of occupation in the region. Each episode of occupation could also have been for a different duration of time.

Unless the archaeological evidence for individual activity events is readily identifiable, it can be highly problematic to determine the types of occupation, number of episodes, and times and duration represented by evidence at a particular site. Suitable circumstances are rarely present in open sites, due to mixing of evidence by post-depositional processes and the superimpositioning of evidence caused by repeated episodes of occupation.

Listed below is a brief description of the nature of each type of occupation and the material circumstances or evidence that may relate to such occupation types within the present investigation area and surrounding locality (Kuskie and Kamminga 2000):

Transitory movement:

- ❑ May occur when an individual or group of people are moving between base camps, or from a campsite to resources or a ceremonial or other special purpose site;
- ❑ Duration would be less than a day and probably less than a few hours;
- ❑ Total numbers of people would generally be relatively low;
- ❑ Could occur on most topographical units and classes of slope, but possibly more frequently on ridge and spur crests and along watercourses and valley flats;
- ❑ Could occur in any type of rock shelter (ie. any size, topographic location, or distance from water source) where shelter may be sought from inclement weather;
- ❑ Proximity to potable water was probably not important;
- ❑ Proximity to food resources was probably not important;
- ❑ Evidence may represent accidental discard, repair of hunting or gathering equipment, children's play or knapping activity;
- ❑ Quantity and density of evidence and range of artefact and stone types are expected to be low, consistent with 'background discard', with few discrete activity areas unless repeated episodes have occurred causing superimpositioning;

Hunting and/or gathering (without camping):

- ❑ May occur when an individual, or more likely a small group of closely related people, engage in hunting activities (more likely to be a party of men) or gathering activities (more likely to be women and children);
- ❑ Duration would be less than a day, with people returning to a base to sleep;

- ❑ Total numbers of people would be relatively small;
- ❑ Would be expected to occur where food resources were available, which for different foods may be a seasonal or annual occurrence;
- ❑ Could occur in any type of rock shelter (ie. any size, topographic location, or distance from water source) particularly where shelter may be sought from inclement weather;
- ❑ Proximity to potable water was probably not important;
- ❑ Evidence may represent accidental discard, loss during use, repair of hunting or gathering equipment, children's play or knapping activity;
- ❑ Quantity and density of evidence and range of artefact and stone types are expected to be low, consistent with 'background discard', possibly with a few discrete activity areas. Loss or discard of specific tool types may be a useful indicator (particularly items with use-wear/residue that are not in association with evidence of their manufacture or maintenance). Repeated visits to particularly food sources may cause a build up of unrelated evidence over a period of time in a specific location. Small shell middens, representing single meal events, would be expected close to shellfish sources, with potentially a build up of temporally unrelated meal events from repeated visits over time.

Camping by small hunting and/or gathering parties:

- ❑ May occur when an individual, or more likely a small group of closely related people, that are engaged in hunting activities (more likely to be a party of men) or gathering activities (more likely to involve women and children) camp overnight near the resource being procured;
- ❑ Duration would be one or several days;
- ❑ Total numbers of people would be relatively small;
- ❑ Would be expected to occur close to where food resources were available, which for different foods may be a seasonal or annual occurrence;
- ❑ Would be expected to occur in open contexts and also in rock shelters, particularly relatively larger rock shelters with sufficient habitable floor areas for activities and sleeping. Aspect of the rock shelter towards the rising or setting sun may have been important;
- ❑ Proximity to potable water probably was important, although temporary sources may have been sufficient;
- ❑ Evidence may represent accidental discard, repair of hunting or gathering equipment, children's play, stone knapping activity, food processing or temporary camp fires;
- ❑ Quantity and density of evidence and range of artefact and stone types are expected to be low to moderate, and distinguishable from 'background discard', with at least several activity areas. A reasonably broad range of artefact and stone types may be discarded (although not as diverse as expected at a base camp). Shell middens representing single or multiple meal events would be expected close to shellfish sources. Items likely to be cached for future use at a base camp, or unlikely to be carried around on a hunting or gathering journey (eg. grindstones) are not expected to occur. Time-consuming activities like construction and use of ovens or heat treatment pits are also unlikely to have occurred.

Nuclear/extended family base camp:

- ❑ May occur when a single nuclear family or extended family camps together;
- ❑ Duration uncertain but probably dependent on availability of food resources and potable water in the locality;
- ❑ Total numbers of people would be relatively small;
- ❑ In open sites, probably situated on level or very gently inclined ground, close to potable water and close to food resources;
- ❑ In rock shelters, probably occurred in shelters close to potable water (with greater potential near higher order sources), close to food resources and only in large rock shelters with sufficient habitable floor area for activities and sleeping. Aspect of the rock shelter towards the rising or setting sun may have been important;
- ❑ The encampment area in open contexts may consist of a several small huts, dispersed in a spatial patterning depending on the social mix of the people;
- ❑ Evidence may represent accidental discard, repair of equipment, children's play, stone knapping activity, food processing, campfires, heat treatment of silcrete and manufacturing of tools;
- ❑ Quantity and density of evidence and range of artefact and stone types discarded are expected to be high. Shell middens representing multiple meal events would be expected close to shellfish sources, including middens of larger size. Repeated visits to a camp site or stays of long duration may cause a build-up of evidence over a period of time in a specific location. Items are likely to have been cached for future use at a base camp. Specific artefact indicators include grindstones. Evidence of casual knapping and production of tools is expected to be common. The significant differences with a temporary hunter/gatherer's camp include the possible presence of features such as heat treatment pits and ovens, broader range of artefact and stone types, presence of specific artefact indicators, higher density of evidence (reflecting more activity and longer duration of use) and relatively common evidence for the production of tools.

Community base camp:

- ❑ May occur when a number of nuclear families camp together;
- ❑ Duration uncertain but probably dependent on availability of food resources;
- ❑ Total numbers of people could be relatively large (30+);
- ❑ Probably situated on level or very gently inclined ground in open contexts;
- ❑ Probably situated close to potable water;
- ❑ Probably situated close to food resources (eg. conjunction of wetlands and forest zones);
- ❑ The encampment area may exceed 100 m² and consist of a number of individual groups and huts, dispersed in a spatial patterning depending on the social mix of the groups;
- ❑ Quantity and density of evidence and range of artefact and stone types discarded are expected to be high. Large shell middens representing multiple meal events would be expected close to shellfish sources. Spatially discrete evidence of individual camp sites would be expected (if the resulting evidence has not been affected by disturbance or superimpositioning). Items may not have been cached for future use. Specific artefact indicators include grindstones, relatively more common evidence of food processing and possibly ochre. Evidence of casual knapping and production of tools is expected to be common. However, features such as heat treatment pits may not occur.

Larger congregation of groups:

- ❑ May occur in relation to special events (eg. major ceremonies) or when a particularly desirable food was most abundant;
- ❑ Probably of short duration (eg. less than two weeks) but potentially for longer duration (eg. up to several months);
- ❑ Total numbers of people could vary widely, but possibly exceed 100;
- ❑ Probably situated on level or very gently inclined ground in open contexts;
- ❑ Probably situated close to potable water;
- ❑ Probably situated close to food resources;
- ❑ A large area or areas of encampments would be expected, possibly covering hundreds of square metres or more;
- ❑ Spatially discrete evidence of individual camp sites would be expected (if the resulting evidence has not been affected by disturbance or superimpositioning);
- ❑ Quantity and density of evidence and range of artefact and stone types discarded are expected to be high (similar to community base camp). Substantial shell middens representing multiple, contemporaneous meal events would be expected close to shellfish sources. Items may not have been cached for future use. Specific artefact indicators include grindstones, relatively more common evidence of food processing and possibly ochre, and possibly evidence of processing uncommon foods for which the gathering may be related (eg. whale). Evidence of casual knapping and production of tools is expected to be common. However, features such as heat treatment pits may not occur.

Ceremonial activity:

- ❑ May occur when a group of people gathers at a particular location to perform a ceremony;
- ❑ Evidence may be present of ceremonial site features such as earthen rings or stone arrangements, or ochre;
- ❑ Evidence of large encampments (similar to that expected for the 'larger congregation of groups' listed below) may be present nearby, including in locations with an aspect towards the ceremonial site.

To distinguish whether single or multiple episodes of occupation occurred, several factors can be examined. Multiple episodes of occupation would tend to exhibit superimpositioning of artefact evidence (eg. mix of unrelated stone materials and artefact types and activity areas). However, identifying which items belong to which activity events can be problematical. Also, distinguishing the effects of post-depositional disturbance from cultural superimpositioning is problematical (Koettig 1994). The analysis of distributions of stone material and artefact types is of benefit in some circumstances. In a stratified deposit, multiple episodes of occupation would be indicated by evidence in different stratigraphic layers, particularly discrete activity areas to exclude the possibility that items have moved vertically through the deposit by bioturbation.

Another indicator of multiple occupation is an expectation of a relatively higher density of artefacts within a locality (combined with superimpositioning as discussed above). Larger areas of occupation may also result, when occupations only partially overlap (eg. Camilli 1989).

Identification of different episodes of occupation over time would require *in situ* deposits with stratified or vertically separated evidence of activity events and datable material (eg. charcoal or midden deposits).

Identification of the duration of individual episodes of occupation may prove very difficult. Where a single episode of occupation has occurred, a greater quantity of items, frequency of discrete activity events and size of contemporaneous shell midden deposit may be indicative of a longer stay.

Identification of the types of occupations when multiple episodes have occurred may prove highly problematical. Unless specific artefact indicators for different types of occupation are present, the superimpositioning of evidence from unrelated occupations (eg. transitory movement over a nuclear family base camp) may not be possible to determine.

3.5 Predictive Model of Site Location

A predictive model of site location is constructed to identify areas of archaeological sensitivity (ie. locations where there is a potential of archaeological evidence occurring), so it can be used as a basis for the planning and management of Aboriginal heritage. Predictive modelling involves reviewing existing literature to determine basic patterns of site distribution. These patterns are then modified according to the specific environment of the investigation area to form a predictive model of site location. A sampling strategy is employed to test the predictive model and the results of the survey used to confirm, refute or modify aspects of the model.

The use of land systems and environmental factors in predictive modelling is based upon the assumption that they provided distinctive sets of constraints that influenced Aboriginal land use patterns. Following from this is the expectation that land use patterns may differ between each zone, because of differing environmental constraints, and that this may result in the physical manifestation of different spatial distributions and forms of archaeological evidence (Hall and Lomax 1993:26).

The predictive model is based on information from the following sources:

- ❑ Identification of land systems and landform units;
- ❑ Previous archaeological surveys conducted within the region;
- ❑ Distribution of recorded sites and known site density;
- ❑ Traditional Aboriginal land use patterns; and
- ❑ Known importance of any parts of the investigation area to the local Aboriginal community.

In certain circumstances, such as where low surface visibility or recent sediment deposition precludes effective assessment of the potential archaeological resource, sub-surface testing may be a viable alternative for further testing the predictive model and assessing the investigation area.

The following is a brief description of the site types that may occur within the Longwalls 24-26 Modification investigation area, following the earlier investigation of Kuskie (2017a).

Artefact Scatters:

In most archaeological contexts, an artefact scatter has been defined as either the presence of two or more stone artefacts within 50 or 100 metres of each other, or a concentration of artefacts at a higher density than surrounding low density 'background scatter'. The definition of an artefact scatter 'site' is often an arbitrary one, which can offer benefits from a heritage management perspective but is a source of theoretical/analytical debate for heritage practitioners.

Due to the nature of the underlying evidence, its identification only within exposures created by erosion or disturbance, and the limited suitability of existing definitions, artefact scatter sites are defined within this study as the presence of one or more stone artefacts within a *survey area* (Kuskie 2000a). The boundaries of the site are defined by the boundaries of the visible extent of artefacts within the survey area. The survey areas are based on discrete, repeated *environmental contexts* termed *archaeological terrain units* (eg. a particular combination of landform unit and class of slope). It is generally assumed that there is a similar probability for comparable evidence to occur elsewhere within the same survey area. As such, while the visible site boundaries are defined by the extent of visible evidence (consistent with the definition of an Aboriginal object under the *National Parks & Wildlife Act 1974*), across the entire survey area in which a site is identified there exists a *potential resource* of comparable evidence.

An artefact scatter may consist of surface material only, which has been exposed by erosion, or it more typically involves a sub-surface deposit of varying depth. Other features may be present within artefact scatter sites, including hearths or stone-lined fireplaces, and heat treatment pits.

Artefact scatters may represent the evidence of:

- ❑ Camp sites, where everyday activities such as habitation, maintenance of stone or wooden tools, manufacturing of stone or wooden tools, management of raw materials, preparation and consumption of food and storage of tools has occurred;
- ❑ Hunting or gathering events;
- ❑ Other events spatially separated from a camp site (eg. tool production or maintenance); or
- ❑ Transitory movement through the landscape.

The detection of artefact scatters depends upon conditions of surface visibility and ground disturbance and whether recent sediment deposition has occurred (Dean-Jones and Mitchell 1993). Vegetation cover and deposition of sediments generally obscures artefact scatter sites and prevents their detection during surface surveys. High levels of ground disturbance can also obscure or remove evidence of a site.

Artefact scatters are a common site type in the Central Lowlands region. There is potential for stone artefact evidence to occur in the investigation area wherever A unit soil is present, apart from in areas which have been substantially impacted by recent land-use (ie. areas in which the A unit or upper soil horizon has been totally removed).

The artefact evidence will predominantly comprise items related to non-specific stone knapping of tuff, and to a lesser extent silcrete, along with a range of other stone materials. Items associated with microblade and microlith production, along with microlith and non-microlith tools, will also occur.

A number of open artefact sites have previously been reported within the LW24-26 Modification investigation area. The potential for further artefact evidence can be characterised within two zones, in relation to the nature in which Aboriginal people may have occupied and utilised the area (refer to Figure 13):

- *Secondary resource zone along North Wambo Creek* - A small portion of the LW24-26 Modification investigation area comprises the higher-order watercourse of North Wambo Creek and associated flats/terraces, which may comprise a secondary resource zone (refer to Figure 13). Within this area, comprising low gradient ground within close proximity of the creek (typically within 100-200 metres), the occupation model indicates that a higher artefact density and potentially deposits of research significance may occur, where more focused occupation (eg. encampments, or events of longer duration or involving larger numbers of people) and/or repeated Aboriginal occupation may have occurred (in addition to hunting and gathering and transitory movement); and
- *Remainder of the investigation area* - Outside of the secondary resource zone, much of the LW24-26 Modification investigation area comprises moderate to steep gradients, distant from higher order watercourses, and gentle gradients that are also distant from higher order watercourses, in which it is inferred that there is limited potential for evidence of focused occupation. These contexts do not conform to primary or secondary resource zones under the model of occupation. The artefact evidence in these areas may typically be of a low to very low density consistent with background discard, and although a low frequency of activity areas (with consequent higher artefact density) may be present, will not represent focused occupation. Occupation of these portions of the investigation area is more likely to have related to hunting and gathering activities, along with transitory movement between locations and procurement of stone materials, and have been of a generally low intensity (Kuskie 2017a).

The potential for deposits dating to the early Holocene or late Pleistocene cannot be discounted in association with alluvial and colluvial soils around North Wambo Creek (Kuskie 2017a).

Bora/Ceremonial Sites:

Bora grounds are a type of ceremonial site associated with initiation ceremonies. They are usually made of two circular depressions in the earth, sometimes edged with stone. Bora grounds can occur on soft sediments in river valleys and elsewhere, although occasionally they are located on high, rocky ground where they may be associated with stone arrangements. Pearson (1981:104-105) identified that the location of ceremonial sites appears to have related to a desire to isolate the site in a secret or seldom visited location.

The potential for bora/ceremonial sites within the investigation area is assessed as being very low, due in part to the recent history of land use and the topography, but cannot be discounted.

The 'Bulga bora ground' has previously been reported approximately nine kilometres south-east of the investigation area and Wambo Site 24, situated about seven kilometres east of the Modification investigation area, has been identified as a 'meeting place' (Brayshaw *et al* 1996:22).

Burials:

Human remains tended to be placed in hollow trees, caves or sand deposits. The location of burials may once have been marked by carved trees (eg. Etheridge 1918:85), although subsequent tree clearing and the long passage of time since the disruption of this practice has rendered these markers extremely rare. Usually burials are only identified when eroding out of sand deposits or creek banks, or when disturbed by development. The probability of detecting burials during archaeological fieldwork is extremely low (albeit refer to Kuskie and Clarke {2004} at Mt Arthur North for one exception).

The potential for burial sites to occur within the LW24-26 Modification investigation area is assessed as being very low, but cannot be discounted, particularly on alluvial sediments associated with North Wambo Creek.

Carved Trees:

Carved trees were still relatively common in NSW in the early 20th century (Etheridge 1918, refer also to Mathews 1894). They were commonly used as markers for ceremonial or symbolic areas, including burials. Around 12 carved trees were recorded at the 'Bulga bora ground' (Brayshaw 2003).

Both vegetation removal, natural attrition (for example, bush fire) and the long passage of time since the practice of tree carving was prevalent have rendered this site type rare. Given these factors and the extent of recent land use impacts, the potential for carved trees to occur within the LW24-26 Modification investigation area is considered to be very low, but cannot be discounted where mature native trees remain.

Culturally Significant Sites or Areas:

Sites of cultural significance to Aboriginal people (excluding the contemporary significance attached to the other site types listed here) can take three forms:

- ❑ Sites or places associated with ceremonies, spiritual/mythological beliefs and traditional knowledge, which date from the pre-contact period and have persisted until the present time;
- ❑ Sites or places associated with historical associations, which date from the post-contact period and are remembered by people today (for example, plant and animal resource use areas and known camp sites); and
- ❑ Sites or places of contemporary significance (apart from those areas for which Aboriginal objects remain, which are discussed elsewhere here), for which the significance has been acquired in recent times.

Although these sites do not qualify as Aboriginal objects under the *National Parks and Wildlife Act 1974* they can be declared as Aboriginal places under the Act.

Mythological sites, or other sites of traditional, historical or contemporary significance to Aboriginal people, can occur in any location. Often natural landscape features may be related to important mythological stories. Consultation with the local Aboriginal community is essential to identify the presence of such cultural significant sites. White (2003), in relation to the comprehensive investigation for the Wambo EIS, did not report any sites of traditional cultural significance within the LW24-26 Modification investigation area.

Physical evidence of historical contact can occur in the form of artefacts manufactured from introduced materials (eg. porcelain or glass), of which several have been reported by White (2003) in the Wambo locality. Evidence of Aboriginal people occupying the locality in the early to mid-1800s has been documented (refer to Section 3.3).

Grinding Grooves:

Grinding grooves are typically elongated narrow depressions in soft rocks (particularly sedimentary) and are generally associated with watercourses. The depressions are created by the shaping and sharpening of ground-edge hatchets and grinding of seeds and processing of other plant matter and animal foods.

Grinding grooves are typically located in sedimentary bedrock along watercourses, but also occur on open surfaces of sandstone in other contexts (eg. simple slopes or spur crests) and on smaller sandstone slabs or surfaces in rock shelters. The potential for grinding groove sites to occur, both in rock shelters and in open contexts, is assessed as low, as the conglomeritic sandstone is generally not suitable for this purpose, notwithstanding the presence of this sandstone and drainage depressions within the LW24-26 Modification investigation area.

Quarry Sites:

In a general sense, a lithic quarry or stone procurement site is the location of an exploited stone source (Hiscock and Mitchell 1993:32). In a more specific sense, a lithic quarry refers to outcrops of bedrock where there is clear evidence of procurement activity such as pits, discarded hammerstones and large deposits of primary flaking debris. Sites will only be located where exposures of a stone type suitable for use in artefact manufacture occurs.

Geological mapping of the investigation area and the investigation of White (2003) indicates that materials suitable for stone knapping, such as silcrete and tuff, have a generally low potential to occur directly within the investigation area. However, the potential for exploitation of alluvial and colluvial gravel sources within the LW24-26 Modification investigation area cannot be discounted. Pebbles of chert, petrified wood, rhyolite, quartz and quartzite have been identified by Kuskie (2017a) in North Wambo Creek (and also in a lower frequency across the slopes and other landform units), which have derived from the eroded conglomerate. The potential exploitation of these alluvial and colluvial gravel sources is likely, although specific archaeological evidence may not remain. Ochre nodules (including golden ochre and red ochre) have also been identified by Kuskie (2017a) and represent potential sources of ochre, although specific archaeological evidence was not identified or may not remain.

Rock Shelters With Art, Deposits and/or Grinding Grooves:

Rock shelters include rock overhangs, shelters or caves which were used by Aboriginal people. Rock shelter sites may contain artefacts, deposits and/or rock art or grinding grooves. These sites will only occur where suitable geological formations are present and may occur in isolated rock formations (eg. boulders) or along more extensive rock formations (eg. cliffs).

Very few rock shelter sites have been identified in the immediate locality east of the investigation area, primarily as suitable rock formations tend to be limited in occurrence in the Central Lowlands. However, numerous rock shelter sites or PADs occur in the adjacent Southern Ranges, where extensive sandstone rock formations are present.

Rock shelter sites can vary widely in terms of contents (eg. containing artefacts, potential deposits, painted art and/or grinding grooves), location (eg. topographic context, distance to watercourse, size/order of watercourse and aspect), nature (eg. size of shelter, extent of habitable floor area, number and types of artefacts and stone materials) and research potential (eg. depth and extent of potential artefact deposits).

Stone artefacts would be the primary form of expected evidence within any rock shelters, in anything from very low to very high densities. Charcoal from fireplaces/hearths may also occur, as may bones and/or shell from fauna used by Aboriginal people for subsistence (or incorporated into the deposit by other means, such as animal activity or natural processes), or art. The presence of other evidence, such as the remains of wooden implements, cannot be discounted, even though their occurrence has rarely been documented in the region (but is known at Yengo National Park).

Sandstone/conglomerate rock formations may occur in portions of the LW24-26 Modification investigation area (particularly the elevated terrain), and as such the potential for rock shelter sites is assessed as moderate in these contexts, but low elsewhere.

Scarred Trees:

Scarred trees contain scars caused by the removal of bark for use in manufacturing canoes, containers, shields or shelters. Mature trees, remnants of stands of the original vegetation, have the potential to contain scars.

However, both vegetation removal, natural attrition (for example, bush fire) and the long passage of time since these practices were prevalent have rendered this site type rare. Given these factors and the extent of recent land use impacts, the potential for scarred trees to occur within the LW24-26 Modification investigation area is considered to be very low, but cannot be discounted where mature native trees remain.

Stone Arrangements:

Stone arrangements include circles, mounds, lines or other patterns of stone arranged by Aboriginal people. Some were associated with bora grounds or ceremonial sites and others with mythological or sacred sites.

Hill tops and ridge crests which contain stone outcrops or surface stone, and have been subject to minimal impacts from recent land use practices, are potential locations for stone arrangements. Although suitable topographic contexts and geology occurs within the LW24-26 Modification investigation area, given the general rarity of this form of evidence and recent land use history, the potential for stone arrangement sites to occur is assessed as very low.

Waterhole/wells:

Waterhole/wells are natural depressions in boulders or exposed bedrock, known as pan-holes or gnamma holes, which retain water, and as such may have represented a source utilised by Aboriginal people. There is not necessarily any direct evidence of Aboriginal working or use of these waterholes.

The potential for these features to occur within the LW24-26 Modification investigation area is assessed as low, but cannot be discounted.

4. METHODOLOGY

This Aboriginal Cultural Heritage Assessment is intended to support any potential AHIP application that may be required and as such, has been completed with reference to the Heritage NSW:

- ❑ *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011a);
- ❑ *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b); and
- ❑ *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy (DECCW 2010c).

During the initial stages of the investigation, research was conducted into the environmental, cultural and archaeological background of the investigation area, and searches were undertaken of the Heritage NSW AHIMS and other relevant heritage registers and planning instruments (refer to Section 3.1).

A draft methodology for the Aboriginal Cultural Heritage Assessment (dated 13 December 2021) was forwarded to all Registered Aboriginal Parties and was subsequently finalised without amendment, with no comments provided by any stakeholders (refer to Section 6 and Appendix 7). The methodology was implemented through the conduct of a field survey of the investigation area and subsequent analysis, consultation and reporting.

The investigation area for this Aboriginal Cultural Heritage Assessment of the Longwalls 24-26 Modification measures approximately 238 hectares (refer to Figure 4).

Approximately 84 hectares or 35% of this area (the southern portion) has previously been surveyed to current heritage standards for the South Bates Extension Modification assessment (Kuskie 2017a, 2017g), following an identical methodology to the current project, with AHIP #C0003213 subsequently issued for this area (refer to Figures 6 and 12). Consequently, it was assumed in the methodology that no additional survey coverage would occur directly within this area, however the potential impacts of the Modification on the identified heritage evidence within this area would be addressed.

The current survey has therefore focused on the 154 hectares (the central and northern portions of the overall Modification area) that has not previously been subject to heritage survey coverage to current standards (referred to herein as the *heritage study area*).

Field inspection of the *heritage study area* was undertaken over seven days (14-17 and 21-23 February 2022) by qualified archaeologists from South East Archaeology (Michael Marsh and Annette Backshall), accompanied on every day by representatives of the RAPs (refer to Section 6 and Table 2). Staff of WCPL (Nicole Dobbins) assisted during the survey with access and other logistical matters.

A heritage survey was undertaken that achieved systematic archaeological survey coverage sampling all of the *heritage study area* of 154 hectares (refer to Table 4 and Figure 17).

Table 2: Personnel involved in the Longwalls 24-26 Modification heritage survey.

Date	Aboriginal Representative	Aboriginal Organisation	SEA Personnel
14/2/2022	Allen Paget	Ungooroo Aboriginal Corporation	Michael Marsh, Annette Backshall
15/2/2022	Allen Paget	Ungooroo Aboriginal Corporation	Michael Marsh, Annette Backshall
16/2/2022	Allen Paget	Ungooroo Aboriginal Corporation	Michael Marsh, Annette Backshall
17/2/2022	Allen Paget	Ungooroo Aboriginal Corporation	Michael Marsh, Annette Backshall
21/2/2022	Allen Paget	Ungooroo Aboriginal Corporation	Michael Marsh, Annette Backshall
22/2/2022	Allen Paget; Wayne French	Ungooroo Aboriginal Corporation; Cacatua Culture Consultants	Michael Marsh, Annette Backshall
23/2/2022	Marcus Sproule; Wayne French	Ungooroo Aboriginal Corporation; Cacatua Culture Consultants	Michael Marsh, Annette Backshall

The *heritage study area* was divided into particular combinations of environmental variables that are assumed to relate to Aboriginal usage of the area. These *archaeological terrain units* or *environmental contexts* were defined on the basis of landform element and class of slope (following McDonald *et al* 1984). They are discrete, recurring areas of land for which it is assumed that the Aboriginal land use and resultant heritage evidence in one location may be extrapolated to other similar locations. Therefore *survey areas* were defined as the individual environmental context that is bounded on all sides by different environmental contexts (Kuskie 2000a).

Detailed recording of the archaeological *survey areas* was made on survey recording forms, including environmental variables and heritage resources identified or potentially present. Each *survey area* was assigned a unique reference code (refer to survey coverage database in Appendix 3 and detailed mapping in Appendix 4).

Within each *survey area*, the areas inspected on foot correspond to the Heritage NSW (DECCW 2010b) definition of *survey units*. The *survey units* typically comprised general transects through vegetated terrain, or coverage of and separate recording of specific exposure types, such as vehicle tracks or erosion scours. Data for each *survey unit* was recorded separately on the survey area recording forms and representative photographs of survey units and survey areas were taken and are included in Appendix 6 where relevant and informative (refer also to site photographs in Appendices 2 and 5).

For the purposes of the analysis, *survey unit* data from each *survey area* are combined (refer to Appendix 3), and data from each survey area can be combined with comparable survey areas to analyse coverage and artefact density with respect to environmental variables such as landform element and slope (refer to Table 3). For a thorough discussion of the rationale for use of the individual artefact as the basic unit of analysis, including the problems with open artefact site definitions due to exposure/obscurement issues, and the margins of error, variables and constraints associated with the data collection procedures and analysis, refer to the comprehensive discussion in Kuskie (2000a).

The general survey procedure involved participants inspecting each survey area working together as a single team, each comprising two archaeologists and one or more Aboriginal community representatives. Time was utilised at the onset of each survey period for Workplace Health and Safety procedures and training/familiarisation.

The survey teams were equipped with high resolution 1:3,000 scale mapping of the investigation area, with one metre contours, a 100 metre MGA grid and an aerial photograph underlay. Along with the use of hand-held Global Positioning System (GPS) units (generally accurate to within five metres), these features assisted with defining survey areas and survey units and accurately establishing the location of Aboriginal sites and marking the above onto the detailed base mapping (refer to Figures 17 and 18 and Appendices 4 and 5).

Hence, the survey sampled the geographic extent of the *heritage study area*, within individual survey areas based on specific combinations of landform element and class of slope. The extent of the sample and nature of survey coverage are discussed further in Section 5.1.

Essentially, the investigation area comprises an area in which the primary impacts will occur from underground mining related subsidence, impacts that would generally be limited to site types such as rock shelters and grinding grooves. Minimal direct surface impacts (potentially limited to small areas from continued use of existing access tracks, exploratory drilling, subsidence remediation and environmental monitoring) are proposed, and in these areas, impacts may occur to other site types (such as open artefact sites).

Within each survey area in the investigation area:

- ❑ Inspection was made widely for the obtrusive site types, particularly those that are susceptible to subsidence impacts, such as rock shelters with deposit and/or art and grinding grooves; and
- ❑ Although not the focus of the inspection, as impacts from subsidence would be limited, where identified during the course of this inspection stone artefact and other cultural evidence, such as scarred trees, were also recorded.

During the survey and throughout the consultation process Aboriginal stakeholders were also asked of their knowledge of any areas of cultural significance within the *heritage study area*, for example:

- ❑ Sites or places associated with ceremonies, spiritual/mythological beliefs and traditional knowledge, which date from the pre-contact period and have persisted until the present time;
- ❑ Sites or places associated with historical associations, which date from the post-contact period and are remembered by people today (for example, plant and animal resource use areas and known camp sites); and
- ❑ Sites or places of contemporary significance (apart from those areas for which Aboriginal objects remain, which are discussed above), for which the significance has been acquired in recent times.

Aboriginal heritage site recording forms for each identified site were also completed. Spatially separate locations of heritage evidence were recorded as separate site loci named after the sequential "Wambo Site" numbering in use for Wambo. Detailed descriptions of all newly identified sites are presented in Appendix 5.

Stone artefacts were recorded on a lithic item recording form, including details about provenance, stone material type, artefact type, size class, cortex and other relevant attributes (refer to details for each site in Appendix 5 and a summary in Table 6). In total 50 artefacts were recorded in detail for sites identified directly within the investigation area.

As required under Section 89A of the *National Parks and Wildlife Act 1974*, Aboriginal Site Recording Forms have been completed for all new site recordings and lodged with Heritage NSW.

The results of the investigation are presented in Section 5. Photographs of the identified sites are presented in Appendices 2 and 5, and additional photographs of survey areas and the general investigation area are presented in Appendix 6.

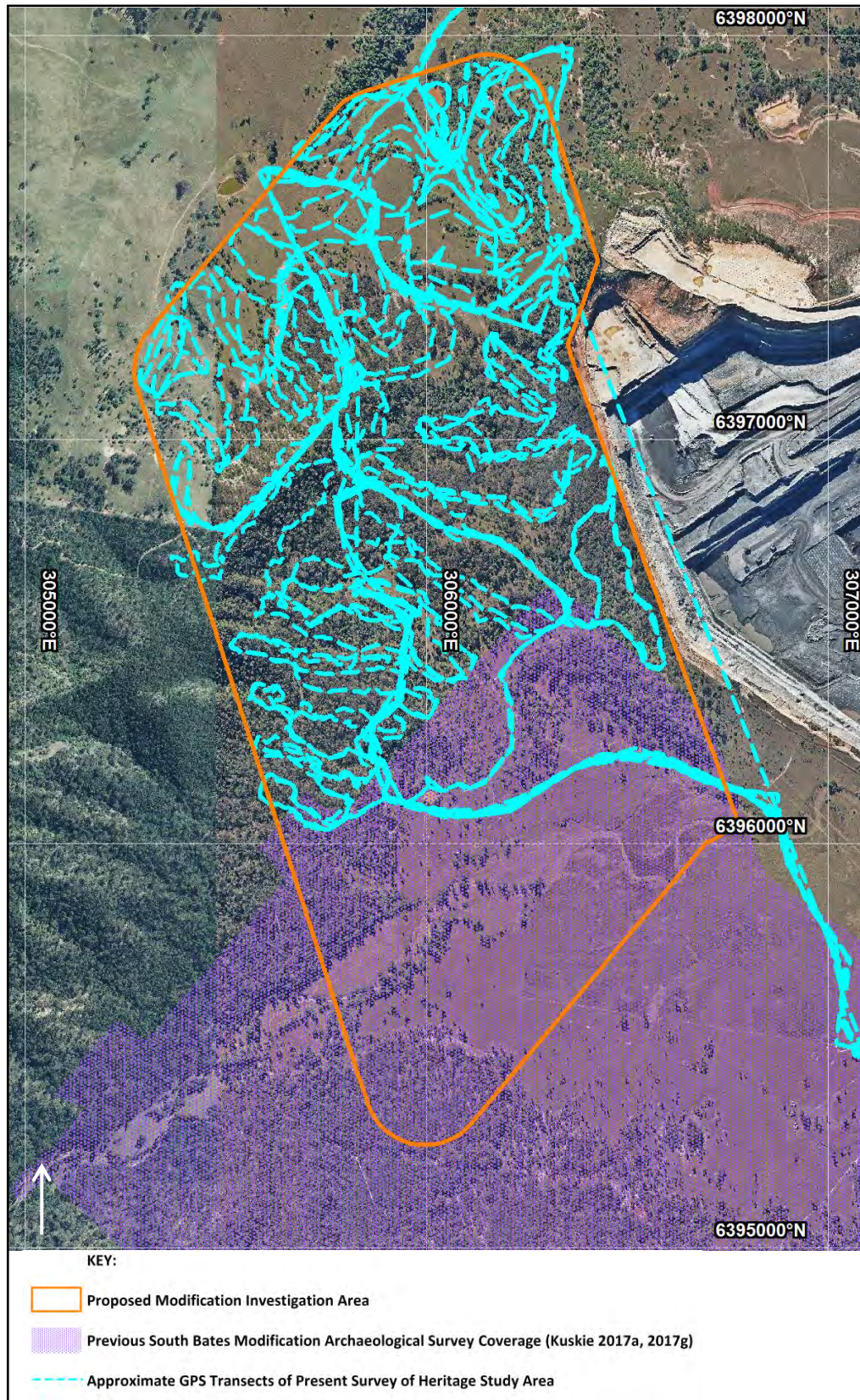


Figure 17: Approximate location of GPS recorded transects within the LW24-26 Modification *heritage study area* (noting that vegetation cover limited the effectiveness and accuracy of the hand-held GPS units at times) (one kilometre MGA grid; aerial photograph courtesy WCPL; refer also to Kuskie 2017a: Figure 14).

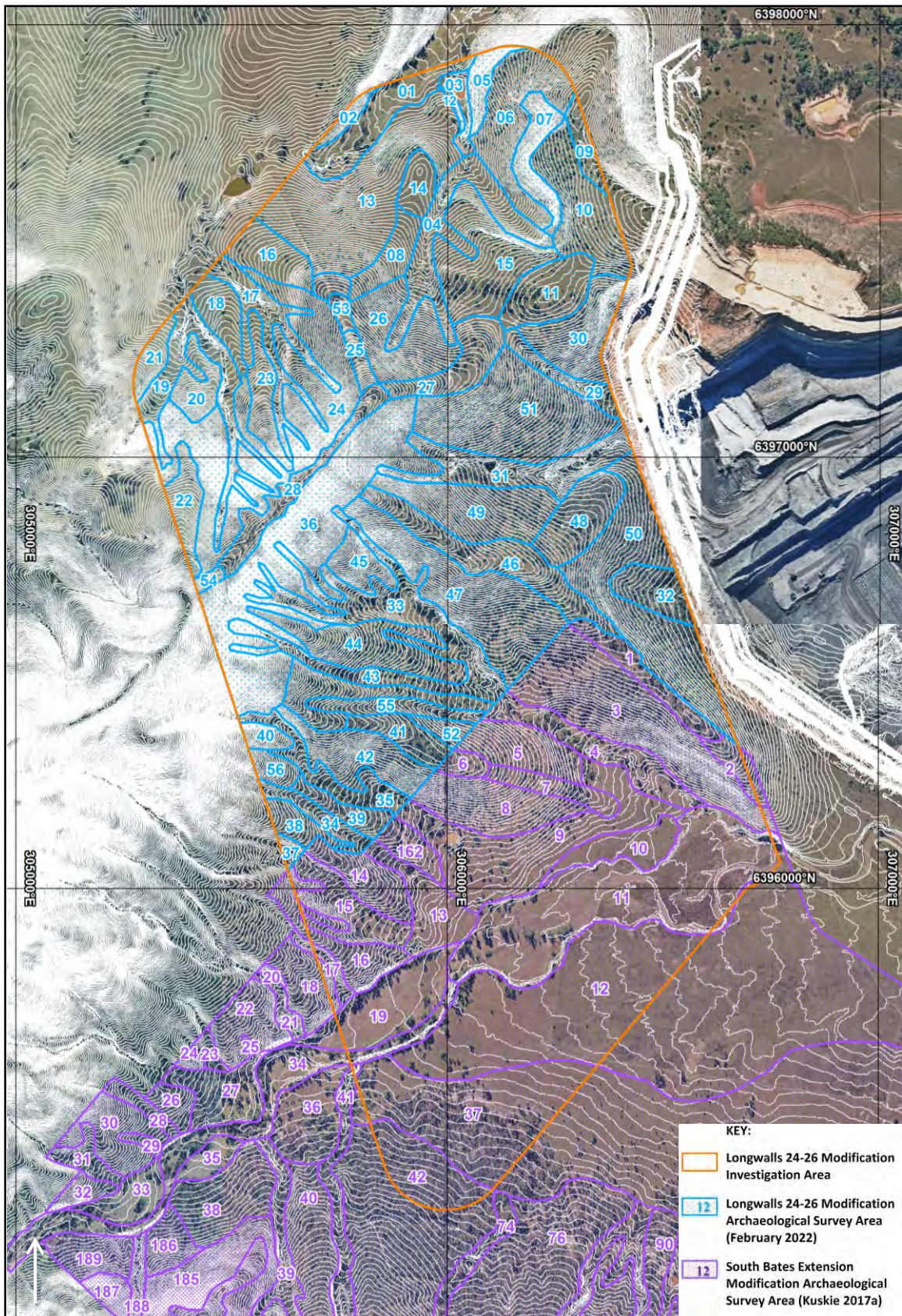


Figure 18: Archaeological survey coverage of the LW24-26 Modification investigation area, including coverage for the South Bates Modification Extension portion of this area (Kuskie 2017a, 2017g) and the present survey of the *heritage study area* (one kilometre MGA grid; one metre contours, aerial photograph courtesy WCPL).

5. RESULTS AND DISCUSSION

5.1 Survey Coverage

For the purposes of this Aboriginal Cultural Heritage Assessment, the investigation area measures 238 hectares, which comprises the area in which conventional subsidence impacts may occur. As approximately 84 hectares or 35% of this area (the southern portion) had previously been surveyed to current heritage standards for the South Bates Extension Modification assessment (Kuskie 2017a, 2017g), following an identical methodology to the current project, with AHIP #C0003213 subsequently issued for this area, the current survey focused on the *heritage study area* of 154 hectares, the central and northern portions of the overall Modification area that had not previously been subject to heritage survey coverage to current standards.

Systematic archaeological survey coverage was obtained across the geographic extent of the *heritage study area* of 154 hectares (refer to Figure 18 and detailed mapping in Appendix 4).

The *heritage study area* was subdivided into a total of 56 archaeological survey areas, each representing a specific combination of landform unit and class of slope (definitions as per McDonald *et al* 1984). Each archaeological survey area was inspected for Aboriginal heritage evidence. The environmental contexts surveyed included the four landform elements and four classes of slope present (refer to Table 3).

The locations of the individual survey areas are marked on Figure 18 and on detailed mapping in Appendix 4, and descriptions are presented in Appendix 3. A summary of the survey coverage is presented in Table 3 for the combined environmental contexts and individual classes of slope and landform elements. Representative photographs of survey areas are included in Appendix 6 (refer also to site photographs in Appendices 2 and 5).

The total survey coverage (ground physically inspected for heritage evidence) equated to approximately 230,810 m², or 15.1% of the *heritage study area*. As this coverage only refers to an area of several metres width directly inspected by each member of the survey team, the actual coverage for obtrusive site types (for example, scarred trees and rock shelters) was significantly greater than this. The total effective survey coverage (*visible* ground surface physically inspected with potential to host heritage evidence) equated to around 10,979 m², or 0.7% of the *heritage study area*.

For the southern portion of the LW24-26 Modification investigation area of 84 hectares that had previously been surveyed to current heritage standards for the South Bates Extension Modification assessment (Kuskie 2017a, 2017g), while it is problematic to accurately total survey coverage strictly within only the portion of the present investigation area (due to the overlap of survey areas; for example 12, 37 and 42 as shown on Figure 18), calculations can be made for the total of all South Bates Extension Modification survey areas within the current LW24-26 Modification investigation area (1-19, 34, 37, 42 and 162), noting that this is a larger area of 171 hectares as it includes 87 hectares outside of the present investigation area (mostly survey areas 12, 37 and 42). Within this area, the previous total survey coverage equated to approximately 189,810 m², or 11.1% of that area and the total effective survey coverage equated to around 4,611 m², or 0.3% of that area (refer to Kuskie 2017a, 2017g).

Table 3: Environmental contexts, class of slope and landform elements - summary of survey coverage and artefact density for the LW24-26 Modification *heritage study area*.

Environmental Context	Total Area of Context (m ²) ^A	% Context Comprises of Survey Investigation Area	Total Area Surveyed (m ²)	% Surveyed of Context	Effective Survey Coverage Total (m ²)	% Effective Survey Coverage of Context	Total # Artefacts (open sites)	Artefact Density (# artefacts per m ² effective survey coverage)
level-very gentle drainage depression	27,910	1.82%	6,400	22.93%	64	0.23%	0	-
moderate drainage depression	295,471	19.32%	47,440	16.06%	1,552	0.53%	32	0.021
moderate simple slope	687,045	44.92%	95,720	13.93%	4,609	0.67%	12	0.003
steep simple slope	131,689	8.61%	18,080	13.73%	181	0.14%	0	-
gentle spur crest	49,742	3.25%	13,800	27.74%	458	0.92%	4	0.009
moderate spur crest	229,822	15.03%	32,170	14.00%	1,387	0.60%	2	0.001
level-very gentle ridge crest	8,163	0.53%	1,400	17.15%	14	0.17%	0	-
gentle ridge crest	49,144	3.21%	7,600	15.46%	1,228	2.50%	7	0.006
moderate ridge crest	50,516	3.30%	8,200	16.23%	1,486	2.94%	7	0.005
Totals/Means	1,529,502	100%	230,810	15.09%	10,979	0.72%	64	0.006
Class of Slope								
level-very gentle	36,073	2.36%	7,800	21.62%	78	0.22%	0	-
gentle	98,886	6.47%	21,400	21.64%	1,686	1.70%	11	0.007
moderate	1,262,854	82.57%	183,530	14.53%	9,034	0.72%	53	0.006
steep	131,689	8.61%	18,080	13.73%	181	0.14%	0	-
Totals/Means	1,529,502	100%	230,810	15.09%	10,979	0.72%	64	0.006
Landform Element								
drainage depression	323,381	21.14%	53,840	16.65%	1,616	0.50%	32	0.020
simple slope	818,734	53.53%	113,800	13.90%	4,790	0.59%	12	0.003
spur crest	279,564	18.28%	45,970	16.44%	1,845	0.66%	6	0.003
ridge crest	107,823	7.05%	17,200	15.95%	2,728	2.53%	14	0.005
Totals/Means	1,529,502	100%	230,810	15.09%	10,979	0.72%	64	0.006

A) Totals may not completely tally due to the effects of rounding.

Conditions of surface visibility were generally very low across the *heritage study area*, due to the dense cover of vegetation, particularly grass (Appendix 3). Archaeological visibility, the actual visible ground surface with potential for heritage evidence (accounts for factors such as ground disturbance and sediment deposition), was generally similar to surface visibility. Mean archaeological visibility across the entire survey sample was approximately 4.8%. Exposures tended to be present in erosion scours, along vehicle tracks and in other areas of recent ground disturbance (such as from animals and farm dams), but much of the investigation area comprised dense vegetation.

A low number of mature native trees exist within the investigation area and where identified, these were inspected for evidence of Aboriginal scarring. Rock formations, both open bedrock surfaces and raised features, such as boulders, occur within the investigation area. These were targeted for inspection during the survey.

Notwithstanding the low surface visibility and resulting low proportion of effective survey coverage as a percentage of the entire *heritage study area*, the level and nature of effective survey coverage is considered satisfactory enough to present an effective assessment of the Aboriginal heritage resources identified and potentially present within the investigation area. The coverage was relatively comprehensive for obtrusive site types (for example, scarred trees, grinding grooves and rock shelters) but limited for the less obtrusive stone artefacts.

Nevertheless, in view of the potential impacts of the proposal (primarily related to subsidence and rock formations), predictive modelling and results obtained from the sample of effective coverage, it is concluded that the survey provides a valid basis for formulating recommendations for the management of the identified and potential Aboriginal heritage resources.

5.2 Aboriginal Heritage Evidence

5.2.0 Overview

Prior to this survey, 24 Aboriginal sites had previously been recorded directly within the LW24-26 Modification investigation area (refer to Table 1 and Figure 6), all open artefact sites¹ (artefact scatters and isolated artefacts).

Full descriptions of these previously recorded sites are presented in Appendix 2. Nineteen of these sites are located in areas covered by an existing AHIP (refer to Figure 6). Nine of these sites have been subject to total salvage and a further three sites have been subject to partial salvage (with portions remaining *in situ*) under the relevant AHIP and Wambo HMP (refer to discussion in Section 3.2).

The present survey has resulted in the identification of another 14 Aboriginal heritage sites within the investigation area (all open artefact sites), Wambo Sites 515-528. Several of the previously recorded sites were re-recorded and found to be larger in extent (Wambo Sites 327 and 514). Artefact evidence could not be relocated at several previously recorded open artefact sites (Wambo Sites 318, 319 and 513 and #37-5-0692), due to the dense cover of grass at the time of the present survey.

Three sites immediately adjacent to the investigation area (Wambo Sites 300-302, AHIMS #37-5-0594, 37-5-0595 and 37-5-0596) were relocated and established to be outside of the LW24-26 Modification area and are not considered further here.

Hence, a total of 38 open artefact sites are known to occur directly within the LW24-26 Modification investigation area (Table 4). Full descriptions of the previously recorded sites are presented in Appendix 2 and the newly identified sites in Appendix 5. The locations of the individual sites are marked on detailed maps included within Appendix 4 and summarised on Figure 19.

For the purposes of the significance assessment and impact assessment (refer to Sections 7 and 9), all 38 sites directly within the LW24-26 Modification investigation area have been subject to consideration.

No Aboriginal heritage sites within the investigation area are listed on any other heritage registers or planning instruments (refer to Section 3.1).

¹ For the purposes of this assessment, "artefact scatters" and "isolated finds" are typically assessed together in recognition that the occurrence of a single artefact often represents the only visible portion of a larger artefact resource within a broader site/survey area.

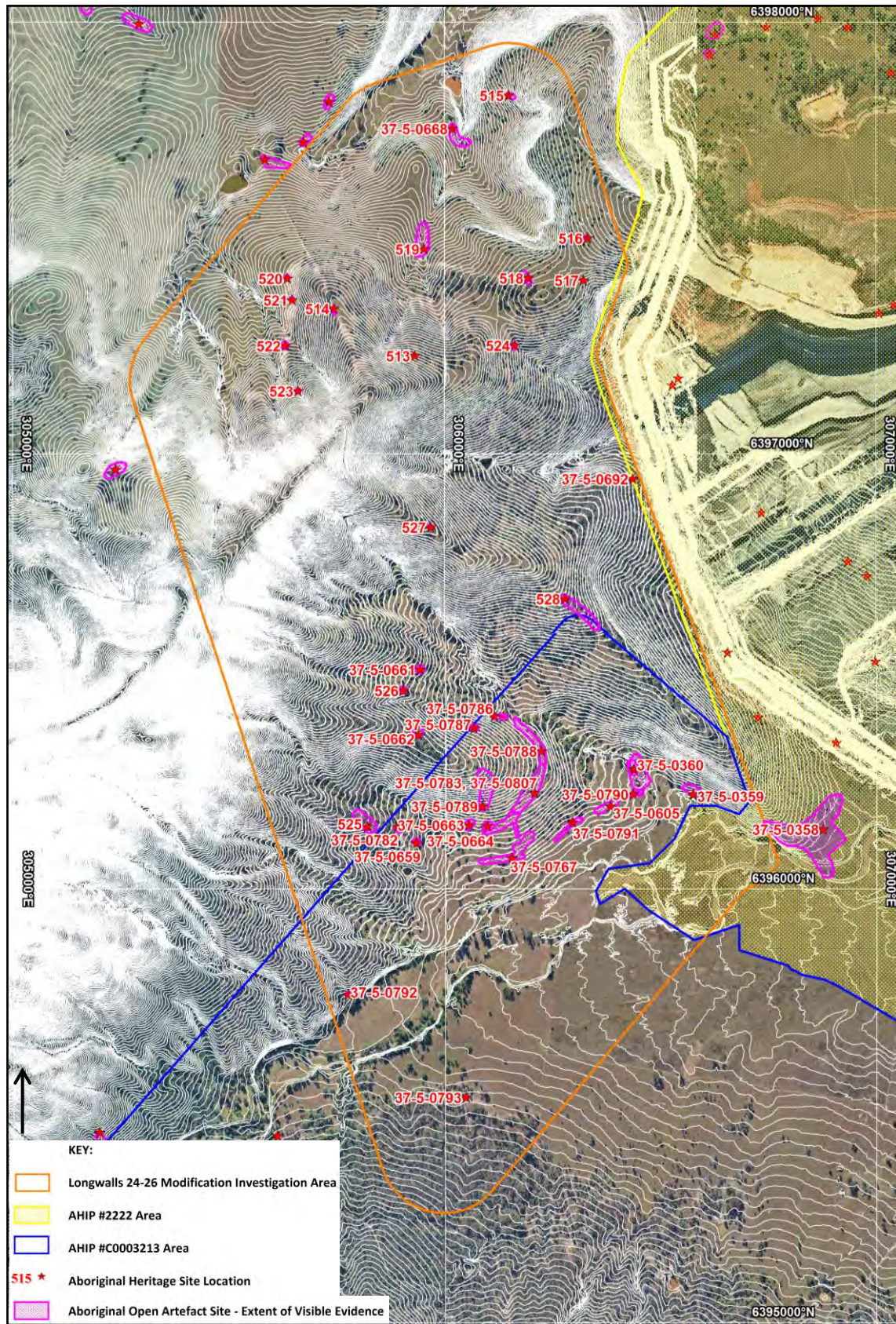


Figure 19: Location of Aboriginal heritage sites within the LW24-26 Modification investigation area (one kilometre MGA grid; one metre contours, aerial photograph courtesy WCPL; refer to Appendix 4 for detailed mapping).

Table 4: Summary of Aboriginal sites within the LW24-26 Modification investigation area.

Site Name	AHIMS #	MGA Easting	MGA Northing	Site Type	Recorder / Report	Status
Wambo Site 239	37-5-0358	306875	6396139	Open Artefact Site	White 2003, Kuskie 2019b, 2020c	Salvaged under AHIP #2222.
Wambo Site 240	37-5-0359	306573	6396220	Open Artefact Site	White 2003, Kuskie 2017a	In situ with AHIP (#C0003213).
Wambo Site 241	37-5-0360	306436	6396277	Open Artefact Site	White 2003, Kuskie 2017a	In situ with AHIP (#C0003213).
Wambo Site 311	37-5-0605	306382	6396192	Open Artefact Site	RPS, Kuskie 2017a, 2018d	Salvaged under AHIP #C0003213.
Wambo Site 317	37-5-0659	305932	6396108	Open Artefact Site	RPS, Kuskie 2017a	In situ with AHIP (#C0003213).
Wambo Site 318	37-5-0661	305941	6396507	Open Artefact Site	RPS	In situ, no AHIP.
Wambo Site 319	37-5-0662	305936	6396357	Open Artefact Site	RPS	In situ, no AHIP.
Wambo Site 320	37-5-0663	306054	6396149	Open Artefact Site	RPS, Kuskie 2017a	In situ with AHIP (#C0003213).
Wambo Site 321	37-5-0664	306097	6396146	Open Artefact Site	RPS, Kuskie 2017a, 2018d	Partially in situ and partially salvaged under AHIP #C0003213.
Wambo Site 327	37-5-0668	306018	6397755	Open Artefact Site	RPS, SEA (present survey)	In situ, no AHIP.
United IF-5	37-5-0692	306437	6396944	Open Artefact Site	OzArk 2016	Salvaged under AHIP #2222.
Wambo Site 483	37-5-0767	306154	6396073	Open Artefact Site	Kuskie 2017a, 2018d	Partially in situ and partially salvaged under AHIP #C0003213.
South Bates Soil Test 2/A	37-5-0782	305888	6396144	Open Artefact Site	Kuskie 2017a, 2018d	Salvaged under AHIP #C0003213.
South Bates Soil Test 6/A	37-5-0783	306206	6396222	Open Artefact Site	Kuskie 2017a, 2018d	Partially in situ and partially salvaged under AHIP #C0003213.
Wambo Site 484	37-5-0786	306113	6396400	Open Artefact Site	Kuskie 2017a	In situ with AHIP (#C0003213).
Wambo Site 485	37-5-0787	306065	6396372	Open Artefact Site	Kuskie 2017a, 2018d	Salvaged under AHIP #C0003213.
Wambo Site 486	37-5-0788	306222	6396319	Open Artefact Site	Kuskie 2017a, 2018d	Salvaged under AHIP #C0003213.
Wambo Site 487	37-5-0789	306085	6396192	Open Artefact Site	Kuskie 2017a, 2018d	Salvaged under AHIP #C0003213.
Wambo Site 488	37-5-0790	306434	6396220	Open Artefact Site	Kuskie 2017a, 2018d	Salvaged under AHIP #C0003213.
Wambo Site 489	37-5-0791	306294	6396155	Open Artefact Site	Kuskie 2017a, 2018d	Salvaged under AHIP #C0003213.
Wambo Site 490	37-5-0792	305774	6395757	Open Artefact Site	Kuskie 2017a	In situ with AHIP (#C0003213).
Wambo Site 491	37-5-0793	306047	6395521	Open Artefact Site	Kuskie 2017a	In situ with AHIP (#C0003213).
Wambo Site 513	pending	305931	6397229	Open Artefact Site	Kuskie 2017a	In situ, no AHIP.

Table 4 (continued):

Site Name	AHIMS #	MGA Easting	MGA Northing	Site Type	Recorder / Report	Status
Wambo Site 514	pending	305744	6397338	Open Artefact Site	Kuskie (2020d), SEA (present survey)	In situ, no AHIP.
Wambo Site 515	pending	306148	6397832	Open Artefact Site	SEA (present survey)	In situ, no AHIP.
Wambo Site 516	pending	306331	6397501	Open Artefact Site	SEA (present survey)	In situ, no AHIP.
Wambo Site 517	pending	306322	6397403	Open Artefact Site	SEA (present survey)	In situ, no AHIP.
Wambo Site 518	pending	306194	6397409	Open Artefact Site	SEA (present survey)	In situ, no AHIP.
Wambo Site 519	pending	305953	6397476	Open Artefact Site	SEA (present survey)	In situ, no AHIP.
Wambo Site 520	pending	305636	6397408	Open Artefact Site	SEA (present survey)	In situ, no AHIP.
Wambo Site 521	pending	305647	6397358	Open Artefact Site	SEA (present survey)	In situ, no AHIP.
Wambo Site 522	pending	305631	6397252	Open Artefact Site	SEA (present survey)	In situ, no AHIP.
Wambo Site 523	pending	305661	6397147	Open Artefact Site	SEA (present survey)	In situ, no AHIP.
Wambo Site 524	pending	306162	6397253	Open Artefact Site	SEA (present survey)	In situ, no AHIP.
Wambo Site 525	pending	305818	6396145	Open Artefact Site	SEA (present survey)	In situ, no AHIP.
Wambo Site 526	pending	305901	6396459	Open Artefact Site	SEA (present survey)	In situ, no AHIP.
Wambo Site 527	pending	305968	6396832	Open Artefact Site	SEA (present survey)	In situ, no AHIP.
Wambo Site 528	pending	306279	6396666	Open Artefact Site	SEA (present survey)	In situ, partially with AHIP (#C0003213), partially no AHIP.

While the above discussion focuses on Aboriginal objects and physical evidence of Aboriginal occupation, contemporary cultural values associated with the investigation area have been identified by the RAPs during the present investigation and the South Bates Extension Modification investigation (Kuskie 2017a). These include:

- In general terms, the use of subsistence or other resources, with comments made about the presence of various native flora and fauna where observed and stone sources such as ochre. These comments were not of a historical nature (ie. did not relate to plant and animal resource use areas known from the post-contact period) but rather were general observations of the occurrence of particular species and their known traditional uses (eg. for food, medicine, tools, etc.) and of the presence of golden ochre (significant to the Plains Clans of the Wonnarua People);
- In general terms, the traditional use of the area by Aboriginal people, and an ongoing cultural and spiritual connection to the land and resources of the study area by the Wonnarua people; and
- Specifically, the significance to the Plains Clans of the Wonnarua People of pathways through the locality, including the potential access from North Wambo Creek to Jerrys Plains Ridge.

The possibility cannot be excluded that further Aboriginal values or associations may exist within the locality of the investigation area that were not divulged to South East Archaeology by the persons consulted.

In addition to these places and values, other archaeological sites identified within the investigation area (artefact scatters) are of contemporary significance to the Aboriginal community, as they represent a tangible link with the traditional past and with the lifestyle and values of community ancestors (refer to Section 7). The artefact scatters around North Wambo Creek were of particular significance to the Plains Clans of the Wonnarua People (Kuskie 2017a).

5.2.1 Open Artefact Sites

A total of 38 open artefact sites are known to occur within the LW24-26 Modification area (refer to Appendices 2, 4 and 5). Many of these sites have been identified in exposures created by erosion or other ground disturbance, such as vehicle tracks.

Fourteen of these sites (Wambo Sites 515-528) were recorded for the first time during the present survey, and two previously known sites (Wambo Sites 327 and 514) were re-recorded during the present survey resulting in extensions to the known site extents (refer to Table 5).

The other 22 open sites were previously recorded and are primarily situated within the previously surveyed southern portion of the LW24-26 Modification area. They comprise:

- ❑ Three sites (Wambo Sites 318, 319 and 513) for which artefact evidence could not be relocated during the present survey due to the dense cover of grass, but which had been recently recorded in sufficient detail for this assessment;
- ❑ Two sites (Wambo Site 239 and United IF5) which have been totally salvaged under AHIP #2222 and further management action is not required in relation to the current approval;
- ❑ Seven sites (Wambo Sites 311 and 485-489, and South Bates Soil Test 2/A) which have been totally salvaged under AHIP #C0003213 and further management action is not required in relation to the current approval;
- ❑ Three sites (Wambo Sites 321 and 483 and South Bates Soil Test 6/A) which have been partially salvaged under AHIP #C0003213, with portions remaining *in situ* and covered by that AHIP; and
- ❑ Seven sites (Wambo Sites 240, 241, 317, 320, 484, 490 and 491) which remain *in situ* and are covered by AHIP #C0003213.

The 14 newly identified open artefact sites occur across the four different landform elements present within the *heritage study area* (drainage depressions, simple slopes, spur crests and ridge crests) and two classes of slope (gentle and moderate). In terms of environmental context, four sites occurred on moderate simple slopes, one on a gentle spur crest, two on moderate spur crests, two on gentle ridge crests, two on moderate ridge crests and three on moderate drainage depressions.

In terms of the artefacts recorded during the survey (including for the two previously recorded sites), 50% of the 64 artefacts occur on drainage depressions, with 22% on ridge crests, 19% on simple slopes and 9% on spur crests (Table 4). Approximately 83% of the artefacts occur on moderate gradients, with the balance on gentle gradients (Table 4). In terms of environmental context, 50% of the artefacts occur on moderate drainage depressions, 19% on moderate simple slopes, 11% on gentle ridge crests and 11% on moderate ridge crests, with lower numbers in the spur crest contexts.

Table 5: Summary of open artefact sites recorded during the LW24-26 Modification survey.

Site Name	Landform Element	Slope	Distance to Water	Vegetation	Land Surface	Exposure Type	Ground Disturbance	Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Archaeological Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts/m ² of Effective Locus Area	Sub-Surface Deposit	Comments
Wambo Site 327 (37-5-0668)	drainage depression	moderate	<50	1	1	A/B	high	varies	varies	60	15	900	70	50%	450	12	0.027	possible	previously recorded by RPS; re-recorded during LW24-26 Modification survey; erosion scours on margins of 2nd order tributary of Waterfall Creek; high disturbance from erosion but very shallow deposit may remain; low potential for deposit of research value
Wambo Site 514	ridge crest	gentle	>50	1, 2	1, 4	A/B	high	varies	varies	20	5	100	50	40%	40	2	0.050	possible	previously recorded by South East Archaeology; re-recorded during LW24-26 Modification survey with an additional two artefacts to the original two recorded; high disturbance from vegetation removal and vehicle track; possible shallow deposit may remain off track; low potential for deposit of research value
Wambo Site 515	simple slope	moderate	>50	1	1	A/B	high	50	7	15	5	75	80	70%	52	4	0.077	possible	identified during LW24-26 Modification survey; artefacts on surface of large erosion scour; high disturbance from erosion but very shallow deposit may remain; low potential for deposit of research value
Wambo Site 516	simple slope	moderate	>50	1	1	A	low	3	2	1	1	1	90	90%	0.9	1	1.111	unlikely	identified during LW24-26 Modification survey; isolated artefact on small area of exposed sandstone bedrock; low research potential
Wambo Site 517	ridge crest	gentle	>50	1	1	A	low	7	3	1	1	1	70	70%	0.7	1	1.429	unlikely	identified during LW24-26 Modification survey; isolated artefact on small area of exposed sandstone bedrock; low research potential
Wambo Site 518	ridge crest	gentle	>50	1	1, 4	A/B	mod	varies	varies	30	10	300	50	50%	150	4	0.027	possible	identified during LW24-26 Modification survey; small artefact scatter on erosion scours; dense grass elsewhere; moderate disturbance from erosion; shallow sub-surface deposit of low research potential may be present
Wambo Site 519	drainage depression	moderate	<50	1	1, 3	A/B	mod-high	varies	varies	70	20	1400	50	50%	700	17	0.024	probable	identified during LW24-26 Modification survey; artefact scatter on erosion scours and exposed bedrock in drainage; dense grass elsewhere; moderate to high disturbance from erosion; low potential for sub-surface deposit of research value, although deposits will be present in adjacent areas as indicated by A unit soil exposed in creek bank; six artefacts recorded, 11 remain to be recorded
Wambo Site 520	spur crest	moderate	>50	1	1	A/B	high	varies	varies	1	1	1	90	80%	0.8	1	1.250	unlikely	identified during LW24-26 Modification survey; artefact on extensive erosion scours; high impacts from vegetation removal and erosion; despite broad exposures very little evidence present; low potential for sub-surface deposit of research value

Table 5 (continued):

Site Name	Landform Element	Slope	Distance to Water	Vegetation	Land Surface	Exposure Type	Ground Disturbance	Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Archaeological Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts/m ² of Effective Locus Area	Sub-Surface Deposit	Comments
Wambo Site 521	simple slope	moderate	<50	1	1	A/B	high	varies	varies	1	1	1	90	80%	0.8	1	1.250	unlikely	identified during LW24-26 Modification survey; artefact on extensive erosion scours; high impacts from vegetation removal and erosion; despite broad exposures very little evidence present; low potential for sub-surface deposit of research value
Wambo Site 522	simple slope	moderate	<50	1	1	A/B	high	60+	20	4	4	16	90	80%	12.8	6	0.469	unlikely	identified during LW24-26 Modification survey; artefacts on extensive erosion scours; six artefacts present, three recorded; high impacts from vegetation removal and erosion; despite broad exposures very little evidence present; low potential for sub-surface deposit of research value
Wambo Site 523	drainage depression	moderate	<50	1	1, 3	A/B	high	2	2	1	1	1	70	50%	0.5	1	2.000	unlikely	identified during LW24-26 Modification survey; artefact on erosion in drainage; low potential for sub-surface deposit of research value; high impacts from vegetation removal and erosion
Wambo Site 524	drainage depression	moderate	<50	1, 2	1	A/B	mod-high	30	10	8	2	16	50	40%	6	2	0.313	possible	identified during LW24-26 Modification survey; erosion exposure at head of first order drainage; disturbance from vegetation removal and erosion; low potential for sub-surface deposit of research value
Wambo Site 525	spur crest	gentle	<50	1, 2	1	A	high	varies	varies	50	5	250	30	20%	50	4	0.080	unlikely	identified during LW24-26 Modification survey; previously cleared area in forest; large erosion scour, sandstone bedrock exposed, but low visibility; disturbance from vegetation removal and erosion; very low potential for sub-surface deposit of research value
Wambo Site 526	spur crest	moderate	<50	1, 2	1	A	mod-high	5	3	1	1	1	40	30%	0.3	1	3.333	possible	identified during LW24-26 Modification survey; small erosion scour in cleared area in regrowth forest; low visibility elsewhere; disturbance from vegetation removal and erosion; shallow A unit soil; low potential for sub-surface deposit of research value
Wambo Site 527	ridge crest	moderate	>50	1, 2	1, 4	A/B	mod-high	50+	3	1	1	1	80	70%	0.7	1	1.429	unlikely	identified during LW24-26 Modification survey; artefact on exposure on access track, dense vegetation off track; probable pathway between mountains and North Wambo Creek; impacts from track, vegetation removal, erosion and ants; very low potential for sub-surface deposit of research value
Wambo Site 528	ridge crest	moderate	>50	1, 2	1, 4	A	mod-high	50+	3	100	3	300	90	80%	240	6	0.025	possible	identified during LW24-26 Modification survey; artefacts on exposure on access track, dense vegetation off track; probable pathway between mountains and North Wambo Creek; impacts from track, vegetation removal and erosion; shallow A unit soil; low potential for sub-surface deposit of research value but more artefacts highly likely

Vegetation - 1 = cleared/grass/crop; 2 = forest/bush/regrowth
Land Surface - 1 = sheet erosion; 2 = gully erosion; 3 = stream bank erosion; 4 = vegetated; 5 = modified

The 14 new sites are located in the central and northern portions of the investigation area, with no particular clustering. In contrast, the previously recorded sites in the southern portion of the investigation area are almost all located within 200 metres of the higher order watercourse of North Wambo Creek (Figure 19).

The newly identified open artefact sites are all small, low density artefact scatters with six or less artefacts (six sites) or isolated finds (seven occurrences), apart from Wambo Site 519 with 17 artefacts.

The identified artefacts probably only represent a small fraction of the entire artefact resource that is present within the *heritage study area*, because the vast majority of evidence is likely to be currently obscured by vegetation and soil. Substantial portions of the *heritage study area* were not directly sampled for artefacts, and where the sample was obtained, conditions of surface visibility were typically very low (mean archaeological visibility across the entire survey sample was 4.8%, and the total effective survey coverage was 0.7%: refer to Section 5.1).

In contrast to the previously surveyed southern portion of the investigation area (Kuskie 2017a), where depositional contexts are widespread (valley flats and terraces around North Wambo Creek) and there is a high potential for sub-surface deposits, the northern and central portions of the investigation area are typically erosional contexts, with less potential for sub-surface deposits. Of the 14 newly identified sites, the potential for a sub-surface deposit (of even low research value) was assessed as unlikely for eight sites, possible for five sites and probable for one site (Wambo Site 519). Of the six sites with some potential for deposits, in all cases the potential for a deposit of high research value was assessed as low (Table 5).

During the present survey, a total of 50 artefacts were recorded in detail (refer to Appendix 5 and summary in Table 6).

Table 6: Summary of stone artefacts recorded during the present heritage survey.

Lithic Item Type	Stone Material					Total
	petrified wood	rhyolite	silcrete	tuff	volcanic	
core		1	2	3		6
core fragment			1	1		2
flake	2	1	4	19	1	27
flake - distal				3		3
flake - longitudinal			1			1
flake - medial				1		1
flake - proximal			3	4		7
geometric microlith				1		1
lithic fragment			1			1
retouched flake			1			1
Total	2	2	13	32	1	50

5.2.2 Cultural Values

Contemporary cultural values associated with the investigation area have been identified by the RAPs during the present investigation and the South Bates Extension Modification investigation (Kuskie 2017a), in particular by the Plains Clans of the Wonnarua People. Some of these values relate to physical objects, including items that qualify as *Aboriginal objects* as defined under the NP&W Act. However, some relate to intangible values, associations or landscape features that do not qualify as *Aboriginal objects*. These include:

- In general terms, the use of subsistence or other resources, with comments made about the presence of various native flora and fauna where observed and stone sources such as ochre. These comments were not of a historical nature (ie. did not relate to plant and animal resource use areas known from the post-contact period) but rather were general observations of the occurrence of particular species and their known traditional uses (eg. for food, medicine, tools, etc.) and of the presence of golden ochre (significant to the Plains Clans of the Wonnarua People). Further discussion of typically available resources and ethnohistorical observations of use are presented in Sections 2 and 3;
- In general terms, the traditional use of the area by Aboriginal people, and an ongoing cultural and spiritual connection to the land and resources of the study area by the Wonnarua people; and
- Specifically, the significance to the Plains Clans of the Wonnarua People of pathways through the locality, including the potential access from North Wambo Creek to Jerrys Plains Ridge.

In addition to these places and values, other archaeological sites identified within the investigation area are of contemporary significance to the Aboriginal community, as they represent a tangible link with the traditional past and with the lifestyle and values of community ancestors (refer to Section 7). The artefact scatters around North Wambo Creek were of particular significance to the Plains Clans of the Wonnarua People (Kuskie 2017a).

In general terms, the attachment of Wonnarua people to the landscape, in particular the Plains Clans of the Wonnarua People, and continuing strong cultural connections with the locality of the study area, were evident. As noted by Goulding (2002:63) land is a fundamental part of Aboriginal culture, and such cultural connections are integral to the health and wellbeing of Aboriginal people, although can be complex and are not always obvious to others.

5.3 Discussion

The results of the survey of the *heritage study area* are discussed below, including the potential integrity of the evidence, nature of the evidence and interpretations of the evidence. Refer to Kuskie (2017a) for a discussion of the evidence within the South Bates Modification Extension portion of the LW24-26 investigation area.

5.3.1 Integrity of Evidence

The integrity of the identified sites and the remainder of the *heritage study area* can primarily be assessed for surface evidence only through examination of land use impacts. Controlled excavation enables integrity to be assessed through the horizontal and vertical distribution of artefacts and by conjoining items.

As discussed in Section 2, recent non-Aboriginal land-use practices have had generally widespread but relatively low-level impacts on the investigation area. Some impacts have been caused by:

- ❑ The widespread clearing of native vegetation (much of the area is cleared or hosts regenerating vegetation, few mature native trees remain);
- ❑ Pastoral and possibly agricultural activities (including the grazing of sheep and cattle, excavation of farm dams, provision of watering troughs, windmills/wells and stockyards, residences, fencing, establishment of pasture improved grasses and erosion control measures such as contour banks);
- ❑ Erosion of hill-slopes and watercourses and the subsequent deposition of soils on the middle and lower portions of drainage lines (subsequent to the removal of native vegetation and introduction of hoofed animals);
- ❑ Essential services and transport (formed roads, unformed vehicle tracks and minor electricity transmission lines);
- ❑ Recreational activities; and
- ❑ Mineral exploration (exploratory drilling).

Levels of ground disturbance were recorded during the survey, after McDonald *et al* (1984) (Appendix 3). The survey areas typically exhibited low (26% by area) or low to moderate (71% by area) levels of ground disturbance.

By virtue of their identification in exposures created by ground disturbance (particularly vehicle tracks and erosion scours), many of the newly identified open artefact sites exhibit moderate to high levels of disturbance. However, several new sites (Wambo Sites 516 and 517) are situated in areas where minimal impacts have arisen from recent land use, and therefore have low levels of ground disturbance. It is also feasible that areas adjacent to the identified sites exhibit lower levels of disturbance (eg. grassed areas off the vehicle tracks or erosion scours).

In general, disturbance levels are low enough across much of the investigation area that should sub-surface deposits of artefacts occur in open contexts, most may exhibit reasonable integrity. Extensive excavations nearby (eg. Kuskie and Clarke 2004) indicate that typically in open site deposits in texture-contrast soils in the Central Lowlands there has been some vertical mixing of deposit through bioturbation, but often reasonable horizontal integrity. Importantly to note, in terms of the research potential of deposits, the impacts of post-depositional processes can also be identified and controlled for (Koettig 1989, Kuskie and Kamminga 2000).

As identified in Section 2, previous timber harvesting may have resulted in the removal of Aboriginal scarred or carved trees, had they once been present.

Virtually no rock formations were identified with any potential to host rock shelters or overhangs, and while a number of open bedrock surfaces were inspected, no grinding grooves were identified.

5.3.2 Lithic Assemblage

A total of 50 stone artefacts were recorded in detail during the present survey (refer to summary in Table 6 and data for each site in Appendix 5).

5.3.2.1 Stone Materials

Although the sample is very small, the combined artefact assemblage is dominated by the stone material tuff (32 artefacts or 64% of the combined assemblage, comparable to the 65.7% for the larger South Bates Modification Extension assemblage) and to a lesser extent silcrete (13 items or 26%, also very comparable to the 23.2% for the South Bates Modification Extension assemblage). Low counts and frequencies of other stone materials occur, including petrified wood, rhyolite and other volcanics (five items in total).

Tuff:

Indurated rhyolitic tuff has been commonly mis-identified by archaeologists as 'indurated mudstone' and continues to be incorrectly identified as such. Previously it was often mis-identified by archaeologists as chert (eg. Moore 1969, 1970, 1981).

This variation (between tuff and mudstone) is perhaps not as great an issue as it appears, because more important to archaeologists (and presumably the Aboriginal knappers) is the grain size and properties of the stone for flaking. The mis-classification of the material with chert is, however, more problematic as there are also low proportions of chert present within Hunter Valley assemblages (Kuskie and Clarke 2004).

As a component of the Black Hill study on the F3 Freeway (now M1 Motorway) (Kuskie and Kamminga 2000), x-ray diffraction analysis, thin-section analysis and hand-inspection tests were undertaken by the Geology Departments of the Australian National University and University of Newcastle to accurately determine the nature of the material tuff. This research identified that this stone is accurately identified as indurated rhyolitic tuff, and while in some respects it is similar to chert, there are significant differences in mineral composition and mechanical properties.

For the tuff artefacts retrieved during the excavations at Black Hill near Maitland (Kuskie and Kamminga 2000), texture was observed to range from glossy or very fine grained to granular. However, in general, the composition of this stone in the artefact assemblages is uniformly fine grained.

Tuff samples examined by Kuskie and Kamminga (2000) from the lower and upper Hunter Valley are rhyolitic in chemical composition (quartz and potassium-feldspar, occasionally with layer silicate or goethite).

In its pristine, unweathered form, rhyolitic tuff is grey to green in colour (a function of grain size, not a reference to individual grains, which can be of a variety of colours). However, tuff is porous enough for the diffusion of iron bearing solution, with iron precipitating out to give a yellow, brown, red or orange colour. Variations to the surface colouration can also result from weathering processes (for example, bleaching to white commonly occurs in porous sandy sediments) (Kuskie and Clarke 2004).

Much of the tuff found in Aboriginal sites in the central to upper Hunter Valley is red, yellow, brown or orange in colour. This colouration is attributable to groundwater charged with iron compounds (in particular goethite and haematite) diffusing through the porous tuff and precipitating out in micropores (Prof. K. Diessel *pers. comm.* 1996). Purple colour may be caused by the trace element cobalt, while black, which has been noted to penetrate up to two millimetres and merge with the grey matrix, may be from manganese oxide which is often associated with iron in groundwater (Prof. K. Diessel *pers. comm.* 1996). Penetration of black colour along cracks may be due to organic matter such as carbon, or oxidation of graphite. Heating from bushfires or dehydration due to weathering may transform yellow goethite to red haematite (Kuskie and Kamminga 2000).

Indurated rhyolitic tuff is a fine grained, isotropic stone formed from ash clouds ejected in explosive volcanic eruptions. The pyroclastic material can be fine ash grain (dust grain; <1/16 mm clast size) or coarse ash grain (<2 mm - 1/16 mm clast size) (Le Maitre 1989). Other types exist (eg. lapillus) but the consultant hasn't observed them in the Hunter Valley. The ash forms a pyroclastic deposit by settling to the ground or through ponded water (including peat swamps; Creech 2002).

The pyroclastic deposit, when it is mainly unconsolidated (tephra), can be fine ash (dust) for fine ash grain pyroclastic material, or coarse ash for coarse ash grain material. When the pyroclastic deposit is mainly consolidated (pyroclastic rock), the coarse ash grain forms coarse (ash) tuff, and the fine ash grain forms fine (ash) tuff (dust tuff) (Le Maitre 1989). The coarse and fine ash tuffs can be further subdivided on the basis of their fragmental composition. A lithic tuff would contain a predominance of rock fragments, a vitric tuff would contain a predominance of pumice and glass fragments, and a crystal tuff would contain a predominance of crystal fragments. These terms can also be further qualified by the use of other suitable prefixes, for example rhyolitic ash, air-fall tuff, lacustrine tuff and submarine tuff.

After burial, some tuff beds become indurated through a low-grade metamorphic process (probably involving pressure) in which the stone recrystallises to a more stable structure. In this sense, it would be accurate to describe tuff as a meta-volcanic. Part of the process may have entailed some precipitation of silica in groundwater before recrystallisation. In its hardest, most indurated form, tuff exhibits conchoidal fracturing and was therefore a suitable material for stone tool manufacturing.

Some tuff deposits show graded bedding, not unlike that of some sedimentary rocks. Lateral sorting also tends to occur, with coarser material settling closer to the vent and finer material further away (Press and Siever 1986).

In relation to tuff, the felsic (eg. rhyolitic) composition indicates rapid emptying of a zoned differentiated magma chamber with high gas pressure. Grain-size variation and sorting indicates fallout from a high eruption column. Massive to poorly bedded thick beds indicates single but fluctuating continuous gas blasts for several hours. Large volumes indicate high eruption columns (Fisher and Schmincke 1984).

In contrast, mudstone is a general term applied to rocks such as siltstone and claystone, composed of more than 50% clay and/or silt with grain sizes typically less than 1/16 mm, or in the case of claystone, less than 1/256 mm (Press and Siever 1986:74). Induration refers to hardening of the rock. The lithification (or hardening and compaction) of mudstones (siltstone and claystone) results in shale. Many muds and shales are mixed with other chemicals, giving individual shales different characteristics (Press and Siever 1986:308). Mudstones are similar in grain size to shales but have no laminations (Nashar 1964). They vary in colour from grey to green, black and brown. 'Indurated mudstone', or shales, do not possess the fracture properties needed for flaking artefacts.

However, some rocks (tuffites) contain pyroclastic deposit and normal clastic (epiclastic - weathering and erosion of older volcanic rock) deposits. For example, coarse ash tuff can consolidate as tuffaceous sandstone, while fine ash tuff can consolidate as tuffaceous siltstone. Tuffaceous mudstone and shale can also form from fine ash tuff, but with a generally much smaller clast size (<1/256 mm). In all of these 'tuffaceous' stones, the amount of pyroclastic material can range from 75% to 25%, whereas in a 'pyroclastic' stone it is 100% to 75% (Le Maitre 1989). The x-ray diffraction results from Kuskie and Kamminga's (2000) Black Hill and Hunter River samples demonstrate that at least these samples are a pyroclastic rock (tuff), not a 'tuffaceous stone' and certainly not a 'mudstone' or 'chert'.

Approximately 34% of tuff artefacts in the surface assemblage exhibit cortex, all of the waterworn variety. The tuff artefacts range in maximum dimension from 10 to 60 mm, but most (62%) are less than 30 mm in maximum size. Colour varies, but most of the surface assemblage tuff artefacts are dominated by red, orange, yellow and grey colours.

Volcanic tuffs occurs in widespread seams throughout the Hunter Valley (Diessel 1980:103; Creech 2002) and are occasionally exposed in drainage lines or in cliff faces, or the cobbles become worked into river gravels (eg. the Hunter River and its tributaries) where they represent a readily available source of the material. Direct sources of suitable quality tuff were not observed within the investigation area during the heritage survey (or by White 2003), however the presence of such sources cannot be totally discounted.

It is inferred that the majority of tuff used and discarded within the investigation area was procured from relatively local terrestrial outcrop, colluvial and alluvial sources (eg. the Hunter River and associated terrace deposits). As identified by Kuskie and Clarke (2004) at Mount Arthur North, procurement may have been a selective process, with cobbles tested for their quality, prior to selection of the better quality materials and transportation elsewhere for use. Considering the widespread availability of tuff in the upper Hunter Valley, it is more likely that the material was obtained during the course of the normal daily or seasonal round, rather than by way of special purpose trips to sources or by trade.

Silcrete:

Silcrete is a brittle, intensely indurate rock composed mainly of quartz clasts cemented by a matrix which may be well-crystallized quartz, cryptocrystalline quartz or amorphous (opaline) silica (Langford-Smith 1978:3). The texture of silcrete reflects that of the host rock and clasts may range in size from very fine grains to boulders.

Silcrete is produced by an absolute accumulation of silica, which can be precipitated from solution by evaporation, cooling, the neutralisation of strongly alkaline solutions, reaction with cations, adsorption by solids and the life-processes of organisms (Summerfield 1983:76). In weathered profiles, downward percolation of silica released through bedrock weathering and clay mineral authigenesis, together with water-table fluctuations, are suitable conditions for formation (Summerfield 1983:80).

Silcrete is normally grey in colour, but can be whitish, red, brown or yellow. It shatters readily into sharp, angular pieces with a conchoidal fracture and newly broken rocks have a semi-vitreous sheen (Langford-Smith 1978:4). Silcrete was an attractive material to the local Aboriginal people because of its flaking properties and availability. Flakes have sharp, reasonably durable edges and implements made from the stone were used for a variety of tasks, including woodworking and spear barbs.

Approximately 46% of silcrete artefacts in the surface assemblage exhibit cortex, all of the waterworn variety. The silcrete artefacts range in maximum dimension up to 70 mm, but most (69%) are less than 40 mm in maximum size.

Direct sources of suitable stone materials such as silcrete (eg. cobbles or boulders) were not identified within the investigation area during the heritage survey, in contrast to other nearby lower elevation areas, such as at Lemington (Brayshaw *et al* 1996, Dean-Jones 1992, Kuskie in prep.) and along the Hunter River (eg. Raggatt 1938). White (2003) also made this observation for the broader Wambo area. However, relatively local colluvial and/or alluvial gravel sources are inferred for the items within the investigation area.

Heat Treatment of Silcrete:

Heat treatment, or thermal alteration, refers to deliberate alteration of stone by heating. In one of the earliest, yet most relevant studies on heat treatment, Crabtree and Butler (1964) noted that deliberate heating can improve the working qualities of a stone. While many materials (particular isotropic, homogenous stone such as tuff or chert) can be readily flaked in their natural state, some more coarsely micro-granular materials such as silcrete can be difficult to carefully reduce. As Flenniken and White (1983:45) note, the "most significant effect of heat treatment is that it improves the flakability of rocks, thus allowing the knapper to reach his or her goal with less expenditure of effort and greater economy in raw material use". It would also allow some materials to be used for purposes they otherwise would not have been suitable for. Hence, more stone materials were available and effort involved in transportation would be less.

Technically, heat treatment reduces point tensile strength, which makes flaking easier, particularly the manufacturing of long, thin flakes (eg. microblades). Rick (1978) noted a decrease in edge angle for tools made from heat treated material. This results in increased sharpness and cutting ability. However, experiments by Rick (1978) revealed that the heat treated edges are less durable (in cutting tasks involving wood) and quickly blunted or dulled, while the untreated edges continued to cut at their initial rate. Rick (1978) argues that thermally altered material was best suited for tasks involving cutting, penetrating as in projectile points, or light duty scraping (without extreme edge stress).

Hanckel (1983:84) argues that heat treatment was used preferentially in the manufacture of certain implement types (backed blades, end scrapers and thumbnail scrapers) at rock shelters on the South Coast. Hanckel (1983) argues that this is evidence for a functional relationship between artefact type and heat treatment. Scrapers were involved in tasks with minimal potential for intensive stress on the working edges (eg. light duty scraping and trimming).

Hanckel (1983:51) used scanning electron microscopy to reveal that silcrete artefacts from all levels at a Burrill Lake rock shelter, and extending back in age to 20,000 years BP, were heat treated. At the Currarong site, heat treated silcrete was identified in the 'Bondaian and post-Bondaian phases' (Hanckel 1983:59). Flenniken and White (1983:43) also suggest that the technique was known throughout Australia from the late Pleistocene.

After identifying that heat treatment was a common practice at two sites in the lower Hunter Valley, Kuskie and Kamminga (2000) concluded that part of the reason for heat treatment may also have been to obtain a desired colour, as well as to improve the knapping properties of the stone. Part of the rationale for this explanation lies in the important symbolic meaning colours had in Aboriginal society. Specific colours (eg. red, pink and purple) may have been especially important for armatures of fighting and hunting spears. The production of microliths (used to arm spears) involves high costs of time and energy and is very wasteful of stone material. Alternative options were available to achieve more or less the same products and material outcomes for less expenditure of time and energy. Therefore Kuskie and Kamminga (2000) postulated that these activities occurred because a spear armed with stone barbs was an important component of a man's equipment and may have had considerable social value. In such circumstances, it is feasible that men would have invested time and energy in producing spear barbs, even transforming the colour of stone for reasons other than purely utilitarian ones.

Heat treatment, both to procure and reduce stone, has been observed ethnohistorically and successfully replicated experimentally (Akerman 1979, Crabtree and Butler 1964, Hanckel 1983, Kuskie and Kamminga 2000, Rowney 1992). The primary process of heat treatment appears to involve the use of a pit dug in sandy sediment, with cobbles or large primary flakes heated to a certain temperature and cooled in a controlled manner. Rapid raising or lowering of the temperature usually results in cracking or crazing.

The effects of heat treatment on siliceous stone reportedly include alterations to texture/structure, lustre, colour, water content, heat damage, conchoidal rippling on flake scars, compressive strength and point tensile strength. These changes relate to the constituency of the stone, the temperature of heating and the rate of heating and cooling (Hanckel 1983:7). However, few reliable tests or procedures for identifying thermal alteration in stone are available (Kuskie and Kamminga 2000). One exception is the tests developed by Domanski and Webb (1992) for changes in fracture toughness. However, the time intensive nature of these methods, the size of the individual samples required, the need to identify the silcrete source and test it also, and the need to destroy part of the sample, are all constraints to their widespread application.

Colour change can be a reliable method for detecting thermal alteration (although not necessarily distinguishing from intentional and unintentional heating) (Kuskie and Kamminga 2000, Kuskie and Clarke 2004). Colour change results from alteration to minute quantities of iron oxides present in the intercrystalline spaces of siliceous materials. In silcrete samples that contain iron oxide, a distinctive colour change from yellow to red will occur at temperatures associated with thermal alteration, attributable to hydrous iron oxide (HFeO_2) changing to haematite (Fe_2O_3).

Of the very small sample of silcrete artefacts, none solely exhibited pink colouration and one exhibited mixed pink/red colouration, with two mixed red/orange and six pure red items, indicative of thermal alteration involving colour change. Pink is a pristine haematite colour and could result from high temperature heating (c.350-400°C+) in an oxidising environment, such as in a bed of porous sand. However, red colouration can result from rapid intense heating and is thus less indicative of intentional thermal alteration.

No specific evidence was identified that suggests heat treatment occurred on-site. This may reflect sampling issues, the potentially minimal 'archaeological signature' of this practice, or that heat treatment was undertaken in sandy soils in other locations (eg. possibly at or close to the source of the stone).

5.3.2.2 Lithic Item Types

A total of ten categories of artefacts were identified in the relatively small sample (Table 6). The combined surface assemblage is overwhelmingly dominated by flakes (54%) and flake portions (24%) (including proximal, distal, medial and longitudinal portions), along with cores (12%), core fragments (4%) and lithic fragments (2%). The only other items recorded were a geometric microlith and a retouched flake (refer to Table 6).

Many of the categories represent debris from stone knapping (eg. flakes, flake portions, cores and lithic fragments). The knapping can be non-specific (eg. flakes) or may relate to the production of microblades and microliths. The occurrence of the key lithic item types are discussed below.

Flakes:

A total of 27 whole flakes were identified in the small combined surface assemblage (excluding other typological categories such as retouched flakes) (Table 6). Flakes include complete or substantially complete flakes which have technologically diagnostic features and a ventral (sometimes termed positive) surface, usually with evidence of hard indenter initiation, or occasionally bending initiation. This class of artefacts may represent:

- ❑ The fragmented debris of on-site knapping of primary flakes and microblades;
- ❑ Possibly backing retouch of implements; and
- ❑ A small proportion of sundry, other on-site fracture of siliceous stone, such as accidental breakage of implements.

As per the overall assemblage, flakes predominantly occur in tuff, but also in silcrete, petrified wood, rhyolite and other volcanics. In the surface assemblage, flakes range in size up to 60 mm in maximum dimension, but consistent with the overall small size of items, 63% of flakes are less than 30 mm in maximum dimension.

Flake Portions:

A total of 12 flake portions were identified in the surface assemblage. Flake portions include:

- ❑ *Distal* - the end of a flake (the opposite to that of the point of fracture origin on the ventral [or inside] surface);
- ❑ *Longitudinal* - a flake longitudinally fractured from its proximal to its distal end. The breakage may be slightly tangential but are mostly axial in orientation. Such breakages tend to occur during knapping (such as longitudinal cone splits) rather than through post-depositional processes;
- ❑ *Medial* - a mid portion of a flake, exhibiting more than one breakage and no platform or termination; and
- ❑ *Proximal* - the portion of a flake comprising the point of fracture origin on the ventral (or inside) surface.

As for flakes, these artefacts predominantly represent the fragmented debris of on-site knapping of primary flakes and microblades (debitage).

Lithic Fragments:

One lithic fragment was recorded. These are flaked pieces of stone which lack sufficient morphological attributes to identify them as a flake (a positive scar) or a core (only negative flake scars), but which are inferred to derive from knapping. The interpretive value of lithic fragments is primarily confined to the circumstantial evidence they provide regarding intensity of site use.

Cores and Core Fragments:

Six cores and two core fragments were recorded, in tuff, silcrete and rhyolite. These were relatively large items, between 30 and 80 mm in maximum dimension. This group of artefacts probably represents on-site knapping to produce flakes, possibly including to an extent ones useful for making into microliths.

Backed Artefacts:

One tuff geometric microlith was recorded. This is a symmetrically shaped retouched flake with one or more margins retouched at a steep angle, opposite a sharp edge or chord. The steep margin is typically formed by bipolar or hammer and anvil knapping. Microliths are often found in artefact scatter sites dating to the mid-late Holocene. While the function of these finely fashioned implements is not known with certainty, most archaeologists consider that they were used in armatures of hunting and fighting spears (Mulvaney and Kamminga 1999:235-36). Microliths may have served as barbs, or else as lacerators intended to disable an enemy or prey by causing haemorrhage.

Utilised/Retouched Items:

Only one silcrete retouched flake was recorded. Retouched flakes are artefacts that have minimal analytical value, because the purpose of the retouch they exhibit is not known. Some may be associated with backed artefact production and some may represent the failed production of a backed artefact (for example, 'preforms' that may represent the initial backing retouch of an elongated flake that was then discarded as being unsuitable for further backing retouch and transformation into a microlith).

5.3.3 Spatial Distribution, Site Interpretation and Reassessment of Occupation Model

The identified open artefact evidence may only represent a fraction of the entire artefact resource that is present within the *heritage study area*, because the vast majority of evidence is likely to be currently obscured by vegetation and soil.

Comprehensive studies (for example, Kuskie 2000a, 2009, Kuskie and Clarke 2004, Kuskie and Kamminga 2000) demonstrate that artefacts occur in a widespread distribution across the landscape, with higher artefact densities, representing a greater focus of Aboriginal activity, tending to occur in primary and secondary resource zones (refer to Section 3.4) than in other contexts. Many major surveys in eastern Australia have identified a virtually continual distribution of artefacts across the landscape, but at varying densities (for example, Hall 1991, 1992, Hall and Lomax 1993, Kuskie 2000a, 2009, Packard 1991, 1992). The results of large area surveys and major excavation projects lend support to arguments that the landscape should be viewed as an archaeological continuum, in which 'sites' represent points where higher frequencies of activities have occurred (Foley 1981).

However, defining a 'site' is problematical, due to the manner in which the evidence is exposed and the nature of the underlying human behaviour that has created the evidence. Most evidence is exposed within areas of erosion or ground disturbance. Therefore, delineating the extent of an open artefact site is not realistically possible without extensive sub-surface testing. The recorded evidence has typically been affected by post-depositional processes to such an extent that definition of a *cultural site* may not be possible (a discrete, culturally defined unit beyond which cultural material is absent). At such locations where artefacts have been identified, unless the items can be demonstrated to be culturally and temporally associated, the evidence cannot be said to represent a *cultural site*. Instead, the evidence may reflect a number of different occupational events that are spatially superimposed or mixed by post-depositional processes, but are not temporally or culturally related. In addition, the 'site' locations and boundaries would simply reflect the distribution and size of surface exposures. The definition of a 'site' is therefore an arbitrary one, which offers benefits in terms of planning and management, but does not necessarily reflect the underlying human behaviour that created the evidence (Dunnell and Dancey 1983).

Many survey assessments have used arbitrary site definitions such as 'two or more artefacts within 50 or 100 metres of each other' or 'concentrations of artefacts at a higher density than *background scatter*'. Neither concept is appropriate in a 'cultural landscape' approach. In recognition of the problems of 'site' definition as discussed above, the definition of an open artefact site 'as the presence of one or more stone artefacts within a *survey area*' is more appropriate (Kuskie 2000a). The *survey area* will always equate to a discrete *environmental context* (a particular combination of landform element and class of slope), bounded by different environmental contexts. While the visible site locus boundaries may be defined by the extent of visible evidence, across the entire *survey area* in which a site is identified, there exists a *potential resource* of comparable evidence. This recognition of the potential resource overcomes the problem of the nature of exposure of evidence (ie. 'sites' simply equate to 'surface exposures').

The 'broad-area' approach is based on the assumption that different environmental contexts provided different sets of constraints to Aboriginal occupation, which resulted in different patterns of land use. Following from this is the expectation that land use patterns may differ between environmental contexts and that this may result in the physical manifestation of different spatial distributions and forms of archaeological evidence. It is assumed that if the specific environmental context is repeated elsewhere within the investigation area, that similar evidence would exist in both locations, reflecting the similar underlying behaviour.

Following from these issues, it is apparent that concentrations of artefacts may represent many different and unrelated episodes of occupation. Therefore, by focusing the analysis on individual artefacts, issues of 'intra-site' spatial context become less critical. It is possible to compare the frequency of individual artefact and stone material types (measured against a constant unit of area, such as a square metre of effective survey coverage or a cubic metre of excavated soil sieved) with environmental variables, in order to test and refine a predictive model.

The *heritage study area* has been subdivided into nine *environmental contexts* (Table 3). These are discrete, recurring areas of land for which it is assumed that the Aboriginal land use and resultant heritage evidence in one location (for example, one *survey area*) may be extrapolated to other similar locations (for example, another *survey area* within the same environmental context). *Environmental contexts* are defined on the basis of two environmental variables:

- Firstly, *landform element* (following the definitions of McDonald *et al* 1984) (for example, ridge crest, spur crest, simple slope, drainage depression and flat); and
- Secondly, *class of slope* (following McDonald *et al* 1984) (for example, level to very gently inclined slopes of less than 1°45'; gently inclined slopes greater than 1°45' and less than 5°45', etc.).

Environmental contexts consist of all of the *survey areas* with a particular combination of landform element and slope (for example, 15 separate *survey areas* were combined to form the 'moderate simple slope' context). As each *survey area* is by definition part of a single *environmental context* (although a number of similar 'survey areas' can make up the total), it is possible to compare and analyse other environmental variables on a fine-scale between each survey area and on a broader-scale between each context.

However, in relation to the present *heritage study area*, the inferences that can be made from this comparison are limited by the very small nature of the effective survey coverage and artefact sample sizes. The artefact densities are very low across this area (mean of 0.006 artefacts per square metre of effective survey coverage).

Artefact densities are highest in the drainage depression landform unit (0.02/m²), compared with the ridge crest (0.005/m²), spur crest (0.003/m²) and simple slope units (0.003/m²) (Table 3). These results must be treated with caution due to the small nature of the artefact and effective survey coverage samples.

Examination of artefact density with respect to gradient reveals that a mean of 0.007 artefacts per square metre of effective survey coverage occurs on gentle gradients, compared with 0.006/m² on moderate gradients (Table 3). No artefacts were identified on steep ground or level to very gentle ground, although these categories comprised only 8.6% and 2.4% of the *heritage study area*. These results must be treated with caution due to the small nature of the artefact and effective survey coverage samples.

In terms of environmental contexts (combinations of landform element and class of slope; refer to Table 3), the highest mean density of 0.021 artefacts per square metre of effective survey coverage occurs on the moderate drainage depressions, consistent with the results above. Very low densities occur in other contexts. Again, these results must be treated with caution due to the small nature of the samples.

The vast majority of the *heritage study area* (91%) comprises moderate to steep gradients, distant from higher order watercourses. The remainder of the *heritage study area* comprises gentle or level to very gentle gradients, but these are also distant from higher order watercourses. Hence for the entire *heritage study area* it was inferred (and supported by the survey results) that there is limited potential for evidence of focused occupation. These contexts do not conform to primary or secondary resource zones under the model of occupation outlined in Section 3.4.

The survey results support predictions that the artefact evidence in these areas will typically be of a low to very low density consistent with background discard, and although a low frequency of activity areas (with consequent higher artefact density) may be present, will not represent focused occupation. Occupation of these portions of the investigation area is more likely to have related to hunting and gathering activities, along with transitory movement between locations and procurement of stone materials, and have been of a generally low intensity.

However, a small portion of the broader Longwalls 24-26 Modification investigation area (previously investigated by Kuskie 2017a) comprises the higher-order watercourse of North Wambo Creek and associated flats/terraces, which may comprise a secondary resource zone (refer to Figure 13). Within this area, comprising low gradient ground within close proximity of the creek (typically within 100-200 metres), the occupation model indicates that a higher artefact density and potentially deposits of research significance may occur, where more focused occupation (eg. encampments, or events of longer duration or involving larger numbers of people) and/or repeated Aboriginal occupation may have occurred (in addition to hunting and gathering and transitory movement). This is a depositional environment and was also densely vegetated with grass during the previous survey (Kuskie 2017a), resulting in a very low sample of effective survey coverage and consequent identification of few artefacts. Notably however, where exposures were present, artefacts were often identified (Kuskie 2017a).

White (2003) reported on various potential access routes between the lower valleys of Wambo, Stony and North Wambo Creeks and Wollombi Brook, and the higher sandstone country to the west (refer to Section 3.2.1 and Figure 8). Figure 13 shows the potential access routes in the vicinity of the Longwalls 24-26 Modification investigation area (modified here on the basis of accurate contour mapping and the results of the field surveys).

Notably, many of the open artefact sites within the previously surveyed portion of the Longwalls 24-26 Modification investigation area (Soil Test 2/A, Soil Test 6/A, Wambo Sites 311, 317, 319-321 and 483-489; respective AHIMS #37-5-0782, 37-5-0783, 37-5-0605, 37-5-0659, 37-5-0662, 37-5-0663, 37-5-0664, 37-5-0767, 37-5-0786 to 37-5-0791), hosting the vast majority of the recorded artefacts, are located on the lower portions of these spurs (Kuskie 2017a). The relatively broad range of evidence in these sites, and relatively low densities (with potentially an accumulation of evidence through superimposition), support the hypothesis that these spurs/ridges were access routes between the lower valleys (such as North Wambo Creek, which leads into Wollombi Brook) and the mountainous terrain to the west. A higher density of evidence may have indicated more focused occupation, rather than transitory movement (or substantial superimpositioning of evidence from unrelated activity events) (Kuskie 2017a).

Additional sites within the central and northern portion of the LW24-26 Modification area are also situated on these spurs and ridges, that were likely access routes. Wambo Sites 525, 526, 527 and 528 are situated on spurs and ridges leading to North Wambo Creek, and Wambo Sites 514, 518 and 520 are situated on spurs and ridges leading to Waterfall Creek (and on to the Hunter River).

In relation to other site types, virtually no rock formations were identified with any potential to host rock shelters or overhangs. No grinding groove sites were identified. Generally, there are limited contexts (eg. exposed open sandstone bedrock in drainage depressions) where such grooves could occur. Typically the open bedrock that is exposed in many of the drainages is conglomerate, or conglomeritic sandstone, which is not suitable or typically used for grinding purposes. Some of the bedrock has probably only become exposed since European land clearing and subsequent erosion and incision of stream channels. Previous timber harvesting and natural attrition have resulted in the removal of most mature native vegetation, so very few trees were present that could host scars.

Ochre nodules (golden ochre at grid reference 306088:6396268) were observed by Kuskie (2017a) in Survey Area 8 in the southern portion of the LW24-26 Modification investigation area that had previously been surveyed for the South Bates Extension Modification. These nodules represent a potential source of ochre for Aboriginal people, however there was no direct evidence that this source was utilised.

In general terms, the nature of occupation within the *heritage study area* could represent a variety of circumstances as outlined in detail in Section 3.4. However, the inferences that can be made about the nature of occupation at the identified sites or elsewhere in the investigation area are limited by the nature of the sample. The evidence identified at the open artefact sites is consistent with background discard, manuport and artefact material which is insufficient either in number or in association with other material to suggest focused activity in a particular location (Rich 1993, Kuskie and Kamminga 2000). The vast majority of evidence represents non-specific stone flaking.

The evidence has clearly arisen from multiple episodes of occupation, which may have occurred over the time span of human occupation of the locality. The duration of individual episodes of occupation is uncertain, although is inferred to have been relatively short. Controlled excavation and dating of cultural deposits would be required to resolve this issue.

Broader models of occupation for the Hunter Valley region have been proposed by Kuskie and Clarke (2004) for the central to upper valley and by Kuskie and Kamminga (2000) for the lower valley, based on ethnographic, ethnohistorical, oral historical and archaeological evidence (refer to Section 3.4).

The evidence identified during the survey is consistent with the occupation model for the locality (refer to Section 3.4). No evidence was identified that would lead to revisions to the model.

The inferences that can be made about the nature of occupation at the identified sites or elsewhere in the *heritage study area* are limited by the nature of the sample. It is inferred from the evidence obtained during the survey that:

- ❑ Aboriginal people widely used the *heritage study area* area, but at a low intensity;
- ❑ The artefact evidence is consistent with transitory movement through the landscape and occasional and short-duration visits by small parties of hunters and/or gatherers;
- ❑ At least some of the evidence within the area relates to occupation during the past 5,000 years (as can be inferred from certain artefact types); and
- ❑ The stone materials tuff, and to a lesser extent silcrete, were predominantly used for stone-working activities, largely because of their local availability, and were probably procured from relatively local terrestrial outcrop, alluvial and colluvial gravels in a casual, opportunistic manner (although possibly not from sources directly within the investigation area).

5.3.4 Chronology

There is no reliable means of dating the surface evidence that has been identified within the *heritage study area*. Cultural evidence can be directly dated by radiometric or other means (eg. radiocarbon, thermoluminescence and optically stimulated thermo-luminescence dating), when samples of datable cultural material (eg. charcoal from a hearth) are retrieved from deposits through controlled excavation. This is not possible within the context of a surface survey.

However, typological evidence can be used to date artefacts in open artefact sites. At least one artefact characteristic of the "Australian Small Tool Phase" occurs within the *heritage study area*. Items such as backed artefacts (eg. geometric microliths) have been reliably dated in rock shelter sites to around 5,000 years of age (Mulvaney and Kamminga 1999). The appearance of the "Small Tool Phase" in the Hunter Valley region is distinguished primarily by the production of microblades and microliths, but the dating of this is imprecise. Perhaps the best estimate for backed artefact proliferation in the region, based on the general pattern of radiocarbon dates for south-eastern Australia, is 3,500 or possibly 4,000 years BP.

Attempts to date open sites through description of technological attributes of artefact assemblages have also been undertaken (eg. Hiscock 1984, 1985, 1986). Hiscock (1985) identified three temporally distinct technological phases, based on analysis of attributes. However, the methods used by Hiscock have not been successfully replicated to date in open sites and are subject to significant constraints.

No items in the form of artefacts manufactured from introduced materials (eg. porcelain or glass) were identified. However, historical evidence of Aboriginal people occupying the immediate vicinity of the investigation area in the early to mid 1800s has been documented and White (2003) reports several such items (refer to Section 3).

A second type of indirect evidence on the age of the evidence can be the sedimentological context. Most of the soils within the *heritage study area* are duplex (texture contrast) soils, with a colluvial topsoil (A unit) overlying unrelated pedal clays formed by *in situ* weathering of bedrock (B unit or horizon). The A unit soils are generally assumed to form relatively quickly (Dean-Jones and Mitchell 1993) and date to the late Holocene. Unless the A horizons are thick (at least 0.3 metres) and incorporate *in situ* older, dateable deposits in their basal levels, it may not be possible stratigraphically to distinguish older artefact assemblages from mid to late Holocene assemblages. Of course, the possibility that artefacts survive in the modern A horizon soil which are older than the sedimentological age of the unit itself cannot be discounted, although would be very difficult to determine archaeologically (Hughes 2000).

5.3.5 Regional Context

The nature of the evidence from the *heritage study area* and the conclusions derived from the present study can be compared with those from studies of other sites within both the locality and the broader central to upper Hunter Valley region (refer to Section 3.2). The primary purpose is to identify similarities and differences with other reported evidence, in order to provide a framework for interpreting representativeness.

However, as identified by Kuskie and Clarke (2004), there are numerous problems and constraints in comparing evidence, including different:

- ❑ Standards and quality of reporting;
- ❑ Unspecified or different methods of calculation (eg. artefact counts, density);
- ❑ Excavation methodology;
- ❑ Sampling strategies;
- ❑ Methods of artefact retrieval during sieving (including sieve mesh size);
- ❑ Identification of stone materials;
- ❑ Identification of artefact types and classes (eg. nomenclature, criteria and consistency in artefact classification);
- ❑ Identification of backing retouch; and
- ❑ Identification of use-wear and residue.

Despite these constraints, a generally qualitative comparison is made below.

Notable similarities with other reported evidence in the Wambo locality and in the region (refer to Section 3.2) include:

- ❑ Stone artefacts being the dominant form of Aboriginal heritage evidence;
- ❑ The identification of evidence generally only in locations exposed by erosion or ground disturbance;
- ❑ Comparable numbers of artefacts within individual site loci;
- ❑ A generally low mean density of artefacts;
- ❑ Evidence occurring on similar landform elements;

- ❑ Similar range of stone material types, with dominance of tuff and silcrete;
- ❑ Use of heat treated silcrete;
- ❑ Similar range of artefact types, with dominance of flakes and flake portions;
- ❑ Predominance of evidence relating to non-specific stone flaking;
- ❑ Generally small size of artefacts; and
- ❑ Estimated late Holocene antiquity of the evidence.

In broad terms, the evidence from the Modification *heritage study area* (and the southern portion of the LW24-26 Modification investigation area that had previously been surveyed for the South Bates Extension Modification; Kuskie 2017a) is typical of that from the Central Lowlands of the Hunter Valley. No specific aspects of the evidence appear to be rare or unusual or not replicated elsewhere within a regional context.

5.3.6 Reassessment of Predictive Model

In view of the survey results (including those of Kuskie 2017a, 2017g), the predictive model of site location for the entire LW24-26 Modification investigation area (refer to Section 3.5) can be reassessed. Although the entire investigation area has been systematically surveyed, this is particularly relevant for the areas within the sampled zone that have not been directly inspected.

Artefact Scatters:

A total of 38 open artefact sites are known to occur directly within the LW24-26 Modification investigation area (Table 4, Figure 19), including 14 sites identified during the present survey of the *heritage study area*.

The potential for further artefact evidence to occur within the portions of the investigation area that were sampled, but not directly inspected, remains high, given that additional evidence would be obscured by sediment or vegetation or occur in areas not directly inspected. There remains a high potential for additional open artefact evidence to occur within the portions of the investigation area that were not sampled, wherever A unit soil is present, apart from in areas that have been substantially impacted by recent land-use (ie. areas in which the A unit soil has been totally removed).

The artefact evidence will predominantly comprise items related to non-specific stone knapping of tuff, and to a lesser extent silcrete, along with a range of other stone materials. Items associated with microblade and microlith production, along with microlith and non-microlith tools, will also occur.

The potential for further artefact evidence can be characterised within two zones, in relation to the nature in which Aboriginal people occupied and utilised the area (refer to Figure 13):

- *Secondary resource zone along North Wambo Creek* - A small portion of the LW24-26 Modification area comprises the higher-order watercourse of North Wambo Creek and associated flats/terraces, which may comprise a secondary resource zone (refer to Figure 13). Within this area, comprising low gradient ground within close proximity of the creek (typically within 100-200 metres), the occupation model indicates that a higher artefact density and potentially deposits of research significance may occur, where more focused occupation (eg. encampments, or events of longer duration or involving larger numbers of people) and/or repeated Aboriginal occupation may have occurred (in addition to hunting and gathering and transitory movement). This is a depositional environment and was also densely vegetated with grass, resulting in a very low sample of effective survey coverage and consequent identification of few artefacts during the survey. Without systematic excavation of a representative sample of contexts (both within and outside of the secondary resource zone), including at varying distances from North Wambo Creek, verification of this modelling and identification of the true nature and distribution of sub-surface evidence within these areas is not possible (Kuskie 2017a);
- *Remainder of the investigation area* - Outside of the secondary resource zone, much of the investigation area comprises moderate to steep gradients, distant from higher order watercourses, and portions of the investigation area comprise level to gentle gradients that are also distant from higher order watercourses, in which it is inferred (and supported by the survey results) that there is limited potential for evidence of focused occupation. These contexts do not conform to primary or secondary resource zones under the model of occupation outlined in Section 3.4. The survey results support predictions that the artefact evidence in these areas will typically be of a low to very low density consistent with background discard, and although a low frequency of activity areas (with consequent higher artefact density) may be present, will not represent focused occupation. Occupation of these portions of the investigation area is more likely to have related to hunting and gathering activities, along with transitory movement between locations and procurement of stone materials, and have been of a generally low intensity.

The potential for deposits dating to the early Holocene or late Pleistocene cannot be discounted in association with alluvial and colluvial soils around North Wambo Creek. Geomorphological investigation would be required to establish whether such contexts occur within the investigation area.

Bora/Ceremonial Sites:

No bora/ceremonial sites were identified within the LW24-26 Modification area. The potential for bora/ceremonial sites to occur within the portions of the investigation area that were sampled, but not directly inspected, can be reassessed as negligible.

Burials:

The probability of detecting burials during archaeological fieldwork is extremely low (albeit refer to Kuskie {2000a} for one notable exception) and no burials were identified within the LW24-26 Modification area during the surveys. The potential for burials to occur within the portions of the investigation area that were sampled, but not directly inspected, remains very low but cannot be discounted, particularly on alluvial sediments associated with North Wambo Creek.

Carved Trees:

No carved trees were identified within the LW24-26 Modification area. The potential for carved trees to occur within the portions of the investigation area that were sampled, but not directly inspected, can be reassessed as negligible.

Cultural Significant Sites or Areas:

Sites of traditional cultural significance (such as mythological sites) were not identified by the Aboriginal representatives involved in the investigations. The Aboriginal stakeholders also did not disclose any specific knowledge of historical cultural values/places (for example, historically known places or resource use areas). Although the possibility cannot be excluded that traditional or historical Aboriginal values or associations may exist that were not divulged by the persons consulted, this potential is reassessed as very low for the investigation area. The Aboriginal stakeholders did identify contemporary values/associations with the investigation area as documented in Section 5.2.2.

Grinding Grooves:

No grinding grooves were identified within the LW24-26 Modification area. The potential for grinding grooves to occur within the portions of the investigation area that were sampled, but not directly inspected, can be reassessed as very low, as the conglomeritic sandstone is generally not suitable for this purpose.

Quarry Sites:

No specific quarry sites were identified within the LW24-26 Modification area, however potential stone sources were identified in a number of locations, including:

- ❑ Pebbles of chert, petrified wood, rhyolite, quartz and quartzite in North Wambo Creek (and also in a lower frequency across the slopes and other landform units), which have derived from the eroded conglomerate (Kuskie 2017a). The potential exploitation of these alluvial and colluvial gravel sources is likely, although specific archaeological evidence may not remain; and
- ❑ Ochre nodules (including golden ochre and red ochre) in Survey Area 8, which represents a potential source, although specific archaeological evidence was not identified or may not remain (Kuskie 2017a).

The potential for quarry sites to occur within the portions of the investigation area that were sampled, but not directly inspected, can be reassessed as very low (direct sources of suitable tuff or silcrete were not identified during the surveys). Geological mapping of the investigation area and the investigation of White (2003) indicates that materials suitable for stone knapping, such as silcrete and tuff, have a generally low potential to occur directly within the area. However, the potential for exploitation of alluvial and colluvial gravel sources and ochre sources cannot be discounted.

Rock Shelters With Art, Deposits and/or Grinding Grooves:

No rock shelter sites or PADs were identified within the LW24-26 Modification area. The potential for rock shelters to occur within the portions of the investigation area that were sampled, but not directly inspected, can be reassessed as negligible, given the comprehensive nature of the survey and the obtrusive nature of this site type.

Scarred Trees:

No scarred trees were identified within the LW24-26 Modification area. The potential for scarred trees to occur within the portions of the investigation area that were sampled, but not directly inspected, can be reassessed as very low.

Stone Arrangements:

No stone arrangements were identified within the LW24-26 Modification area. The potential for stone arrangements to occur within the portions of the investigation area that were sampled, but not directly inspected, can be reassessed as very low or negligible.

Waterhole/wells:

No waterhole/wells were identified within the LW24-26 Modification area. The potential for waterhole/wells to occur within the portions of the investigation area that were sampled, but not directly inspected, can be reassessed as very low.

6. ABORIGINAL CONSULTATION

The investigation area lies within the boundaries of the Wanaruah Local Aboriginal Land Council (LALC) and within an area of interest to other Aboriginal persons and organisations.

The Aboriginal Cultural Heritage Assessment has involved a comprehensive program of consultation with the Aboriginal community that complies with the policy requirements of Heritage NSW (refer to consultation database and relevant correspondence in Appendix 7). These requirements are specified in the Heritage NSW policy entitled *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010c).

The consultation requirements specified in the Heritage NSW *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010c) involve the following procedures (numbering follows the guidelines):

- 4.1.2) In order to identify Aboriginal people who may have an interest in the investigation area and hold knowledge relevant to determining the cultural significance of Aboriginal objects or places, providing written notification of the project to the relevant DECCW Environment, Protection and Regulation Group (EPRG) regional office, LALC, Local Council and Catchment Management Authority (CMA), along with the Registrar of Aboriginal Owners under the *Aboriginal Land Rights Act 1983* (Department of Aboriginal Affairs), National Native Title Tribunal and Native Title Services Corporation Ltd (NTSCORP)² including the name and contact details of the proponent, the location and a brief overview of the proposed project, and a request for advice on the contact details of such Aboriginal people;
- 4.1.3) Providing written notification of the project directly to those Aboriginal persons/organisations that were identified in Procedure 4.1.2, along with the LALC, and placing an advertisement in a local newspaper circulated in the general location of the investigation area, explaining the project and its location. The notification includes the name and contact details of the proponent, the location and a brief overview of the proposal, a statement about the purpose of the consultation, an invitation for Aboriginal people with cultural knowledge relevant to the investigation area to register an interest and advice on privacy matters³, with a minimum 14 day response period⁴;
- 4.1.6) Providing a record of the names of each Aboriginal person who registered an interest along with a copy of that registration and the notification letter in Procedure 4.1.3 to the relevant DECCW EPRG regional office and LALC within 28 days of the closing date for registrations of interest;
- 4.2 & 4.3) Providing detailed information about the project, heritage impact assessment process and proposed heritage assessment methodology to all registered Aboriginal parties identified in Procedure 4.1, with a minimum 28 day response period for comments;

² Procedures 4.1.2 - 4.1.7 are not required where an approved native title determination exists over the entire investigation area. In this event, consultation is only required with the native title holders.

³ Procedure 4.1.5.

⁴ Procedure 4.1.4.

- 4.2 & 4.3) Considering any input received from the registered parties in finalising the heritage assessment methodology and process, and implementing the methodology in consultation with the registered Aboriginal parties. This included seeking input on knowledge of Aboriginal objects and places of cultural value to Aboriginal people within the investigation area and views on potential management strategies, and incorporated a field inspection of the investigation area;
- 4.3 & 4.4) Preparation of a draft Aboriginal heritage impact assessment report and seeking the views of registered Aboriginal parties on cultural values and potential management strategies through provision of a copy of the draft report to the registered parties, with a minimum 28 day response period for comments; and
- 4.3 & 4.4) Preparation of a final Aboriginal heritage impact assessment report that incorporates the input of the registered Aboriginal parties and the proponent's response to each submission made on the draft report, and making the final report available to the registered Aboriginal parties and the relevant LALC.

All consultation with the Aboriginal community in relation to the present Aboriginal Cultural Heritage Assessment is documented below and in Appendix 7 of this report. Consultation relating to the southern portion of the LW24-26 Modification investigation area that had previously been surveyed for the South Bates Extension Modification is documented by Kuskie (2017a).

Compliance with Procedure #4.1.2 of the Heritage NSW policy was achieved through correspondence forwarded to the relevant organisations by WCPL on 9 November 2021. This correspondence included advice that the previously known RAPs⁵ for Wambo would be automatically registered for the present assessment. One response was received, from Heritage NSW on 23 November 2021, with a list of potential stakeholders to be contacted (refer to Appendix 7).

As a result of the Heritage NSW response, Procedure #4.1.3 of the consultation policy was then implemented by WCPL writing on 24 November 2021 to the organisations named who were not already considered as automatically registered for the Modification, with an invitation to register an interest by 8 December 2021 (refer to Appendix 7).

Correspondence was also forwarded by WCPL on 24 November 2021 to the existing RAPs for Wambo advising them of the Modification and to notify them that they had been automatically registered for the Modification (refer to Appendix 7).

An advertisement was also placed in the Public Notices section of the Singleton Argus on 25 November 2021, with an invitation for interested parties to register an interest by 8 December 2021 (refer to Appendix 7).

At the conclusion of these registration of interest procedures, 70 Aboriginal parties had registered an interest in the Modification (or were deemed to be registered by virtue of previous registrations of interest at Wambo), as listed in Table 7 (herein referred to as the Registered Aboriginal Parties or RAPs).

Compliance with procedure #4.1.6 of the OEH consultation policy was achieved on 14 March 2022 by providing copies of the required information to Heritage NSW and the Wanaruah LALC (refer to Appendix 7).

⁵ Database maintained by WCPL.

As per procedures 4.2 and 4.3 of the Heritage NSW consultation policy, detailed information about the Project and the proposed (draft) methodology were forwarded to all RAPs on 14 December 2021 with a request for comment by 28 January 2022, apart from one late registrant of interest who was sent this correspondence on 11 January 2022 (refer to Table 7 and Appendix 7).

No responses to the draft methodology were received from any of the RAPs. The draft methodology for the Aboriginal Cultural Heritage Assessment was subsequently finalised without amendment and implemented.

WCPL elected to engage several representatives of the RAPs for paid participation in the field survey. Invitations were initially extended to the Wanaruah LALC, Tocomwall, Bawurra Consultants, Ungooroo Aboriginal Corporation and Cacatua Culture Consultants (refer to Appendix 7). Tocomwall and Bawurra Consultants advised that they could not attend the survey. Wanaruah LALC, Ungooroo Aboriginal Corporation and Cacatua Culture Consultants confirmed their participation in the survey.

Field inspection of the investigation area was undertaken over seven days (14-17 and 21-23 February 2022) by qualified archaeologists from South East Archaeology accompanied on every day by representatives of the RAPs (refer to Table 2), including:

- ❑ Allen Paget, representing Ungooroo Aboriginal Corporation, for six days of the survey;
- ❑ Marcus Sproule, representing Ungooroo Aboriginal Corporation, for one day of the survey; and
- ❑ Wayne French, representing Cacatua Culture Consultants, for two days of the survey.

On most days, representatives of organisations (particularly the Wanaruah LALC) that had been invited to send a representative and confirmed their participation were unable to attend. Attempts were made to re-arrange participants and engage other RAPs such as Buudang, Crimson-Rosie, Culturally Aware and Carrawonga Consultants, but were not successful due to the limited timeframes (refer to Appendix 7).

During the investigation the representatives did not disclose any specific knowledge of sites or places associated with ceremonies, spiritual/mythological beliefs or traditional knowledge, which date from the pre-contact period and have persisted until the present time, within the *heritage study area*. The representatives also did not disclose any specific knowledge of sites or places associated with historical associations, which date from the post-contact period and are remembered by people today (for example, plant and animal resource use areas and known camp sites), within the *heritage study area*.

The possibility cannot be excluded however, that traditional or historical Aboriginal values or associations may exist that were not divulged to South East Archaeology by the persons consulted. It was not feasible to contact every single knowledge holder in the Aboriginal community.

Representatives in the previous survey of the southern portion of the LW24-26 Modification investigation area (Kuskie 2017a), in particular the Plains Clans of the Wonnarua People, did however disclose a number of associations with the LW24-26 area of contemporary cultural significance (refer to Section 5.2.2), including:

- ❑ In general terms, the use of subsistence or other resources such as ochre;

- ❑ In general terms, the traditional use of the area by Aboriginal people, and an ongoing cultural and spiritual connection to the land and resources of the area by the Wonnarua people;
- ❑ Specifically, the significance to the Plains Clans of the Wonnarua People of pathways through the locality, including the potential access from North Wambo Creek to Jerrys Plains Ridge; and
- ❑ The contemporary significance of Aboriginal objects - archaeological evidence (such as artefact scatters) identified within the investigation area is of contemporary significance to the Aboriginal community, as it represents a tangible link with the traditional past and with the lifestyle and values of community ancestors. Artefact scatters around North Wambo Creek were of particular significance to the Plains Clans of the Wonnarua People (Kuskie 2017a).

In general terms, the attachment of Wonnarua people to the landscape and continuing strong cultural connections with the locality of the study area were evident. As noted by Goulding (2002:63) land is a fundamental part of Aboriginal culture, and such cultural connections are integral to the health and wellbeing of Aboriginal people, although can be complex and are not always obvious to others.

Any issues raised by the Aboriginal stakeholders during the course of the assessment and subsequent consultation and how they have been addressed are outlined in Table 8. Issues that relate to the paid engagement of stakeholders with respect to the investigation are not heritage related and are not addressed further here (although refer to database in Appendix 7 for details of all consultation).

Compliance with Procedures 4.3 and 4.4 of the Heritage NSW consultation policy was achieved by providing copies of the draft Aboriginal Cultural Heritage Assessment Report to each of the RAPs via email and/or post on 7 and 8 April 2022, with a request for comment by 12 May 2022 (refer to Appendix 7).

No responses to the draft ACHAR were received prior to the closing date for comments, however shortly thereafter Cacatua Culture Consultants, AGA Services and Ungooroo Aboriginal Corporation endorsed the draft report (refer to Appendix 7).

Copies of this final heritage assessment report were prepared that incorporated and addressed input received from the RAPs and will be made available to all RAPs.

Table 7: Summary of Registered Aboriginal Parties involvement in the Modification.

Registered Aboriginal Party	Sent Project Information and Methodology	Responded to Methodology by Closing Date	Attended Field Survey
A1 Indigenous Services	14/12/21	-	-
Aboriginal Native Title Consultants	14/12/21	-	-
AGA Services	14/12/21	-	-
Bawurra Consultants	14/12/21	-	-
Breeza Plains Cultural Heritage Consultants	14/12/21	-	-
Buudang	14/12/21	-	-
Cacatua Culture Consultants	14/12/21	-	22-23/2/22
Carrawonga Consultants	14/12/21	-	-
Crimson-Rosie (Jeffery Matthews)	14/12/21	-	-
Culturally Aware	14/12/21	-	-
Deslee Talbott Consultants	14/12/21	-	-
DFTV Enterprises	14/12/21	-	-
DRM Cultural Management	14/12/21	-	-
EMT Cultural & Heritage	14/12/21	-	-
Galamaay Consultant	14/12/21	-	-
Gidawaa Walang Cultural Heritage Consultancy	14/12/21	-	-
Giwiir Consultants	14/12/21	-	-
HECMO Consultants	14/12/21	-	-
Heilamon Cultural Consultants	14/12/21	-	-
Hunter Traditional Owner EMS	14/12/21	-	-
Hunter Valley Aboriginal Corporation	14/12/21	-	-
Hunter Valley Cultural Consultants	14/12/21	-	-
Hunter Valley Cultural Surveying	14/12/21	-	-
Hunter Valley Environment Land & Mining Services	14/12/21	-	-
Hunter Valley Natural & Cultural Resource Management	14/12/21	-	-
I & E Aboriginal Culture and Heritage	14/12/21	-	-
Janet Fenwick	14/12/21	-	-
Jarban & Mugrebea	14/12/21	-	-
Jill Green	14/12/21	-	-
JLC Cultural Services	14/12/21	-	-
Kawul Cultural Services	14/12/21	-	-
Kawul Pty Ltd (trading as Wonn1 Sites)	14/12/21	-	-
Kayaway Eco Cultural & Heritage Services	14/12/21	-	-
KL.KG Saunders Trading Services	14/12/21	-	-
L.J. Cultural Management	14/12/21	-	-

Table 7 (continued):

Registered Aboriginal Party	Sent Project Information and Methodology	Responded to Methodology by Closing Date	Attended Field Survey
Lorraine Towney	14/12/21	-	-
Lower Hunter Aboriginal Incorporated	14/12/21	-	-
Lower Hunter Wonnarua Cultural Services	14/12/21	-	-
Minnga Consultants	14/12/21	-	-
Moreeites	14/12/21	-	-
Muswellbrook Cultural Consultants	14/12/21	-	-
Myland Cultural & Heritage Group	14/12/21	-	-
Ngarramang-Kuri Aboriginal Culture & Heritage Group	14/12/21	-	-
Plains Clans of the Wonnarua People's Registered Native Title Claimants	14/12/21	-	-
Roger Noel Matthews	14/12/21	-	-
Roslyn Sampson	14/12/21	-	-
Scott Smith	14/12/21	-	-
Smith Dhagaans Cultural Group	14/12/21	-	-
T & G Culture Consultants	14/12/21	-	-
Tocomwall Pty Ltd	14/12/21	-	-
Ungooroo Aboriginal Corporation	14/12/21	-	14-17, 21-23/2/22
Ungooroo Cultural & Community Services	14/12/21	-	-
Upper Hunter Heritage Consultants	14/12/21	-	-
Upper Hunter Wonnarua Council	14/12/21	-	-
Valley Culture	14/12/21	-	-
Waabi Gabinya Cultural Consultancy	14/12/21	-	-
Wallangan Cultural Services	14/12/21	-	-
Wanaruah Custodians Aboriginal Corporation	14/12/21	-	-
Wanaruah Local Aboriginal Land Council	14/12/21	-	-
Warragil Cultural Services	14/12/21	-	-
Wattaka Wonnarua Cultural Consultancy Services	14/12/21	-	-
Widescope Indigenous Group	14/12/21	-	-
Wonnarua Culture Heritage	14/12/21	-	-
Wonnarua Nation Aboriginal Corporation	14/12/21	-	-
Wonnarua Traditional Custodians	14/12/21	-	-
Wonnarua Traditional Owners	14/12/21	-	-
Wurrumay Consultants	14/12/21	-	-
Yinarr Cultural Services	14/12/21	-	-
Didge Ngunawal Clan	14/12/21	-	-
Non-Disclosure Requested	11/1/22	-	-

Table 8: Summary of Registered Aboriginal Parties key comments and how they have been addressed by the Modification.

Issue #	Issue	Raised by	Project Team Response
1	Endorsed the draft ACHAR.	George Sampson (Cacatua Culture Consultants) and Ashley Sampson (AGA Services), via email 20/5/2022.	Noted.
2	Endorsed the draft ACHAR.	Allen Paget (Ungooroo Aboriginal Corporation), via telephone 24/5/2022.	Noted.

7. SIGNIFICANCE ASSESSMENT

7.1 Criteria

The information contained within this report, along with an assessment of the significance of the Aboriginal heritage evidence, provides the basis for informed decisions to be made regarding the management and degree of protection which should be afforded to specific Aboriginal heritage sites.

The significance of Aboriginal heritage evidence can be assessed along the following criteria, widely used in Aboriginal heritage management, derived from the relevant aspects of the International Council on Monuments and Sites (ICOMOS) *Burra Charter*:

- I. Scientific (Archaeological) value;
- II. Importance to Aboriginal people (Cultural value);
- III. Educational value;
- IV. Historic value; and
- V. Aesthetic value.

Greater emphasis is generally placed on scientific and cultural criteria when assessing the significance of Aboriginal heritage evidence in Australia.

Scientific (Archaeological) Value:

Scientific value refers to the potential usefulness of heritage evidence to address further research questions, the representativeness of the evidence, the nature of the evidence and its state of preservation.

Research Potential:

Research potential refers to the potential for information derived from further investigation of the evidence to be used for answering current or future research questions. Research questions may relate to any number of issues concerning past human culture, human behaviour generally or the environment. Numerous locations of heritage evidence have research potential. The critical issue is the threshold level, at which the identification of research potential translates to significance/importance at a local, regional or national level.

Several key questions can be posed for each location of heritage evidence:

- Can the evidence contribute knowledge not available from any other resource?
- Can the evidence contribute knowledge, which no other such location of evidence can?
- Is this knowledge relevant to general questions about human history, past environment or other subjects?

Assessing research potential therefore relies on comparison with other evidence in local and regional contexts. The criteria used for assessing research potential include the:

- a) Potential to address locally specific research questions;
- b) Potential to address regional research questions;

- c) Potential to address general methodological or theoretical questions;
- d) Potential deposits; and
- e) Potential to address future research questions.

In terms of meeting a threshold level to have significant research potential, the particular questions asked of the evidence should be able to contribute knowledge that is not available from other resources or evidence (either on a local or regional scale) and are relevant to general questions about human history, past environment or other subjects.

Representativeness:

Representativeness is generally assessed at local, regional and national levels. It is an important criterion, because the primary goal of cultural resource management is to afford greatest protection to a representative sample of Aboriginal heritage evidence throughout a region. The more unique or rare evidence is, the greater its value as being representative within a regional context.

The main criteria used for assessing representativeness include:

- a) The extent to which the evidence occurs elsewhere in the region;
- b) The extent to which this type of evidence is subject to existing or potential future impacts in the region;
- c) The integrity of the evidence compared to that at other localities in the region;
- d) Whether the evidence represents a prime example of its type within the region; and
- e) Whether the evidence has greater potential for educational or demonstrative purposes than at other similar localities in the region.

Nature of Evidence:

The nature of the heritage evidence is related to representativeness and research potential. The less common the type of evidence is, the more likely it will have representative value. The nature of the evidence is directly related to its potential to be used in addressing present or future research questions. Criteria used in assessing the nature of the evidence include the:

- a) Presence, range and frequency of stone materials;
- b) Presence, range and frequency of artefact types; and
- c) Presence and types of other features.

A broader range of stone and artefact types generally equates to the potential for information to address a broader range of research questions. The presence of non-microlith and microlith tool types also equates to higher potential to address relevant research questions. The presence and frequency of particular stone or artefact types or other features also has relevance to the issue of representativeness (for example, a rare type may be present).

Integrity:

The state of preservation of the evidence (integrity) is also related to representativeness and research potential. The higher the integrity of evidence, the greater the level of scientific information likely to be obtained from its further study. This translates to greater importance for the evidence within a local or regional context, as it may be a suitable example for preservation within a sample representative of the entire cultural resources of a region.

The criteria used in assessing integrity include:

- a) Horizontal and vertical spatial distribution of artefacts;
- b) Preservation of intact features such as midden deposits, hearths or knapping floors;
- c) Preservation of site contents such as charcoal and shell which may enable accurate direct dating or other analysis; and
- d) Preservation of artefacts which may enable use-wear/residue analysis.

Generally, many of these criteria can only be applied to evidence obtained by controlled excavation. High levels of ground disturbance limit the possibility that the evidence would surpass the threshold of significance on the basis of integrity (ie. the area would be unlikely to possess intact spatial distributions, intact features, *in situ* charcoal or shell, etc).

Aboriginal (Cultural) Significance:

Aboriginal (cultural) significance refers to the value placed upon Aboriginal heritage evidence by the local Aboriginal community.

All heritage evidence tends to have some contemporary significance to Aboriginal people, because it represents an important tangible link to their past and to the landscape. Heritage evidence may be part of contemporary Aboriginal culture or be significant because of its connection to spiritual beliefs or as a part of recent Aboriginal history.

Consultation with the local Aboriginal community is essential to identify the level of Aboriginal significance.

Educational Value:

Educational value refers to the potential of heritage evidence to be used as an educational resource for groups within the community.

Historic Value:

Historic value refers to the importance of heritage evidence in relation to the location of an historic event, phase, figure or activity.

Aesthetic Value:

Aesthetic value includes all aspects of sensory perception. This criterion is mainly applied to art sites or mythological sites.

7.2 Significance of Heritage Evidence Within the LW24-26 Modification Area

The significance of the Aboriginal heritage sites, cultural values and potential deposits within the LW24-26 Modification area have been assessed in relation to the criteria presented in Section 7.1. The significance assessment is presented for each site in Table 9. The assessments by Kuskie (2017a, 2017g) are incorporated for the previously recorded and assessed sites within the southern portion of the LW24-26 Modification area, noting that the complete salvage of a number of sites has resulted in a change of the rating from the previously assessed level to 'not applicable' (n/a).

The significance assessment involves ratings of 'low', 'low-moderate', 'moderate', 'moderate-high' and 'high'. Key criteria for assessment of each site are included in Table 9. The assessment has been conducted within both local (abbreviated as 'L') and regional ('R') contexts.

It is noted that all Aboriginal heritage is of interest and contemporary value to the Aboriginal community. Aboriginal heritage evidence represents a tangible link with the traditional past and with the lifestyle and values of community ancestors. The Aboriginal community themselves are in the best position to identify the levels of cultural significance and the stakeholders have been invited throughout the course of the project, the field investigation and subsequent consultation to provide input into the cultural significance of the specific sites and areas.

Several RAPs, including the Wanaruah LALC and Registered Native Title Claimants (Plains Clans of the Wonnarua People), are of the view that all identified sites and cultural values, along with the Modification area itself, are of cultural significance (Kuskie 2017a). Some Aboriginal community members are reluctant to engage in any comparative or ranking process (as is inherent within any system of significance assessment) and prefer to identify all sites and the investigation area as being of cultural significance.

The key conclusions of the significance assessment are presented below for each site type (refer also to Table 9).

Open Artefact Sites

In overall terms for the open artefact sites, which comprise physical objects under the NP&W Act:

- Nine previously recorded open artefact sites have been subject to total salvage and the significance level is now reported as 'not applicable' (Wambo Sites 239, 311 and 485-489, United IF5 and South Bates Soil Test 2/A; respective AHIMS # 37-5-0358, 37-5-0605, 37-5-0692, 37-5-0782 and 37-5-0787 to 37-5-0791);
- 26 open artefact sites are assessed as being of low significance within a local context, due to low representative value (common), low research potential, low integrity and/or isolated occurrences (Wambo Sites 240, 241, 317-320, 327, 484, 490, 491 and 513-528; refer to Table 9);
- Two open artefact sites (Wambo Site 321 and South Bates Soil Test 6/A; respective AHIMS # 37-5-0664 and 37-5-0783/37-5-0807) are assessed as being of low to possibly moderate significance within a local context (Kuskie 2017a), although both sites have been partially salvaged (Kuskie 2018d); and

- One open artefact site is assessed as being of moderate significance within a local context (Wambo Site 483; AHIMS #37-5-0767) (Kuskie 2017a), although this site has also been partially salvaged (Kuskie 2018d).

Artefact scatters and isolated artefacts are common occurrences throughout the region and are therefore generally of low representative value. The sites tended to be of lower significance if levels of ground disturbance were high (and therefore the integrity of any evidence low), there was a limited range and nature of artefact evidence, and/or the potential for deposits of research value was low. Many of the open artefact sites contained low numbers of artefacts, with a consequent limited range of contents, and were located outside of the secondary resource zone in areas of low potential for deposits of research value.

Research potential relates to the probability that the sites contain sub-surface deposits that may yield evidence useful in addressing locally relevant research questions, such as those relating to occupation patterns or stone technology. This was assessed in relation to the model of occupation (refer to Section 3.4) and thus assumes that deposits of higher research potential will generally be located where more focused occupation has occurred, such as in the secondary resource zone along North Wambo Creek.

The artefact sites tended to be of 'low to possibly moderate' (Wambo Site 321 and South Bates Soil Test 6/A) or 'moderate' (Wambo Site 483) significance where there was potential for deposits of research value and/or in some cases a moderate range and nature of evidence present. These three sites were part of the complex of sites associated with the potential pathway on the northern side of North Wambo Creek and are in the southern portion of the LW24-26 Modification area in the area previously assessed by Kuskie (2017a). These sites are located within the secondary resource zone of the creek. Further investigation of the deposits could address locally important questions regarding logistical and settlement patterns (nature of occupation, relationship of these sites with each other and with other sites in the locality, and potential movement of people and material items) and stone artefact manufacturing technology.

It is noted that these three sites have been partially salvaged under existing AHIPs (Kuskie 2018d), through surface collection of artefacts along the vehicle tracks. The only remaining *in situ* portions of the sites are the sections off the vehicle tracks (Kuskie 2018d).

Nine of the previously recorded open artefact sites within the LW24-26 Modification area have been subject to total salvage under existing AHIPs (Kuskie 2018d, 2019b, 2020c and Ozark 2016) and the significance level is now appropriately reported as 'not applicable' (Wambo Sites 239, 311 and 485-489, United IF5 and South Bates Soil Test 2/A).

Cultural Places/Values

No sites or places associated with ceremonies, spiritual/mythological beliefs or traditional knowledge, which date from the pre-contact period and have persisted until the present time, or places associated with historical associations which date from the post-contact period and are remembered by people today, were identified within the LW24-26 Modification area.

However, as documented above, the physical manifestations of evidence of past occupation (Aboriginal objects or archaeological/heritage sites) are generally of contemporary significance to the Aboriginal community, as they represent a tangible link with the traditional past and with the lifestyle and values of community ancestors.

The representatives did disclose a number of associations with the investigation area of contemporary cultural significance during the present investigation and the South Bates Extension Modification investigation (Kuskie 2017a; refer to Section 5.2.2), including:

- ❑ In general terms, the use of subsistence or other resources such as ochre;
- ❑ In general terms, the traditional use of the area by Aboriginal people, and an ongoing cultural and spiritual connection to the land and resources of the area by the Wonnarua people;
- ❑ Specifically, the significance to the Plains Clans of the Wonnarua People of pathways through the locality, including the potential access from North Wambo Creek to Jerrys Plains Ridge; and
- ❑ The contemporary significance of Aboriginal objects - archaeological evidence (such as artefact scatters) identified within the investigation area is of contemporary significance to the Aboriginal community, as it represents a tangible link with the traditional past and with the lifestyle and values of community ancestors. Artefact scatters around North Wambo Creek were of particular significance to the Plains Clans of the Wonnarua People (Kuskie 2017a).

In general terms, the attachment of Wonnarua people to the landscape, in particular the Plains Clans of the Wonnarua People, and continuing strong cultural connections with the locality of the study area, were evident (Kuskie 2017a). As noted by Goulding (2002:63) land is a fundamental part of Aboriginal culture, and such cultural connections are integral to the health and wellbeing of Aboriginal people, although can be complex and are not always obvious to others. Nevertheless, evidence was not identified during the investigation that distinguished, in a comparative or ranking sense, the investigation area as being more or less significant than other parts of the Hunter Valley.

Table 9: Significance assessment of Aboriginal sites, cultural areas/values and potential deposits within the LW24-26 Modification area.

Site Number / Name	Site Type	Comments	Significance					
			Overall	Archaeological / Scientific	Aboriginal / Cultural ⁶	Aesthetic	Educational	Historic
37-5-0358 (Wambo Site 239)	Open Artefact Site	Salvaged under AHIP #2222.	n/a	-	-	-	-	-
37-5-0359 (Wambo Site 240)	Open Artefact Site	In situ with AHIP (#C0003213).	low L, low R	low (common, low research potential, low integrity, isolated)	high	low	low	nil
37-5-0360 (Wambo Site 241)	Open Artefact Site	In situ with AHIP (#C0003213).	low L, low R	low (common, low to possibly moderate research potential)	high	low	low	nil
37-5-0605 (Wambo Site 311)	Open Artefact Site	Salvaged under AHIP #C0003213.	n/a	-	-	-	-	-
37-5-0659 (Wambo Site 317)	Open Artefact Site	In situ with AHIP (#C0003213).	low L, low R	low (common, low research potential, isolated)	high	low	low	nil
37-5-0661 (Wambo Site 318)	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential)	high	low	low	nil
37-5-0662 (Wambo Site 319)	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential, low integrity, part of complex of sites associated with potential pathway)	high	low	low	nil
37-5-0663 (Wambo Site 320)	Open Artefact Site	In situ with AHIP (#C0003213).	low L, low R	low (common, low research potential, low integrity, part of complex of sites associated with potential pathway)	high	low	low	nil
37-5-0664 (Wambo Site 321)	Open Artefact Site	Partially in situ and partially salvaged under AHIP #C0003213.	low-possibly mod L, low R	low-possibly mod (common, moderate research potential off track, part of complex of sites associated with potential pathway)	high	low	low	nil
37-5-0668 (Wambo Site 327)	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential)	high	low	low	nil
37-5-0692 (United IF-5)	Open Artefact Site	Salvaged under AHIP #2222.	n/a	-	-	-	-	-
37-5-0767 (Wambo Site 483)	Open Artefact Site	Partially in situ and partially salvaged under AHIP #C0003213.	mod L, low R	mod (moderate research potential, modest range of evidence, part of complex of sites associated with potential pathway)	high	low	low	nil
37-5-0782 (South Bates Soil Test 2/A)	Open Artefact Site	Salvaged under AHIP #C0003213.	n/a	-	-	-	-	-
37-5-0783, 37-5-0807 (South Bates Soil Test 6/A)	Open Artefact Site	Partially in situ and partially salvaged under AHIP #C0003213.	low-possibly mod L, low R	low-possibly mod (moderate research potential off track, modest range of evidence, part of complex of sites associated with potential pathway)	high	low	low	nil

⁶ A number of registered Aboriginal parties have expressed the view that all of the sites/places are of high cultural significance (ie. high importance) and make no differentiation on the comparative level of value between any site or place. This is acknowledged and respected.

Table 9 (continued):

Site Number / Name	Site Type	Comments	Significance					
			Overall	Archaeological / Scientific	Aboriginal / Cultural	Aesthetic	Educational	Historic
37-5-0786 (Wambo Site 484)	Open Artefact Site	In situ with AHIP (#C0003213).	low L, low R	low (common, low research potential, low integrity, associated with potential pathway)	high	low	low	nil
37-5-0787 (Wambo Site 485)	Open Artefact Site	Salvaged under AHIP #C0003213.	n/a	-	-	-	-	-
37-5-0788 (Wambo Site 486)	Open Artefact Site	Salvaged under AHIP #C0003213.	n/a	-	-	-	-	-
37-5-0789 (Wambo Site 487)	Open Artefact Site	Salvaged under AHIP #C0003213.	n/a	-	-	-	-	-
37-5-0790 (Wambo Site 488)	Open Artefact Site	Salvaged under AHIP #C0003213.	n/a	-	-	-	-	-
37-5-0791 (Wambo Site 489)	Open Artefact Site	Salvaged under AHIP #C0003213.	n/a	-	-	-	-	-
37-5-0792 (Wambo Site 490)	Open Artefact Site	In situ with AHIP (#C0003213).	low L, low R	low (common, low research potential, low integrity, isolated)	high	low	low	nil
37-5-0793 (Wambo Site 491)	Open Artefact Site	In situ with AHIP (#C0003213).	low L, low R	low (common, low research potential, low integrity, isolated)	high	low	low	nil
Wambo Site 513	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential)	high	low	low	nil
Wambo Site 514	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential, low integrity, associated with potential pathway)	high	low	low	nil
Wambo Site 515	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential, low integrity)	high	low	low	nil
Wambo Site 516	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential, isolated)	high	low	low	nil
Wambo Site 517	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential, isolated)	high	low	low	nil
Wambo Site 518	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential, associated with potential pathway)	high	low	low	nil
Wambo Site 519	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential, low integrity)	high	low	low	nil
Wambo Site 520	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential, low integrity, isolated, associated with potential pathway)	high	low	low	nil
Wambo Site 521	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential, low integrity, isolated)	high	low	low	nil
Wambo Site 522	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential, low integrity)	high	low	low	nil

Table 9 (continued):

Site Number / Name	Site Type	Comments	Significance					
			Overall	Archaeological / Scientific	Aboriginal / Cultural	Aesthetic	Educational	Historic
Wambo Site 523	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential, low integrity, isolated)	high	low	low	nil
Wambo Site 524	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential, low integrity)	high	low	low	nil
Wambo Site 525	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential, low integrity, associated with potential pathway)	high	low	low	nil
Wambo Site 526	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential, low integrity, isolated, associated with potential pathway)	high	low	low	nil
Wambo Site 527	Open Artefact Site	In situ, no AHIP.	low L, low R	low (common, low research potential, low integrity, isolated, associated with potential pathway)	high	low	low	nil
Wambo Site 528	Open Artefact Site	In situ, partially with AHIP (#C0003213), partially no AHIP.	low L, low R	low (common, low research potential, associated with potential pathway)	high	low	low	nil
Modification Area	Cultural area/value	Contemporary cultural value of entire investigation area as identified by RAPs.	low L, low R	n/a	high	low	low	nil
Use of subsistence and other resources	Cultural area/value	Contemporary value and previous use of plant and animal resources across the entire investigation area as identified by RAPs.	low L, low R	n/a	high	low	low	nil
Pathways through the locality, including the potential access from North Wambo Creek to Jerrys Plains Ridge	Cultural area/value	As shown on Figure 13, potential Aboriginal access routes between the major creeks and the mountains to the west (eg. Jerrys Plains Ridge).	mod L, low R	mod (complex of open artefact sites and potential deposits on spurs on north side of North Wambo Creek, moderate research potential; nature of occupation at these sites, relationship of these sites with each other and with other sites in the locality, potential movement of people and material items, are locally relevant research issues for which the evidence that may be able to contribute knowledge that may not be available from other sources).	high	low	low	nil
Contemporary significance of Aboriginal objects	Cultural area/value (refer above to each site)	Contemporary cultural value of individual sites as identified by RAPs.	-	-	-	-	-	-

Note: Includes previous assessments from Kuskie (2017a). Where site fully salvaged, significance not applicable. L = Local context, R = Regional context. 'mod' = moderate.

8. STATUTORY OBLIGATIONS

Commonwealth, State and local legislation relevant to the protection and management of Aboriginal heritage is outlined in the sections below. The investigation area does not contain any heritage items listed for indigenous values under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* or *NSW Heritage Act 1977*, but it does contain Aboriginal objects protected under the *NSW National Parks and Wildlife Act 1974*.

8.1 Commonwealth

While the primary legislation offering protection to Aboriginal heritage in NSW is enacted by the State (refer to Section 8.2), several Acts administered by the Commonwealth may also be relevant.

Environment Protection and Biodiversity Conservation Act 1999:

The EPBC Act is the primary Commonwealth legislation for the protection and management of matters of national environmental significance, which includes heritage places. The primary features of the EPBC Act relating to heritage include:

- ❑ A National Heritage List of natural, indigenous and historic places of national heritage significance; and
- ❑ A Commonwealth Heritage List of heritage places owned or managed by the Commonwealth.

Commonwealth Heritage places are protected in that:

- ❑ Actions taken on Commonwealth land which are likely to have a significant impact on the environment will require the approval of the Minister;
- ❑ Actions taken outside Commonwealth land which are likely to have a significant impact on the environment on Commonwealth land, will require the approval of the Minister; and
- ❑ Actions taken by the Commonwealth Government or its agencies that are likely to have a significant impact on the environment anywhere will require approval by the Minister.

Australian Government agencies that own or lease heritage places are required to assist the Minister and the Australian Heritage Council to identify and assess the heritage values of these places. They are required to:

- ❑ Develop heritage strategies;
- ❑ Produce a register of the heritage places under their control;
- ❑ Develop a management plan to manage these places consistent with the Commonwealth Heritage Management Principles prescribed in regulations to the Act;
- ❑ Ensure the ongoing protection of the Commonwealth heritage values of the place when selling or leasing a Commonwealth heritage place; and
- ❑ Ask the Minister for advice about taking an action, if the action has, will have, or is likely to have, a significant impact on a Commonwealth heritage place.

The environmental assessment process of the EPBC Act protects matters of national environmental significance (including national heritage places), along with the environment where actions proposed are on, or will affect, Commonwealth land and/or where Commonwealth agencies are proposing to take an action.

When a proposal is identified as having the potential to have a significant impact on a matter of national environmental significance, the proponent must refer the project to the Commonwealth Department of Agriculture, Water and the Environment. The Minister then decides whether the likely environmental impacts of the project are such that it should be assessed under the EPBC Act.

State governments may, under agreement with the Commonwealth, assess actions that may have an impact on matters of national environmental significance on behalf of the Commonwealth. Following assessment, the Minister or their delegate may approve the action (with or without conditions) or not approve the action.

Australian Heritage Council Act 2003:

The *Australian Heritage Council Act 2003* established the Australian Heritage Council, an independent expert body to advise the Minister on the listing and protection of heritage places and other matters relating to heritage. This Act also enabled until 19 February 2012 the continued management of the Register of the National Estate, a list of more than 13,000 heritage places around Australia that had been compiled by the former Australian Heritage Commission since 1976. The Register of the National Estate has now ceased to be a statutory list and is retained only as an archive of information. References to the Register of the National Estate have now been removed from the EPBC Act and *Australian Heritage Council Act 2003*.

Aboriginal and Torres Strait Islander Heritage Protection Act 1984:

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* provides for the protection of areas and objects which are of significance to Aboriginal people in accordance with Aboriginal tradition. The Act allows Aboriginal people to apply to the Minister to seek protection for significant Aboriginal areas and objects. The Minister has broad powers to make such a declaration should the Minister be satisfied that the area or object is a significant Aboriginal area or object and is under immediate threat of injury or desecration. An 'emergency declaration' can remain in force for up to 30 days.

8.2 State

National Parks and Wildlife Act 1974:

The *National Parks and Wildlife Act 1974* (NP&W Act) provides the primary basis for the legal protection and management of Aboriginal heritage in NSW. With respect to development proposals and planning approvals, the *Environmental Planning and Assessment Act 1979* (EP&A Act) is the primary legislation.

Implementation of the Aboriginal heritage provisions of the NP&W Act is the responsibility of Heritage NSW (former OEH). The rationale behind the NP&W Act is to prevent the unnecessary or unwarranted destruction of Aboriginal objects and to protect and conserve objects where such action is considered warranted (DECCW 2009a, 2009b).

Section 2A of the Act, defines its objects to include:

- (b) the conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to:
 - (i) places, objects and features of significance to Aboriginal people, and
 - (ii) places of social value to the people of New South Wales, and
 - (iii) places of historic, architectural or scientific significance.

Section 2A also identifies that the objects of the Act are to be achieved by applying the principles of ecologically sustainable development, defined in Section 6 of the *Protection of the Environment Administration Act 1991* as requiring the integration of *economic* and *environmental* and *social* considerations (including cultural heritage) in the decision-making process.

In regard to Aboriginal cultural heritage, ecologically sustainable development can be achieved by applying the principle of intergenerational equity and the precautionary principle (DECCW 2009b).

Intergenerational equity is the principle whereby the present generation should ensure the health, diversity and productivity of the environment for the benefit of future generations. In terms of Aboriginal heritage, intergenerational equity can be considered in terms of the cumulative impacts to Aboriginal objects and places in a region. If few Aboriginal objects and places remain in a region, fewer opportunities remain for future generations of Aboriginal people to enjoy the cultural benefits of those Aboriginal objects and places. Information about the integrity, rarity or representativeness of the Aboriginal objects and places proposed to be impacted, and how they illustrate the occupation and use of land by Aboriginal people across the region, are therefore relevant to the consideration of intergenerational equity and the understanding of the cumulative impacts of a proposal (DECCW 2009b:26).

The precautionary principle states that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation. In applying the precautionary principle, decisions should be guided by (DECCW 2009b:26):

- ❑ A careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
- ❑ An assessment of the risk-weighted consequences of various options.

The precautionary principle is relevant to Heritage NSW consideration of potential impacts to Aboriginal cultural heritage where:

- ❑ The proposal involves a risk of serious or irreversible damage to Aboriginal objects or places or to the value of those objects or places; and
- ❑ There is uncertainty about the Aboriginal cultural heritage values or scientific or archaeological values, including in relation to the integrity, rarity or representativeness of the Aboriginal objects or places proposed to be impacted (DECCW 2009b:26).

Where this is the case, Heritage NSW instructs that a precautionary approach should be taken and all cost-effective measures implemented to prevent or reduce damage to the objects/place (DECCW 2009b).

With the exception of some artefacts in collections, the NP&W Act generally defines all Aboriginal objects to be the property of the Crown. The Act then provides various controls for the protection, management of and impacts to these objects. An 'Aboriginal object' is defined under Section 5(1) 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 (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains'.

In practice, archaeologists generally subdivide the legal category of 'object' into different site types, which relate to the way Aboriginal heritage evidence is found within the landscape. The archaeological definition of a 'site' may vary according to survey objectives, however it should be noted that even single and isolated artefacts are protected as Aboriginal objects under the NP&W Act.

Under Section 89A of the NP&W Act, a person who is aware of the location of an Aboriginal object that is the property of the Crown or, not being the property of the Crown, is real property, and does not, in the prescribed manner, notify the Director-General thereof within a reasonable time after the person first becomes aware of that location is guilty of an offence against the Act unless the person believes on reasonable grounds that the Director-General is aware of the location of that Aboriginal object. The 'prescribed manner' is currently taken to be written notice in a form approved by the Director-General, being the Aboriginal Site Recording Forms available on the Heritage NSW (former OEH) website. Failure to comply with the requirements may result in a maximum penalty of 100 penalty units and, in the case of a continuing offence, a further 10 penalty units for each day the offence continues, for an individual, with double the fines for a corporation.

Aboriginal places are defined as any place declared to be an Aboriginal place under Section 84 of the Act. Typically these are locations of 'special significance with respect to Aboriginal culture' (for example, traditional or historical cultural value to Aboriginal people), for which identified Aboriginal objects may not be present.

Section 86 of the NP&W Act specifies the offences and penalties relating to harming or desecrating Aboriginal objects and Aboriginal places:

- 1) A person must not harm or desecrate an object that the person knows is an Aboriginal object.

Maximum Penalty:

- (a) in the case of an individual - 2,500 penalty units or imprisonment for one year, or both, or (in circumstances of aggravation) 5,000 penalty units or imprisonment for two years, or both, or
- (b) in the case of a corporation - 10,000 penalty units (currently \$1,100,000).

- 2) A person must not harm an Aboriginal object ('strict liability offence').

Maximum Penalty:

- (a) in the case of an individual - 500 penalty units or (in circumstances of aggravation) 1,000 penalty units, or
- (b) in the case of a corporation - 2,000 penalty units (currently \$220,000).

Under Section 86(4) it is an offence for a person to harm or desecrate an Aboriginal place, with maximum penalties of 5,000 penalty units or imprisonment for two years, or both, for individuals and 10,000 penalty units for corporations.

Harm to an Aboriginal object or place is defined under Section 5(1) as any act or omission that:

- (a) destroys, defaces or damages the object or place, or
- (b) in relation to an object - moves the object from the land on which it had been situated, or
- (c) is specified by the regulations, or
- (d) causes or permits the object or place to be harmed in a manner referred to in paragraph (a), (b) or (c),
but does not include any act or omission that:
- (e) desecrates the object or place, or
- (f) is trivial or negligible, or
- (g) is excluded from this definition by the regulations.

There are various exemptions and defences to offences under Section 86 of the Act, including:

- Of most relevance to development proposals generally, the offences under Section 86(1), (2) and (4) have a defence to prosecution under Section 87(1) if the harm or desecration was authorised by an Aboriginal Heritage Impact Permit (AHIP) and the conditions to which that AHIP were subject have not been contravened;
- The strict liability offence under Section 86(2) has a defence to prosecution under Section 87(2) if the person exercised *due diligence* to determine whether the act or omission constituting the alleged offence would harm an Aboriginal object and reasonably determined that no Aboriginal object would be harmed. Section 87(3) and the regulations associated with the Act (National Parks and Wildlife Regulation 2019) enable due diligence to be achieved through compliance with industry-specific Codes of Practice approved by the Minister. These include the DECCW (2010a) *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* and other approved codes such as the *NSW Minerals Industry Due Diligence Code of Practice for the Protection of Aboriginal Objects* (NSW Minerals Council 2010).
- The strict liability offence under Section 86(2) has a defence to prosecution under Section 87(4) if the person shows that the act or omission constituting the alleged offence is prescribed by the regulations as a low impact act or omission.

Clause 58 of the National Parks and Wildlife Regulation 2019 describes low impact acts or omissions as including:

- Maintenance work on land already disturbed (such as maintenance of existing roads, tracks or utilities);
- Farming and land management works on land already disturbed (such as cropping or leaving paddocks fallow, or construction of farm dams, fences, irrigation infrastructure, ground water bores, flood mitigation works, erosion control or soil conservation works, or maintenance of various existing infrastructure);
- Grazing of animals;
- Activity on already disturbed land that comprises exempt development or was the subject of a complying development certificate issued under the EP&A Act;
- Mining exploration work (such as costeaning, bulk sampling or drilling) on land already disturbed;
- Geological mapping, surface geophysical surveys and sub-surface surveys involving downhole logging, sampling or coring using hand-held equipment except where conducted as part of an archaeological investigation (exempted where the DECCW 2010 *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* is followed);

- Removal of isolated dead or dying vegetation if there is minimal ground disturbance;
- On already disturbed land seismic surveying or groundwater monitoring bores;
- Environmental rehabilitation work (such as silt fencing, tree planting, bush regeneration and weed removal, but not erosion control or soil conservation works).

For the purposes of Clause 80B, land is considered to be 'already 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' (for example, soil ploughing, construction of rural infrastructure such as dams and fences, construction of roads, tracks and trails, clearing of vegetation, construction of buildings, installation of utilities, substantial grazing involving the construction of rural infrastructure, or construction of earthworks related to the above);

- ❑ The defence of honest and reasonable mistake of fact applies under Section 86(5) to the strict liability offence of Section 86(2) and to offences against Aboriginal places under Section 86(4);
- ❑ The offences under Section 86(1) and (2) do not apply under Section 86(6), with respect to an Aboriginal object that is dealt with in accordance with section 85A (refer below);
- ❑ Exemptions are available under Section 87A to Section 86(1)-(4) for various emergency situations, conservation works and conservation agreements; and
- ❑ Exemptions are available under Section 87B to Section 86(1), (2) and (4) for Aboriginal people in relation to the carrying out of traditional cultural activities.

Consents regarding impacts to Aboriginal objects or areas with potential for Aboriginal objects are managed through the Heritage NSW Aboriginal Heritage Impact Permit system, as outlined in Section 90 of the NP&W Act and clauses 60-62 of the Regulations. The issuing of an AHIP is dependent upon adequate archaeological assessment and review (cultural heritage assessment report), together with an appropriate level of Aboriginal community liaison and involvement.

Typically, to support an AHIP, an Aboriginal cultural heritage assessment must be undertaken in accordance with the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011a), which effectively involves an assessment following the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b) and Aboriginal community consultation in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy (DECCW 2010c) (refer to Section 6).

The DECCW (2010b) *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* contains detailed requirements for heritage assessments. Key features include:

- ❑ Investigations must be undertaken by people with appropriate skills and experience, specified in Section 1.6 as:
 - 1) A minimum of a Bachelor's degree with honours in archaeology or relevant experience in the field of Aboriginal cultural heritage management, and
 - 2) The equivalent of two years full-time experience in Aboriginal archaeological investigation, including involvement in a project of similar scope, and
 - 3) A demonstrated ability to conduct a project of the scope required through inclusion as an attributed author on a report of similar scope.

- ❑ Archaeological test excavation will be necessary when (regardless of whether or not there are objects present on the ground surface) it can be demonstrated through Requirements 1, 2, 3, 4, and 5 of the Code that sub-surface Aboriginal objects with potential conservation value have a high probability of being present in an area, and the area cannot be substantially avoided by the proposed activity; and
- ❑ A Section 90 AHIP is not required for test excavations undertaken in compliance with the Code (implementation of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy is required however).

Under clause 61 of the National Parks and Wildlife Regulation 2019, the cultural heritage assessment report that accompanies the AHIP application must address:

- ❑ The significance of the Aboriginal objects or Aboriginal places that are the subject of the application;
- ❑ The actual or likely harm to those Aboriginal objects or Aboriginal places from the proposed activity that is the subject of the application;
- ❑ Any practical measures that may be taken to protect and conserve those Aboriginal objects or Aboriginal places;
- ❑ Any practical measures that may be taken to avoid or mitigate any actual or likely harm to those Aboriginal objects or Aboriginal places; and
- ❑ Include any submission received from a registered Aboriginal party under clause 80C and the applicant's response to that submission.

Heritage NSW determination of AHIP applications is guided by the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011a), *Applying for an Aboriginal Heritage Impact Permit: Guide for Applicants* (OEH 2011b) and *Guide to Aboriginal Heritage Impact Permit Processes and Decision-Making* (OEH 2011c) policy.

AHIPs may be issued in relation to a specified Aboriginal object, Aboriginal place, land, activity or person or specified types or classes of Aboriginal objects, Aboriginal places, land, activities or persons. AHIPs may be transferred or varied (subject to conditions and approval of the Director-General). AHIPs may be refused. An application is taken to be refused (unless otherwise granted or refused earlier), 60 days after the date on which the application was received by the Director-General (not including any period during which an applicant is required to supply to the Director-General further information under Section 90F).

The Director-General may attach any conditions seen fit to any AHIP granted. Failure to comply with a condition is deemed under Section 90J to be a contravention of the Act. Such offences may result in a maximum penalty of 1,000 penalty units and/or imprisonment for six months, and, in the case of a continuing offence, a further 100 penalty units for each day the offence continues, for an individual, with double the fines for a corporation.

Under Section 90K of the NP&W Act, in making a decision in relation to an AHIP, the Director-General must consider the following matters (but only these matters):

- a) The objects of the Act;
- b) Actual or likely harm to the Aboriginal objects or Aboriginal place that are the subject of the permit;
- c) Practical measures that may be taken to protect and conserve the Aboriginal objects or Aboriginal place that are the subject of the permit;

- d) Practical measures that may be taken to avoid or mitigate any actual or likely harm to the Aboriginal objects or Aboriginal place that are the subject of the permit;
- e) The significance of the Aboriginal objects or Aboriginal place that are the subject of the permit;
- f) The results of any consultation by the applicant with Aboriginal people regarding the Aboriginal objects or Aboriginal place that are the subject of the permit (including any submissions made by Aboriginal people as part of a consultation required by the regulations);
- g) Whether any such consultation substantially complied with any requirements for consultation set out in the regulations (specified in Section 90N of the NP&W Act and clause 60 of the National Parks and Wildlife Regulation 2019 and in the DECCW *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*);
- h) The social and economic consequences of making the decision;
- i) Any documents accompanying the application and any public submission that has been made under the EP&A Act in connection with the activity to which the permit application relates and that has been received by the Director-General; and
- j) Any other matter prescribed by the regulations.

An appeals process is available under Section 90L of the NP&W Act whereby an applicant, dissatisfied with the refusal of the Director-General to grant a Section 90 AHIP, or with any conditions attached to the AHIP, may appeal to the Land and Environment Court. The appeal must be made within 21 days after notice of the decision that is being appealed. The decision of the Land and Environment Court on the appeal is final and is binding on the Director-General and the appellant.

Under Section 85A of the NP&W Act, the Director-General may 'dispose' of Aboriginal objects that are the property of the crown:

- a) By returning the Aboriginal objects to an Aboriginal owner or Aboriginal owners entitled to, and willing to accept possession, custody or control of the Aboriginal objects in accordance with Aboriginal tradition, or
- b) By otherwise dealing with the Aboriginal objects in accordance with any reasonable directions of an Aboriginal owner or Aboriginal owners referred to in paragraph (a), or
- c) If there is or are no such Aboriginal owner or Aboriginal owners - by transferring the Aboriginal objects to a person, or a person of a class, prescribed by the regulations for safekeeping (typically implemented by way of a Care Agreement between the OEH (now Heritage NSW) and the Aboriginal person or organisation).

Under Section 85A(3) of the NP&W Act, the regulations may make provision as to the manner in which any dispute concerning the entitlement of an Aboriginal owner or Aboriginal owners to possession, custody or control of Aboriginal objects for the purposes of this section is to be resolved.

Under Section 91AA of the NP&W Act, if the Director-General is of the opinion that any action is being, or is about to be carried out that is likely to significantly affect an Aboriginal object or Aboriginal place or any other item of cultural heritage situated on land reserved under the Act, the Director-General may make a stop-work order for a period of 40 days. Various exemptions exist, such as for emergency situations and for approved developments under the EP&A Act. A person that contravenes a stop-work order may be penalised up to 1,000 penalty units and an additional 100 units for every day the offence continues (10,000 units and 1,000 units respectively in the case of a corporation). Under Section 91A, the Director-General may also make recommendations to the Minister for an Interim Protection Order in respect of land which has cultural significance, including Aboriginal objects, for a duration of up to two years. The existence of an AHIP does not prevent the making of a stop-work order or an interim protection order (Section 90O).

Under Section 91L of the NP&W Act the Director-General may direct a person to carry out remediation work to Aboriginal objects or places, if they have been harmed as a result of an offence under the Act. The remediation work may involve protection, conservation, maintenance, remediation or restoration of the harmed Aboriginal object or place. The maximum penalties under Section 91Q for contravening a remediation direction are 2,000 penalty units and 200 penalty units for each day the offence continues for a corporation.

Environmental Planning and Assessment Act 1979:

The EP&A Act requires that environmental impacts (including those to cultural heritage) be considered in land use planning and decision-making. Under the EP&A Act various planning instruments such as Local Environmental Plans (LEPs) or Development Control Plans (DCPs) may be approved. These planning instruments and Plans may identify places and features of cultural heritage significance and define statutory requirements regarding the potential development, modification and conservation of these items. In general, places of identified significance, or places requiring further assessment, are listed in heritage schedules that form part of an LEP. Listed heritage items are then protected from certain defined activities, unless consent has been gained from an identified consent authority (typically the local government authority).

In determining a Development Application (DA) under Part 4 of the EP&A Act, a consent authority, such as a local government authority, must take into consideration matters such as the provisions of environmental planning instruments (for example, LEPs), the likely impacts of that development, including environmental impacts on the natural and built environments, and social and economic impacts on the locality (Section 79C{1}).

If Aboriginal objects are known to exist on the land to which the development application applies prior to the application being made, under Part 4 of the EP&A Act an 'Integrated Development Application' (IDA) must be submitted to the consent authority. Any Development Approval issued for development of this kind must be consistent with the General Terms of Approval (GTA's) or requirements provided by the relevant State Government agency (for example, Heritage NSW). Wambo Coal Mine has a development Consent (DA 305-7-2003) under Part 4 of the EP&A Act and is seeking approval of a Modification under Section 4.55(2) of the Act.

Part 3A of the EP&A Act has been repealed, but under Division 4.1 of Part 4, 'State Significant Development' is treated in a similar manner to the former Part 3A. The Minister may be the Consent authority for State Significant Development applications, although for specific developments, the Independent Planning Commission may be the Consent authority. As for other development applications under Part 4, the environmental impacts of the proposal need to be considered, including those on heritage.

Under Section 4.41 of the EP&A Act, a Section 90 AHIP to impact Aboriginal objects is not required for a State Significant Development approved after the commencement of the division, or for any investigative or other activities required to be carried out for the purpose of complying with environmental assessment requirements issued in connection with a development application for any such development. Aboriginal heritage is typically managed post-approval under an Aboriginal Cultural Heritage Management Plan subject to the approval of the Department of Planning and Environment (DPE), rather than under a Section 90 AHIP obtained under the NP&W Act.

The interplay of the NP&W Act and Regulation and the planning system is complex. For proposed developments, the specific level of Aboriginal heritage impact assessment and Aboriginal community consultation required, and any requirement for an AHIP, is highly dependent upon not just the NP&W Act and Regulation, but the nature of the proposal, the Part and Division of the EP&A Act under which planning approval is required, any specific project approval requirements issued by the DPE and/or Heritage NSW, the presence or otherwise of Aboriginal objects, and the potential for Aboriginal objects to occur.

8.3 Local

Under the *Environmental Planning and Assessment Act 1979* the Minister may make various planning instruments such as Local Environment Plans (LEPs), that are administered at a local government level. These plans set out objectives and controls for the development of land in the local government areas.

The *Singleton Local Environmental Plan 2013* applies to the investigation area, however it is noted that the NSW Minister for Planning is the consent authority for the Project, as approval is being sought under Part 4 of the EP&A Act.

9. POTENTIAL IMPACTS

The proposed works associated with the LW24-26 Modification have been outlined in Section 1.1 and are shown on Figure 3. Principally the Modification involves reorientation of the approved Longwalls 24 and 25, and the addition of Longwall 26. The longwalls would use the existing approved infrastructure at the South Bates Extension Underground Mine.

Hence, the primary potential impacts of the Modification on Aboriginal heritage (comprising both the identified Aboriginal objects, the potential resource and cultural areas/values) relate to indirect impacts to the ground surface associated with underground mining induced subsidence, within an area of about 238 hectares (refer to Section 9.1). This is the area in which conventional subsidence impacts may occur, along with some buffer land (refer to Figure 4). Approximately 84 hectares or 35% of this area (the southern portion) has previously been assessed and approved for subsidence impacts (along with minor surface impacts) for the South Bates Extension Modification (Kuskie 2017a).

Minimal direct surface impacts (potentially limited to small areas from continued use of existing access tracks, exploratory drilling, subsidence remediation and environmental monitoring) are proposed (refer to Section 9.2). As existing approved infrastructure will be utilised, no new ventilation shafts or other infrastructure are proposed.

In addition to assessment of direct and indirect impacts, consideration of the Modification's impacts within a regional context (ie. cumulative impacts) has been undertaken (refer to Section 9.3).

The potential impacts of the Modification on each of the Aboriginal sites and cultural areas/values within the LW24-26 Modification area are presented in Table 10. The level of impacts may be reduced by the implementation of various mitigation measures and management strategies, as outlined in Sections 10 and 11. The 'type of harm', 'degree of harm' and 'consequence of harm' are as specified in the Heritage NSW (DECCW 2010b) requirements.

In the absence of appropriate management and mitigation measures, it is concluded that the impacts of the LW24-26 Modification on Aboriginal heritage would be very low within a local context and negligible within a regional context. With the implementation of mitigation measures, the impacts of the Modification on Aboriginal heritage would be reduced to negligible within both local and regional contexts.

9.1 Potential Subsidence Impacts

The impacts of underground mining on the ground surface occur through subsidence and have the potential to affect Aboriginal heritage evidence, particularly rock shelter and grinding groove sites. No cliff formations or Aboriginal rock shelter or grinding groove sites have been identified within the LW24-26 Modification area and the potential for these site types to occur within the areas that were sampled but not directly inspected has been reassessed as very low for grinding grooves and negligible for rock shelters.

The potential subsidence impacts of the project on Aboriginal heritage have been assessed by MSEC (2022) who have prepared a generic assessment of the predicted subsidence, tilt and curvature for the underground mining area and for each Aboriginal site location (refer here to Appendix 8).

The maximum predicted vertical subsidence after the completion of extraction is 1.95 metres, maximum predicted total conventional tilt is 90 mm/m (ie. 9%) and the maximum predicted curvature is greater than 3.0 km⁻¹ (MSEC 2022). The maximum predicted total subsidence parameters occur where the depths of cover are the shallowest (MSEC 2022).

MSEC (2022) note that longwall mining can result in surface cracking, heaving, buckling and humping. A number of factors affect the extent of ground deformations, including the mine geometry, depth of cover, overburden geology, locations of natural joints in bedrock, presence of near surface geological structures and multi-seam mining conditions (MSEC 2022).

MSEC (2022) note that ponding areas may develop along North Wambo Creek with depths of up to 1.5 metres and lengths of up to approximately 225 metres. Fracturing and compression heaving are expected to occur along sections of the watercourses directly above proposed longwalls, for which surface remediation by infilling with soil or by regrading and compacting the surface may be necessary in relation to larger surface deformations.

MSEC (2022) note that no cliffs occur within the investigation area. Cliffs outside of the investigation area associated with the Wollemi escarpment and the Wollemi National Park were assessed as being unlikely to experience any measurable conventional tilts, curvatures or strains, with less than 20 millimetres of vertical subsidence (MSEC 2022). Surface cracking and compression heaving may occur along the areas of steep slopes above the proposed longwall panels.

MSEC (2022) has also assessed the probability that the predicted levels of subsidence, tilt and curvature will result in perceptible impacts for each Aboriginal site (refer to Appendix 8). 'Adverse impact' can be taken to refer to any changes in the rock formations that are associated with mining activity and subsidence movements. Such impacts may include tensile cracking, ranging from fine cracks to major fractures, shear movements on bedding planes and through intact strata, perceptible disturbance of any formations, and rock falls, ranging from minor dislocation of material through to major falls.

Potential Subsidence Impacts on Open Artefact Sites

MSEC (2022) provides an assessment of potential subsidence impacts for each open artefact site (refer to Appendix 8), based on a generic assessment of the predicted subsidence, tilt and horizontal strain in particular localities, not on the potential for impacts to the specific artefacts.

MSEC (2022) conclude that cracking of surface soils could occur in the vicinity of open sites that are located directly above the longwall panels. However, as MSEC (2022) note, it is unlikely that the artefacts themselves would be impacted by any surface soil cracking. Hence, the actual potential for perceptible impacts to the open artefact sites is inferred to be low, notwithstanding that minor cracking of the soil may occur in the general locality. Notwithstanding, any subsequent remediation works could result in direct impacts (refer to Section 9.2).

Elsewhere (for example, at Ulan Coal Mine), Mills (2005, 2007, 2009) reports that no significant impacts have been noted at previously undermined open sites. Although temporary cracking during the period of active mining can affect the ground surface in the locality of sites situated directly over longwall panels, and there is potential for more permanent tension cracks within about 50 to 90 metres of chain pillar edges and close to the ends of the longwall panels, previous experience indicates that these tension cracks are not commonly evident and gradually fill in over a period of years (Mills 2005, 2007, 2009; Kuskie pers. obs.).

As such, the potential impacts of subsidence on any of the open artefact sites within the underground area is assessed as very low or negligible. Any effects are likely to be short-term in duration, minimal in extent and confined to the context of the sites (sediments in which the artefacts are located) rather than direct impacts or damage to the artefacts themselves.

Potential Subsidence Impacts on Cultural Values

The contemporary cultural values identified by the Aboriginal stakeholders (relating to traditional land use and ongoing cultural and spiritual connections to the land and resources of the area, and use of subsistence and other resources) relate to the investigation area as a whole. As a result, the impacts to the cultural values will include the full range of predicted mine subsidence movements as documented by MSEC (2022). While there may be some adverse effects on these cultural values, any decrease in value is inferred to be relatively low.

9.2 Potential Surface Impacts

As existing approved infrastructure will be utilised for the Modification, no major new surface impacts are proposed.

Other minor direct surface impacts may occur, such as those limited to small areas from continued use of existing access tracks, exploratory drilling, subsidence remediation and environmental monitoring.

The nature and level of potential direct surface impacts of relevance to Aboriginal heritage can be categorised as follows:

- ❑ Small-scale low-high level impacts, within the underground area, comprising areas with potentially some flexibility in location (small area impacts such as exploratory drilling, environmental monitoring and subsidence remediation); and
- ❑ Low-high level continuing land-use impacts, within the underground area, comprising areas such as existing vehicle tracks, that will be subject to ongoing use.

The locations of any potential small-scale low-high level impact areas are not currently known, and as such they cannot be predicted in the 'impacts' column of Table 10. Nevertheless, any potential surface impacts would be limited to small discrete areas, and it would generally be feasible to avoid impacts to identified heritage sites, particularly evidence of significance. Potential impacts are assessed in Table 10. Measures are proposed in Sections 10 and 11 to further investigate, mitigate, avoid and minimise these potential impacts.

Continuation of existing land-use practices, mostly relating to the maintenance and use of the vehicle tracks, may result in impacts to Aboriginal heritage evidence within the Modification area and therefore requires management consideration.

A number of the open artefact sites within the Modification area are located on vehicle tracks. Use of these tracks by WCPL (for example, during exploratory drilling or subsidence or environmental monitoring or remediation works) may result in impacts to these sites. A higher level of impact would be expected to arise when maintenance works are conducted along vehicle tracks, compared with the very low level of impacts that would be expected from the passage of vehicles and machinery.

However, under the existing approval and AHIPs, heritage salvages have already occurred for the portions of eight of the 16 open artefact sites located partially or wholly along existing roads (Wambo Sites 239, 311, 321, 483, 486, 488, 489 and South Bates Soil Test 6/A)⁷. Only eight open artefact sites (Wambo Sites 240, 318, 319, 490, 491, 514, 527 and 528) remain with *in situ* portions along vehicle tracks, however for Wambo Sites 240, 490 and 491 within the previously approved southern portion of the LW24-26 Modification area and AHIP #C0003213 area, under the existing approval, heritage assessment (Kuskie 2017a) and AHIP, unmitigated impacts are permissible (refer to Section 10).

Although the level of potential impacts is generally unlikely to be different or greater than previous impacts which have occurred over several centuries of non-indigenous occupation, management strategies can be implemented to ensure that significant additional impacts do not occur, or that inadvertent impacts do not occur to heritage sites of significance. Measures are proposed in Sections 10 and 11 to further investigate, mitigate, avoid and minimise these potential impacts where relevant.

9.3 Regional Context and Cumulative Impacts

An objective of the NP&W Act (Section 2A) is the "conservation of objects, places or features ... of cultural value within the landscape, including, but not limited to ... places, objects and features of significance to Aboriginal people ...". This objective is to be achieved by applying the principles of ecologically sustainable development (Section 2A), defined in Section 6 of the *Protection of the Environment Administration Act 1991* as requiring the integration of *economic* and *environmental* considerations (including cultural heritage) in the decision-making process. In regard to Aboriginal cultural heritage, ecologically sustainable development can be achieved by applying the principle of intergenerational equity and the precautionary principle (DECCW 2009b), which are discussed in Section 8.2.

Hence, the extent to which the heritage resource present within the Modification area may exist elsewhere in the region is therefore highly relevant to an assessment of the potential impacts of the Modification with respect to the principles of ecologically sustainable development, intergenerational equity and the precautionary principle, along with the significance assessment of the sites (representative value) and an assessment of the cumulative impacts of the Modification.

An analysis of the evidence from the investigation area within a regional context has been undertaken (refer to Section 5.3.5). However, there are various problems and constraints that limit comparison of the evidence within a regional context. Notable constraints to the assessment are the absence of quantitative baseline data from the region and the problems inherent with the quality and suitability of information from existing studies. No regional heritage assessments have been undertaken to any level of detail sufficient to provide suitable quantitative or baseline data for comparison.

Two avenues of inquiry can be pursued, as to whether similar heritage resources to those identified within the investigation area exist elsewhere within the region:

- 1) By comparison of the *identified resource* with other heritage studies in the region and known site databases; and

⁷ Sites that have been partially salvaged (including Wambo Sites 321 and 483, and South Bates Soil Test 6/A) have been subject to total salvage along the vehicle tracks, with only portions off the tracks remaining *in situ*.

- 2) By examination of topographic mapping and aerial photographs to identify if comparable environmental contexts exists elsewhere in the region, in which a similar *potential resource* may occur.

The identified heritage resource and cultural values of the investigation area have been analysed in a regional context in Section 5.3.5.

There are numerous similarities with other reported evidence in the locality and in the region including the nature of site types recorded, numbers of artefacts in site loci, low mean density of artefacts, evidence in similar landform units, similar range of stone materials with dominance of tuff and silcrete, use of heat-treated silcrete, similar range of artefact types with dominance of flakes and flake portions, predominance of evidence relating to non-specific stone flaking, small size of artefacts and estimated antiquity of evidence. Similar contemporary cultural values have been identified by the Aboriginal stakeholders in many other investigation areas.

In broad terms, the evidence from the LW24-26 Modification area is typical of that from the Central Lowlands of the Hunter Valley. No specific aspects of the evidence appear to be rare or unusual or not replicated elsewhere within a regional context.

The primary potential resource of the investigation area relates to stone artefacts within open context sub-surface deposits (refer to Section 5.3.6). Other types of evidence (for example rock shelters or scarred trees) have been reassessed as having a very low or negligible potential to occur within the Modification area.

The investigation results and occupation model indicate that while there is potential for stone artefacts to occur in a widespread distribution of variable density across virtually all landform units, this resource will predominantly comprise a low to very low density distribution consistent with background discard. The potential for sub-surface deposits of artefacts that may be of high research value to occur is generally low, apart from a zone comprising low gradient ground within close proximity of North Wambo Creek, which may represent a secondary resource zone and could exhibit a higher artefact density and potentially deposits of some research significance if more focused occupation and/or repeated occupation has occurred (Kuskie 2017a).

Extensive investigations elsewhere in the Central Lowlands demonstrate that such a resource is very widespread. As such, any impacts to this resource within the Modification area will have limited impact upon the overall potential resource of the region. Similar environmental contexts (and potential resources) are present within the adjacent locality and within the wider region.

Hence, analysis of the potential resource in the region supports the conclusions above that the impacts of the proposed Modification on Aboriginal heritage would be very low within a local context and negligible within a regional context.

Following a conclusion that the impacts of the proposed Modification would be negligible within a regional context, it logically follows that the cumulative impact of the Modification within a regional context (in combination with other mining projects in the region) would be negligible.

The Modification is not inconsistent with the principle of intergenerational equity as outlined in Section 8.2. With the implementation of the mitigation measures as outlined in Sections 10 and 11, the Modification would not cause, within a regional context, a loss of heritage resources that could be viewed as being rare or unique or unlikely to exist elsewhere.

In relation to the precautionary principle (refer to Section 8.2), the comprehensive nature of the archaeological survey and assessment and consultation process substantially reduces the risk of lack of scientific certainty. The present study along with the previous assessment of Kuskie (2017a, 2017g) have sampled the entirety of the geographic extent of the investigation area.

Table 10: Potential impacts to Aboriginal sites, cultural areas/values and potential deposits within the LW24-26 investigation area from the Modification prior to the implementation of mitigation measures.

Site Number / Name	Site Type	Potential Impacts From Modification				
		Surface Impact ⁸	Subsidence Impact	Type of Harm	Degree of Harm	Consequence of Harm
37-5-0358 (Wambo Site 239)	Open Artefact Site	nil proposed but potentially low-high level continuing land use (vehicle track) to very small portion of site (remainder outside Modification area)	nil	possibly direct or none	possibly partial or none	possibly partial or no loss of value
37-5-0359 (Wambo Site 240)	Open Artefact Site	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0360 (Wambo Site 241)	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0605 (Wambo Site 311)	Open Artefact Site	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0659 (Wambo Site 317)	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0661 (Wambo Site 318)	Open Artefact Site	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0662 (Wambo Site 319)	Open Artefact Site	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0663 (Wambo Site 320)	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0664 (Wambo Site 321)	Open Artefact Site	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0668 (Wambo Site 327)	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0692 (United IF-5)	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0767 (Wambo Site 483)	Open Artefact Site	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0782 (South Bates Soil Test 2/A)	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0783, 37-5-0807 (South Bates Soil Test 6/A)	Open Artefact Site	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0786 (Wambo Site 484)	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0787 (Wambo Site 485)	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value

⁸ The potential for small scale low-high level impacts from activities such as subsidence remediation cannot be predicted, however the 'Type of Harm' and 'Degree of Harm' and subsequent management strategies (refer to Table 11) take into consideration possible small scale impacts such as these.

Table 10 (continued):

Site Number / Name	Site Type	Potential Impacts From Modification				
		Surface Impact	Subsidence Impact	Type of Harm	Degree of Harm	Consequence of Harm
37-5-0788 (Wambo Site 486)	Open Artefact Site	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0789 (Wambo Site 487)	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0790 (Wambo Site 488)	Open Artefact Site	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0791 (Wambo Site 489)	Open Artefact Site	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0792 (Wambo Site 490)	Open Artefact Site	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
37-5-0793 (Wambo Site 491)	Open Artefact Site	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
Wambo Site 513	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
Wambo Site 514	Open Artefact Site	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
Wambo Site 515	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
Wambo Site 516	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
Wambo Site 517	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
Wambo Site 518	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
Wambo Site 519	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
Wambo Site 520	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
Wambo Site 521	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
Wambo Site 522	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
Wambo Site 523	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
Wambo Site 524	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
Wambo Site 525	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
Wambo Site 526	Open Artefact Site	nil proposed	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
Wambo Site 527	Open Artefact Site	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value

Table 10 (continued):

Site Number / Name	Site Type	Potential Impacts From Modification				
		Surface Impact	Subsidence Impact	Type of Harm	Degree of Harm	Consequence of Harm
Wambo Site 528	Open Artefact Site	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	possibly direct or none	possibly total or partial or none	possibly total or partial or no loss of value
Modification Area	Cultural area/value	small-scale high level (small portions), low-high level continuing land use	full range as predicted for Modification area	probably direct and indirect	probably partial	probably partial loss of value
Use of subsistence and other resources	Cultural area/value	small-scale high level (small portions), low-high level continuing land use	as predicted for Modification area	possibly direct or none	possibly partial or none	possibly partial or no loss of value
Pathways through the locality, including the potential access from North Wambo Creek to Jerrys Plains Ridge	Cultural area/value	small-scale high level (small portions), low-high level continuing land use	as predicted for Modification area	probably direct and indirect	probably partial	probably partial loss of value
Contemporary significance of Aboriginal objects	Cultural area/value (refer above to each site)					

10. POTENTIAL MITIGATION AND MANAGEMENT STRATEGIES

10.1 General Strategies

General strategies for the management of the identified and potential Aboriginal heritage resources and cultural areas/values within the LW24-26 Modification area are presented below. Specific options are discussed in Section 10.2 and the recommended strategies are presented in Section 11.

A key consideration in selecting a suitable strategy is the recognition that Aboriginal heritage is of primary importance to the local Aboriginal community, and that decisions about the management of the sites should be made in consultation with the RAPs, particularly "Traditional Owners or custodians with appropriate cultural heritage knowledge to inform decision making" in relation to the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy (DECCW 2010c).

10.1.1 Strategy A (Further Investigation)

In circumstances where an Aboriginal heritage site is identified (particularly an open artefact site or rock shelter), but the extent of the site, the nature of its contents, its level of integrity and/or its level of significance cannot be adequately assessed solely through surface survey (generally because of conditions of low surface visibility or sediment deposition), sub-surface testing may be an appropriate strategy to further assess the site. Sub-surface testing may also be appropriate in locations where artefact deposits are predicted to occur (for example, in rock shelters or in open contexts) through application of a predictive model, in order to identify whether such deposits exist and their nature, extent, integrity and significance.

Test excavations can take the form of auger holes, shovel pits, mechanically excavated trenches or surface scrapes. The selection of a methodology (including a sampling strategy) is a process that involves (Boismier 1991):

- 1) Identification of the specific environmental/cultural characteristics of the investigation area;
- 2) Construction of a model of Aboriginal occupation for the locality;
- 3) Definition of the expected nature and distribution of evidence (predictive model);
- 4) Formation of research questions and a methodology to retrieve the required data/evidence, in consideration of the expected nature and distribution of evidence; and
- 5) Analytical techniques for the evidence recovered that are appropriate to address the research questions and project objectives.

A Section 90 AHIP is not required for test excavations undertaken in compliance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b), although implementation of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy (DECCW 2010c) is required.

However, under the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*, archaeological test excavation is necessary when (regardless of whether or not there are objects present on the ground surface) it can be demonstrated through Requirements 1, 2, 3, 4, and 5 of the Code that sub-surface Aboriginal objects with potential conservation value have a high probability of being present in an area, and the area cannot be substantially avoided by the proposed activity.

A Section 90 AHIP is also not required under Section 89J of Part 4 of the EP&A Act (or under Section 75U{4} of the former Part 3A), for any investigative or other activities required to be carried out for the purpose of complying with environmental assessment requirements issued in connection with a development application for State Significant Development.

In all other circumstances a Section 90 AHIP is normally required from Heritage NSW to undertake sub-surface testing. Heritage NSW determination of AHIP applications is guided by the OEH (2011c) *Guide to Aboriginal Heritage Impact Permit Processes and Decision-Making* policy. Typically, approval of an AHIP can take up to 60 days, following receipt by Heritage NSW of all necessary information.

This is a pro-active strategy, which should result in the identification, assessment and management of the Aboriginal heritage resource prior to any development activity occurring. Following assessment of each Aboriginal site, management strategies as outlined in Sections 10.1.2 - 10.1.5 can be applied.

10.1.2 Strategy B (Conservation)

Conservation is a suitable strategy for all heritage sites, but particularly those of high archaeological significance and/or high cultural significance. Conservation is also appropriate for specific archaeological resources and environmental/cultural contexts, as part of a regional strategy aimed at conserving a representative sample of identified and potential heritage resources.

Options exist within development proposals that can be utilised for the conservation of identified or potential Aboriginal heritage resources, including exclusion of development from zones of high heritage significance or potential, preservation of areas within formal conservation zones, or the re-design of works to avoid or minimise impacts to specific areas.

In the case of underground mining, options for conservation include the avoidance of undermining specific significant sites or areas susceptible to subsidence (eg. grinding grooves, rock shelters or culturally significant areas with rock formations) by altering mine plans to avoid any undermining and subsidence, or restricting the extent of coal extracted ("partial extraction") underneath the sites in order to minimise the potential level of subsidence.

In the case of surface impacts, options for conservation include relocating minor surface infrastructure (such as ventilation shafts) where feasible to avoid identified sites of significance, and/or altering construction methods to minimise the surface impact area within the vicinity of significant sites or potential resources.

In the case of continuing land use, such as the continued use and maintenance of existing roads, the options for conservation tend to be limited. Typically, a similar resource will potentially exist in adjacent, less-disturbed areas, and therefore options such as closing an existing road and constructing a new road are actually likely to result in higher impacts to the heritage resource.

10.1.3 Strategy C (Mitigated Impact)

In circumstances where an Aboriginal site may be of archaeological and/or cultural significance, but the options for conservation are limited and the surface collection of artefacts or excavation of deposits could yield benefits to the Aboriginal community and/or the archaeological study of Aboriginal occupation, mitigation measures (salvage) may be warranted.

Salvage in these circumstances may include the collection of surface artefacts and/or systematic excavation of artefact deposits. Salvage of other site types may also be warranted, for example scarred trees. Salvage of a scarred tree may involve cutting and removing the tree or the portion of the tree containing the scar. Similarly, grinding grooves may be salvaged by removal of the freestanding rock they are situated on, or in the case of grooves on open bedrock, cutting and removing the section of bedrock with the grooves.

The imperative for salvage measures can be assessed in relation to:

- ❑ The nature of the identified and expected evidence, its significance and its research potential (ie. the potential for salvage to provide additional, useful evidence that will enhance the overall understanding of the nature of human occupation in the locality);
- ❑ The views of the Aboriginal stakeholders, as salvage may be warranted to minimise the impacts of development on the cultural values of the evidence; and
- ❑ The extent of potential development impacts on particular sites or potential resources.

Under the terms of the NP&W Act it is an offence to harm or desecrate an object that the person knows is an Aboriginal object, or to harm an Aboriginal object. As such, a Section 90 AHIP must normally be obtained from Heritage NSW prior to impacting any Aboriginal objects, including through mitigation activities. Heritage NSW determination of AHIP applications is guided by the OEH (2011c) *Guide to Aboriginal Heritage Impact Permit Processes and Decision-Making* policy.

A Section 90 AHIP is generally not required for impacts to Aboriginal objects where the project is for State Significant Development under Part 4 of the EP&A Act, and commitments relating to the management of and mitigation of impacts to Aboriginal heritage *in lieu* of a Section 90 AHIP (typically in the form of an Aboriginal Cultural Heritage Management Plan) are approved by the DPE and implemented.

Salvage typically involves the development of a detailed research design (including the nature of the methodology and sampling strategy, as discussed in Section 10.1.1). Where an AHIP is required, an Aboriginal Cultural Heritage Assessment must be undertaken in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b) and Aboriginal community consultation in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy (DECCW 2010c).

10.1.4 Strategy D (Unmitigated Impact)

The strategy of unmitigated impact involves the proponent causing impacts to the heritage evidence without any mitigation measures. This strategy is typically suitable when the heritage evidence is of low scientific and cultural significance, the registered Aboriginal parties hold no objections, and it is unfeasible to implement any other strategy.

Under the terms of the NP&W Act it is an offence to harm or desecrate an object that the person knows is an Aboriginal object, or to harm an Aboriginal object. As such, a Section 90 AHIP must normally be obtained from Heritage NSW prior to impacting any Aboriginal objects. An AHIP is generally not required for impacts to Aboriginal objects where the project is for State Significant Development under Part 4 of the EP&A Act, and commitments relating to the management of and mitigation of impacts to Aboriginal heritage *in lieu* of a Section 90 AHIP (typically in the form of an Aboriginal Cultural Heritage Management Plan) are approved by the DPE and implemented.

Where an AHIP is required, an Aboriginal Cultural Heritage Assessment must be undertaken in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b) and Aboriginal community consultation in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy (DECCW 2010c).

10.1.5 Strategy E (Monitoring)

An alternative strategy for zones where archaeological deposits are predicted to occur is to monitor construction, particularly any initial earthmoving and soil removal works, for the presence of artefacts, shell or skeletal remains.

Monitoring is one of the primary strategies for managing the possible occurrence of Aboriginal skeletal remains. Monitoring for the presence of shell and stone artefacts is also often of value to the Aboriginal community, who may be seeking to identify and salvage material that was not visible on the surface during a preliminary study. The sieving of graded deposits is also a practical measure that enhances the benefits of monitoring for artefacts. However, the nature of construction methods (eg. the use of earthmoving machinery to rapidly excavate large quantities of soil) tends to limit the potential for successful identification of heritage evidence during monitoring.

Monitoring for artefacts (in preference to controlled excavation) is not a widely accepted method within the context of a scientific investigation, because it could result in substantial and costly delays to construction (particularly if a Section 90 AHIP or Part 4 State Significant Development approval is not in force), late revisions to development plans, and/or cause undesirable impacts to sites of significance. However, monitoring for the presence of artefacts and other features during initial earthworks can be of scientific benefit and benefit to the Aboriginal community, by enabling the identification and retrieval of cultural evidence that may not otherwise have been recorded or salvaged.

In relation to potential subsidence impacts, monitoring is primarily associated with inspecting and recording the condition of identified grinding groove and rock shelter sites before and after undermining has taken place, in order to identify if any subsidence related impacts have occurred. Such information can be used to refine the modelling involved in assessing potential subsidence impacts and guide future assessments within a locality.

10.2 Assessment of Specific Management Options for Aboriginal Sites, Potential Resources and Cultural Values

The assessment of specific strategies for the management of the identified and potential Aboriginal heritage resources and cultural values within the LW24-26 Modification area can be considered in relation to various criteria such as the nature of the heritage evidence, its significance, the nature of the potential impacts, existing approved strategies and actions, and the views of the RAPs.

Consideration of management options can be discussed within general categories (refer to Sections 10.2.1-10.2.3), based on the nature and level of potential impacts:

- ❑ Small-scale low-high level impacts, within the underground area, comprising areas with potentially some flexibility in location (small area impacts such as exploratory drilling, environmental monitoring and subsidence remediation: refer to Section 10.2.1);
- ❑ Low-high level continuing land-use impacts, within the underground area, comprising areas such as existing vehicle tracks that will be subject to ongoing use (Section 10.2.2); and
- ❑ Subsidence impacts, within the underground area (Section 10.2.3).

A Section 90 AHIP would be required, prior to any impacts occurring to any heritage evidence. The southern portion of the LW24-26 Modification area is already covered by AHIP #C0003213, and the eastern margin is covered by AHIP #2222, therefore any sites within these areas (refer to Table 11) can be managed under the existing AHIPs.

However the central and northern portions of the Modification area are not covered by any AHIP (refer to Figure 19). A new AHIP would be required for this area prior to any works being undertaken that may cause any impacts to any identified Aboriginal sites.

The *Wambo Coal Heritage Management Plan* (HMP) (current version, WCPL 2019), specifies detailed procedures for the management of Aboriginal heritage under the existing AHIPs at Wambo, and would provide a suitable basis for the management of Aboriginal heritage under any new AHIP for the central and northern portions of the Modification area.

The HMP (WCPL 2019) referenced in the AHIPs provides detailed procedures for:

- ❑ Aboriginal community involvement, including participation in heritage surveys and salvages (Section 3);
- ❑ A surface disturbance permit process, to identify and manage heritage actions required in relation to specific ground disturbance works (Section 4.1);
- ❑ Surface salvage procedures, including detailed methods for site recording and surface collection (Section 4.2);
- ❑ Sub-surface salvage and excavation procedures, including detailed methods for initial test excavation, additional controlled hand excavation and mechanical salvage excavation (surface scrapes) (Section 4.3);
- ❑ Artefact analysis and recording (Section 4.4);
- ❑ Heritage salvage reporting, including provision of copies of reports to RAPs and Heritage NSW (Section 4.5);
- ❑ Assessment of ancillary infrastructure once detailed design is available (Section 4.6);

- ❑ Subsidence management and monitoring of Aboriginal sites (Section 4.7);
- ❑ Management of any previously unrecorded Aboriginal heritage evidence, including detailed procedures for different site types (eg. open artefact sites, rock shelters, grinding grooves and scarred trees) based on the nature of the evidence, assessed level of significance and level of potential impacts (Section 4.8);
- ❑ Management of any human remains that may be identified (Section 4.9);
- ❑ Management of salvaged Aboriginal objects, including a temporary storage location (Section 4.10);
- ❑ Aboriginal community access for cultural purposes (Section 4.12);
- ❑ Maintenance of an Aboriginal heritage site database (Section 4.13); and
- ❑ Heritage inductions and an Aboriginal cultural education program for all personnel working at Wambo (Section 6.0).

Strategies for the management of any potential impacts within the investigation area for all identified Aboriginal sites and values have been included in Table 11. The strategies comprise:

- ❑ For nine open artefact sites (Wambo Sites 239, 311, 485-489, United IF-5 and South Bates Soil Test 2/A), no further action is required as these sites have been subject to total salvage under existing AHIPs;
- ❑ For seven open artefact sites (Wambo Sites 240, 241, 317, 320, 484, 490 and 491) of low significance, no further action is required as unmitigated impact is approved under an existing AHIP. Three of these sites may be subject to continued land use impacts as they are located along existing vehicle tracks;
- ❑ For three open artefact sites (Wambo Sites 321 and 483 and South Bates Soil Test 6/A), of low to moderate significance, no further action is required for the portions of the sites along vehicle tracks that have been subject to total salvage under existing AHIPs, but surface collection is warranted for the portions of the sites off the roads under existing AHIPs if any future impacts are proposed (eg. drilling or subsidence remediation) in order to mitigate impacts on scientific and cultural values and to retrieve and conserve samples of the heritage evidence;
- ❑ For one open artefact site (Wambo Site 528) of low significance, which may be subject to continued land use impacts as it is situated on a vehicle track, surface collection is warranted in order to mitigate impacts on scientific and cultural values and to retrieve and conserve samples of the heritage evidence, but only with a new AHIP for the portion of the site outside of the existing AHIP area, and under the existing AHIP within the AHIP #C0003213 area;
- ❑ For one open artefact site (Wambo Site 319) of low significance, which may be subject to continued land use impacts as it is situated on a vehicle track, surface collection is warranted in order to mitigate impacts on scientific and cultural values and to retrieve and conserve samples of the heritage evidence, but only with a new AHIP;
- ❑ For three open artefact sites (Wambo Sites 318, 514 and 527) of low significance, which are outside of current AHIP areas but may be subject to continued land use impacts as they are situated on vehicle tracks, unmitigated impact is feasible but only with a new AHIP;

- ❑ For 14 open artefact sites (Wambo Sites 327, 513, 515-526) of low significance, which are outside of current AHIP areas and for which no impacts are proposed, unmitigated impact is feasible if any future impacts are proposed (eg. drilling or subsidence remediation) but only with a new AHIP; and
- ❑ In relation to the intangible cultural values associated with the investigation area, implementation of the above mitigation measures and other measures recommended below will act to reduce impacts.

10.2.1 Management of Small-Scale Low to High Level Impacts

It is not possible at present to identify the location of all future minor surface impacts that may occur under within the Modification area, for example from exploratory drilling, subsidence and environmental monitoring, or subsidence remediation. These impacts would be limited to small discrete areas, and as such it is anticipated that it would be highly feasible to avoid impacts to identified heritage sites, particularly any sites of significance.

Procedures are included within the Wambo HMP (WCPL 2019) to assess future minor surface impacts (Sections 4.1 and 4.6), and then implement appropriate heritage management actions consistent with the approved AHIPs. Should impacts be proposed, identified sites can be managed as listed in Table 11. Any previously unrecorded sites identified during additional surveys can be managed in accordance with procedures specified in the HMP (Section 4.8) under an approved AHIP.

Where impacts can be avoided to identified heritage sites, but occur within close proximity, appropriate site-specific precautionary measures, such as informing relevant staff and contractors of the nature and location of the items and need to avoid impacts, along with temporary protective fencing and signage, may be warranted.

Where impacts cannot be avoided to previously unrecorded heritage sites of low significance, where the proposed impacts are minimal in extent, unmitigated impact may be an appropriate management strategy. Alternatively, mitigated impact, potentially involving surface collection of identified artefacts, may be warranted (refer to Table 11 and Section 4.8 of the HMP).

As any potential surface impacts within the underground area would be limited to small discrete areas and would be minimal in overall extent, and the area is dominated by the zone in which the potential artefact resource will predominantly comprise a very low density distribution consistent with background discard, further investigation or mitigation (for example, test excavations and salvage excavations) with respect to potential artefact evidence is generally not warranted (except where specified in Table 11 in relation to specific identified sites). However, if future broad-scale impacts were proposed in the secondary resource zone associated with North Wambo Creek (Figure 13), additional investigation and mitigation measures would be strongly warranted. No such impacts are proposed within that zone under the Modification.

Any small-scale surface impacts are likely to have minimal affect on the contemporary cultural values identified by the Aboriginal stakeholders. Avoidance of impacts or mitigation measures additional to those outlined above and in Table 11 (for example, monitoring of construction works) are not considered to be warranted.

10.2.2 Management of Continuing Land-Use Impacts

A number of the open artefact sites within the Modification area are located on vehicle tracks. The use of and potential maintenance of these tracks by WCPL (for example, during exploratory drilling or subsidence or environmental monitoring or remediation works), may result in impacts to these sites (refer to Table 11).

Following from the previous assessment of the southern portion of the Modification area (Kuskie 2017a), many of the identified open artefact sites along vehicle tracks and potentially subject to impacts from continued land use have been subject to surface collection (Table 11). No further action is required in relation to these sites. Further action is also not required under the existing approval and AHIP for another three sites of low significance situated along vehicle tracks within the AHIP #C0003213 area (Table 11).

Another five open artefact sites of low significance are situated on vehicle tracks in the portions of the Modification area not currently subject to an AHIP (Table 11). A Section 90 AHIP would be required, prior to any impacts occurring to any of this heritage evidence. As outlined in Table 11, surface collection is warranted for two sites (Wambo Sites 319 and 528) to mitigate impacts on scientific and cultural values and to retrieve and conserve samples of the heritage evidence, while unmitigated impact is feasible for three sites (Wambo Sites 318, 514 and 527).

Detailed procedures for surface collection, recording of lithic items, reporting and curation are specified in the HMP (WCPL 2019), which would appropriately form the basis of any new AHIP, consistent with the other AHIPs at Wambo.

10.2.3 Management of Subsidence Impacts

No Aboriginal site types have been identified in the underground mining area that may be susceptible to subsidence impacts. The potential for such sites types to occur (for example rock shelters, grinding grooves or scarred trees) has been reassessed as very low or negligible. The present study along with the previous assessment of Kuskie (2017a, 2017g) has sampled the entirety of the geographic extent of the investigation area.

The potential for subsidence impacts to occur to the open artefact sites within the underground area has been assessed as very low or negligible. Although minor cracking of soil may occur, any effects are likely to be short-term in duration, minimal in extent and confined to the context of the sites (sediments in which the artefacts are located) rather than direct impacts or damage to the artefacts themselves. Given the assessed minimal potential for subsidence impacts to open artefact sites, specific mitigation or conservation measures are not warranted for these sites⁹.

The contemporary cultural values identified by the Aboriginal stakeholders (relating to traditional land use and ongoing cultural and spiritual connections to the land and resources of the area, and use of subsistence and other resources) relate to the Modification area as a whole. As a result, the impacts to the cultural values will include the full range of predicted mine subsidence movements as documented by MSEC (2022). While there may be some adverse effects on these cultural values, any decrease in value is inferred to be relatively low and specific mitigation or conservation measures are not warranted.

⁹ Refer to Section 10.2.1 for management of any remediation works relating to soil cracking.

11. RECOMMENDATIONS

This Aboriginal Cultural Heritage Assessment of the South Bates Extension Underground Mine Longwalls 24-26 Modification has been prepared by South East Archaeology for WCPL in relation to an approval being sought by WCPL from the DPE for the Modification under Section 4.55(2) of the EP&A Act.

The Modification would involve a reorientation of the approved Longwalls 24 and 25, and the addition of Longwall 26. The longwalls would use the existing approved infrastructure at the South Bates Extension Underground Mine.

A total of 38 open artefact sites are known to occur within the LW24-26 Modification area. Contemporary cultural values have also been identified by the Aboriginal stakeholders, including those associated with the investigation area (relating to traditional land use and ongoing cultural and spiritual connections to the land and resources of the area), use of subsistence and other resources, pathways including the potential access from North Wambo Creek to Jerrys Plains Ridge, and in relation to the Aboriginal objects/sites.

The primary potential impacts of the Modification on Aboriginal heritage (comprising both the identified Aboriginal objects, the potential resource and cultural areas/values) relate to indirect impacts to the ground surface associated with underground mining induced subsidence, within an area of about 238 hectares. Approximately 35% of this area (the southern portion) has previously been assessed and approved for subsidence impacts (along with minor surface impacts) for the South Bates Extension Modification, and management actions (including heritage salvages) have been completed for many Aboriginal sites within this area.

Minimal direct surface impacts (potentially limited to small areas from continued use of existing access tracks, exploratory drilling, subsidence remediation and environmental monitoring) are proposed or anticipated.

In the absence of appropriate management and mitigation measures, it is concluded that the impacts of the LW24-26 Modification on Aboriginal heritage would be very low within a local context and negligible within a regional context. With the implementation of mitigation measures, the impacts of the Modification on Aboriginal heritage would be reduced to negligible within both local and regional contexts.

The following recommendations are made on the basis of legal requirements under the EP&A Act and NP&W Act, the results of the investigation and consultation with the Registered Aboriginal Parties:

- 1) Management of all Aboriginal heritage within the portion of the LW24-26 Modification area covered by AHIP #C0003213 and AHIP #2222 (refer to Figure 19) and the *Wambo Coal Heritage Management Plan* (current version, WCPL 2019) should continue in accordance with the relevant AHIP, HMP and Table 11 of this report;
- 2) WCPL should obtain from Heritage NSW a Section 90 AHIP for the central and northern portions of the LW24-26 Modification area that are not covered by an existing AHIP (refer to Figure 19). The primary elements of the AHIP should comprise:
 - a) Consistent with the existing AHIPs at Wambo, management of all identified and potential Aboriginal heritage within the AHIP application area in accordance with the *Wambo Coal Heritage Management Plan* (current version, WCPL 2019), along with Table 11 of this report ('Recommended Strategy' column).

The HMP contains detailed strategies and procedures of relevance to this portion of the LW24-26 Modification area, including for:

- i) Aboriginal community involvement, including participation in heritage salvages (Section 3 of the HMP);
 - ii) A surface disturbance permit process, to identify and manage heritage actions required in relation to specific ground disturbance works (Section 4.1 of the HMP);
 - iii) Systematic surface collection of identified artefact evidence (relevant for Wambo Sites 319 and 528; refer to Table 11) (Section 4.2 of the HMP);
 - iv) Artefact analysis and recording (Section 4.4 of the HMP);
 - v) Management of salvaged Aboriginal objects (Section 4.10 of the HMP);
 - vi) Heritage salvage reporting, including provision of copies of reports to RAPs and Heritage NSW (Section 4.5 of the HMP);
 - vii) Management of any previously unrecorded Aboriginal heritage evidence that might be identified, including detailed procedures for different site types based on the nature of the evidence, assessed level of significance and level of potential impacts (Section 4.8 of the HMP);
 - viii) Management of any human remains that may be identified (Section 4.9 of the HMP);
 - ix) Subsidence management and monitoring of Aboriginal sites (Section 4.7 of the HMP);
 - x) Aboriginal community access for cultural purposes (Section 4.12 of the HMP);
 - xi) Ongoing maintenance of the Wambo Aboriginal Site Database (Section 4.13 of the HMP); and
 - xii) Heritage inductions and an Aboriginal cultural education program for all personnel working at Wambo (Section 6.0 of the HMP);
- 3) Aboriginal Site Recording Forms should be lodged in a timely manner with Heritage NSW for any previously unrecorded Aboriginal heritage evidence that is identified within the Modification area during the course of operations and/or further heritage assessments, or that is subject to salvage or impact (Aboriginal Site Impact Recording Form);
 - 4) Under the terms of the NP&W Act it is an offence to harm or desecrate an object that the person knows is an Aboriginal object, or to harm an Aboriginal object ('strict liability offence'). Therefore, no activities or work should be undertaken within the Aboriginal site areas as described in this report and marked on Appendix 4 and Figure 19 without approval of a Section 90 AHIP and subsequent implementation of any relevant approval conditions; and
 - 5) Copies of this final report should be made available to each RAP and the DPE and Heritage NSW.

Table 11: Summary of recommended management strategies and consequent potential impacts to Aboriginal sites, cultural areas/values and potential deposits within the LW24-26 Modification area after the implementation of mitigation measures.

Site Number / Name	Site Type	Overall Significance ¹⁰	Potential Surface Impacts	Potential Subsidence Impacts	Management Rationale	Recommended Strategy	Consequent Impacts
37-5-0358 (Wambo Site 239)	Open Artefact Site	n/a	nil proposed but potentially low-high level continuing land use (vehicle track) to very small portion of site (remainder outside Modification area)	nil	site subject to total salvage under existing AHIP	no further action required	no loss of value
37-5-0359 (Wambo Site 240)	Open Artefact Site	low L, low R	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	low significance; problematic to relocate; potential continued land use impacts; unmitigated impact approved under existing AHIP	unmitigated impact under existing AHIP	possibly total or partial or no loss of value
37-5-0360 (Wambo Site 241)	Open Artefact Site	low L, low R	nil proposed	nil	low significance; no impacts proposed; unmitigated impact approved under existing AHIP	unmitigated impact under existing AHIP	possibly total or partial or no loss of value
37-5-0605 (Wambo Site 311)	Open Artefact Site	n/a	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	site subject to total salvage under existing AHIP	no further action required	no loss of value
37-5-0659 (Wambo Site 317)	Open Artefact Site	low L, low R	nil proposed	nil	low significance; problematic to relocate; no impacts proposed; unmitigated impact approved under existing AHIP	unmitigated impact under existing AHIP	possibly total or partial or no loss of value
37-5-0661 (Wambo Site 318)	Open Artefact Site	low L, low R	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	low significance; problematic to relocate; potential continued land use impacts	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value
37-5-0662 (Wambo Site 319)	Open Artefact Site	low L, low R	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	low significance; potential continued land use impacts; collection will mitigate impacts to cultural and scientific values	surface collection if continued use of vehicle track (only with new AHIP)	possibly total or partial or no loss of value
37-5-0663 (Wambo Site 320)	Open Artefact Site	low L, low R	nil proposed	nil	low significance; no impacts proposed; unmitigated impact approved under existing AHIP	unmitigated impact under existing AHIP	possibly total or partial or no loss of value
37-5-0664 (Wambo Site 321)	Open Artefact Site	low-possibly mod L, low R	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	low to possibly moderate significance; potential continued land use impacts; collection will mitigate impacts to cultural and scientific values; portion of site along road subject to salvage under existing AHIP; portion of site off road in situ but no impacts proposed	portion of site along road - no further action required; portion of site off road - surface collection under existing AHIP if impacts proposed	possibly total or partial or no loss of value
37-5-0668 (Wambo Site 327)	Open Artefact Site	low L, low R	nil proposed	nil	low significance; no impacts proposed	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value

¹⁰ A number of RAPs have expressed the view that all of the sites/places are of high cultural significance (ie. high importance) and make no differentiation on the comparative level of value between any site or place. This is acknowledged and respected.

Table 11 (continued):

Site Number / Name	Site Type	Overall Significance	Potential Surface Impacts	Potential Subsidence Impacts	Management Rationale	Recommended Strategy	Consequent Impacts
37-5-0692 (United IF-5)	Open Artefact Site	n/a	nil proposed	nil	site subject to salvage under existing AHIP	no further action required	no loss of value
37-5-0767 (Wambo Site 483)	Open Artefact Site	mod L, low R	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	moderate significance; potential continued land use impacts; collection will mitigate impacts to cultural and scientific values; portion of site along road subject to salvage under existing AHIP; portion of site off road in situ but no impacts proposed	portion of site along road - no further action required; portion of site off road - surface collection under existing AHIP if impacts proposed	possibly total or partial or no loss of value
37-5-0782 (South Bates Soil Test 2/A)	Open Artefact Site	n/a	nil proposed	nil	site subject to total salvage under existing AHIP	no further action required	no loss of value
37-5-0783, 37-5-0807 (South Bates Soil Test 6/A)	Open Artefact Site	low-possibly mod L, low R	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	low to possibly moderate significance; potential continued land use impacts; collection will mitigate impacts to cultural and scientific values; portion of site along road subject to salvage under existing AHIP; portion of site off road in situ but no impacts proposed	portion of site along road - no further action required; portion of site off road - surface collection under existing AHIP if impacts proposed	possibly total or partial or no loss of value
37-5-0786 (Wambo Site 484)	Open Artefact Site	low L, low R	nil proposed	nil	low significance; no impacts proposed; unmitigated impact approved under existing AHIP	unmitigated impact under existing AHIP	possibly total or partial or no loss of value
37-5-0787 (Wambo Site 485)	Open Artefact Site	n/a	nil proposed	nil	site subject to total salvage under existing AHIP	no further action required	no loss of value
37-5-0788 (Wambo Site 486)	Open Artefact Site	n/a	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	site subject to total salvage under existing AHIP	no further action required	no loss of value
37-5-0789 (Wambo Site 487)	Open Artefact Site	n/a	nil proposed	nil	site subject to total salvage under existing AHIP	no further action required	no loss of value
37-5-0790 (Wambo Site 488)	Open Artefact Site	n/a	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	site subject to total salvage under existing AHIP	no further action required	no loss of value
37-5-0791 (Wambo Site 489)	Open Artefact Site	n/a	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	site subject to total salvage under existing AHIP	no further action required	no loss of value
37-5-0792 (Wambo Site 490)	Open Artefact Site	low L, low R	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	low significance; problematic to relocate; potential continued land use impacts; unmitigated impact approved under existing AHIP	unmitigated impact under existing AHIP	possibly total or partial or no loss of value
37-5-0793 (Wambo Site 491)	Open Artefact Site	low L, low R	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	low significance; problematic to relocate; potential continued land use impacts; unmitigated impact approved under existing AHIP	unmitigated impact under existing AHIP	possibly total or partial or no loss of value
Wambo Site 513	Open Artefact Site	low L, low R	nil proposed	nil	low significance; no impacts proposed	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value

Table 11 (continued):

Site Number / Name	Site Type	Overall Significance	Potential Surface Impacts	Potential Subsidence Impacts	Management Rationale	Recommended Strategy	Consequent Impacts
Wambo Site 514	Open Artefact Site	low L, low R	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	low significance; potential continued land use impacts	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value
Wambo Site 515	Open Artefact Site	low L, low R	nil proposed	nil	low significance; no impacts proposed	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value
Wambo Site 516	Open Artefact Site	low L, low R	nil proposed	nil	low significance; problematic to relocate; no impacts proposed	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value
Wambo Site 517	Open Artefact Site	low L, low R	nil proposed	nil	low significance; problematic to relocate; no impacts proposed	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value
Wambo Site 518	Open Artefact Site	low L, low R	nil proposed	nil	low significance; no impacts proposed	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value
Wambo Site 519	Open Artefact Site	low L, low R	nil proposed	nil	low significance; no impacts proposed	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value
Wambo Site 520	Open Artefact Site	low L, low R	nil proposed	nil	low significance; problematic to relocate; no impacts proposed	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value
Wambo Site 521	Open Artefact Site	low L, low R	nil proposed	nil	low significance; problematic to relocate; no impacts proposed	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value
Wambo Site 522	Open Artefact Site	low L, low R	nil proposed	nil	low significance; no impacts proposed	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value
Wambo Site 523	Open Artefact Site	low L, low R	nil proposed	nil	low significance; problematic to relocate; no impacts proposed	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value
Wambo Site 524	Open Artefact Site	low L, low R	nil proposed	nil	low significance; no impacts proposed	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value
Wambo Site 525	Open Artefact Site	low L, low R	nil proposed	nil	low significance; no impacts proposed	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value
Wambo Site 526	Open Artefact Site	low L, low R	nil proposed	nil	low significance; problematic to relocate; no impacts proposed	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value
Wambo Site 527	Open Artefact Site	low L, low R	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	low significance; problematic to relocate; potential continued land use impacts	unmitigated impact (only with new AHIP)	possibly total or partial or no loss of value

Table 11 (continued):

Site Number / Name	Site Type	Overall Significance	Potential Surface Impacts	Potential Subsidence Impacts	Management Rationale	Recommended Strategy	Consequent Impacts
Wambo Site 528	Open Artefact Site	low L, low R	nil proposed but potentially low-high level continuing land use (vehicle track)	nil	low significance; potential continued land use impacts; collection will mitigate impacts to cultural and scientific values; site partially within AHIP #C0003213 area	surface collection if continued use of vehicle track (with existing AHIP for that AHIP area; only with new AHIP for portion outside of existing AHIP area)	possibly total or partial or no loss of value
Modification Area	Cultural area/value	low L, low R	small-scale high level (small portions), low-high level continuing land use	full range as predicted for Modification area	overall impacts of Modification negligible within a regional context; mitigation and other management measures can further reduce impacts	mitigation measures as outlined above and in Modification report recommendations	probably partial loss of value
Use of subsistence and other resources	Cultural area/value	low L, low R	small-scale high level (small portions), low-high level continuing land use	as predicted for Modification area	overall impacts of Modification negligible within a regional context	unmitigated impact	possibly partial or no loss of value
Pathways through the locality, including the potential access from North Wambo Creek to Jerrys Plains Ridge	Cultural area/value	mod L, low R	small-scale high level (small portions), low-high level continuing land use	as predicted for Modification area	overall impacts of Modification negligible within a regional context; mitigation and other management measures can further reduce impacts	mitigation measures as outlined above and in Modification report recommendations	probably partial loss of value
Contemporary significance of Aboriginal objects	Cultural area/value (refer above to each site)	-					

REFERENCES

- AECOM 2009 *Aboriginal Heritage Assessment: Mount Thorley Warkworth Mine Lease West of Wallaby Scrub Road*. Unpublished report to Rio Tinto Coal Australia.
- Akerman, K. 1979 Heat and lithic technology in the Kimberleys, W.A. *Archaeology and Physical Anthropology in Oceania* 14 (2):144-151.
- AMBS 2002 Aboriginal Heritage Study. In, *Warkworth Extension of Mining Environmental Impact Statement Technical Reports Part E*. Unpublished report.
- Attenbrow, V. 1987 *The Upper Mangrove Creek Catchment: A Study of Quantitative Changes in the Archaeological Record*. Unpublished PhD Thesis, University of Sydney.
- Backhouse, J. 1843 *A Narrative of a Visit to the Australian Colonies* Hamilton Adams and Co.: London.
- Baker, N. 1994 *Moffats Swamp Dune: Final Report on Archaeological Site Salvage, Testing and Artefact Analysis*. Unpublished report to RZM Pty Ltd.
- Barrallier, F. 1802 Letter to C. F. Greville. Banks Papers, Brabourne Collection. MS A78-3, Mitchell Library, Sydney.
- Besant, A. and Wyatt, E. 2008 *Aboriginal Archaeological Assessment Macquarie Generation Proposed Gas Pipeline North-South Route*. Unpublished report to CBD Environmental.
- Binford, L. R. 1980 Willow smoke and dogs' tails: hunter-gatherer settlement systems and archaeological site formation. *American Antiquity* 45(1):4-20.
- Blyton, G. 2012 Aboriginal guides of the Hunter Region 1800-1850 A case study in Indigenous labour history. *History Australia* 9(2):89-106.
- Blyton, G., Heitmeyer, D. and Maynard, J. 2004 *Wannin Thanbarrin: A History of Aboriginal and European Contact in Muswellbrook and the Upper Hunter Valley*. Muswellbrook Shire Council: Muswellbrook.
- Boismier, W. A. 1991 The role of research design in surface collection: an example from Broom Hill, Braishfield, Hampshire. In, A. J. Schofield (ed) *Interpreting Artefact Scatters: Contributions to Ploughzone Archaeology*. *Oxbow Monograph 4*. Oxbow Books: Oxford.
- Boot, P.G. 2002 *Didthul, Bhundoo, Gulga and Wadbilliga: An Archaeological Study of the Aboriginals of the New South Wales South Coast Hinterland*. Unpublished PhD thesis, Australian National University: ACT.
- Brayshaw, H. 1966 *Some Aspects of Material Culture of the Aborigines of the Hunter Valley at the Time of First White Settlement*. Unpublished BA (Hons) Thesis. Department of Archaeology, University of New England.
- Brayshaw, H. 1981 *Archaeological Survey of the Proposed Rail Spur - Mt Thorley to Warkworth/Lemington*. Unpublished report to GHD Pty Ltd.

- Brayshaw, H. 1982 *Archaeological Survey of Hunter River Alluvial Flats Buchanan/Lemington Coal Mine Near Warkworth, N.S.W.* Unpublished report to Dames and Moore.
- Brayshaw, H. 1984a *Archaeological Survey at Wambo Near Warkworth, NSW.* Unpublished report to Wambo Mining Corporation Pty Ltd.
- Brayshaw, H. 1984b *Archaeological Investigation of Buchanan Borehole Collieries' Lemington Holding.* Unpublished report to Dames and Moore.
- Brayshaw, H. 1986 *Aborigines of the Hunter Valley: A Study of Colonial Records.* Scone and Upper Hunter Historical Society: Scone.
- Brayshaw, H. 1994 *National Highway Extension F3 to New England Highway at Branxton, Hunter Valley, NSW: Archaeological Survey for Aboriginal Sites.* Unpublished report to RTA through Connell Wagner Pty Ltd.
- Brayshaw, H. 2003 *Looking for the Bora Ground in the Wallaby Scrub Near Bulga NSW.* In, E. White (2003) *Wambo Development Project: Aboriginal Heritage Assessment.* Unpublished report to Resource Strategies Pty Ltd.
- Brayshaw, H., Haglund, L. and Rich, E. 1996 *Lemington Mine Hunter Valley Southern Extension EIS: Archaeological Survey for Aboriginal Sites.* Unpublished report to Sinclair Knight Merz.
- Breton, W. H. 1833 *Excursions in New South Wales and Van Diemen's Land, 1830-1833.* London.
- Bridgman, H. A. and Oliver, J. 1995 *Climate of the Hunter-Central Coast Region, NSW.* In, Sloan, S. W. and Allman, M. A. (eds) *Conference on Engineering Geology of the Newcastle-Gosford Region.* Australian Geomechanics Society: Sydney.
- Butlin, N. 1983 *Our Original Aggression: Aboriginal Populations of South-eastern Australia 1788-1850.* George Allen and Unwin : Sydney.
- Camilli, E. 1989 *The occupational history of sites and the interpretation of prehistoric technological systems: an example from Cedar Mesa, Utah.* In, Torrence, R. (ed) *Time, Energy and Stone Tools.* Cambridge University Press: Cambridge.
- Campbell, J. F. 1928 *John Howe's exploratory journal from Windsor to the Hunter River in 1819.* *Journal of the Royal Australian Historical Society.* 14, 4: 232-41.
- Canning, S. 2016 *United Wambo Open Cut Coal Project Aboriginal Cultural Values Assessment Report.* Unpublished report to Glencore Coal Assets Australia Pty Ltd.
- Corkill, T. 1990 *Preliminary Survey for Archaeological Sites, South Wambo, Near Warkworth, NSW.* Unpublished report to Envirosiences Pty Ltd.
- Crabtree, D.E. and Butler, R. 1964 *Notes on experiments in flintknapping: 1. heat treatment of silica minerals.* *Tebawi* 7(1): 1-7.
- Creech, M. 2002 *Tuffaceous deposition in the Newcastle Coal Measures: challenging existing concepts of peat formation in the Sydney Basin, New South Wales, Australia.* *International Journal of Coal Geology* 51:185-214.

- Dangar, H. 1828 *Map of the River Hunter and it's Branches, Shewing the Lands Reserved Thereon for Church Purposes, the Locations Made to Settlers, and the Settlement and Part of the Lands of the Australian Agricultural Company at Port Stephens, Together with the Station of the Mission to the Aborigines Belonging to the London Missionary Society on Lake Macquarie, New South Wales*. J. Cross: London.
- David, T. W. E. 1890 Aborigines in the Maitland district. *Journal and Proceedings of Royal Historical Society* 24:119-120.
- David, T. W. E. and Etheridge, R. 1890 The raised beaches of the Hunter River delta. *Records of the Geological Survey of New South Wales* 2(2):41-52.
- Davidson, G. F. 1846 *Trade and Travel in the Far East*. Madden and Malcolm: London.
- Davidson, I. and Lovell-Jones, C. 1993 *Ethnographic Investigations: Proposed Bayswater No. 3 Colliery Authorisation Area (A437)*. Unpublished report to Resource Planning Pty Ltd.
- 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. 1990 *Newcastle Bight Aboriginal Sites Study*. Unpublished report to NPWS.
- Dean-Jones, P. 1992 *Archaeological Investigations of Aboriginal Sites, Proposed North Western Open Cut Area*. Unpublished report to Lemington Coal Mines Ltd.
- Dean-Jones, P. 1995 *Salvage of Archaeological Sites in the North-west Corner of Lemington Colliery Lease, Hunter Valley, NSW*. Unpublished report to Lemington Mine Pty Ltd and NSW NPWS.
- Dean-Jones, P. and Mitchell, P. B. 1993 *Hunter Valley Aboriginal Sites Assessment Project: Environmental Modelling for Archaeological Site Potential in the Central Lowlands of the Hunter Valley*. Unpublished report to NPWS.
- DEC 2004 *Interim Community Consultation Requirements for Applicants*. DEC: Sydney.
- DECCW 2009a *Guide to Determining and Issuing Aboriginal Heritage Impact Permits*. DECCW: Sydney.
- DECCW 2009b *Operational Policy: Protecting Aboriginal Cultural Heritage*. DECCW: Sydney.
- DECCW 2010a *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*. DECCW: Sydney.
- DECCW 2010b *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*. DECCW: Sydney.
- DECCW 2010c *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*. DECCW: Sydney.

- Diessel, C. F. K. 1980 Newcastle and Tomago Coal Measures. In, Herbert, C. & Helby, R. (eds) *A Guide to the Sydney Basin. Geological Survey of New South Wales Bulletin No. 26.* Department of Mineral Resources: Sydney.
- Domanski, M. and Webb, J. A. 1992 Effect of heat treatment on siliceous rocks used in prehistoric lithic technology. *Journal of Archaeological Science* 19:601-614.
- Donlon, D. and Kuskie, P. 2003 *Traditional Aboriginal Burial at Mount Arthur North, Hunter Valley, New South Wales.* Unpublished report to Mount Arthur North Project and Wonnarua Elders.
- Dunn, M. 2016 Aboriginal guides in the Hunter Valley, New South Wales. In, Shellam, T., Nugent, M., Konishi, S. and Cadzow, A (eds) *Brokers and Boundaries: Colonial Exploration in Indigenous Territory.* ANU Press: Canberra.
- Dunnell, R. and Dancy, W. 1983 Siteless survey: A regional scale data collection strategy. In, M. Schiffer (ed) *Advances in Archaeological Method and Theory Vol. 6.* Academic Press: New York.
- Dyall, L. K. 1971 Aboriginal occupation of the Newcastle coastline. *Hunter Natural History* (3):154-163.
- Dyall, L. K. 1979a *Warkworth Coal Tender Area - Interim Report on Aboriginal Relics* Unpublished report to Warkworth Mining Ltd.
- Dyall, L. K. 1979b *Warkworth Coal Tender Area - Report on Aboriginal Relics* Unpublished report to Warkworth Mining Ltd.
- Dyall, L. K. 1980 *Report on Aboriginal Relics at Wambo Coal Lease.* Unpublished report to Dames and Moore.
- Ebsworth, H. T. 1826 A letter book, kept at Sydney and Port Stephens. MS B852, Mitchell Library, Sydney.
- EJE Architecture 1991 *Wambo Homestead, Near Warkworth, NSW: A Conservation Plan.* Unpublished report to Wambo Mining Corporation Pty Limited.
- Enright, W. J. 1914 Mammals, birds, etc. In, British Association for Advancement of Science (ed) *Handbook: Maitland District.* E. Tipper: Maitland.
- Enright, W. J. 1932 The Kattang (Kutthung) or Worimi: An Aboriginal tribe. *Mankind* pp. 75-78.
- Enright, W. J. 1937 Notes on the Aborigines of the North Coast of New South Wales. *Mankind* 2(4):88-91, 2(7): 193-195, 2(9): 321-324.
- Envirosciences Pty Ltd 1991 *Environmental Impact Statement: Expansion of Wambo Coal Mine at Warkworth.* Report to Wambo Mining Corporation Pty Ltd.
- Etheridge, R. 1918 *The Dendroglyphs or 'Carved Trees' of NSW.* NSW Govt. Printer, Sydney.
- Fawcett, J. W. 1898 Notes on the Customs and Dialect of the Wanna-ruah Tribe. *Science of Man and Australasian Anthropological Journal.* 1(7): 152-154.

- Fisher, R. V. and Schmincke, H.-U. 1984 *Pyroclastic Rocks*. Springer-Verlag: Berlin.
- 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.
- Fraser, J. 1882 The Aborigines of New South Wales. *Journal and Proceedings of Royal Society of New South Wales* (16):193-233.
- Galloway, R. W. 1963 Geomorphology of the Hunter Valley. In, Story, R., Galloway, R. W., van de Graaff, R. H. M. and Tweedie, A. D. General Report on the Lands of the Hunter Valley. *Land Research Series No. 8*. CSIRO: Melbourne.
- Godwin, L. 2010 *Warkworth Mining Limited Coal and Allied, Warkworth Mine Extension Project Aboriginal Cultural Heritage Assessment Report*. Unpublished report to Rio Tinto Coal Australia.
- Gollan, V. 1993 *The Military Suppression of Wanaruah Resistance in the Upper Hunter 1826: Mount Arthur and Surrounding Area*. Unpublished report to Wanaruah Land Council.
- Goold, W. J. 1981 *The 'Birth of Newcastle'*. Newcastle and Hunter District Historical Society: New Lambton.
- Gorecki, P., Morton, D. R., Stern, N. and Wright, R. V. S. 1984 Coexistence of humans and megafauna in Australia - improved stratified evidence. *Archaeology in Oceania* 19:114-119.
- Goulding, M. 2002 *Cultural Places, Contested Spaces: An Approach to Managing Aboriginal Peoples' Attachments to Landscape, Coffs Harbour Region Cultural Heritage Study Stage 2*. Report to NSW NPWS.
- 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. and Rich, E. 1995 *Warkworth Open Cut Coal Mines: Report on Salvage Investigation of Site 37-6-155 (= Mt. Thorley E/W4), Carried out in Compliance With NPWS Consent #732. Volumes 1-111*. Unpublished report to Warkworth Mining Ltd.
- Hall, R. 1991 *Far East Gippsland Archaeological Survey*. Unpublished report to Victoria Archaeological Survey.
- Hall, R. 1992 *A Predictive Archaeological Assessment of Crown-Timber Lands in the Glen Innes Management Area*. Unpublished report to NSW Forestry Commission.
- Hall, R. and Lomax, K. 1993 *Grafton Management Area Supplementary Report - Archaeological Report*. Unpublished report to NSW Forestry Commission.
- Hanckel, M. 1983 *Hot Rocks From the South Coast: A Study in Thermal Pretreatment at Burrill Lake and Currarong, New South Wales*. Unpublished BA (Hons) Thesis, Department of Anthropology, University of Sydney.

- Hartley, D. T. 1986 *The Settlers of the Big Swamps: A Sage of the Thomas Family and Their Contemporaries*. D. T. Hartley: Fennell Bay.
- Hartley, D. T. 1995 *Men of Their Time: Pioneers of the Hunter River*. Aquila Agribusiness Pty Ltd: North Arm Cove, NSW.
- 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. 1985 *Data Recorded on Artefacts in Square AA at Sandy Hollow 1*. Unpublished report to ANUTECH Pty Ltd.
- Hiscock, P. 1986 Technological change in the Hunter River Valley and the interpretation of Late Holocene change in Australia. *Archaeology in Oceania*. 21: 40-50.
- Hiscock, P. and Mitchell, S. 1993 *Stone Artefact Quarries and Reduction Sites in Australia: Towards a Type Profile*. AGPS: Canberra.
- Howitt, A. W. 1904 [2001] *The Native Tribes of South-East Australia*. Aboriginal Studies Press, Canberra.
- Hughes, P. J. 2000 *A Geomorphological Assessment of the Mount Arthur North Study Area*. Unpublished report to South East Archaeology Pty Ltd.
- Hughes, P. J. 2003 A geomorphological assessment of the Wambo development project area, Warkworth, NSW. In, E. White (2003) *Wambo Development Project: Aboriginal Heritage Assessment*. Unpublished report to Resource Strategies Pty Ltd.
- Isaacs, J. 1987 *Bush Food: Aboriginal Food and Herbal Medicine*. Weldon: Sydney.
- Kammaing, J. 1974 Report on the edge wear on stone tools from the Clarence River site. In McBryde, I. (ed) *Aboriginal Prehistory in New England*. University of Sydney Press: Sydney.
- Kayandel 2007 *Aboriginal Archaeological Salvage of Twelve Sites at Wambo, Hunter Valley, NSW*. Unpublished report.
- Kayandel 2009 *Wambo Site Test Excavation of Site 154, Wambo Coal Mine, Warkworth, NSW*. Unpublished report.
- Koettig, M. 1986 *Test Excavations at Six Locations Along the Proposed Pipeline Between Singleton and Glennies Creek, Hunter Valley Region, NSW*. Unpublished report to Public Works Department, NSW.
- 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. 1994 *Bulga Lease Authorisation 219 Salvage Excavations. Volumes 1-5*. Unpublished report to Saxonvale Coal Pty Ltd.

- Koettig, M. and Hughes, P. J. 1983 *Archaeological Investigations on the United Collieries Coal Lease, Warkworth, Hunter Valley, NSW*. Unpublished report to United Collieries Pty Ltd.
- Koettig, M. and Hughes, P. J. 1985 *Archaeological Investigations at Plashett Dam, Mount Arthur North, and Mount Arthur South in the Hunter Valley, New South Wales*. Unpublished report (3 volumes) by Anutech Pty Ltd to Electricity Commission of NSW and Mount Arthur South Coal Pty Ltd.
- Kovac, M. and Laurie, J. 1991 *Soil Landscapes of the Singleton 1:250,000 Sheet*. Soil Conservation Service of NSW: Sydney.
- Kuskie, P. 1998a *An Archaeological Assessment of the Proposed Jerrys Plains Coal Terminal and Rail Line, Between Warkworth and Mount Thorley, Hunter Valley, NSW*. Unpublished report to CMPS&F Pty Limited.
- Kuskie, P. 1998b *An Archaeological Assessment of the Proposed Wambo Mine Conveyor and Haul Road, Near Warkworth, Hunter Valley, New South Wales*. Unpublished report to CMPS&F Pty Limited.
- Kuskie, P. 1999 *An Aboriginal Archaeological Assessment of a Proposed Extension to the South Lemington Coal Mine Lease, Hunter Valley, New South Wales*. Unpublished report to Lemington Coal Mines Limited.
- Kuskie, P. 2000a *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. 2000b *Jerrys Plains Coal Terminal and Rail Line: An Aboriginal Archaeological Assessment of Several Haul Road Options at United and Lemington Collieries, Hunter Valley, New South Wales*. Unpublished report to Maintenance & Project Engineering Pty Limited.
- Kuskie, P. 2009 *Ulan Coal Continued Operations: Aboriginal Heritage Assessment (Volumes A and B)*. Unpublished report to Umwelt (Australia) Pty Ltd on behalf of Ulan Coal Mines Ltd.
- Kuskie, P. 2016a *Wambo Coal Mine, Hunter Valley, New South Wales: Reassessment of Previously Reported Scarred Tree Wambo Site 312*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2016b *Report on Aboriginal Heritage Due Diligence of Proposed Electricity Transmission Line Realignment at Wambo Coal Mine, Hunter Valley, New South Wales*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2016c *Wambo Coal Mine - South Bates Extension Modification Area: Report on Aboriginal Heritage Due Diligence Survey of Soil Test Pit Locations*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2016d *Wambo Coal Mine - South Bates Extension Modification Area: Report on Aboriginal Heritage Due Diligence Survey of Drilling Locations*. Unpublished report to Wambo Coal Pty Limited.

- Kuskie, P. 2016e *Wambo Coal Mine - Wambo Sites 304 (OEH #37-5-0598) and 325 (OEH #37-5-0610): Report on Aboriginal Heritage Salvage*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2017a *Wambo Coal Mine, Hunter Valley, New South Wales: South Bates Extension Modification - Aboriginal Cultural Heritage Assessment*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2017b *Wambo Coal Mine - Report on Aboriginal Heritage Due Diligence Survey of Drilling Locations in January 2017*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2017c *Wambo Coal Mine - Report on Aboriginal Heritage Due Diligence Survey of Drilling Locations in February 2017*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2017d *Wambo Coal Mine - Report on Aboriginal Heritage Due Diligence Survey of Drilling Locations in May 2017*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2017e *Wambo Coal Mine - North Wambo Underground Mine: Longwall Panels 8A to 10A - End of Panel Aboriginal Heritage Report*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2017f *Revised Report on Aboriginal Heritage Due Diligence Assessment of Proposed Electricity Transmission Line Realignment at Wambo Coal Mine, Hunter Valley, New South Wales*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2017g *Wambo Coal Mine - South Bates Extension Modification: Report on Aboriginal Heritage Survey of Potential Impact Areas Not Previously Subject to Sampling*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2018a *Wambo Coal Mine - Aboriginal Site "United IF-6" (OEH #37-5-0693): Report on Heritage Salvage*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2018b *Wambo Coal Mine – Wambo Site 31 (OEH #37-5-0034): Report on Partial Aboriginal Heritage Salvage in Relation to Drilling Activities*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2018c *Wambo Coal Mine - Report on Aboriginal Heritage Due Diligence Investigation of Drilling Locations in May 2018*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2018d *Wambo Coal Mine, Hunter Valley, New South Wales: South Bates Extension - Report on Salvage of Open Artefact Sites*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2018e *Wambo Coal Mine - Report on Aboriginal Heritage Due Diligence Investigation of Drilling Location in June 2018*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2019a *Wambo Coal Mine - Report on Aboriginal Heritage Due Diligence Survey of Drilling Locations in January 2019*. Unpublished report to Wambo Coal Pty Limited.

- Kuskie, P. 2019b *Wambo Coal Mine, Hunter Valley, New South Wales: Report on Salvage of Open Artefact Sites in December 2018 and January 2019 Under Aboriginal Heritage Impact Permits #C0002000 and #2222*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2019c *Wambo Coal Mine, Hunter Valley, New South Wales: Report on Salvage of Open Artefact Sites in February 2019 Under Aboriginal Heritage Impact Permits #C0001474 and #2222*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2019d *Wambo Coal Mine - Report on Aboriginal Heritage Due Diligence Survey of Drilling Locations EX09 and EX12 in May 2019*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2020a *Wambo Coal Mine - Report on Aboriginal Heritage Due Diligence Survey of Drilling Locations in January 2020*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2020b *Wambo Coal Mine - Report on Aboriginal Heritage Due Diligence Study of Proposed Seismic Investigation Area*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2020c *Wambo Coal Mine, Hunter Valley, New South Wales: Report on Salvage of Open Artefact Sites in April and May 2019 Under Aboriginal Heritage Impact Permit #2222*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2020d *Wambo Coal Mine - Report on Aboriginal Heritage Due Diligence Survey of Soil Testing Locations in July 2020*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. 2021a *Wambo Coal Mine - Aboriginal Heritage Due Diligence Investigation of Drilling Locations, November 2021*. Unpublished report to Wambo Coal Pty Limited.
- Kuskie, P. (in prep) *Salvage of Aboriginal Heritage Sites at South Lemington*. Unpublished report in preparation to Lemington Coal Mine Pty Limited.
- Kuskie, P. and Clarke, E. 2004 *Salvage of Aboriginal Heritage Sites in the Mount Arthur North Coal Mine Lease, Hunter Valley, New South Wales. Volumes A-C*. Unpublished report to BHP Billiton.
- Kuskie, P. J. and Clarke, E. 2006 *Sub-Surface Archaeological Investigation of Part Lot 12 DP 603613, Raymond Terrace Road, Thornton North, Lower Hunter Valley, NSW, in Relation to a Proposed Residential Development*. Unpublished report to TRD (Thornton North) Pty 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).
- Langford-Smith, T. (ed) 1978 *Silcrete in Australia*. Department of Geography, University of New England: Armidale.
- Le Maitre, R. W. (ed) 1989 *A Classification of Igneous Rocks and Glossary of Terms*. Blackwell Scientific Publications: Oxford.
- Low, T. 1989 *Bush Tucker: Australia's Wild Food Harvest*. Angus and Robertson: Sydney.

- MacDonald, K. and I. Davidson, n.d. *The Bayswater Archaeological Research Project: Volume One*. Unpublished report to Bayswater Colliery Company Pty Ltd.
- Mathews, R. H. 1894 Some stone implements used by the Aborigines of New South Wales. *Journal and Proceedings of Royal Society of New South Wales* (28):301-305.
- Mathews, R. H. 1903 Languages of the Kamilaroi and other Aboriginal Tribes of New South Wales. *JAI* 33: 259-283.
- 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.
- Miller, J. 1985 *Koori: A Will to Win: The Heroic Resistance, Survival and Triumph of Black Australia*. Angus & Robertson: Sydney.
- Mills, K. W. 2005 *Subsidence Assessment for Longwalls 23-26 and Longwall W1 at Ulan Coal Mine*. Unpublished report to Ulan Coal Mines Limited.
- Mills, K. W. 2007 *Subsidence Assessment for Longwalls W2 and W3 at Ulan Coal Mine*. Unpublished report to Ulan Coal Mines Limited.
- Mills, K. W. 2009 *Part 3A Subsidence Assessment Ulan Coal Continuing Operations*. Unpublished report to Ulan Coal Mines Limited.
- Mitchell, P. 1988 The influences of vegetation, animals and micro-organisms on soil processes. In, Viles, H. A. (ed) *Biogeomorphology*. Basil Blackwell Ltd: Oxford.
- Mitchell, P. 2005 *Geomorphological Assessment of Aboriginal Sites, Anvil Hill Project*. Unpublished report to Umwelt (Australia) Pty Ltd.
- Moore, D. R. 1969 The Prehistory of the Hunter River Valley. *Australian Natural History* 16(5): 166-171.
- Moore, D. R. 1970 Results of an archaeological survey of the Hunter River Valley, New South Wales, Australia. Part I. *Records of the Australian Museum*. 28: 25-64.
- Moore, D. R. 1981 Results of an archaeological survey of the Hunter River Valley, New South Wales, Australia. Part 2: Problems of the lower Hunter and contacts with the Hawkesbury Valley. *Records of the Australian Museum* 33(9):388-442.
- MSEC 2022 *Wambo Coal: South Bates Extension Longwalls 24 to 26 Modification Subsidence Assessment*. Unpublished report to Wambo Coal Pty Ltd.
- Mulvaney, D.J. and Kamminga, J. 1999 *Prehistory of Australia*. Allen and Unwin: Sydney.
- Nashar, B. 1964 *The Geology of the Hunter Valley*. Jacaranda Press: Newcastle.
- 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 Legislative Council 1846 *New South Wales Aborigines: Replies to a Circular Letter Addressed to the Clergy of All Denominations, By Order of the Select Committee on the Condition of the Aborigines*. W.W. Davies: Sydney. Manuscript AB9841, Auchmuty Library, University of Newcastle.

- NSW Minerals Council 2010 *NSW Minerals Industry Due Diligence Code of Practice for the Protection of Aboriginal Objects*. NSW Minerals Council Limited: Sydney.
- Office of Environment and Heritage (OEH) 2011a *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*. OEH: Sydney.
- Office of Environment and Heritage (OEH) 2011b *Applying for an Aboriginal Heritage Impact Permit: Guide for Applicants*. OEH: Sydney.
- Office of Environment and Heritage (OEH) 2011c *Guide to Aboriginal Heritage Impact Permit Processes and Decision-Making*. OEH: Sydney.
- OzArk 2016 *Aboriginal Archaeological Values Assessment, United Wambo Project, Singleton Local Government Area*. Unpublished report to Glencore/Peabody Energy.
- Packard, P. 1991 *Sites and Sampling in the South East Forests: Research Design, Sampling Methodologies and Sample Selection for a Proposed Site Survey Project*. Unpublished report to NPWS and NSW Forestry Commission.
- Packard, P. 1992 *An Archaeological Assessment of State Forests in the Kempsey and Wauchope Forestry Management Areas*. Unpublished report to NSW Forestry Commission.
- Pearson, M. 1981 *Seen Through Different Eyes: Changing Land Use and Settlement Patterns in the Upper Macquarie River Region of NSW from Prehistoric Times to 1860*. Unpublished PhD Thesis, Sydney University.
- Peterson, N. 1976 *Tribes and Boundaries in Australia*. AIAS: Canberra.
- Press, F. and Siever, R. 1986 *Earth* (fourth edition). W. H. Freeman and Company: New York.
- Raggatt, H. G. 1938 Note on some silicified terrace sands ('grey billy') in the Hunter Valley (N.S.W.). *Journal and Proceedings of the Royal Society of New South Wales* (72):318-324.
- Rich, E. 1991a *Proposed Open-Cut and Underground Mining at Wambo, Near Warkworth, in the Hunter Valley, NSW: Archaeological Survey for Aboriginal Sites*. Unpublished report to Envirosiences Pty Ltd.
- Rich, E. 1991b *Investigation of Aboriginal Sites SW3 and SC4 at South Wambo, Near Bulga, NSW*. Unpublished report to Envirosiences Pty Ltd.
- Rich, E. 1993 *Proposed Bengalla Coal Mine, Muswellbrook NSW: Archaeological Survey for Aboriginal Sites*. Unpublished report to Envirosiences Pty Ltd and Bengalla JV.
- Rich, E. 1995 Site W4 (NPWS #37-6-155), Warkworth, Hunter Valley: artefact analysis. in Haglund, L. and Rich, E. *Warkworth Open Cut Coal Mines: Report on Salvage Investigation of Site 37-6-155 (= Mt. Thorley E/W4), Carried out in Compliance With NPWS Consent #732. Volumes I-III*. Unpublished report to Warkworth Mining Ltd.
- Rick, J. W. 1978 *Heat-Altered Cherts of the Lower Illinois Valley*. Northwestern University Archaeological Program, Prehistoric Records No. 2.

- Rowney, M. 1992 *Heat Treatment on the Rocks: (Shaken not Stirred): A Study of Heat Treatment Detection Methods*. Unpublished BA (Hons) Thesis, Department of Prehistoric and Historical Archaeology, University of Sydney.
- Roy, P. and Boyd, R. 1996 *International Geological Correlation Program Project No. 367. Quaternary Geology of Southeast Australia: a Tectonically Stable, Wave Dominated, Sediment-Deficient Margin: Field Guide to the Central New South Wales Coast*. Geological Survey of NSW, Department of Mineral Resources: Sydney.
- Roy, P. S., Hudson, J. P. and Boyd, R. L. 1995 Quaternary geology of the Hunter delta - An estuarine valley-fill case study. In, Sloan, S. W. and Allman, M. A. (eds) *Conference on Engineering Geology of the Newcastle-Gosford Region*. Australian Geomechanics Society: Sydney.
- RPS 2011 *Aboriginal Cultural Heritage Impact Assessment: Montrose East Underground Modification*. Unpublished report to Wambo Coal Pty Ltd.
- RPS 2012a *Cultural Heritage Impact Assessment: North Wambo Underground Mine Modification*. Unpublished report to Wambo Coal Pty Ltd.
- RPS 2012b *Aboriginal Due Diligence Assessment: Montrose Water Storage Modification*. Unpublished report to Wambo Coal Pty Ltd.
- RPS 2014a *Cultural Heritage Impact Assessment: North Wambo Underground Mine Longwall 10A Modification*. Unpublished report to Wambo Coal Pty Ltd.
- RPS 2014b *Wambo Aboriginal Archaeological Site Distribution and Landform Mapping, Interim Report, Wambo Coal Mine*. Unpublished report to Wambo Coal Pty Ltd.
- RPS 2015 *South Bates (Wambo Seam) Underground Mine Modification Cultural Heritage Impact Assessment*. Unpublished report to Wambo Coal Pty Ltd.
- RPS 2016a *Cultural Heritage Impact Assessment: South Wambo Underground Mine Modification*. Unpublished report to Wambo Coal Pty Ltd.
- RPS 2016b *Wambo Salvage Report for Artefacts Salvaged by Navin Officer*. Unpublished report to Wambo Coal Pty Ltd.
- Scarp Archaeology 2009a *Warkworth Sands Archaeological Project*. Unpublished report to Rio Tinto Coal Australia.
- Scarp Archaeology 2009b *Cultural Heritage Investigations: Warkworth Southwest Study Area*. Unpublished report to Rio Tinto Coal Australia.
- Silcox, R. 1998 *Archaeological Assessment for a Proposed Rail Spur Line and Coal Loading Facility, Jerrys Plains, NSW*. Unpublished report to CMPS&F Pty Limited.
- Sokoloff, B. 1978a As it was in the past. *Hunter Natural History* 10:145-148.
- Sokoloff, B. 1978b Aborigines and fire in the Lower Hunter. Part 1. *Hunter Natural History* 10:70-80.
- Sokoloff, B. 1978c Aborigines and fire in the Lower Hunter. Part 2. *Hunter Natural History* 10:124-129.

- Sokoloff, B. 1978d Aborigines and fire in the Lower Hunter. Part 3. *Hunter Natural History* 10:192-197.
- Stephenson, B. and Kuskie, P. 2016a *Wambo Coal Mine, Hunter Valley, New South Wales: Reassessment of Previously Reported Grinding Groove Locations*. Unpublished report to Wambo Coal Pty Limited.
- Stephenson, B. and Kuskie, P. 2016b *Wambo Coal Mine, Hunter Valley, New South Wales: Reassessment of Previously Reported Grinding Groove Locations - Supplementary Report in Relation to Wambo Sites 117 and 473*. Unpublished report to Wambo Coal Pty Limited.
- Story, R. 1963 Vegetation of the Hunter Valley. In, Story, R., Galloway, R. W., van de Graaff, R. H. M. and Tweedie, A. D. General Report on the Lands of the Hunter Valley. *Land Research Series No. 8*. CSIRO: Melbourne.
- Summerfield, M.A. 1983 Silcrete. In A. S. Goudie and K. Pye (eds), *Chemical Sediments and Geomorphology: Precipitates and Residua in Near-Surface Environments*. Academic Press, London.
- Thom, B. G., Bowman, G. M. and Roy, P. S. 1981 Late Quaternary evolution of coastal sand barriers, Port Stephens - Myall Lakes area, Central New South Wales, Australia. *Quaternary Research* 15:345-364.
- Thompson, K. 1985 *A History of the Aboriginal People of East Gippsland*. Unpublished report to Land Conservation Council, Victoria.
- Threlkeld, L. E. 1834 *An Australian Grammar, Comprehending the Principals and Natural Rules of the Language, as Spoken by the Aborigines, in the Vicinity of Hunter's River, Lake Macquarie, andc. New South Wales*. Stephens and Stokes: Sydney.
- Threlkeld, L. E. 1892 *An Australian Language as Spoken by the Awabakal, the People of Awaba or Lake Macquarie (near Newcastle, New South Wales) Being an Account of Their Language, Traditions and Customs*. Charles Potter, Sydney.
- Tindale, N. B. 1974 *Aboriginal Tribes of Australia*. ANU: Canberra.
- Tocomwall Pty Ltd 2015 *Glencore United Collieries Aboriginal Cultural Heritage Assessment*. Unpublished report to Glencore Coal Assets Australia Pty Ltd.
- Torrence, R. 1983 Time budgeting and hunter-gatherer technology. In, G. Bailey (ed), *Hunter Gatherer Economy in Prehistory*. Cambridge University Press: Cambridge.
- Turner, J. and Blyton, G. 1995 *The Aborigines of Lake Macquarie: A Brief History*. Lake Macquarie City Council: Speers Point.
- Umwelt (Australia) Pty Ltd 2006 *Aboriginal Archaeological Assessment Anvil Hill Project*. Unpublished report to Centennial Hunter Pty Ltd.
- Urban Tree Management 2011 *Report: Arboricultural Assessment of Scarred Trees at Warkworth New South Wales*. Unpublished report to Peabody Wambo Coal.
- Wambo Coal Pty Ltd (WCPL) 2019 *Wambo Coal Heritage Management Plan*. Document #WA-ENV-MNP-510.

- White, E. 2003 *Wambo Development Project: Aboriginal Heritage Assessment*. Unpublished report to Resource Strategies Pty Ltd.
- Windross, J. and Ralston, J. P. 1897 *Historical Records of Newcastle 1797-1897*. Federal Printing and Bookbinding Works: Newcastle.
- Wood, W. A. 1972 *Dawn in the Valley: The Story of the Settlement in the Hunter River Valley to 1833*. Wentworth Books: Sydney.

ACKNOWLEDGEMENTS

The consultant wishes to acknowledge the assistance of the following people:

- ❑ Peter Jaeger, Nicole Dobbins and staff, Wambo Coal Pty Limited;
- ❑ Josh Peters, Jo Hinks, Lucas Burns and staff, Resource Strategies;
- ❑ Members of the Registered Aboriginal Parties, particularly Allen Paget, Wayne French, Marcus Sproule, Donna Sampson, George Sampson and Ashley Sampson.

DISCLAIMER

The information contained within this report is based on sources believed to be reliable. Every effort has been made to ensure accuracy by using the best possible data and standards available. The accuracy of information generated during the course of this field investigation is the responsibility of the consultant.

However, as no independent verification is necessarily available, South East Archaeology provides no guarantee that the base data (eg. the Heritage NSW AHIMS) or information from informants (obtained in previous studies or during the course of this investigation) is necessarily correct, and accepts no responsibility for any resultant errors contained therein and any damage or loss which may follow to any person or party. Nevertheless this study has been completed to the highest professional standards.

APPENDIX 1.

GLOSSARY

Acidic volcanic - broad category of extrusive, fine-grained igneous stone, formed by rapid cooling.

Activity - the nature of behaviour that resulted in the discard of a lithic item. Categories include *non-specific stone flaking*, *bipolar flaking*, *microblade production*, *microlith production*, *loss or intentional discard of microliths* and *loss or discard of non-microlith tools*.

Activity area - a single location in which one or more *activity events* has resulted in the discard of items that constitute archaeological evidence. For example, an *activity area* may represent a single *activity* such as *microblade production*. However, this activity is comprised of numerous *activity events* (eg. each blow to the core can be described as an *activity event*), which result in multiple discarded items, each from different *activity events*.

Activity event (discard event) - the discard of lithic item(s) resulting from a single action performed during an *activity*. For example, a single blow to a core during a *non-specific stone flaking* event may result in the detachment of several flakes.

Alternate platforms - different flake initiation surfaces or platforms on a core (nucleus).

Archaeological site - any location that contains evidence of human activity.

Archaeological visibility - a mean estimate of the percentage of visible ground surface within a *sample area* or *site* that has potential to contain evidence of Aboriginal heritage.

Artefact - an object, normally portable, made or modified by the human hand (refer also to *stone artefact*).

Artefact density per square metre of effective survey coverage - mean number of artefacts within each square metre of visible ground surface with potential to contain Aboriginal artefacts that is physically inspected. Calculated by dividing the *number of artefacts* by *effective survey coverage*.

Artefact scatter - a locality that contains evidence of Aboriginal occupation in the form of stone artefacts. For the purposes of the assessment, artefact scatter sites were defined as the presence of one or more stone artefacts within a *survey area* (Kuskie 2000a). The survey areas are based on discrete, repeated *environmental contexts* or *archaeological terrain units*. Each spatially discrete location of evidence within a survey area is defined as a site locus, with the boundaries of the site locus defined by the visible extent of artefacts (ie. Aboriginal objects protected under the *National Parks & Wildlife Act 1974*). However, it is assumed that there is a similar probability for comparable evidence to occur elsewhere within the same survey area. Hence, while the visible site loci boundaries are defined by the extent of visible evidence, across the entire survey area in which a site is identified there exists a *potential resource* of comparable evidence.

Associated - where artefacts are identified to be in context with other material. Two main forms of association are where artefacts are identified to be of the same stone material and potentially belonging to the same reduction event, and where artefacts are associated with another feature such as a hearth.

Backed artefact - a retouched flake with one or more margins retouched at a steep angle, and that margin is opposite a sharp edge. The steep margin is formed by bipolar or hammer and anvil knapping. This type of artefact is subdivided into asymmetrical (Bondi) and symmetrically (geometric) shaped backed artefacts.

Backed artefact - retouched - a *backed artefact* with intentional retouch along the chord.

Backed blade - refer to *backed artefact* or *microlith*.

Background scatter (background discard) - manuports and artefactual material that are insufficient either in number or in association with other material to suggest focused activity in a particular location.

Backing (retouch) - abruptly angled flaking (retouch) which has shaped a thick back part to an implement such as an elouera or a microlith. The process of flaking varies from bipolar impact (on some eloueras) to delicate application of pressure with a small stone ('chimbling' used to make microliths).

Backing flake - a small flake detached from an artefact during the process of backing.

Bending initiation - (commonly associated with soft hammer percussion and pressure flaking) - the commencement of a fracture by the application of a bending load or force, as in breaking a bar of chocolate, where the load is applied away from the point at which the object breaks.

Bipolar flaking - a method of making flakes or retouched flake tools by breaking a piece of stone rested on a stone surface by repeatedly striking the core from above with a stone hammer. Bipolar reduction is evidenced by fracture/initiation (often wedging) at 'both' ends of the 'same' flake/scar and is quite different to simple Hertzian or bending initiation with regular terminations (feather, hinge, step etc.) on a small anvil rested core. It is often employed when core inertia becomes low and/or when platform angles become high, or to commence reduction of a small waterworn pebble.

Bondi point - a sub-type of microlith or *backed artefact* with abruptly angled backing retouch along one lateral margin (and often the butt end) so that it has an asymmetrical plan shape similar to a pen knife blade. This microlith type is commonly found east of the Great Divide as far north as Great Keppel Island.

Bondi point - butt - the thicker end of a bondi point, normally the proximal part of the original flake or microblade preform from which the bondi point has been fashioned.

Bondi point preform - a microblade or flake that has been partially backed by abruptly angled retouch scars along one lateral margin for the purpose of making a bondi point.

Bondi point - tip - the thinner end of a bondi point, normally the distal part of the original flake or microblade preform from which the bondi point has been fashioned.

Bulb of force (bulb of percussion) - the rounded outwards swelling of the inside surface of a conchoidal flake beginning just below the partial or complete Hertzian cone. This swelling is caused by the uniform change of direction of the fracture front as the outward bending component of the applied force decays and is overtaken by the compressive component of the force.

Chert - a highly siliceous rock type formed biogenically from the compaction and precipitation of the silica skeletons of diatoms. Normally there is a high percentage of cryptocrystalline quartz. This rock type breaks by the process of conchoidal fracture and provides flakes that have sharp, durable edges.

Chord - the cutting edge of a microlith.

Cobble - waterworn stones of diameter greater than 64 mm and less than 256 mm. Archaeologists often refer to cobbles as pebbles (refer also to *pebble*).

Conjoin analysis - refitting or 'conjoining' artefacts assists with reconstructing prehistoric events (such as tool manufacture, tool use activities and cutting-edge rejuvenation) and determining chronology and assessing site integrity.

Core (synonymous with *nucleus*) - a piece of stone, often a cobble or pebble, but also quarried stone, which has been used for striking flakes. These flakes are called 'primary flakes' and may be further shaped by finer flaking, called 'retouch'. The term 'nucleus' refers to cores and flakes or cores that have been retouched.

Core fragment - a portion of a core, typically retaining one or more flake scars but not the platform.

Core rotation - turning of a core (nucleus) on its side or end, so as to continue detaching useful flakes or blades off another surface. Usually this occurs when the previously flaked part of the core became unsuitable for further flake removal.

Cortex - the weathered surface of a piece of stone altered by chemical and/or physical means. Pebble cortex is topographically smooth and occurs with a continuous curve.

Cortex amount - amount of the original weathered surface of the stone material, expressed as a percentage of the item's dorsal surface for flakes or total surface for other items.

Cortex type - nature of the original weathered surface of the stone material. Three types are identified: waterworn/pebble (rounded waterworn surface), tabular (smooth tabular shaped surface, may be waterworn) and terrestrial (rough cortex not consistent with tabular or waterworn surface).

Cortical initiation surface - an initiation surface on a pebble or cobble (refer to 'cortex' and 'initiation surface/platform').

Debitage - commonly used term for the discarded debris from stone flaking. Usually there is a large quantity of flaking refuse or 'debitage' for every finished stone implement.

Discard - in relation to lithic scatters, discard means the incidental, intended or accidental placement of a lithic item on the ground surface.

Distal portion or end - the end of a flake or microblade (opposite to point of fracture origin on the ventral surface).

Dorsal face/facet - the outside surface(s) of a flake, opposite the inside (bulbar or ventral) surface, created during the formation of the flake (refer also to *ventral face*).

Drainage depression - landform element that typically comprises a shallow open depression with smoothly concave cross-section, rising to moderately inclined side slopes, eroded or aggraded by sheetwash (after McDonald *et al* 1984). For the purposes here, this unit also includes gullies (drainage depressions subjected to gully erosion), along with ground up to approximately 50 metres either side of the centre of the drainage depression.

Edge rounding - rounding wear along the cutting edge of a stone tool resulting from its use. This use-wear can be described as continuous or discontinuous and moderate or pronounced (refer also to *use-wear*).

Effective survey coverage - a measure of the quantity of visible ground surface physically inspected within a *sample area*, with potential to contain Aboriginal heritage evidence. Calculated by multiplying the *total sample area* of a *survey area* with the percentage of *archaeological visibility*. For a *total sample area* that includes multiple exposures, the *effective survey coverage* of each exposure was calculated separately and added to produce the reported figure.

Elongated flake - a flake at least twice as long as it is broad (by percussion axis).

Environmental context (archaeological terrain unit) - discrete, recurring areas of land in which the same combination of landform element and class of slope are present.

Environmental/cultural context - a specific context that exists (generally within an individual archaeological terrain unit), that may host a different range of evidence (reflecting different types and frequencies of activities) than other locations within the same archaeological terrain unit or environmental context. For example, a particular spur crest may lead from a ridgeline used for transitory movement to a camp site bordering a food resource, whereas another spur crest may lead to a stone material source. Individual survey areas on these spur crests may host different types and proportions of evidence, reflecting different ways in which these landforms were utilised.

Feather termination - a normal ending to a flake, in which the fracture turns slightly to meet the fresh surface of the core at a very low angle, as in the ending of a feather.

Flake - a complete or substantially complete piece of lithic material detached from a core (nucleus), usually with evidence of hard indenter initiation, or occasionally bending initiation. The flake's primary fracture surface (ventral or inside surface) exhibits features such as fracture initiation, bulb of force, and undulations and lances. Very occasionally a conchoidal flake comprises only a bulb of force.

Flake - distal - a flake portion without its area of fracture initiation but with general shape characteristics and/or fracture surface attributes (usually conchoidal markings) indicating its status as an artefact fragment.

Flake - longitudinal - a flake longitudinally fractured from its proximal to its distal end. The breakage may be slightly tangential but are mostly axial in orientation. Such breakages tend to occur during knapping (such as longitudinal cone splits) rather than through post-depositional processes.

Flake - medial - a mid portion of a flake, without the proximal or distal ends.

Flake portion - medial, proximal, longitudinal or distal portion of the original flake.

Flake - proximal - the proximal portion of a flake retaining its area of primary fracture initiation, including 'step terminated flakes'.

Flake - proximal - utilised - proximal portion of a flake which displays macroscopic evidence of use.

Flake - utilised - refer to '*utilised flake or piece*'.

Flaked piece - refer to '*lithic fragment*'.

Flat - landform element that is neither a crest nor a depression and is level or very gently inclined (after McDonald *et al* 1984).

Focused initiation surface - an initiation surface area defined by a complete or partial Hertzian cone, sometimes with lateral extensions forming a narrow platform which is less than twice the area of the ring crack.

Freehand percussion - striking a core held in one hand with a hammer (usually stone) held in the other.

Geometric microlith - a group of microliths distinguished by their various geometric plan-shapes such as triangle, trapeze and rectangle.

Grinding grooves - typically elongated narrow depressions in soft rocks (particularly sedimentary), generally associated with watercourses. The depressions are created by the shaping and sharpening of ground-edge hatchets and grinding of seeds and processing of other plant matter and animal foods.

Ground disturbance - an estimate of the extent of recent human impacts and impacts of natural processes, noted in low, moderate or high categories, modified after McDonald *et al* (1984:69). The low category includes no effective disturbance, minor vegetation removal and low intensity grazing and minimal erosion. The moderate category includes extensive vegetation removal, improved pasture grasses and moderate levels of erosion. The high category includes complete vegetation removal and cultivation, extensive erosion and areas where the A horizon soil has been removed.

Ground edge axe - (hatchet) - a multipurpose implement normally made from a hard basic volcanic stone, often finished by grinding the edge on an abrasive stone (ground-edge axe). Stone hatchets were an essential part of a male's tool-kit. Some of their uses included to cut saplings for building gunyahs, for stripping bark from trees, cutting notches in trees for climbing, and cutting toe-holds in trees to procure animals or honey from bee nests.

Hammerstone - a piece of stone used as a hammer to detach flakes from a core or in applying controlled pressure when retouching a tool's edge. Stone hammers are often quartzite or a volcanic stone, round or oval in shape, with concentrated hammer impact damage on at least one side or end. The presence of use-wear often is the only diagnostic attribute of this tool type.

Heat fracture - fractures cause by heating the stone, either from natural causes, a camp fire, or intentional heat treatment. Also termed *heat shatter* and *thermal fracture*. Attributes indicating heat fracture include colour change, crazing, potlidding and rugose fracture surface topography.

Heat treatment - the intentional slow heating of stone, such as silcrete, to alter its structure (such as homogenising the matrix) and thereby improve its flaking properties.

Hertzian cone - similar in shape to the neck of a milk bottle with the top of the cone being the initiation of the circular fracture. On a flake surface the cone is not fully formed and is represented by one side, because the fracture-initiating force was applied from above at an angle of about forty-five degrees, not ninety degrees.

Hertzian initiation - a Hertzian cone initiation which leads to the formation of a conchoidal flake (refer to 'Hertzian cone').

Hinge termination - when the end of the flake or fracture continuously turns at ninety degrees to the surface of the core or outside surface of the flake (refer also to 'retroflexed hinge termination').

Implement (of stone) - synonym for a *stone tool*, usually denoting a tool that has been shaped by flaking (retouch).

Indurated mudstone - refer to *tuff*.

Indurated rhyolitic tuff - refer to *tuff*.

Initiation surface/platform - the surface of a stone that is struck with a hammerstone at a low angle, for the purpose of detaching a flake. This surface is where a flake-forming crack commences; commonly part of it is retained on the flake. The load applied to this surface may be delivered by a hammerstone or by continuous increasing pressure with a length of dense wood or bone.

Knapping floor - a series of flaking events (refer to *knapping event*) that are generally defined as involving a single stone core (but sometimes multiple cores of the same or different materials) and resulting in the deposition of stone flaking debris that may be later recorded in discrete areas or be mixed by post-depositional processes.

Knapping event - a single act of flaking a piece of stone, resulting in the *in-situ* deposition of stone flaking debris. Such an event may occur as part of a series of events (refer to *knapping floor*).

Landform element - specific type of topographical feature, following the definitions of McDonald *et al* (1984).

Lateral margin - the thin sides of a flake or microblade.

Lithic - in an archaeological context, items of a hard, usually siliceous, stone of a type selected by Aborigines for tool making. These items are often nondescript fragments, but some are finely shaped implements.

Lithic assemblage (of stone) - a collection of whole and fragmentary stone artefacts and manuports obtained from an archaeological site, either by collecting items scattered on the present ground surface (refer to *artefact scatter*) or by controlled excavation (refer also to *stone artefact*).

Lithic fragment - (or *flaked piece*) - a flaked piece of stone which lacks sufficient morphological attributes to identify it as a flake (a positive scar) or a core (only negative flake scars) or other specific type.

Lithic item - a piece of stone exhibiting fracture surfaces and not identified as a natural piece of stone.

Lithic item associations - inferred relationships between individual lithic items as recorded in the databases. Formal associations between items is based on single or combination of intrinsic attributes such as stone type and colouration, presence of microscopically similar cortex surface, artefact type, production method and metrical dimensions, and extrinsic factors such as nature and characteristics of other lithic items from the unit of sediment excavated. While all such associations are less secure than conjoined artefacts, the level of reliability is from possible to highly probable.

Lithic item type - formal category of an artefact (including lithic fragments).

Lithic quarry - a site of stone procurement, typically used in the specific sense to refer to outcrops of bedrock, where there is clear evidence of procurement activity such as pits, discarded hammerstones and large deposits of primary flaking debris.

Loss or discard of non-microlith tools - activity category comprising the loss or intentional discard after use or caching for future use of implements other than microliths.

Loss or intentional discard of microliths - activity category comprising the discard of microlithic implements either during manufacture, after use or unintentionally.

Mean archaeological visibility of site - an estimate of the mean visible ground surface within a *site* that has potential to contain evidence of Aboriginal heritage (expressed as a percentage of the *visible site area*).

Mean artefact density - the average number of surface artefacts recorded within each square metre of visible ground surface with potential to contain Aboriginal artefacts that is physically inspected within a sample area (eg. a site locus or a survey area). Obtained by dividing the *number of artefacts* by the *effective sample area* and expressed as a number of artefacts per square metre of effective sample area. Alternatively, the average number of artefacts located within a volume of excavated deposit, per unit of volume (eg. cubic metre). *Conflated* artefact density refers to the number of artefacts located within a volume of excavated deposit, expressed as a mean of the surface area of the excavation (eg. # artefacts per square metre). This measure is designed to reduce the impact of sediment volume on density comparisons (eg. geomorphological processes will result in lower slopes having a deeper A unit soil than upper slopes).

Mean surface visibility - an estimate of the mean visible ground surface within a *sample area*.

Microblade - an elongated flake with one or more longitudinal ridges and a length greater than twice the width. This type of specialised flake is detached from a microblade core. They were probably fashioned into spear barbs, during recent prehistoric times.

Microblade core - a small core from which regularly shaped bladelets have been struck. Some microblade cores have only one or two microblade facets; others have numerous facets emanating from more than one striking platform.

Microblade portion - a piece of broken microblade (either proximal, distal, medial or longitudinal portion).

Microblade production - activity category describing a method of making small implements (eg. bondi points, geometric microliths) from regular blades struck from a small core.

Microlith - (synonymous with *backed blade*) - a variety of small, delicately retouched implements of various shapes, such as asymmetric (bondi) point, segment, crescent, triangle, trapeze, rectangle and oblique ended. These implements probably functioned as spear barbs.

Microlith production- backing retouch of microliths.

"*Mudstone*" - refer to *tuff*.

Multiple scars fracture initiation surface - an initiation surface which comprises more than one flake scar (refer also to 'initiation surface'). Includes fracture surfaces that are faceted.

Negative - a scar on an artefact (usually concave) caused by the removal of a flake.

Non-specific stone flaking - activity category of general or non-specific knapping activity. Artefacts do not identify a more specific activity. Includes debitage from primary flaking and from making flake tools.

Ochre - a clay containing sufficient iron oxide to enable it to be used as a pigment. Ochre occurs in red (haematite), yellow and brown (limonite and goethite) colours and may be a friable sediment or a hard metallic stone. Ochre paints vary in depth, richness and shade of colour, and in ease of grinding and staining ability, depending on the particular geological source of the raw ochre.

Outrepassé termination - (also 'plunging') a flake with a thick ending caused by the flake-forming fracture turning inwards within the core. This occurs when the fracture front approaches the bottom of a core.

Overhang removal - where there is evidence to suggest that some platform preparation has occurred in the form of removing small flakes from the edge of the core prior to the removal of further flakes.

Pebble - a waterworn stone less than 64 millimetres in diameter. Refer also to *cobble*.

Pebble (waterworn) cortex - the topographically smooth weathered surface of a stone, which occurs with a continuous curve.

Petrified wood - a banded brown and grey rock, originating from the replacement of the original wood by silica. Petrified (or 'fossilised') wood is another form of chert. After dead wood is buried by sediment, often containing volcanic ash, water infiltrates it leading to the replacement of the wood by silica. When petrified wood is struck along what was the original grain, an irregular fracture results.

Plain fracture initiation surface - an initiation surface which comprises a single flake scar or continuous cortex surface (refer also to 'initiation surface').

Platform faceting - a series of flakes removed transversely, to set up the platform of a microblade core. These flake detachments create ridges where the margins of the scars meet or overlap, and such ridges provide surface prominences that are the hammerstone's point of contact. These ridges allow for more precise flaking of microblades.

Platform preparation - flaking the surface of a core's initiation platform (*platform faceting*) and removal of any overhanging edge (spur removal) to create a suitable topography and geometry for microblade detachment.

Potential resource - archaeological evidence predicted to occur through application of a predictive model of site location.

Potlid - a piece of lithic material that has a generally convex or dome-shaped ventral surface, often with evidence of fracture initiation from a location within the surface and not from the edge. Detached by heating and cooling, not percussive blows.

Provenance - the location of a lithic item within a site.

Proximal - the top part of a flake, beginning with the initiation surface or ridge. Likewise for an implement (or tool). The opposite end of the flake is termed the distal end.

Quarry (lithic quarry, stone procurement site) - a general term for the location of an exploited stone source (Hiscock and Mitchell 1993:32). Often in archaeological studies it is used in a more specific sense, to refer to places where stone was obtained by excavation from a bedrock source (*lithic quarry*).

Quartz - a mineral composed of crystalline silica (SiO₂). Quartz is a very stable mineral that does not alter chemically during weathering or metamorphism. It is hard, usually colourless or white ('milky'). In its massive form quartz occurs as geodes or veins, from which pebbles are formed by weathering. Despite the often unpredictable nature of fracture in quartz, the flakes tend to have sharp edges. Flakes made from quartz were widely used in Australia as convenient light-duty cutting tools.

Quartzite - a hard, silica rich stone formed from sandstone that has been recrystallised by heat (metaquartzite) or strengthened by slow infilling of silica in the voids between sand grains (orthoquartzite). The essential difference between sandstone and quartzite is that a major fracture will propagate around the larger grains in sandstone and through the grains in quartzite.

Reduction process - the process of removing flakes from a core, or manufacturing an implement by flaking and/or grinding, or progressively rejuvenating a tool's working edge.

Reduction strategy - strategy of flaking and/or grinding a piece of stone in predetermined stages to produce an implement.

Residues on stone tools - residue analysis concerns the identification of tool use activities from preserved organic and inorganic residues of worked materials. These residues may be compacted into small flake scars on the edges of utilised artefacts or adhere strongly to their surfaces.

Retouch or retouching - an area of flake scars on an artefact resulting from intentional shaping or resharpening of a stone tool. In resharpening a cutting edge, the retouch is invariably found only on one side.

Retouched flake - an artefact or portion of an artefact from which flakes have been removed after the manufacture of the original flake (refer also to *backed artefact* where the purpose of the retouch is to back or blunt a thick margin).

Retouched flake portion - proximal, longitudinal or distal portion of a retouched flake.

Retouched piece - an artefact from which flakes have been removed after the manufacture of the original flake, but which lacks sufficient morphological attributes to identify it as a flake or other artefact type.

Ridge crest - landform element that stands above most or all of the surrounding points in the adjacent terrain, typically smoothly convex upwards and with a length greater than the width of the landform element (after McDonald *et al* 1984).

Sandstone - a cemented or compacted rock consisting of detrital grains, which range in size from 1/16 mm to 2 mm in diameter. Quartz typically comprises the majority of grains. The grains can be bound together by a cement of silica, carbonate or other minerals, or a matrix of clay minerals. The nature of the cement is denoted by terms such as argillaceous (clayey), calcareous, ferruginous and tuffaceous sandstone.

Scarp - a laterally extensive steep to precipitous maximal slope eroded by gravity, water-aided mass movement or sheet flow.

Silcrete - a brittle, intensely indurated rock composed mainly of quartz clasts cemented by a matrix which may be well-crystallised quartz, cryptocrystalline quartz or amorphous (opaline) silica (Langford-Smith 1978:3). The texture of silcrete reflects that of the host rock and clasts may range in size from very fine grains to boulders. Silcrete is produced by an absolute accumulation of silica, which is made available by chemical weathering. The formation of silcrete therefore requires the removal of most elements, other than silicon, in the host material. Silcrete is normally grey in colour, but can be whitish, red, brown or yellow. It shatters readily into sharp, angular pieces with a conchoidal fracture and newly broken rocks have a semi-vitreous sheen (Langford-Smith 1978:4).

Simple slope - slope landform element adjacent below a crest or flat and adjacent above a flat or depression (after McDonald *et al* 1984). For the purposes here, this unit also includes *upper slopes*, *mid-slopes* and *lower slopes* as these become problematic to differentiate on the surface or on base mapping.

Site - location of evidence of Aboriginal occupation.

Site integrity - the extent to which the distribution of site contents corresponds to their spatial relationships at the time of deposition. Subsequent to deposition, a range of post-depositional processes affect the spatial relationships of items, and therefore site integrity.

Size class - artefact size as the maximum measurement in any direction, in units of 10 mm. For example, class '1' equals items with a maximum dimension of up to 10 mm and size class '2' equals items with a maximum dimension of between 10 and 20 mm.

Slope (class of slope) - gradient delineated after McDonald *et al* (1984):

Class 1 (level/very gentle) - level to very gently inclined slopes $<1^{\circ}45'$;

Class 2 (gentle) - gently inclined slopes $>1^{\circ}45'$ and $<5^{\circ}45'$; and

Class 3 (moderate) - moderately inclined slopes $>5^{\circ}45'$ and $<18^{\circ}$.

Class 4 (steep) - steeply inclined slopes $>18^{\circ}$.

Spit - a level in which an excavation unit is excavated.

Spur crest - landform element comprising a *ridge crest* that descends from a dominant or main ridge crest to adjacent lower elevation terrain.

Step termination - when the end of the flake turns sharply at ninety degrees to the surface of the core or outside surface of the flake.

Stone artefact - a piece of stone with evidence of intentional human modification.

Stone material - the geological type of stone from which an artefact is made. Synonymous with 'lithic material', 'stone type' and 'raw material', the latter of which is a less specific but commonly used term.

Stone procurement site (quarry) - a general term for the location of an exploited stone source. Sources can vary from alluvial gravels (where there may be little or no archaeological evidence of human activity) to extensively quarried outcrops of bedrock, where there is clear evidence of procurement activity such as pits, discarded hammerstones and large deposits of primary flaking debris (refer also to *quarry*, *lithic quarry*).

Stone tool - a piece of flaked or ground stone used in an activity or fashioned for use as a tool. A synonym of stone tool is *implement*, which is more often used to describe a flake tool fashioned by more delicate flaking (retouch).

Sub-surface deposit - identified or predicted deposits of artefacts buried under the surface, both in open contexts and within rock shelters.

Surface visibility - a mean estimate of the percentage of visible ground surface within a *total sample area* or a *site*. Where a single component's *sample area* is comprised of multiple exposures, the surface visibility was recorded separately and the range of the surface visibility percentages noted in the database.

Survey area - an area sampled during the present survey, consisting of a single *environmental context* (*archaeological terrain unit* or discrete area of land in which the same combination of landform element and class of slope are present) that is bounded on all sides by different environmental contexts or archaeological terrain units.

Tabular cortex (*abbr.* = *tab*) - weathered surface of a tabular shaped cobble.

Terrace - a former flood plain on which erosion and aggradation by channelled and over-bank stream flow is barely active or inactive because deepening or enlargement of the stream channel has lowered the level of flooding (after McDonald *et al* 1984).

Terrestrial cortex (*rough and weathered cortex*; *abbr.* = *terr*) - a cortical surface which has developed by weathering of a fractured surface. Includes surfaces which have been weathered after natural fracturing along faults and exfoliation. Indicative of a terrestrial, not an alluvial source. The topographically rough weathered surface of a stone differs from that of *waterworn* (*pebble*) or *tabular cortex*.

Tuff - lithified volcanic ash with a chemical composition of rhyolite. This stone has been commonly misidentified as *indurated mudstone* and *chert*. Tuff is composed of fine ash which has been hurled from the vent of a volcano during a violent explosive eruption. The tuff is rhyolitic in chemical composition, being comprised of quartz and potassium-feldspar, sometimes with layer silicates. After settling to the land, or more likely ponded water, the tuff undergoes recrystallisation at low pressures. This ‘indurated’ rhyolitic tuff exhibits conchoidal fractures. Colour is predominantly grey but variation occurs when mineral bearing solutions pass through the rock and some minerals (eg. goethite) precipitate out. Some tuff deposits show graded bedding, not unlike that of some sedimentary rocks. Lateral sorting also tends to occur, with coarser material settling closer to the volcanic vent and finer material further away.

Use-wear - microscopic and macroscopic damage to the surfaces of a stone implement resulting from its use. Examination for use-wear is aided by low-magnification microscopy. Major use-wear forms are edge fractures, use-polish and smoothing, abrasion, and edge rounding and bevelling.

Utilised flake or piece - a flake or lithic fragment displaying utilisation wear along one or more edges from use as a hand-held tool or as part of a composite wood and stone implement or weapon. The wear may be edge-rounding, surface polish, abrasive smoothing or abrasion such pitting and scratching (‘striations’).

Valley flat - a compound landform element comprising a gently inclined to level flat, aggraded or occasionally eroded by channelled or over-bank stream flow, typically enclosed by hill slopes (after McDonald *et al* 1984). For the purposes of the survey, this unit also includes stream beds, stream banks and stream channels where they exist within a valley flat.

Ventral face - the inside surface of a flake created during the flake’s formation. The speed of the fracture ranges from about 200 metres to over 1000 metres per second (refer also to *dorsal face*).

Visible extent of artefacts - for each *site*, the approximate dimensions of the area in which artefacts are visible.

Visible extent of surface exposures - the approximate dimensions of a surface exposure in which a *site* has been identified.

Volcanic - rocks produced from the discharge of volcanic matter. Includes crystalline rock, such as granite, formed by the consolidation of magma, and fine-grained igneous rocks that result from more rapid cooling (eg. basalt).

Waterworn (pebble) cortex - the topographically smooth weathered surface of a stone, which occurs with a continuous curve.

APPENDIX 2.

**RELEVANT PREVIOUSLY RECORDED
ABORIGINAL SITE RECORDS¹**

¹ From Heritage NSW AHIMS and Wambo heritage reports.

Kuskie (2020c):

Wambo Site 239 (AHIMS #37-5-0358)

- ❑ Wambo Site 239 was initially recorded by White (2003), who reported that “many artefacts were found on a vehicle track and adjacent erosion area across a spur over a distance of 130 metres”. A total of 148 artefacts were recorded by White (2003).
- ❑ An Aboriginal Site Impact Recording Form (ASIRF) had been lodged by RPS stating that Wambo Site 239 was salvaged “*in accordance with the Wambo Mine AHIP #2222. The site was salvaged in participation with the Registered Aboriginal Parties. Aboriginal consultation was documented and field work was described. The methodology, results and additional details are included in the RPS 2015 Salvage Report: Wambo Aboriginal Archaeological Excavation and Surface Collection – AHIP 2222*”.
- ❑ At the time of report preparation the RPS 2015 Salvage Report had not been lodged with Wambo Coal or the OEH and had not been sighted.
- ❑ The location of Wambo Site 239 was relocated and the site was subject to surface collection on 3 and 4 December 2018 by a qualified archaeologist from South East Archaeology and a representative of the registered Aboriginal parties for Wambo Mine under AHIP #2222 (Kuskie 2019b). A total of 772 artefacts were collected, with many (but possibly not all) of the original artefacts assumed to have been relocated and collected, and numerous previously unrecorded artefacts also collected (Kuskie 2019b).
- ❑ No evidence was identified that Wambo Site 239 had previously been salvaged (by either surface collection or hand excavation as required under AHIP #2222) by RPS.
- ❑ Wambo Site 239 was subject to salvage excavations as required under AHIP #2222 and Section 4.3 of the Wambo HMP by qualified archaeologists from South East Archaeology and representatives of the registered Aboriginal parties for Wambo Mine over 13 days between 29 April and 16 May 2019.
- ❑ The first stage of the salvage excavations comprised initial sub-surface testing consistent with Section 4.3.1 of the Wambo HMP, with 29 test units, each measuring 0.5 x 0.5 metres in area, dug at five metre intervals along two 70 metre length transects. A total of 7.25 m² was excavated and 2.915 m³ of deposit sieved and 300 artefacts retrieved at a mean density of 41.4/conflated m² or 102.9/m³.
- ❑ The second stage of the salvage excavations comprised further controlled hand excavation consistent with Section 4.3.2 of the Wambo HMP, with extensions of excavation by 1 m² units (0.75 m² where the original test unit was located) at test units that had potential for deposits of scientific significance. A total of 10.25 m² was excavated by extensions around Test Units A5, A30, A45-A50, A60, B30 and B35, with 3.768 m³ of deposit sieved and 523 artefacts retrieved at a mean density of 51/conflated m² or 138.8/m³.

² Only the western most edge of the defined shape of Wambo Site 239 lies within the LW24-26 Modification study area. As salvages have been completed by South East Archaeology (Kuskie 2019b, 2020c) only brief details of the site are included here.

- The third stage of the salvage excavations comprised surface scrapes and localised hand excavations consistent with Section 4.3.3 of the Wambo HMP. One mechanical surface scrape was conducted across an area measuring 50 x 40 metres (2,000 m²) with up to 26 separate spits. A total of 225 artefacts were retrieved from the scrape at a mean density of 0.112/conflated m². Two localised hand excavations were conducted around features of potential significance within the scrape, each involving excavation of contiguous 1 m² units. A total of 19 m² was excavated in HE1 with 0.982 m³ of deposit sieved and 1,829 artefacts retrieved at a mean density of 96.3/conflated m² or 1,862.5/m³. A total of 2 m² was excavated in HE2 with 0.029 m³ of deposit sieved and 23 artefacts retrieved at a mean density of 11.5/conflated m² or 793.1/m³.
- A fourth and final stage of the salvage comprised additional surface collection of Wambo Site 239 to retrieve artefacts that had been exposed by heavy rainfall, erosion and vehicular and machinery traffic in the intervening five month period since the previous collection. A total of 120 artefacts were located and collected under AHIP #2222.

Photograph of Wambo Site 239 during first stage of salvage in April-May 2019, Test Unit Transect A (view north-west at completion):



Photograph of Wambo Site 239 during first stage of salvage in April-May 2019, Test Unit Transect B (view south-west at completion):



Photograph of Wambo Site 239 during second stage of salvage in April-May 2019, Test Unit Extensions (A45-A50):



Photograph of Wambo Site 239 during third stage of salvage in April-May 2019, Surface Scrape (view north at completion):



Photograph of Wambo Site 239 during third stage of salvage in April-May 2019, Surface Scrape (view west at completion):



Photograph of Wambo Site 239 during third stage of salvage in April-May 2019, Localised Hand Excavation HE1 in the Surface Scrape (at completion) and HE2 (foreground):



Photograph of Wambo Site 239 during third stage of salvage in April-May 2019, Localised Hand Excavation HE2 in the Surface Scrape (at completion):



Photograph of Wambo Site 239 surface collection, May 2019:



Figure: Overview of Wambo Site 239 showing Scrape, localised hand excavations HE1 and HE2 within the scrape, Test Unit Transects A and B, and artefacts subject to surface collection in May 2019 (aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid).

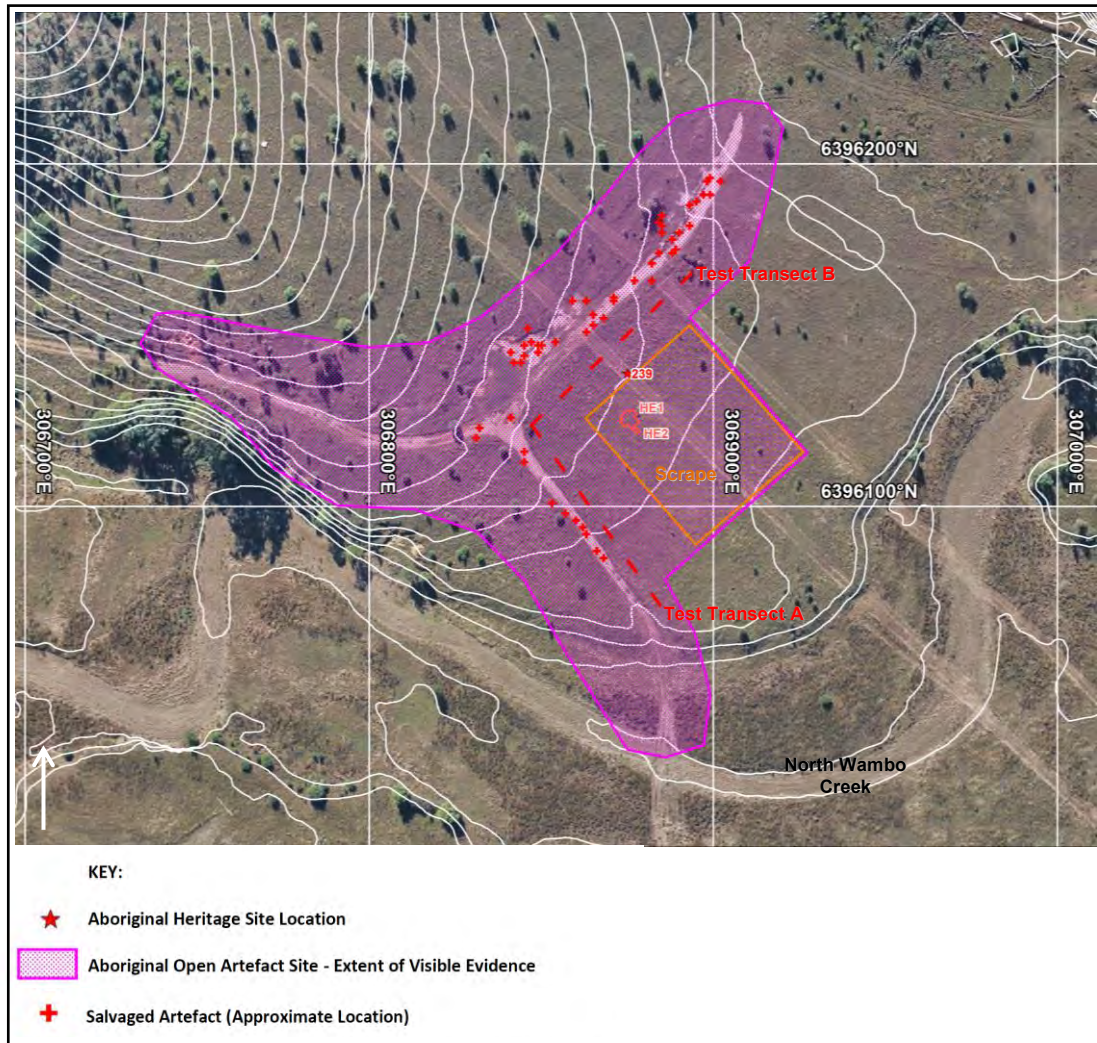
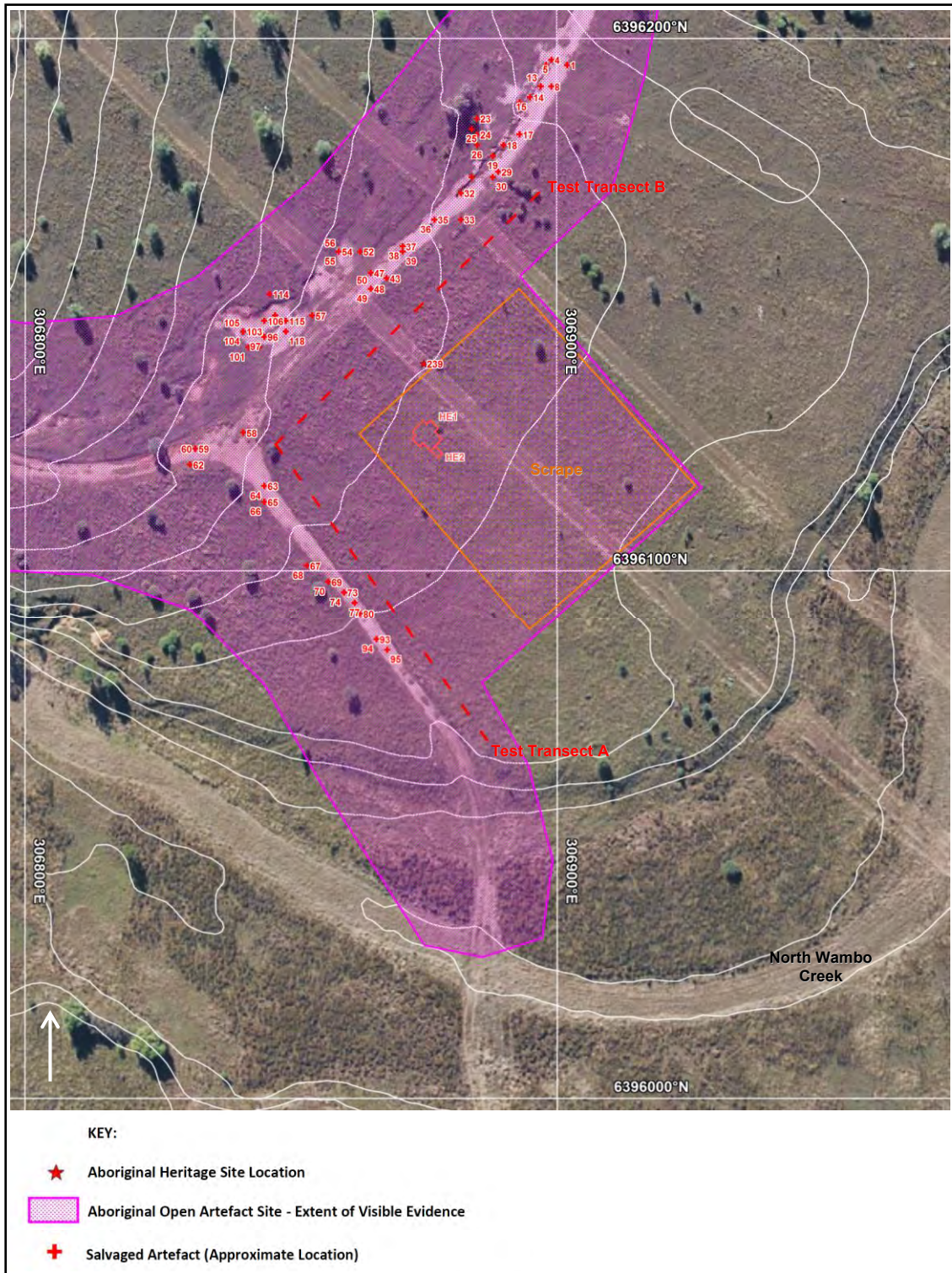



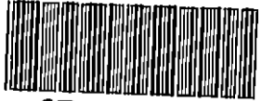
Figure: Plan of Wambo Site 239 showing Scrape, localised hand excavations HE1 and HE2 within the scrape, Test Unit Transects A and B, and artefacts subject to surface collection in May 2019 (aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid).

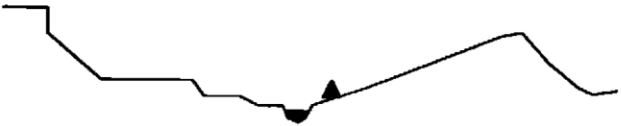


AHIMS #37-5-0359 (Wambo Site 240)

White (2003)/AHIMS Record:

New recording Additional Information

		National Parks and Wildlife Service PO Box 1967, Hurstville, NSW, 2220. Tel: (02) 9586 644 Standard Site Recording Form	
1:250,000 map sheet: <u>SINGLETON</u>		NPWS Code: <u>37</u>	HEAD OFFICE USE ONLY: NPWS Site no: <u>37-5-0359</u>
AMG Grid reference <u>306468 mE 6396030 mN</u> Scale of map used (or grid reference) <input checked="" type="checkbox"/> 25K.50K <input type="checkbox"/> 100K <input type="checkbox"/> 250K Please use largest scale available (preferred) 1:25K. 50K. 100K map name: <u>DOYLES CK (GPS)</u>		Site types: Accessioned by: _____ Date: _____ Data entered by: <u>CP</u> Date: <u>28/3/04</u> Owner/Manager: Address: _____	
Site name: Wambo Site 240	Locality/property name: _____		
NPWS District: _____	Region: Central		
Reason for investigation EIS for Wambo Development Project		 37-5-0359	
Portion no: Parish:			
Photos taken? How many attached?			
How to get to the site (refer to permanent features, give best approach to site eg. from above, below, along cliff) (Draw diagram on separate sheet.)			
Other sites in locality? Yes		Site Types include: Open, IF	
Are sites in NPWS Register? Yes			
Have artefacts been removed from site? By whom?		When? Deposited where?	
Is site important to local Aborigines? Give contact(s) name(s) + address(es) The Wanaruah LALC, the Upper Hunter Wonnarua Council, the Lower Wonnarua Tribal Council, and the Ungaroo Aboriginal Corporation			
Contacted for this recording? Yes (attach additional information separately) If not, why not?			
Verbal/written reference sources (Including full title of accompanying report) White, E. 2003 Wambo Development Project, Aboriginal Heritage Assessment. Prepared for Resource Strategies Pty Ltd and Wambo Coal Pty Ltd.			NPWS Report Catalogue
Checklist: surface visibility damage/disturbance/ threat to site	Condition of site: Area cleared and artefact probably displaced by road		
Recommendations for management & protection (attach separate sheet if necessary): Beyond proposed impact area			
Site recorded by: E. White		Date: Nov 2002	
Address/institution: 12B Heathcote St, Picton, NSW, 2571.			

SITE POSITION & ENVIRONMENT		OFFICE USE ONLY: NPWS site no:
<p>1. Landform a. beach/hillslope/ridge top, etc: Simple slope</p> <p>d. mark on diagram provided or on your own sketch the position of the site</p>  <p>f. Local rock type: Pswj</p>		<p>b. site aspect: South c. slope: Moderate</p> <p>e. describe briefly: Artefact found near base of moderate slope, just above tributary of North Wambo Creek. Located at c.118m AHD.</p> <p>g. Land use/effect Grazing, road</p>
2. Distance from drinking water: c. 30m to 2nd order creek		
3. Resource zone associated with site (estuarine, riverine, forest etc):		
4. Vegetation:		
5. Edible plants noted:		
6. Faunal resources (including shellfish):		
7. Other exploitable resources (river pebbles, ochre etc)		
<p>Site type: Isolated find</p> <p>CHECKLIST TO HELP: length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock.</p> <p>DEPOSIT: colour, texture, estimated, depth, stratigraphy, contents- shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types.</p> <p>ART area of surface decorated, motifs, colours, wet, dry pigment, technique of engraving, no. of figures, sizes, patination.</p> <p>BURIALS: number & condition of bone, position, age, sex, associated artefacts.</p> <p>TREES; number, alive, dead, likely age, scar shape, position, size, patterns, axe marks, regrowth</p> <p>QUARRIES, rock type, debris, recognizable artefacts, percentage quarried.</p> <p>OTHER SITES EG. structures (fish traps, stone arrangements, bora rings, mia mias), mythological sites, rock holes, engraved groove, channels, contact sites (missions massacres, cemeteries) as appropriate.</p>	<p>DESCRIPTION OF SITE & CONTENTS. Note state of preservation of site & contents. Do NOT dig, disturb, damage site or contents.</p> <p>Artefact found at a cutting beside the road. The cutting is 20m long x 1-3m wide, 0-60% visibility.</p> <p>The artefact is a silicified tuff flake tool (scraper?) 2-3cm in size, no cortex, with scars on the platform, and recent edge damage.</p>	

Kuskie (2017a):



Wambo Site 240 - Photograph November 2016 (approximate location)

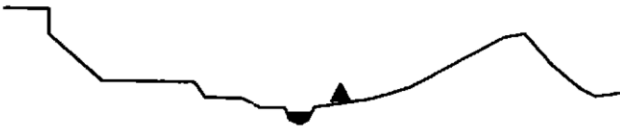


AHIMS #37-5-0360 (Wambo Site 241)

White (2003)/AHIMS Record:

New recording Additional Information

		National Parks and Wildlife Service PO Box 1967, Hurstville, NSW, 2220. Tel: (02) 9585 644 Standard Site Recording Form	
1:250,000 map sheet: <u>SINGLETON</u>		NPWS Code <u>37</u>	HEAD OFFICE USE ONLY: NPWS Site no: <u>37-5-0360</u>
AMG Grid reference 306331 mE 6396087 mN Scale of map used (or grid reference) <input checked="" type="checkbox"/> 25K.50K <input type="checkbox"/> 100K <input type="checkbox"/> 250K Please use largest scale available (preferred) 1:25K. 50K. 100K map name: DOYLES CK (GPS)		Site types: Accessioned by: _____ Date: _____ Data entered by: _____ Date: _____ Owner/Manager: Address: _____	
Site name: Wambo Site 241	Locality/property name: Region: Central		 37-5-0360
NPWS District:			
Reason for investigation EIS for Wambo Development Project			
Portion no: Parish:			
Photos taken? How many attached?			
How to get to the site (refer to permanent features, give best approach to site eg. from above, below, along cliff) (Draw diagram on separate sheet.)			
Other sites in locality? Yes		Site Types include: Open, IF	
Are sites in NPWS Register? Yes			
Have artefacts been removed from site? By whom?		When? Deposited where?	
Is site important to local Aborigines? Give contact(s) name(s) + address(es) The Wanaruah LALC, the Upper Hunter Wonnarua Council, the Lower Wonnarua Tribal Council, and the Ungoroo Aboriginal Corporation			
Contacted for this recording? Yes (attach additional information separately) if not, why not?			
Verbal/written reference sources (Including full title of accompanying report) White, E. 2003 Wambo Development Project, Aboriginal Heritage Assessment. Prepared for Resource Strategies Pty Ltd and Wambo Coal Pty Ltd.			NPWS Report Catalogue
Checklist: surface visibility damage/disturbance/ threat to site	Condition of site: Area cleared, and dam constructed, also erosion along edge of slope. Some intact deposit likely to be present.		
Recommendations for management & protection (attach separate sheet if necessary): Beyond proposed impact area			
Site recorded by: E. White		Date: Nov 2002	
Address/institution: 12B Heathcote St, Picton, NSW, 2571.			

SITE POSITION & ENVIRONMENT		OFFICE USE ONLY: NPWS site no:																																																															
<p>1. Landform a. beach/hillslope/ridge top, etc: Waning lower slope</p> <p>d. mark on diagram provided or on your own sketch the position of the site</p>  <p>f. Local rock type: Pswj</p>		<p>b. site aspect: South c. slope: Gentle</p> <p>e. describe briefly: Artefacts found around edge of slope, just above tributary of North Wambo Creek. Located at c.124m AHD.</p> <p>g. Land use/effect Grazing, dam</p>																																																															
2. Distance from drinking water: c. 10m to 2nd order creek																																																																	
3. Resource zone associated with site (estuarine, riverine, forest etc):																																																																	
4. Vegetation:																																																																	
5. Edible plants noted:																																																																	
6. Faunal resources (including shellfish):																																																																	
7. Other exploitable resources (river pebbles, ochre etc)																																																																	
<p>Site type: Open site</p> <p>CHECKLIST TO HELP: length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated, depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART area of surface decorated, motifs, colours, wet, dry pigment, technique of engraving, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead, likely age, scar shape, position, size, patterns, axe marks, regrowth QUARRIES, rock type, debris, recognizable artefacts, percentage quarried. OTHER SITES EG. structures (fish traps, stone arrangements, bora rings, mia mias), mythological sites, rock holes, engraved groove, channels, contact sites (missions massacres, cemeteries) as appropriate.</p>	<p>DESCRIPTION OF SITE & CONTENTS. Note state of preservation of site & contents. Do NOT dig, disturb, damage site or contents.</p> <p>Artefacts found in area of disturbance caused by dam construction, and north-west of this on exposure which runs along the edge of the slope, just above the creek. The ground is very stony and this significantly reduced ground visibility. More artefacts are likely to be present. The total exposure is 30x20m with visibility estimated at 0-40%.</p> <p>The 8 recorded artefacts are mostly silcrete, in strong contrast to site 239.</p> <table border="1"> <thead> <tr> <th>Count</th> <th>Raw Material</th> <th>Size</th> <th>Artefact Type</th> <th>Cortex</th> <th>Platform</th> <th>Comments</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Silcrete</td> <td>1-2</td> <td>Backed artefact</td> <td>0</td> <td></td> <td>Fairly rough stone!</td> </tr> <tr> <td>1</td> <td>Silcrete</td> <td>4-5</td> <td>Flake</td> <td>0</td> <td>Ridged</td> <td></td> </tr> <tr> <td>1</td> <td>Silcrete</td> <td>3-4</td> <td>Flake</td> <td>0</td> <td>Faceted</td> <td>Elongate</td> </tr> <tr> <td>1</td> <td>Silcrete</td> <td>3-4</td> <td>Flaked piece</td> <td>0</td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>Silcrete</td> <td>1-2</td> <td>Broken flake</td> <td>0</td> <td>Ridged</td> <td></td> </tr> <tr> <td>1</td> <td>Silcrete</td> <td>1-2</td> <td>Flake fragment</td> <td>0</td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>S Tuff</td> <td>3-4</td> <td>Flake fragment</td> <td>0</td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>Quartz</td> <td>1-2</td> <td>Flake fragment</td> <td>10</td> <td></td> <td>Good quality</td> </tr> </tbody> </table>		Count	Raw Material	Size	Artefact Type	Cortex	Platform	Comments	1	Silcrete	1-2	Backed artefact	0		Fairly rough stone!	1	Silcrete	4-5	Flake	0	Ridged		1	Silcrete	3-4	Flake	0	Faceted	Elongate	1	Silcrete	3-4	Flaked piece	0			1	Silcrete	1-2	Broken flake	0	Ridged		1	Silcrete	1-2	Flake fragment	0			1	S Tuff	3-4	Flake fragment	0			1	Quartz	1-2	Flake fragment	10		Good quality
Count	Raw Material	Size	Artefact Type	Cortex	Platform	Comments																																																											
1	Silcrete	1-2	Backed artefact	0		Fairly rough stone!																																																											
1	Silcrete	4-5	Flake	0	Ridged																																																												
1	Silcrete	3-4	Flake	0	Faceted	Elongate																																																											
1	Silcrete	3-4	Flaked piece	0																																																													
1	Silcrete	1-2	Broken flake	0	Ridged																																																												
1	Silcrete	1-2	Flake fragment	0																																																													
1	S Tuff	3-4	Flake fragment	0																																																													
1	Quartz	1-2	Flake fragment	10		Good quality																																																											



Kuskie (2017a):

SITE NAME: WAMBO SITE 241 (OEH #37-5-0360)³

Site Type: *Artefact Scatter* MGA Grid Reference: *306447:6396300*
 Date Recorded: *23/11/16* Topographic Map: *Doyles Creek 9032-I-N*
 Recorder: *Peter Kuskie*

Landform Element: *Drainage Depression* Vegetation: *Cleared/Regrowth*
 Slope: *Gentle* Ground Disturbance: *Low to Moderate*
 Distance to Water: *<50*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
varies	varies	40	30	1200	20	20	240	7	0.029	probable

Artefact Database:

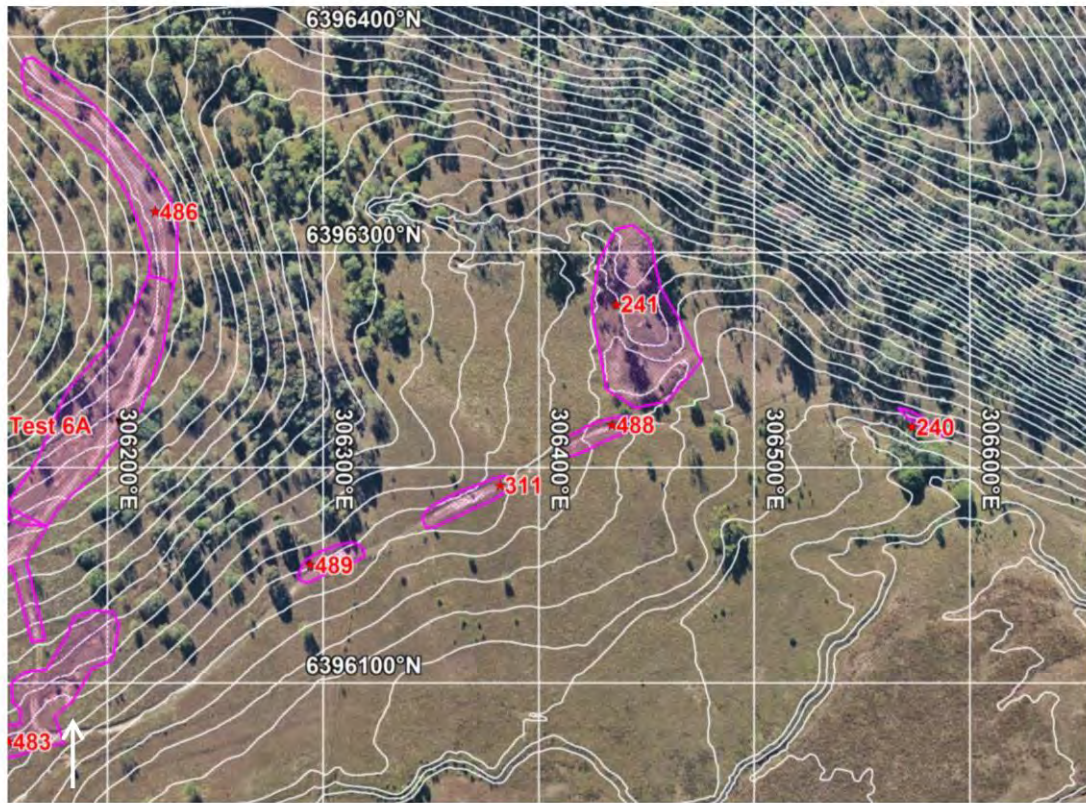
Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	grey	silcrete	core fragment	36x18x17	10	ter	fractured on all margins	306447	6396300
2	grey/red	silcrete	lithic fragment	20x18x8				306448	6396300
3	orange/red	silcrete	flake	45x25x10				306442	6396293
4	grey/pink	silcrete	core fragment	44x32x18			numerous negative flake scars but no clear platform	306442	6396293
5	white	quartz	core fragment	25x15x15	10	ww		306441	6396278
6	brown	tuff	flake	33x23x8				306441	6396278
7	pink	tuff	lithic fragment	30x20x7			near former dam	306455	6396265

Additional Comments:

- Probably shallow deposit;
- Low level spur/terrace adjacent to creek channel;
- Grass, box and ironbark present;
- Low to moderate ground disturbance from erosion and vegetation removal, but higher in adjacent former dam in drainage where previously recorded artefacts also present (but not relocated);
- Moderate research potential;
- Previously recorded site.

³ Site re-recorded during present inspection, refer to Appendix 2 for original recording.

Site Location: Wambo Site 241 (100 metre MGA grid; one metre contours)





Photograph: Wambo Site 241 (view south)



AHIMS #37-5-0605 (Wambo Site 311)

RPS/AHIMS Record:

 <p>AHIMS Aboriginal Heritage Information Management System</p>	<p>Aboriginal Site Recording Form</p> <p>AHIMS Registrar PO Box 1967, Hurstville NSW 2220</p>																																									
<p>Office Use Only</p> <p style="text-align: right;">Site Number 3 7 - 5 - 0 6 0 5</p> <p>Date received <input type="text"/> / <input type="text"/> / <input type="text"/> Date entered into system <input type="text"/> / <input type="text"/> / <input type="text"/> Date catalogued <input type="text"/> / <input type="text"/> / <input type="text"/></p> <p>Entered by (I.D.) <input type="text"/></p>																																										
<p>Information Access</p> <p><input type="checkbox"/> Gender/male <input type="checkbox"/> Gender/female <input type="checkbox"/> Location restriction <input type="checkbox"/> General restriction <input type="checkbox"/> No access</p> <p>For Further Information Contact:</p> <p><input type="checkbox"/> Nominated Trustee</p> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">Title</td> <td style="width:35%;">Surname</td> <td style="width:35%;">First Name</td> <td style="width:15%;">Initials</td> </tr> <tr> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td colspan="4">Organisation <input type="text"/></td> </tr> <tr> <td colspan="4">Address <input type="text"/></td> </tr> <tr> <td colspan="2">Phone number <input type="text"/></td> <td colspan="2">Fax <input type="text"/></td> </tr> </table> <p><input type="checkbox"/> Knowledge Holder</p> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">Title</td> <td style="width:35%;">Surname</td> <td style="width:35%;">First Name</td> <td style="width:15%;">Initials</td> </tr> <tr> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td colspan="4">Organisation <input type="text"/></td> </tr> <tr> <td colspan="4">Address <input type="text"/></td> </tr> <tr> <td colspan="2">Phone number <input type="text"/></td> <td colspan="2">Fax <input type="text"/></td> </tr> </table> <p>Aboriginal Heritage Unit or Cultural Heritage Division Contacts</p> <input type="text"/>		Title	Surname	First Name	Initials	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Organisation <input type="text"/>				Address <input type="text"/>				Phone number <input type="text"/>		Fax <input type="text"/>		Title	Surname	First Name	Initials	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Organisation <input type="text"/>				Address <input type="text"/>				Phone number <input type="text"/>		Fax <input type="text"/>		<p>Office Use Only</p> <p>Client on system <input type="checkbox"/></p> <p>Client on system <input type="checkbox"/></p>
Title	Surname	First Name	Initials																																							
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>																																							
Organisation <input type="text"/>																																										
Address <input type="text"/>																																										
Phone number <input type="text"/>		Fax <input type="text"/>																																								
Title	Surname	First Name	Initials																																							
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>																																							
Organisation <input type="text"/>																																										
Address <input type="text"/>																																										
Phone number <input type="text"/>		Fax <input type="text"/>																																								
<p>Geographic Location</p> <p>Site Name <input type="text" value="WAMBO SITE 311"/></p> <p>Easting <input type="text" value="306382"/> Northing <input type="text" value="6396192"/> AGD/GDA <input type="text" value="GDA"/></p> <p>Mapsheet <input type="text" value="DOYLES CREEK"/></p> <p>Zone <input type="text" value="56"/> Location Method <input type="text" value="Differential GPS"/></p> <p>Other Registration <input type="text"/></p>																																										
<p>Primary Recorder</p> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">Title</td> <td style="width:35%;">Surname</td> <td style="width:35%;">First Name</td> <td style="width:15%;">Initials</td> </tr> <tr> <td><input type="text" value="MS"/></td> <td><input type="text" value="GOODE"/></td> <td><input type="text" value="GILLIAN"/></td> <td><input type="text"/></td> </tr> <tr> <td colspan="4">Organisation <input type="text" value="RPS AUSTRALIAN EAST PTY LTD"/></td> </tr> <tr> <td colspan="4">Address <input type="text" value="PO BOX 428 HAMILTON NSW 2303"/></td> </tr> <tr> <td colspan="2">Phone number <input type="text" value="02 49404200"/></td> <td colspan="2">Fax <input type="text" value="02 49616794"/></td> </tr> </table> <p>Date recorded <input type="text" value="15/12/2009"/></p>		Title	Surname	First Name	Initials	<input type="text" value="MS"/>	<input type="text" value="GOODE"/>	<input type="text" value="GILLIAN"/>	<input type="text"/>	Organisation <input type="text" value="RPS AUSTRALIAN EAST PTY LTD"/>				Address <input type="text" value="PO BOX 428 HAMILTON NSW 2303"/>				Phone number <input type="text" value="02 49404200"/>		Fax <input type="text" value="02 49616794"/>		<p>Client on system <input type="checkbox"/></p>																				
Title	Surname	First Name	Initials																																							
<input type="text" value="MS"/>	<input type="text" value="GOODE"/>	<input type="text" value="GILLIAN"/>	<input type="text"/>																																							
Organisation <input type="text" value="RPS AUSTRALIAN EAST PTY LTD"/>																																										
Address <input type="text" value="PO BOX 428 HAMILTON NSW 2303"/>																																										
Phone number <input type="text" value="02 49404200"/>		Fax <input type="text" value="02 49616794"/>																																								

OPEN/CLOSE SITE Open Site

Site Context

Landform

- Mountainous
- Plain
- Rolling hills
- Steep hills
- Undulating plain

Slope

degrees

Landform Unit

- | | | | |
|--|---|--------------------------------------|---|
| <input type="checkbox"/> Beach | <input type="checkbox"/> Tidal Flat | <input type="checkbox"/> Upper slope | <input type="checkbox"/> Stream bank |
| <input type="checkbox"/> Coastal rock platform | <input type="checkbox"/> Cliff | <input type="checkbox"/> Plain | <input type="checkbox"/> Stream channel |
| <input type="checkbox"/> Dune | <input type="checkbox"/> Crest | <input type="checkbox"/> Ridge | <input type="checkbox"/> Swamp |
| <input type="checkbox"/> Intertidal flat | <input type="checkbox"/> Flat | <input type="checkbox"/> Tor | <input type="checkbox"/> Terrace |
| <input type="checkbox"/> Lagoon | <input checked="" type="checkbox"/> Lower slope | <input type="checkbox"/> Valley flat | <input type="checkbox"/> Terrace flat |
| <input type="checkbox"/> Tidal Creek | <input type="checkbox"/> Mid slope | <input type="checkbox"/> Levy | |

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- Residential

Water

- Distance to permanent water source metres
- Distance to temporary water source metres
- Name of nearest permanent water source
- Name of nearest temporary water

Directions for Relocation

Paddock to west of farm track off Pinegrove Road on southern side of the Golden Highway and to east of Jerrys Plains township. Access track joins existing fire trail at footslopes of Jerrys Plains Ridge.

Current Land Tenure

- Public National Park / other Government Dept.
- Private

Primary report

I.D. (I.D. Office Use only)

Site Location Map



*Note – incorrect photograph.

General Site Information

Closed Site

Shelter/Cave Formation

- Boulder
- Wind erosion
- Water erosion
- Rock collapse

Rock Surface Condition

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

Open Site

Site Orientation

- N-S
- NE-SW
- E-W
- SE-NW
- N/A

Condition of Ceiling

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

Shelter Aspect

- North
- North East
- East
- South East
- South
- South West
- West
- North West

Features

- 1. Aboriginal Ceremony & Dreaming
- 2. Aboriginal Resource & Gathering
- 3. Art
- 4. Artefact
- 5. Burial
- 6. Ceremonial Ring
- 7. Conflict
- 8. Earth Mound
- 9. Fish Trap
- 10. Grinding Groove
- 11. Habitation Structure
- 12. Hearth
- 13. Non Human Bone & Organic Material
- 14. Ochre quarry
- 15. Potential Archaeological Deposit
- 16. Stone Quarry
- 17. Shell
- 18. Stone Arrangement
- 19. Modified Tree
- 20. Water Hole

Site Plan Indicate scale, boundaries of site, features

Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- Total length of visible site
- Average width of visible site
- Estimated area of visible site
- Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

If proposed or existing mine activities are likely to impact on the Aboriginal archaeological site, then the site should be salvaged (subject to an appropriate permit being in force) and the artefacts or objects relocated to the temporary keeping place under the Wambo Care & Control Permit #3130.

Large artefact scatter near North Wambo Creek along a farm access off Pinegrove Road; artefact scatter possibly associated with Wambo Site 241

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus

Title	Surname	First Name	Initials
<input style="width: 30px; height: 20px;" type="text"/> <input style="width: 30px; height: 20px;" type="text"/> <input style="width: 30px; height: 20px;" type="text"/>	<input style="width: 100%; height: 20px;" type="text"/>	<input style="width: 100%; height: 20px;" type="text"/>	<input style="width: 30px; height: 20px;" type="text"/> <input style="width: 30px; height: 20px;" type="text"/>
Organisation	<input style="width: 100%; height: 20px;" type="text"/>		
Address	<input style="width: 100%; height: 20px;" type="text"/>		
Phone number	<input style="width: 60%; height: 20px;" type="text"/>	Fax	<input style="width: 40%; height: 20px;" type="text"/>

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts-No.

Comments

NPWS FEATURE RECORDING FORM - ARTEFACT

Site I.D. Site Name

First recorded date Importance

No. of instances

Recorded by

Yes No

Stone artefacts only

Artefacts collected

Permit issued

Percentage of Non-stone Artefacts to Percentage of Stone Artefacts

0-9% 10-19% 20-29% 30-39% 40-49% 50-59% 60-69% 70-79% 80-89% 90-100%

Feature Context & Condition

Scatter No. Easting Northing

Density (Artefact count per square metre) Dimensions Length (m) Width (m) Depth (m)

In situ Stratified

Feature Condition	General Condition	Recommended Action
<input type="checkbox"/> Very good	<input checked="" type="checkbox"/> Weathered	<input type="checkbox"/> Boardwalk
<input type="checkbox"/> Good	<input checked="" type="checkbox"/> Vehicle damage	<input type="checkbox"/> Fencing
<input checked="" type="checkbox"/> Poor	<input checked="" type="checkbox"/> Surface water wash	<input type="checkbox"/> Closure to public
	<input type="checkbox"/> Fire damage	<input checked="" type="checkbox"/> Continued inspection
	<input checked="" type="checkbox"/> Erosion	<input type="checkbox"/> Fire hazard reduction
	<input checked="" type="checkbox"/> Stock damage	<input type="checkbox"/> Expert assessment
	<input checked="" type="checkbox"/> Exposed archaeological material	<input type="checkbox"/> Meeting with land manager
		<input type="checkbox"/> Revegetation
		<input type="checkbox"/> Signage
		<input type="checkbox"/> Soil erosion control
		<input type="checkbox"/> Track closure/re-routing
		<input type="checkbox"/> Additional recording



Feature Environment (Complete when feature environment differs to site environment, use attributes from cover card, p. 2)

Rolling Hills Land form

Simple slope Land form unit

Lower Slope

Grassland Vegetation

Farming Land use

Water

Distance to permanent water source metres

Distance to temporary water source metres

Name of nearest permanent water source

Name of nearest temporary water

Kuskie (2017a):

SITE NAME: WAMBO SITE 311

Site Type: *Artefact Scatter*
 Date Recorded: *23/11/16*
 Recorder: *Peter Kuskie*

MGA Grid Reference: *306372:6396188*
 Topographic Map: *Doyles Creek 9032-I-N*

Landform Element: *Spur Crest*
 Slope: *Moderate*
 Distance to Water: *>50*

Vegetation: *Cleared/Regrowth*
 Ground Disturbance: *Moderate to High*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
50+	3	14	4	56	50	50	28	12	0.429	probable

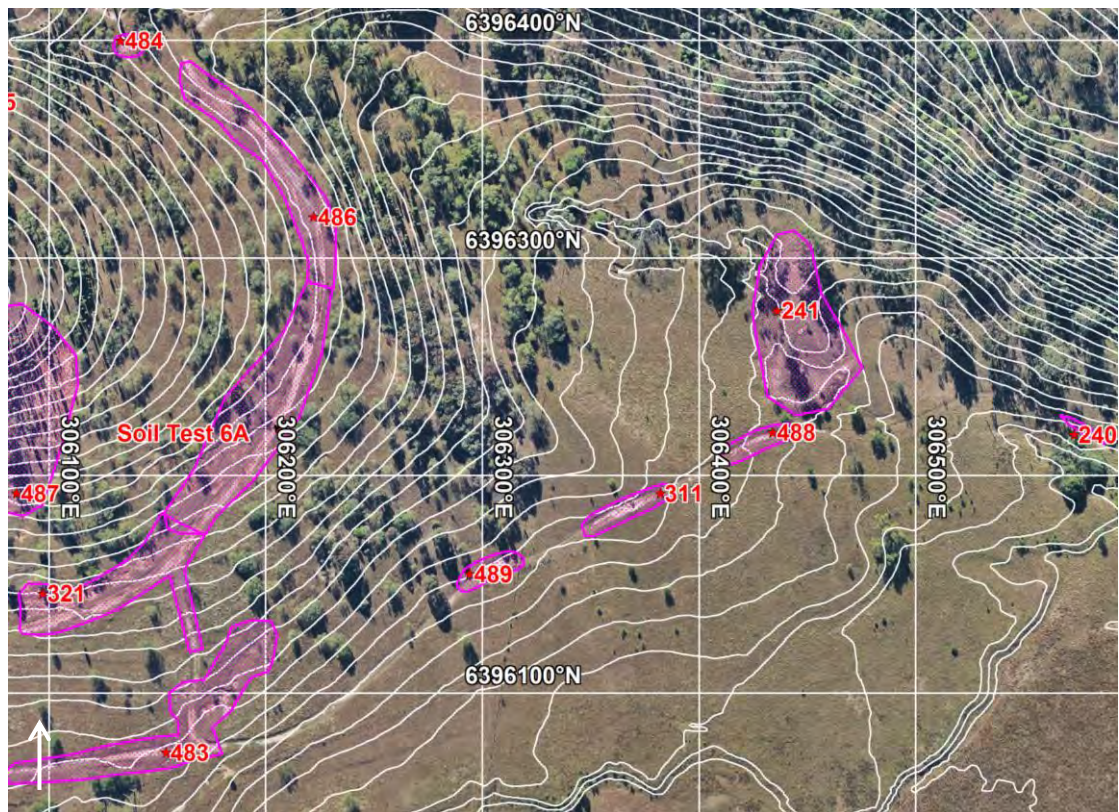
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	yellow/red	tuff	flake - longitudinal	18x10x2			on the road	306372	6396188
2	grey/pink	silcrete	microblade core	48x40x23			five flake scars with two opposing platforms; on road	306372	6396188
3	pink/red	silcrete	flake	40x24x10			on the road	306372	6396188
4	red	silcrete	flake	24x14x3	10	ter	on the road	306372	6396188
5	cream	silcrete	flake	45x30x8			on the road	306372	6396188
6	orange	tuff	flake - longitudinal	23x17x6			on the road	306372	6396188
7	brown	tuff	flake - longitudinal	17x14x3			on the road	306372	6396188
8	brown	chert	core	30x25x18			three flake scars and two platforms; very glossy and fine grained; on the road	306372	6396188
9	yellow	tuff	lithic fragment	28x13x4			on the road	306372	6396188
10	yellow	tuff	flake	28x20x10	10	tab	on the road	306372	6396188
11	white	quartz	core fragment	35x23x7				306372	6396188
12	cream	silcrete	flake	58x26x20				306364	6396182

Additional Comments:

- ❑ Previously recorded by RPS (refer to Appendix 2 of Kuskie 2017a for description). Original site record photo incorrect;
- ❑ Lowest position of pathline to mountains;
- ❑ Gentler portion of crest overlooking North Wambo Creek valley;
- ❑ Road cut through spur crest;
- ❑ Moderate to high disturbance on the road but low off road on grass;
- ❑ Most artefacts on the verge of road eroding from relatively thick 0.3 - 0.5 metre A unit soil;
- ❑ Moderate to high research potential.

Site Location: Wambo Site 311 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 311 (view east)





Aboriginal Site Impact Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW
 December 2010 DECCW 2010/1022

- 1 This form must be completed following impacts to AHIMS sites that are:
 - a) an outcome of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
 - b) authorised by an Aboriginal Heritage Impact Permit (AHIP)
 - c) undertaken for the purpose of complying with environmental assessment requirements issued by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), or
 - d) authorised by a Part 3A project approval under the EP&A Act.
- 2 Completed forms must be submitted to the AHIMS Registrar (www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm).
- 3 This form is intended to complement (not replace) the AHIMS Site Recording Form. Where there is a need to provide detailed information about the nature of a site, use the AHIMS Site Recording Form.
- 4 This form does not replace the need to submit reports to DECCW (as specified by a condition of an AHIP or Part 3A approval). This form must be submitted in addition to any reports.

AHIMS site ID:

Site impact authorisation (select one)	Reference numbers, dates
<input type="checkbox"/> Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the <i>Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW</i> .)	Date DECCW was notified (under requirement 15c of the Code): <input type="text"/> DECCW Regional office notified: <input type="text"/>
<input checked="" type="checkbox"/> AHIP (The impacts to this site were authorised by an AHIP.)	AHIP number: <input type="text" value="C0003213"/> Date issued/signed: <input type="text" value="22 February 2018"/> AHIMS permit ID/number: <input type="text"/>
<input type="checkbox"/> Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)	Major project number: <input type="text"/> Date environmental assessment requirements issued: <input type="text"/>
<input type="checkbox"/> Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)	or Date of project approval: <input type="text"/>

Site status following impacts:

- Not a site (The investigations concluded that this is not a site.)
 Valid site (The investigations confirmed that this is an Aboriginal site.)
 Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)
 Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name:

Easting: **Northing:** **Coordinates must be in GDA (MGA)**

Map sheet:

Zone: **Location method:**

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name
Mr	Kuskie	Peter
Organisation:	South East Archaeology Pty Limited	
Address:	24 Bamford Street, Hughes, ACT, 2605	
Phone:	262604439	E-mail: peter@southeastarchaeology.com.au
Date recorded:	8/5/18	Fax: 262604439

Site information

Open/closed site: Open

Features:

- | | | | |
|-------------------------------------|--------------------------------------|--------------------------|---|
| <input type="checkbox"/> | 1. Aboriginal ceremony and dreaming | <input type="checkbox"/> | 11. Habitation structure |
| <input type="checkbox"/> | 2. Aboriginal resource and gathering | <input type="checkbox"/> | 12. Hearth |
| <input type="checkbox"/> | 3. Art | <input type="checkbox"/> | 13. Non-human bone and organic material |
| <input checked="" type="checkbox"/> | 4. Artefact | <input type="checkbox"/> | 14. Ochre quarry |
| <input type="checkbox"/> | 5. Burial | <input type="checkbox"/> | 15. Potential archaeological deposit |
| <input type="checkbox"/> | 6. Ceremonial ring | <input type="checkbox"/> | 16. Stone quarry |
| <input type="checkbox"/> | 7. Conflict | <input type="checkbox"/> | 17. Shell |
| <input type="checkbox"/> | 8. Earth mound | <input type="checkbox"/> | 18. Stone arrangement |
| <input type="checkbox"/> | 9. Fish trap | <input type="checkbox"/> | 19. Modified tree |
| <input type="checkbox"/> | 10. Grinding groove | <input type="checkbox"/> | 20. Water hole |

Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

The salvage of Wambo Site 311 occurred in accordance with the conditions of AHIP #C0003213 and the Wambo Heritage Management Plan (HMP). Surface collection of the site was undertaken on 7 and 8 May 2018 by a suitably qualified archaeologist (Peter Kuskie of South East Archaeology) and a representative of the Registered Aboriginal Parties (RAPs) for Wambo Coal Mine, David Horton of the Wanaruah Local Aboriginal Land Council (LALC). A total of 31 artefacts were collected (refer to attachment). It is likely that the salvage retrieved most, if not all, originally reported artefacts, along with several additional items.

Management recommendations

Summary of any management recommendations for the AHIMS site

No further heritage action required. However, all other provisions of the Wambo HMP and AHIP #C0003213 need to be implemented where relevant.

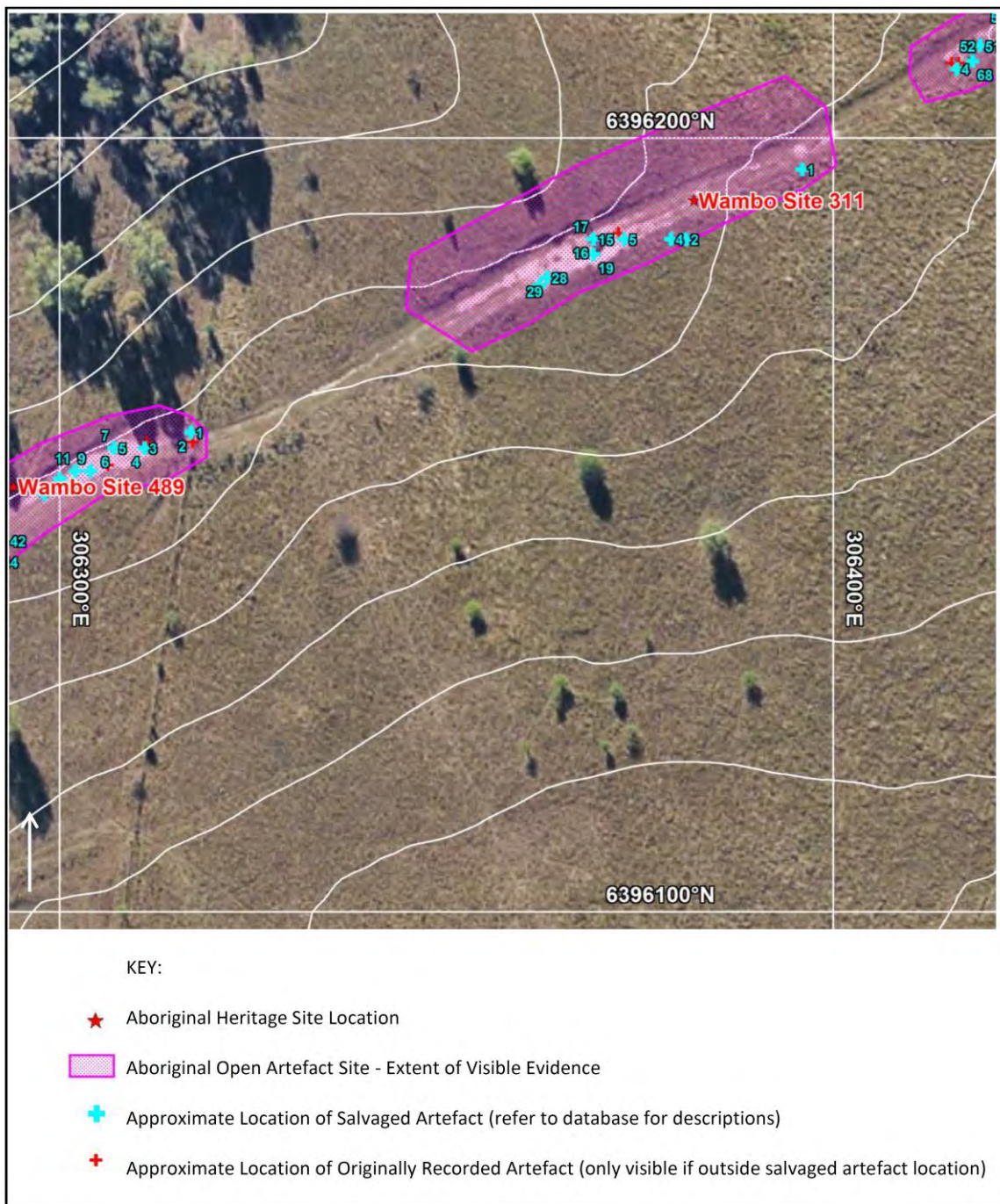
Post-investigation significance

Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

Site has been totally salvaged - nil heritage significance remaining with respect to the identified heritage evidence (surface artefacts), although the probable occurrence of further artefacts obscured by vegetation and sediment and a sub-surface deposit of artefacts where the A unit soil remains present is very likely. Such potential evidence may be of low to possibly moderate significance within a local context.

Additional comments

Figure: Approximate location of Wambo Site 311 salvaged artefacts and originally recorded artefacts (aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid; original artefact locations not visible unless outside of salvaged artefact locations; artefact locations approximate only).



Wambo Site 311 (OEH #37-5-0605) ASIRF Attachment



Lithic Items Salvaged from Wambo Site 311.

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 311	1	306396	6396196	yellow	tuff	flake - proximal	15x7x4	all artefacts along track; collected 07/05/18
Wambo Site 311	2	306381	6396187	brown	tuff	flake - distal	30x13x3	banded colouring
Wambo Site 311	3	306381	6396187	yellow	tuff	flake - distal - utilised	13x7x3	damage on distal margin
Wambo Site 311	4	306379	6396187	red	tuff	retouched flake - distal	12x10x5	fine retouch on distal margin forming a jagged edge
Wambo Site 311	5	306373	6396187	grey/pink	silcrete	core	46x37x20	3x3m area
Wambo Site 311	6	306373	6396187	brown/pink	tuff	core	32x31x20	3x3m area; terrestrial cortex on 30% of surfaces
Wambo Site 311	7	306373	6396187	grey	silcrete	flake	39x24x8	3x3m area
Wambo Site 311	8	306373	6396187	orange/pink	silcrete	flake	40x22x10	3x3m area
Wambo Site 311	9	306373	6396187	yellow/pink	silcrete	microblade - utilised	36x9x3	3x3m area; bevelling on lateral left margin near proximal for 15mm
Wambo Site 311	10	306373	6396187	red	silcrete	flake - distal	23x12x4	3x3m area
Wambo Site 311	11	306373	6396187	orange	tuff	flake - longitudinal - utilised	25x9x3	3x3m area; edge damage along lateral right margin
Wambo Site 311	12	306373	6396187	orange	tuff	flake - distal	16x11x3	3x3m area
Wambo Site 311	13	306373	6396187	orange/yellow	tuff	flake - longitudinal	15x8x5	3x3m area
Wambo Site 311	14	306373	6396187	yellow	tuff	flake - medial - utilised	11x8x3	3x3m area; bevelling along a margin for approximately 10mm from use
Wambo Site 311	15	306369	6396187	pink	tuff	flake - proximal - utilised	24x22x11	crushed notch and edge polish on lateral right margin from use
Wambo Site 311	16	306369	6396187	pink	tuff	flake - longitudinal	23x12x5	
Wambo Site 311	17	306369	6396187	red	tuff	flake - medial	19x14x5	
Wambo Site 311	18	306369	6396187	red	tuff	microblade - distal	8x4x3	
Wambo Site 311	19	306369	6396185	yellow	tuff	flake - utilised	27x18x9	damage on distal margin from use
Wambo Site 311	20	306369	6396185	white	quartz	flake	36x22x9	
Wambo Site 311	21	306369	6396185	red	silcrete	flake	21x18x4	
Wambo Site 311	22	306369	6396185	orange	tuff	flake - medial - utilised	25x12x8	13mm of edge fracturing along one margin from use
Wambo Site 311	23	306369	6396185	orange/brown	tuff	lithic fragment	27x16x9	
Wambo Site 311	24	306369	6396185	red/yellow	silcrete	flake - proximal	36x23x7	terrestrial cortex on 40% of surfaces
Wambo Site 311	25	306369	6396185	pink	silcrete	microblade core	25x14x9	
Wambo Site 311	26	306369	6396185	yellow/pink	tuff	microblade - proximal - utilised	19x13x4	edge damage on each lateral margin for approximately 15mm from use
Wambo Site 311	27	306369	6396185	purple/pink	silcrete	microblade - medial - utilised	17x13x5	15mm of edge damage along one lateral margin from use
Wambo Site 311	28	306363	6396182	pink/red	tuff	flake - distal	38x27x15	waterworm cortex on 20% of surfaces
Wambo Site 311	29	306363	6396182	grey/brown	silcrete	flake	58x29x18	terrestrial cortex on 40% of surfaces
Wambo Site 311	30	306364	6396182	grey/brown	silcrete	lithic fragment	32x29x27	waterworm cortex on 25% of surfaces
Wambo Site 311	31	306362	6396181	orange	tuff	flake - medial - utilised	16x7x4	approximately 10mm of edge bevelling along one lateral margin from use

Wambo Site 311 (OEH #37-5-0605) ASIRF Attachment

AHIMS #37-5-0659 (Wambo Site 317)

RPS/AHIMS Record:

		Aboriginal Site Recording Form			Office of Environmen & Heritage		
		AHIMS Registrar PO Box 1967, Hurstville NSW 2220					
Office Use Only							
		Site Number 3 7 - 5 - 0 6 5 9					
Date received		Date entered into system		Date catalogued			
Entered by (I.D.)							
Information Access							
<input type="checkbox"/> Gender/male <input type="checkbox"/> Gender/female <input type="checkbox"/> Location restriction <input type="checkbox"/> General restriction <input type="checkbox"/> No access							
For Further Information Contact:							
<input type="checkbox"/> Nominated Trustee							
Title		Surname		First Name		Initials	
Organisation							
Address							
Phone number				Fax			
<input type="checkbox"/> Knowledge Holder							
Title		Surname		First Name		Initials	
Organisation							
Address							
Phone number				Fax			
Aboriginal Heritage Unit or Cultural Heritage Division Contacts							
Geographic Location							
Site Name						W A M B O S I T E 3 1 7	
Easting		Northing		AGD/GDA		GDA	
3 0 5 9 3 2		6 3 9 6 1 0 8					
Mapsheet						D O Y L E S C R E E K	
Zone		Location Method					
56		Differential GPS					
Other Registration							
Primary Recorder							
Title		Surname		First Name		Initials	
Organisation						R P S	
Address						P O B O X 4 2 8 H A M I L T O N N S W 2 3 0 3	
Phone number				Fax			
2 4 9 4 0 4 2 0 0				2 4 9 6 1 6 7 9 4			
Date recorded							
						Office Use Only	
						Client on system	
						<input type="checkbox"/>	
						Client on system	
						<input type="checkbox"/>	
						Client on system	
						<input type="checkbox"/>	

NPWS Aboriginal Site Recording Form - Site Information

OPEN/CLOSE SITE Open Site

Site Context

Landform

- Mountainous
- Plain
- Rolling hills
- Steep hills
- Undulating plain

Slope

degrees

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek
- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope
- Upper slope
- Plain
- Ridge
- Tor
- Valley flat
- Levy
- Stream bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- Residential

Water

- Distance to permanent water source metres
- Distance to temporary water source metres
- Name of nearest permanent water source
- Name of nearest temporary water

Directions for Relocation

Refer to DGPS coordinates. Paddock to west of farm track off Pinegrove Road on southern side of the Golden Highway and to east of Jerrys Plains township. One Quartz flaked artefact located on eroded slope to the west and above existing farm track.

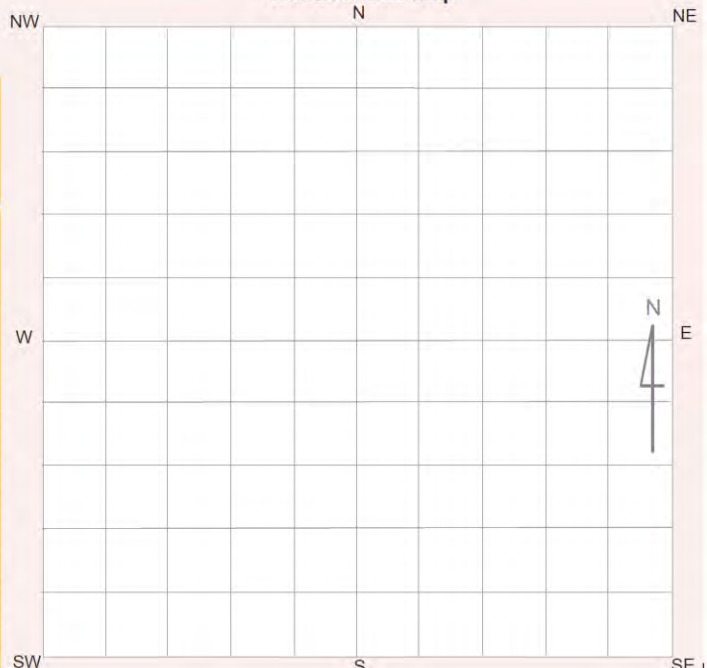
Current Land Tenure

- Public National Park / other Government Dept.
- Private

Primary report

I.D. (I.D. Office Use only)

Site Location Map



General Site Information

Closed Site

Shelter/Cave Formation

- Boulder
- Wind erosion
- Water erosion
- Rock collapse

Rock Surface Condition

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

Open Site

Site Orientation

- N-S
- NE-SW
- E-W
- SE-NW
- N/A

Condition of Ceiling

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

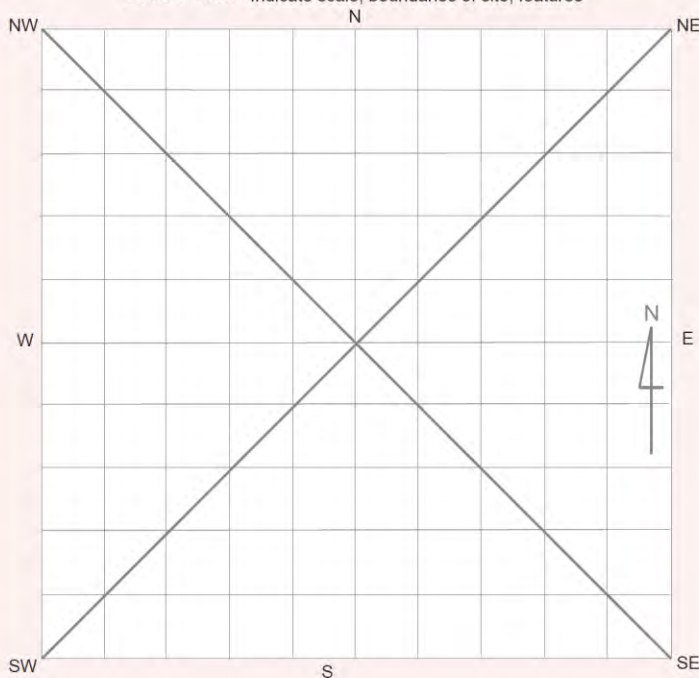
Shelter Aspect

- North
- North East
- East
- South East
- South
- South West
- West
- North West

Features

- 1. Aboriginal Ceremony & Dreaming
- 2. Aboriginal Resource & Gathering
- 3. Art
- 4. Artefact
- 5. Burial
- 6. Ceremonial Ring
- 7. Conflict
- 8. Earth Mound
- 9. Fish Trap
- 10. Grinding Groove
- 11. Habitation Structure
- 12. Hearth
- 13. Non Human Bone & Organic Material
- 14. Ochre quarry
- 15. Potential Archaeological Deposit
- 16. Stone Quarry
- 17. Shell
- 18. Stone Arrangement
- 19. Modified Tree
- 20. Water Hole

Site Plan Indicate scale, boundaries of site, features



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- Total length of visible site
- Average width of visible site
- Estimated area of visible site
- Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

This site was located on an east facing lower slope amongst rolling hills, approximately 260 metres from North Wambo Creek. The vegetation in the area was regenerating eucalypt woodland, and pasture grasses. The artefact was situated adjacent to a dirt road and approximately 60 metres west of a dam. The artefact was a quartz flake.

If proposed or existing mine activities are likely to impact on the Aboriginal archaeological site, then the site should be salvaged (subject to an appropriate permit being in force) and the artefacts or objects relocated to the temporary keeping place under the Wambo Care & Control Permit #3130.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus

Title	Surname	First Name	Initials
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Organisation	<input type="text"/>		
Address	<input type="text"/>		
Phone number	<input type="text"/>	Fax	<input type="text"/>

Attachments (No.)

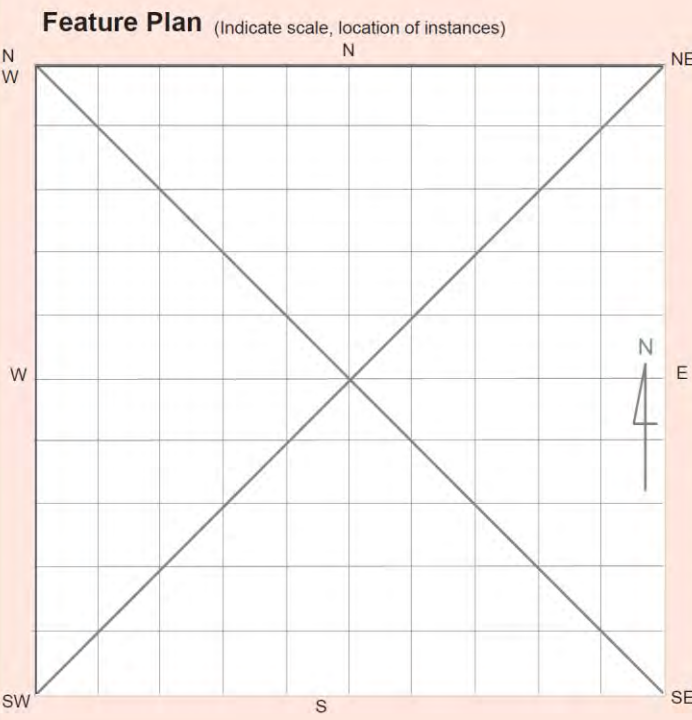
- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts-No.

Comments

NPWS FEATURE RECORDING FORM - ARTEFACT

Site I.D. Site Name
 First recorded date Importance
 No. of instances
 Recorded by
 Yes No
 Stone artefacts only
 Artefacts collected **Percentage of Non-stone Artefacts to Percentage of Stone Artefacts**
 Permit issued 0-9% 10-19% 20-29% 30-39% 40-49% 50-59% 60-69% 70-79% 80-89% 90-100%

Feature Context & Condition Scatter No. Easting Northing
 Density (Artefact count per square metre) Dimensions Length (m) Width (m) Depth (m)
 In situ Stratified Yes No
Feature Condition **General Condition** **Recommended Action**
 Very good Weathered Boardwalk Revegetation
 Good Vehicle damage Fencing Signage
 Poor Surface water wash Closure to public Soil erosion control
 Fire damage Continued inspection Track closure/re-routing
 Erosion Fire hazard reduction Additional recording
 Stock damage Expert assessment
 Exposed archaeological material Meeting with land manager



Feature Environment (Complete when feature environment differs to site environment, use attributes from cover card, p. 2)

Land form
 Land form unit
 Slope
 Vegetation
 Land use

Water
 Distance to permanent water source metres
 Distance to temporary water source metres
 Name of nearest permanent water source
 Name of nearest temporary water

Table: Artefact Attributes

ID	Artefact Type	Completeness	Raw Material	Colour	Length (mm)	Width (mm)	Thickness (mm)	Weight (grams)	Notes	Location Specified
1	Flake	Complete	Quartz	Milky	30	20	4			

Site Description

This site was located on an east facing lower slope amongst rolling hills, approximately 260 metres from North Wambo Creek. The vegetation in the area was regenerating eucalypt woodland, and pasture grasses. The artefact was situated adjacent to a dirt road and approximately 60 metres west of a dam. The artefact was a quartz flake.

Photos





Wambo Site 317 facing east with dam in background.



Quartz artefact at Wambo Site 317

AHIMS #37-5-0661 (Wambo Site 318)

RPS/AHIMS Record:

		Aboriginal Site Recording Form			Office of Environment & Heritage				
		AHIMS Registrar PO Box 1967, Hurstville NSW 2220							
Office Use Only									
		Site Number 3 7 - 5 - 0 6 6 1							
Date received		/ /	Date entered into system		/ /				
Entered by (I.D.)									
Information Access									
<input type="checkbox"/> Gender/male <input type="checkbox"/> Gender/female <input type="checkbox"/> Location restriction <input type="checkbox"/> General restriction <input type="checkbox"/> No access									
For Further Information Contact:									
<input type="checkbox"/> Nominated Trustee									
Title		Surname		First Name		Initials			
Organisation									
Address									
Phone number				Fax					
<input type="checkbox"/> Knowledge Holder									
Title		Surname		First Name		Initials			
Organisation									
Address									
Phone number				Fax					
Aboriginal Heritage Unit or Cultural Heritage Division Contacts									
Geographic Location									
Site Name						W A M B O S I T E 3 1 8			
Easting		3 0 5 9 4 1		Northing		6 3 9 6 5 0 7			
AGD/GDA						GDA			
Mapsheet						D O Y L E S C R E E K			
Zone		56		Location Method				Differential GPS	
Other Registration									
Primary Recorder									
Title		Surname		First Name		Initials			
Organisation						R P S			
Address						P O B O X 4 2 8 H A M I L T O N N S W 2 3 0 3			
Phone number				Fax		2 4 9 6 1 6 7 9 4			
Date recorded									
						Office Use Only			
						Client on system			
						<input type="checkbox"/>			
						Client on system			
						<input type="checkbox"/>			
						Client on system			
						<input type="checkbox"/>			

OPEN/CLOSE SITE

Site Context

Landform

- Mountainous
- Plain
- Rolling hills
- Steep hills
- Undulating plain

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek

- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope
- Upper slope
- Plain
- Ridge
- Tor
- Valley flat
- Levy

- Stream bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Slope

degrees

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- Residential

Water

Distance to permanent water source metres

Distance to temporary water source metres

Name of nearest permanent water source

Name of nearest temporary water

Directions for Relocation

Refer to attached map & DGPS coordinates. Artefact scatter located close to bend in track adjacent to small clump of trees on the surface of an eroded slope. Property accessed from Pinegrove Road on southern side of Golden Highway and to the east of Jerrys Plains township.

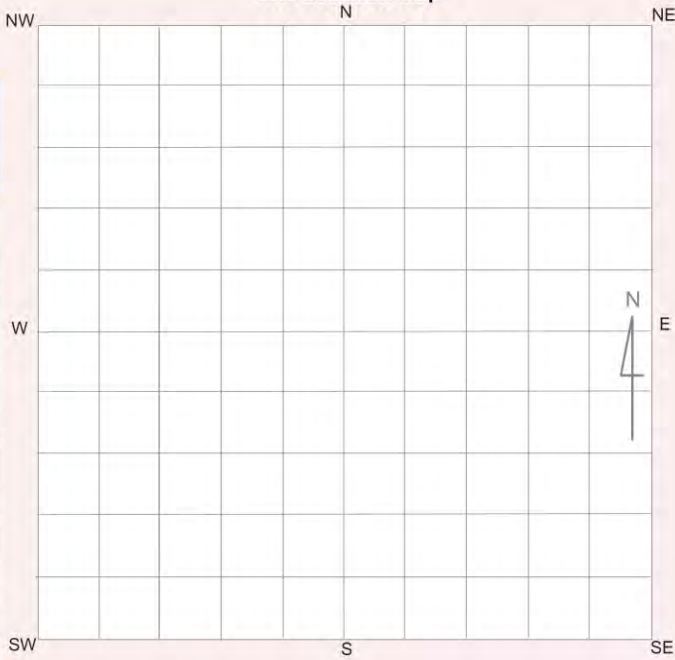
Current Land Tenure

- Public National Park / other Government Dept.
- Private

Primary report

I.D. (I.D. Office Use only)

Site Location Map



General Site Information

Closed Site

Shelter/Cave Formation

- Boulder
- Wind erosion
- Water erosion
- Rock collapse

Rock Surface Condition

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

Open Site

Site Orientation

- N-S
- NE-SW
- E-W
- SE-NW
- N/A

Condition of Ceiling

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

Shelter Aspect

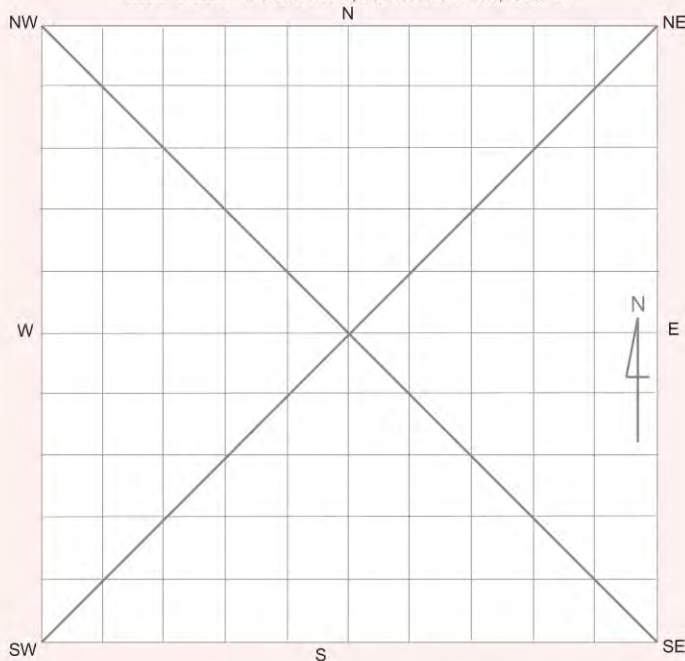
- North
- North East
- East
- South East
- South
- South West
- West
- North West

Features

- 1. Aboriginal Ceremony & Dreaming
- 2. Aboriginal Resource & Gathering
- 3. Art
- 4. Artefact
- 5. Burial
- 6. Ceremonial Ring
- 7. Conflict
- 8. Earth Mound
- 9. Fish Trap
- 10. Grinding Groove
- 11. Habitation Structure
- 12. Hearth
- 13. Non Human Bone & Organic Material
- 14. Ochre quarry
- 15. Potential Archaeological Deposit
- 16. Stone Quarry
- 17. Shell
- 18. Stone Arrangement
- 19. Modified Tree
- 20. Water Hole

Site Plan

Indicate scale, boundaries of site, features



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- Total length of visible site
- Average width of visible site
- Estimated area of visible site
- Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Wambo Site 318 is in rolling hills and lies adjacent to a dirt farm access track on an east facing, mid slope about 600 metres to the north of North Wambo Creek and 100 metres to the south west of an unnamed tributary of North Wambo Creek. The vegetation in the area was regenerating woodland and grasses. The artefacts were two grey silcrete flakes and one grey silcrete core.

If proposed or existing mine activities are likely to impact on the Aboriginal archaeological site, then the site should be salvaged (subject to an appropriate permit being in force) and the artefacts or objects relocated to the temporary keeping place under the Wambo Care & Control Permit #3130.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus

Title	Surname	First Name	Initials
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Organisation	<input type="text"/>		
Address	<input type="text"/>		
Phone number	<input type="text"/>	Fax	<input type="text"/>

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts-No.

Comments

NPWS FEATURE RECORDING FORM - ARTEFACT

page 1

Site I.D. Site Name
 First recorded date Importance
 No. of instances
 Recorded by
 Yes No
 Stone artefacts only
 Artefacts collected **Percentage of Non-stone Artefacts to Percentage of Stone Artefacts**
 Permit issued 0-9% 10-19% 20-29% 30-39% 40-49% 50-59% 60-69% 70-79% 80-89% 90-100%

Feature Context & Condition

Scatter No. Easting Northing
 Density (Artefact count per square metre) Dimensions: Length (m) Width (m) Depth (m)
 In situ Stratified

Feature Condition

- Very good
- Good
- Poor

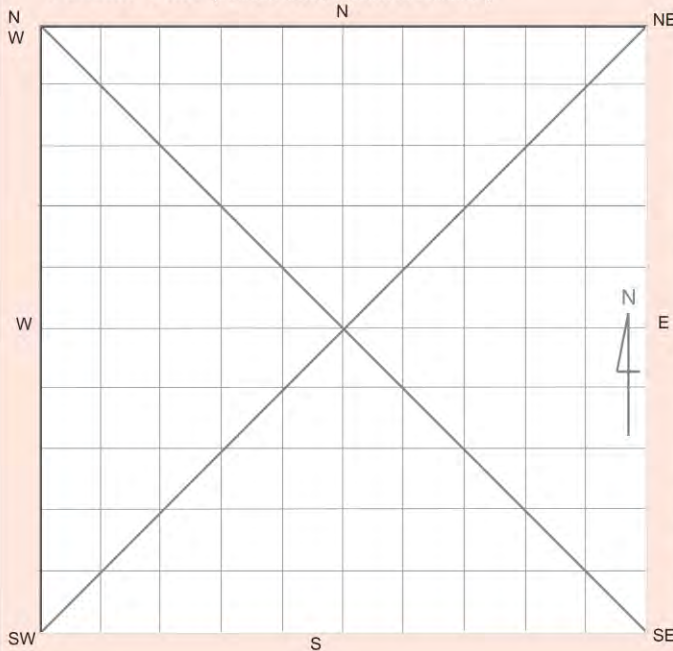
General Condition

- Weathered
- Vehicle damage
- Surface water wash
- Fire damage
- Erosion
- Stock damage
- Exposed archaeological material

Recommended Action

- Boardwalk
- Fencing
- Closure to public
- Continued inspection
- Fire hazard reduction
- Expert assessment
- Meeting with land manager
- Revegetation
- Signage
- Soil erosion control
- Track closure/re-routing
- Additional recording

Feature Plan (Indicate scale, location of instances)



Feature Environment

(Complete when feature environment differs to site environment, use attributes from cover card, p. 2)

Rolling Hills Land form
 Moderate to Steep Slope Land form unit
 Mid Slope
 Open Forest Vegetation
 Farming Land use

Water

Distance to permanent water source metres
 Distance to temporary water source metres
 Name of nearest permanent water source

 Name of nearest temporary water

Table: Artefact Attributes

ID	Artefact Type	Completeness	Raw Material	Colour	Length (mm)	Width (mm)	Thickness (mm)	Weight (grams)	Notes	Location Specified
1	Flake	Complete	Silcrete	Grey	30	20				
2	Flake	Complete	Silcrete	Grey	50	30				
3	Core	NA	Silcrete	Grey	50	40				

Site Description

Wambo Site 318 is in rolling hills and lies adjacent to a dirt farm access track on an east facing, mid slope about 600 metres to the north of North Wambo Creek and 100 metres to the south west of an unnamed tributary of North Wambo Creek. The vegetation in the area was regenerating woodland and grasses. The artefacts were two grey silcrete flakes and one grey silcrete core.

Photos





Access track showing Wambo Site 318 on the western side of the track.



Grey silcrete artefacts at Wambo Site 318

AHIMS #37-5-0662 (Wambo Site 319)

RPS/AHIMS Record:

 <p>AHIMS Aboriginal Heritage Information Management System</p>	<h3 style="margin: 0;">Aboriginal Site Recording Form</h3> <p style="margin: 0;">AHIMS Registrar PO Box 1967, Hurstville NSW 2220</p>	 <p style="margin: 0;">Office of Environment & Heritage</p>																
Office Use Only Site Number <input style="width: 150px;" type="text" value="37-5-0662"/> Date received <input style="width: 40px;" type="text"/> / <input style="width: 40px;" type="text"/> / <input style="width: 40px;" type="text"/> Date entered into system <input style="width: 40px;" type="text"/> / <input style="width: 40px;" type="text"/> / <input style="width: 40px;" type="text"/> Date catalogued <input style="width: 40px;" type="text"/> / <input style="width: 40px;" type="text"/> / <input style="width: 40px;" type="text"/> Entered by (I.D.) <input style="width: 200px;" type="text"/>																		
Information Access <input type="checkbox"/> Gender/male <input type="checkbox"/> Gender/female <input type="checkbox"/> Location restriction <input type="checkbox"/> General restriction <input type="checkbox"/> No access For Further Information Contact: <input type="checkbox"/> Nominated Trustee <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 15%;">Title</th> <th style="width: 35%;">Surname</th> <th style="width: 35%;">First Name</th> <th style="width: 15%;">Initials</th> </tr> <tr> <td><input style="width: 30px;" type="text"/></td> <td><input style="width: 100px;" type="text"/></td> <td><input style="width: 100px;" type="text"/></td> <td><input style="width: 30px;" type="text"/></td> </tr> </table> Organisation <input style="width: 100%; height: 15px;" type="text"/> Address <input style="width: 100%; height: 15px;" type="text"/> Phone number <input style="width: 100%; height: 15px;" type="text"/> Fax <input style="width: 100%; height: 15px;" type="text"/> <input type="checkbox"/> Knowledge Holder <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 15%;">Title</th> <th style="width: 35%;">Surname</th> <th style="width: 35%;">First Name</th> <th style="width: 15%;">Initials</th> </tr> <tr> <td><input style="width: 30px;" type="text"/></td> <td><input style="width: 100px;" type="text"/></td> <td><input style="width: 100px;" type="text"/></td> <td><input style="width: 30px;" type="text"/></td> </tr> </table> Organisation <input style="width: 100%; height: 15px;" type="text"/> Address <input style="width: 100%; height: 15px;" type="text"/> Phone number <input style="width: 100%; height: 15px;" type="text"/> Fax <input style="width: 100%; height: 15px;" type="text"/> Aboriginal Heritage Unit or Cultural Heritage Division Contacts <input style="width: 100%; height: 15px;" type="text"/>		Title	Surname	First Name	Initials	<input style="width: 30px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 30px;" type="text"/>	Title	Surname	First Name	Initials	<input style="width: 30px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 30px;" type="text"/>	Office Use Only Client on system <input type="checkbox"/> Client on system <input type="checkbox"/>
Title	Surname	First Name	Initials															
<input style="width: 30px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 30px;" type="text"/>															
Title	Surname	First Name	Initials															
<input style="width: 30px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 30px;" type="text"/>															
Geographic Location Site Name <input style="width: 100%; height: 15px;" type="text" value="WAMBO SITE 319"/> Easting <input style="width: 40px;" type="text" value="305936"/> Northing <input style="width: 40px;" type="text" value="6396357"/> AGD/GDA <input style="width: 40px;" type="text" value="GDA"/> Mapsheet <input style="width: 100%; height: 15px;" type="text" value="DOYLES CREEK"/> Zone <input style="width: 40px;" type="text" value="56"/> Location Method <input style="width: 100%; height: 15px;" type="text" value="Differential GPS"/> Other Registration <input style="width: 100%; height: 15px;" type="text"/>																		
Primary Recorder <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 15%;">Title</th> <th style="width: 35%;">Surname</th> <th style="width: 35%;">First Name</th> <th style="width: 15%;">Initials</th> </tr> <tr> <td><input style="width: 30px;" type="text"/></td> <td><input style="width: 100px;" type="text"/></td> <td><input style="width: 100px;" type="text"/></td> <td><input style="width: 30px;" type="text"/></td> </tr> </table> Organisation <input style="width: 100%; height: 15px;" type="text" value="RPS AUSTRALIA EST PTY LTD"/> Address <input style="width: 100%; height: 15px;" type="text" value="PO BOX 428 HAMILTON NSW 2303"/> Phone number <input style="width: 100%; height: 15px;" type="text" value="249404200"/> Fax <input style="width: 100%; height: 15px;" type="text" value="249616794"/> Date recorded <input style="width: 100%; height: 15px;" type="text"/>		Title	Surname	First Name	Initials	<input style="width: 30px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 30px;" type="text"/>	Client on system <input type="checkbox"/>								
Title	Surname	First Name	Initials															
<input style="width: 30px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 30px;" type="text"/>															

General Site Information

Closed Site

Shelter/Cave Formation

- Boulder
- Wind erosion
- Water erosion
- Rock collapse

Rock Surface Condition

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

Open Site

Site Orientation

- N-S
- NE-SW
- E-W
- SE-NW
- N/A

Condition of Ceiling

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

Shelter Aspect

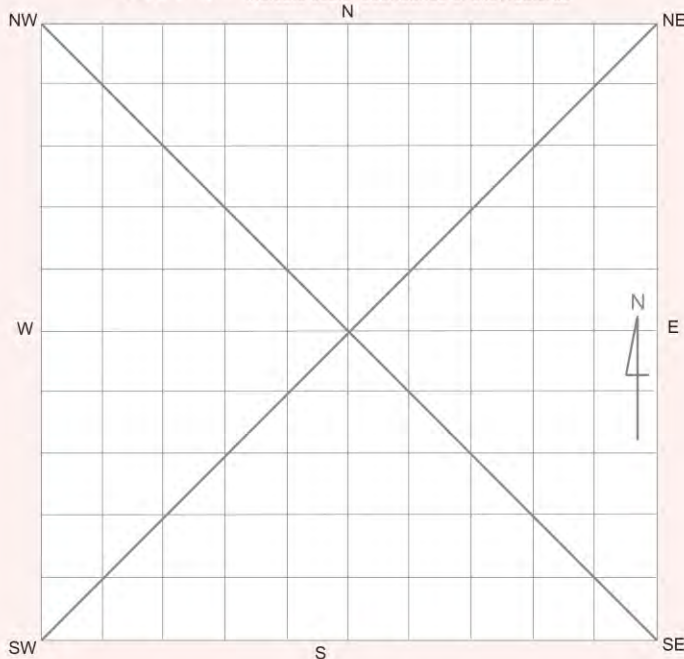
- North
- North East
- East
- South East
- South
- South West
- West
- North West

Features

- 1. Aboriginal Ceremony & Dreaming
- 2. Aboriginal Resource & Gathering
- 3. Art
- 4. Artefact
- 5. Burial
- 6. Ceremonial Ring
- 7. Conflict
- 8. Earth Mound
- 9. Fish Trap
- 10. Grinding Groove
- 11. Habitation Structure
- 12. Hearth
- 13. Non Human Bone & Organic Material
- 14. Ochre quarry
- 15. Potential Archaeological Deposit
- 16. Stone Quarry
- 17. Shell
- 18. Stone Arrangement
- 19. Modified Tree
- 20. Water Hole

Site Plan

Indicate scale, boundaries of site, features



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- 1.0m Total length of visible site
- 1.0m Average width of visible site
- 1.00 sq m Estimated area of visible site
- 2.0m Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

This site is located in rolling hills on an east facing mid slope. The site is in a clearing adjacent to a dirt access track. The vegetation is characterised by regrowth pencil pines and eucalypts. The area shows extensive erosion by water runoff and is approximately 500 metres north of North Wambo Creek and 100 metres to the south of an ephemeral first order tributary of North Wambo Creek. Thirteen mudstone and silcrete flake artefacts were identified.

If proposed or existing mine activities are likely to impact on the Aboriginal archaeological site, then the site should be salvaged (subject to an appropriate permit being in force) and the artefacts or objects relocated to the temporary keeping place under the Wambo Care & Control Permit #3130.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus

Title	Surname	First Name	Initials
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Organisation

Address

Phone number Fax

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts-No.

Comments

NPWS FEATURE RECORDING FORM - ARTEFACT

Site I.D. Site Name

First recorded date Importance

No. of instances

Recorded by

Yes No

Stone artefacts only

Artefacts collected

Permit issued

Percentage of Non-stone Artefacts to Percentage of Stone Artefacts

0-9% 10-19% 20-29% 30-39% 40-49% 50-59% 60-69% 70-79% 80-89% 90-100%

Feature Context & Condition

Scatter No. Easting Northing

Density (Artefact count per square metre) Dimensions Length (m) Width (m) Depth (m)

In situ Stratified

Feature Condition

- Very good
- Good
- Poor

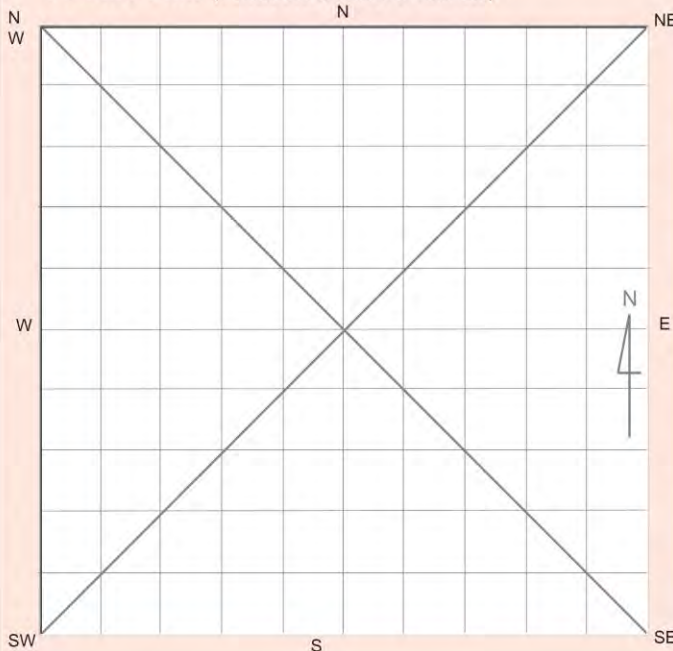
General Condition

- Weathered
- Vehicle damage
- Surface water wash
- Fire damage
- Erosion
- Stock damage
- Exposed archaeological material

Recommended Action

- Boardwalk
- Fencing
- Closure to public
- Continued inspection
- Fire hazard reduction
- Expert assessment
- Meeting with land manager
- Revegetation
- Signage
- Soil erosion control
- Track closure/re-routing
- Additional recording

Feature Plan (Indicate scale, location of instances)



Feature Environment

(Complete when feature environment differs to site environment, use attributes from cover card, p. 2)

Land form

Land form unit

Slope

Vegetation

Land use

Water

Distance to permanent water source metres

Distance to temporary water source metres

Name of nearest permanent water source

Name of nearest temporary water

Table: Artefact Attributes

ID	Artefact Type	Completeness	Raw Material	Colour	Length (mm)	Width (mm)	Thickness (mm)	Weight (grams)	Notes	Location Specified
1	Flake	Complete	Mudstone	Yellow						
2	Flake	Complete	Mudstone	Yellow						
3	Flake	Complete	Mudstone	Yellow						
4	Flake	Complete	Mudstone	Yellow						
5	Flake	Complete	Mudstone	Yellow						
6	Flake	Complete	Mudstone	Red						
7	Flake	Complete	Mudstone	Red						
8	Flake	Complete	Mudstone	Red						
9	Flake	Complete	Silcrete	Pink						
10	Flake	Complete	Silcrete	Pink						
11	Flake	Complete	Silcrete	Pink						
12	Flake	Complete	Silcrete	Grey						
13	Flake	Complete	Silcrete	Grey						

Site Description

Wambo Site 319 is located in rolling hills on an east facing mid slope. The site is in a clearing adjacent to a dirt access track. The vegetation includes regrowth pencil pines and eucalypts. The area shows extensive erosion by water runoff and is approximately 500 metres north of North Wambo Creek and 100 metres to the south of an ephemeral first order tributary of North Wambo Creek. Thirteen mudstone and silcrete flake artefacts were identified.

Photos





Wambo Site 319 facing north



Mudstone and silcrete artefacts at Wambo Site 319

AHIMS #37-5-0663 (Wambo Site 320)

RPS/AHIMS Record:

		<h2 style="margin: 0;">Aboriginal Site Recording Form</h2> <p style="margin: 0;">AHIMS Registrar PO Box 1967, Hurstville NSW 2220</p>		 <p style="margin: 0; font-size: small;">Office of Environment & Heritage</p>	
Office Use Only					
		Site Number	<input type="text" value="3"/> <input type="text" value="7"/> <input type="text" value="-"/> <input type="text" value="5"/> <input type="text" value="-"/> <input type="text" value="0"/> <input type="text" value="6"/> <input type="text" value="6"/> <input type="text" value="3"/>		
Date received	<input type="text" value=""/> / <input type="text" value=""/> / <input type="text" value=""/>	Date entered into system	<input type="text" value=""/> / <input type="text" value=""/> / <input type="text" value=""/>	Date catalogued	<input type="text" value=""/> / <input type="text" value=""/> / <input type="text" value=""/>
Entered by (I.D.) <input style="width: 100%;" type="text"/>					
Information Access					
<input type="checkbox"/> Gender/male <input type="checkbox"/> Gender/female <input type="checkbox"/> Location restriction <input type="checkbox"/> General restriction <input type="checkbox"/> No access					
For Further Information Contact:					
<input type="checkbox"/> Nominated Trustee					
Title	Surname	First Name	Initials		
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>		
Organisation <input style="width: 100%;" type="text"/>					
Address <input style="width: 100%;" type="text"/>					
Phone number <input style="width: 50%;" type="text"/>		Fax <input style="width: 50%;" type="text"/>			
<input type="checkbox"/> Knowledge Holder					
Title	Surname	First Name	Initials		
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>		
Organisation <input style="width: 100%;" type="text"/>					
Address <input style="width: 100%;" type="text"/>					
Phone number <input style="width: 50%;" type="text"/>		Fax <input style="width: 50%;" type="text"/>			
Aboriginal Heritage Unit or Cultural Heritage Division Contacts					
<input style="width: 100%;" type="text"/>					
Geographic Location					
Site Name <input style="width: 100%;" type="text" value="W A M B O S I T E 3 2 0"/>					
Easting <input style="width: 50%;" type="text" value="3 0 6 0 5 4"/>		Northing <input style="width: 50%;" type="text" value="6 3 9 6 1 4 9"/>		AGD/GDA <input type="text" value="GDA"/>	
Mapsheets <input style="width: 100%;" type="text"/>					
Zone <input style="width: 50%;" type="text" value="56"/>		Location Method <input style="width: 50%;" type="text" value="Differential GPS"/>			
Other Registration <input style="width: 100%;" type="text"/>					
Primary Recorder					
Title	Surname	First Name	Initials		
<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>		
Organisation <input style="width: 100%;" type="text" value="R P S"/>					
Address <input style="width: 100%;" type="text" value="P O B O X 4 2 8 H A M I L T O N N S W 2 3 0 3"/>					
Phone number <input style="width: 50%;" type="text" value="2 4 9 4 0 4 2 0 0"/>		Fax <input style="width: 50%;" type="text" value="2 4 9 6 1 6 7 9 4"/>			
Date recorded <input style="width: 100%;" type="text"/>					

OPEN/CLOSE SITE Open Site

Site Context

Landform

- Mountainous
- Plain
- Rolling hills
- Steep hills
- Undulating plain

Slope

degrees

Landform Unit

- | | | | |
|--|---|--------------------------------------|---|
| <input type="checkbox"/> Beach | <input type="checkbox"/> Tidal Flat | <input type="checkbox"/> Upper slope | <input type="checkbox"/> Stream bank |
| <input type="checkbox"/> Coastal rock platform | <input type="checkbox"/> Cliff | <input type="checkbox"/> Plain | <input type="checkbox"/> Stream channel |
| <input type="checkbox"/> Dune | <input type="checkbox"/> Crest | <input type="checkbox"/> Ridge | <input type="checkbox"/> Swamp |
| <input type="checkbox"/> Intertidal flat | <input type="checkbox"/> Flat | <input type="checkbox"/> Tor | <input type="checkbox"/> Terrace |
| <input type="checkbox"/> Lagoon | <input checked="" type="checkbox"/> Lower slope | <input type="checkbox"/> Valley flat | <input type="checkbox"/> Terrace flat |
| <input type="checkbox"/> Tidal Creek | <input type="checkbox"/> Mid slope | <input type="checkbox"/> Levy | |

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- Residential

Water

Distance to permanent water source metres
 Distance to temporary water source metres
 Name of nearest permanent water source
 Name of nearest temporary water

Directions for Relocation

See attached map and DGPS coordinates. The area was off the extension of Pinegrove Road on the southern side of the golden Highway and to the was of Jerrys Plains township. Four artefacts were identified on a south west facing slope.

Current Land Tenure

- Public National Park / other Government Dept.
- Private

Primary report I.D. (I.D. Office Use only)



General Site Information

Closed Site

Shelter/Cave Formation

- Boulder
- Wind erosion
- Water erosion
- Rock collapse

Rock Surface Condition

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

Open Site

Site Orientation

- N-S
- NE-SW
- E-W
- SE-NW
- N/A

Condition of Ceiling

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

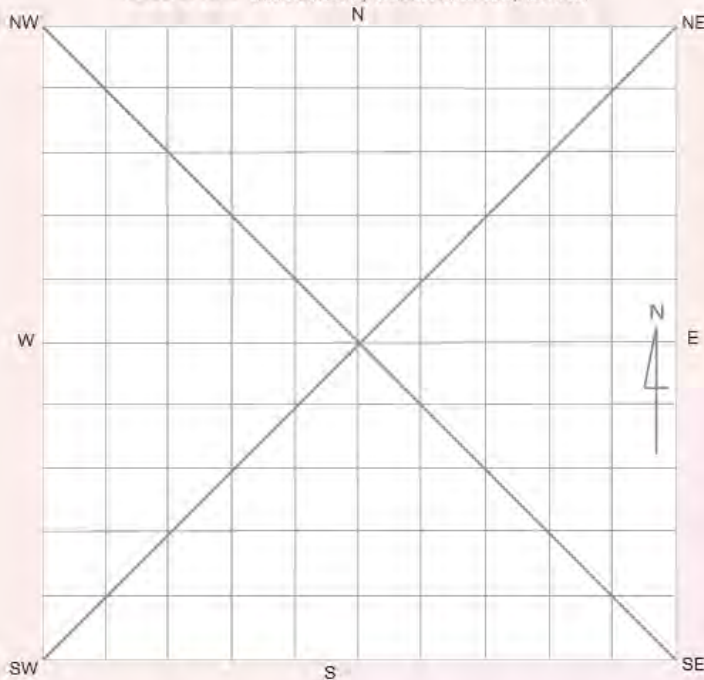
Shelter Aspect

- North
- North East
- East
- South East
- South
- South West
- West
- North West

Features

- 1. Aboriginal Ceremony & Dreaming
- 2. Aboriginal Resource & Gathering
- 3. Art
- 4. Artefact
- 5. Burial
- 6. Ceremonial Ring
- 7. Conflict
- 8. Earth Mound
- 9. Fish Trap
- 10. Grinding Groove
- 11. Habitation Structure
- 12. Hearth
- 13. Non Human Bone & Organic Material
- 14. Ochre quarry
- 15. Potential Archaeological Deposit
- 16. Stone Quarry
- 17. Shell
- 18. Stone Arrangement
- 19. Modified Tree
- 20. Water Hole

Site Plan Indicate scale, boundaries of site, features



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- Total length of visible site
- Average width of visible site
- Estimated area of visible site
- Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Wambo Site 320 was situated in an erosion scour on a lower slope associated with rolling hills. Vegetation in the area included open regenerating woodland of ironbark and pencil pines. The B horizon was exposed due to extensive sheet wash erosion. The site was about 250 metres to the north of North Wambo Creek, with a dammed creek line approximately 40 metres to the south west. The artefact scatter comprised one chert and three mudstone flakes.

If proposed or existing mine activities are likely to impact on the Aboriginal archaeological site, then the site should be salvaged (subject to an appropriate permit being in force) and the artefacts or objects relocated to the temporary keeping place under the Wambo Care & Control Permit #3130.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus

Title	Surname	First Name	Initials
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Organisation	<input type="text"/>		
Address	<input type="text"/>		
Phone number	<input type="text"/>	Fax	<input type="text"/>

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts-No.

Comments

NPWS FEATURE RECORDING FORM - ARTEFACT

Site I.D. Site Name

First recorded date Importance

No. of instances

Recorded by

Yes No

Stone artefacts only

Artefacts collected

Permit issued

Percentage of Non-stone Artefacts to Percentage of Stone Artefacts

0-9% 10-19% 20-29% 30-39% 40-49% 50-59% 60-69% 70-79% 80-89% 90-100%

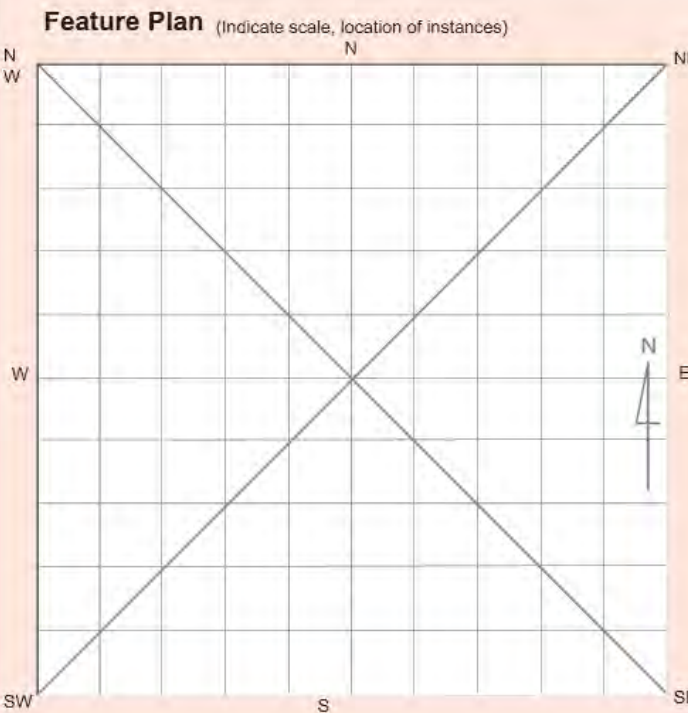
Feature Context & Condition

Scatter No. Easting Northing

Density (Artefact count per square metre) Dimensions Length (m) Width (m) Depth (m)

In situ Stratified

Feature Condition	General Condition	Recommended Action
<input type="checkbox"/> Very good	<input type="checkbox"/> Weathered	<input type="checkbox"/> Boardwalk
<input type="checkbox"/> Good	<input type="checkbox"/> Vehicle damage	<input type="checkbox"/> Fencing
<input type="checkbox"/> Poor	<input type="checkbox"/> Surface water wash	<input type="checkbox"/> Closure to public
	<input type="checkbox"/> Fire damage	<input type="checkbox"/> Continued inspection
	<input checked="" type="checkbox"/> Erosion	<input type="checkbox"/> Fire hazard reduction
	<input type="checkbox"/> Stock damage	<input type="checkbox"/> Expert assessment
	<input type="checkbox"/> Exposed archaeological material	<input type="checkbox"/> Meeting with land manager
		<input type="checkbox"/> Revegetation
		<input type="checkbox"/> Signage
		<input type="checkbox"/> Soil erosion control
		<input type="checkbox"/> Track closure/re-routing
		<input type="checkbox"/> Additional recording



Feature Environment (Complete when feature environment differs to site environment, use attributes from cover card, p. 2)

Land form

Land form unit

Slope

Vegetation

Land use

Water

Distance to permanent water source metres

Distance to temporary water source metres

Name of nearest permanent water source

Name of nearest temporary water

Table: Artefact Attributes

ID	Artefact Type	Completeness	Raw Material	Colour	Length (mm)	Width (mm)	Thickness (mm)	Weight (grams)	Notes	Location Specified
1	Flake	Complete	Mudstone	Pink	20	10				
2	Flake	Complete	Mudstone	Red	20	20				
3	Flake	Complete	Mudstone	Red	20	15				
4	Flake	Complete	Chert	Cream	40	40				

Site Description

Wambo Site 320 was situated in an erosion scour on a lower slope associated with rolling hills. Vegetation in the area included open regenerating woodland of ironbark and pencil pines. The B horizon was exposed due to extensive sheet wash erosion. The site was about 250 metres to the north of North Wambo Creek, with a dammed creek line approximately 40 metres to the south west. The artefact scatter comprised one chert and three mudstone flakes.

Photos





Wambo Site 320 facing south west



One chert and three mudstone flakes at Wambo Site 320

AHIMS #37-5-0664 (Wambo Site 321)

RPS/AHIMS Record:

	<h2 style="margin:0;">Aboriginal Site Recording Form</h2> <p style="margin:0;">AHIMS Registrar PO Box 1967, Hurstville NSW 2220</p>	 <p style="margin:0; font-size: small;">Office of Environment & Heritage</p>																								
Office Use Only <div style="display: flex; justify-content: space-between;"> <div> <p>Site Number <input style="width: 150px;" type="text" value="3750664"/></p> <p>Date received <input style="width: 50px;" type="text" value=""/>/</p> </div> <div> <p>Date entered into system <input style="width: 50px;" type="text" value=""/>/</p> </div> <div> <p>Date catalogued <input style="width: 50px;" type="text" value=""/>/</p> </div> </div> <p>Entered by (I.D.) <input style="width: 150px;" type="text"/></p>																										
Information Access <input type="checkbox"/> Gender/male <input type="checkbox"/> Gender/female <input type="checkbox"/> Location restriction <input type="checkbox"/> General restriction <input type="checkbox"/> No access For Further Information Contact: <input type="checkbox"/> Nominated Trustee <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">Title</td> <td style="width:35%;">Surname</td> <td style="width:35%;">First Name</td> <td style="width:15%;">Initials</td> </tr> <tr> <td><input style="width: 20px;" type="text"/></td> <td><input style="width: 100px;" type="text"/></td> <td><input style="width: 100px;" type="text"/></td> <td><input style="width: 20px;" type="text"/></td> </tr> </table> <p>Organisation <input style="width: 100%;" type="text"/></p> <p>Address <input style="width: 100%;" type="text"/></p> <p>Phone number <input style="width: 50%;" type="text"/> Fax <input style="width: 50%;" type="text"/></p> <input type="checkbox"/> Knowledge Holder <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">Title</td> <td style="width:35%;">Surname</td> <td style="width:35%;">First Name</td> <td style="width:15%;">Initials</td> </tr> <tr> <td><input style="width: 20px;" type="text"/></td> <td><input style="width: 100px;" type="text"/></td> <td><input style="width: 100px;" type="text"/></td> <td><input style="width: 20px;" type="text"/></td> </tr> </table> <p>Organisation <input style="width: 100%;" type="text"/></p> <p>Address <input style="width: 100%;" type="text"/></p> <p>Phone number <input style="width: 50%;" type="text"/> Fax <input style="width: 50%;" type="text"/></p> <p>Aboriginal Heritage Unit or Cultural Heritage Division Contacts <input style="width: 100%;" type="text"/></p>		Title	Surname	First Name	Initials	<input style="width: 20px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 20px;" type="text"/>	Title	Surname	First Name	Initials	<input style="width: 20px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 20px;" type="text"/>	<p style="font-size: x-small; text-align: center;">Office Use Only</p> <p style="text-align: center;">Client on system <input type="checkbox"/></p> <p style="text-align: center;">Client on system <input type="checkbox"/></p>								
Title	Surname	First Name	Initials																							
<input style="width: 20px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 20px;" type="text"/>																							
Title	Surname	First Name	Initials																							
<input style="width: 20px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 20px;" type="text"/>																							
Geographic Location <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">Site Name</td> <td colspan="3"><input style="width: 100%;" type="text" value="WAMBO SITE 321"/></td> </tr> <tr> <td>Easting</td> <td><input style="width: 50px;" type="text" value="306097"/></td> <td>Northing</td> <td><input style="width: 50px;" type="text" value="6396146"/></td> </tr> <tr> <td></td> <td colspan="3">AGD/GDA <input style="width: 50px;" type="text" value="GDA"/></td> </tr> <tr> <td>Mapsheet</td> <td colspan="3"><input style="width: 100%;" type="text" value="DOYLES CREEK"/></td> </tr> <tr> <td>Zone</td> <td><input style="width: 50px;" type="text" value="56"/></td> <td>Location Method</td> <td><input style="width: 100%;" type="text" value="Differential GPS"/></td> </tr> <tr> <td></td> <td colspan="3">Other Registration <input style="width: 150px;" type="text"/></td> </tr> </table>			Site Name	<input style="width: 100%;" type="text" value="WAMBO SITE 321"/>			Easting	<input style="width: 50px;" type="text" value="306097"/>	Northing	<input style="width: 50px;" type="text" value="6396146"/>		AGD/GDA <input style="width: 50px;" type="text" value="GDA"/>			Mapsheet	<input style="width: 100%;" type="text" value="DOYLES CREEK"/>			Zone	<input style="width: 50px;" type="text" value="56"/>	Location Method	<input style="width: 100%;" type="text" value="Differential GPS"/>		Other Registration <input style="width: 150px;" type="text"/>		
Site Name	<input style="width: 100%;" type="text" value="WAMBO SITE 321"/>																									
Easting	<input style="width: 50px;" type="text" value="306097"/>	Northing	<input style="width: 50px;" type="text" value="6396146"/>																							
	AGD/GDA <input style="width: 50px;" type="text" value="GDA"/>																									
Mapsheet	<input style="width: 100%;" type="text" value="DOYLES CREEK"/>																									
Zone	<input style="width: 50px;" type="text" value="56"/>	Location Method	<input style="width: 100%;" type="text" value="Differential GPS"/>																							
	Other Registration <input style="width: 150px;" type="text"/>																									
Primary Recorder <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">Title</td> <td style="width:35%;">Surname</td> <td style="width:35%;">First Name</td> <td style="width:15%;">Initials</td> </tr> <tr> <td><input style="width: 20px;" type="text"/></td> <td><input style="width: 100px;" type="text"/></td> <td><input style="width: 100px;" type="text"/></td> <td><input style="width: 20px;" type="text"/></td> </tr> </table> <p>Organisation <input style="width: 100%;" type="text" value="RPS"/></p> <p>Address <input style="width: 100%;" type="text" value="PO BOX 428 HAMILTON NSW 2303"/></p> <p>Phone number <input style="width: 50%;" type="text" value="249404200"/> Fax <input style="width: 50%;" type="text" value="249616794"/></p> <p>Date recorded <input style="width: 50px;" type="text"/></p>		Title	Surname	First Name	Initials	<input style="width: 20px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 20px;" type="text"/>	<p style="text-align: center;">Client on system <input type="checkbox"/></p>																
Title	Surname	First Name	Initials																							
<input style="width: 20px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 20px;" type="text"/>																							

OPEN/CLOSE SITE Open Site

Site Context

Landform

- Mountainous
- Plain
- Rolling hills
- Steep hills
- Undulating plain

Slope

degrees

Landform Unit

- | | | | |
|--|---|--------------------------------------|---|
| <input type="checkbox"/> Beach | <input type="checkbox"/> Tidal Flat | <input type="checkbox"/> Upper slope | <input type="checkbox"/> Stream bank |
| <input type="checkbox"/> Coastal rock platform | <input type="checkbox"/> Cliff | <input type="checkbox"/> Plain | <input type="checkbox"/> Stream channel |
| <input type="checkbox"/> Dune | <input type="checkbox"/> Crest | <input type="checkbox"/> Ridge | <input type="checkbox"/> Swamp |
| <input type="checkbox"/> Intertidal flat | <input type="checkbox"/> Flat | <input type="checkbox"/> Tor | <input type="checkbox"/> Terrace |
| <input type="checkbox"/> Lagoon | <input checked="" type="checkbox"/> Lower slope | <input type="checkbox"/> Valley flat | <input type="checkbox"/> Terrace flat |
| <input type="checkbox"/> Tidal Creek | <input type="checkbox"/> Mid slope | <input type="checkbox"/> Levy | |

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- Residential

Water

Distance to permanent water source metres
 Distance to temporary water source metres
 Name of nearest permanent water source
 Name of nearest temporary water

Directions for Relocation
 Refer to GPS coordinates. Cleared paddock to north of an existing dirt access track which was an extension of Pinegrove Road on the southern side of the Golden Highway and to the east of Jerrys Plans township. Twelve mudstone, silcrete and basalt flakes were identified on the surface of the B Horizon.

Current Land Tenure

- Public National Park / other Government Dept.
- Private

Primary report

I.D. (I.D. Office Use only)



General Site Information

Closed Site

Shelter/Cave Formation

- Boulder
- Wind erosion
- Water erosion
- Rock collapse

Rock Surface Condition

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

Open Site

Site Orientation

- N-S
- NE-SW
- E-W
- SE-NW
- N/A

Condition of Ceiling

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

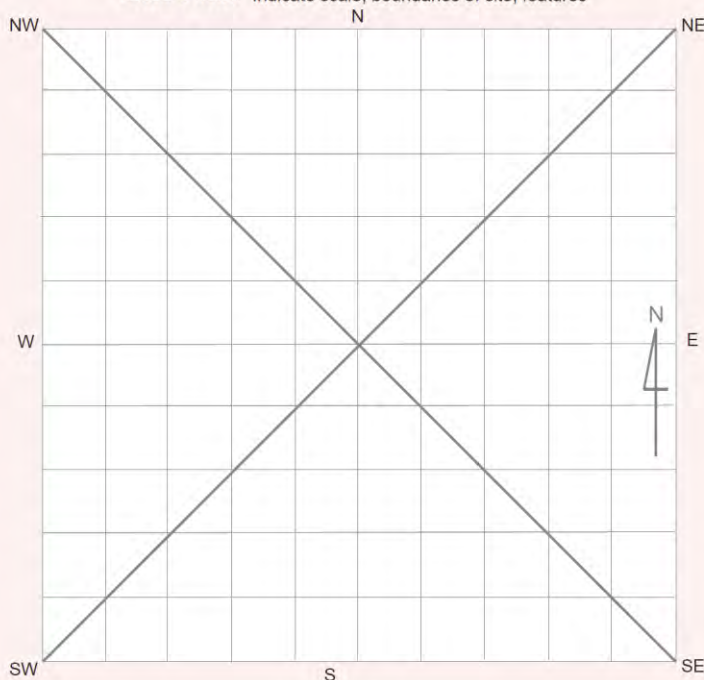
Shelter Aspect

- North
- North East
- East
- South East
- South
- South West
- West
- North West

Features

- 1. Aboriginal Ceremony & Dreaming
- 2. Aboriginal Resource & Gathering
- 3. Art
- 4. Artefact
- 5. Burial
- 6. Ceremonial Ring
- 7. Conflict
- 8. Earth Mound
- 9. Fish Trap
- 10. Grinding Groove
- 11. Habitation Structure
- 12. Hearth
- 13. Non Human Bone & Organic Material
- 14. Ochre quarry
- 15. Potential Archaeological Deposit
- 16. Stone Quarry
- 17. Shell
- 18. Stone Arrangement
- 19. Modified Tree
- 20. Water Hole

Site Plan Indicate scale, boundaries of site, features



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- Total length of visible site
- Average width of visible site
- Estimated area of visible site
- Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Wambo Site 321 is located on a lower slope associated with rolling hills. Vegetation in the area was predominantly pasture grasses with some open woodland nearby, but the immediate area had been cleared. The soils in the area showed effects of extensive sheet wash erosion. The site was about 250 metres to the north of North Wambo Creek, with a dam and creek line approximately 75 metres to the west. The artefact scatter comprised 10 mudstone flakes, one silcrete flake and one basalt flake.

If proposed or existing mine activities are likely to impact on the Aboriginal archaeological site, then the site should be salvaged (subject to an appropriate permit being in force) and the artefacts or objects relocated to the temporary keeping place under the Wambo Care & Control Permit #3130.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus

Title	Surname	First Name	Initials
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Organisation	<input type="text"/>		
Address	<input type="text"/>		
Phone number	<input type="text"/>	Fax	<input type="text"/>

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts-No.

Comments

NPWS FEATURE RECORDING FORM - ARTEFACT

Site I.D. Site Name

First recorded date Importance

No. of instances

Recorded by

Yes No

Stone artefacts only

Artefacts collected

Permit issued

Percentage of Non-stone Artefacts to Percentage of Stone Artefacts

0-9% 10-19% 20-29% 30-39% 40-49% 50-59% 60-69% 70-79% 80-89% 90-100%

Feature Context & Condition

Scatter No. Easting Northing

Density (Artefact count per square metre) Dimensions

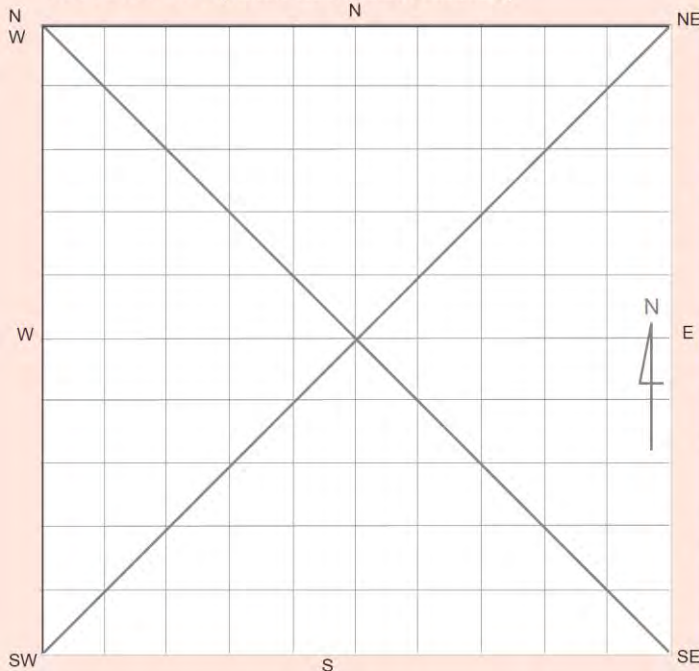
Length (m) Width (m) Depth (m)

In situ

Stratified

Feature Condition	General Condition	Recommended Action
<input type="checkbox"/> Very good	<input type="checkbox"/> Weathered	<input type="checkbox"/> Boardwalk
<input type="checkbox"/> Good	<input type="checkbox"/> Vehicle damage	<input type="checkbox"/> Fencing
<input checked="" type="checkbox"/> Poor	<input checked="" type="checkbox"/> Surface water wash	<input type="checkbox"/> Closure to public
	<input type="checkbox"/> Fire damage	<input checked="" type="checkbox"/> Continued inspection
	<input checked="" type="checkbox"/> Erosion	<input type="checkbox"/> Fire hazard reduction
	<input checked="" type="checkbox"/> Stock damage	<input type="checkbox"/> Expert assessment
	<input checked="" type="checkbox"/> Exposed archaeological material	<input type="checkbox"/> Meeting with land manager
		<input type="checkbox"/> Revegetation
		<input type="checkbox"/> Signage
		<input type="checkbox"/> Soil erosion control
		<input type="checkbox"/> Track closure/re-routing
		<input type="checkbox"/> Additional recording

Feature Plan (Indicate scale, location of instances)



Feature Environment

(Complete when feature environment differs to site environment, use attributes from cover card, p. 2)

Land form

Land form unit

Slope

Vegetation

Land use

Water

Distance to permanent water source metres

Distance to temporary water source metres

Name of nearest permanent water source

Name of nearest temporary water

Table: Artefact Attributes

ID	Artefact Type	Completeness	Raw Material	Colour	Length (mm)	Width (mm)	Thickness (mm)	Weight (grams)	Notes	Location Specified
1	Flake	Complete	Mudstone	Red						
2	Flake	Complete	Mudstone	Red						
3	Flake	Complete	Mudstone	Cream						
4	Flake	Complete	Mudstone	Yellow						
5	Flake	Complete	Mudstone	Yellow						
6	Flake	Complete	Mudstone	Yellow						
7	Flake	Complete	Mudstone	Yellow						
8	Flake	Complete	Mudstone	Yellow						
9	Flake	Complete	Mudstone	Yellow						
10	Flake	Complete	Mudstone	Yellow						
11	Flake	Complete	Silcrete	Grey						
12	Flake	Complete	Basalt	Dark Grey						

Site Description

Wambo Site 321 is located on a lower slope associated with rolling hills. Vegetation in the area was predominantly pasture grasses with some open woodland nearby, but the immediate area has been cleared. The soils in the area showed effects of extensive sheet wash erosion. The site was about 250 metres to the north of North Wambo Creek, with a dam and creek line approximately 75 metres to the west. The artefact scatter comprised 10 mudstone flakes, one silcrete flake and one basalt flake.

Photos



Wambo Site 321 facing south west



Mudstone, silcrete and basalt artefacts at Wambo Site 321

Kuskie (2017a):

SITE NAME: WAMBO SITE 321

Site Type: *Artefact Scatter*
 Date Recorded: *23/11/16*
 Recorder: *Birgitta Stephenson*

MGA Grid Reference: *306157:6396161*
 Topographic Map: *Doyles Creek 9032-I-N*

Landform Element: *Simple Slope*
 Slope: *Moderate*
 Distance to Water: *>50*

Vegetation: *Cleared/Regrowth*
 Ground Disturbance: *Moderate*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
varies	varies	85	50	4250	20	20	850	28	0.033	probable

Artefact Database:

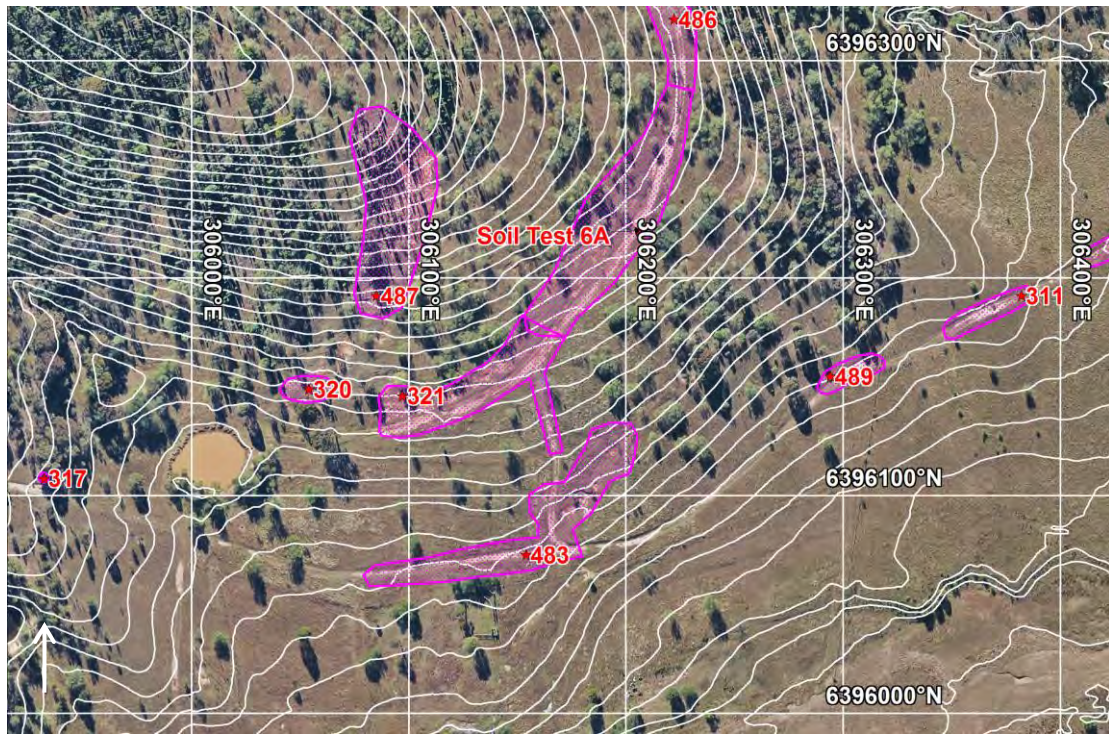
Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	grey/orange	tuff	flake - utilised	20x15x4			use-wear present on the right lateral margin	306099	6396135
2	orange/brown	tuff	lithic fragment	20x18x10	10	tab	no bulb present but some possibly flake scars	306127	6396145
3	orange/brown	tuff	flake - proximal - utilised	16x16x4	2	tab	distal end snapped; major use-wear present on the right lateral	306130	6396146
4	orange/brown	tuff	flake - proximal	20x16x2				306139	6396150
5	orange	tuff	flake - distal - utilised	20x30x2			exhaustive use-wear on the distal and right lateral	306150	6396156
6	cream	tuff	flake - utilised	30x30x6			use-wear present on left lateral for 20mm	306157	6396161
7	cream	silcrete	flake - utilised	40x34x4			use-wear present on distal section and left lateral	306158	6396163
8	orange	tuff	flake - utilised	24x16x2			use-wear on distal margin	306162	6396168
9	red/purple	tuff	flake	45x30x4			two flake scars on distal margin; on erosion scour near the side of the road	306149	6396157
10	red	tuff	flake - distal	14x8x2			on erosion scour near the side of the road	306149	6396157
11	red/yellow	chert	flake	20x18x2			on erosion scour near the side of the road	306149	6396157
12	red/yellow	chert	flake	44x26x10			large step fracture on the left lateral; wide distal margin	306146	6396158

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
13	yellow/brown	chert	flake - utilised	60x28x4			major use-wear in both lateral margins	306145	6396155
14	yellow/brown	chert	flake - utilised	40x20x6			use-wear present on both lateral margins	306144	6396159
15	red/orange	chert	flake	70x40x4	20	tab	flake scars on the distal margin and the right lateral	306144	6396159
16	red/brown	chert	core	34x24x10			two flake scars and one platform	306136	6396156
17	red/brown	chert	lithic fragment	70x40x20	5	tab		306136	6396156
18	cream/orange	tuff	flake - distal	28x12x2			flake scar on the left lateral dorsal surface	306135	6396155
19	pink/cream	tuff	retouched utilised flake	40x40x6			retouch on the left lateral margin and use-wear on right	306129	6396150
20	pink	tuff	flake	16x6x2			on track connecting to two other tracks	306164	6396131
21	grey	tuff	flake	34x28x6			step fractures on the dorsal surface; on track connecting to two other tracks	306164	6396121
22	grey	tuff	flake - utilised	24x18x2			use-wear on right lateral	306094	6396133
23	red/yellow	tuff	retouched utilised flake	70x70x8			retouch on the right lateral margin and use-wear on left	306095	6396143
24	cream	tuff	microblade core	40x30x20	5	ww	four flake scars and one platform	306095	6396143
25	pink/red	tuff	core	50x50x30	20	ww	one flake scar and one platform	306095	6396143
26	yellow	tuff	retouched flake	55x50x6			retouch on the distal margin for 20mm	306095	6396143
27	grey	chert	core	40x40x8	1	ww	four flake scars and one platform	306095	6396143
28	brown/orange	tuff	flake	30x25x6				306095	6396146

Additional Comments:

- Along a vehicle track;
- Previously recorded site;
- Low grass off track;
- Moderate ground disturbance on track;
- Moderate research potential;
- Some erosion;
- Potential pathway from North Wambo Creek to mountains.

Site Location: Wambo Site 321 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 321 (view south)



Photograph: Wambo Site 321 (view east)



Photograph: Wambo Site 321 - artefact #13, utilised flake





Aboriginal Site Impact Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW
 December 2010 DECCW 2010/1022

- 1 This form must be completed following impacts to AHIMS sites that are:
 - a) an outcome of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
 - b) authorised by an Aboriginal Heritage Impact Permit (AHIP)
 - c) undertaken for the purpose of complying with environmental assessment requirements issued by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), or
 - d) authorised by a Part 3A project approval under the EP&A Act.
- 2 Completed forms must be submitted to the AHIMS Registrar (www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm).
- 3 This form is intended to complement (not replace) the AHIMS Site Recording Form. Where there is a need to provide detailed information about the nature of a site, use the AHIMS Site Recording Form.
- 4 This form does not replace the need to submit reports to DECCW (as specified by a condition of an AHIP or Part 3A approval). This form must be submitted in addition to any reports.

AHIMS site ID:

Site impact authorisation (select one)	Reference numbers, dates
<input type="checkbox"/> Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the <i>Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW</i> .)	Date DECCW was notified (under requirement 15c of the Code): <input type="text"/> DECCW Regional office notified: <input type="text"/>
<input checked="" type="checkbox"/> AHIP (The impacts to this site were authorised by an AHIP.)	AHIP number: <input type="text" value="C0003213"/> Date issued/signed: <input type="text" value="22 February 2018"/> AHIMS permit ID/number: <input type="text"/>
<input type="checkbox"/> Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)	Major project number: <input type="text"/> Date environmental assessment requirements issued: <input type="text"/>
<input type="checkbox"/> Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)	or Date of project approval: <input type="text"/>

Site status following impacts:

Not a site (The investigations concluded that this is not a site.)
 Valid site (The investigations confirmed that this is an Aboriginal site.)
 Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)
 Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name:

Easting: **Northing:** **Coordinates must be in GDA (MGA)**

Map sheet:

Zone: **Location method:**

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name
<input type="text" value="Mr"/>	<input type="text" value="Kuskie"/>	<input type="text" value="Peter"/>
Organisation:	<input type="text" value="South East Archaeology Pty Limited"/>	
Address:	<input type="text" value="24 Bamford Street, Hughes, ACT, 2605"/>	
Phone:	<input type="text" value="262604439"/>	E-mail: <input type="text" value="peter@southeastarchaeology.com.au"/>
Date recorded:	<input type="text" value="8/5/18"/>	Fax: <input type="text" value="262604439"/>

Site information

Open/closed site:

Features:

- | | | | |
|-------------------------------------|--------------------------------------|--------------------------|---|
| <input type="checkbox"/> | 1. Aboriginal ceremony and dreaming | <input type="checkbox"/> | 11. Habitation structure |
| <input type="checkbox"/> | 2. Aboriginal resource and gathering | <input type="checkbox"/> | 12. Hearth |
| <input type="checkbox"/> | 3. Art | <input type="checkbox"/> | 13. Non-human bone and organic material |
| <input checked="" type="checkbox"/> | 4. Artefact | <input type="checkbox"/> | 14. Ochre quarry |
| <input type="checkbox"/> | 5. Burial | <input type="checkbox"/> | 15. Potential archaeological deposit |
| <input type="checkbox"/> | 6. Ceremonial ring | <input type="checkbox"/> | 16. Stone quarry |
| <input type="checkbox"/> | 7. Conflict | <input type="checkbox"/> | 17. Shell |
| <input type="checkbox"/> | 8. Earth mound | <input type="checkbox"/> | 18. Stone arrangement |
| <input type="checkbox"/> | 9. Fish trap | <input type="checkbox"/> | 19. Modified tree |
| <input type="checkbox"/> | 10. Grinding groove | <input type="checkbox"/> | 20. Water hole |

Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

The partial salvage of Wambo Site 321 occurred in accordance with the conditions of AHIP #C0003213 and the Wambo Heritage Management Plan (HMP). Surface collection of the site was undertaken on 7 and 8 May 2018 by a suitably qualified archaeologist (Peter Kuskie of South East Archaeology) and a representative of the Registered Aboriginal Parties (RAPs) for Wambo Coal Mine, David Horton of the Wanaruah Local Aboriginal Land Council (LALC). A total of 67 artefacts were collected (refer to attachment). It is likely that the salvage retrieved most, if not all, originally reported artefacts along the vehicle track, along with a number of additional items. However, the site was only subject to collection on the track, and artefacts off the track remain in situ.

Management recommendations

Summary of any management recommendations for the AHIMS site

No further heritage action required in relation to use of the vehicle track. However, only artefacts along the existing road were subject to collection and numerous artefacts remain off the road in areas that are not currently anticipated to be subject to impacts. Impacts cannot occur to the portion of the site off the immediate road surfaces unless prior surface collection is undertaken in accordance with AHIP #C0003213 and the procedures in the Wambo HMP. In addition, all other provisions of the Wambo HMP and AHIP #C0003213 need to be implemented where relevant.

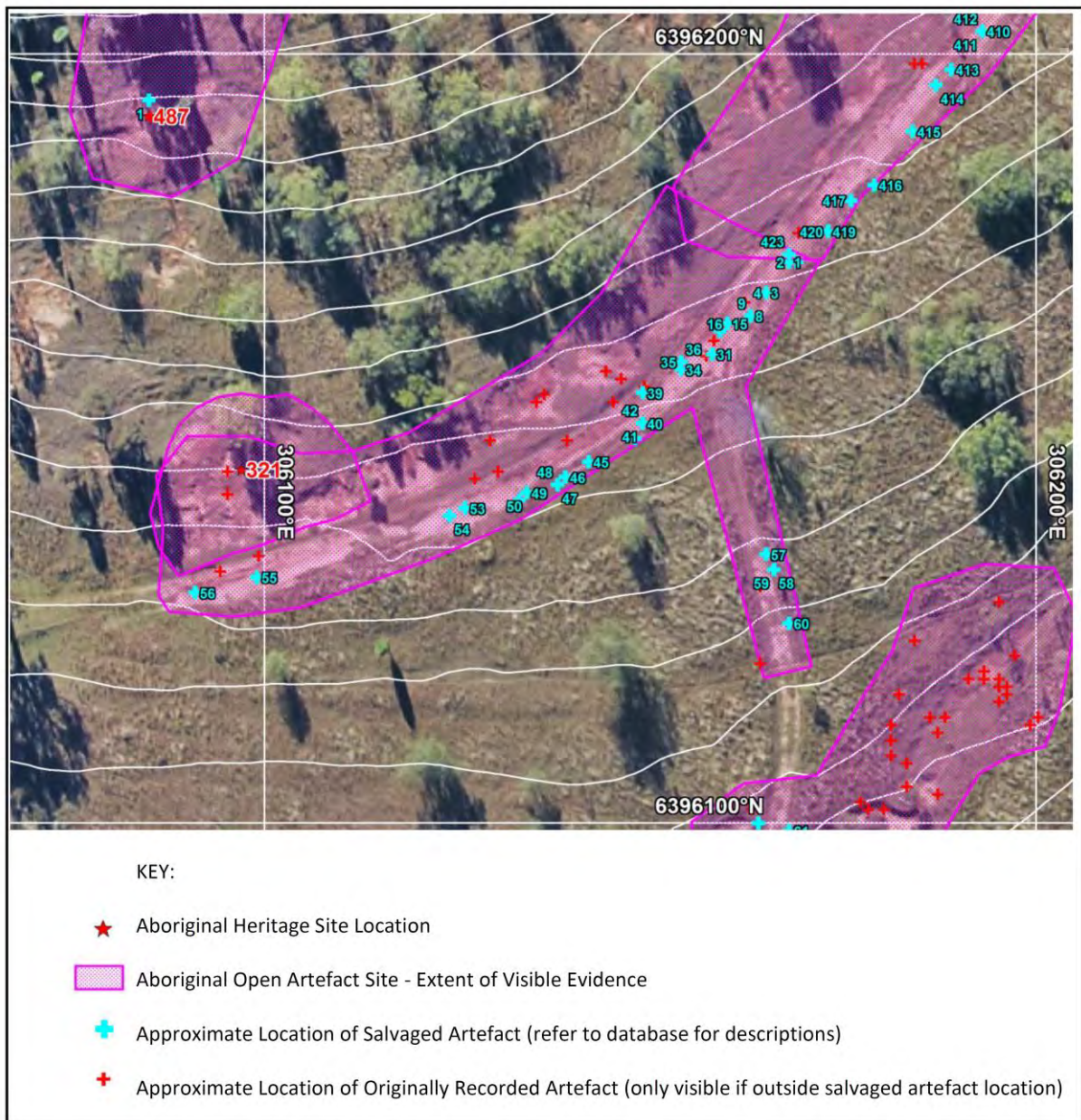
Post-investigation significance

Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

Site has been partially salvaged. A number of originally reported artefacts remain present and the probable occurrence of further artefacts obscured by vegetation and sediment and a sub-surface deposit of artefacts where the A unit soil remains present is very likely. Such evidence may remain as being of low to possibly moderate significance within a local context.

Additional comments

Figure: Approximate location of Wambo Site 321 salvaged artefacts and originally recorded artefacts (aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid; original artefact locations not visible unless outside of salvaged artefact locations; artefact locations approximate only).



Lithic Items Salvaged from Wambo Site 321.

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 321	1	306168	6396173	red	tuff	core	27x19x16	all artefacts on road; surface collection 8/5/18 only on road - artefacts in erosion scours off road left in situ - need to avoid impacts
Wambo Site 321	2	306168	6396173	red	tuff	core	14x12x7	
Wambo Site 321	3	306165	6396169	red/orange	tuff	core	22x21x7	
Wambo Site 321	4	306165	6396169	orange	tuff	core	24x15x8	
Wambo Site 321	5	306165	6396169	red/brown	tuff	flake	26x20x10	
Wambo Site 321	6	306165	6396169	orange/brown	tuff	core	25x16x12	
Wambo Site 321	7	306165	6396169	grey/brown	tuff	lithic fragment	23x13x6	terrestrial cortex on 80% of surfaces
Wambo Site 321	8	306163	6396166	orange	tuff	flake - proximal	17x15x9	
Wambo Site 321	9	306163	6396166	red	tuff	microblade - proximal	10x10x3	
Wambo Site 321	10	306163	6396166	red	tuff	flake	14x7x2	
Wambo Site 321	11	306163	6396166	yellow/brown	tuff	flake - medial	14x11x4	
Wambo Site 321	12	306163	6396166	grey/brown	porphyritic rhyolite	lithic fragment	19x12x5	
Wambo Site 321	13	306163	6396166	pink	silcrete	flake - medial	16x12x4	
Wambo Site 321	14	306163	6396166	pink/grey	silcrete	flake - medial	21x11x6	
Wambo Site 321	15	306160	6396165	brown	silcrete	flake - proximal - utilised	43x33x8	beveling and polish along the lateral margins from use
Wambo Site 321	16	306160	6396165	brown	petrified wood	lithic fragment	16x9x4	
Wambo Site 321	17	306160	6396165	brown	tuff	lithic fragment	20x12x4	
Wambo Site 321	18	306160	6396165	pink/brown	tuff	core	31x16x9	
Wambo Site 321	19	306160	6396165	red	tuff	core	19x12x11	
Wambo Site 321	20	306160	6396165	orange/red	tuff	flake - distal	23x12x6	
Wambo Site 321	21	306160	6396165	orange/white	tuff	core	17x16x8	
Wambo Site 321	22	306160	6396165	yellow/brown	tuff	flake - distal	19x11x3	
Wambo Site 321	23	306160	6396165	yellow/brown	tuff	flake - proximal	17x13x4	
Wambo Site 321	24	306160	6396165	red	tuff	flake	9x8x1	
Wambo Site 321	25	306159	6396164	yellow/brown	tuff	flake - proximal - utilised	39x37x16	beveling and crushing on lateral right margin from use; waterworn cortex on 30% of surfaces
Wambo Site 321	26	306159	6396164	red/yellow	tuff	flake - medial	20x20x10	waterworn cortex on 50% of surfaces
Wambo Site 321	27	306159	6396164	yellow	petrified wood	lithic fragment	22x10x7	
Wambo Site 321	28	306159	6396164	brown	tuff	microblade - distal - utilised	19x9x6	crushed notch on lateral left distal and crushing leading upwards from here on lateral left margin; "burin"
Wambo Site 321	29	306159	6396164	pink	silcrete	flake - medial	16x13x5	
Wambo Site 321	30	306159	6396164	white	quartz	flake - distal	16x13x4	
Wambo Site 321	31	306158	6396161	pink	tuff	core	62x25x25	
Wambo Site 321	32	306158	6396161	yellow/pink	tuff	microblade core	36x18x12	small elongated flake negatives
Wambo Site 321	33	306158	6396161	orange	tuff	retouched flake - utilised	23x16x6	retouched notch on lateral right distal with crushing from use; "burin"
Wambo Site 321	34	306154	6396159	red	tuff	core	27x22x12	



Wambo Site 321 (OEH #37-5-0664) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 321	35	306154	6396160	brown	tuff	flake	32x19x3	
Wambo Site 321	36	306154	6396160	orange	tuff	core	13x12x9	
Wambo Site 321	37	306154	6396160	orange	tuff	flake - distal	10x6x4	
Wambo Site 321	38	306154	6396160	orange	tuff	flake	10x7x2	
Wambo Site 321	39	306149	6396156	orange	tuff	retouched flake - distal	32x24x6	retouch on the lateral right margin forming a sharp serrated edge
Wambo Site 321	40	306149	6396152	white/pink	tuff	flake - proximal	29x22x13	
Wambo Site 321	41	306149	6396152	grey/red	tuff	core	19x13x9	
Wambo Site 321	42	306149	6396152	red	tuff	lithic fragment	9x5x4	
Wambo Site 321	43	306149	6396152	white	quartz	core	21x20x9	waterworn cortex on 40% of surfaces
Wambo Site 321	44	306148	6396150	brown/pink	tuff	flake - proximal - utilised	29x26x7	bevelling along each lateral margin from use
Wambo Site 321	45	306142	6396147	red	tuff	flake - medial	13x8x2	
Wambo Site 321	46	306139	6396145	grey/pink	silcrete	flake - distal	16x9x5	
Wambo Site 321	47	306138	6396144	yellow	tuff	flake - proximal	17x8x4	
Wambo Site 321	48	306138	6396144	red	tuff	lithic fragment	8x5x2	
Wambo Site 321	49	306134	6396143	red	tuff	core	24x18x11	
Wambo Site 321	50	306134	6396143	orange	tuff	lithic fragment	8x6x1	
Wambo Site 321	51	306133	6396142	orange	tuff	microblade - proximal - utilised	15x15x4	edge damage on the lateral right margin from use
Wambo Site 321	52	306133	6396142	red/orange	tuff	flake - medial	13x10x4	
Wambo Site 321	53	306126	6396141	white/brown	quartz	flake - proximal - utilised	31x21x7	bevelling on the lateral left margin from use
Wambo Site 321	54	306124	6396140	brown	tuff	core	37x33x24	waterworn cortex on 30% of surfaces
Wambo Site 321	55	306099	6396132	red/yellow	tuff	flake - distal - utilised	22x13x4	edge polish on distal margin from use and black residue on same margin
Wambo Site 321	56	306091	6396130	orange	tuff	flake - proximal	18x9x4	
Wambo Site 321	57	306165	6396135	orange	tuff	microblade - proximal	10x6x3	on side road
Wambo Site 321	58	306166	6396133	yellow	tuff	flake - utilised	18x11x4	on side road; bevelling on distal margin and lateral left margin from use
Wambo Site 321	59	306166	6396133	orange	tuff	bondi point - butt	15x7x3	on side road
Wambo Site 321	60	306168	6396126	orange	tuff	microblade - utilised	10x7x3	on side road; bevelling on lateral left margin from use
Wambo Site 321	61	306168	6396099	grey/brown	tuff	core	19x15x5	on side road; terrestrial cortex on 20% of surfaces
Wambo Site 321	62	306168	6396099	yellow/pink	tuff	flake - distal	12x7x2	on side road
Wambo Site 321	63	306164	6396100	brown/grey	tuff	flake - proximal - utilised	42x30x10	off side road by 2m in scour; polish on lateral right margin from use
Wambo Site 321	64	306164	6396100	yellow/pink	tuff	flake - proximal	24x17x4	off side road by 2m in scour
Wambo Site 321	65	306164	6396100	yellow	tuff	flake - utilised	35x15x11	off side road by 2m in scour; crushing on the lateral right margin from use
Wambo Site 321	66	306164	6396100	pink	tuff	flake - distal	14x6x1	off side road by 2m in scour
Wambo Site 321	67	306168	6396095	pink	tuff	flake - proximal - utilised	22x12x4	on side road; edge damage on the lateral left margin from use; green residue on same margin

Wambo Site 321 (OEH #37-5-0664) ASIRF Attachment

AHIMS #37-5-0668 (Wambo Site 327)

RPS/AHIMS Record:

		<h2 style="margin:0;">Aboriginal Site Recording Form</h2> <p style="margin:0;">AHIMS Registrar PO Box 1967, Hurstville NSW 2220</p>			
Office Use Only					
		Site Number	<input type="text" value="3"/> <input type="text" value="7"/> <input type="text" value="-"/> <input type="text" value="5"/> <input type="text" value="-"/> <input type="text" value="0"/> <input type="text" value="6"/> <input type="text" value="6"/> <input type="text" value="8"/>		
Date received		<input type="text"/>	Date entered into system		<input type="text"/>
		<input type="text"/>	Date catalogued		<input type="text"/>
Entered by (I.D.) <input type="text"/>					
Information Access					
<input type="checkbox"/> Gender/male <input type="checkbox"/> Gender/female <input type="checkbox"/> Location restriction <input type="checkbox"/> General restriction <input type="checkbox"/> No access					
For Further Information Contact:					
<input type="checkbox"/> Nominated Trustee					
Title	Surname	First Name	Initials		
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>		
Organisation <input type="text"/>					
Address <input type="text"/>					
Phone number		<input type="text"/>	Fax <input type="text"/>		
<input type="checkbox"/> Knowledge Holder					
Title	Surname	First Name	Initials		
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>		
Organisation <input type="text"/>					
Address <input type="text"/>					
Phone number		<input type="text"/>	Fax <input type="text"/>		
Aboriginal Heritage Unit or Cultural Heritage Division Contacts					
<input type="text"/>					
Geographic Location					
Site Name <input type="text" value="W"/> <input type="text" value="a"/> <input type="text" value="m"/> <input type="text" value="b"/> <input type="text" value="o"/> <input type="text" value="S"/> <input type="text" value="i"/> <input type="text" value="t"/> <input type="text" value="e"/> <input type="text" value="3"/> <input type="text" value="2"/> <input type="text" value="7"/>					
Easting <input type="text" value="3"/> <input type="text" value="0"/> <input type="text" value="6"/> <input type="text" value="0"/> <input type="text" value="1"/> <input type="text" value="8"/>		Northing <input type="text" value="6"/> <input type="text" value="3"/> <input type="text" value="9"/> <input type="text" value="7"/> <input type="text" value="7"/> <input type="text" value="5"/> <input type="text" value="5"/>		AGD/GDA <input type="text" value="GDA"/>	
Mapsheet <input type="text" value="D"/> <input type="text" value="o"/> <input type="text" value="y"/> <input type="text" value="l"/> <input type="text" value="e"/> <input type="text" value="s"/> <input type="text" value="C"/> <input type="text" value="r"/> <input type="text" value="e"/> <input type="text" value="e"/> <input type="text" value="k"/>					
Zone <input type="text" value="56"/>		Location Method <input type="text" value="Differential GPS"/>			
Other Registration <input type="text"/>					
Primary Recorder					
Title	Surname	First Name	Initials		
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>		
Organisation <input type="text" value="R"/> <input type="text" value="P"/> <input type="text" value="S"/>					
Address <input type="text" value="P"/> <input type="text" value="O"/> <input type="text" value="B"/> <input type="text" value="O"/> <input type="text" value="X"/> <input type="text" value="4"/> <input type="text" value="2"/> <input type="text" value="8"/> <input type="text" value="H"/> <input type="text" value="A"/> <input type="text" value="M"/> <input type="text" value="I"/> <input type="text" value="L"/> <input type="text" value="T"/> <input type="text" value="O"/> <input type="text" value="N"/> <input type="text" value="N"/> <input type="text" value="S"/> <input type="text" value="W"/> <input type="text" value="2"/> <input type="text" value="3"/> <input type="text" value="0"/> <input type="text" value="3"/>					
Phone number		<input type="text" value="2"/> <input type="text" value="4"/> <input type="text" value="9"/> <input type="text" value="4"/> <input type="text" value="0"/> <input type="text" value="4"/> <input type="text" value="2"/> <input type="text" value="0"/> <input type="text" value="0"/>	Fax <input type="text" value="2"/> <input type="text" value="4"/> <input type="text" value="9"/> <input type="text" value="6"/> <input type="text" value="1"/> <input type="text" value="6"/> <input type="text" value="7"/> <input type="text" value="9"/> <input type="text" value="4"/>		
Date recorded <input type="text"/>					
Office Use Only Client on system <input type="checkbox"/> Client on system <input type="checkbox"/>					

OPEN/CLOSE SITE

Site Context

Landform

- Mountainous
- Plain
- Rolling hills
- Steep hills
- Undulating plain

Landform Unit

- | | | | |
|--|---|--------------------------------------|---|
| <input type="checkbox"/> Beach | <input type="checkbox"/> Tidal Flat | <input type="checkbox"/> Upper slope | <input type="checkbox"/> Stream bank |
| <input type="checkbox"/> Coastal rock platform | <input type="checkbox"/> Cliff | <input type="checkbox"/> Plain | <input type="checkbox"/> Stream channel |
| <input type="checkbox"/> Dune | <input type="checkbox"/> Crest | <input type="checkbox"/> Ridge | <input type="checkbox"/> Swamp |
| <input type="checkbox"/> Intertidal flat | <input type="checkbox"/> Flat | <input type="checkbox"/> Tor | <input type="checkbox"/> Terrace |
| <input type="checkbox"/> Lagoon | <input type="checkbox"/> Lower slope | <input type="checkbox"/> Valley flat | <input type="checkbox"/> Terrace flat |
| <input type="checkbox"/> Tidal Creek | <input checked="" type="checkbox"/> Mid slope | <input type="checkbox"/> Levy | |

Slope

degrees

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- Residential

Water

Distance to permanent water source metres
 Distance to temporary water source metres
 Name of nearest permanent water source
 Name of nearest temporary water

Directions for Relocation
 See Attached Map and DGPS co-ordinates.
 Located on private property off Jerry's Plains Road.

Current Land Tenure

- Public National Park / other Government Dept.
- Private

Primary report

I.D. (I.D. Office Use only)

Site Location Map



General Site Information

Closed Site

Shelter/Cave Formation

- Boulder
- Wind erosion
- Water erosion
- Rock collapse

Rock Surface Condition

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

Open Site

Site Orientation

- N-S
- NE-SW
- E-W
- SE-NW
- N/A

Condition of Ceiling

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

Shelter Aspect

- North
- North East
- East
- South East
- South
- South West
- West
- North West

Features

- 1. Aboriginal Ceremony & Dreaming
- 2. Aboriginal Resource & Gathering
- 3. Art
- 4. Artefact
- 5. Burial
- 6. Ceremonial Ring
- 7. Conflict
- 8. Earth Mound
- 9. Fish Trap
- 10. Grinding Groove
- 11. Habitation Structure
- 12. Hearth
- 13. Non Human Bone & Organic Material
- 14. Ochre quarry
- 15. Potential Archaeological Deposit
- 16. Stone Quarry
- 17. Shell
- 18. Stone Arrangement
- 19. Modified Tree
- 20. Water Hole

Site Plan Indicate scale, boundaries of site, features

Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- Total length of visible site
- Average width of visible site
- Estimated area of visible site
- Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

If proposed or existing mine activities are likely to impact on the Aboriginal archaeological site, then the site should be salvaged (subject to an appropriate permit being in force) and the artefacts or objects relocated to the temporary keeping place under the Wambo Care & Control Permit #3130.

The site was located on an upper creek bank, and consisted of two yellow mudstone flakes, one silcrete flake and one quartzite flake.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus

Title	Surname	First Name	Initials
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Organisation	<input type="text"/>		
Address	<input type="text"/>		
Phone number	<input type="text"/>	Fax	<input type="text"/>

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts-No.

Comments

NPWS FEATURE RECORDING FORM - ARTEFACT

Site I.D. Site Name

First recorded date Importance

No. of instances

Recorded by

Yes No

Stone artefacts only

Artefacts collected

Permit issued

Percentage of Non-stone Artefacts to Percentage of Stone Artefacts
 0-9% 10-19% 20-29% 30-39% 40-49% 50-59% 60-69% 70-79% 80-89% 90-100%

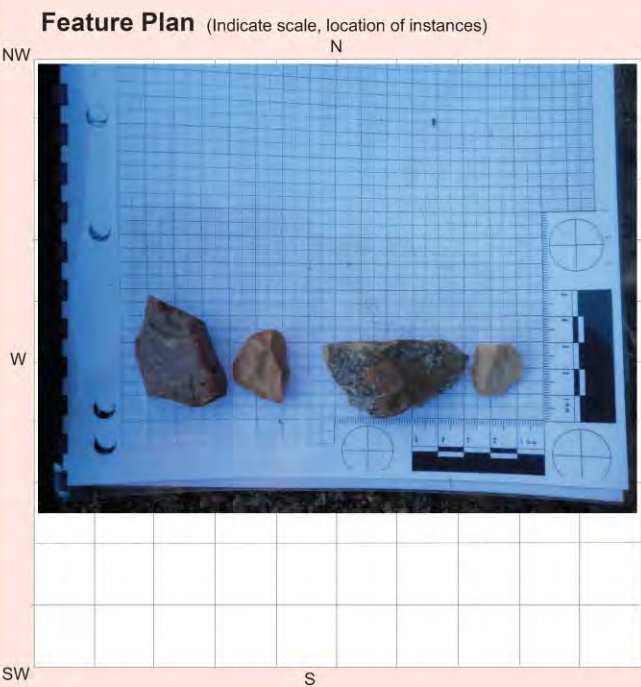
Feature Context & Condition

Scatter No. Easting Northing

Density (Artefact count per square metre) Dimensions: Length (m) Width (m) Depth (m)

In situ Stratified

Feature Condition	General Condition	Recommended Action
<input type="checkbox"/> Very good	<input type="checkbox"/> Weathered	<input type="checkbox"/> Boardwalk
<input type="checkbox"/> Good	<input type="checkbox"/> Vehicle damage	<input type="checkbox"/> Fencing
<input checked="" type="checkbox"/> Poor	<input type="checkbox"/> Surface water wash	<input type="checkbox"/> Closure to public
	<input type="checkbox"/> Fire damage	<input type="checkbox"/> Continued inspection
	<input checked="" type="checkbox"/> Erosion	<input type="checkbox"/> Fire hazard reduction
	<input checked="" type="checkbox"/> Stock damage	<input type="checkbox"/> Expert assessment
	<input checked="" type="checkbox"/> Exposed archaeological material	<input type="checkbox"/> Meeting with land manager
		<input type="checkbox"/> Revegetation
		<input type="checkbox"/> Signage
		<input type="checkbox"/> Soil erosion control
		<input type="checkbox"/> Track closure/re-routing
		<input type="checkbox"/> Additional recording



Feature Environment (Complete when feature environment differs to site environment, use attributes from cover card, p. 2)

Rolling hills Land form

Upper creek bank Land form unit

Mid Slope

Cleared Vegetation

Farming Land use

Water

Distance to permanent water source metres

Distance to temporary water source metres

Name of nearest permanent water source

Name of nearest temporary water

NPWS FEATURE RECORDING TABLE - ARTEFACT

page 2

Stone Artefact

Instance No.	Recording Date	Artefact Material	Artefact Type	Platform Surface	Platform Type	Termination	Cross Section	Length (mm)	Width (mm)	Thickness (mm)
1	07/07/2011	Fine Grained	Flake							
2	07/07/2011	Fine Grained	Flake							
3	07/07/2011	Silcrete	Flake							
4	07/07/2011	Quartz	Flake							

Other Artefact Type

Instance No.	Recording Date	Artefact Material	Artefact Type	Description	Length (mm)	Width (mm)	Thickness (mm)

Material Basalt Chert Fine grained siliceous Granite Quartz Quartzite Sandstone Silcrete Green glass Amber glass Amethyst glass	 Clear glass Ceramic Porcelain Tin can Wire Nail Button Shell Bone Wood Resin	Artefact Description Adze Anvil Axe Backed blade Blade Core Core tool Cyclon Distal fragment Eloura Flake	 Flake tool Flaked piece Hammerstone Manuport Milling slab Mortar Muller Nuclear tool Pirri Proximal fragment Tula Other diagnostic type Modified Unworked	Platform Surface Cortex Flake scar More than one flake scar Faceted Ground Indeterminate Bipolar	Termination Feather Hinge Step Outrepassé Bipolar	Platform Type Wide Focal Shattered Indeterminate Bipolar	Cross Section High/strong High/weak Low/weak Irregular
---	--	---	--	--	---	--	---

Comments:

Additional Recording LW24-26 Modification Survey February 2022:

SITE NAME: WAMBO SITE 327

Site Type: *Artefact Scatter* MGA Grid Reference: *306018:6397755*
 Date Recorded: *15/02/2022* Topographic Map: *Doyles Creek 9032-I-N*
 Recorder: *Michael Marsh*

Landform Element: *Drainage depression* Vegetation: *Cleared/Regrowth*
 Slope: *Moderate* Ground Disturbance: *High*
 Distance to Water: *<50*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
varies	varies	60	15	900	70	50	450	12	0.027	possible

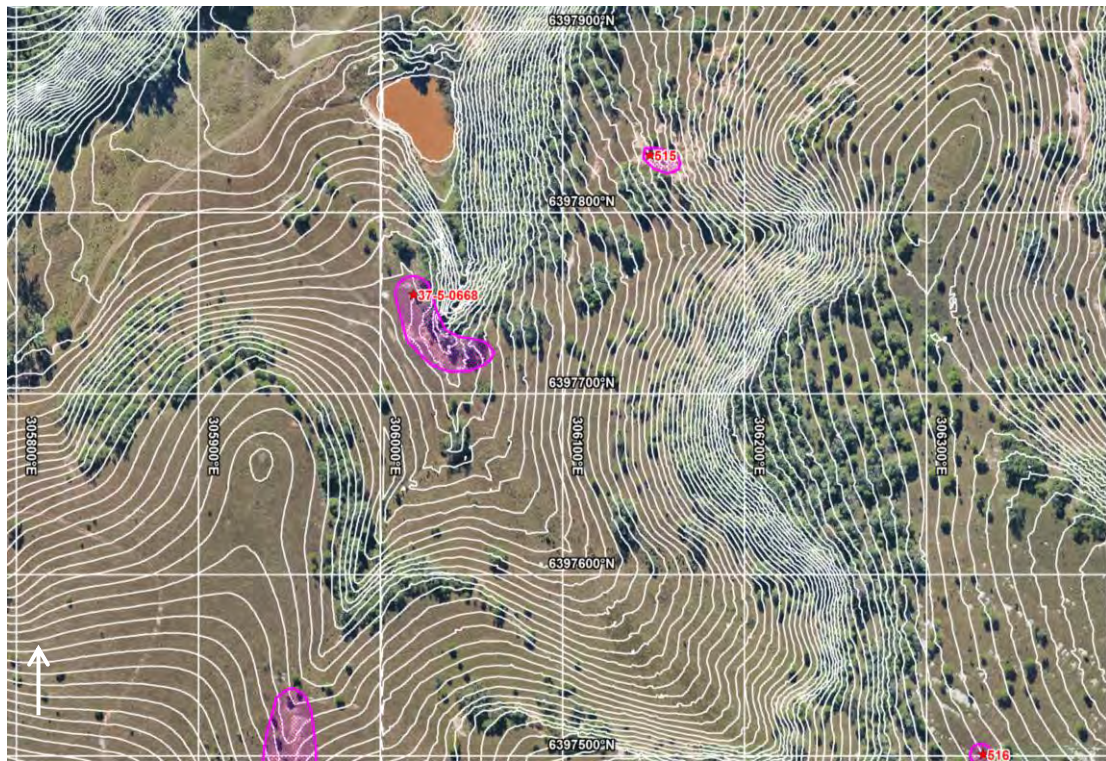
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	red	silcrete	flake	28x34x5	50	ww		306052	6397723
2	red/orange	silcrete	core	7-x41x20	30	ww		306055	6397720
3	orange/yellow	tuff	flake	30x40x20	50	ww		306036	6397719
4	yellow/brown	tuff	core	60x50x25	30	ww	multiple scars, some elongated	306028	6397728
5	grey	silcrete	flake - longitudinal	40x40x15	90	ww		306026	6397733
6	red	tuff	flake	15x22x7				306025	6397734
7	red	tuff	core	45x20x25	30	ww	one negative scar, one platform	306021	6397733
8	light grey/red	tuff	flake	25x14x6	90	ww		306018	6397734
9	light grey/red	tuff	flake - distal	20x16x15				306018	6397734
10	yellow	silcrete	flake	18x22x8				306018	6397741
11	red	silcrete	lithic fragment	22x15x5				306018	6397741
12	red	tuff	flake - proximal	45x20x20	90	ww		306024	6397734

Additional Comments:

- Wambo Site 327 (AHIMS #37-5-0668) previously recorded by RPS;
- Erosion scours on margins of 2nd order tributary of Waterfall Creek;
- High disturbance from erosion but very shallow deposit may remain;
- Low potential for deposit of research value.

Site Location: Wambo Site 327 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 327



Photographs: Wambo Site 327



Photographs: Wambo Site 327 artefacts #1-5.



Photographs: Wambo Site 327 artefacts #6-11.



AHIMS #37-5-0692 (United IF-5)

OzArk (2016)/AHIMS Record:



Office of
Environment
& Heritage

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW

AHIMS site ID:	<input type="text" value="37-5-0692"/>	Date recorded:	<input type="text" value="22-12-2015"/>
-----------------------	--	-----------------------	---

Site Location Information

Site name:

Easting: **Northing:** **Coordinates must be in GDA (MGA)**

Horizontal Accuracy (m):

Zone: **Location method:**

Recorder Information
(The person responsible for the completion and submission of this form)

Title	Surname	First name
<input type="text" value="Ms."/>	<input type="text" value="Rusden"/>	<input type="text" value="Stephanie"/>
Organisation:	<input type="text" value="OzArk EHM"/>	
Address:	<input type="text" value="145 Wingewarra Street Dubbo"/>	
Phone:	<input type="text" value="0268820118"/>	E-mail: <input type="text" value="stephanie@ozarkeh.com.au"/>

Site Context Information

Land Form Pattern:

Land Form Unit:

Vegetation:

Distance to Water (m):

Primary Report:

How to get to the site:

Site location map



Site contents information

open/closed site:

Site condition:

Features:

1.

Number of features

Length of feature(s) extent (m)

Width of feature (s) extent (m)

Description:

The site consists of an isolated mudstone flake which is tertiary and complete. It is assessed that United IF-5 is not associated with further intact, archaeological deposits.

Scarred Trees

Scar Depth (cm)

Regrowth (cm)

Scar Length (cm)

Scar Width (cm)

Scar shape

Tree Species

Features:

2.

Number of features

Length of feature(s) extent (m)

Width of feature (s) extent (m)

Description:

Scarred Trees

Scar Depth (cm)

Regrowth (cm)

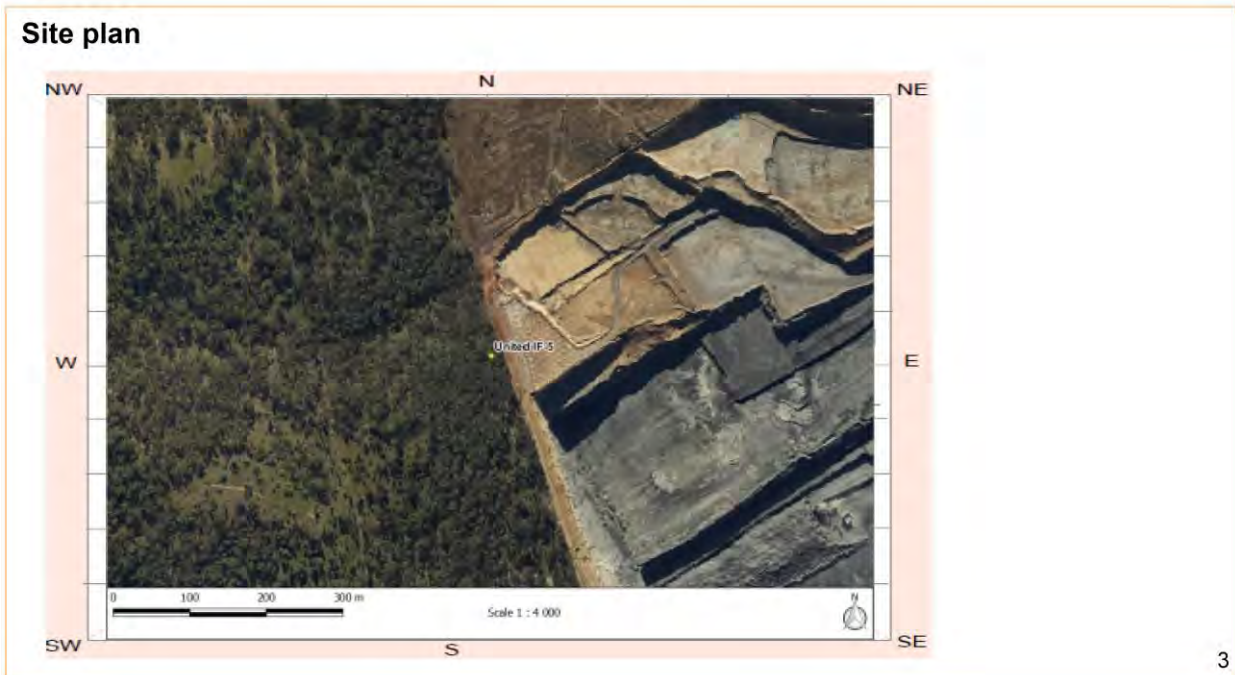
Scar Length (cm)

Scar Width (cm)

Scar shape

Tree Species

Features:		Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)	Scarred Trees			
3.	<input style="width: 100%;" type="text"/>	<input style="width: 30px; height: 30px;" type="text"/>	<input style="width: 30px; height: 30px;" type="text"/>	<input style="width: 30px; height: 30px;" type="text"/>	Scar Depth (cm)	Regrowth (cm)	Scar Length (cm)	Scar Width (cm)
Description:					Scar shape	<input style="width: 100%;" type="text"/>		Tree Species
Features:		Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)	Scarred Trees			
4.	<input style="width: 100%;" type="text"/>	<input style="width: 30px; height: 30px;" type="text"/>	<input style="width: 30px; height: 30px;" type="text"/>	<input style="width: 30px; height: 30px;" type="text"/>	Scar Depth (cm)	Regrowth (cm)	Scar Length (cm)	Scar Width (cm)
Description:					Scar shape	<input style="width: 100%;" type="text"/>		Tree Species
Features:		Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)	Scarred Trees			
5.	<input style="width: 100%;" type="text"/>	<input style="width: 30px; height: 30px;" type="text"/>	<input style="width: 30px; height: 30px;" type="text"/>	<input style="width: 30px; height: 30px;" type="text"/>	Scar Depth (cm)	Regrowth (cm)	Scar Length (cm)	Scar Width (cm)
Description:					Scar shape	<input style="width: 100%;" type="text"/>		Tree Species
Other Site Info:	United IF-5 is located 14m from the Wambo Open Cut Mine (Montrose Pit) within a natural exposure. The isolated silcrete flake was recorded on a 2° slope in an area of regenerating ironbark about 120m south an ephemeral drainage line.							



Site photographs



Description:

Description:



Description:

Description:

Site restrictions

Do you want to Restrict this site?:

Restriction type: Gender General Location

Why is this site restricted?:

Further information contact

Title	Surname	First name
<input type="text"/>	<input type="text"/>	<input type="text"/>
Organisation:	<input type="text"/>	
Address:	<input type="text"/>	
Phone:	<input type="text"/>	E-mail: <input type="text"/>

4



Aboriginal Site Impact Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW

- 1 This form must be completed following impacts to AHIMS sites that are:
 - a) a result of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
 - b) authorised by an Aboriginal Heritage Impact Permit (AHIP) issued by the Office of Environment and Heritage (OEH)
 - c) undertaken for the purpose of complying with Director General's Requirements issued by the Department of Planning and Infrastructure (DP&I) for:
 - State Significant Development (SSD - Part 4),
 - State Significant Infrastructure (SSI - Part 5.1), or
 - A Major Project (Part 3A - now repealed) under the *Environmental Planning and Assessment Act 1979 (EP&A Act)*, or
 - d) authorised by a SSD/SSI/Part 3A consent/approval under the EP&A Act.
- 2 Completed forms must be submitted to the AHIMS Registrar (www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm).
- 3 This form is intended to complement (not replace) the AHIMS Site Recording Form. Where there is a need to provide detailed information about the nature of a site, use the AHIMS Site Recording Form.
- 4 This form does not replace the need to submit reports to OEH (as a condition of an AHIP or SSD/SSI/Part 3A consent/approval). This form must be submitted in addition to any reports.

AHIMS site ID:

Date recorded:

Site impact authorisation (select one)	Reference numbers, dates
<input type="checkbox"/> Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the <i>Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW</i> .)	Date OEH was notified (under requirement 15c of the Code): <input type="text"/> OEH Regional office notified: <input type="text"/>
<input checked="" type="checkbox"/> AHIP (The impacts to this site were authorised by an AHIP.)	AHIP number: <input type="text" value="2222"/> Date issued/signed: <input type="text" value="2005-06-20"/> AHIMS permit ID/number: <input type="text" value="2222"/>
<input type="checkbox"/> SSD/SSI/Part 3A application (The impacts to this site were undertaken for the purposes of complying with Director General's Requirements issued by the DP&I)	Project number: <input type="text"/> Date Director General's Requirements issued: <input type="text"/>
<input type="checkbox"/> SSD/SSI/Part 3A approved project (The impacts to this site were authorised by a consent/approval under Parts 4/5.1/3A of the EP&A Act.)	or Date of project approval: <input type="text"/>

Site status following impacts:

Not a site (The investigations concluded that this is not a site.)

Valid site (The investigations confirmed that this is an Aboriginal site.)

Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)

Destroyed (The site was completely destroyed following authorised impacts.)

Site Location Information:

Site name:	United IF-5			
Easting:	306437	Northing:	6396944	Coordinates must be in GDA (MGA)
Horizontal Accuracy (m):	4			
Zone:	56	Location method:	Non-Differential GPS	

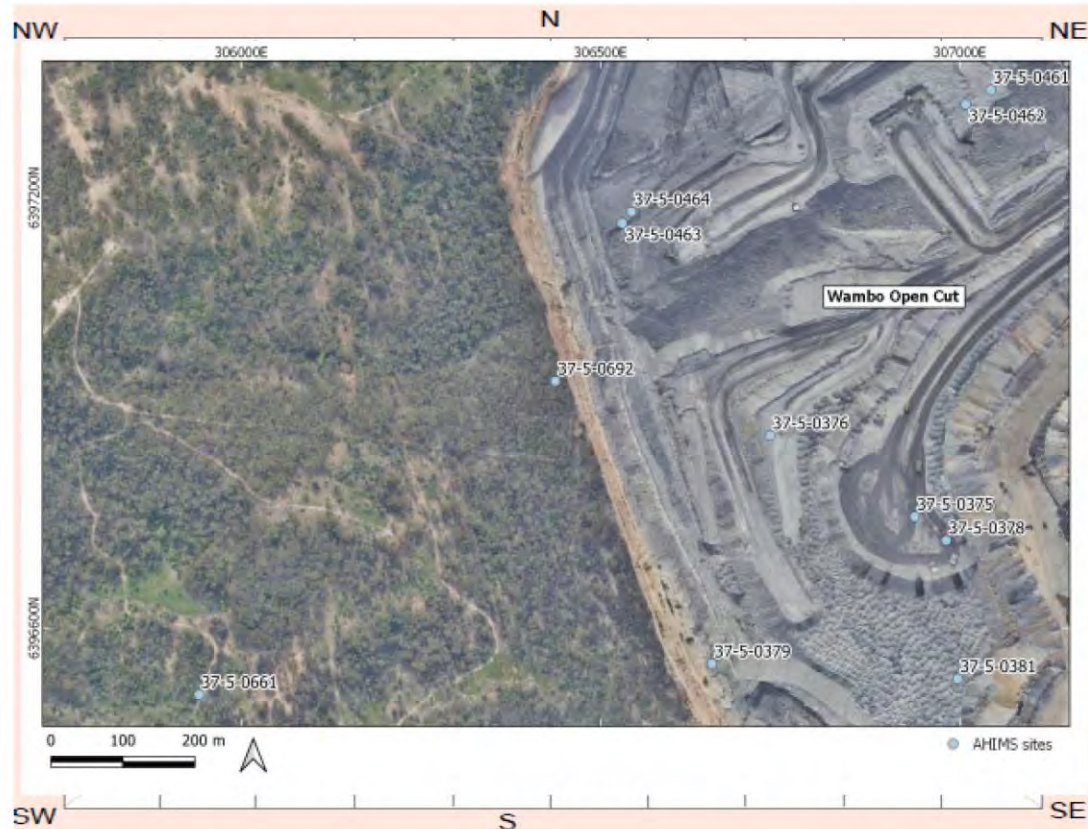
Recorder Information:

(The person responsible for the completion and submission of this form)

Title	Surname	First name
Ms.	Rusden	Stephanie
Organisation:	OzArk EHM	
Address:	145 Wingewarra Street Dubbo	
Phone:	0268820118	E-mail: stephanie@ozarkehm.com.au

Location map

Clearly demarcate the original AHIMS site boundary, show the boundaries of impacted areas and the areas where the site remains in situ. Display map coordinates.



Methodology and results

Summary of the methodology and results of the activity or works undertaken through the authorised impacts, as relevant to the AHIMS site

An attempt to salvage the artefact was made by an OzArk archaeologist on 31 March 2021. The salvage was completed in accordance with AHIP #2222 held by Wambo. The silcrete artefact was unable to be located during the salvage despite reasonable GSV.

Management recommendations

Summary of any management recommendations for the AHIMS site

There are no further management requirements for the site.

Post-investigation significance

Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

The site has no further scientific or cultural significance.

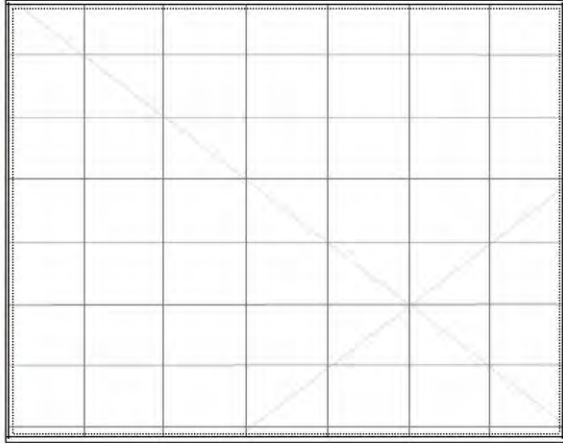
Additional comments

Site photographs

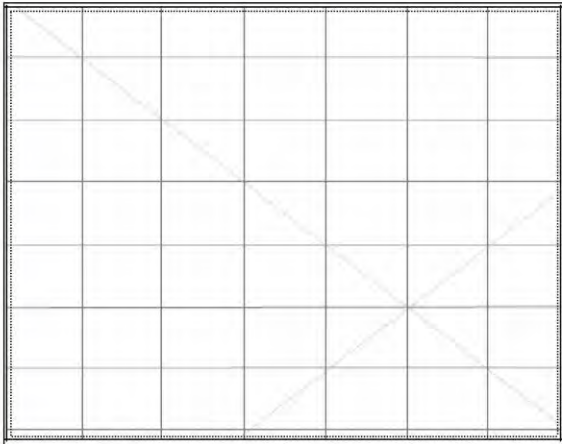
Include photographs of the authorised impacts activity, as relevant to the AHIMS site. Please keep photo size to a maximum of 200 kb.



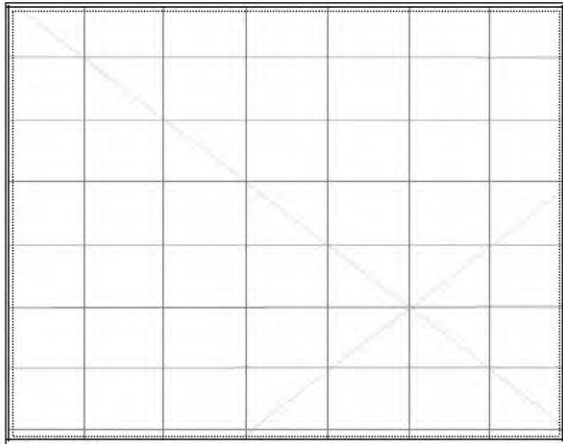
Description: Description:



Description:



Description:



Description:

AHIMS #37-5-0767 (Wambo Site 483)

Kuskie (2017a):

SITE NAME: WAMBO SITE 483

Site Type: *Artefact Scatter* MGA Grid Reference: *306116:6396065*
Date Recorded: *23/11/16* Topographic Map: *Doyles Creek 9032-I-N*
Recorder: *Corey O'Driscoll*

Landform Element: *Simple Slope* Vegetation: *Cleared*
Slope: *Gentle* Ground Disturbance: *Moderate*
Distance to Water: *>50*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
varies	varies	140	50	7000	20	20	1400	200	0.143	probable

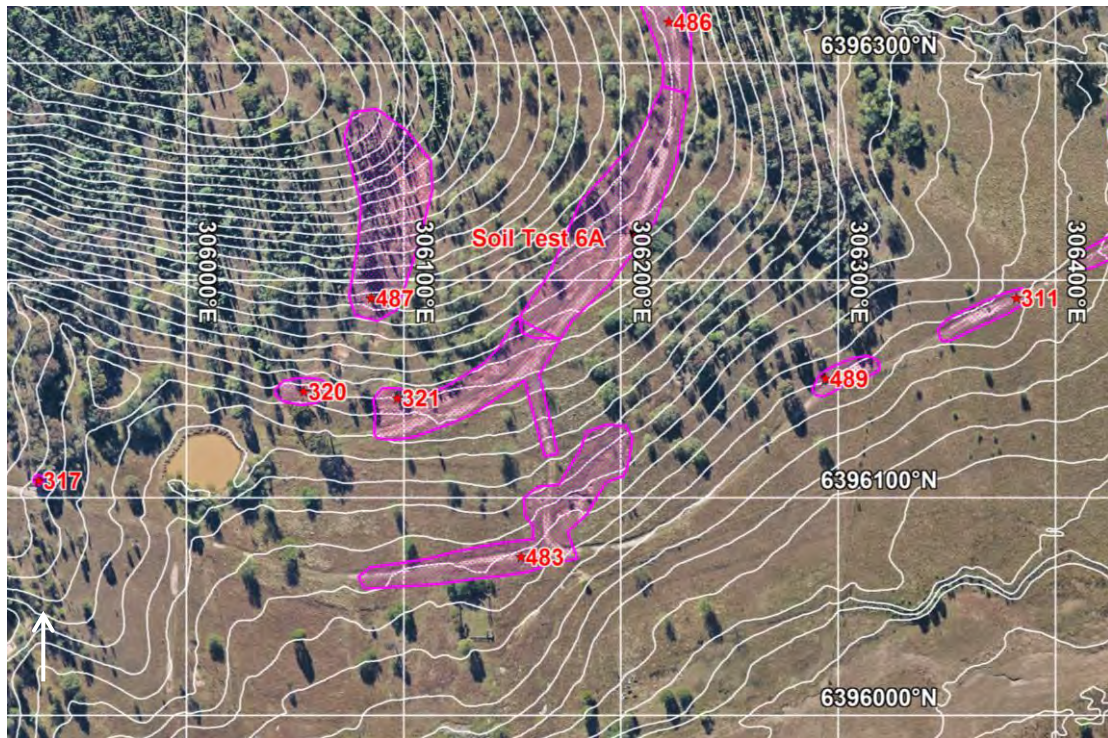
Additional Comments:

- Moderate research potential - base of broad spur crest that is potential pathway from North Wambo Creek to mountains, overlooks North Wambo Creek less than 100 metres to south;
- Along a vehicle track and a surface exposure just off the track;
- Ironstone fragments along track;
- Some ceramic and glass along track;
- Erosion scours north of the track and either side of the track leading north;
- Previously recorded site, though only 10 artefacts recorded;
- Low grass and some shrubs off track;
- Large ant nests with over 30 silcrete artefacts on it, indicating that there is potential for a large number of sub-surface artefacts;
- Thin A unit in sections.

Summary of Artefact Database:

Lithic Type	Stone Material							Total
	acidic volcanic	chert	petrified wood	quartz	quartzite	silcrete	tuff	
backed artefact							1	1
backed artefact -retouched - medial							1	1
backed artefact -retouched - portion							1	1
backing flake							1	1
bondi point							1	1
bondi point - portion		1					2	3
bondi point - portion - utilised							1	1
bondi point - preform - portion							1	1
core						2	5	7
flake			1			11	20	32
flake - distal		2		1		7	8	18
flake - distal - utilised						1		1
flake - longitudinal		2				7	25	34
flake - medial		1			1	6	7	15
flake - proximal		1			1	7	14	23
flake - utilised							2	2
ground-edge axe	1							1
hammerstone	1							1
lithic fragment		2	1			9	18	30
microblade - medial		1						1
microblade - proximal							2	2
retouched flake						1	7	8
retouched flake - distal							4	4
retouched flake - longitudinal							2	2
retouched flake - proximal						2	4	6
retouched piece	1							1
retouched utilised flake		1						1
retouched utilised piece							1	1
Total	3	11	2	1	2	53	128	200

Site Location: Wambo Site 483 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 483 (view west along track)



Photograph: Wambo Site 483 (north-eastern section of site)



Photograph: Wambo Site 483 (view west across north-eastern section of site)



Photograph: Wambo Site 483 - Artefacts #9 and #10 (tuff retouched flakes)



Photograph: Wambo Site 483 - Artefacts #18 (tuff retouched flake - left), #38 (chert bondi point portion - centre) and #50 (tuff bondi point - right)



Photograph: Wambo Site 483 - Artefacts #42 (tuff retouched flake - top left), #76 (tuff core - bottom left), #79 (tuff core - top right) and #80 (silcrete flake - bottom right)



Photograph: Wambo Site 483 - Artefact #142 (ground-edge axe)



Photograph: Wambo Site 483 - Artefacts #164 (tuff bondi point portion - top left), #165 (silcrete core - bottom left) and #172 (volcanic hammerstone - right)



Photograph: Wambo Site 483 - Artefacts #184 (tuff utilised flake)





Aboriginal Site Impact Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW
 December 2010 DECCW 2010/1022

- 1 This form must be completed following impacts to AHIMS sites that are:
 - a) an outcome of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
 - b) authorised by an Aboriginal Heritage Impact Permit (AHIP)
 - c) undertaken for the purpose of complying with environmental assessment requirements issued by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), or
 - d) authorised by a Part 3A project approval under the EP&A Act.
- 2 Completed forms must be submitted to the AHIMS Registrar (www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm).
- 3 This form is intended to complement (not replace) the AHIMS Site Recording Form. Where there is a need to provide detailed information about the nature of a site, use the AHIMS Site Recording Form.
- 4 This form does not replace the need to submit reports to DECCW (as specified by a condition of an AHIP or Part 3A approval). This form must be submitted in addition to any reports.

AHIMS site ID:

Site impact authorisation (select one)	Reference numbers, dates
<input type="checkbox"/> Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the <i>Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW</i> .)	Date DECCW was notified (under requirement 15c of the Code): <input type="text"/> DECCW Regional office notified: <input type="text"/>
<input checked="" type="checkbox"/> AHIP (The impacts to this site were authorised by an AHIP.)	AHIP number: <input type="text" value="C0003213"/> Date issued/signed: <input type="text" value="22 February 2018"/> AHIMS permit ID/number: <input type="text"/>
<input type="checkbox"/> Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)	Major project number: <input type="text"/> Date environmental assessment requirements issued: <input type="text"/>
<input type="checkbox"/> Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)	or Date of project approval: <input type="text"/>

Site status following impacts:

- Not a site (The investigations concluded that this is not a site.)
 Valid site (The investigations confirmed that this is an Aboriginal site.)
 Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)
 Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name:

Easting: **Northing:** **Coordinates must be in GDA (MGA)**

Map sheet:

Zone: **Location method:**

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name
Mr	Kuskie	Peter
Organisation:	South East Archaeology Pty Limited	
Address:	24 Bamford Street, Hughes, ACT, 2605	
Phone:	262604439	E-mail: peter@southeastarchaeology.com.au
Date recorded:	8/5/18	Fax: 262604439

Site information

Open/closed site:

Features:

- | | | | |
|-------------------------------------|--------------------------------------|--------------------------|---|
| <input type="checkbox"/> | 1. Aboriginal ceremony and dreaming | <input type="checkbox"/> | 11. Habitation structure |
| <input type="checkbox"/> | 2. Aboriginal resource and gathering | <input type="checkbox"/> | 12. Hearth |
| <input type="checkbox"/> | 3. Art | <input type="checkbox"/> | 13. Non-human bone and organic material |
| <input checked="" type="checkbox"/> | 4. Artefact | <input type="checkbox"/> | 14. Ochre quarry |
| <input type="checkbox"/> | 5. Burial | <input type="checkbox"/> | 15. Potential archaeological deposit |
| <input type="checkbox"/> | 6. Ceremonial ring | <input type="checkbox"/> | 16. Stone quarry |
| <input type="checkbox"/> | 7. Conflict | <input type="checkbox"/> | 17. Shell |
| <input type="checkbox"/> | 8. Earth mound | <input type="checkbox"/> | 18. Stone arrangement |
| <input type="checkbox"/> | 9. Fish trap | <input type="checkbox"/> | 19. Modified tree |
| <input type="checkbox"/> | 10. Grinding groove | <input type="checkbox"/> | 20. Water hole |

Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

The partial salvage of Wambo Site 483 occurred in accordance with the conditions of AHIP #C0003213 and the Wambo Heritage Management Plan (HMP). Surface collection of the site was undertaken on 7 and 8 May 2018 by a suitably qualified archaeologist (Peter Kuskie of South East Archaeology) and a representative of the Registered Aboriginal Parties (RAPs) for Wambo Coal Mine, David Horton of the Wanaruah Local Aboriginal Land Council (LALC). A total of 202 artefacts were collected (refer to attachment). It is likely that the salvage retrieved most, if not all, originally reported artefacts along the vehicle track, along with a number of additional items. However, the site was only subject to collection on the track, and a substantial number of artefacts off the track remain in situ.

Management recommendations

Summary of any management recommendations for the AHIMS site

No further heritage action required in relation to use of the vehicle track. However, only artefacts along the existing road were subject to collection and numerous artefacts remain off the road in areas that are not currently anticipated to be subject to impacts. Impacts cannot occur to the portion of the site off the immediate road surfaces unless prior surface collection is undertaken in accordance with AHIP #C0003213 and the procedures in the Wambo HMP. In addition, all other provisions of the Wambo HMP and AHIP #C0003213 need to be implemented where relevant.

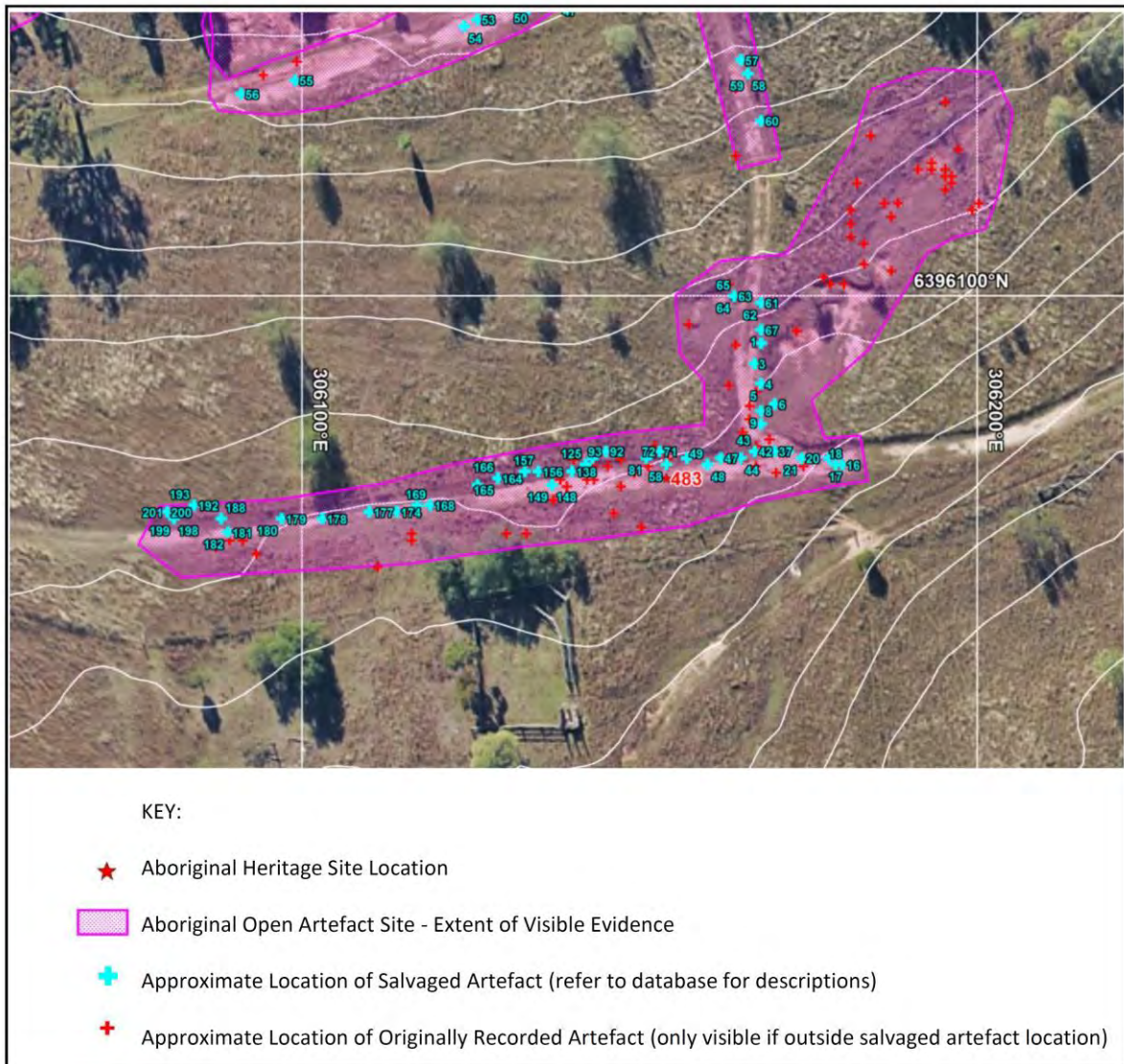
Post-investigation significance

Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

Site has been partially salvaged. A number of originally reported artefacts remain present and the probable occurrence of further artefacts obscured by vegetation and sediment and a sub-surface deposit of artefacts where the A unit soil remains present is very likely. Such evidence may remain as being of moderate significance within a local context.

Additional comments

Figure: Approximate location of Wambo Site 483 salvaged artefacts and originally recorded artefacts (aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid; original artefact locations not visible unless outside of salvaged artefact locations; artefact locations approximate only).



Lithic Items Salvaged from Wambo Site 483.

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 483	1	306168	6396095	pink	tuff	flake - distal	24x11x3	only collected on roads, not verges or off road; on side road down hill
Wambo Site 483	2	306168	6396093	orange	tuff	bondi point - butt - utilised	15x11x5	on side road down hill; striations and damage on lateral right margin from use
Wambo Site 483	3	306167	6396090	orange	tuff	retouched flake - utilised	22x13x5	on side road down hill; retouched notch on distal lateral right with crushing from use; damage on each lateral margin from use; "burin"
Wambo Site 483	4	306168	6396087	yellow	tuff	flake - distal	21x14x3	on side road down hill
Wambo Site 483	5	306168	6396087	yellow	tuff	core	40x24x6	on side road down hill; waterworn cortex on 40% of surfaces
Wambo Site 483	6	306170	6396084	yellow	tuff	core	19x18x7	on side road down hill
Wambo Site 483	7	306170	6396084	pink	silerete	core	18x9x6	on side road down hill
Wambo Site 483	8	306168	6396083	brown	silerete	flake - distal	27x22x12	on side road down hill
Wambo Site 483	9	306168	6396083	pink/yellow	silerete	flake - distal	20x12x4	on side road down hill
Wambo Site 483	10	306168	6396083	orange/brown	tuff	core	31x23x8	on side road down hill; weathered appearance
Wambo Site 483	11	306168	6396083	brown	silerete	flake - proximal	16x13x4	on side road down hill
Wambo Site 483	12	306168	6396081	brown	silerete	flake - proximal - utilised	45x33x16	on side road down hill near junction; large flake with crushing and rounding on each lateral margin from use
Wambo Site 483	13	306168	6396081	grey	silerete	bondi point - tip	16x13x5	on side road down hill near junction
Wambo Site 483	14	306168	6396081	red	tuff	core	28x24x20	on side road down hill near junction
Wambo Site 483	15	306168	6396081	red	tuff	flake - proximal	15x9x3	on side road down hill near junction
Wambo Site 483	16	306180	6396075	brown	tuff	lithic fragment	9x8x2	all artefacts below on main track
Wambo Site 483	17	306179	6396075	white/brown	tuff	flake	12x9x4	speckled colouring; #17 and 18 conjoin and possibly were broken recently
Wambo Site 483	18	306179	6396075	white/brown	tuff	core	14x11x8	speckled colouring; #17 and 18 conjoin and possibly were broken recently
Wambo Site 483	19	306178	6396076	red/orange	tuff	retouched flake - distal - utilised	23x17x7	retouch around all margins forming a serrated edge with crushing from use; elongated like a blade
Wambo Site 483	20	306174	6396076	red	tuff	microblade - medial	24x9x5	
Wambo Site 483	21	306174	6396076	red	tuff	core	12x8x4	
Wambo Site 483	22	306174	6396076	orange	tuff	flake - medial	8x4x3	
Wambo Site 483	23	306172	6396074	pink	silerete	microblade core	26x23x18	small elongated flake scars in an alternating pattern
Wambo Site 483	24	306172	6396074	pink	tuff	flake	19x16x4	
Wambo Site 483	25	306172	6396074	grey	tuff	lithic fragment	10x10x5	
Wambo Site 483	26	306172	6396074	yellow	tuff	retouched flake - distal - utilised	19x17x6	retouch around all margins forming a serrated edge with crushing from use; elongated like a blade

Wambo Site 483 (OEH #37-5-0767) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 483	27	306172	6396077	brown	silcrete	core	32x21x14	on main track at junction with another track
Wambo Site 483	28	306172	6396077	brown/pink	silcrete	flake - proximal	35x27x8	on main track at junction with another track
Wambo Site 483	29	306172	6396077	brown	silcrete	flake - distal	21x15x3	on main track at junction with another track
Wambo Site 483	30	306172	6396077	brown	silcrete	flake - distal	18x14x4	on main track at junction with another track
Wambo Site 483	31	306172	6396077	brown	silcrete	core	25x15x7	on main track at junction with another track
Wambo Site 483	32	306172	6396077	brown	silcrete	flake	16x16x4	on main track at junction with another track
Wambo Site 483	33	306172	6396077	pink	silcrete	flake	9x4x2	on main track at junction with another track
Wambo Site 483	34	306172	6396077	orange	silcrete	flake	11x6x2	on main track at junction with another track
Wambo Site 483	35	306172	6396077	red	tuff	flake - proximal	24x18x6	on main track at junction with another track
Wambo Site 483	36	306172	6396077	orange	tuff	flake	22x11x3	on main track at junction with another track
Wambo Site 483	37	306170	6396077	orange	tuff	microblade - medial	17x12x6	on main track at junction with another track
Wambo Site 483	38	306170	6396077	yellow	tuff	flake - distal	17x8x2	on main track at junction with another track
Wambo Site 483	39	306170	6396077	orange	tuff	bondi point - butt	9x6x6	on main track at junction with another track
Wambo Site 483	40	306170	6396077	yellow	tuff	flake - distal	17x9x4	on main track at junction with another track
Wambo Site 483	41	306170	6396077	pink	silcrete	flake	9x7x2	on main track at junction with another track
Wambo Site 483	42	306167	6396077	yellow	tuff	bondi point	21x7x4	on main track at junction with another track
Wambo Site 483	43	306167	6396077	yellow	tuff	lithic fragment	8x4x2	on main track at junction with another track
Wambo Site 483	44	306165	6396076	brown	volcanic	core	40x31x24	on main track; waterworn cortex on 30% of surfaces
Wambo Site 483	45	306165	6396076	pink	tuff	flake	31x24x9	
Wambo Site 483	46	306165	6396076	grey/brown	tuff	microblade - proximal	10x10x3	
Wambo Site 483	47	306162	6396076	yellow	tuff	lithic fragment	12x7x7	
Wambo Site 483	48	306160	6396075	orange	tuff	flake - proximal	24x21x9	
Wambo Site 483	49	306160	6396075	red	tuff	flake	8x5x2	
Wambo Site 483	50	306160	6396075	white	quartz	flake - distal	12x9x4	
Wambo Site 483	51	306157	6396076	brown	tuff	flake	19x21x4	on main track, near stockyards
Wambo Site 483	52	306157	6396076	yellow	tuff	flake	24x15x5	on main track, near stockyards
Wambo Site 483	53	306157	6396076	yellow	tuff	flake - distal	11x9x4	on main track, near stockyards
Wambo Site 483	54	306157	6396076	orange	tuff	microblade - distal	25x12x8	on main track, near stockyards
Wambo Site 483	55	306157	6396076	yellow	tuff	flake	13x9x3	on main track, near stockyards
Wambo Site 483	56	306157	6396076	brown	tuff	flake - proximal	12x11x3	on main track, near stockyards
Wambo Site 483	57	306157	6396076	white	quartz	flake - medial	13x13x6	on main track, near stockyards
Wambo Site 483	58	306154	6396075	brown/red	tuff	flake - distal	26x24x8	

Wambo Site 483 (OEH #37-5-0767) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 483	59	306154	6396075	yellow	tuff	microblade - medial - utilised	14x10x4	beveling along each lateral margin from use
Wambo Site 483	60	306154	6396075	red	tuff	core	16x15x6	
Wambo Site 483	61	306154	6396075	brown	tuff	microblade - distal	17x9x1	
Wambo Site 483	62	306154	6396075	orange	tuff	core	13x10x7	
Wambo Site 483	63	306154	6396075	black/red	tuff	flake - distal	18x16x4	
Wambo Site 483	64	306154	6396075	yellow/pink	tuff	flake	18x16x5	
Wambo Site 483	65	306154	6396075	grey	tuff	retouched flake - distal - utilised	16x8x4	retouched notch on the lateral right distal with crushing from use; "burin"
Wambo Site 483	66	306154	6396075	yellow	tuff	flake - medial	13x13x4	
Wambo Site 483	67	306154	6396075	yellow	tuff	flake - distal	14x9x5	
Wambo Site 483	68	306154	6396075	brown	tuff	flake	10x6x2	
Wambo Site 483	69	306154	6396075	pink	tuff	flake - distal	11x7x3	
Wambo Site 483	70	306154	6396075	yellow/brown	tuff	flake	6x6x2	
Wambo Site 483	71	306153	6396077	pink	tuff	core	18x17x7	
Wambo Site 483	72	306153	6396077	orange	tuff	core	21x15x7	
Wambo Site 483	73	306153	6396077	orange	tuff	retouched flake - distal - utilised	18x10x4	retouched notch on the lateral right distal with crushing from use; "burin"
Wambo Site 483	74	306153	6396077	brown	tuff	lithic fragment	10x9x3	
Wambo Site 483	75	306153	6396077	red	tuff	flake - distal	9x6x3	
Wambo Site 483	76	306153	6396077	brown/red	tuff	core	13x9x5	
Wambo Site 483	77	306153	6396077	yellow/pink	tuff	flake	12x10x3	
Wambo Site 483	78	306153	6396077	red	tuff	microblade - distal - utilised	17x10x5	edge damage on lateral right margin from use
Wambo Site 483	79	306153	6396077	orange/pink	tuff	core	14x12x6	
Wambo Site 483	80	306151	6396076	brown	tuff	retouched flake - utilised	36x34x13	retouch on distal and lateral left margin has made a thick jagged chord and the lateral right has been finely retouched forming a sharp serrated edge with fracturing and crushing from use; black residue on lateral left near centre in a line from the distal; possibly hafting resin from setting this thick margin in a wooden handle
Wambo Site 483	81	306151	6396076	pink/cream	tuff	flake	21x13x6	microblade negatives on dorsal
Wambo Site 483	82	306151	6396076	brown	tuff	flake - medial	21x9x6	
Wambo Site 483	83	306151	6396076	pink	tuff	microblade - medial	13x11x4	
Wambo Site 483	84	306151	6396076	pink/yellow	tuff	flake - distal	21x11x5	
Wambo Site 483	85	306151	6396076	red	tuff	bondi point - tip - utilised	19x9x6	beveling along lateral right margin from use
Wambo Site 483	86	306151	6396076	pink	tuff	microblade - proximal	14x11x3	
Wambo Site 483	87	306151	6396076	orange	tuff	lithic fragment	12x9x3	
Wambo Site 483	88	306151	6396076	orange	tuff	microblade - medial	9x6x1	
Wambo Site 483	89	306151	6396076	grey/brown	tuff	flake	14x11x3	
Wambo Site 483	90	306151	6396076	grey	tuff	flake	13x9x4	
Wambo Site 483	91	306151	6396076	pink/brown	silcrete	lithic fragment	19x11x6	terrestrial cortex on 50% of surfaces
Wambo Site 483	92	306145	6396077	pink	tuff	flake	25x15x8	
Wambo Site 483	93	306145	6396077	grey/purple	tuff	flake - proximal	23x19x8	

Wambo Site 483 (OEH #37-5-0767) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 483	94	306145	6396077	grey	tuff	microblade - distal	16x9x3	
Wambo Site 483	95	306145	6396077	orange	tuff	flake - distal	24x13x3	
Wambo Site 483	96	306145	6396077	orange	tuff	flake - distal	14x11x2	
Wambo Site 483	97	306145	6396077	purple/grey	tuff	core	23x14x11	
Wambo Site 483	98	306145	6396077	pink/cream	tuff	bondi point - tip	17x7x4	
Wambo Site 483	99	306145	6396077	orange	tuff	core	15x12x10	
Wambo Site 483	100	306145	6396077	pink/purple	tuff	flake	15x5x2	
Wambo Site 483	101	306145	6396077	brown/pink	silcrete	lithic fragment	15x14x7	
Wambo Site 483	102	306143	6396076	pink	tuff	core	32x18x17	waterworn cortex on 30% of surfaces
Wambo Site 483	103	306143	6396076	pink	tuff	microblade - proximal	30x12x4	
Wambo Site 483	104	306143	6396076	grey/red	tuff	flake	18x16x3	
Wambo Site 483	105	306143	6396076	purple	tuff	flake	19x9x4	
Wambo Site 483	106	306143	6396076	brown	tuff	flake - proximal	19x13x5	
Wambo Site 483	107	306143	6396076	red	tuff	flake - proximal	16x11x4	
Wambo Site 483	108	306143	6396076	yellow	tuff	flake	18x12x6	
Wambo Site 483	109	306143	6396076	grey/brown	tuff	microblade - proximal	11x8x4	
Wambo Site 483	110	306143	6396076	yellow/pink	tuff	flake	11x9x2	
Wambo Site 483	111	306143	6396076	pink	tuff	flake - proximal	10x5x2	
Wambo Site 483	112	306143	6396076	cream/pink	tuff	flake - medial	15x11x2	
Wambo Site 483	113	306143	6396076	orange	tuff	flake - distal	11x8x2	
Wambo Site 483	114	306143	6396076	orange	tuff	flake - medial	14x9x2	
Wambo Site 483	115	306143	6396076	yellow	tuff	flake - proximal	11x10x3	
Wambo Site 483	116	306143	6396076	orange	tuff	flake - distal	8x4x1	
Wambo Site 483	117	306143	6396076	pink	tuff	lithic fragment	7x4x3	
Wambo Site 483	118	306143	6396076	pink	tuff	flake	9x7x2	
Wambo Site 483	119	306143	6396076	pink	tuff	flake - medial	12x6x4	
Wambo Site 483	120	306143	6396076	orange	tuff	flake	11x9x2	
Wambo Site 483	121	306143	6396076	purple	tuff	flake - distal	11x8x2	
Wambo Site 483	122	306143	6396076	pink	tuff	flake - proximal	7x6x1	
Wambo Site 483	123	306143	6396076	white	quartz	flake - distal	8x6x3	
Wambo Site 483	124	306143	6396076	brown	tuff	retouched flake - utilised	51x25x13	lateral left margin has been heavily retouched to form a thick crescent edge; large retouched notch on distal half of lateral right margin with crushing and bevelling from use; possibly an elouera
Wambo Site 483	125	306142	6396075	pink	tuff	flake	31x16x9	
Wambo Site 483	126	306142	6396075	brown/grey	tuff	flake - distal	18x13x2	
Wambo Site 483	127	306142	6396075	pink/purple	tuff	flake - distal	22x15x7	
Wambo Site 483	128	306142	6396075	yellow/brown	tuff	retouched flake - utilised	26x18x5	retouch along lateral right and distal margins forming a dull serrated edge with crushing from use
Wambo Site 483	129	306142	6396075	grey	tuff	flake	26x10x4	
Wambo Site 483	130	306142	6396075	brown	silcrete	flake - distal	13x12x7	
Wambo Site 483	131	306142	6396075	brown	tuff	flake - proximal	16x9x4	
Wambo Site 483	132	306142	6396075	brown	tuff	microblade - medial	9x7x4	
Wambo Site 483	133	306142	6396075	yellow	tuff	flake	10x8x5	
Wambo Site 483	134	306142	6396075	pink	tuff	core	12x6x5	

Wambo Site 483 (OEH #37-5-0767) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 483	135	306142	6396075	white/pink	quartz	core	22x19x12	waterworn cortex on 40% of surfaces; pebble core
Wambo Site 483	136	306142	6396075	white	quartz	lithic fragment	14x11x7	
Wambo Site 483	137	306142	6396075	grey/pink	tuff	core	19x8x6	
Wambo Site 483	138	306140	6396074	pink	tuff	core	17x9x5	
Wambo Site 483	139	306140	6396074	pink	tuff	lithic fragment	15x13x7	
Wambo Site 483	140	306140	6396074	brown	tuff	flake - distal	15x12x5	
Wambo Site 483	141	306140	6396074	orange	tuff	flake - proximal	13x8x6	
Wambo Site 483	142	306140	6396074	orange	tuff	lithic fragment	13x7x6	
Wambo Site 483	143	306140	6396074	red	tuff	lithic fragment	13x10x4	
Wambo Site 483	144	306140	6396074	pink/brown	silcrete	core	31x22x10	
Wambo Site 483	145	306140	6396074	pink	silcrete	flake - medial	12x12x6	
Wambo Site 483	146	306140	6396074	white	quartz	flake - medial	10x5x4	
Wambo Site 483	147	306140	6396074	brown	chert	flake	32x24x12	
Wambo Site 483	148	306137	6396072	grey	quartzite	lithic fragment	42x39x14	
Wambo Site 483	149	306137	6396072	orange	tuff	flake - distal	26x12x3	
Wambo Site 483	150	306137	6396072	orange	tuff	flake - proximal	9x6x2	
Wambo Site 483	151	306137	6396072	grey/pink	silcrete	flake	36x28x11	
Wambo Site 483	152	306137	6396072	pink	silcrete	core	33x23x12	
Wambo Site 483	153	306137	6396072	pink	silcrete	core	25x12x10	
Wambo Site 483	154	306137	6396072	pink	silcrete	lithic fragment	13x8x6	
Wambo Site 483	155	306137	6396072	yellow/brown	tuff	flake - utilised	62x48x19	waterworn cortex on 40% of surfaces; crushing and fracturing around each margin from use
Wambo Site 483	156	306135	6396074	pink	tuff	flake	24x12x10	
Wambo Site 483	157	306135	6396074	pink	silcrete	flake	15x12x4	
Wambo Site 483	158	306135	6396074	pink	tuff	flake	8x6x1	
Wambo Site 483	159	306135	6396074	grey	tuff	flake - distal	16x16x3	
Wambo Site 483	160	306133	6396074	red	tuff	flake - distal	14x9x2	
Wambo Site 483	161	306133	6396074	yellow	tuff	flake - distal	12x10x2	
Wambo Site 483	162	306133	6396074	orange	tuff	flake	12x7x2	
Wambo Site 483	163	306133	6396074	pink	tuff	flake	9x8x3	
Wambo Site 483	164	306129	6396073	pink	tuff	flake - distal	17x9x3	
Wambo Site 483	165	306129	6396073	pink	tuff	core	21x12x9	
Wambo Site 483	166	306129	6396073	pink	tuff	lithic fragment	6x3x2	
Wambo Site 483	167	306126	6396072	pink	silcrete	microblade - medial	13x12x4	
Wambo Site 483	168	306119	6396069	pink	silcrete	flake	30x22x6	
Wambo Site 483	169	306119	6396069	red/brown	tuff	core	29x23x11	
Wambo Site 483	170	306117	6396069	yellow/brown	silcrete	core	39x27x16	
Wambo Site 483	171	306117	6396069	orange	tuff	flake - proximal	26x22x8	
Wambo Site 483	172	306117	6396069	orange	tuff	flake - medial	16x12x3	
Wambo Site 483	173	306117	6396069	orange	tuff	flake - medial	15x6x2	
Wambo Site 483	174	306114	6396068	grey/pink	tuff	flake - utilised	45x31x9	beveling and crushing along distal margin and lateral right from use
Wambo Site 483	175	306114	6396068	orange	tuff	lithic fragment	11x4x2	
Wambo Site 483	176	306114	6396068	orange	tuff	lithic fragment	10x4x3	
Wambo Site 483	177	306110	6396068	grey/red	tuff	core	17x11x11	
Wambo Site 483	178	306103	6396067	pink	silcrete	core	58x29x17	

Wambo Site 483 (OEH #37-5-0767) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 483	179	306097	6396067	yellow/brown	tuff	flake - utilised	51x39x10	edge damage on lateral right margin from use
Wambo Site 483	180	306097	6396067	yellow/brown	tuff	core	38x35x24	
Wambo Site 483	181	306089	6396065	yellow	tuff	flake - distal	40x18x10	
Wambo Site 483	182	306089	6396065	pink	tuff	flake	23x14x5	
Wambo Site 483	183	306089	6396065	yellow	tuff	core	31x24x8	also a flake with percussion bulb on one surface
Wambo Site 483	184	306089	6396065	pink	tuff	core	14x13x8	
Wambo Site 483	185	306089	6396065	yellow	tuff	flake - distal	14x10x4	
Wambo Site 483	186	306089	6396065	yellow	tuff	flake - distal	14x7x2	
Wambo Site 483	187	306089	6396065	yellow	tuff	flake - distal	19x14x6	
Wambo Site 483	188	306088	6396067	grey	volcanic	flake - proximal	35x25x6	
Wambo Site 483	189	306088	6396067	orange	tuff	core	31x28x11	
Wambo Site 483	190	306088	6396067	yellow	tuff	flake - distal - utilised	17x14x6	fracturing on distal from use
Wambo Site 483	191	306088	6396067	grey	silcrete	core	28x23x13	waterworn cortex on 20% of surfaces
Wambo Site 483	192	306084	6396069	orange	tuff	core fragment	18x10x6	#192 and 193 conjoin
Wambo Site 483	193	306084	6396069	orange	tuff	core fragment	19x15x8	#192 and 193 conjoin
Wambo Site 483	194	306084	6396069	orange	tuff	lithic fragment	17x12x5	
Wambo Site 483	195	306084	6396069	orange	tuff	lithic fragment	14x9x5	
Wambo Site 483	196	306084	6396069	orange	tuff	lithic fragment	6x4x2	
Wambo Site 483	197	306084	6396069	orange	tuff	lithic fragment	8x5x4	
Wambo Site 483	198	306081	6396067	yellow/brown	tuff	core	28x20x15	waterworn cortex on 30 % of surfaces
Wambo Site 483	199	306081	6396067	white	porphyritic rhyolite	lithic fragment	18x6x5	
Wambo Site 483	200	306080	6396068	orange	tuff	core	28x23x10	
Wambo Site 483	201	306080	6396068	yellow	tuff	flake	16x9x4	
Wambo Site 483	202	306080	6396068	grey/brown	silcrete	flake - proximal	31x17x6	

Wambo Site 483 (OEI #37-5-0767) ASIRF Attachment

AHIMS #37-5-0782 (South Bates Soil Test 2/A)

Kuskie (2016c, 2017a):

SITE NAME: SOUTH BATES SOIL TEST 2/A

Site Type: *Open Artefact Site* MGA Grid Reference: *305888:6396144*
Date Recorded: *1/8/2016* Topographic Map: *Doyles Creek 9032-1N*
Recorder: *Peter Kuskie*

Landform Element: *Spur crest* Vegetation: *Cleared*
Slope: *Gentle* Ground Disturbance: *Moderate*
Distance to Water: *>50*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
varies	varies	1	1	1	80	80	0.8	1+	1.25	unlikely

Additional Comments:

- Preliminary inspection and recording only, detailed recording required in future;
- On spur overlooking North Wambo Creek;
- Spur is a potential access corridor between Wollombi Brook and North Wambo Creek and the Jerrys Plains Ridge to the west;
- One tuff flake distal portion observed on erosion scour west of the vehicle track;
- Potentially a number more artefacts;
- Moderate disturbance from erosion;
- Low potential for deposit of research value.

Site Location: South Bates Soil Test 2/A (1 metre contours, 100 metre MGA grid)



Photograph: South Bates Soil Test 2/A.





Aboriginal Site Impact Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW
 December 2010 DECCW 2010/1022

- 1 This form must be completed following impacts to AHIMS sites that are:
 - a) an outcome of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
 - b) authorised by an Aboriginal Heritage Impact Permit (AHIP)
 - c) undertaken for the purpose of complying with environmental assessment requirements issued by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), or
 - d) authorised by a Part 3A project approval under the EP&A Act.
- 2 Completed forms must be submitted to the AHIMS Registrar (www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm).
- 3 This form is intended to complement (not replace) the AHIMS Site Recording Form. Where there is a need to provide detailed information about the nature of a site, use the AHIMS Site Recording Form.
- 4 This form does not replace the need to submit reports to DECCW (as specified by a condition of an AHIP or Part 3A approval). This form must be submitted in addition to any reports.

AHIMS site ID:

Site impact authorisation (select one)	Reference numbers, dates
<input type="checkbox"/> Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the <i>Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW</i> .)	Date DECCW was notified (under requirement 15c of the Code): <input type="text"/> DECCW Regional office notified: <input type="text"/>
<input checked="" type="checkbox"/> AHIP (The impacts to this site were authorised by an AHIP.)	AHIP number: <input type="text" value="C0003213"/> Date issued/signed: <input type="text" value="22 February 2018"/> AHIMS permit ID/number: <input type="text"/>
<input type="checkbox"/> Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)	Major project number: <input type="text"/> Date environmental assessment requirements issued: <input type="text"/>
<input type="checkbox"/> Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)	or Date of project approval: <input type="text"/>

Site status following impacts:

- Not a site (The investigations concluded that this is not a site.)
 Valid site (The investigations confirmed that this is an Aboriginal site.)
 Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)
 Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name:
Easting: **Northing:** **Coordinates must be in GDA (MGA)**
Map sheet:
Zone: **Location method:**

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name
<input type="text" value="Mr"/>	<input type="text" value="Kuskie"/>	<input type="text" value="Peter"/>
Organisation:	<input type="text" value="South East Archaeology Pty Limited"/>	
Address:	<input type="text" value="24 Bamford Street, Hughes, ACT, 2605"/>	
Phone:	<input type="text" value="262604439"/>	E-mail: <input type="text" value="peter@southeastarchaeology.com.au"/>
Date recorded:	<input type="text" value="8/5/18"/>	Fax: <input type="text" value="262604439"/>

Site information

Open/closed site:

Features:

- | | | | |
|-------------------------------------|--------------------------------------|--------------------------|---|
| <input type="checkbox"/> | 1. Aboriginal ceremony and dreaming | <input type="checkbox"/> | 11. Habitation structure |
| <input type="checkbox"/> | 2. Aboriginal resource and gathering | <input type="checkbox"/> | 12. Hearth |
| <input type="checkbox"/> | 3. Art | <input type="checkbox"/> | 13. Non-human bone and organic material |
| <input checked="" type="checkbox"/> | 4. Artefact | <input type="checkbox"/> | 14. Ochre quarry |
| <input type="checkbox"/> | 5. Burial | <input type="checkbox"/> | 15. Potential archaeological deposit |
| <input type="checkbox"/> | 6. Ceremonial ring | <input type="checkbox"/> | 16. Stone quarry |
| <input type="checkbox"/> | 7. Conflict | <input type="checkbox"/> | 17. Shell |
| <input type="checkbox"/> | 8. Earth mound | <input type="checkbox"/> | 18. Stone arrangement |
| <input type="checkbox"/> | 9. Fish trap | <input type="checkbox"/> | 19. Modified tree |
| <input type="checkbox"/> | 10. Grinding groove | <input type="checkbox"/> | 20. Water hole |

Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

The salvage of South Bates Soil Test 2/A occurred in accordance with the conditions of AHIP #C0003213 and the Wambo Heritage Management Plan (HMP). Surface collection of the site was undertaken on 7 and 8 May 2018 by a suitably qualified archaeologist (Peter Kuskie of South East Archaeology) and a representative of the Registered Aboriginal Parties (RAPs) for Wambo Coal Mine, David Horton of the Wanaruah Local Aboriginal Land Council (LALC). A total of 2 artefacts were collected (refer to attachment). The salvage retrieved the originally noted artefact, along with one other item.

Management recommendations

Summary of any management recommendations for the AHIMS site

No further heritage action required. However, all other provisions of the Wambo HMP and AHIP #C0003213 need to be implemented where relevant.

Post-investigation significance

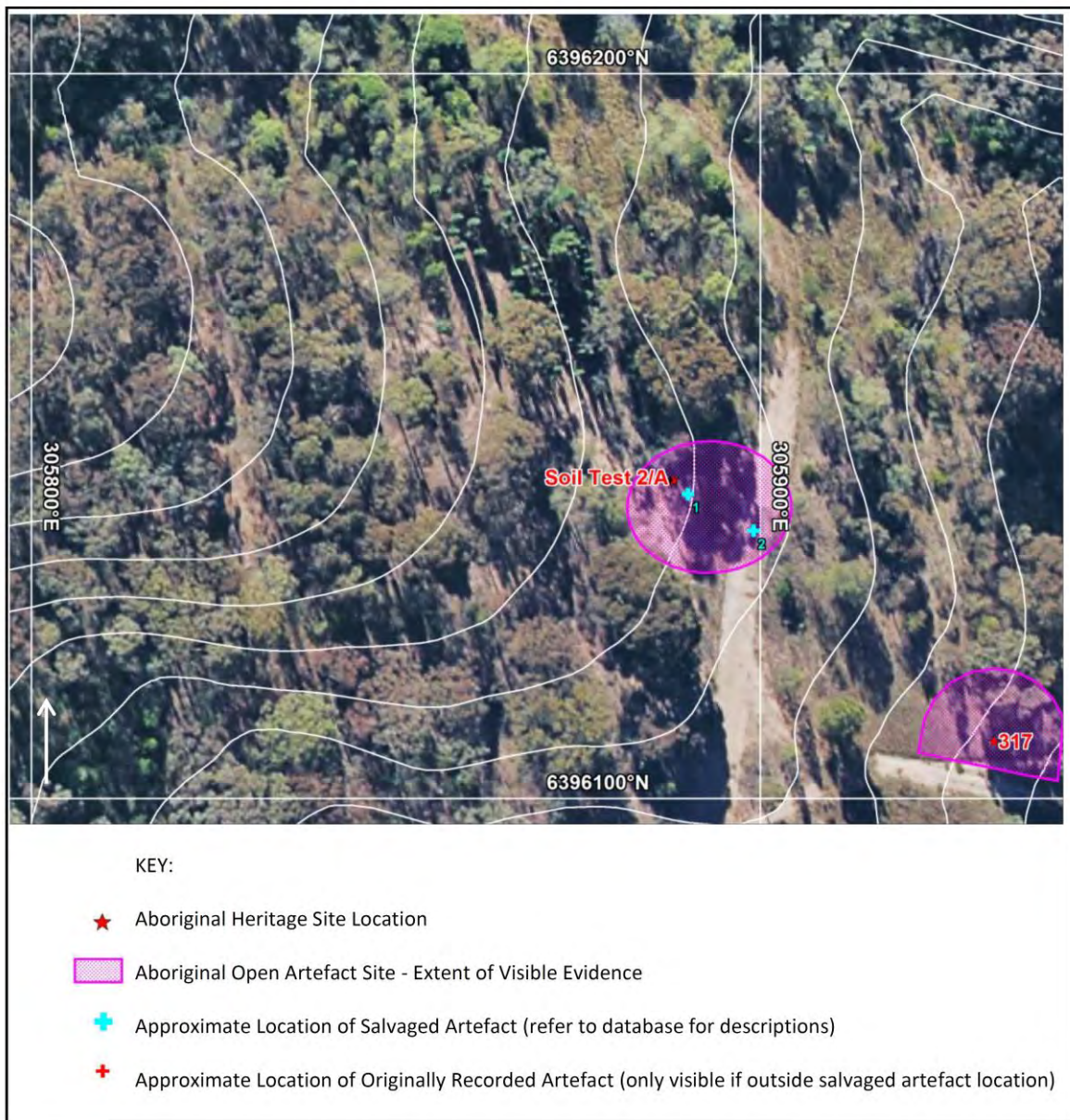
Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

Site has been totally salvaged - nil heritage significance remaining with respect to the identified heritage evidence (surface artefacts), although the probable occurrence of further artefacts obscured by vegetation and sediment and a sub-surface deposit of artefacts where the A unit soil remains present is likely. Such potential evidence may be of low significance within a local context.

Additional comments

Empty box for additional comments.

Figure: Approximate location of South Bates Soil Test 2A salvaged artefacts and originally recorded artefacts (aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid; original artefact locations not visible unless outside of salvaged artefact locations; artefact locations approximate only).



South Bates Soil Test 2A (OEH #37-5-0782) ASIRF Attachment

Lithic Items Salvaged from South Bates Soil Test 2A (OEH #37-5-0782).

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
South Bates Soil Test 2/A	1	305890	6396142	pink/cream	tuff	flake - distal - utilised	22x17x4	edge damage on each lateral margin from use
South Bates Soil Test 2/A	2	305899	6396137	yellow	tuff	flake - utilised	22x18x4	damage on distal margin from use

South Bates Soil Test 2A (OEH #37-5-0782) ASIRF Attachment

AHIMS #37-5-0783 (South Bates Soil Test 6/A)

Kuskie (2017a):

SITE NAME: SOUTH BATES SOIL TEST 6/A

Site Type: *Artefact Scatter* MGA Grid Reference: *306206:6396222*
 Date Recorded: *23/11/16* Topographic Map: *Doyles Creek 9032-I-N*
 Recorder: *Birgitta Stephenson*

Landform Element: *Simple slope, spur crest* Vegetation: *Cleared/Regrowth*
 Slope: *Moderate* Ground Disturbance: *Moderate*
 Distance to Water: *>50*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
varies	varies	125	30	3750	20	20	750	59	0.079	probable

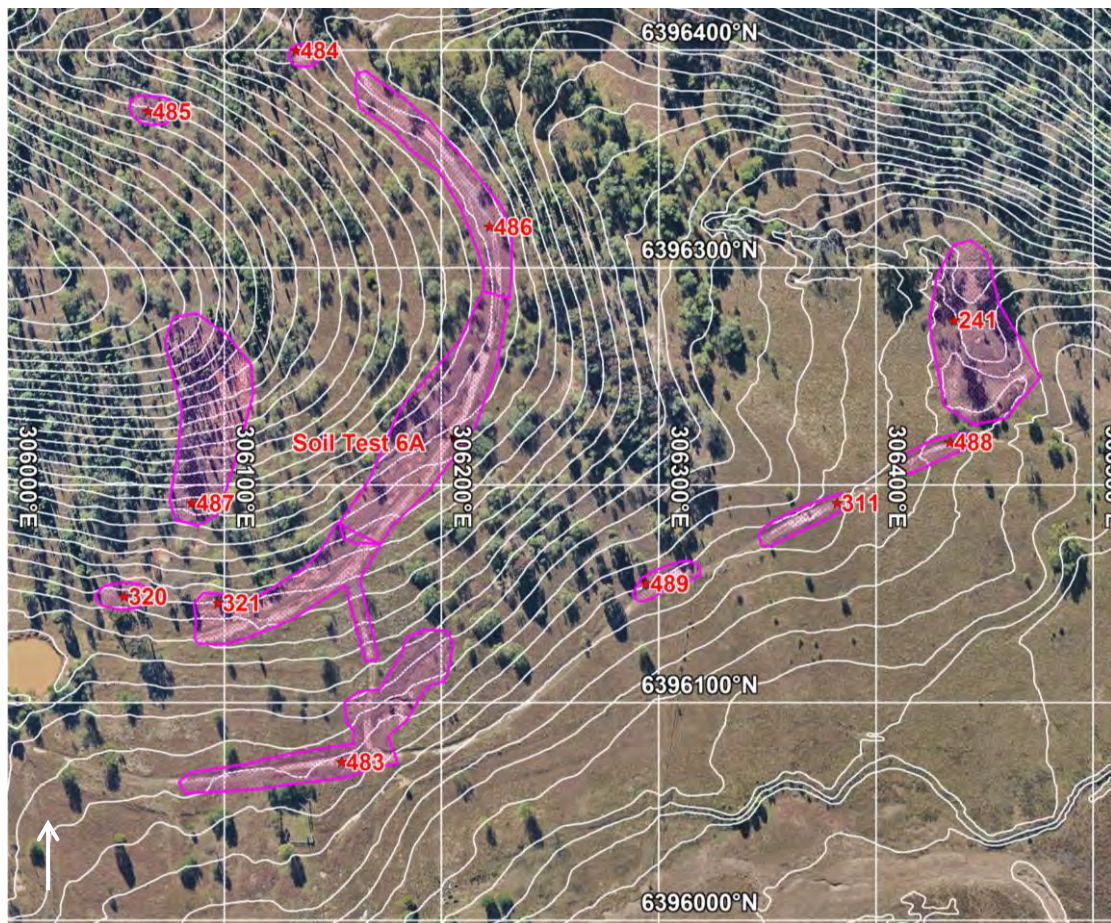
Summary of Artefact Database:

Lithic Type	Stone Material		Total
	silcrete	tuff	
core	1	3	4
flake	3	12	15
flake - distal		3	3
flake - distal - utilised		2	2
flake - longitudinal - utilised		1	1
flake - medial		1	1
flake - medial - utilised		1	1
flake - proximal	1	1	2
flake - proximal - utilised		1	1
flake - utilised	2	10	12
lithic fragment	3	8	11
microblade - proximal		1	1
retouched flake		2	2
retouched flake - proximal		1	1
retouched utilised flake		2	2
Total	10	49	59

Additional Comments:

- ❑ Along a vehicle track;
- ❑ Previously recorded site extending across spur crest come simple slope, slope borderline gentle in portions;
- ❑ Low grass off track;
- ❑ Moderate ground disturbance on track;
- ❑ Moderate research potential - potential pathway from North Wambo Creek to mountains.

Site Location: South Bates Soil Test 6/A (100 metre MGA grid; one metre contours)



Photograph: South Bates Soil Test 6/A



Photograph: South Bates Soil Test 6/A (view south)





Aboriginal Site Impact Recording Form

AHIMS Registrar
 PO Box 1967, Hurstville 2220 NSW
 December 2010 DECCW 2010/1022

- 1 This form must be completed following impacts to AHIMS sites that are:
 - a) an outcome of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
 - b) authorised by an Aboriginal Heritage Impact Permit (AHIP)
 - c) undertaken for the purpose of complying with environmental assessment requirements issued by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), or
 - d) authorised by a Part 3A project approval under the EP&A Act.
- 2 Completed forms must be submitted to the AHIMS Registrar (www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm).
- 3 This form is intended to complement (not replace) the AHIMS Site Recording Form. Where there is a need to provide detailed information about the nature of a site, use the AHIMS Site Recording Form.
- 4 This form does not replace the need to submit reports to DECCW (as specified by a condition of an AHIP or Part 3A approval). This form must be submitted in addition to any reports.

AHIMS site ID:

Site impact authorisation (select one)	Reference numbers, dates
<input type="checkbox"/> Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the <i>Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW</i> .)	Date DECCW was notified (under requirement 15c of the Code): <input type="text"/> DECCW Regional office notified: <input type="text"/>
<input checked="" type="checkbox"/> AHIP (The impacts to this site were authorised by an AHIP.)	AHIP number: <input type="text" value="C0003213"/> Date issued/signed: <input type="text" value="22 February 2018"/> AHIMS permit ID/number: <input type="text"/>
<input type="checkbox"/> Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)	Major project number: <input type="text"/> Date environmental assessment requirements issued: <input type="text"/>
<input type="checkbox"/> Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)	or Date of project approval: <input type="text"/>

Site status following impacts:

Not a site (The investigations concluded that this is not a site.)
 Valid site (The investigations confirmed that this is an Aboriginal site.)
 Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)
 Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name:

Easting: Northing: Coordinates must be in GDA (MGA)

Map sheet:

Zone: Location method:

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name
<input type="text" value="Mr"/>	<input type="text" value="Kuskie"/>	<input type="text" value="Peter"/>
Organisation:	<input type="text" value="South East Archaeology Pty Limited"/>	
Address:	<input type="text" value="24 Bamford Street, Hughes, ACT, 2605"/>	
Phone:	<input type="text" value="262604439"/>	E-mail: <input type="text" value="peter@southeastarchaeology.com.au"/>
Date recorded:	<input type="text" value="8/5/18"/>	Fax: <input type="text" value="262604439"/>

Site information

Open/closed site:

Features:

- | | | | |
|-------------------------------------|--------------------------------------|--------------------------|---|
| <input type="checkbox"/> | 1. Aboriginal ceremony and dreaming | <input type="checkbox"/> | 11. Habitation structure |
| <input type="checkbox"/> | 2. Aboriginal resource and gathering | <input type="checkbox"/> | 12. Hearth |
| <input type="checkbox"/> | 3. Art | <input type="checkbox"/> | 13. Non-human bone and organic material |
| <input checked="" type="checkbox"/> | 4. Artefact | <input type="checkbox"/> | 14. Ochre quarry |
| <input type="checkbox"/> | 5. Burial | <input type="checkbox"/> | 15. Potential archaeological deposit |
| <input type="checkbox"/> | 6. Ceremonial ring | <input type="checkbox"/> | 16. Stone quarry |
| <input type="checkbox"/> | 7. Conflict | <input type="checkbox"/> | 17. Shell |
| <input type="checkbox"/> | 8. Earth mound | <input type="checkbox"/> | 18. Stone arrangement |
| <input type="checkbox"/> | 9. Fish trap | <input type="checkbox"/> | 19. Modified tree |
| <input type="checkbox"/> | 10. Grinding groove | <input type="checkbox"/> | 20. Water hole |

Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

The partial salvage of South Bates Soil Test 6/A occurred in accordance with the conditions of AHIP #C0003213 and the Wambo Heritage Management Plan (HMP). Surface collection of the site was undertaken on 7 and 8 May 2018 by a suitably qualified archaeologist (Peter Kuskie of South East Archaeology) and a representative of the Registered Aboriginal Parties (RAPs) for Wambo Coal Mine, David Horton of the Wanaruah Local Aboriginal Land Council (LALC). A total of 425 artefacts were collected (refer to attachment). It is likely that the salvage retrieved most, if not all, originally reported artefacts along the vehicle track, along with a number of additional items. However, the site was only subject to collection on the track, and artefacts off the track remain in situ. This site is also listed with OEH AHIMS #37-5-0783.

Management recommendations

Summary of any management recommendations for the AHIMS site

No further heritage action required in relation to use of the vehicle track. However, only artefacts along the existing road were subject to collection and numerous artefacts remain off the road in areas that are not currently anticipated to be subject to impacts. Impacts cannot occur to the portion of the site off the immediate road surfaces unless prior surface collection is undertaken in accordance with AHIP #C0003213 and the procedures in the Wambo HMP. In addition, all other provisions of the Wambo HMP and AHIP #C0003213 need to be implemented where relevant.

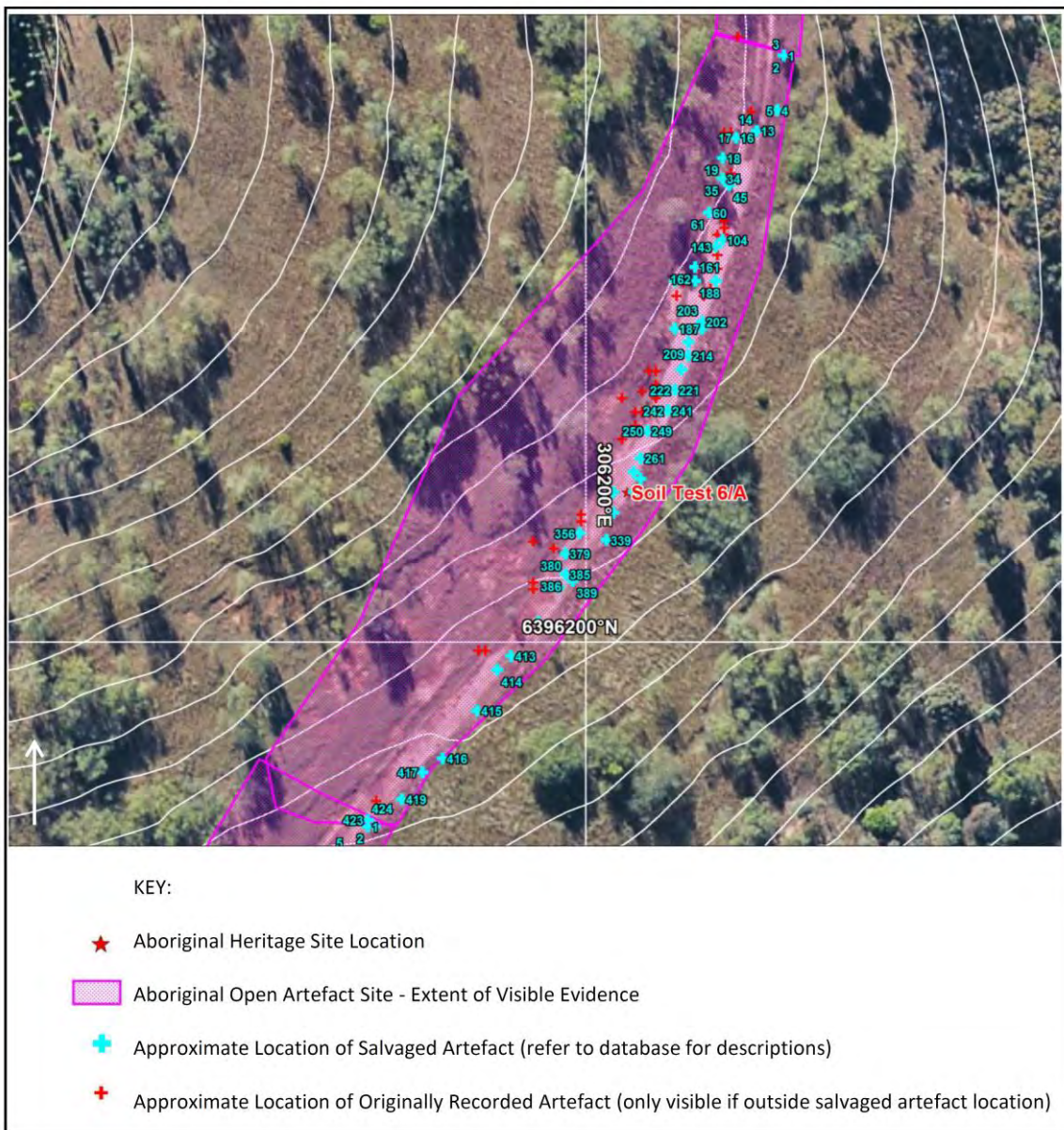
Post-investigation significance

Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

Site has been partially salvaged. A number of originally reported artefacts remain present and the probable occurrence of further artefacts obscured by vegetation and sediment and a sub-surface deposit of artefacts where the A unit soil remains present is very likely. Such evidence may remain as being of low to possibly moderate significance within a local context.

Additional comments

Figure: Approximate location of South Bates Soil Test 6/A salvaged artefacts and originally recorded artefacts (aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid; original artefact locations not visible unless outside of salvaged artefact locations; artefact locations approximate only).



Lithic Items Salvaged from South Bates Soil Test 6/A (OEH #37-5-0807).

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
South Bates Soil Test 6/A	1	306229	6396286	red/grey	tuff	flake - distal	38x25x14	started salvage at opposite end to original recording (most artefacts collected in 2m sections along road)
South Bates Soil Test 6/A	2	306229	6396286	orange	tuff	flake - medial	15x11x4	
South Bates Soil Test 6/A	3	306229	6396286	white	quartz	flake	13x9x3	
South Bates Soil Test 6/A	4	306228	6396278	brown	tuff	flake	31x29x8	
South Bates Soil Test 6/A	5	306228	6396278	brown	tuff	flake	30x14x8	
South Bates Soil Test 6/A	6	306228	6396278	yellow	tuff	core fragment	16x7x5	
South Bates Soil Test 6/A	7	306228	6396278	red	tuff	flake - proximal	24x23x9	
South Bates Soil Test 6/A	8	306228	6396278	red	tuff	flake - proximal	31x21x7	
South Bates Soil Test 6/A	9	306228	6396278	orange/red	tuff	flake - distal - utilised	27x14x8	damage on each lateral margin from use
South Bates Soil Test 6/A	10	306228	6396278	brown/red	tuff	lithic fragment	20x12x8	
South Bates Soil Test 6/A	11	306228	6396278	red	tuff	flake - medial	12x9x4	
South Bates Soil Test 6/A	12	306228	6396278	pink/grey	silcrete	flake	15x15x3	
South Bates Soil Test 6/A	13	306225	6396275	red/yellow	tuff	core	56x51x26	
South Bates Soil Test 6/A	14	306225	6396275	pink	silcrete	core	36x27x15	
South Bates Soil Test 6/A	15	306225	6396275	white	quartz	flake - distal	14x7x4	
South Bates Soil Test 6/A	16	306222	6396274	cream	tuff	flake - distal - utilised	19x13x8	
South Bates Soil Test 6/A	17	306222	6396274	red	silcrete	flake	15x14x3	
South Bates Soil Test 6/A	18	306220	6396271	brown/yellow	tuff	flake	49x41x10	
South Bates Soil Test 6/A	19	306220	6396271	red/brown	tuff	flake - medial	40x17x8	
South Bates Soil Test 6/A	20	306220	6396271	brown/yellow	tuff	flake - distal - utilised	37x16x7	damage on lateral left margin from use
South Bates Soil Test 6/A	21	306220	6396271	brown	tuff	flake - distal	26x16x5	
South Bates Soil Test 6/A	22	306220	6396271	brown/yellow	tuff	flake - distal	19x14x4	
South Bates Soil Test 6/A	23	306220	6396271	orange	tuff	core fragment	17x8x4	
South Bates Soil Test 6/A	24	306220	6396271	brown/grey	tuff	flake	20x17x4	
South Bates Soil Test 6/A	25	306220	6396271	grey	tuff	flake	27x13x4	
South Bates Soil Test 6/A	26	306220	6396271	grey	tuff	flake	23x10x4	
South Bates Soil Test 6/A	27	306220	6396271	brown	tuff	lithic fragment	10x7x4	
South Bates Soil Test 6/A	28	306220	6396271	orange	tuff	lithic fragment	8x5x2	
South Bates Soil Test 6/A	29	306220	6396271	red	tuff	flake - proximal	9x8x1	
South Bates Soil Test 6/A	30	306220	6396271	red	tuff	microblade - distal	10x8x2	
South Bates Soil Test 6/A	31	306220	6396271	cream	tuff	flake - distal	8x4x2	
South Bates Soil Test 6/A	32	306220	6396271	orange/pink	silcrete	flake - distal	37x18x10	
South Bates Soil Test 6/A	33	306220	6396271	white	quartz	core	20x14x6	
South Bates Soil Test 6/A	34	306220	6396268	brown	tuff	core	47x26x14	
South Bates Soil Test 6/A	35	306220	6396268	red	tuff	retouched flake - distal - utilised	41x22x6	retouched notch on the distal left with crushing within from use; burin
South Bates Soil Test 6/A	36	306220	6396268	yellow	tuff	flake - distal	10x10x5	
South Bates Soil Test 6/A	37	306220	6396268	pink	tuff	flake - utilised	15x13x4	edge damage on the distal margin from use
South Bates Soil Test 6/A	38	306220	6396268	orange	tuff	lithic fragment	5x5x2	
South Bates Soil Test 6/A	39	306220	6396268	red/brown	tuff	lithic fragment	13x7x4	
South Bates Soil Test 6/A	40	306220	6396268	orange/brown	tuff	lithic fragment	17x12x5	
South Bates Soil Test 6/A	41	306220	6396268	grey	silcrete	flake - proximal	10x7x2	

South Bates Soil Test 6/A (OEH #37-5-0807) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
South Bates Soil Test 6/A	42	306220	6396268	pink	silcrete	flake - distal	8x6x2	
South Bates Soil Test 6/A	43	306220	6396268	pink	silcrete	flake	15x13x4	overhang removal
South Bates Soil Test 6/A	44	306220	6396268	red	silcrete	core	15x13x8	
South Bates Soil Test 6/A	45	306221	6396267	grey/pink	silcrete	core	36x26x20	
South Bates Soil Test 6/A	46	306221	6396267	red	silcrete	microblade - proximal	17x8x4	
South Bates Soil Test 6/A	47	306221	6396267	red	silcrete	lithic fragment	13x8x6	
South Bates Soil Test 6/A	48	306221	6396267	brown	silcrete	flake - distal	13x10x5	
South Bates Soil Test 6/A	49	306221	6396267	grey	petrified wood	lithic fragment	25x19x13	
South Bates Soil Test 6/A	50	306221	6396267	red	petrified wood	flake - distal	23x14x6	
South Bates Soil Test 6/A	51	306221	6396267	orange	tuff	flake	30x26x7	
South Bates Soil Test 6/A	52	306221	6396267	red/pink	tuff	core fragment	11x9x6	
South Bates Soil Test 6/A	53	306221	6396267	pink	tuff	microblade	27x12x4	
South Bates Soil Test 6/A	54	306221	6396267	orange	tuff	backed artefact	14x8x5	
South Bates Soil Test 6/A	55	306221	6396267	pink	tuff	flake	13x7x2	
South Bates Soil Test 6/A	56	306221	6396267	yellow	tuff	flake	19x15x3	
South Bates Soil Test 6/A	57	306221	6396267	red	tuff	flake - proximal	13x8x4	
South Bates Soil Test 6/A	58	306221	6396267	orange	tuff	flake	9x7x2	
South Bates Soil Test 6/A	59	306221	6396267	red	tuff	lithic fragment	5x4x2	
South Bates Soil Test 6/A	60	306218	6396263	brown/yellow	tuff	core	42x24x23	
South Bates Soil Test 6/A	61	306218	6396263	red	tuff	core	31x27x20	
South Bates Soil Test 6/A	62	306218	6396263	pink	tuff	core	35x25x12	also a flake
South Bates Soil Test 6/A	63	306218	6396263	yellow	tuff	flake - proximal - utilised	31x20x7	bevelling on the lateral left margin from use
South Bates Soil Test 6/A	64	306218	6396263	yellow	tuff	flake - proximal - utilised	20x20x4	waterworn cortex on 20% of surfaces; damage on the lateral left margin from use
South Bates Soil Test 6/A	65	306218	6396263	yellow/pink	tuff	microblade - proximal	15x13x1	
South Bates Soil Test 6/A	66	306218	6396263	yellow/pink	tuff	flake	21x12x4	
South Bates Soil Test 6/A	67	306218	6396263	brown/yellow	tuff	microblade - medial	24x13x7	
South Bates Soil Test 6/A	68	306218	6396263	brown/yellow	tuff	flake - distal	16x11x4	
South Bates Soil Test 6/A	69	306218	6396263	yellow	tuff	retouched flake	18x15x13	retouch around lateral right margin to distal forming a thick chord
South Bates Soil Test 6/A	70	306218	6396263	cream/pink	tuff	bondi point - tip	22x6x5	point has been bisected by a flaking event owing to a hertzian initiation on a newer ventral surface
South Bates Soil Test 6/A	71	306218	6396263	red	tuff	core	31x20x10	
South Bates Soil Test 6/A	72	306218	6396263	red	tuff	flake	25x15x6	waterworn cortex on 40% of surfaces
South Bates Soil Test 6/A	73	306218	6396263	red	tuff	flake - proximal	16x9x3	
South Bates Soil Test 6/A	74	306218	6396263	yellow	tuff	flake - distal	9x6x2	
South Bates Soil Test 6/A	75	306218	6396263	yellow	tuff	flake - distal	19x11x4	
South Bates Soil Test 6/A	76	306218	6396263	red	tuff	flake	15x13x3	
South Bates Soil Test 6/A	77	306218	6396263	red	tuff	flake - medial	8x5x1	
South Bates Soil Test 6/A	78	306218	6396263	orange	tuff	flake - distal	10x8x1	
South Bates Soil Test 6/A	79	306218	6396263	orange	tuff	flake - distal	10x6x1	

South Bates Soil Test 6A (OEH #37-5-0807) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
South Bates Soil Test 6/A	80	306218	6396263	black/red	tuff	retouched flake - utilised	22x17x4	carefully retouched around lateral left and distal margin forming a neat round implement with a dull serrated edge; large retouched notch on the lateral right margin with crushing within from use
South Bates Soil Test 6/A	81	306218	6396263	pink	tuff	bondi point - utilised	34x8x4	crushing along the middle of the lateral right margin from use
South Bates Soil Test 6/A	82	306218	6396263	grey	tuff	bondi point - butt - utilised	21x8x4	edge damage along the lateral left margin from use
South Bates Soil Test 6/A	83	306218	6396263	grey	tuff	flake - proximal	18x11x3	
South Bates Soil Test 6/A	84	306218	6396263	pink	tuff	flake - distal - utilised	26x17x6	damage on the distal margin from use
South Bates Soil Test 6/A	85	306218	6396263	pink	tuff	flake - utilised	17x13x3	damage on the distal margin from use
South Bates Soil Test 6/A	86	306218	6396263	grey	tuff	flake	18x12x4	
South Bates Soil Test 6/A	87	306218	6396263	grey/pink	tuff	flake - proximal	12x8x2	
South Bates Soil Test 6/A	88	306218	6396263	pink	tuff	flake	17x6x4	elongated
South Bates Soil Test 6/A	89	306218	6396263	orange	tuff	flake - proximal	15x10x5	
South Bates Soil Test 6/A	90	306218	6396263	orange	tuff	flake - utilised	11x8x2	beveling on the distal margin from use
South Bates Soil Test 6/A	91	306218	6396263	orange	tuff	flake	9x7x2	
South Bates Soil Test 6/A	92	306218	6396263	pink	tuff	lithic fragment	9x7x3	
South Bates Soil Test 6/A	93	306218	6396263	red/brown	tuff	lithic fragment	11x9x3	
South Bates Soil Test 6/A	94	306218	6396263	red	tuff	core fragment	11x7x5	waterworn cortex on 30% of surfaces
South Bates Soil Test 6/A	95	306218	6396263	red/brown	tuff	microblade - medial	9x6x2	
South Bates Soil Test 6/A	96	306218	6396263	pink	tuff	flake	12x7x2	
South Bates Soil Test 6/A	97	306218	6396263	pink	tuff	lithic fragment	14x8x2	
South Bates Soil Test 6/A	98	306218	6396263	grey	tuff	microblade - medial	9x6x2	
South Bates Soil Test 6/A	99	306218	6396263	brown	tuff	flake	9x9x1	
South Bates Soil Test 6/A	100	306218	6396263	brown/pink	silcrete	flake - proximal	12x8x3	
South Bates Soil Test 6/A	101	306218	6396263	brown	silcrete	core	27x18x11	
South Bates Soil Test 6/A	102	306218	6396263	grey	silcrete	core	30x26x19	
South Bates Soil Test 6/A	103	306220	6396259	pink	tuff	retouched piece - utilised	59x30x19	one retouched chord forming a sharp serrated edge with crushing and striations on one surface from use; two breaks perpendicular to the retouched chord have removed much of the original piece; thick cortical edge opposite the retouched chord; likely a large wedge implement like a hand-held chopper
South Bates Soil Test 6/A	104	306220	6396259	purple/brown	tuff	core	22x18x7	
South Bates Soil Test 6/A	105	306220	6396259	yellow	tuff	flake - distal - utilised	19x8x2	edge damage along distal margin from use
South Bates Soil Test 6/A	106	306220	6396259	yellow/brown	tuff	core	26x16x9	waterworn cortex on 30% of surfaces
South Bates Soil Test 6/A	107	306220	6396259	red	tuff	core	23x12x12	

South Bates Soil Test 6A (OEH #37-5-0807) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
South Bates Soil Test 6/A	108	306220	6396259	red/yellow	tuff	flake - utilised	23x14x6	edge damage along lateral left margin from use
South Bates Soil Test 6/A	109	306220	6396259	grey/pink	tuff	flake	18x21x3	
South Bates Soil Test 6/A	110	306220	6396259	yellow	tuff	microblade - distal - utilised	21x14x5	beveling and striations on the lateral left margin from use
South Bates Soil Test 6/A	111	306220	6396259	yellow/pink	tuff	core fragment	18x8x7	
South Bates Soil Test 6/A	112	306220	6396259	red	tuff	flake - distal	14x7x2	
South Bates Soil Test 6/A	113	306220	6396259	red	tuff	microblade - medial	13x6x2	
South Bates Soil Test 6/A	114	306220	6396259	red	tuff	microblade - medial	14x8x4	
South Bates Soil Test 6/A	115	306220	6396259	red/brown	tuff	lithic fragment	11x10x1	
South Bates Soil Test 6/A	116	306220	6396259	red	tuff	core fragment	12x10x6	
South Bates Soil Test 6/A	117	306220	6396259	pink	tuff	lithic fragment	10x8x2	
South Bates Soil Test 6/A	118	306220	6396259	brown/pink	tuff	lithic fragment	11x8x3	waterworn cortex on 30% of surfaces
South Bates Soil Test 6/A	119	306220	6396259	cream	tuff	flake	10x7x3	terrestrial cortex on 40% of surfaces
South Bates Soil Test 6/A	120	306220	6396259	brown	tuff	flake	9x7x1	
South Bates Soil Test 6/A	121	306220	6396259	brown	tuff	flake	10x5x1	
South Bates Soil Test 6/A	122	306220	6396259	yellow	tuff	core	35x30x8	
South Bates Soil Test 6/A	123	306220	6396259	red	tuff	flake	47x19x5	
South Bates Soil Test 6/A	124	306220	6396259	brown/red	tuff	microblade - proximal - utilised	24x15x5	crushing along lateral right margin from use; waterworn cortex on 30% of surfaces
South Bates Soil Test 6/A	125	306220	6396259	brown	tuff	microblade - distal - utilised	28x10x4	crushing within a notch on the lateral left margin near the proximal end
South Bates Soil Test 6/A	126	306220	6396259	brown/pink	tuff	flake - distal	28x16x5	waterworn cortex on 40% of the surfaces
South Bates Soil Test 6/A	127	306220	6396259	red	tuff	flake - distal	17x15x5	
South Bates Soil Test 6/A	128	306220	6396259	brown/pink	silcrete	microblade - proximal - utilised	22x15x6	crushing along the lateral right margin from use
South Bates Soil Test 6/A	129	306220	6396259	red/brown	tuff	flake - distal	19x11x7	
South Bates Soil Test 6/A	130	306220	6396259	yellow/pink	tuff	flake	14x8x3	
South Bates Soil Test 6/A	131	306220	6396259	red	tuff	flake - proximal	13x10x4	
South Bates Soil Test 6/A	132	306220	6396259	yellow	tuff	flake - proximal	10x8x3	
South Bates Soil Test 6/A	133	306220	6396259	orange	tuff	microblade - proximal	16x13x4	
South Bates Soil Test 6/A	134	306220	6396259	pink	tuff	core	22x12x7	
South Bates Soil Test 6/A	135	306220	6396259	red/brown	tuff	flake - medial	14x10x3	
South Bates Soil Test 6/A	136	306220	6396259	yellow	tuff	flake - proximal	11x8x2	
South Bates Soil Test 6/A	137	306220	6396259	yellow/pink	tuff	flake - distal	7x6x1	
South Bates Soil Test 6/A	138	306220	6396259	yellow	tuff	flake - distal - utilised	11x8x4	damage on the distal margin from use
South Bates Soil Test 6/A	139	306220	6396259	red/brown	tuff	flake	9x6x1	
South Bates Soil Test 6/A	140	306220	6396259	red/brown	tuff	lithic fragment	7x4x2	
South Bates Soil Test 6/A	141	306220	6396259	yellow/pink	silcrete	flake - distal	21x20x7	
South Bates Soil Test 6/A	142	306220	6396259	white	quartz	lithic fragment	12x7x5	
South Bates Soil Test 6/A	143	306219	6396258	yellow	tuff	core	32x29x21	
South Bates Soil Test 6/A	144	306219	6396258	yellow	tuff	core	38x32x19	
South Bates Soil Test 6/A	145	306219	6396258	red/orange	tuff	flake - utilised	27x14x8	crushing on distal margin from use

South Bates Soil Test 6A (OEH #37-5-0807) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
South Bates Soil Test 6/A	146	306219	6396258	pink	tuff	lithic fragment	25x16x6	
South Bates Soil Test 6/A	147	306219	6396258	red	tuff	flake - distal	29x9x7	waterworn cortex on 20% of surfaces
South Bates Soil Test 6/A	148	306219	6396258	yellow	tuff	flake - longitudinal - utilised	22x12x5	fracturing on distal from use
South Bates Soil Test 6/A	149	306219	6396258	yellow	tuff	microblade - medial - utilised	16x11x7	beveling on one lateral margin from use; waterworn or tabular cortex on 20% of surfaces
South Bates Soil Test 6/A	150	306219	6396258	cream	tuff	flake - distal	19x14x10	
South Bates Soil Test 6/A	151	306219	6396258	grey	tuff	core	18x9x5	
South Bates Soil Test 6/A	152	306219	6396258	yellow	tuff	flake	13x11x6	
South Bates Soil Test 6/A	153	306219	6396258	yellow	tuff	flake	11x11x4	
South Bates Soil Test 6/A	154	306219	6396258	red	tuff	flake	15x13x3	
South Bates Soil Test 6/A	155	306219	6396258	red	tuff	flake	11x6x3	
South Bates Soil Test 6/A	156	306219	6396258	red	tuff	flake - proximal	11x7x2	
South Bates Soil Test 6/A	157	306219	6396258	yellow	tuff	flake - distal	7x5x1	
South Bates Soil Test 6/A	158	306219	6396258	brown/grey	silcrete	flake	38x22x7	
South Bates Soil Test 6/A	159	306219	6396258	red	silcrete	lithic fragment	17x9x8	
South Bates Soil Test 6/A	160	306219	6396258	grey	silcrete	flake - distal	20x12x7	
South Bates Soil Test 6/A	161	306216	6396255	yellow	tuff	flake - distal - utilised	23x16x6	beveling along lateral right margin from use
South Bates Soil Test 6/A	162	306216	6396255	yellow	tuff	flake - proximal - utilised	27x16x9	beveling along the lateral left margin from use
South Bates Soil Test 6/A	163	306216	6396255	yellow/pink	tuff	flake	28x24x6	
South Bates Soil Test 6/A	164	306216	6396255	pink	tuff	microblade - distal - utilised	30x12x5	crushing for length of lateral left margin and focused crushing near distal on lateral right margin
South Bates Soil Test 6/A	165	306216	6396255	cream	tuff	flake - distal - utilised	19x11x5	beveling on distal margin from use
South Bates Soil Test 6/A	166	306216	6396255	orange	tuff	flake - proximal	11x9x5	
South Bates Soil Test 6/A	167	306216	6396255	orange	tuff	flake - proximal	7x5x2	
South Bates Soil Test 6/A	168	306216	6396255	red	tuff	flake	10x5x3	
South Bates Soil Test 6/A	169	306216	6396255	orange	tuff	flake - distal	12x6x6	
South Bates Soil Test 6/A	170	306216	6396255	brown/grey	silcrete	core	28x23x14	
South Bates Soil Test 6/A	171	306216	6396255	red	silcrete	microblade - proximal	11x7x3	
South Bates Soil Test 6/A	172	306216	6396255	grey	silcrete	flake - medial	13x9x4	
South Bates Soil Test 6/A	173	306216	6396255	brown/pink	acidic volcanic	core	82x66x36	waterworn cortex on 40% of surfaces
South Bates Soil Test 6/A	174	306216	6396255	yellow	tuff	flake - distal	21x17x6	
South Bates Soil Test 6/A	175	306216	6396255	red	tuff	flake - proximal - utilised	20x16x8	blade; crushing along each lateral margin from use
South Bates Soil Test 6/A	176	306216	6396255	pink	tuff	retouched flake - distal - utilised	18x12x8	retouched notch on lateral right distal with crushing within from use; "burin"
South Bates Soil Test 6/A	177	306216	6396255	orange	tuff	retouched flake - utilised	22x14x7	retouched notch on lateral right distal with crushing within from use; "burin"

South Bates Soil Test 6A (OEH #37-5-0807) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
South Bates Soil Test 6/A	178	306216	6396255	cream	tuff	microblade - utilised	13x7x5	fracturing along lateral margins from use
South Bates Soil Test 6/A	179	306216	6396255	orange	tuff	flake	9x6x4	
South Bates Soil Test 6/A	180	306216	6396255	grey	silcrete	core	39x21x20	
South Bates Soil Test 6/A	181	306216	6396255	white	quartz	core	33x18x15	
South Bates Soil Test 6/A	182	306213	6396253	red/pink	tuff	core	31x30x17	waterworn cortex on 30% of surfaces
South Bates Soil Test 6/A	183	306213	6396253	red/pink	tuff	core	47x32x15	
South Bates Soil Test 6/A	184	306213	6396253	pink/yellow	tuff	flake - distal - utilised	22x17x4	crushing on lateral right margin from use
South Bates Soil Test 6/A	185	306213	6396253	white/pink	quartz	core	34x21x12	waterworn cortex on 40% of surfaces; pebble core
South Bates Soil Test 6/A	186	306213	6396253	pink	silcrete	microblade - distal	8x8x3	
South Bates Soil Test 6/A	187	306213	6396246	grey	tuff	core	30x15x12	
South Bates Soil Test 6/A	188	306216	6396253	yellow/brown	tuff	core	24x23x11	collected below 8/05/18; waterworn cortex on 50% of surfaces
South Bates Soil Test 6/A	189	306216	6396253	yellow	tuff	flake - proximal	16x14x5	
South Bates Soil Test 6/A	190	306216	6396253	cream/pink	tuff	core	21x18x6	
South Bates Soil Test 6/A	191	306216	6396253	orange	tuff	bondi point - butt	14x11x6	
South Bates Soil Test 6/A	192	306216	6396253	brown	silcrete	flake - medial	24x12x10	
South Bates Soil Test 6/A	193	306216	6396253	black/orange	petrified wood	core fragment	21x11x7	
South Bates Soil Test 6/A	194	306219	6396253	pink	tuff	core	44x36x14	
South Bates Soil Test 6/A	195	306219	6396253	red	tuff	microblade - distal	26x11x3	
South Bates Soil Test 6/A	196	306219	6396253	orange	tuff	flake - proximal	16x15x6	
South Bates Soil Test 6/A	197	306219	6396253	pink	tuff	flake - medial	18x7x3	
South Bates Soil Test 6/A	198	306219	6396253	yellow	tuff	flake - medial	11x7x3	
South Bates Soil Test 6/A	199	306219	6396253	black	volcanic	lithic fragment	29x20x9	waterworn cortex on 20% of surfaces
South Bates Soil Test 6/A	200	306219	6396253	red	petrified wood	core	19x15x10	
South Bates Soil Test 6/A	201	306219	6396253	white	quartz	lithic fragment	14x10x7	
South Bates Soil Test 6/A	202	306217	6396247	white/pink	tuff	flake - distal	14x14x5	
South Bates Soil Test 6/A	203	306217	6396247	white	tuff	lithic fragment	11x6x2	
South Bates Soil Test 6/A	204	306217	6396247	brown	silcrete	flake - proximal	20x18x5	
South Bates Soil Test 6/A	205	306217	6396247	red	silcrete	bondi point - medial	9x5x3	
South Bates Soil Test 6/A	206	306217	6396247	pink	quartz	lithic fragment	16x9x6	
South Bates Soil Test 6/A	207	306217	6396246	yellow	tuff	flake - medial	16x7x4	
South Bates Soil Test 6/A	208	306217	6396246	orange	tuff	flake	8x6x1	
South Bates Soil Test 6/A	209	306215	6396244	pink	quartz	core	41x28x19	
South Bates Soil Test 6/A	210	306215	6396244	grey	quartz	flake - medial	12x9x4	
South Bates Soil Test 6/A	211	306215	6396244	grey	tuff	lithic fragment	11x7x3	
South Bates Soil Test 6/A	212	306215	6396244	red	tuff	flake - distal - utilised	10x9x2	crushing on the lateral left margin from use
South Bates Soil Test 6/A	213	306215	6396244	red/brown	silcrete	core	15x11x6	
South Bates Soil Test 6/A	214	306215	6396242	brown/grey	tuff	lithic fragment	21x15x5	
South Bates Soil Test 6/A	215	306215	6396242	red/orange	tuff	lithic fragment	15x6x5	
South Bates Soil Test 6/A	216	306215	6396242	red/yellow	tuff	flake	10x7x2	
South Bates Soil Test 6/A	217	306215	6396242	red	silcrete	flake	11x9x5	
South Bates Soil Test 6/A	218	306215	6396242	white	quartz	lithic fragment	9x6x4	

South Bates Soil Test 6A (OEI #37-5-0807) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
South Bates Soil Test 6/A	219	306214	6396240	red	silcrete	core	37x35x13	
South Bates Soil Test 6/A	220	306214	6396240	red/yellow	tuff	flake	11x11x4	
South Bates Soil Test 6/A	221	306213	6396237	red	silcrete	microblade core	55x28x22	
South Bates Soil Test 6/A	222	306213	6396237	pink	tuff	retouched flake - proximal - utilised	27x23x6	retouched notch on the lateral left margin near the proximal with crushing within from use
South Bates Soil Test 6/A	223	306213	6396237	yellow/orange	tuff	flake - distal	16x13x6	
South Bates Soil Test 6/A	224	306213	6396237	pink	tuff	flake - proximal	14x12x6	
South Bates Soil Test 6/A	225	306213	6396237	pink	tuff	retouched flake - distal - utilised	18x12x6	retouched notch on the distal with crushing within from use
South Bates Soil Test 6/A	226	306213	6396237	orange	tuff	retouched flake - distal - utilised	11x10x4	retouch along lateral margins with crushing from use
South Bates Soil Test 6/A	227	306213	6396237	red	tuff	retouched flake - distal - utilised	15x11x5	retouch along lateral and distal margins with crushing from use
South Bates Soil Test 6/A	228	306213	6396237	orange	tuff	flake	10x8x2	
South Bates Soil Test 6/A	229	306213	6396237	orange/red	tuff	flake - distal	16x12x6	
South Bates Soil Test 6/A	230	306213	6396237	yellow	tuff	flake - distal	14x10x2	
South Bates Soil Test 6/A	231	306212	6396237	grey	porphyritic rhyolite	core	62x36x12	
South Bates Soil Test 6/A	232	306212	6396237	grey/black	volcanic	core	36x16x14	waterworn cortex on 20% of surfaces
South Bates Soil Test 6/A	233	306212	6396237	brown	petrified wood	lithic fragment	13x10x4	
South Bates Soil Test 6/A	234	306212	6396237	red	silcrete	lithic fragment	8x6x4	
South Bates Soil Test 6/A	235	306212	6396237	orange	tuff	core	22x17x8	
South Bates Soil Test 6/A	236	306212	6396237	yellow	tuff	retouched flake - utilised	22x17x6	retouched notch on the lateral left distal with crushing from use; "burin"; damage along lateral left and striations on ventral from use
South Bates Soil Test 6/A	237	306212	6396237	red	tuff	microblade - medial - utilised	13x10x4	beveling along lateral margin from use
South Bates Soil Test 6/A	238	306212	6396237	orange	tuff	microblade - medial	10x6x3	
South Bates Soil Test 6/A	239	306212	6396237	orange	tuff	lithic fragment	8x8x3	
South Bates Soil Test 6/A	240	306212	6396237	red	tuff	flake - medial	10x6x5	
South Bates Soil Test 6/A	241	306212	6396234	red	silcrete	flake	44x38x14	
South Bates Soil Test 6/A	242	306212	6396234	red/brown	silcrete	flake - proximal	33x22x10	
South Bates Soil Test 6/A	243	306212	6396234	red	silcrete	lithic fragment	18x10x6	
South Bates Soil Test 6/A	244	306212	6396234	red	tuff	retouched flake - distal - utilised	25x19x9	retouched notch on lateral right distal with crushing from use; "burin"
South Bates Soil Test 6/A	245	306212	6396234	red	tuff	backed artefact - utilised	25x12x6	stout backed artefact with fracturing on lateral left edge from use
South Bates Soil Test 6/A	246	306212	6396234	yellow/brown	tuff	flake	38x19x12	
South Bates Soil Test 6/A	247	306212	6396234	yellow	tuff	core	25x16x10	waterworn cortex on 40% of surfaces
South Bates Soil Test 6/A	248	306212	6396234	red	tuff	flake	11x9x4	
South Bates Soil Test 6/A	249	306209	6396231	yellow	tuff	core	40x36x20	waterworn cortex on 40% of surfaces

South Bates Soil Test 6A (OEH #37-5-0807) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
South Bates Soil Test 6/A	250	306209	6396231	orange	tuff	core	24x23x10	
South Bates Soil Test 6/A	251	306209	6396231	yellow	tuff	microblade - medial	32x11x5	#253 and 251 conjoin
South Bates Soil Test 6/A	252	306209	6396231	yellow	tuff	flake - distal	22x11x4	
South Bates Soil Test 6/A	253	306209	6396231	yellow	tuff	microblade - proximal	17x13x5	#253 and 251 conjoin
South Bates Soil Test 6/A	254	306209	6396231	pink	tuff	microblade - distal	14x7x3	
South Bates Soil Test 6/A	255	306209	6396231	grey	tuff	lithic fragment	14x7x2	
South Bates Soil Test 6/A	256	306209	6396231	orange	tuff	flake - proximal	14x9x4	
South Bates Soil Test 6/A	257	306209	6396231	grey	tuff	lithic fragment	15x10x3	
South Bates Soil Test 6/A	258	306209	6396231	yellow	tuff	microblade - medial	10x8x3	
South Bates Soil Test 6/A	259	306209	6396231	brown	porphyritic rhyolite	core	16x13x8	
South Bates Soil Test 6/A	260	306209	6396231	red	silcrete	flake - distal	7x6x2	
South Bates Soil Test 6/A	261	306208	6396227	grey/brown	tuff	flake - utilised	34x18x7	edge damage on each lateral margin
South Bates Soil Test 6/A	262	306208	6396227	white/orange	tuff	utilised piece	31x21x11	crushing on one margin from use
South Bates Soil Test 6/A	263	306208	6396227	yellow/orange	tuff	flake - proximal	29x17x9	
South Bates Soil Test 6/A	264	306208	6396227	orange	tuff	core	22x15x9	
South Bates Soil Test 6/A	265	306208	6396227	pink	tuff	flake	14x11x5	
South Bates Soil Test 6/A	266	306208	6396227	orange	tuff	flake - proximal	12x9x3	
South Bates Soil Test 6/A	267	306208	6396227	pink	tuff	flake - distal - utilised	13x9x5	edge damage on lateral left margin from use
South Bates Soil Test 6/A	268	306208	6396227	red	tuff	flake - medial - utilised	19x15x8	edge damage on one lateral margin from use
South Bates Soil Test 6/A	269	306208	6396227	red	tuff	flake	7x4x2	
South Bates Soil Test 6/A	270	306208	6396227	red	tuff	lithic fragment	5x3x2	
South Bates Soil Test 6/A	271	306208	6396227	red	tuff	flake	12x10x3	
South Bates Soil Test 6/A	272	306208	6396227	orange	tuff	core fragment	10x8x4	
South Bates Soil Test 6/A	273	306208	6396227	grey	silcrete	flake - medial	12x11x6	
South Bates Soil Test 6/A	274	306208	6396227	grey/pink	silcrete	flake - proximal	15x10x4	
South Bates Soil Test 6/A	275	306208	6396227	red	tuff	core	29x19x13	
South Bates Soil Test 6/A	276	306208	6396227	orange	petrified wood	lithic fragment	11x9x6	
South Bates Soil Test 6/A	277	306208	6396227	red	petrified wood	core	21x10x7	
South Bates Soil Test 6/A	278	306207	6396225	red/grey	silcrete	core	56x22x18	
South Bates Soil Test 6/A	279	306207	6396225	red	silcrete	flake - distal	9x6x4	
South Bates Soil Test 6/A	280	306207	6396225	pink	quartz	flake	20x13x8	
South Bates Soil Test 6/A	281	306207	6396225	white	quartz	flake - distal	16x10x5	
South Bates Soil Test 6/A	282	306207	6396225	white/pink	quartz	lithic fragment	12x10x6	
South Bates Soil Test 6/A	283	306207	6396225	grey/pink	tuff	core	19x12x8	
South Bates Soil Test 6/A	284	306207	6396225	pink/red	tuff	core	14x14x11	
South Bates Soil Test 6/A	285	306207	6396225	pink/grey	tuff	core	14x10x9	
South Bates Soil Test 6/A	286	306207	6396225	red	tuff	flake - medial	11x9x4	
South Bates Soil Test 6/A	287	306207	6396225	orange	tuff	core	23x12x11	
South Bates Soil Test 6/A	288	306208	6396224	pink	tuff	retouched flake - distal - utilised	24x16x6	retouch along distal margin forming a serrated edge with crushing from use
South Bates Soil Test 6/A	289	306208	6396224	yellow	tuff	flake	9x5x2	
South Bates Soil Test 6/A	290	306208	6396224	pink/yellow	tuff	flake	19x12x5	
South Bates Soil Test 6/A	291	306208	6396224	pink/white	tuff	flake	14x8x6	

South Bates Soil Test 6A (OEH #37-5-0807) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
South Bates Soil Test 6/A	292	306208	6396224	red	tuff	flake - proximal	12x12x5	
South Bates Soil Test 6/A	293	306208	6396224	red	tuff	flake	22x17x4	
South Bates Soil Test 6/A	294	306208	6396224	orange	tuff	flake	10x7x2	
South Bates Soil Test 6/A	295	306208	6396224	pink	silcrete	retouched flake - utilised	21x17x9	thick flake with retouch forming a scalloped edge along the lateral left margin; bevelling and crushing from use
South Bates Soil Test 6/A	296	306208	6396224	brown	petrified wood	lithic fragment	12x5x2	
South Bates Soil Test 6/A	297	306207	6396222	red	tuff	core	12x10x4	
South Bates Soil Test 6/A	298	306207	6396222	orange	tuff	core	13x10x5	
South Bates Soil Test 6/A	299	306207	6396222	orange	tuff	microblade - proximal	15x8x6	
South Bates Soil Test 6/A	300	306207	6396222	orange	tuff	flake	5x4x1	
South Bates Soil Test 6/A	301	306207	6396222	yellow	tuff	flake - distal	10x5x3	
South Bates Soil Test 6/A	302	306207	6396222	red/brown	silcrete	flake - distal	27x15x6	
South Bates Soil Test 6/A	303	306207	6396222	red/brown	silcrete	flake - proximal	13x8x4	
South Bates Soil Test 6/A	304	306207	6396222	pink	silcrete	flake - distal	8x7x3	
South Bates Soil Test 6/A	305	306207	6396222	orange	silcrete	flake - distal	7x6x2	
South Bates Soil Test 6/A	306	306207	6396222	grey	silcrete	flake - distal	8x8x3	
South Bates Soil Test 6/A	307	306207	6396222	white	quartz	core	15x14x11	
South Bates Soil Test 6/A	308	306207	6396222	white	quartz	lithic fragment	14x7x3	
South Bates Soil Test 6/A	309	306204	6396222	red	tuff	core	22x20x9	
South Bates Soil Test 6/A	310	306204	6396222	red	tuff	core	12x11x5	
South Bates Soil Test 6/A	311	306204	6396222	orange	tuff	retouched flake - distal	10x7x3	fine retouch along distal margin
South Bates Soil Test 6/A	312	306204	6396222	red	tuff	flake - medial	8x8x4	
South Bates Soil Test 6/A	313	306204	6396222	red/brown	tuff	lithic fragment	10x9x2	
South Bates Soil Test 6/A	314	306204	6396222	grey	tuff	microblade - medial	10x9x4	
South Bates Soil Test 6/A	315	306204	6396222	cream/pink	tuff	retouched flake - utilised	17x12x5	fine retouch on distal margin forming a serrated edge with crushing from use
South Bates Soil Test 6/A	316	306204	6396222	grey	tuff	flake - utilised	21x11x7	crushing on lateral right margin from use
South Bates Soil Test 6/A	317	306204	6396222	red	silcrete	flake - proximal	12x12x5	
South Bates Soil Test 6/A	318	306204	6396222	grey/pink	silcrete	flake - distal	17x11x5	
South Bates Soil Test 6/A	319	306204	6396219	brown/red	tuff	retouched flake - utilised	42x24x14	retouch along lateral left margin with crushing from use; lateral right margin and proximal are a cortical surface
South Bates Soil Test 6/A	320	306204	6396219	brown	tuff	flake - utilised	27x13x8	bevelling along lateral margins from use
South Bates Soil Test 6/A	321	306204	6396219	orange	tuff	bondi point - medial	15x9x7	
South Bates Soil Test 6/A	322	306204	6396219	cream	tuff	retouched flake - distal	16x8x6	retouched notch on the distal margin with crushing within from use; "burin"
South Bates Soil Test 6/A	323	306204	6396219	brown/grey	tuff	microblade - distal - utilised	15x10x4	bevelling and crushing on each lateral margin from use
South Bates Soil Test 6/A	324	306204	6396219	red	tuff	core	17x14x6	
South Bates Soil Test 6/A	325	306204	6396219	orange/white	tuff	flake - distal	10x8x4	
South Bates Soil Test 6/A	326	306204	6396219	orange	tuff	core	11x8x4	

South Bates Soil Test 6A (OEH #37-5-0807) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
South Bates Soil Test 6/A	327	306204	6396219	orange	tuff	lithic fragment	7x6x2	
South Bates Soil Test 6/A	328	306204	6396219	red	tuff	lithic fragment	7x4x1	
South Bates Soil Test 6/A	329	306204	6396219	pink	silcrete	retouched piece	11x5x3	fine retouch on margin
South Bates Soil Test 6/A	330	306204	6396219	orange	tuff	microblade - medial	11x7x2	
South Bates Soil Test 6/A	331	306204	6396219	red	tuff	lithic fragment	10x5x3	
South Bates Soil Test 6/A	332	306204	6396219	orange	tuff	flake	6x5x1	
South Bates Soil Test 6/A	333	306204	6396219	orange	tuff	flake	6x5x1	
South Bates Soil Test 6/A	334	306204	6396219	brown	tuff	flake - distal	8x5x1	
South Bates Soil Test 6/A	335	306204	6396219	brown/pink	silcrete	core	34x25x15	
South Bates Soil Test 6/A	336	306204	6396219	grey/brown	silcrete	flake - proximal	28x20x9	
South Bates Soil Test 6/A	337	306204	6396219	pink	silcrete	microblade - medial	10x7x6	
South Bates Soil Test 6/A	338	306204	6396219	white	quartz	lithic fragment	7x6x4	
South Bates Soil Test 6/A	339	306203	6396215	brown	tuff	core	22x11x10	
South Bates Soil Test 6/A	340	306203	6396215	pink	tuff	microblade - utilised	20x11x5	beveling along lateral left margin from use
South Bates Soil Test 6/A	341	306203	6396215	brown	tuff	flake - distal	13x13x5	
South Bates Soil Test 6/A	342	306203	6396215	orange	tuff	flake	11x7x3	
South Bates Soil Test 6/A	343	306203	6396215	brown	tuff	flake - utilised	16x9x5	beveling along lateral left margin from use
South Bates Soil Test 6/A	344	306203	6396215	orange	tuff	flake	10x6x2	
South Bates Soil Test 6/A	345	306203	6396215	orange	tuff	flake	9x7x2	
South Bates Soil Test 6/A	346	306203	6396215	yellow	tuff	lithic fragment	9x7x3	
South Bates Soil Test 6/A	347	306203	6396215	brown	tuff	microblade - proximal	12x10x4	
South Bates Soil Test 6/A	348	306203	6396215	orange	tuff	flake - distal	10x8x4	
South Bates Soil Test 6/A	349	306203	6396215	red	silcrete	microblade - distal	19x9x6	
South Bates Soil Test 6/A	350	306203	6396215	red	silcrete	lithic fragment	8x5x5	
South Bates Soil Test 6/A	351	306203	6396215	red	silcrete	flake - distal	9x7x3	
South Bates Soil Test 6/A	352	306203	6396215	red	silcrete	microblade - medial	10x7x2	
South Bates Soil Test 6/A	353	306203	6396215	pink	silcrete	flake - proximal	10x9x2	
South Bates Soil Test 6/A	354	306203	6396215	pink	silcrete	flake - distal	7x6x3	
South Bates Soil Test 6/A	355	306199	6396216	yellow/pink	tuff	flake - distal - utilised	26x20x6	edge damage on all margins from use
South Bates Soil Test 6/A	356	306199	6396216	white/pink	tuff	core	24x24x10	also a flake
South Bates Soil Test 6/A	357	306199	6396216	orange	tuff	core	17x16x7	
South Bates Soil Test 6/A	358	306199	6396216	orange	tuff	core	11x9x4	
South Bates Soil Test 6/A	359	306199	6396216	orange	tuff	core	21x13x8	
South Bates Soil Test 6/A	360	306199	6396216	brown	tuff	lithic fragment	16x11x7	
South Bates Soil Test 6/A	361	306199	6396216	yellow	tuff	flake - utilised	11x9x3	edge damage around all margins from use
South Bates Soil Test 6/A	362	306199	6396216	red	tuff	retouched flake - distal	13x10x3	retouch around lateral and distal margins forming a serrated edge
South Bates Soil Test 6/A	363	306199	6396216	grey	tuff	flake - proximal	12x6x4	
South Bates Soil Test 6/A	364	306199	6396216	orange	tuff	flake - medial	10x6x4	
South Bates Soil Test 6/A	365	306199	6396216	grey/pink	tuff	flake - distal	6x5x1	
South Bates Soil Test 6/A	366	306199	6396216	grey/pink	tuff	lithic fragment	12x7x7	
South Bates Soil Test 6/A	367	306199	6396216	pink	tuff	microblade - proximal - utilised	9x8x5	edge damage on lateral margins from use
South Bates Soil Test 6/A	368	306199	6396216	orange	tuff	microblade - proximal	6x5x2	
South Bates Soil Test 6/A	369	306199	6396216	pink	silcrete	flake	22x14x3	
South Bates Soil Test 6/A	370	306199	6396216	grey	silcrete	flake	18x12x7	

South Bates Soil Test 6A (OEH #37-5-0807) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
South Bates Soil Test 6/A	371	306199	6396216	red	silcrete	microblade - medial - utilised	18x5x4	edge damage on one lateral margin from use
South Bates Soil Test 6/A	372	306199	6396216	pink	silcrete	flake - proximal	10x8x4	
South Bates Soil Test 6/A	373	306199	6396216	red	silcrete	microblade - proximal	9x6x4	
South Bates Soil Test 6/A	374	306199	6396216	white	quartz	lithic fragment	10x7x6	
South Bates Soil Test 6/A	375	306199	6396216	white	quartz	lithic fragment	6x5x2	
South Bates Soil Test 6/A	376	306199	6396216	white/grey	petrified wood	core fragment	15x15x8	
South Bates Soil Test 6/A	377	306199	6396216	pink/grey	petrified wood	lithic fragment	13x7x4	
South Bates Soil Test 6/A	378	306199	6396216	pink/grey	petrified wood	lithic fragment	12x10x6	
South Bates Soil Test 6/A	379	306197	6396213	red	tuff	retouched flake - distal	13x10x3	distal and lateral right margin are finely retouched forming a round serrated edge; "scraper"
South Bates Soil Test 6/A	380	306197	6396213	pink	tuff	core	11x11x4	
South Bates Soil Test 6/A	381	306197	6396213	orange	tuff	core	12x7x4	
South Bates Soil Test 6/A	382	306197	6396213	pink	tuff	lithic fragment	8x6x2	
South Bates Soil Test 6/A	383	306197	6396213	yellow	tuff	flake - distal	8x8x3	
South Bates Soil Test 6/A	384	306197	6396213	white	quartz	core fragment	12x9x4	
South Bates Soil Test 6/A	385	306197	6396210	pink	tuff	core	31x19x6	
South Bates Soil Test 6/A	386	306197	6396210	pink	tuff	core	9x9x6	
South Bates Soil Test 6/A	387	306197	6396210	red	tuff	core	11x10x5	
South Bates Soil Test 6/A	388	306197	6396210	brown	tuff	bondi point - preform - medial	13x7x4	retouch on one lateral margin but not the alternating pattern typical of a complete bondi
South Bates Soil Test 6/A	389	306198	6396209	grey/brown	petrified wood	core	32x31x20	
South Bates Soil Test 6/A	390	306198	6396209	white/brown	petrified wood	core	30x20x14	
South Bates Soil Test 6/A	391	306198	6396209	pink	silcrete	microblade - medial	9x6x3	
South Bates Soil Test 6/A	392	306198	6396209	pink	silcrete	flake - medial	11x8x2	
South Bates Soil Test 6/A	393	306198	6396209	white	quartz	flake	23x11x6	
South Bates Soil Test 6/A	394	306198	6396209	brown	tuff	core fragment	15x10x6	
South Bates Soil Test 6/A	395	306198	6396209	brown/white	tuff	core fragment	12x12x7	
South Bates Soil Test 6/A	396	306198	6396209	yellow	tuff	flake - proximal	23x12x6	
South Bates Soil Test 6/A	397	306198	6396209	red	tuff	flake - proximal	9x6x3	
South Bates Soil Test 6/A	398	306198	6396209	brown	tuff	core fragment	11x9x6	
South Bates Soil Test 6/A	399	306198	6396209	cream/pink	tuff	flake	15x12x2	
South Bates Soil Test 6/A	400	306198	6396209	pink/brown	tuff	lithic fragment	12x9x3	
South Bates Soil Test 6/A	401	306198	6396209	orange	tuff	flake - medial	9x6x2	
South Bates Soil Test 6/A	402	306198	6396209	pink	tuff	lithic fragment	12x8x4	
South Bates Soil Test 6/A	403	306198	6396209	red	tuff	flake	19x14x3	
South Bates Soil Test 6/A	404	306196	6396208	pink/grey	tuff	core	24x14x13	
South Bates Soil Test 6/A	405	306196	6396208	grey	tuff	lithic fragment	22x15x6	
South Bates Soil Test 6/A	406	306196	6396208	yellow	tuff	flake - medial	17x9x4	
South Bates Soil Test 6/A	407	306196	6396208	brown	tuff	lithic fragment	11x10x3	
South Bates Soil Test 6/A	408	306196	6396208	pink	silcrete	microblade - medial	11x10x4	
South Bates Soil Test 6/A	409	306196	6396208	white	quartz	flake - distal	15x8x3	

South Bates Soil Test 6A (OEH #37-5-0807) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
South Bates Soil Test 6/A	410	306193	6396203	pink	tuff	flake - medial	25x12x5	
South Bates Soil Test 6/A	411	306193	6396203	white	tuff	core fragment	18x17x7	
South Bates Soil Test 6/A	412	306193	6396203	pink	tuff	flake - medial	16x14x5	
South Bates Soil Test 6/A	413	306189	6396198	grey	silcrete	core	46x28x14	
South Bates Soil Test 6/A	414	306187	6396196	grey	silcrete	core	48x21x15	
South Bates Soil Test 6/A	415	306184	6396190	white/red	tuff	core	15x10x4	
South Bates Soil Test 6/A	416	306179	6396183	black	volcanic	core	55x35x28	
South Bates Soil Test 6/A	417	306176	6396181	orange/brown	tuff	flake - utilised	45x35x12	red residue on ventral surface of piece and a small crushed notch on the distal margin from use
South Bates Soil Test 6/A	418	306176	6396181	brown	tuff	retouched flake - distal	19x11x5	retouch on both lateral margins forming a sharp serrated edge
South Bates Soil Test 6/A	419	306173	6396177	red	silcrete	flake - utilised	36x23x11	beveling and crushing along the lateral right margin and the distal from use
South Bates Soil Test 6/A	420	306173	6396177	red	silcrete	flake - proximal	17x14x5	
South Bates Soil Test 6/A	421	306169	6396173	yellow	tuff	retouched flake - utilised	35x26x11	three large retouched notches on the lateral right margin with crushing within from use
South Bates Soil Test 6/A	422	306169	6396173	pink	silcrete	core	17x11x5	
South Bates Soil Test 6/A	423	306168	6396174	pink/yellow	tuff	core	48x37x25	
South Bates Soil Test 6/A	424	306168	6396174	yellow/pink	tuff	retouched flake - utilised	35x28x9	retouched notch on the lateral left distal with crushing and striations from use; "burin"; retouch on lateral right margin near proximal forming a dull serrated edge with fracturing from use
South Bates Soil Test 6/A	425	306168	6396174	yellow/pink	tuff	flake	11x6x2	did not collect exposures off road - no impacts proposed

South Bates Soil Test 6A (OEH #37-5-0807) ASIRF Attachment

AHIMS #37-5-0786 (Wambo Site 484)

Kuskie (2017a):

SITE NAME: WAMBO SITE 484

Site Type: *Artefact Scatter* MGA Grid Reference: *306113:6396400*
 Date Recorded: *20/11/16* Topographic Map: *Doyles Creek 9032-I-N*
 Recorder: *Peter Kuskie*

Landform Element: *Drainage Depression* Vegetation: *Cleared/Regrowth*
 Slope: *Gentle* Ground Disturbance: *High*
 Distance to Water: *<50*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
9	4	4	2	8	90	50	4	5	1.250	probable

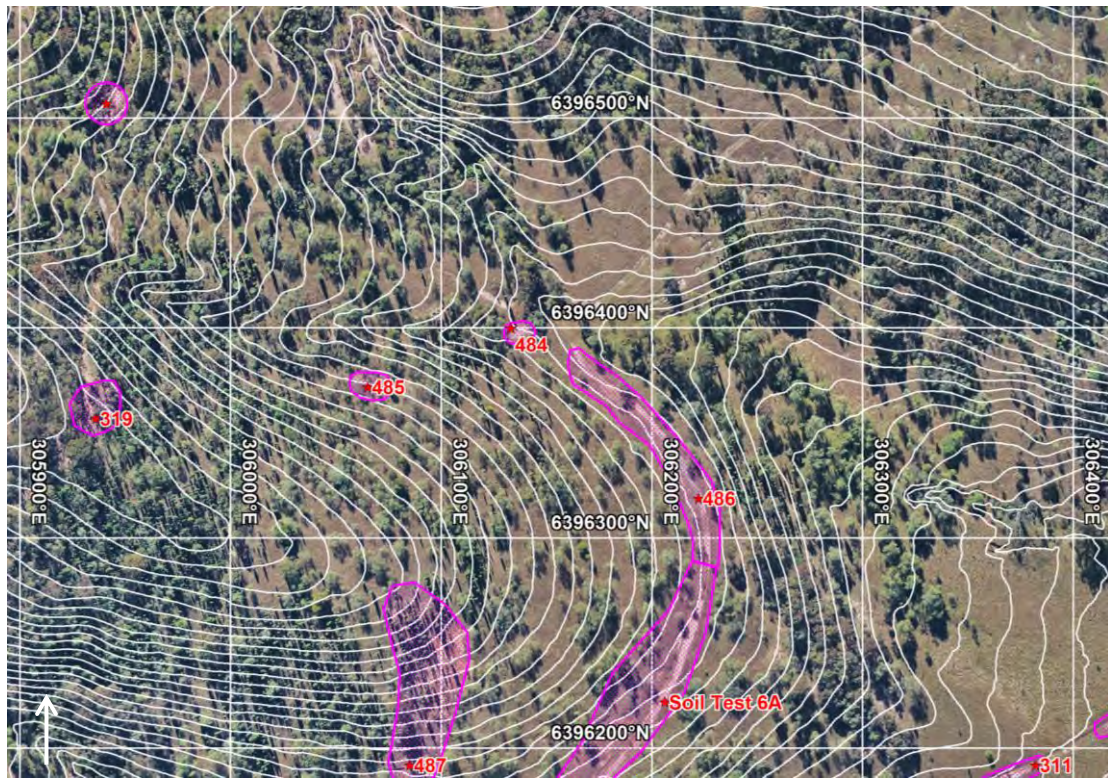
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	cream	tuff	flake	28x25x10			dorsal surface very fresh; ventral heavily weathered	306133	6396400
2	red/brown	tuff	flake - proximal	50x23x10	20	tab		306133	6396400
3	red/brown	tuff	flake - longitudinal	58x37x17	5	tab		306133	6396400
4	red/brown	tuff	flake - proximal	40x36x8				306133	6396400
5	red/brown	tuff	retouched flake	55x45x15	90	ww	large primary flake; retouch along the lateral margins and distal	306133	6396400

Additional Comments:

- Low research potential;
- Heavily eroded;
- Probably continuous distribution all over area;
- High ground disturbance due to erosion and vegetation removal.

Site Location: Wambo Site 484 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 484 (inset: artefact #5, tuff retouched flake)



AHIMS #37-5-0787 (Wambo Site 485)

Kuskie (2017a):

SITE NAME: WAMBO SITE 485

Site Type: *Artefact Scatter* MGA Grid Reference: *306065:6396372*
 Date Recorded: *20/11/16* Topographic Map: *Doyles Creek 9032-I-N*
 Recorder: *Peter Kuskie*

Landform Element: *Simple Slope* Vegetation: *Cleared/Regrowth*
 Slope: *Moderate* Ground Disturbance: *Moderate*
 Distance to Water: *<50*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
8	2	8	2	16	10	10	1.6	4	2.500	possible

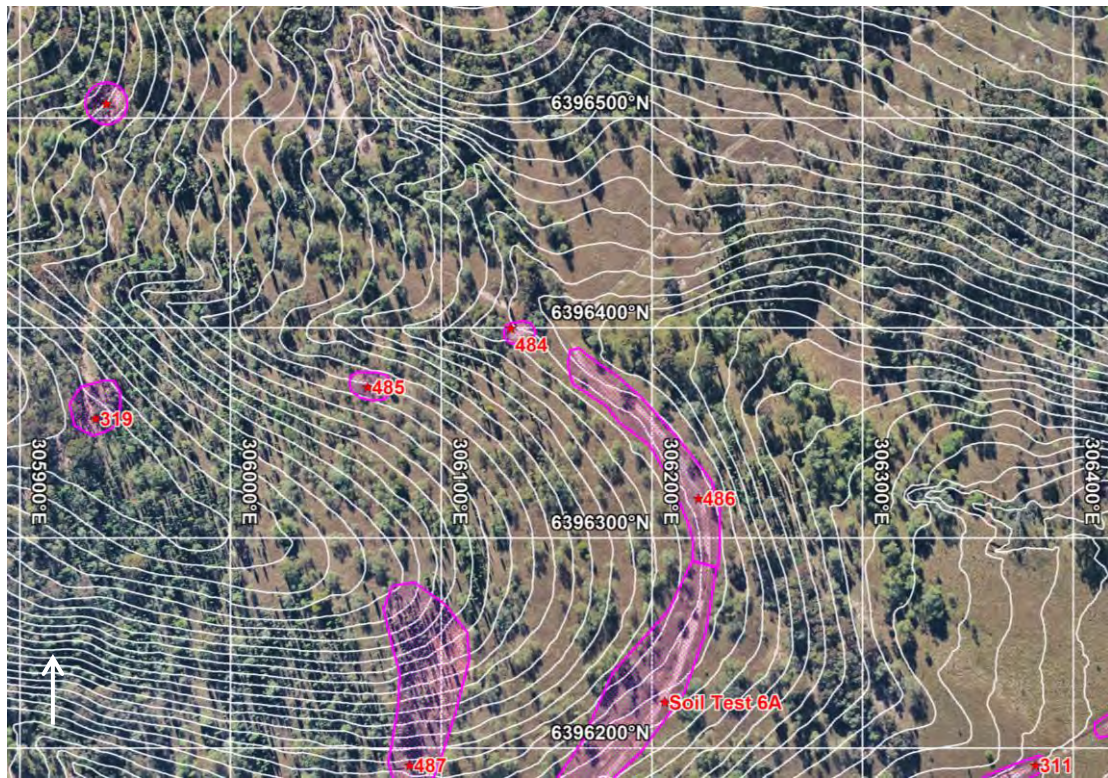
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	brown	tuff	core fragment	22x15x10	40	ww		306065	6396372
2	red	tuff	lithic fragment	11x11x5	10	ww		306065	6396372
3	dark grey	acidic volcanic	core	83x53x25	80	ww	potentially the butt portion of a broken axe; two flake removals at one end and snapped at the opposite end	306065	6396372
4	red	tuff	flake - longitudinal	38x26x16				306065	6396372

Additional Comments:

- On the side of the ridge descending from mountains as probable pathway;
- Shallow A unit sediment;
- Small exposure, probably a continual distribution of artefacts all over spur and slopes;
- Low research potential;
- Grassy with regrowth pines;
- Moderate ground disturbance due to erosion and vegetation removal.

Site Location: Wambo Site 485 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 485 (inset: artefact #3, core and potential butt portion of axe)





Aboriginal Site Impact Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW
 December 2010 DECCW 2010/1022

- 1 This form must be completed following impacts to AHIMS sites that are:
 - a) an outcome of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
 - b) authorised by an Aboriginal Heritage Impact Permit (AHIP)
 - c) undertaken for the purpose of complying with environmental assessment requirements issued by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), or
 - d) authorised by a Part 3A project approval under the EP&A Act.
- 2 Completed forms must be submitted to the AHIMS Registrar (www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm).
- 3 This form is intended to complement (not replace) the AHIMS Site Recording Form. Where there is a need to provide detailed information about the nature of a site, use the AHIMS Site Recording Form.
- 4 This form does not replace the need to submit reports to DECCW (as specified by a condition of an AHIP or Part 3A approval). This form must be submitted in addition to any reports.

AHIMS site ID:

Site impact authorisation (select one)	Reference numbers, dates
<input type="checkbox"/> Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the <i>Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW</i> .)	Date DECCW was notified (under requirement 15c of the Code): <input type="text"/> DECCW Regional office notified: <input type="text"/>
<input checked="" type="checkbox"/> AHIP (The impacts to this site were authorised by an AHIP.)	AHIP number: <input type="text" value="C0003213"/> Date issued/signed: <input type="text" value="22 February 2018"/> AHIMS permit ID/number: <input type="text"/>
<input type="checkbox"/> Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)	Major project number: <input type="text"/> Date environmental assessment requirements issued: <input type="text"/>
<input type="checkbox"/> Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)	or Date of project approval: <input type="text"/>

Site status following impacts:

- Not a site (The investigations concluded that this is not a site.)
 Valid site (The investigations confirmed that this is an Aboriginal site.)
 Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)
 Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name:

Easting: **Northing:** **Coordinates must be in GDA (MGA)**

Map sheet:

Zone: **Location method:**

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name
<input type="text" value="Mr"/>	<input type="text" value="Kuskie"/>	<input type="text" value="Peter"/>
Organisation:	<input type="text" value="South East Archaeology Pty Limited"/>	
Address:	<input type="text" value="24 Bamford Street, Hughes, ACT, 2605"/>	
Phone:	<input type="text" value="262604439"/>	E-mail: <input type="text" value="peter@southeastarchaeology.com.au"/>
Date recorded:	<input type="text" value="8/5/18"/>	Fax: <input type="text" value="262604439"/>

Site information

Open/closed site:

Features:

- | | | | |
|-------------------------------------|--------------------------------------|--------------------------|---|
| <input type="checkbox"/> | 1. Aboriginal ceremony and dreaming | <input type="checkbox"/> | 11. Habitation structure |
| <input type="checkbox"/> | 2. Aboriginal resource and gathering | <input type="checkbox"/> | 12. Hearth |
| <input type="checkbox"/> | 3. Art | <input type="checkbox"/> | 13. Non-human bone and organic material |
| <input checked="" type="checkbox"/> | 4. Artefact | <input type="checkbox"/> | 14. Ochre quarry |
| <input type="checkbox"/> | 5. Burial | <input type="checkbox"/> | 15. Potential archaeological deposit |
| <input type="checkbox"/> | 6. Ceremonial ring | <input type="checkbox"/> | 16. Stone quarry |
| <input type="checkbox"/> | 7. Conflict | <input type="checkbox"/> | 17. Shell |
| <input type="checkbox"/> | 8. Earth mound | <input type="checkbox"/> | 18. Stone arrangement |
| <input type="checkbox"/> | 9. Fish trap | <input type="checkbox"/> | 19. Modified tree |
| <input type="checkbox"/> | 10. Grinding groove | <input type="checkbox"/> | 20. Water hole |

Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

The salvage of Wambo Site 485 occurred in accordance with the conditions of AHIP #C0003213 and the Wambo Heritage Management Plan (HMP). Surface collection of the site was undertaken on 7 and 8 May 2018 by a suitably qualified archaeologist (Peter Kuskie of South East Archaeology) and a representative of the Registered Aboriginal Parties (RAPs) for Wambo Coal Mine, David Horton of the Wanaruah Local Aboriginal Land Council (LALC). A total of 6 artefacts were collected (refer to attachment). It is likely that the salvage retrieved all originally reported artefacts, along with several additional items.

Management recommendations

Summary of any management recommendations for the AHIMS site

No further heritage action required. However, all other provisions of the Wambo HMP and AHIP #C0003213 need to be implemented where relevant.

Post-investigation significance

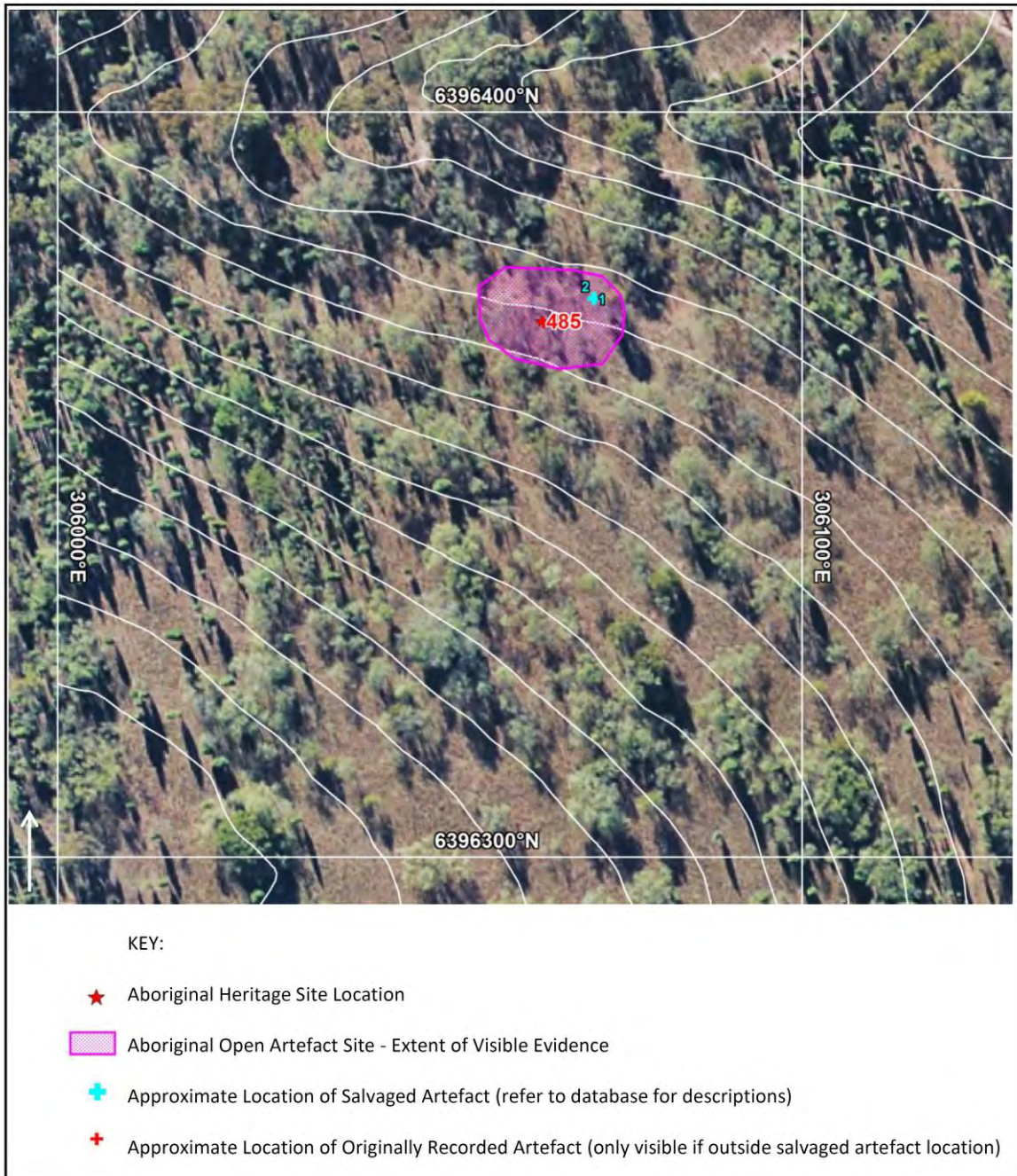
Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

Site has been totally salvaged - nil heritage significance remaining with respect to the identified heritage evidence (surface artefacts), although the probable occurrence of further artefacts obscured by vegetation and sediment and a sub-surface deposit of artefacts where the A unit soil remains present is very likely. Such potential evidence may be of low significance within a local context.

Additional comments

Empty box for additional comments.

Figure: Approximate location of Wambo Site 485 salvaged artefacts and originally recorded artefacts (aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid; original artefact locations not visible unless outside of salvaged artefact locations; artefact locations approximate only).



Wambo Site 485 (OEH #37-5-0787) ASIRF Attachment

Lithic Items Salvaged from Wambo Site 485.

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 485	1	306072	6396375	black	volcanic	hammerstone/core	82x51x25	originally recorded #3; small cobble with pitting on one end from use as a hammerstone; large break has removed much of the original piece; two flake negatives on surface may be from damage; all original artefacts relocated at this site
Wambo Site 485	2	306072	6396375	red/brown	tuff	flake - distal	38x22x17	
Wambo Site 485	3	306072	6396375	brown	tuff	flake - utilised	35x25x10	edge damage on each lateral and distal margin from use
Wambo Site 485	4	306072	6396375	orange	tuff	core fragment	14x12x5	
Wambo Site 485	5	306072	6396375	brown	tuff	flake - medial	16x9x3	
Wambo Site 485	6	306072	6396375	brown	tuff	core	22x15x11	

Wambo Site 485 (OEH #37-5-0787) ASIRF Attachment

AHIMS #37-5-0788 (Wambo Site 486)

Kuskie (2017a):

SITE NAME: WAMBO SITE 486

Site Type: *Artefact Scatter*
 Date Recorded: *23/11/16*
 Recorder: *Peter Kuskie*

MGA Grid Reference: *306222:6396319*
 Topographic Map: *Doyles Creek 9032-I-N*

Landform Element: *Simple Slope*
 Slope: *Moderate*
 Distance to Water: *<50*

Vegetation: *Cleared/Regrowth*
 Ground Disturbance: *Moderate*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
varies	varies	120	20	2400	20	20	480	29	0.060	probable

Artefact Database:

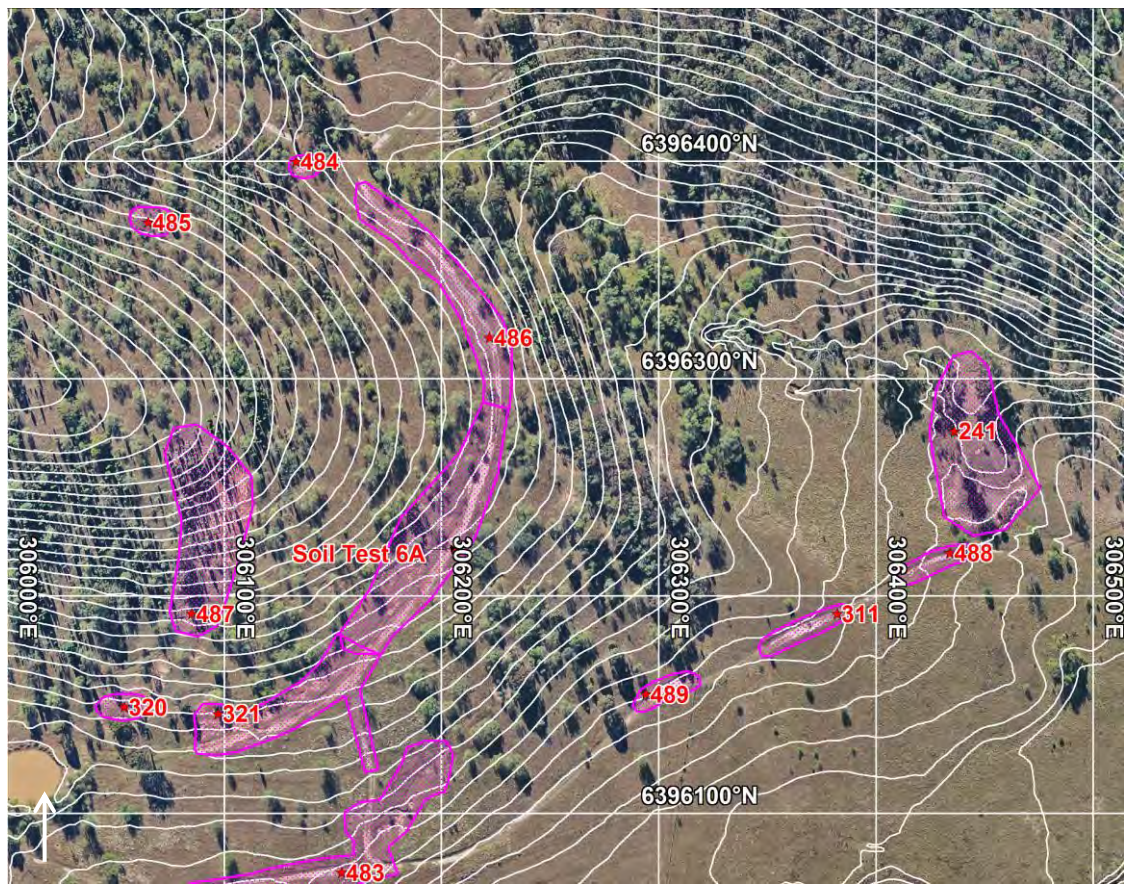
Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	grey	tuff	flake - proximal	48x30x5	10	tab	large step fracture on dorsal	306222	6396289
2	orange	tuff	flake - proximal	28x14x6				306222	6396293
3	cream	silcrete	flake	18x10x2			flake scar on right lateral	306226	6396295
4	yellow	tuff	flake - medial	14x10x4				306226	6396295
5	cream	tuff	flake - utilised	24x10x2			use-wear present on left lateral	306226	6396295
6	red/ brown	tuff	flake - proximal	20x18x4			recent damage	306222	6396296
7	red/ yellow	tuff	lithic fragment	18x10x6				306222	6396296
8	brown	tuff	flake	14x10x2			large flake scar on the distal margin	306224	6396303
9	red/ cream	silcrete	core	40x30x30			two flake scars and one platform	306224	6396314
10	pink/ cream	tuff	microblade - distal - utilised	30x10x2			use-wear on the left lateral margin for 10mm	306222	6396314
11	yellow	tuff	flake	32x28x1			possible retouch on left lateral	306222	6396319
12	red/ yellow	tuff	flake	30x30x4			numerous scars on the dorsal surface	306215	6396329

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
13	pink	tuff	flake - utilised	40x10x2			use-wear present on left lateral	306204	6396344
14	white/orange	tuff	lithic fragment	36x20x8			just on the high side of the track	306199	6396351
15	yellow	tuff	flake - medial	16x16x2				306199	6396352
16	grey/yellow	tuff	flake - utilised	46x40x2			large flake scar on the right lateral; use-wear on the left lateral	306195	6396357
17	red/yellow	chert	flake - utilised	40x30x4	5	tab	damaged distal margin; retouch/use-wear on the left lateral	306194	6396350
18	red/orange	chert	flake - utilised	26x20x4			use-wear on the left lateral	306191	6396359
19	red/grey	silcrete	flake - utilised	50x30x2			possibly longitudinally split on the right lateral; use-wear present on the left lateral and distal	306191	6396359
20	red/white	silcrete	flake - utilised	34x24x4			use-wear on the right lateral	306191	6396359
21	cream/red	tuff	flake - proximal	30x20x8	5	tab		306191	6396359
22	red/yellow	silcrete	flake - medial	20x18x4			recent damage	306191	6396359
23	cream/pink	tuff	lithic fragment	25x25x6			flake scars on dorsal surface	306191	6396359
24	brown/cream	tuff	flake - proximal	40x30x4			also longitudinally split	306191	6396359
25	red/brown	tuff	lithic fragment	20x14x8				306191	6396359
26	white/cream	tuff	lithic fragment	55x50x20			one negative flake scar present	306191	6396359
27	white/cream	tuff	flake - distal	46x38x20			step fractures on the dorsal surface; two large flake scars on the distal	306191	6396359
28	red/yellow	tuff	flake - distal	14x10x2			eastern end of the track towards the drainage	306172	6396376
29	grey	silcrete	core	38x30x10			two step fractures and one platform	306163	6396383

Additional Comments:

- Along a vehicle track;
- Extension of adjacent sites;
- Low grass off track;
- Moderate ground disturbance along track, some erosion;
- Moderate research potential - broad spur crest that is potential pathway from North Wambo Creek to mountains.

Site Location: Wambo Site 486 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 486 (view south) (inset: artefact #17, chert utilised flake)





Aboriginal Site Impact Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW
 December 2010 DECCW 2010/1022

- 1 This form must be completed following impacts to AHIMS sites that are:
 - a) an outcome of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
 - b) authorised by an Aboriginal Heritage Impact Permit (AHIP)
 - c) undertaken for the purpose of complying with environmental assessment requirements issued by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), or
 - d) authorised by a Part 3A project approval under the EP&A Act.
- 2 Completed forms must be submitted to the AHIMS Registrar (www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm).
- 3 This form is intended to complement (not replace) the AHIMS Site Recording Form. Where there is a need to provide detailed information about the nature of a site, use the AHIMS Site Recording Form.
- 4 This form does not replace the need to submit reports to DECCW (as specified by a condition of an AHIP or Part 3A approval). This form must be submitted in addition to any reports.

AHIMS site ID:

Site impact authorisation (select one)	Reference numbers, dates
<input type="checkbox"/> Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the <i>Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW</i> .)	Date DECCW was notified (under requirement 15c of the Code): <input type="text"/> DECCW Regional office notified: <input type="text"/>
<input checked="" type="checkbox"/> AHIP (The impacts to this site were authorised by an AHIP.)	AHIP number: <input type="text" value="C0003213"/> Date issued/signed: <input type="text" value="22 February 2018"/> AHIMS permit ID/number: <input type="text"/>
<input type="checkbox"/> Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)	Major project number: <input type="text"/> Date environmental assessment requirements issued: <input type="text"/>
<input type="checkbox"/> Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)	or Date of project approval: <input type="text"/>

Site status following impacts:

Not a site (The investigations concluded that this is not a site.)
 Valid site (The investigations confirmed that this is an Aboriginal site.)
 Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)
 Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name:

Easting: **Northing:** **Coordinates must be in GDA (MGA)**

Map sheet:

Zone: **Location method:**

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name
<input type="text" value="Mr"/>	<input type="text" value="Kuskie"/>	<input type="text" value="Peter"/>
Organisation:	<input type="text" value="South East Archaeology Pty Limited"/>	
Address:	<input type="text" value="24 Bamford Street, Hughes, ACT, 2605"/>	
Phone:	<input type="text" value="262604439"/>	E-mail: <input type="text" value="peter@southeastarchaeology.com.au"/>
Date recorded:	<input type="text" value="8/5/18"/>	Fax: <input type="text" value="262604439"/>

Site information

Open/closed site:

Features:

- | | | | |
|-------------------------------------|--------------------------------------|--------------------------|---|
| <input type="checkbox"/> | 1. Aboriginal ceremony and dreaming | <input type="checkbox"/> | 11. Habitation structure |
| <input type="checkbox"/> | 2. Aboriginal resource and gathering | <input type="checkbox"/> | 12. Hearth |
| <input type="checkbox"/> | 3. Art | <input type="checkbox"/> | 13. Non-human bone and organic material |
| <input checked="" type="checkbox"/> | 4. Artefact | <input type="checkbox"/> | 14. Ochre quarry |
| <input type="checkbox"/> | 5. Burial | <input type="checkbox"/> | 15. Potential archaeological deposit |
| <input type="checkbox"/> | 6. Ceremonial ring | <input type="checkbox"/> | 16. Stone quarry |
| <input type="checkbox"/> | 7. Conflict | <input type="checkbox"/> | 17. Shell |
| <input type="checkbox"/> | 8. Earth mound | <input type="checkbox"/> | 18. Stone arrangement |
| <input type="checkbox"/> | 9. Fish trap | <input type="checkbox"/> | 19. Modified tree |
| <input type="checkbox"/> | 10. Grinding groove | <input type="checkbox"/> | 20. Water hole |

Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

The salvage of Wambo Site 486 occurred in accordance with the conditions of AHIP #C0003213 and the Wambo Heritage Management Plan (HMP). Surface collection of the site was undertaken on 7 and 8 May 2018 by a suitably qualified archaeologist (Peter Kuskie of South East Archaeology) and a representative of the Registered Aboriginal Parties (RAPs) for Wambo Coal Mine, David Horton of the Wanaruah Local Aboriginal Land Council (LALC). A total of 230 artefacts were collected (refer to attachment). It is likely that the salvage retrieved most, if not all, originally reported artefacts, along with numerous additional items.

Management recommendations

Summary of any management recommendations for the AHIMS site

No further heritage action required. However, all other provisions of the Wambo HMP and AHIP #C0003213 need to be implemented where relevant.

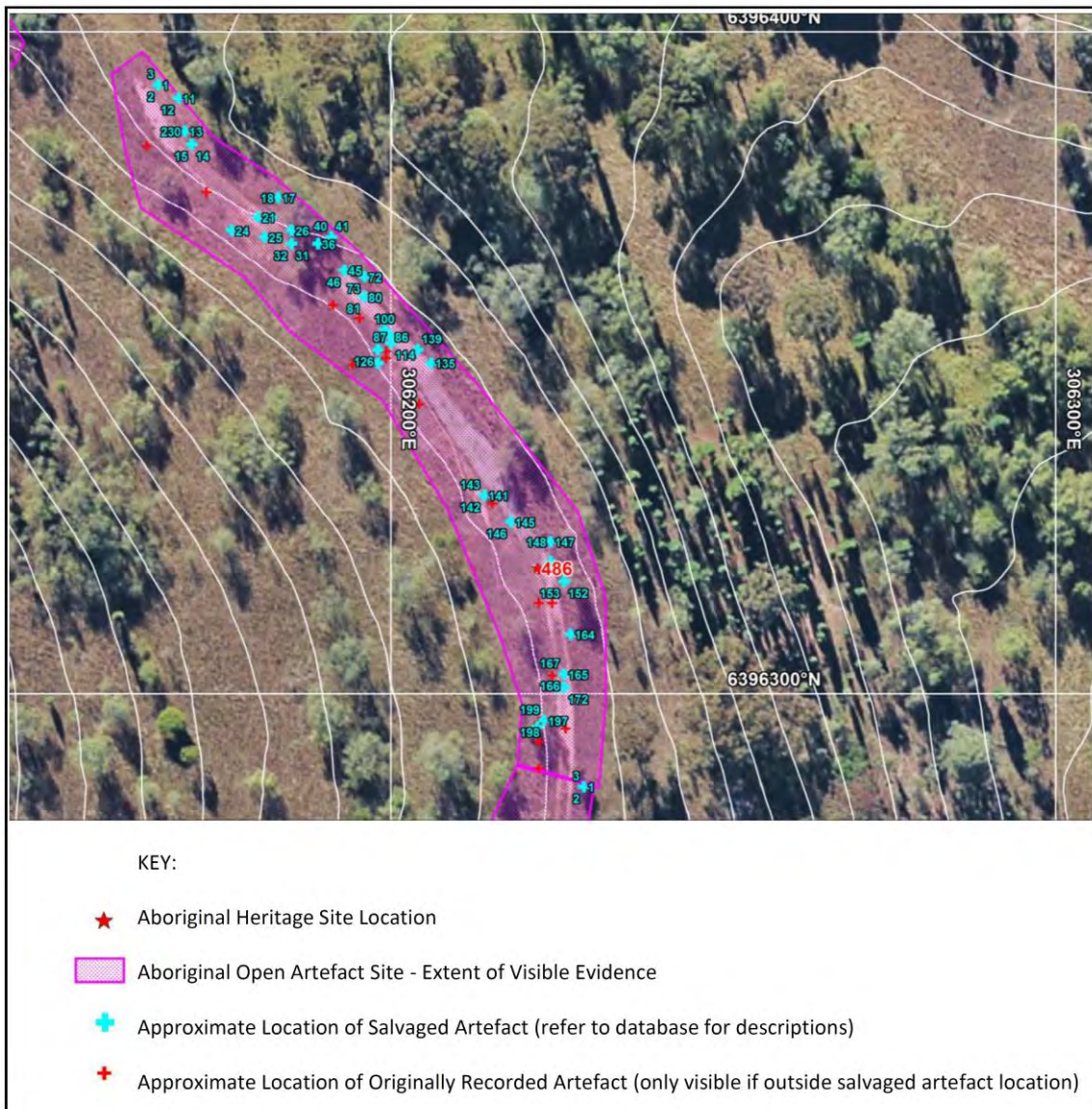
Post-investigation significance

Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

Site has been totally salvaged - nil heritage significance remaining with respect to the identified heritage evidence (surface artefacts), although the probable occurrence of further artefacts obscured by vegetation and sediment and a sub-surface deposit of artefacts where the A unit soil remains present is very likely. Such potential evidence may be of low to possibly moderate significance within a local context.

Additional comments

Figure: Approximate location of Wambo Site 486 salvaged artefacts and originally recorded artefacts (aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid; original artefact locations not visible unless outside of salvaged artefact locations; artefact locations approximate only).



Lithic Items Salvaged from Wambo Site 486.

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 486	1	306165	6396392	yellow/red	tuff	bondi point - preform	31x10x6	surface collection along road and verges starting at north-west end of site, opposite to original recording; cluster in 2x2m area
Wambo Site 486	2	306165	6396392	brown	tuff	flake - proximal	12x10x2	cluster in 2x2m area
Wambo Site 486	3	306165	6396392	brown/pink	silcrete	microblade - proximal	23x13x6	cluster in 2x2m area
Wambo Site 486	4	306165	6396392	brown/pink	silcrete	backed artefact - distal - utilised	18x14x5	cluster in 2x2m area; 12mm of edge damage along lateral right margin from use; backing retouch ceases approximately 10mm from termination of flake
Wambo Site 486	5	306165	6396392	red	silcrete	core	36x26x18	cluster in 2x2m area
Wambo Site 486	6	306165	6396392	red/grey	silcrete	core	38x26x19	cluster in 2x2m area
Wambo Site 486	7	306165	6396392	red	silcrete	flake	34x29x9	cluster in 2x2m area
Wambo Site 486	8	306165	6396392	grey	silcrete	core	39x30x15	cluster in 2x2m area
Wambo Site 486	9	306165	6396392	grey/pink	silcrete	flake - proximal	9x7x2	cluster in 2x2m area
Wambo Site 486	10	306165	6396392	grey/pink	silcrete	flake - distal	13x5x4	cluster in 2x2m area
Wambo Site 486	11	306168	6396390	red	silcrete	flake - distal	15x11x3	on track
Wambo Site 486	12	306168	6396390	orange	tuff	flake - medial - utilised	14x13x6	crushed notch on one margin from use
Wambo Site 486	13	306169	6396385	orange/brown	tuff	retouched flake	33x29x12	26mm of fine retouch on distal margin forming a serrated edge
Wambo Site 486	14	306170	6396383	grey/yellow	silcrete	flake - utilised	55x18x13	lateral right half of a flake; edge damage on distal margin from use; #14 and 15 conjoin
Wambo Site 486	15	306170	6396383	grey/yellow	silcrete	flake - utilised	44x27x13	lateral left half of a flake; edge damage on distal margin from use; #14 and 15 conjoin
Wambo Site 486	16	306170	6396383	grey/brown	quartzite	flake - utilised	42x38x14	waterworn cortex on 40% of surfaces predominantly dorsal; edge damage around lateral margins and distal from use
Wambo Site 486	17	306183	6396375	red/pink	tuff	flake - distal	18x17x7	
Wambo Site 486	18	306183	6396375	orange	tuff	flake	45x25x12	flake has been damaged on the distal and lateral right margin and much of the lateral left has broken off
Wambo Site 486	19	306183	6396375	orange	tuff	flake	14x8x3	overhang removal
Wambo Site 486	20	306183	6396375	brown/pink	silcrete	retouched flake - utilised	38x23x11	retouched notch on lateral left distal with crushing within from use; "burin"
Wambo Site 486	21	306180	6396372	brown/pink	silcrete	hammerstone/anvil	83x68x34	pitting on large flat surface from use as an anvil and pitting and damage on one end surface from use as a hammerstone
Wambo Site 486	22	306182	6396372	red/cream	tuff	flake - distal - utilised	14x14x4	edge damage on lateral right margin for approximately 10mm from use
Wambo Site 486	23	306182	6396372	orange/pink	silcrete	flake - proximal	24x23x9	retouch on lateral margins from ventral to dorsal forming an even serrated edge

Wambo Site 486 (OEH #37-5-0788) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 486	24	306176	6396370	yellow	tuff	flake - utilised	30x23x14	road verge; bevelling on distal margin from use; lateral right has been removed in a percussion event owing to bulb negatives
Wambo Site 486	25	306181	6396369	red	silcrete	retouched flake - utilised	32x21x8	road verge; retouched notch on lateral right distal with crushing within from use; "burin"
Wambo Site 486	26	306185	6396370	red	tuff	retouched flake - utilised	39x25x10	on road; retouch on lateral right lateral left and proximal forming a dull serrated edge with bevelling from use; "scraper"
Wambo Site 486	27	306185	6396370	orange	tuff	retouched flake - proximal	16x17x5	retouch along each lateral margin forming sharp serrated edges
Wambo Site 486	28	306185	6396370	red	tuff	lithic fragment	12x7x3	
Wambo Site 486	29	306185	6396370	pink/grey	silcrete	flake	33x22x10	
Wambo Site 486	30	306185	6396370	pink/brown	silcrete	retouched flake	38x24x7	several small retouch scars along the lateral left margin forming a sharp serrated edge
Wambo Site 486	31	306185	6396368	yellow	tuff	core	26x17x9	also a flake
Wambo Site 486	32	306185	6396368	pink/red	tuff	flake - proximal	16x12x5	
Wambo Site 486	33	306185	6396368	red/white	tuff	core fragment	25x17x7	
Wambo Site 486	34	306185	6396368	red	silcrete	core fragment	11x9x9	
Wambo Site 486	35	306185	6396368	red/pink	tuff	retouched flake - distal	16x19x7	fine retouch along distal margin for 12mm
Wambo Site 486	36	306189	6396368	pink/brown	tuff	flake	19x12x5	
Wambo Site 486	37	306189	6396368	red	tuff	flake - distal	13x10x3	
Wambo Site 486	38	306189	6396368	red	tuff	flake - proximal	17x12x4	
Wambo Site 486	39	306189	6396368	white/grey	quartz	flake - proximal	31x16x8	
Wambo Site 486	40	306191	6396369	grey/pink	tuff	core	31x26x23	
Wambo Site 486	41	306191	6396369	brown/grey	silcrete	lithic fragment	25x12x9	waterworn cortex on 20% of surfaces
Wambo Site 486	42	306191	6396369	white	quartz	flake	22x11x4	
Wambo Site 486	43	306191	6396369	white	quartz	flake	22x11x5	
Wambo Site 486	44	306191	6396369	pink	silcrete	flake	15x9x3	
Wambo Site 486	45	306193	6396364	grey	tuff	flake - proximal	18x9x8	
Wambo Site 486	46	306193	6396364	yellow/red	tuff	flake	13x11x3	
Wambo Site 486	47	306193	6396364	yellow/red	tuff	flake	17x14x8	
Wambo Site 486	48	306193	6396364	white	quartz	flake	14x10x6	
Wambo Site 486	49	306193	6396364	pink	silcrete	flake - medial	14x12x4	
Wambo Site 486	50	306193	6396364	pink/brown	silcrete	flake - distal	21x12x2	
Wambo Site 486	51	306193	6396364	red/grey	silcrete	microblade - medial	18x14x3	
Wambo Site 486	52	306194	6396364	pink/yellow	silcrete	retouched flake	51x28x12	retouch on lateral left and distal margins forming a sharp serrated edge; waterworn cortex on 15% of surfaces
Wambo Site 486	53	306194	6396364	pink/brown	silcrete	flake - medial	34x24x7	terrestrial cortex on 40% of surfaces

Wambo Site 486 (OEH #37-5-0788) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 486	54	306194	6396364	pink	silcrete	retouched flake - distal	17x14x5	fine retouch along distal and lateral left margins forming a dull serrated edge; break has removed lateral right and proximal
Wambo Site 486	55	306194	6396364	pink	silcrete	lithic fragment	13x13x3	
Wambo Site 486	56	306194	6396364	red	silcrete	microblade - medial - utilised	12x13x3	bevelling on one lateral margin from use
Wambo Site 486	57	306194	6396364	pink/cream	tuff	flake	18x7x4	
Wambo Site 486	58	306194	6396364	cream/orange	tuff	retouched flake - utilised	37x24x9	16mm retouched notch on distal lateral left with crushing within from use; elongated piece with retouch along lateral left margin forming a sharp serrated edge also; "burin/knife"
Wambo Site 486	59	306194	6396364	pink	tuff	core	41x19x9	
Wambo Site 486	60	306194	6396364	pink	tuff	retouched flake - utilised	26x22x9	retouch around each margin forming a round serrated implement with crushing within larger retouch scars from use
Wambo Site 486	61	306194	6396364	pink	tuff	flake - utilised	26x25x13	damage on distal margin from use
Wambo Site 486	62	306194	6396364	pink/cream	tuff	core	35x26x12	also a flake
Wambo Site 486	63	306194	6396364	pink/red	tuff	flake - utilised	23x19x12	crushing on lateral and distal margins from use
Wambo Site 486	64	306194	6396364	pink	tuff	flake	20x13x9	
Wambo Site 486	65	306194	6396364	red/white	tuff	core fragment	23x14x7	
Wambo Site 486	66	306194	6396364	grey	tuff	flake - medial	15x8x2	
Wambo Site 486	67	306194	6396364	grey	tuff	core fragment	17x17x5	
Wambo Site 486	68	306194	6396364	white/red	tuff	lithic fragment	11x8x5	
Wambo Site 486	69	306194	6396364	pink	tuff	flake - proximal	9x6x2	
Wambo Site 486	70	306194	6396364	white	siltstone	hammerstone fragment	43x33x17	elongated hammerstone or chisel broken along mid-section with fracturing on tapered end from use; surface is scratched and rounded especially near edges either from use or damage upon the ground surface
Wambo Site 486	71	306194	6396364	red	tuff	core	15x11x6	
Wambo Site 486	72	306196	6396363	red/pink	tuff	core fragment	25x21x9	waterworn cortex on 40% of surfaces
Wambo Site 486	73	306196	6396363	red	tuff	flake	7x6x2	
Wambo Site 486	74	306196	6396363	yellow	tuff	flake	13x6x3	
Wambo Site 486	75	306196	6396363	red/pink	silcrete	flake - utilised	13x10x3	9mm of crushing along distal margin from use
Wambo Site 486	76	306196	6396363	pink/orange	tuff	core	37x33x10	also a flake; banded colouring to material
Wambo Site 486	77	306196	6396363	cream	silcrete	flake	17x15x5	
Wambo Site 486	78	306196	6396363	cream	silcrete	flake - proximal	19x15x7	
Wambo Site 486	79	306196	6396363	cream/orange	silcrete	flake - proximal	14x6x2	
Wambo Site 486	80	306196	6396360	white	quartz	core	43x34x29	"pebble core"; waterworn cortex on 60% of surfaces
Wambo Site 486	81	306196	6396360	yellow	tuff	flake	53x45x18	break on lateral right distal has removed a large portion of the flake there

Wambo Site 486 (OEH #37-5-0788) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 486	82	306196	6396360	yellow/red	tuff	flake - distal	31x30x13	
Wambo Site 486	83	306196	6396360	brown/white	tuff	core fragment	20x18x13	
Wambo Site 486	84	306196	6396360	brown	tuff	flake - distal	15x7x3	
Wambo Site 486	85	306196	6396360	brown	silcrete	flake - distal	13x9x3	
Wambo Site 486	86	306200	6396354	pink	quartzite	core	40x29x18	
Wambo Site 486	87	306200	6396354	pink	silcrete	flake - utilised	36x25x12	edge damage along lateral margins from use
Wambo Site 486	88	306200	6396354	pink	silcrete	microblade core	36x28x13	
Wambo Site 486	89	306200	6396354	cream	silcrete	flake	35x26x15	
Wambo Site 486	90	306200	6396354	cream	silcrete	microblade - proximal	13x8x3	
Wambo Site 486	91	306200	6396354	white	quartz	lithic fragment	20x14x7	
Wambo Site 486	92	306200	6396354	yellow	tuff	flake - medial	12x10x2	
Wambo Site 486	93	306200	6396354	pink	tuff	lithic fragment	21x15x8	
Wambo Site 486	94	306200	6396354	pink/brown	tuff	lithic fragment	21x16x6	
Wambo Site 486	95	306200	6396354	yellow	tuff	lithic fragment	9x9x5	
Wambo Site 486	96	306200	6396354	pink	tuff	bondi point	20x6x4	very tip has snapped off
Wambo Site 486	97	306200	6396354	orange	tuff	backed artefact - medial	11x10x3	
Wambo Site 486	98	306200	6396354	pink	petrified wood	lithic fragment	15x7x3	
Wambo Site 486	99	306200	6396354	brown/pink	petrified wood	lithic fragment	14x10x3	
Wambo Site 486	100	306199	6396355	pink	silcrete	core	45x33x14	also a flake
Wambo Site 486	101	306199	6396355	red/yellow	silcrete	core	40x31x22	
Wambo Site 486	102	306199	6396355	red	silcrete	flake - medial	14x11x3	
Wambo Site 486	103	306199	6396355	pink	silcrete	flake - medial	15x12x4	
Wambo Site 486	104	306199	6396355	red	silcrete	flake - proximal	11x7x3	
Wambo Site 486	105	306199	6396355	red	silcrete	flake - proximal	10x6x2	
Wambo Site 486	106	306199	6396355	pink	silcrete	flake	9x8x4	
Wambo Site 486	107	306199	6396355	red	silcrete	backed artefact - utilised	12x7x2	small asymmetrical backed artefact with a small amount of edge damage near the distal opposite the backed chord
Wambo Site 486	108	306199	6396355	grey	tuff	core	18x13x4	
Wambo Site 486	109	306199	6396355	red	tuff	flake - proximal	22x15x7	
Wambo Site 486	110	306199	6396355	red/white	tuff	core	30x16x10	
Wambo Site 486	111	306199	6396355	yellow	tuff	flake - medial	17x16x4	
Wambo Site 486	112	306199	6396355	red	tuff	bondi point - butt - utilised	11x8x3	bevelling on the lateral right margin from use
Wambo Site 486	113	306199	6396355	white	quartz	flake - distal	8x7x3	
Wambo Site 486	114	306200	6396353	brown/pink	silcrete	core	41x31x16	
Wambo Site 486	115	306200	6396353	red	silcrete	microblade - medial	12x11x3	
Wambo Site 486	116	306200	6396353	pink	silcrete	flake - medial	22x18x6	
Wambo Site 486	117	306200	6396353	pink/yellow	silcrete	flake - proximal	28x22x7	
Wambo Site 486	118	306200	6396353	pink	silcrete	flake - distal	19x12x4	
Wambo Site 486	119	306200	6396353	red/grey	silcrete	flake - proximal	21x20x8	
Wambo Site 486	120	306200	6396353	pink	silcrete	retouched flake - utilised	24x18x8	distal and lateral margins have been retouched so as to dull and narrow the distal half of the flake for use; crushing on these same margins from use

Wambo Site 486 (OEH #37-5-0788) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 486	121	306200	6396353	yellow	tuff	flake	14x10x4	
Wambo Site 486	122	306200	6396353	yellow	tuff	lithic fragment	8x7x4	
Wambo Site 486	123	306200	6396353	pink	tuff	lithic fragment	13x10x9	
Wambo Site 486	124	306200	6396353	orange	tuff	flake - medial - utilised	22x18x12	fracturing and crushing along one lateral margin from use
Wambo Site 486	125	306200	6396353	white	quartz	flake - distal	21x11x7	
Wambo Site 486	126	306198	6396352	grey	quartzite	flake	38x33x17	
Wambo Site 486	127	306198	6396352	yellow/red	tuff	flake - utilised	23x23x7	overhang removal; bevelling along the distal margin from use
Wambo Site 486	128	306198	6396352	white	quartz	flake	26x16x7	waterworn cortex on 30% of surfaces
Wambo Site 486	129	306198	6396350	grey	quartz	flake	32x17x6	
Wambo Site 486	130	306198	6396350	white	quartz	flake	18x17x8	
Wambo Site 486	131	306198	6396350	brown	tuff	flake	28x23x6	
Wambo Site 486	132	306198	6396350	red	silcrete	flake	23x17x5	
Wambo Site 486	133	306198	6396350	red	tuff	flake - distal	17x11x5	
Wambo Site 486	134	306198	6396350	pink	silcrete	core	30x25x12	
Wambo Site 486	135	306206	6396350	orange	tuff	flake - longitudinal	41x18x7	
Wambo Site 486	136	306206	6396350	orange	tuff	flake - utilised	20x17x3	bevelling around the lateral and distal margins from use
Wambo Site 486	137	306206	6396350	orange	tuff	flake - medial	15x8x3	
Wambo Site 486	138	306206	6396350	cream	silcrete	flake - distal	26x14x6	
Wambo Site 486	139	306204	6396352	red/orange	tuff	flake	22x13x6	on road; start of lot of blue metal dumped
Wambo Site 486	140	306204	6396352	orange	tuff	flake - distal	14x10x3	
Wambo Site 486	141	306214	6396330	brown/pink	tuff	core	30x23x13	
Wambo Site 486	142	306214	6396330	orange	tuff	core	31x17x12	
Wambo Site 486	143	306214	6396330	yellow/orange	tuff	flake - proximal	23x21x8	
Wambo Site 486	144	306214	6396330	white/grey	tuff	core	21x15x8	
Wambo Site 486	145	306218	6396326	red	tuff	flake - distal	18x12x4	
Wambo Site 486	146	306218	6396326	yellow	tuff	flake - medial	12x9x4	
Wambo Site 486	147	306224	6396323	yellow/pink	tuff	flake	38x33x13	end of blue metal
Wambo Site 486	148	306224	6396323	orange	tuff	core	25x16x11	
Wambo Site 486	149	306224	6396323	yellow	tuff	flake - proximal	13x7x4	
Wambo Site 486	150	306224	6396323	yellow	tuff	flake - proximal	17x9x6	
Wambo Site 486	151	306224	6396320	pink	silcrete	flake - proximal	27x15x5	
Wambo Site 486	152	306226	6396317	brown/pink	silcrete	lithic fragment	25x23x14	
Wambo Site 486	153	306226	6396317	brown/pink	silcrete	lithic fragment	28x14x13	waterworn cortex on 30% of surfaces
Wambo Site 486	154	306226	6396317	pink	silcrete	microblade - distal - utilised	30x14x6	edge fracturing on lateral right margin from use
Wambo Site 486	155	306226	6396317	pink	silcrete	flake - medial	14x10x3	
Wambo Site 486	156	306226	6396317	pink	silcrete	flake - medial	17x13x3	
Wambo Site 486	157	306226	6396317	pink	silcrete	microblade - proximal	17x8x2	
Wambo Site 486	158	306226	6396317	pink	silcrete	lithic fragment	8x6x1	
Wambo Site 486	159	306226	6396317	red	silcrete	flake	12x7x3	
Wambo Site 486	160	306226	6396317	grey	tuff	microblade - distal	23x10x6	
Wambo Site 486	161	306226	6396317	grey	tuff	microblade - medial	12x7x4	
Wambo Site 486	162	306226	6396317	red	tuff	lithic fragment	12x11x6	
Wambo Site 486	163	306226	6396317	red	tuff	flake - proximal	11x8x2	

Wambo Site 486 (OEI #37-5-0788) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 486	164	306227	6396309	red	silcrete	flake - proximal	17x16x5	
Wambo Site 486	165	306226	6396303	orange	silcrete	flake - proximal	36x27x14	waterworn cortex on 10% of surfaces
Wambo Site 486	166	306226	6396303	pink/yellow	silcrete	flake - distal	15x6x5	
Wambo Site 486	167	306226	6396303	orange	tuff	core fragment	15x8x6	
Wambo Site 486	168	306226	6396303	orange	tuff	flake - distal	15x8x1	
Wambo Site 486	169	306226	6396303	red	tuff	lithic fragment	13x10x3	waterworn cortex on 40% of surfaces
Wambo Site 486	170	306226	6396303	pink	tuff	flake	15x10x7	
Wambo Site 486	171	306226	6396303	orange	tuff	core	24x13x11	
Wambo Site 486	172	306226	6396301	pink	silcrete	core	26x17x8	
Wambo Site 486	173	306226	6396301	pink	silcrete	flake - proximal - utilised	17x13x4	crushed notch on the lateral left near proximal from use
Wambo Site 486	174	306226	6396301	yellow	silcrete	flake - proximal	22x15x3	
Wambo Site 486	175	306226	6396301	grey	silcrete	lithic fragment	10x8x4	
Wambo Site 486	176	306226	6396301	pink/white	tuff	flake - distal - utilised	16x12x7	edge damage on distal from use
Wambo Site 486	177	306226	6396301	orange	tuff	flake - distal - utilised	15x12x5	edge damage on lateral right margin from use
Wambo Site 486	178	306226	6396301	orange	tuff	lithic fragment	15x13x5	
Wambo Site 486	179	306226	6396301	brown	tuff	flake - medial	20x12x6	
Wambo Site 486	180	306226	6396301	orange	tuff	retouched flake - utilised	12x7x3	fine retouch around lateral and distal margins forming a serrated edge with crushing from use
Wambo Site 486	181	306226	6396301	red	tuff	flake - distal - utilised	11x8x7	edge damage on lateral right and distal margins from use
Wambo Site 486	182	306225	6396301	pink	silcrete	core	33x25x16	
Wambo Site 486	183	306225	6396301	pink	silcrete	core	21x13x10	
Wambo Site 486	184	306225	6396301	pink	tuff	lithic fragment	23x17x13	
Wambo Site 486	185	306225	6396301	pink	tuff	flake - proximal - utilised	23x19x9	crushed notch on lateral right margin from use
Wambo Site 486	186	306225	6396301	orange	tuff	flake - proximal - utilised	25x13x6	edge damage and bevelling along the lateral right margin from use
Wambo Site 486	187	306225	6396301	red	tuff	core	26x19x8	waterworn cortex on 30% of surfaces
Wambo Site 486	188	306225	6396301	pink/yellow	tuff	lithic fragment	17x11x7	
Wambo Site 486	189	306225	6396301	brown	tuff	microblade - distal	19x5x5	
Wambo Site 486	190	306225	6396301	red/orange	tuff	microblade - proximal - utilised	12x7x3	edge damage and striations on lateral right margin from use; #190 and 191 conjoin
Wambo Site 486	191	306225	6396301	orange	tuff	microblade - medial - utilised	10x6x4	edge damage and striations on lateral right margin from use; #190 and 191 conjoin
Wambo Site 486	192	306225	6396301	orange	tuff	flake - proximal	12x7x1	
Wambo Site 486	193	306225	6396301	pink	tuff	core fragment	10x7x4	
Wambo Site 486	194	306225	6396301	pink	tuff	microblade - proximal	13x9x3	
Wambo Site 486	195	306225	6396301	brown/white	tuff	lithic fragment	12x9x6	
Wambo Site 486	196	306225	6396301	yellow	silcrete	flake - distal	14x14x5	
Wambo Site 486	197	306223	6396296	pink/grey	quartzite	retouched flake	41x23x10	retouch around each lateral and distal margin forming a jagged edge; waterworn cortex on 30% of surfaces
Wambo Site 486	198	306223	6396296	grey	silcrete	core	32x21x19	

Wambo Site 486 (OEH #37-5-0788) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 486	199	306223	6396296	grey	silcrete	flake - medial	19x14x5	
Wambo Site 486	200	306223	6396296	grey	silcrete	flake	18x13x3	
Wambo Site 486	201	306223	6396296	grey	silcrete	flake - distal	13x7x3	
Wambo Site 486	202	306223	6396296	red	silcrete	lithic fragment	15x10x9	
Wambo Site 486	203	306223	6396296	orange	tuff	core	23x17x7	
Wambo Site 486	204	306223	6396296	pink	tuff	flake - distal - utilised	19x10x8	crushing on the lateral left margin from use
Wambo Site 486	205	306223	6396296	red	tuff	flake - medial	14x9x5	
Wambo Site 486	206	306223	6396296	orange	tuff	flake	9x6x3	
Wambo Site 486	207	306223	6396296	orange	tuff	flake - medial	17x11x6	
Wambo Site 486	208	306223	6396296	yellow	tuff	flake	17x12x3	
Wambo Site 486	209	306223	6396296	yellow	tuff	flake - medial - utilised	15x14x5	beveling on one lateral margin from use
Wambo Site 486	210	306222	6396295	grey/pink	silcrete	core	48x39x30	
Wambo Site 486	211	306222	6396295	brown/grey	silcrete	core	46x45x28	
Wambo Site 486	212	306222	6396295	grey/pink	silcrete	core	33x26x16	
Wambo Site 486	213	306222	6396295	pink	silcrete	core	33x19x14	
Wambo Site 486	214	306222	6396295	pink	silcrete	flake	22x19x5	
Wambo Site 486	215	306222	6396295	pink	silcrete	lithic fragment	15x5x5	
Wambo Site 486	216	306222	6396295	grey	silcrete	flake - proximal	16x11x5	
Wambo Site 486	217	306222	6396295	grey/pink	silcrete	flake - distal	10x6x2	
Wambo Site 486	218	306222	6396295	purple	tuff	flake	26x22x10	
Wambo Site 486	219	306222	6396295	orange	tuff	core	17x17x13	
Wambo Site 486	220	306222	6396295	brown/orange	tuff	flake - distal	26x25x15	
Wambo Site 486	221	306222	6396295	orange	tuff	flake	15x8x5	
Wambo Site 486	222	306222	6396295	red	tuff	lithic fragment	22x18x10	
Wambo Site 486	223	306222	6396295	orange	tuff	core fragment	12x9x8	
Wambo Site 486	224	306222	6396295	red	tuff	bondi point - butt - utilised	10x6x4	beveling on the lateral left margin from use
Wambo Site 486	225	306222	6396295	red	tuff	lithic fragment	12x8x7	
Wambo Site 486	226	306222	6396295	brown/cream	petrified wood	core	24x15x14	
Wambo Site 486	227	306222	6396295	pink	tuff	flake - distal - utilised	11x9x3	edge damage on the distal margin from use
Wambo Site 486	228	306222	6396295	red	tuff	flake - distal	10x6x1	
Wambo Site 486	229	306222	6396295	white	quartz	flake	8x6x2	waterworn cortex on 30% of surfaces
Wambo Site 486	230	306169	6396385	pink/brown	silcrete	core	46x37x20	

Wambo Site 486 (OEH #37-5-0788) ASIRF Attachment

AHIMS #37-5-0789 (Wambo Site 487)

Kuskie (2017a):

SITE NAME: WAMBO SITE 487

Site Type: *Artefact Scatter* MGA Grid Reference: *306085:6396192*
 Date Recorded: *23/11/16* Topographic Map: *Doyles Creek 9032-I-N*
 Recorder: *Peter Kuskie*

Landform Element: *Simple Slope* Vegetation: *Cleared/Regrowth*
 Slope: *Moderate* Ground Disturbance: *Low to Moderate*
 Distance to Water: *>50*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
varies	varies	80	30	2400	40	40	960	7	0.007	probable

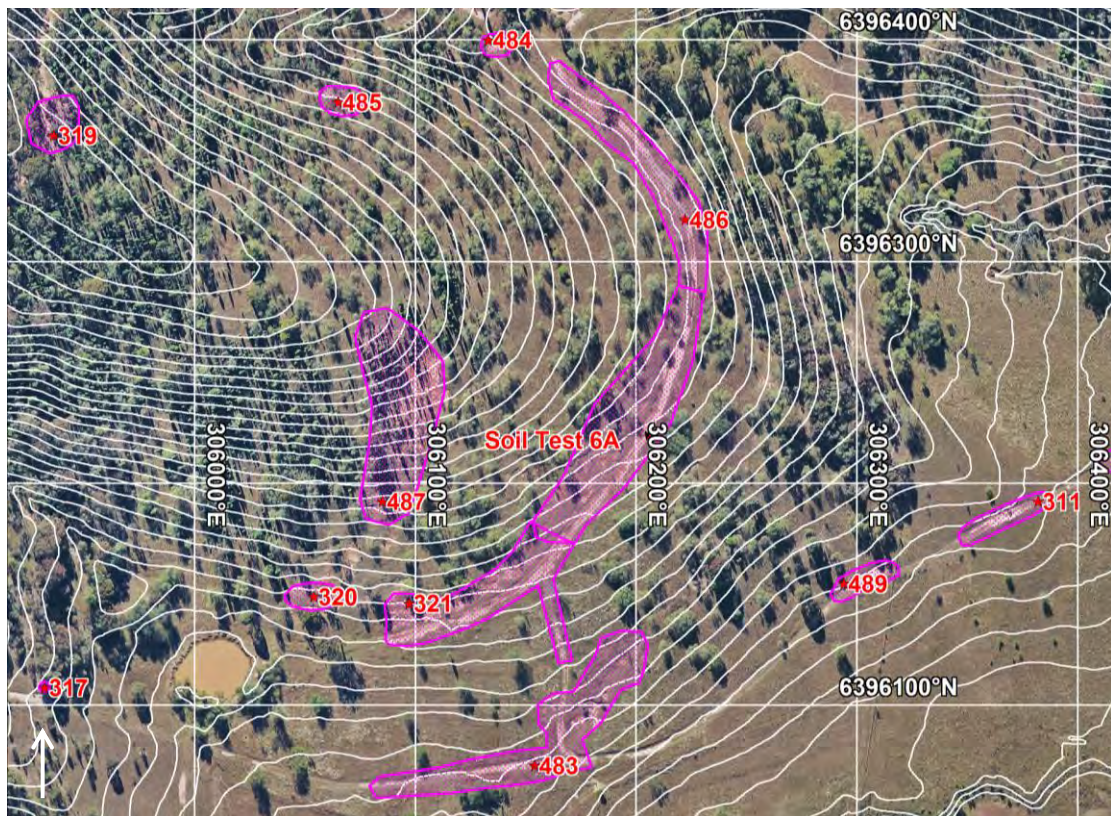
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	brown	tuff	flake - proximal	40x37x6				306085	6396192
2	cream/red	tuff	flake - longitudinal	58x38x18			at the main exposure to the north	306095	6396231
3	grey	acidic volcanic	core	89x70x44	20	ww	two flake scars and one platform	306097	6396234
4	red	silcrete	core	43x40x23			probable microblade scars and possibly heat treated; three flake scars and two platforms	306100	6396244
5	red/brown	tuff	core fragment	55x34x20				306104	6396244
6	grey	silcrete	core fragment	42x33x15	30	ww	distinct waterworn cortex	306105	6396244
7	white	quartz	lithic fragment	30x24x7	80	ww		306088	6396269

Additional Comments:

- Moderate research potential - broad spur crest that is potential pathway from North Wambo Creek to mountains;
- High potential for numerous more artefacts but only a shallow deposit;
- Grassy with small pine regrowth;
- Low to moderate ground disturbance owing to diggings, erosion and vegetation removal;
- Large yellow/gold ochre nodule at 306088:6396268 - potentially a source, but no evidence of use.

Site Location: Wambo Site 487 (100 metre MGA grid; one metre contours)



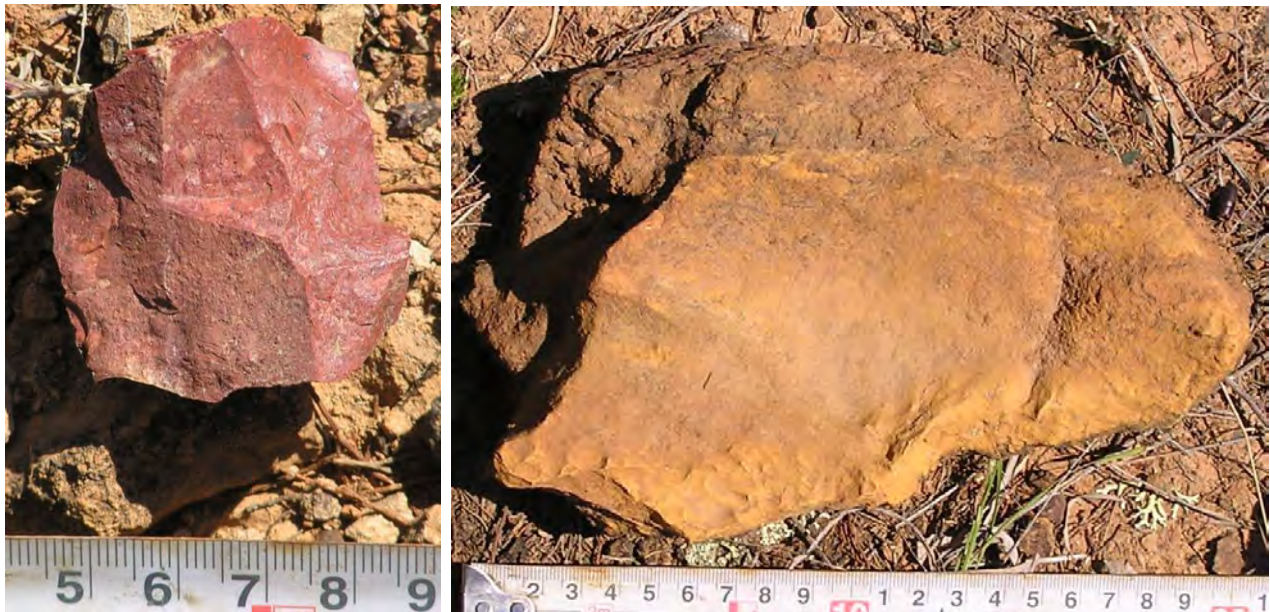
Photograph: Wambo Site 487 (view north)



Photograph: Wambo Site 487 (view north)



Photograph: Wambo Site 487 - Artefact #4 (silcrete core) and large yellow ochre nodule





Aboriginal Site Impact Recording Form

AHIMS Registrar
 PO Box 1967, Hurstville 2220 NSW
 December 2010 DECCW 2010/1022

- 1 This form must be completed following impacts to AHIMS sites that are:
 - a) an outcome of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
 - b) authorised by an Aboriginal Heritage Impact Permit (AHIP)
 - c) undertaken for the purpose of complying with environmental assessment requirements issued by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), or
 - d) authorised by a Part 3A project approval under the EP&A Act.
- 2 Completed forms must be submitted to the AHIMS Registrar (www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm).
- 3 This form is intended to complement (not replace) the AHIMS Site Recording Form. Where there is a need to provide detailed information about the nature of a site, use the AHIMS Site Recording Form.
- 4 This form does not replace the need to submit reports to DECCW (as specified by a condition of an AHIP or Part 3A approval). This form must be submitted in addition to any reports.

AHIMS site ID:

Site impact authorisation (select one)	Reference numbers, dates
<input type="checkbox"/> Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the <i>Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW</i> .)	Date DECCW was notified (under requirement 15c of the Code): <input type="text"/> DECCW Regional office notified: <input type="text"/>
<input checked="" type="checkbox"/> AHIP (The impacts to this site were authorised by an AHIP.)	AHIP number: <input type="text" value="C0003213"/> Date issued/signed: <input type="text" value="22 February 2018"/> AHIMS permit ID/number: <input type="text"/>
<input type="checkbox"/> Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)	Major project number: <input type="text"/> Date environmental assessment requirements issued: <input type="text"/>
<input type="checkbox"/> Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)	or Date of project approval: <input type="text"/>

Site status following impacts:

- Not a site (The investigations concluded that this is not a site.)
 Valid site (The investigations confirmed that this is an Aboriginal site.)
 Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)
 Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name:
 Easting: Northing: Coordinates must be in GDA (MGA)
 Map sheet:
 Zone: Location method:

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name
Mr	Kuskie	Peter
Organisation:	South East Archaeology Pty Limited	
Address:	24 Bamford Street, Hughes, ACT, 2605	
Phone:	262604439	E-mail: peter@southeastarchaeology.com.au
Date recorded:	8/5/18	Fax: 262604439

Site information

Open/closed site:

Features:

- | | | | |
|-------------------------------------|--------------------------------------|--------------------------|---|
| <input type="checkbox"/> | 1. Aboriginal ceremony and dreaming | <input type="checkbox"/> | 11. Habitation structure |
| <input type="checkbox"/> | 2. Aboriginal resource and gathering | <input type="checkbox"/> | 12. Hearth |
| <input type="checkbox"/> | 3. Art | <input type="checkbox"/> | 13. Non-human bone and organic material |
| <input checked="" type="checkbox"/> | 4. Artefact | <input type="checkbox"/> | 14. Ochre quarry |
| <input type="checkbox"/> | 5. Burial | <input type="checkbox"/> | 15. Potential archaeological deposit |
| <input type="checkbox"/> | 6. Ceremonial ring | <input type="checkbox"/> | 16. Stone quarry |
| <input type="checkbox"/> | 7. Conflict | <input type="checkbox"/> | 17. Shell |
| <input type="checkbox"/> | 8. Earth mound | <input type="checkbox"/> | 18. Stone arrangement |
| <input type="checkbox"/> | 9. Fish trap | <input type="checkbox"/> | 19. Modified tree |
| <input type="checkbox"/> | 10. Grinding groove | <input type="checkbox"/> | 20. Water hole |

Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

The salvage of Wambo Site 487 occurred in accordance with the conditions of AHIP #C0003213 and the Wambo Heritage Management Plan (HMP). Surface collection of the site was undertaken on 7 and 8 May 2018 by a suitably qualified archaeologist (Peter Kuskie of South East Archaeology) and a representative of the Registered Aboriginal Parties (RAPs) for Wambo Coal Mine, David Horton of the Wanaruah Local Aboriginal Land Council (LALC). A total of 7 artefacts were collected (refer to attachment). It is likely that the salvage retrieved all but one of the originally reported artefacts, along with one additional item.

Management recommendations

Summary of any management recommendations for the AHIMS site

No further heritage action required. However, all other provisions of the Wambo HMP and AHIP #C0003213 need to be implemented where relevant.

Post-investigation significance

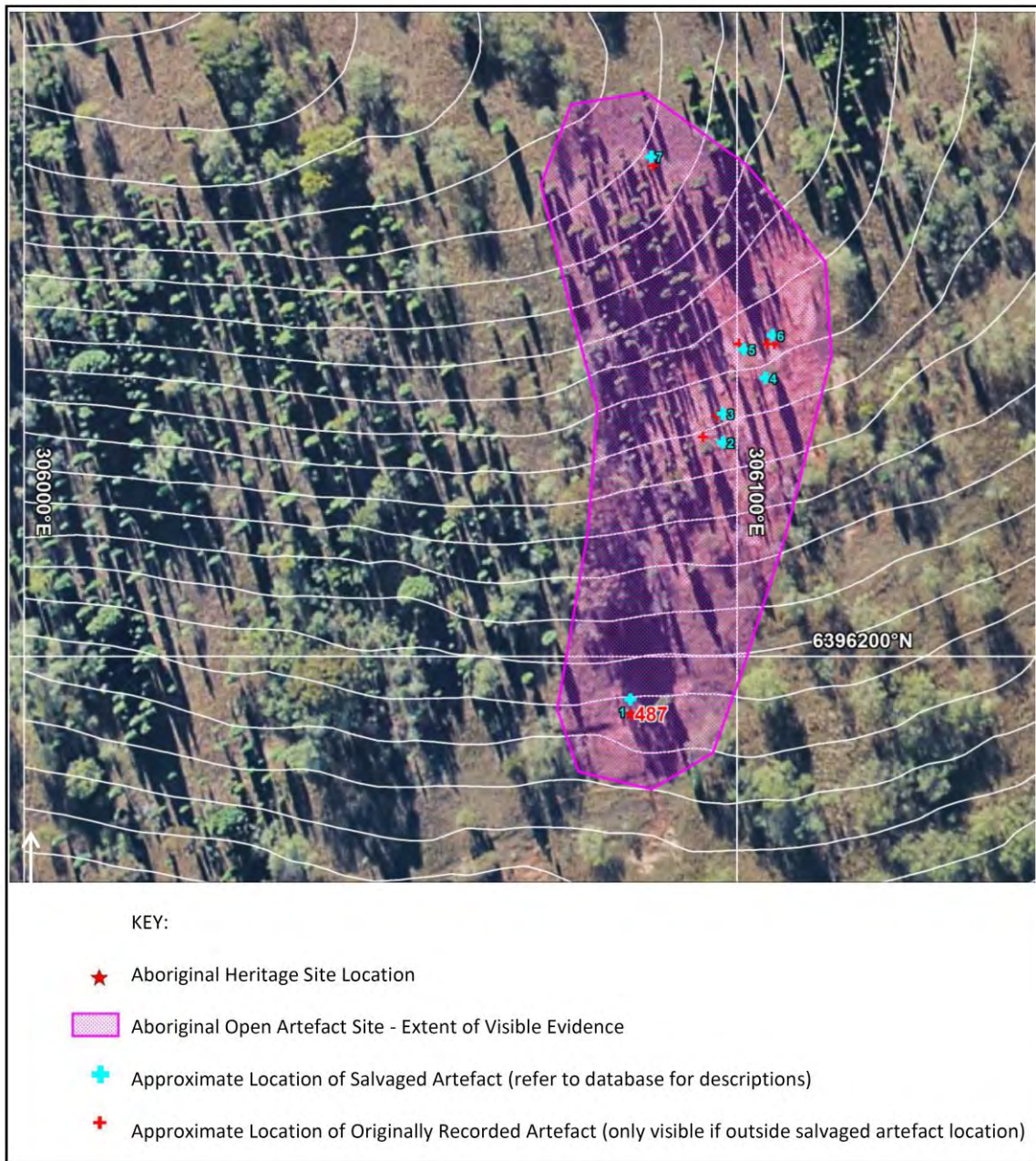
Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

Site has been totally salvaged - nil heritage significance remaining with respect to the identified heritage evidence (surface artefacts), although the probable occurrence of further artefacts obscured by vegetation and sediment and a sub-surface deposit of artefacts where the A unit soil remains present is very likely. Such potential evidence may be of low to possibly moderate significance within a local context.

Additional comments

Empty box for additional comments.

Figure: Approximate location of Wambo Site 487 salvaged artefacts and originally recorded artefacts (aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid; original artefact locations not visible unless outside of salvaged artefact locations; artefact locations approximate only).



Lithic Items Salvaged from Wambo Site 487.

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 487	1	306085	6396194	yellow	tuff	flake - proximal - utilised	33x29x7	surface collection 7/05/18; on erosion scour but severe erosion and possible future impacts; fine edge bevelling along each lateral margin from use
Wambo Site 487	2	306098	6396230	pink/grey	tuff	core	58x37x21	
Wambo Site 487	3	306098	6396234	grey	volcanic	hammerstone/anvil/core	83x76x46	medium sized cobble with pitting on a large flat and slightly concave surface from anvil use; further pitting on one end from use as a hammerstone; several large flake negatives from removals in final use as a core
Wambo Site 487	4	306104	6396239	red/brown	silcrete	flake	47x34x21	
Wambo Site 487	5	306101	6396243	red	silcrete	core	47x42x21	originally recorded #4
Wambo Site 487	6	306105	6396245	orange/brown	tuff	core	55x34x18	originally recorded #5
Wambo Site 487	7	306088	6396270	white/pink	quartz	core	32x25x8	originally recorded #7; could not relocate original #6 but all others found; waterworn cortex on 40% of surfaces

Wambo Site 487 (OEH #37-5-0789) ASIRF Attachment

AHIMS #37-5-0790 (Wambo Site 488)

Kuskie (2017a):

SITE NAME: WAMBO SITE 488

Site Type: *Artefact Scatter*
 Date Recorded: *23/11/16*
 Recorder: *Peter Kuskie*

MGA Grid Reference: *306434:6396220*
 Topographic Map: *Doyles Creek 9032-I-N*

Landform Element: *Simple Slope*
 Slope: *Gentle*
 Distance to Water: *<50*

Vegetation: *Cleared*
 Ground Disturbance: *Low to Moderate*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
20	3	20	3	60	80	80	48	20	0.417	probable

Artefact Database:

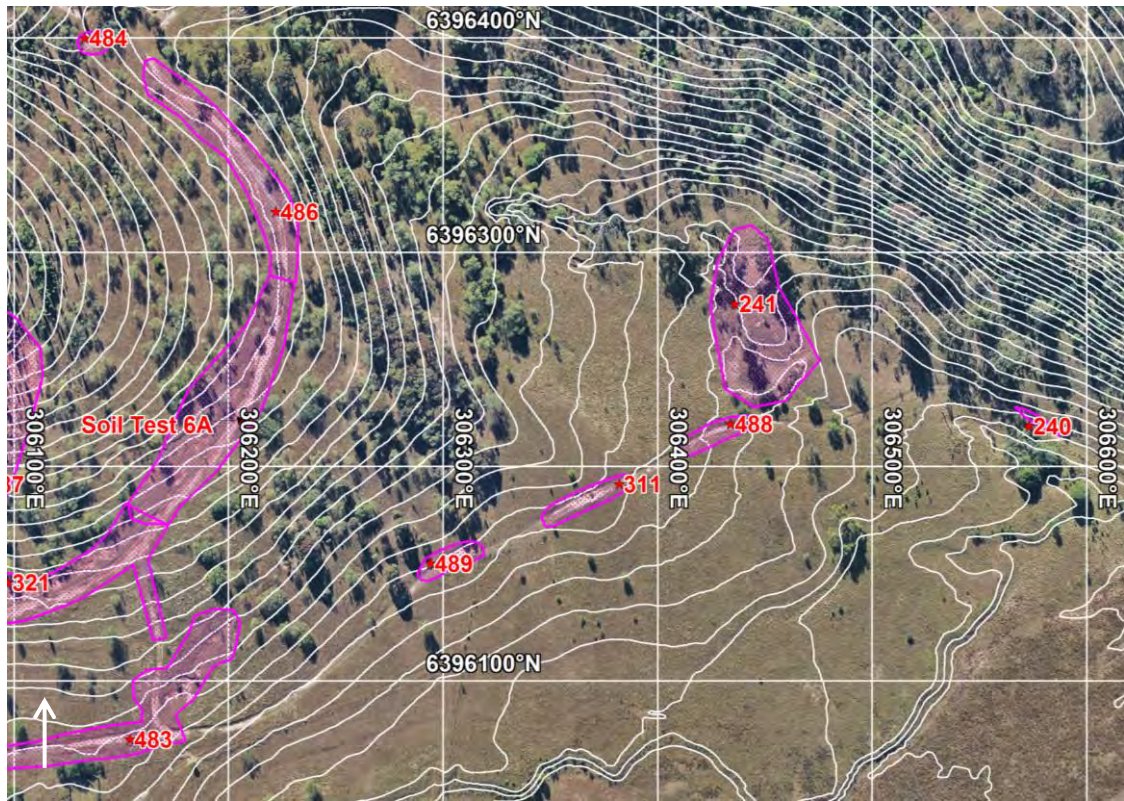
Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	pink	tuff	lithic fragment	19x13x4	10	tab	#1-6 all together; all on vehicle track at northeast end	306434	6396220
2	brown	chert	flake	35x25x10			banded material	306434	6396220
3	brown	tuff	lithic fragment	18x13x6				306434	6396220
4	yellow/red	tuff	flake - proximal - utilised	20x15x5			edge damage for 15mm on one lateral margin	306434	6396220
5	yellow	tuff	retouched flake - distal	24x17x9			concave notch present; potentially utilised	306434	6396220
6	red/pink	tuff	core	31x25x11	10	tab	three scars and one platform	306434	6396220
7	yellow/red	tuff	flake - distal	28x18x6	20	tab		306434	6396220
8	white	quartz	core	20x13x10			three scars and one platform	306434	6396220
9	brown/yellow	tuff	core	40x30x25	40	ww	>4 scars and >3 platforms	306434	6396220
10	yellow	tuff	lithic fragment	38x15x10			orange patination; four metres from #1; another artefact was nearby but buried and could not be recorded	306425	6396214

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
11	brown	tuff	retouched flake	39x35x18	20	ww	large flake used as a core; five flake scars and five platforms; use-wear/edge damage/retouch present along one margin; possibly another but could be a result of vehicle impacts	306423	6396213
12	cream	tuff	flake	45x30x10	20	ww	red cortex	306417	6396212
13	yellow	tuff	flake	23x16x8				306416	6396210
14	red/pink	tuff	microblade	36x18x6				306416	6396210
15	yellow	tuff	microblade - medial	15x14x4				306416	6396210
16	yellow/red	tuff	lithic fragment	20x11x2				306416	6396210
17	yellow	tuff	microblade - medial	20x14x3	40	tab	brown cortex	306416	6396210
18	purple	tuff	flake - proximal	20x14x4			#18-19 adjacent; good integrity despite being on the track; rare purple tuff	306416	6396210
19	purple	tuff	flake - proximal	17x13x3				306416	6396210
20	brown	tuff	flake	20x17x8				306415	6396210

Additional Comments:

- Grassy;
- Low to moderate ground disturbance from vegetation removal and use as a vehicle track;
- Low to moderate research potential - base of broad spur crest that is potential pathway from North Wambo Creek to mountains;
- Possibly part of originally recorded Wambo Site 311.

Site Location: Wambo Site 488 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 488 (view south-west)





Aboriginal Site Impact Recording Form

AHIMS Registrar
 PO Box 1967, Hurstville 2220 NSW
 December 2010 DECCW 2010/1022

- 1 This form must be completed following impacts to AHIMS sites that are:
 - a) an outcome of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
 - b) authorised by an Aboriginal Heritage Impact Permit (AHIP)
 - c) undertaken for the purpose of complying with environmental assessment requirements issued by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), or
 - d) authorised by a Part 3A project approval under the EP&A Act.
- 2 Completed forms must be submitted to the AHIMS Registrar (www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm).
- 3 This form is intended to complement (not replace) the AHIMS Site Recording Form. Where there is a need to provide detailed information about the nature of a site, use the AHIMS Site Recording Form.
- 4 This form does not replace the need to submit reports to DECCW (as specified by a condition of an AHIP or Part 3A approval). This form must be submitted in addition to any reports.

AHIMS site ID:

Site impact authorisation (select one)	Reference numbers, dates
<input type="checkbox"/> Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the <i>Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW</i> .)	Date DECCW was notified (under requirement 15c of the Code): <input type="text"/> DECCW Regional office notified: <input type="text"/>
<input checked="" type="checkbox"/> AHIP (The impacts to this site were authorised by an AHIP.)	AHIP number: <input type="text" value="C0003213"/> Date issued/signed: <input type="text" value="22 February 2018"/> AHIMS permit ID/number: <input type="text"/>
<input type="checkbox"/> Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)	Major project number: <input type="text"/> Date environmental assessment requirements issued: <input type="text"/>
<input type="checkbox"/> Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)	or Date of project approval: <input type="text"/>

Site status following impacts:

- Not a site (The investigations concluded that this is not a site.)
 Valid site (The investigations confirmed that this is an Aboriginal site.)
 Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)
 Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name:
 Easting: Northing: Coordinates must be in GDA (MGA)
 Map sheet:
 Zone: Location method:

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name
<input type="text" value="Mr"/>	<input type="text" value="Kuskie"/>	<input type="text" value="Peter"/>
Organisation:	<input type="text" value="South East Archaeology Pty Limited"/>	
Address:	<input type="text" value="24 Bamford Street, Hughes, ACT, 2605"/>	
Phone:	<input type="text" value="262604439"/>	E-mail: <input type="text" value="peter@southeastarchaeology.com.au"/>
Date recorded:	<input type="text" value="8/5/18"/>	Fax: <input type="text" value="262604439"/>

Site information

Open/closed site:

Features:

- | | | | |
|-------------------------------------|--------------------------------------|--------------------------|---|
| <input type="checkbox"/> | 1. Aboriginal ceremony and dreaming | <input type="checkbox"/> | 11. Habitation structure |
| <input type="checkbox"/> | 2. Aboriginal resource and gathering | <input type="checkbox"/> | 12. Hearth |
| <input type="checkbox"/> | 3. Art | <input type="checkbox"/> | 13. Non-human bone and organic material |
| <input checked="" type="checkbox"/> | 4. Artefact | <input type="checkbox"/> | 14. Ochre quarry |
| <input type="checkbox"/> | 5. Burial | <input type="checkbox"/> | 15. Potential archaeological deposit |
| <input type="checkbox"/> | 6. Ceremonial ring | <input type="checkbox"/> | 16. Stone quarry |
| <input type="checkbox"/> | 7. Conflict | <input type="checkbox"/> | 17. Shell |
| <input type="checkbox"/> | 8. Earth mound | <input type="checkbox"/> | 18. Stone arrangement |
| <input type="checkbox"/> | 9. Fish trap | <input type="checkbox"/> | 19. Modified tree |
| <input type="checkbox"/> | 10. Grinding groove | <input type="checkbox"/> | 20. Water hole |

Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

The salvage of Wambo Site 488 occurred in accordance with the conditions of AHIP #C0003213 and the Wambo Heritage Management Plan (HMP). Surface collection of the site was undertaken on 7 and 8 May 2018 by a suitably qualified archaeologist (Peter Kuskie of South East Archaeology) and a representative of the Registered Aboriginal Parties (RAPs) for Wambo Coal Mine, David Horton of the Wanaruah Local Aboriginal Land Council (LALC). A total of 69 artefacts were collected (refer to attachment). It is likely that the salvage retrieved most, if not all, originally reported artefacts along the vehicle track, along with a number of additional items.

Management recommendations

Summary of any management recommendations for the AHIMS site

No further heritage action required. However, all other provisions of the Wambo HMP and AHIP #C0003213 need to be implemented where relevant.

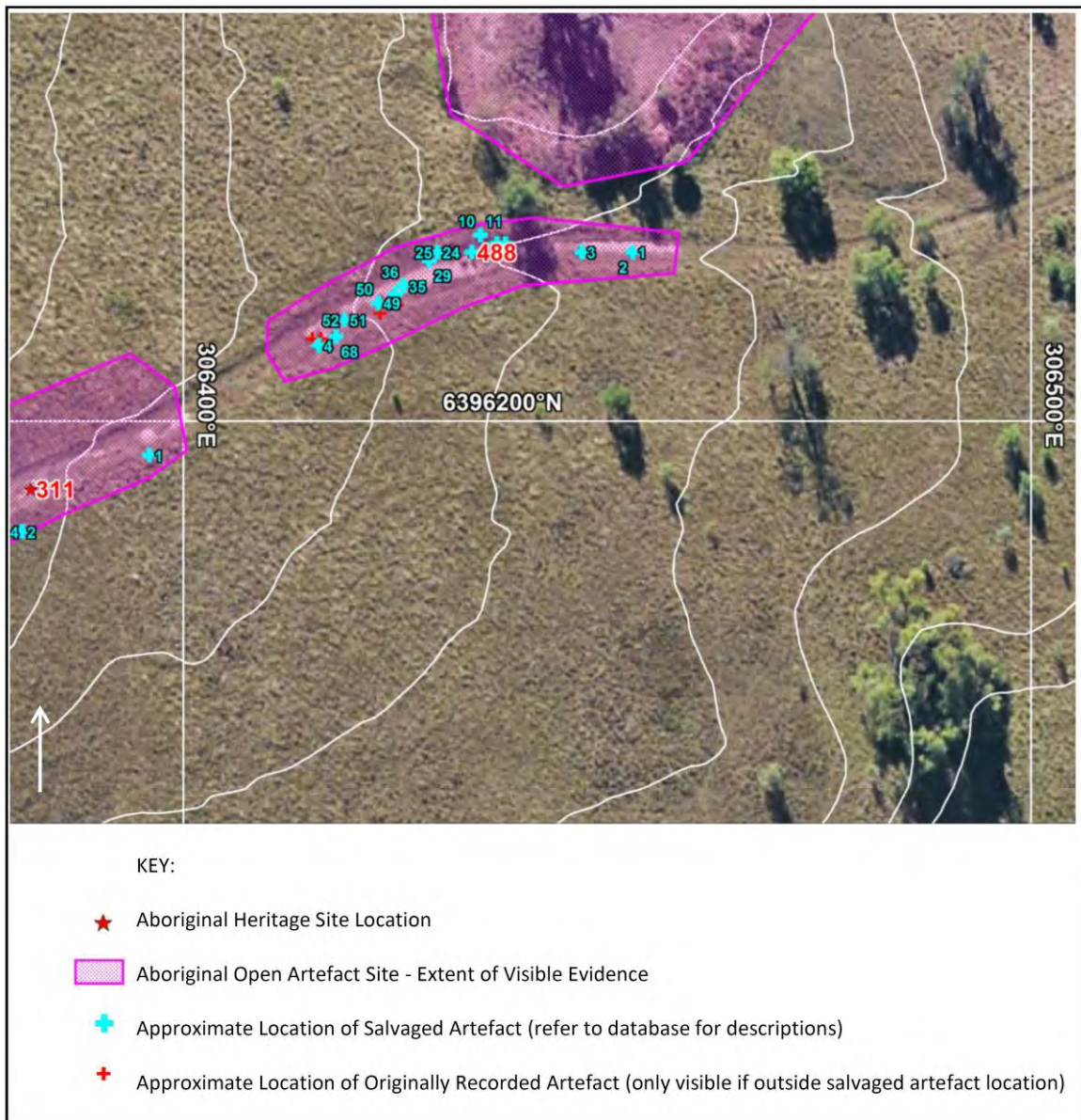
Post-investigation significance

Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

Site has been totally salvaged - nil heritage significance remaining with respect to the identified heritage evidence (surface artefacts), although the probable occurrence of further artefacts obscured by vegetation and sediment and a sub-surface deposit of artefacts where the A unit soil remains present is very likely. Such potential evidence may be of low to possibly moderate significance within a local context.

Additional comments

Figure: Approximate location of Wambo Site 488 salvaged artefacts and originally recorded artefacts (aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid; original artefact locations not visible unless outside of salvaged artefact locations; artefact locations approximate only).



Wambo Site 488 (OEH #37-5-0790) ASIRF Attachment

Lithic Items Salvaged from Wambo Site 488.

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 488	1	306453	6396220	pink/brown	silcrete	flake - proximal - utilised	32x22x6	all on track - collected 07/07/18; edge damage on lateral left margin from use
Wambo Site 488	2	306453	6396220	brown/yellow	silcrete	flake - proximal	35x16x6	
Wambo Site 488	3	306447	6396220	red	tuff	retouched flake	21x19x7	retouch around lateral and distal margins forming a dull serrated edge: "scraper"
Wambo Site 488	4	306416	6396209	brown	tuff	flake - proximal	15x14x3	
Wambo Site 488	5	306438	6396221	pink	tuff	core	23x17x8	
Wambo Site 488	6	306438	6396221	yellow/pink	tuff	flake - distal	20x10x4	
Wambo Site 488	7	306438	6396221	orange	tuff	flake - proximal	8x4x2	
Wambo Site 488	8	306437	6396221	orange	tuff	microblade - proximal	13x9x6	
Wambo Site 488	9	306437	6396221	yellow/pink	tuff	microblade - distal	15x6x3	
Wambo Site 488	10	306435	6396222	pink/orange	tuff	core	37x24x19	
Wambo Site 488	11	306435	6396222	pink/red	tuff	core	33x24x10	
Wambo Site 488	12	306435	6396222	orange	tuff	core	19x18x12	
Wambo Site 488	13	306435	6396222	orange	tuff	lithic fragment	20x13x6	
Wambo Site 488	14	306435	6396222	yellow/orange	tuff	core	12x6x4	
Wambo Site 488	15	306435	6396222	red	tuff	lithic fragment	15x9x3	
Wambo Site 488	16	306435	6396222	pink/red	tuff	flake	32x21x10	
Wambo Site 488	17	306435	6396222	pink/yellow	tuff	flake - proximal	19x15x6	
Wambo Site 488	18	306435	6396222	pink/yellow	tuff	flake	25x16x5	
Wambo Site 488	19	306435	6396222	yellow	tuff	retouched flake - distal - utilised	23x16x9	retouched notch on lateral left distal with crushing within from use; "burin"
Wambo Site 488	20	306435	6396222	white	quartz	core	19x12x10	
Wambo Site 488	21	306434	6396220	brown/yellow	tuff	core	41x27x25	
Wambo Site 488	22	306434	6396220	brown/yellow	tuff	flake - distal	39x22x10	
Wambo Site 488	23	306434	6396220	red	tuff	flake - distal	13x13x8	
Wambo Site 488	24	306430	6396220	brown	tuff	core fragment	33x28x16	waterworn cortex on 30% of surfaces
Wambo Site 488	25	306430	6396220	yellow/orange	tuff	core	38x16x10	
Wambo Site 488	26	306430	6396220	yellow	tuff	flake - distal	10x7x4	
Wambo Site 488	27	306430	6396220	yellow	tuff	core fragment	17x17x11	
Wambo Site 488	28	306430	6396220	yellow	tuff	microblade - distal	16x7x1	
Wambo Site 488	29	306429	6396219	brown	tuff	core	55x47x29	
Wambo Site 488	30	306429	6396219	brown	tuff	core	64x45x38	
Wambo Site 488	31	306429	6396219	pink	tuff	retouched flake - utilised	32x18x6	retouch on each margin forming a jagged edge with fracturing from use
Wambo Site 488	32	306429	6396219	brown	tuff	core fragment	27x20x8	coarse tuff
Wambo Site 488	33	306429	6396219	brown/yellow	tuff	flake	23x12x6	waterworn cortex on 20% of surfaces
Wambo Site 488	34	306429	6396219	orange	tuff	lithic fragment	11x8x5	
Wambo Site 488	35	306426	6396216	yellow/brown	tuff	core	38x34x13	waterworn cortex on 20% of surfaces
Wambo Site 488	36	306426	6396216	pink/red	tuff	core	28x22x20	
Wambo Site 488	37	306426	6396216	grey/blue	tuff	microblade - medial - utilised	14x8x3	crushing on one lateral margin from use
Wambo Site 488	38	306426	6396216	yellow/brown	tuff	core	17x17x9	
Wambo Site 488	39	306426	6396216	red	tuff	core	22x11x9	

Wambo Site 488 (OEH #37-5-0790) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 488	40	306426	6396216	red	tuff	lithic fragment	23x18x5	
Wambo Site 488	41	306426	6396216	red	tuff	lithic fragment	11x8x6	
Wambo Site 488	42	306426	6396216	pink	silcrete	core	39x30x21	
Wambo Site 488	43	306426	6396216	white	tuff	core	33x29x16	
Wambo Site 488	44	306425	6396215	yellow/brown	tuff	core	23x18x12	
Wambo Site 488	45	306425	6396215	red/pink	tuff	core	26x19x12	
Wambo Site 488	46	306425	6396215	brown	tuff	lithic fragment	17x12x6	
Wambo Site 488	47	306425	6396215	pink	tuff	lithic fragment	17x12x5	
Wambo Site 488	48	306425	6396215	yellow/brown	tuff	retouched flake - distal - utilised	23x14x6	retouch along distal margin forming a dull serrated edge with crushing from use
Wambo Site 488	49	306423	6396214	brown	tuff	retouched flake - proximal - utilised	95x74x42	primary flake from a cobble core owing to size and 50% waterworn cortical surface; retouch along lateral left margin forming a sharp serrated edge with fracturing and striations on the ventral and red residue; some form of hand held chopper or cleaver
Wambo Site 488	50	306423	6396214	yellow	tuff	bondi point - tip - utilised	16x6x5	crushing on lateral left near tip from use
Wambo Site 488	51	306419	6396212	pink/cream	tuff	retouched flake - utilised	45x28x11	2x2m area; large retouched notch on distal lateral right with crushing from use; "burin"; lateral left margin is also retouched forming a serrated edge with fracturing and damage from use
Wambo Site 488	52	306419	6396212	pink/orange	tuff	flake - utilised	35x17x6	2x2m area; large blade with bevelling and crushing on each lateral margin from use
Wambo Site 488	53	306419	6396212	red	tuff	retouched flake - utilised	22x20x4	2x2m area; distal edge is at a right angle to the direction of the flake with a retouched notch on each lateral margin with crushing from use; striations on the lateral right ventral from use
Wambo Site 488	54	306419	6396212	white/grey	tuff	core	33x10x9	2x2m area
Wambo Site 488	55	306419	6396212	yellow/brown	tuff	flake	26x18x4	2x2m area
Wambo Site 488	56	306419	6396212	grey/blue	tuff	flake	25x18x6	2x2m area
Wambo Site 488	57	306419	6396212	purple	tuff	flake - proximal	19x12x5	2x2m area; distinct purple colouring with orange spots
Wambo Site 488	58	306419	6396212	purple	tuff	flake - distal	17x11x3	2x2m area; distinct purple colouring with orange spots
Wambo Site 488	59	306419	6396212	grey/blue	tuff	retouched flake - distal - utilised	19x11x5	2x2m area; retouched notch on lateral right distal with crushing from use; "burin"
Wambo Site 488	60	306419	6396212	yellow	tuff	flake - proximal	31x18x8	2x2m area; silver seams running through material
Wambo Site 488	61	306419	6396212	yellow	tuff	flake - proximal	26x16x9	2x2m area
Wambo Site 488	62	306419	6396212	yellow	tuff	flake - proximal	17x14x5	2x2m area
Wambo Site 488	63	306419	6396212	yellow	tuff	flake - medial - utilised	20x13x3	2x2m area; edge damage on each lateral margin from use
Wambo Site 488	64	306419	6396212	red/yellow	tuff	flake - distal	19x10x3	2x2m area
Wambo Site 488	65	306419	6396212	orange	tuff	flake - medial	8x6x1	2x2m area
Wambo Site 488	66	306419	6396212	white	quartz	core	22x11x9	2x2m area

Wambo Site 488 (OEH #37-5-0790) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 488	67	306419	6396212	white	quartz	core	27x18x11	2x2m area
Wambo Site 488	68	306418	6396210	red	tuff	core	21x16x8	
Wambo Site 488	69	306418	6396210	grey	tuff	bondi point - utilised	26x8x3	beveling and crushing along lateral right margin from use



Plate 1: Wambo Site 488 during the surface collection on 7 May 2018 with David Horton of the Wanaruah LALC.

AHIMS #37-5-0791 (Wambo Site 489)

Kuskie (2017a):

SITE NAME: WAMBO SITE 489

Site Type: *Artefact Scatter*
 Date Recorded: *23/11/16*
 Recorder: *Peter Kuskie*

MGA Grid Reference: *306294:6396155*
 Topographic Map: *Doyles Creek 9032-I-N*

Landform Element: *Simple Slope*
 Slope: *Gentle*
 Distance to Water: *<50*

Vegetation: *Cleared*
 Ground Disturbance: *Moderate*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
20	3	20	3	60	90	80	48	6	0.125	probable

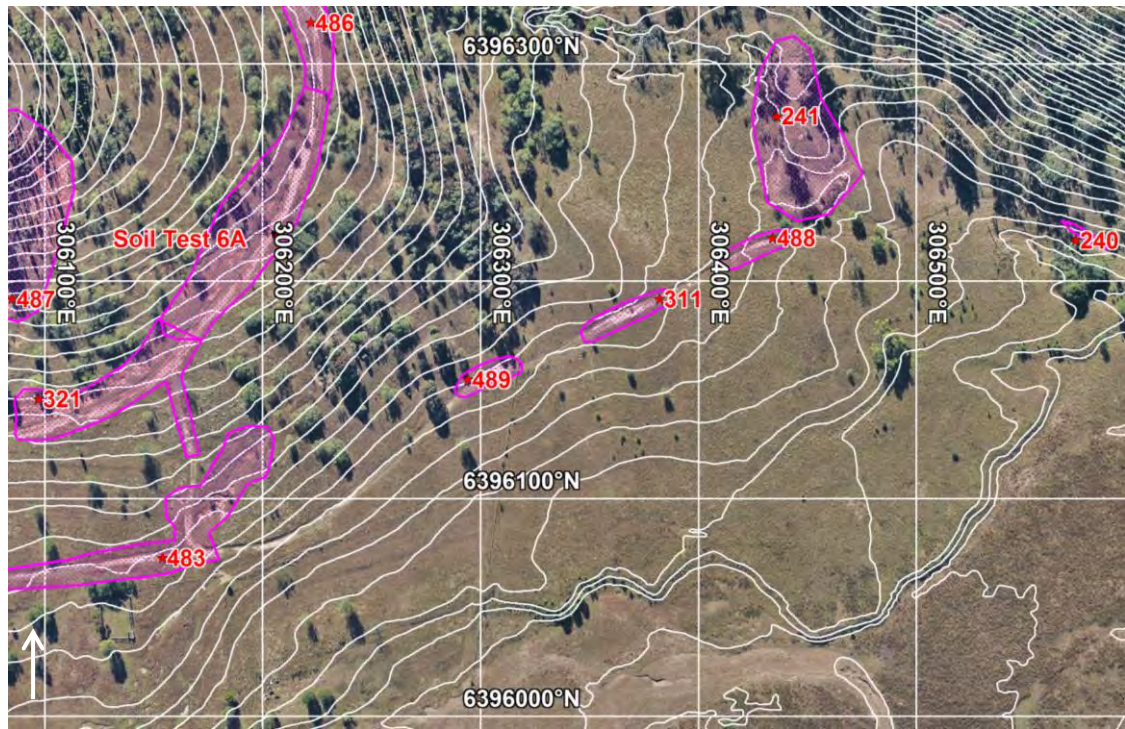
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	red	tuff	flake	14x8x4			three metres west of gate	306317	6396161
2	red	tuff	retouched piece	30x22x10			retouch present along two margins	306311	6396161
3	cream/yellow	chert	microblade core	29x20x6			one flake scar and one platform	306306	6396158
4	cream/yellow	chert	flake	39x24x10			#3-4 strongly associated and adjacent	306306	6396158
5	brown/grey	chert	flake	32x28x14			#5-6 similar, unusual materials; strongly associated and adjacent on the track	306292	6396153
6	brown/grey	chert	flake	39x28x14				306292	6396153

Additional Comments:

- Moderate research potential - base of broad spur crest that is potential pathway from North Wambo Creek to mountains;
- Along a vehicle track - moderate ground disturbance;
- Low disturbance off track.

Site Location: Wambo Site 489 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 489 (view east)
(inset - artefacts #5 and #6, chert flakes)





Aboriginal Site Impact Recording Form

AHIMS Registrar
 PO Box 1967, Hurstville 2220 NSW
 December 2010 DECCW 2010/1022

- 1 This form must be completed following impacts to AHIMS sites that are:
 - a) an outcome of test excavation carried out in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW*
 - b) authorised by an Aboriginal Heritage Impact Permit (AHIP)
 - c) undertaken for the purpose of complying with environmental assessment requirements issued by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), or
 - d) authorised by a Part 3A project approval under the EP&A Act.
- 2 Completed forms must be submitted to the AHIMS Registrar (www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm).
- 3 This form is intended to complement (not replace) the AHIMS Site Recording Form. Where there is a need to provide detailed information about the nature of a site, use the AHIMS Site Recording Form.
- 4 This form does not replace the need to submit reports to DECCW (as specified by a condition of an AHIP or Part 3A approval). This form must be submitted in addition to any reports.

AHIMS site ID:

Site impact authorisation (select one)	Reference numbers, dates
<input type="checkbox"/> Archaeological Code (The impacts to this site were the result of test excavation carried out in accordance with the <i>Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW</i> .)	Date DECCW was notified (under requirement 15c of the Code): <input type="text"/> DECCW Regional office notified: <input type="text"/>
<input checked="" type="checkbox"/> AHIP (The impacts to this site were authorised by an AHIP.)	AHIP number: <input type="text" value="C0003213"/> Date issued/signed: <input type="text" value="22 February 2018"/> AHIMS permit ID/number: <input type="text"/>
<input type="checkbox"/> Part 3A application (The impacts to this site were undertaken for the purposes of complying with Part 3A environmental assessment requirements issued by the Department of Planning.)	Major project number: <input type="text"/> Date environmental assessment requirements issued: <input type="text"/>
<input type="checkbox"/> Part 3A approved project (The impacts to this site were authorised by a project approval under Part 3A of the EP&A Act.)	or Date of project approval: <input type="text"/>

Site status following impacts:

Not a site (The investigations concluded that this is not a site.)
 Valid site (The investigations confirmed that this is an Aboriginal site.)
 Partially destroyed (The site was partially destroyed following authorised impacts; a portion of the site remains in situ.)
 Destroyed (The site was completely destroyed following authorised impacts.)

Geographic location

Site name:

Easting: Northing: Coordinates must be in GDA (MGA)

Map sheet:

Zone: Location method:

Primary recorder

(The person responsible for the completion and submission of this form)

Title	Surname	First name
<input type="text" value="Mr"/>	<input type="text" value="Kuskie"/>	<input type="text" value="Peter"/>
Organisation: <input type="text" value="South East Archaeology Pty Limited"/>		
Address: <input type="text" value="24 Bamford Street, Hughes, ACT, 2605"/>		
Phone: <input type="text" value="262604439"/>	E-mail: <input type="text" value="peter@southeastarchaeology.com.au"/>	
Date recorded: <input type="text" value="8/5/18"/>	Fax: <input type="text" value="262604439"/>	

Site information

Open/closed site:

Features:

- | | | | |
|-------------------------------------|--------------------------------------|--------------------------|---|
| <input type="checkbox"/> | 1. Aboriginal ceremony and dreaming | <input type="checkbox"/> | 11. Habitation structure |
| <input type="checkbox"/> | 2. Aboriginal resource and gathering | <input type="checkbox"/> | 12. Hearth |
| <input type="checkbox"/> | 3. Art | <input type="checkbox"/> | 13. Non-human bone and organic material |
| <input checked="" type="checkbox"/> | 4. Artefact | <input type="checkbox"/> | 14. Ochre quarry |
| <input type="checkbox"/> | 5. Burial | <input type="checkbox"/> | 15. Potential archaeological deposit |
| <input type="checkbox"/> | 6. Ceremonial ring | <input type="checkbox"/> | 16. Stone quarry |
| <input type="checkbox"/> | 7. Conflict | <input type="checkbox"/> | 17. Shell |
| <input type="checkbox"/> | 8. Earth mound | <input type="checkbox"/> | 18. Stone arrangement |
| <input type="checkbox"/> | 9. Fish trap | <input type="checkbox"/> | 19. Modified tree |
| <input type="checkbox"/> | 10. Grinding groove | <input type="checkbox"/> | 20. Water hole |

Site condition

Written description of the condition of the AHIMS site (including relevant features) following the authorised impact of the site

The salvage of Wambo Site 489 occurred in accordance with the conditions of AHIP #C0003213 and the Wambo Heritage Management Plan (HMP). Surface collection of the site was undertaken on 7 and 8 May 2018 by a suitably qualified archaeologist (Peter Kuskie of South East Archaeology) and a representative of the Registered Aboriginal Parties (RAPs) for Wambo Coal Mine, David Horton of the Wanaruah Local Aboriginal Land Council (LALC). A total of 49 artefacts were collected (refer to attachment). It is likely that the salvage retrieved most, if not all, originally reported artefacts along the vehicle track, along with a number of additional items.

Management recommendations

Summary of any management recommendations for the AHIMS site

No further heritage action required. However, all other provisions of the Wambo HMP and AHIP #C0003213 need to be implemented where relevant.

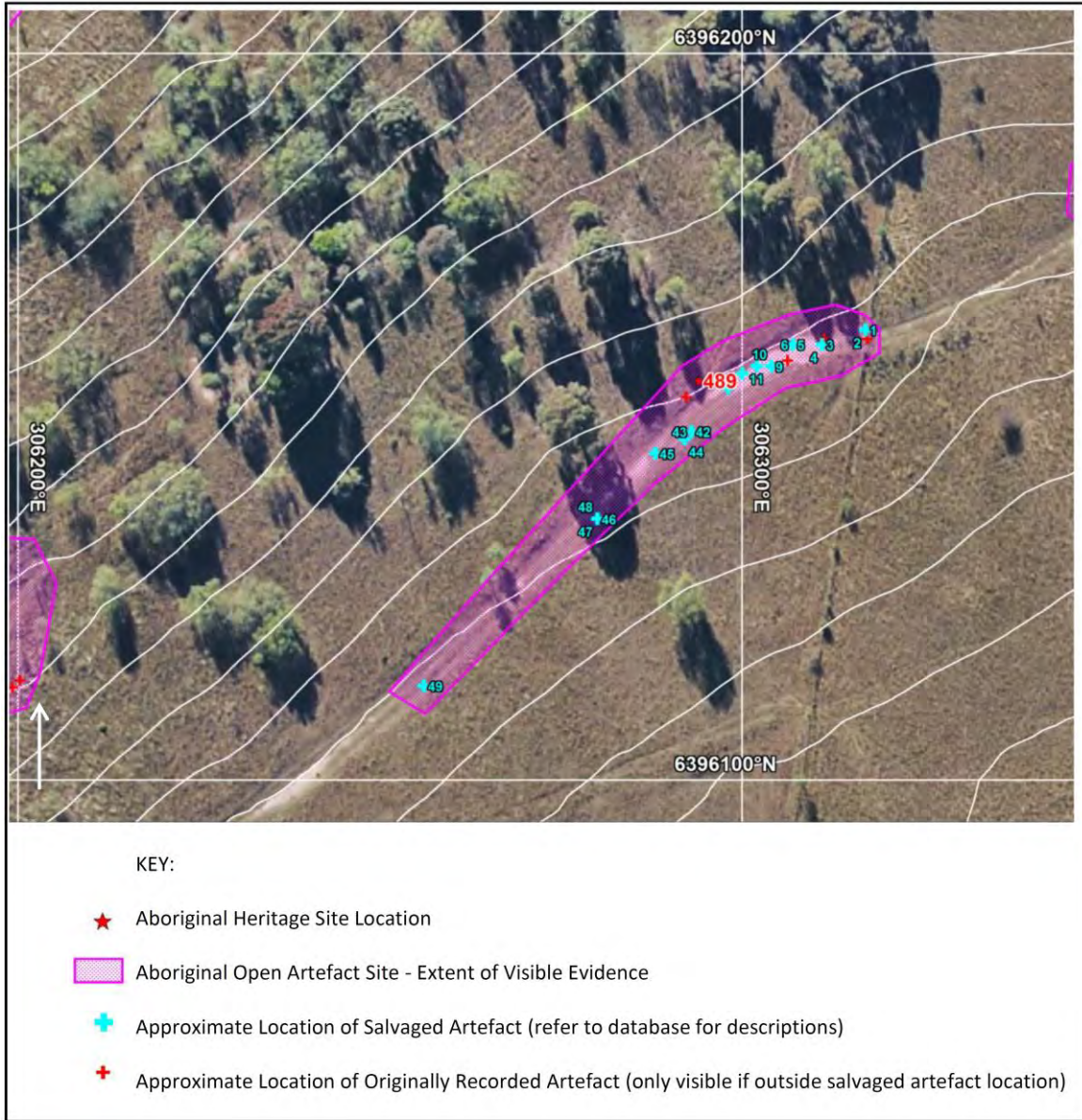
Post-investigation significance

Discuss if the scientific/archaeological or cultural significance of the site has changed in light of the results of the investigations or works conducted at the site.

Site has been totally salvaged - nil heritage significance remaining with respect to the identified heritage evidence (surface artefacts), although the probable occurrence of further artefacts obscured by vegetation and sediment and a sub-surface deposit of artefacts where the A unit soil remains present is very likely. Such potential evidence may be of low to possibly moderate significance within a local context.

Additional comments

Figure: Approximate location of Wambo Site 489 salvaged artefacts and originally recorded artefacts (aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid; original artefact locations not visible unless outside of salvaged artefact locations; artefact locations approximate only).



Lithic Items Salvaged from Wambo Site 489.

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 489	1	306317	6396162	pink	tuff	flake - proximal	30x16x4	all on road next to gate
Wambo Site 489	2	306317	6396162	pink	tuff	flake - distal	21x8x5	
Wambo Site 489	3	306311	6396160	pink	tuff	core	31x23x11	
Wambo Site 489	4	306311	6396160	cream	tuff	flake - longitudinal	20x12x6	
Wambo Site 489	5	306307	6396160	grey	tuff	flake - distal	25x23x11	
Wambo Site 489	6	306307	6396160	brown	tuff	microblade - proximal	17x12x3	
Wambo Site 489	7	306307	6396160	grey	tuff	flake - distal	10x10x3	
Wambo Site 489	8	306307	6396160	cream/brown	tuff	flake - medial	13x10x3	
Wambo Site 489	9	306304	6396157	cream/brown	tuff	core	28x19x7	
Wambo Site 489	10	306304	6396157	orange/red	tuff	flake - utilised	28x18x8	crushing on distal from use
Wambo Site 489	11	306302	6396157	yellow/brown	tuff	microblade - proximal	14x10x4	
Wambo Site 489	12	306302	6396157	orange/red	tuff	flake	16x12x4	
Wambo Site 489	13	306300	6396156	red	silcrete	core	31x25x20	waterworn cortex for 10% of surfaces
Wambo Site 489	14	306300	6396156	yellow	tuff	backed artefact - proximal - utilised	25x16x8	medium sized backed artefact with damage on lateral right from use; "elouera"
Wambo Site 489	15	306300	6396156	red	silcrete	core	18x14x10	
Wambo Site 489	16	306298	6396154	brown/grey	tuff	flake - proximal	30x30x14	
Wambo Site 489	17	306298	6396154	brown/grey	tuff	core	28x25x20	
Wambo Site 489	18	306298	6396154	brown/grey	tuff	core	22x22x12	
Wambo Site 489	19	306298	6396154	brown/grey	tuff	microblade - proximal	28x14x2	
Wambo Site 489	20	306298	6396154	brown/grey	tuff	core	23x19x8	
Wambo Site 489	21	306298	6396154	grey	tuff	microblade	21x9x7	
Wambo Site 489	22	306298	6396154	grey	tuff	flake	8x8x2	
Wambo Site 489	23	306298	6396154	grey	tuff	flake - medial	7x6x2	
Wambo Site 489	24	306298	6396154	grey	tuff	flake	9x6x3	
Wambo Site 489	25	306298	6396154	grey	tuff	flake	10x10x5	
Wambo Site 489	26	306298	6396154	grey	tuff	flake - distal	8x7x4	
Wambo Site 489	27	306298	6396154	grey	tuff	flake - proximal	9x8x2	
Wambo Site 489	28	306298	6396154	grey	tuff	flake	25x16x4	
Wambo Site 489	29	306298	6396154	grey	tuff	flake	12x11x6	
Wambo Site 489	30	306298	6396154	grey	tuff	flake - proximal	13x12x3	
Wambo Site 489	31	306298	6396154	grey	tuff	microblade - medial	12x7x3	
Wambo Site 489	32	306298	6396154	grey	tuff	flake - medial	11x5x3	
Wambo Site 489	33	306298	6396154	grey	tuff	flake - proximal	10x10x2	
Wambo Site 489	34	306298	6396154	grey	tuff	flake	9x9x2	
Wambo Site 489	35	306298	6396154	grey	tuff	flake - distal	11x7x5	
Wambo Site 489	36	306298	6396154	grey	silcrete	flake	14x7x5	
Wambo Site 489	37	306298	6396154	grey	silcrete	microblade - distal	11x5x2	
Wambo Site 489	38	306298	6396154	black/red	silcrete	flake - medial	11x7x3	
Wambo Site 489	39	306298	6396154	red	tuff	flake - distal	10x8x1	
Wambo Site 489	40	306298	6396154	brown	tuff	flake - proximal	26x16x6	
Wambo Site 489	41	306298	6396154	yellow	tuff	microblade - distal	11x7x3	
Wambo Site 489	42	306293	6396148	brown/yellow	tuff	flake - utilised	33x27x9	edge damage on distal and lateral right margin from use
Wambo Site 489	43	306293	6396148	brown/yellow	tuff	microblade - utilised	16x5x3	beveling on lateral right margin from use

Wambo Site 489 (OE#37-5-0791) ASIRF Attachment

Site Name	Artefact #	MGA Easting	MGA Northing	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments
Wambo Site 489	44	306292	6396147	brown/yellow	tuff	flake - distal - utilised	27x18x8	crushing on lateral left margin from use
Wambo Site 489	45	306288	6396145	red	tuff	flake - proximal	14x10x3	
Wambo Site 489	46	306280	6396136	yellow/brown	tuff	core	30x18x16	waterworn cortex on 60% of surfaces; pebble core; #47 and 46 conjoin
Wambo Site 489	47	306280	6396136	yellow/brown	tuff	flake - distal	14x11x4	waterworn cortex on 50% of surfaces; #47 and 46 conjoin
Wambo Site 489	48	306280	6396136	pink	silcrete	flake - proximal - utilised	18x13x10	crushing on lateral left margin from use
Wambo Site 489	49	306256	6396113	cream/brown	tuff	backed artefact - proximal - utilised	20x13x5	beveling and crushing on lateral left margin from use; green stain on same margin

Wambo Site 489 (OEH #37-5-0791) ASIRF Attachment

AHIMS #37-5-0792 (Wambo Site 490)

Kuskie (2017a):

SITE NAME: WAMBO SITE 490

Site Type: *Isolated Artefact* MGA Grid Reference: *305774:6395757*
 Date Recorded: *21/11/16* Topographic Map: *Doyles Creek 9032-I-N*
 Recorder: *Birgitta Stephenson*

Landform Element: *Drainage Depression* Vegetation: *Regrowth*
 Slope: *Moderate* Ground Disturbance: *low*
 Distance to Water: *<50*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
varies	varies	1	1	1	20	2	0.02	1	50	unlikely

Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	orange/red	tuff	flake	25x25x4			potentially a retouched flake with scars on both lateral margins and distal	305774	6395757

Additional Comments:

- Artefact on a cleared vehicle track;
- Large quantity of conglomerate derived pebbles in the area;
- Low research potential.

Site Location: Wambo Site 490 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 490 (view west) (inset: artefact #1, tuff flake)



AHIMS #37-5-0793 (Wambo Site 491)

Kuskie (2017a):

SITE NAME: WAMBO SITE 491

Site Type:	<i>Isolated Artefact</i>	MGA Grid Reference:	<i>306047:6395521</i>
Date Recorded:	<i>9/11/16</i>	Topographic Map:	<i>Doyles Creek 9032-I-N</i>
Recorder:	<i>Peter Kuskie</i>		
Landform Element:	<i>Simple Slope</i>	Vegetation:	<i>Cleared/Regrowth</i>
Slope:	<i>Gentle</i>	Ground Disturbance:	<i>High</i>
Distance to Water:	<i>>50</i>		

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
50	5	1	1	1	50	50	0.5	1	2.000	unlikely

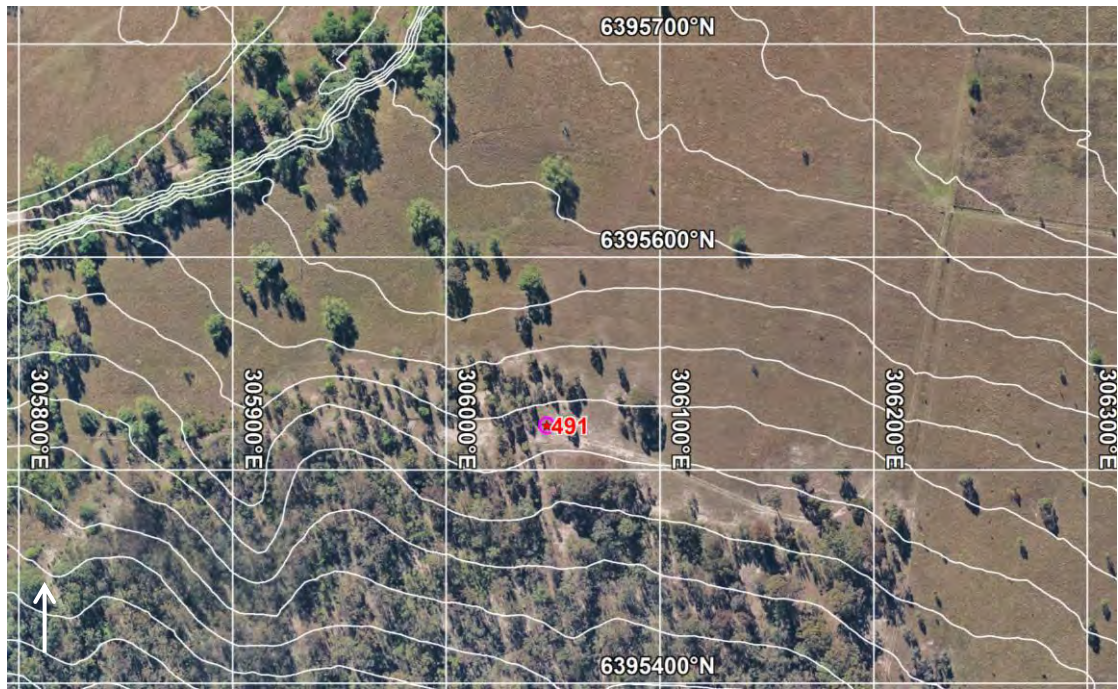
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	yellow	tuff	flake - distal	25x20x4			also longitudinally split	306047	6395521

Additional Comments:

- Low research potential;
- Exposed B unit sandy clay;
- Erosion scour and vehicle track;
- All of A unit eroded;
- Probably more artefacts present in a low density on exposures and tracks;
- High ground disturbance.

Site Location: Wambo Site 491 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 491



Wambo Site 513

Kuskie (2020a):



Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2220



Office Use Only

Site Number

Date received / / Date entered into system / / Date catalogued / /

Entered by (I.D.)

Information Access

Gender/male Gender/female Location restriction General restriction No access

For Further Information Contact:

Nominated Trustee

Title Surname First Name Initials
Organisation
Address
Phone number Fax

Knowledge Holder

Title Surname First Name Initials
Organisation
Address
Phone number Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Geographic Location

Site Name W a m b o S i t e 5 1 3

Easting 3 0 5 9 3 1 Northing 6 3 9 7 2 2 9 AGD/GDA GDA

Mapsheet D o y l e s C r e e k 9 0 3 2 - I N

Zone 56 Location Method Non-Differential GPS

Other Registration

Primary Recorder

Title M r Surname K u s k i e First Name P e t e r Initials
Organisation S o u t h E a s t A r c h a e o l o g y
Address 2 4 B a m f o r d S t , H u g h e s A C T
Phone number 0 2 6 2 6 0 4 4 3 9 Fax 0 2 6 2 6 0 4 4 3 9

Date recorded 20/1/20

Office Use Only

Client on system

Client on system

Client on system

OPEN/CLOSE SITE Open Site

Site Context

Landform

- Mountainous
- Plain
- Rolling hills
- Steep hills
- Undulating plain

Slope

>5 degrees

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek
- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope
- Upper slope
- Plain
- Ridge
- Tor
- Valley flat
- Levy
- Stream bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

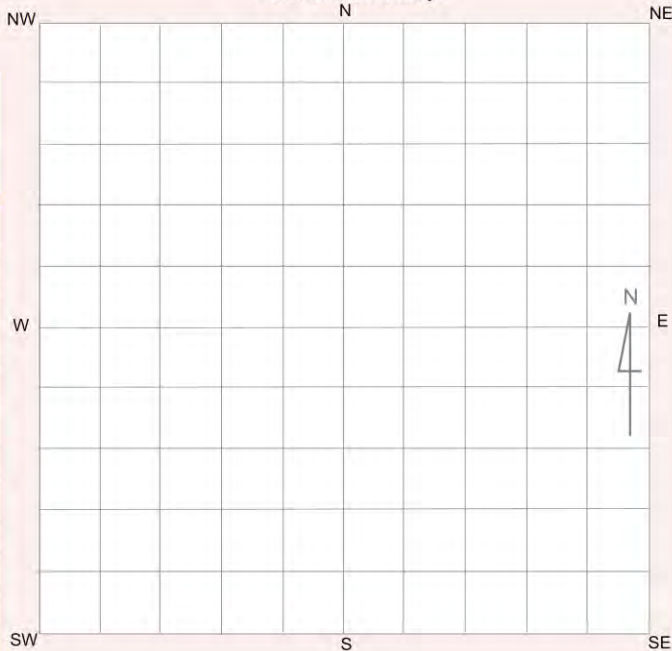
- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- N/A

Water

- Distance to permanent water source metres
- Distance to temporary water source metres
- Name of nearest permanent water source
- Name of nearest temporary water

Directions for Relocation

Site Location Map



Current Land Tenure

- Public National Park / other Government Dept.
- Private

Primary report

I.D. (I.D. Office Use only)

Kuskie, P. 2020 Wambo Coal Mine - Report on				
Aboriginal Heritage Due Diligence Survey of Drilling				
Locations in January 2020.				

General Site Information

Closed Site

Shelter/Cave Formation

- Boulder
- Wind erosion
- Water erosion
- Rock collapse

Rock Surface Condition

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

Open Site

Site Orientation

- N-S
- NE-SW
- E-W
- SE-NW
- N/A

Condition of Ceiling

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

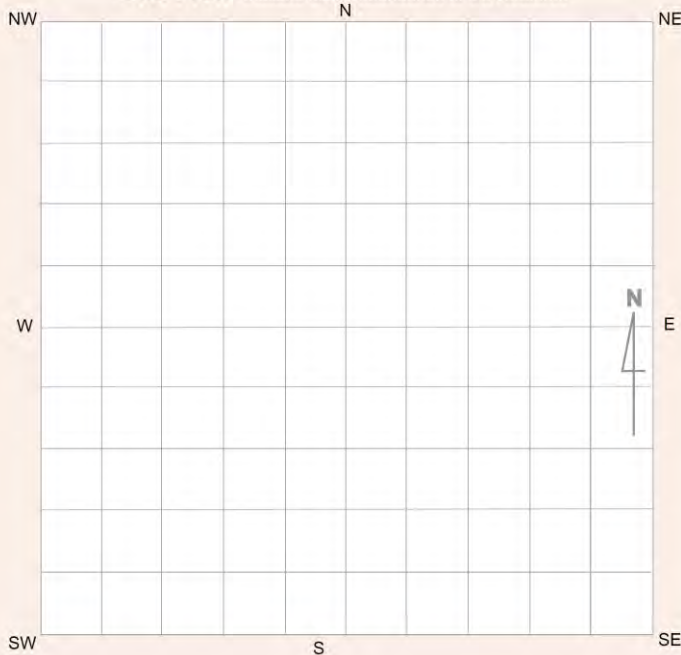
Shelter Aspect

- North
- North East
- East
- South East
- South
- South West
- West
- North West

Features

- 1. Aboriginal Ceremony & Dreaming
- 2. Aboriginal Resource & Gathering
- 3. Art
- 4. Artefact
- 5. Burial
- 6. Ceremonial Ring
- 7. Conflict
- 8. Earth Mound
- 9. Fish Trap
- 10. Grinding Groove
- 11. Habitation Structure
- 12. Hearth
- 13. Non Human Bone & Organic Material
- 14. Ochre quarry
- 15. Potential Archaeological Deposit
- 16. Stone Quarry
- 17. Shell
- 18. Stone Arrangement
- 19. Modified Tree
- 20. Water Hole

Site Plan Indicate scale, boundaries of site, features



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- Total length of visible site
- Average width of visible site
- Estimated area of visible site
- Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Avoid impacts.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus

Title	Surname	First Name	Initials
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
Organisation	<input style="width: 100%;" type="text"/>		
Address	<input style="width: 100%;" type="text"/>		
Phone number	<input style="width: 100%;" type="text"/>	Fax	<input style="width: 100%;" type="text"/>

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts-No.

Comments

Refer to attachments for photographs, location plan and detailed site description.

SITE NAME: WAMBO SITE 513

Site Type:	Artefact Scatter	MGA Grid Reference:	305931:6397229
Date Recorded:	20/1/20	Topographic Map:	Doyles Creek 9032-I-N
Recorder:	Peter Kuskie		
Landform Element:	Simple Slope	Vegetation:	Cleared/Regrowth
Slope:	Moderate	Ground Disturbance:	Low to Moderate
Distance to Water:	>50m		

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
varies	varies	13	2	26	50	50	13	2	0.154	unlikely

Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments	MGA Easting	MGA Northing
1	orange/red	tuff	flake	25x20x3		305931	6397229
2	cream pink	tuff	flake – proximal	13x16x3		305928	6397232

Additional Comments:

- Adjacent to proposed drilling location;
- Low to moderate disturbance from previous vegetation removal and erosion;
- Low research potential.

Site Location: Wambo Site 513 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 513



Wambo Site 514

Kuskie (2020d):



Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville NSW 2220



Office Use Only

Site Number

Date received / / Date entered into system / / Date catalogued / /

Entered by (I.D.)

Information Access

Gender/male Gender/female Location restriction General restriction No access

For Further Information Contact:

Nominated Trustee

Title Surname First Name Initials

Organisation

Address

Phone number Fax

Knowledge Holder

Title Surname First Name Initials

Organisation

Address

Phone number Fax

Aboriginal Heritage Unit or Cultural Heritage Division Contacts

Office Use Only

Client on system

Client on system

Geographic Location

Site Name W a m b o S i t e 5 1 4

Easting 3 0 5 7 4 4 Northing 6 3 9 7 3 3 8 AGD/GDA GDA

Mapsheet D o y l e s C r e e k 9 0 3 2 - I N

Zone 56 Location Method Non-Differential GPS

Other Registration

Primary Recorder

Title M r Surname K u s k i e First Name P e t e r Initials

Organisation S o u t h E a s t A r c h a e o l o g y

Address 2 4 B a m f o r d S t , H u g h e s A C T

Phone number 0 2 6 2 6 0 4 4 3 9 Fax 0 2 6 2 6 0 4 4 3 9

Date recorded 21/7/20

Client on system

NPWS Aboriginal Site Recording Form - Site Information

OPEN/CLOSE SITE Open Site

Site Context

Landform

- Mountainous
- Plain
- Rolling hills
- Steep hills
- Undulating plain

Landform Unit

- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek
- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope
- Upper slope
- Plain
- Ridge
- Tor
- Valley flat
- Levy
- Stream bank
- Stream channel
- Swamp
- Terrace
- Terrace flat

Slope

<5 degrees

Vegetation

- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use

- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- N/A

Water

Distance to permanent water source > 50 metres

Distance to temporary water source > 50 metres

Name of nearest permanent water source

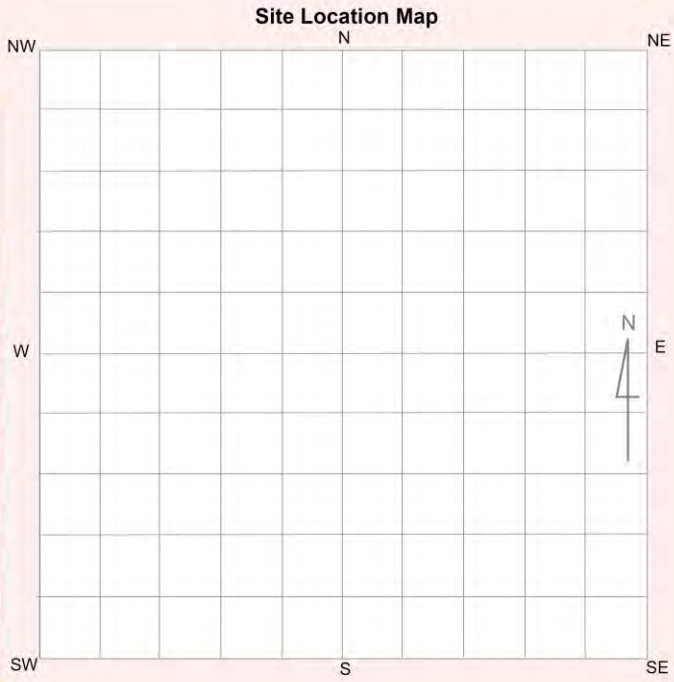
Name of nearest temporary water

Directions for Relocation
In Wambo Coal Mine Modification 18 area.

Current Land Tenure

- Public National Park / other Government Dept.
- Private

Primary report	I.D.	(I.D. Office Use only)
Kuskie, P. 2020 Wambo Coal Mine - Report on		
Aboriginal Heritage Due Diligence Survey of Soil		
Testing Locations in July 2020.		



General Site Information

Closed Site

Shelter/Cave Formation

- Boulder
- Wind erosion
- Water erosion
- Rock collapse

Rock Surface Condition

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

Open Site

Site Orientation

- N-S
- NE-SW
- E-W
- SE-NW
- N/A

Condition of Ceiling

- Boulder
- Sandstone platform
- Silica gloss
- Tessellated
- Weathered
- Other platform

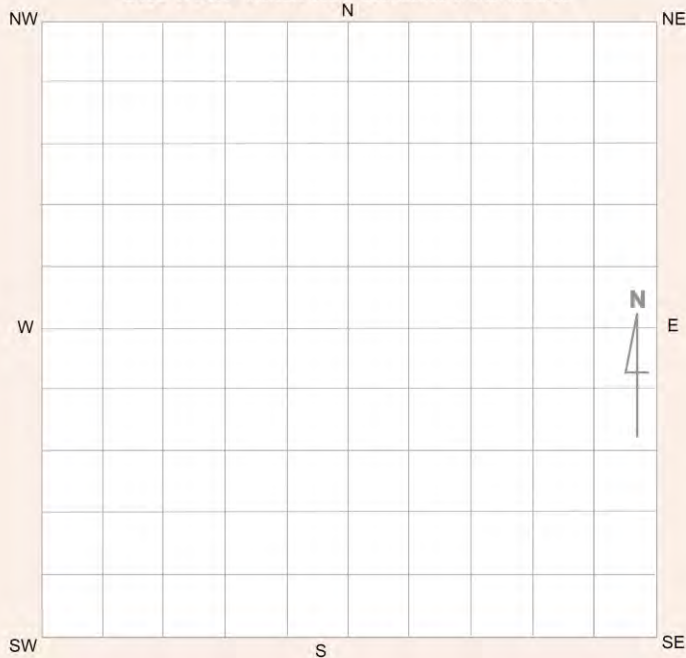
Shelter Aspect

- North
- North East
- East
- South East
- South
- South West
- West
- North West

Features

- 1. Aboriginal Ceremony & Dreaming
- 2. Aboriginal Resource & Gathering
- 3. Art
- 4. Artefact
- 5. Burial
- 6. Ceremonial Ring
- 7. Conflict
- 8. Earth Mound
- 9. Fish Trap
- 10. Grinding Groove
- 11. Habitation Structure
- 12. Hearth
- 13. Non Human Bone & Organic Material
- 14. Ochre quarry
- 15. Potential Archaeological Deposit
- 16. Stone Quarry
- 17. Shell
- 18. Stone Arrangement
- 19. Modified Tree
- 20. Water Hole

Site Plan Indicate scale, boundaries of site, features



Site Dimensions

Closed Site Dimensions (m)

- Internal length
- Internal width
- Shelter height
- Shelter floor area

Open Site Dimensions (m)

- Total length of visible site
- Average width of visible site
- Estimated area of visible site
- Length of assessed site area

Aboriginal Community Interpretation and Management Recommendations

Preliminary Site Assessment

Site Cultural & Scientific Analysis and Preliminary Management Recommendations

Avoid impacts.

This section should only be filled in by the Endorsees

Endorsed by: Knowledge Holder Nominated Trustee Native Title Holder Community Consensus

Title	Surname	First Name	Initials
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
Organisation	<input style="width: 100%;" type="text"/>		
Address	<input style="width: 100%;" type="text"/>		
Phone number	<input style="width: 100%;" type="text"/>	Fax	<input style="width: 100%;" type="text"/>

Attachments (No.)

- A4 location map
- B/W photographs
- Colour photographs
- Slides
- Aerial photographs
- Site plans, drawings
- Recording tables
- Other
- Feature inserts-No.

Comments

Refer to attachments for photographs, location plan and detailed site description.

SITE NAME: WAMBO SITE 514

Site Type:	Artefact Scatter	MGA Grid Reference:	305744:6397338
Date Recorded:	21/7/20	Topographic Map:	Doyles Creek 9032-I-N
Recorder:	Peter Kuskie		
Landform Element:	Ridge crest	Vegetation:	Cleared/regrowth
Slope:	Gentle	Ground Disturbance:	High
Distance to Water:	>50 metres		

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
50+	3	3	1	3	100	100	3	2	0.667	unlikely

Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Comments	MGA Easting	MGA Northing
1	grey	tuff	flake - distal	19 x 15 x 3	on vehicle track	305744	6397338
2	grey	tuff	flake	24 x 17 x 5	on vehicle track, 3 metres east of #1		

Additional Comments:

- Adjacent to proposed soil test pit location;
- High disturbance from previous vegetation removal and vehicle track;
- Tuff cobbles nearby;
- Low research potential.

Site Location: Wambo Site 514 (100 metre MGA grid)



Photograph: Wambo Site 514



Additional Recording LW24-26 Modification Survey February 2022:

Site Data February 2022:

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
varies	varies	20	5	100	50	40	40	2	0.050	possible

Artefacts Recorded February 2022:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	grey	tuff	flake - proximal	18x18x5				305741	6397337
2	grey	tuff	flake	22x30x10				305745	6397326

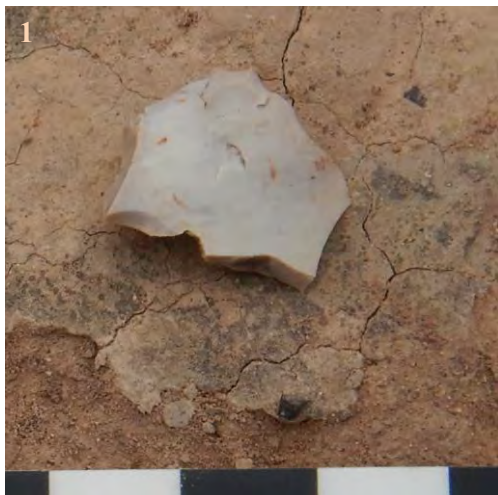
Additional Comments February 2022:

- Wambo Site 514 was previously recorded by South East Archaeology and re-recorded during the LW24-26 Modification survey with an additional two artefacts to the original two recorded;
- High disturbance from vegetation removal and vehicle track;
- Possible shallow deposit may remain off track;
- Low potential for deposit of research value.

Photograph: Wambo Site 514 February 2022:



Photographs: Wambo Site 514 artefacts #1-2, February 2022.



APPENDIX 3.

ARCHAEOLOGICAL SURVEY COVERAGE DATABASE

Key:

Vegetation: 1 = cleared/grass/crop; 2 = forest/bush/regrowth;

Land Surface: 1 = sheet erosion; 2 = gully erosion; 3 = stream bank erosion; 4 = vegetated; 5 = modified;

Detection Limiting Factors: 1 = vegetation; 2 = leaf litter/gravel; 3 = sediment deposition; 4 = other.

of artefacts: Only relates to sites and artefacts as recorded during the current survey.

SOUTH BATES EXTENSION LW24-26 MODIFICATION - ARCHAEOLOGICAL SURVEY COVERAGE DATABASE

Survey Area (LW24-26)	Landform Element	Slope	Distance to Water (metres)	Vegetation	Land Surface	Exposure Type (Horizon)	Total Sample Area (m ²)	Surface Visibility (%)	Detection Limiting Factors	Archaeological Visibility %	Ground Disturbance	Effective Survey Coverage (m ²)	# of Artefacts (open sites)	Rock Outcrop Material	Rock Outcrop Form	Extent of Rock Outcrop (%)	Artefact Density/m ² of Effective Survey Coverage	Comments	Survey Unit Area (m ²)
1	drainage depression	level - very gentle	<50	1	1, 3, 4	A	6,400	1	1, 2	1%	low - mod	64	0	sandstone	boulder	<10	-	3rd order section of Waterfall Creek on north boundary of investigation area; dense grass; track and animal tracks; moderate to high potential on small flat adjacent to stream channel for sub-surface deposits	27910
2	simple slope	moderate	<50	1, 2	1, 4	A	1,600	1	1, 2	1%	low - mod	16	0	sandstone	open surface, boulder	<10	-	adjacent to 3rd order section of Waterfall Creek on north boundary of investigation area; dense grass, few exposures; animal tracks; low sub-surface potential	4598
3	drainage depression	moderate	<50	1, 2	1, 2, 4	A/B	2,400	1-70	1, 2	1-60	low - high	214	12	sandstone	open surface, boulder, outcrop	<10	0.056	small section of 2nd order tributary of Waterfall Creek; large dam has impacted much of unit; dense grass; few exposures	6756
4	drainage depression	moderate	<50	1, 2	4	A	11,200	1-80	1, 2	1-70	low	832	17	sandstone	open surface, boulder, outcrop	<10	0.020	1st and 2nd order tributaries of Waterfall Creek; generally very dense grass, few exposures	40090
5	simple slope	moderate	<50	2	4	A	2,800	5	1, 2	2%	low	56	0	sandstone	open surface, boulder, outcrop	10-50	-	dense vegetation; several animal tracks; low potential	9372
6	simple slope	moderate	<50	1, 2	2, 4	A	14,400	1-80	1, 2	1-70	low - mod	389	4	sandstone	open surface, boulder, outcrop	<10	0.010	large exposure on hill side, otherwise dense vegetation and very low visibility; low potential for deposits of research value	41490
7	simple slope	steep	>50	1, 2	4	A	3,200	1	1, 2	1%	low	32	0	sandstone	open surface, boulder, outcrop	10-50	-	very low visibility; very low potential	16920
8	spur crest	moderate	>50	1, 2	4	A	2,400	1	1, 2	1%	low - mod	24	0	sandstone	open surface, boulder, outcrop	<10	-	dense grass; very low visibility	14290
9	ridge crest	level - very gentle	>50	1	4	A	1,400	1	1, 2	1%	low	14	0	sandstone	outcrop	<10	-	very low visibility	8163
10	simple slope	moderate	>50	1, 2	4	A	4,200	1	1, 2	1%	low	42	1	sandstone	open surface, outcrop	<10	0.024	very low visibility; low potential; open sandstone surfaces	38570
11	ridge crest	gentle	>50	1, 2	4	A	2,800	1	1, 2	1%	low	28	5	sandstone	open surface, outcrop	<10	0.179	sandstone open bedrock exposures, otherwise very dense grass and very low visibility; low potential	24500

SOUTH BATES EXTENSION LW24-26 MODIFICATION - ARCHAEOLOGICAL SURVEY COVERAGE DATABASE

Survey Area (LW24-26/)	Landform Element	Slope	Distance to Water (metres)	Vegetation	Land Surface	Exposure Type (Horizon)	Total Sample Area (m ²)	Surface Visibility (%)	Detection Limiting Factors	Archaeological Visibility %	Ground Disturbance	Effective Survey Coverage (m ²)	# of Artefacts (open sites)	Rock Outcrop Material	Rock Outcrop Form	Extent of Rock Outcrop (%)	Artefact Density/m ² of Effective Survey Coverage	Comments	Survey Unit Area (m ²)
12	simple slope	steep	<50	1, 2	4	A	488	1	1, 2	1%	low-mod	5	0	sandstone	open surface, boulder, outcrop	10-50	-	dense vegetation; few exposures; low potential	1369
13	simple slope	moderate	>50	1, 2	4	A	16,000	1	1, 2	1%	low-mod	160	0	sandstone	open surface, boulder, outcrop	<10	-	dense grass; very low visibility	86790
14	spur crest	gentle	>50	1	4	A	2,000	1	1, 2	1%	low-mod	20	0	sandstone	open surface, outcrop	<10	-	dense grass; very low visibility; artefacts possible but low potential for sub-surface deposit of value	9992
15	simple slope	moderate	<50	1, 2	1, 4	A	9,600	1	1, 2	1%	low	96	0	sandstone	open surface, boulder, outcrop	<10	-	very low visibility; dense grass	46680
16	spur crest	moderate	<50	1	4	A	2,400	1-80	1	1-80	low-mod	1,000	1	sandstone	open surface, outcrop	<10	0,001	very low visibility; dense grass; artefacts possible but low potential for sub-surface deposit of value; large erosion scour with single artefact	18380
17	drainage depression	moderate	<50	1, 2	2, 3, 4	A/B	8,000	1	1, 2	1%	mod	80	1	sandstone	boulder, outcrop	<10	0,013	dense grass, a few larger erosion scours; low potential for sub-surface deposit of research value	28440
18	spur crest	gentle	<50	1	4	A	4,800	1	1, 2	1%	low-mod	48	0	sandstone	boulder, outcrop	<10	-	dense grass, few exposures	14830
19	drainage depression	moderate	<50	1, 2	1, 3, 4	A/B	1,800	1	1, 2	1%	low-mod	18	0	sandstone	open surface, outcrop	<10	-	dense grass and vegetation; few exposures; lower gradient lower down, steeper higher up near ridge crest	35560
20	spur crest	moderate	<50	1, 2	1, 4	A	1,200	1	1, 2	1%	low-mod	12	0	sandstone	open surface, outcrop	<10	-	dense grass; very low visibility; artefacts possible but low potential for sub-surface deposit of value; small portions of crest of lesser gradient	13120
21	spur crest	moderate	<50	1	4	A	2,400	1	1, 2	1%	low-mod	24	0	sandstone	open surface, outcrop	<10	-	dense grass; very low visibility; very low potential for sub-surface deposit of value	8590
22	spur crest	moderate	<50	1, 2	4	A	4,000	2	1, 2	2%	low-mod	80	0	sandstone	open surface, outcrop	<10	-	mostly dense grass, no large exposures; artefacts possible but low potential for sub-surface deposit of value;	14390
23	spur crest	moderate	<50	1, 2	4	A	2,800	1	1, 2	1%	low-mod	28	0	sandstone	open surface, outcrop	<10	-	mostly dense grass, few exposures; low potential	16220

SOUTH BATES EXTENSION LW24-26 MODIFICATION - ARCHAEOLOGICAL SURVEY COVERAGE DATABASE

Survey Area (LW24-26/)	Landform Element	Slope	Distance to Water (metres)	Vegetation	Land Surface	Exposure Type (Horizon)	Total Sample Area (m ²)	Surface Visibility (%)	Detection Limiting Factors	Archaeological Visibility %	Ground Disturbance	Effective Survey Coverage (m ²)	# of Artefacts (open sites)	Rock Outcrop Material	Rock Outcrop Form	Extent of Rock Outcrop (%)	Artefact Density/m ² of Effective Survey Coverage	Comments	Survey Unit Area (m ²)
24	simple slope	moderate	<50	1, 2	1, 4	A	10,000	5-80	1, 2	5-80%	low	3,420	7	sandstone	open surface, boulder, outcrop	<10	0.002	mostly moderate to steeply sloping sides of main ridges and spurs adjacent to first order headwater drainages; low potential; generally dense grass and vegetation but some large erosion scours and animal exposures	103700
25	ridge crest	moderate	>50	1, 2	1, 4	A/B	2,400	10	1, 2	10%	low-mod	240	0	sandstone	outcrop	<10	-	dense grass on and off vehicle track; unit split by small section of gentle gradient with site 514	9596
26	simple slope	moderate	<50	1, 2	1, 4	A	3,600	1	1, 2	1%	low	36	0	sandstone	open surface, outcrop	<10	-	mostly dense grass, few exposures; low potential	35900
27	spur crest	moderate	<50	1, 2	1, 4	A	2,400	1	1, 2	1%	low-mod	24	0	sandstone	open surface, outcrop	<10	-	dense grass, few exposures; low potential for deposits of research value	22240
28	ridge crest	gentle	>50	1, 2	1, 4	A	3,600	30	1, 2	30%	low-mod	1,080	0	sandstone	open surface, outcrop	<10	-	major ridgeline leading into hinterland; vehicle track with exposures but very low visibility off track; artefacts probable but low potential for sub-surface deposit of value	21240
29	drainage depression	moderate	<50	2	1, 4	A	1,800	2-50	1, 2	2-40	low-mod	156	2	sandstone	open surface, outcrop	<10	0.013	dense grass and vegetation; a few small exposures; low potential	11520
30	simple slope	moderate	<50	1, 2	1, 4	A	4,800	1	1, 2	1%	low-mod	48	0	sandstone	open surface, outcrop	<10	-	dense grass and vegetation; very few exposures; low potential	30220
31	drainage depression	moderate	<50	2	3, 4	A	3,000	2	1, 2	2%	low-mod	60	0	sandstone	open surface, outcrop	<10	-	dense grass and vegetation; several erosion exposures, animal tracks and dams; low potential	37500
32	drainage depression	moderate	<50	2	4	A	800	1	1, 2	1%	low-mod	8	0	sandstone	open surface, boulder, outcrop	<10	-	dense grass and vegetation; very few exposures; low potential	16550
33	drainage depression	moderate	<50	1, 2	1, 4	A	12,000	1	1, 2	1%	low-mod	120	0	sandstone	open surface, boulder, outcrop	<10	-	first and second order headwater drainages on side of ridge; dense grass and vegetation, low visibility; low potential	71980
34	drainage depression	moderate	<50	1, 2	1, 4	A	2,400	1	1, 2	1%	low-mod	24	0	sandstone	open surface, boulder, outcrop	<10	-	first order headwater drainage on side of ridge; dense grass and vegetation, low visibility; access track; low potential	10840
35	drainage depression	moderate	<50	1, 2	1, 4	A	2,400	1	1, 2	1%	low-mod	24	0	sandstone	open surface, boulder, outcrop	<10	-	first order headwater drainage on side of ridge; dense grass and vegetation, low visibility; low potential	20130

SOUTH BATES EXTENSION LW24-26 MODIFICATION - ARCHAEOLOGICAL SURVEY COVERAGE DATABASE

Survey Area (LW24-26/)	Landform Element	Slope	Distance to Water (metres)	Vegetation	Land Surface	Exposure Type (Horizon)	Total Sample Area (m ²)	Surface Visibility (%)	Detection Limiting Factors	Archaeological Visibility %	Ground Disturbance	Effective Survey Coverage (m ²)	# of Artefacts (open sites)	Rock Outcrop Material	Rock Outcrop Form	Extent of Rock Outcrop (%)	Artefact Density/m ² of Effective Survey Coverage	Comments	Survey Unit Area (m ²)
36	simple slope	steep	<50	1, 2	1, 4	A	14,400	1	1, 2	1%	low-mod	144	0	sandstone	open surface, boulder, outcrop	<10	-	steep sideslopes of ridge; dense grass and vegetation; very little visibility apart from minor animal tracks; low potential	113400
37	drainage depression	moderate	<50	2	1, 4	A	240	1	1, 2	1%	low	2	0	sandstone	open surface, boulder, outcrop	<10	-	small section of lower order drainage; very little visibility	2765
38	spur crest	moderate	<50	2	1, 4	A	600	1	1, 2	1%	low	6	0	sandstone	boulder	<10	-	dense understorey and grass; very low visibility	9627
39	spur crest	gentle	<50	2	1, 4	A	4,000	1-40	1, 2	1-30	low-mod	360	4	sandstone	outcrop	<10	0.011	forest; several erosion scours; artefacts possible but low potential for sub-surface deposit of value	10510
40	spur crest	moderate	<50	2	4	A	800	1	1, 2	1%	low-mod	8	0	sandstone	open surface, outcrop	<10	-	dense vegetation; few exposures; low potential	5827
41	spur crest	gentle	>50	1, 2	4	A	3,000	1	1	1%	low-mod	30	0	sandstone	open surface, outcrop	<10	-	grassy, regrowth, part of main spur that may have been access corridor to and from mountains; artefacts probable in addition to Wambo Site 319 but low potential for sub-surface deposit of value	14410
42	simple slope	moderate	<50	2	4	A	5,600	1	1, 2	1%	low	56	0	sandstone	open surface, boulder, outcrop	<10	-	dense grass and vegetation; very few exposures; low potential	30150
43	spur crest	moderate	<50	2	4	A	4,800	1	1, 2	1%	low-mod	48	1	sandstone	open surface, outcrop	<10	0.021	access track but very dense grass and vegetation across unit; few exposures; artefacts possible but low potential for sub-surface deposit of value	24980
44	spur crest	moderate	<50	2	4	A	5,000	2	1, 2	2%	low	100	0	sandstone	open surface, outcrop	<10	-	dense grass and vegetation; few exposures; low potential	36690
45	spur crest	moderate	<50	2	4	A	1,250	1	1, 2	1%	low-mod	12	0	sandstone	open surface, outcrop	<10	-	dense grass and vegetation; very little visibility; low potential	12690
46	ridge crest	moderate	>50	1, 2	1, 4	A	5,200	1-90	1	1-70	low-mod	1,066	7	sandstone	open surface, boulder, outcrop	<10	0.007	almost gentle gradient in portions; some visibility along vehicle track but otherwise dense grass and vegetation; access route between mountains and North Wambo Creek; thin, skeletal A unit soil	38560
47	simple slope	moderate	<50	1, 2	4	A	6,000	1	1, 2	1%	low-mod	60	0	sandstone	open surface, boulder, outcrop	<10	-	dense grass and vegetation; few exposures; low potential	67700

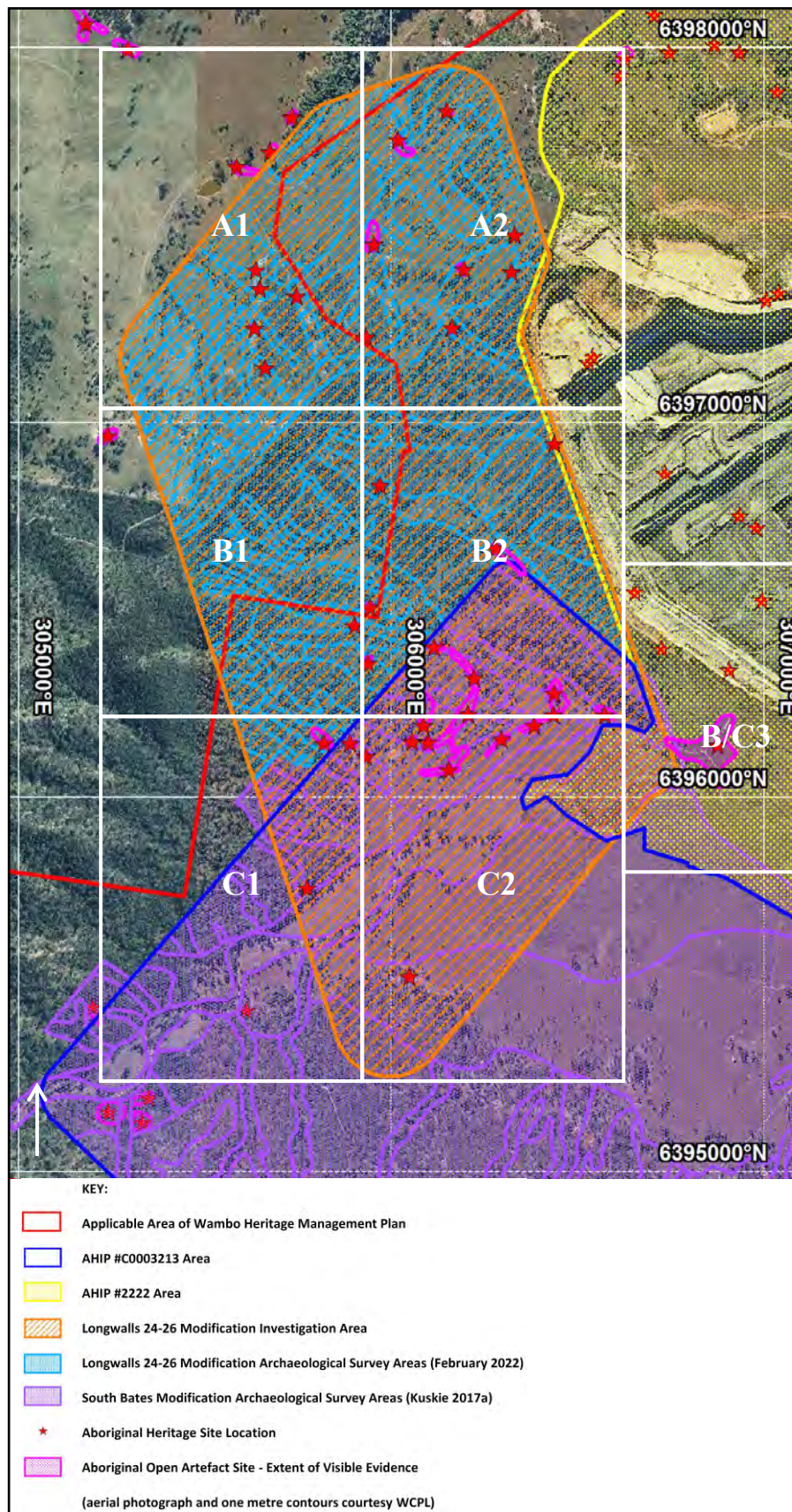
SOUTH BATES EXTENSION LW24-26 MODIFICATION - ARCHAEOLOGICAL SURVEY COVERAGE DATABASE

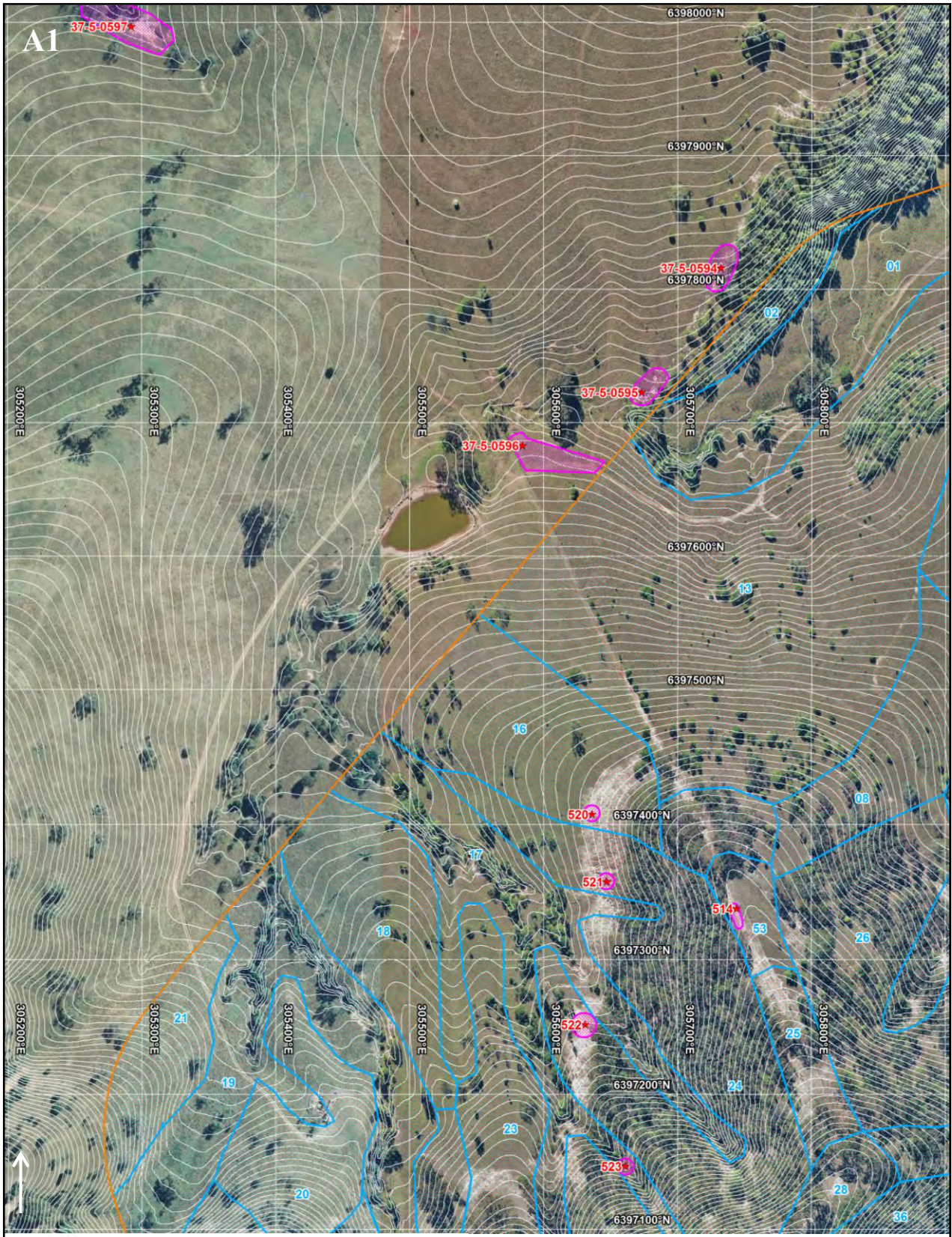
Survey Area (LW24-26/)	Landform Element	Slope	Distance to Water (metres)	Vegetation	Land Surface	Exposure Type (Horizon)	Total Sample Area (m ²)	Surface Visibility (%)	Detection Limiting Factors	Archaeological Visibility %	Ground Disturbance	Effective Survey Coverage (m ²)	# of Artefacts (open sites)	Rock Outcrop Material	Rock Outcrop Form	Extent of Rock Outcrop (%)	Artefact Density/m ² of Effective Survey Coverage	Comments	Survey Unit Area (m ²)
48	spur crest	moderate	<50	1, 2	4	A	1,800	1	1, 2	1%	low - mod	18	0	sandstone	open surface, boulder, outcrop	<10	-	dense grass and regrowth vegetation; few exposures; low potential	25800
49	simple slope	moderate	<50	1, 2	4	A	2,400	1	1, 2	1%	low - mod	24	0	sandstone	open surface, boulder, outcrop	<10	-	dense grass and vegetation; few exposures; low potential	40000
50	simple slope	moderate	<50	1, 2	4	A	8,800	1	1, 2	1%	low - mod	88	0	sandstone	open surface, outcrop	<10	-	dense grass and vegetation; few exposures; access tracks overgrown; low potential	74150
51	simple slope	moderate	<50	1, 2	1, 4	A	4,800	2	1, 2	2%	low - mod	96	0	sandstone	open surface, boulder, outcrop	<10	-	dense grass and vegetation; a few small exposures; low potential	72080
52	simple slope	moderate	<50	1, 2	1, 4	A	1,120	2	1, 2	2%	low - mod	22	0	sandstone	outcrop	<10	-	dense grass, regrowth pine; very low visibility; low potential	5645
53	ridge crest	gentle	>50	1, 2	1, 4	A/B	1,200	10	1, 2	10%	low - mod	120	2	sandstone	outcrop	<10	0.017	dense grass on and off vehicle track; unit separates sections of moderate gradient	3404
54	ridge crest	moderate	>50	1, 2	1, 4	A	600	30	1, 2	30%	low - mod	180	0	sandstone	open surface, outcrop	<10	-	major ridgeline leading into hinterland; vehicle track with exposures but very low visibility off track; artefacts probable but low potential for sub-surface deposit of value	2360
55	drainage depression	moderate	<50	1, 2	1, 4	A	1,400	1	1, 2	1%	low - mod	14	0	sandstone	open surface, boulder, outcrop	<10	-	first order headwater drainage on side of ridge; dense grass and vegetation, low visibility; low potential	13340
56	spur crest	moderate	<50	2	4	A	320	1	1, 2	1%	low - mod	3	0	sandstone	outcrop	<10	-	forest	6978

APPENDIX 4.

**DETAILED MAPPING OF
ARCHAEOLOGICAL SURVEY AREAS AND
ABORIGINAL HERITAGE SITES**

Mapping Layout (one kilometre MGA grid):

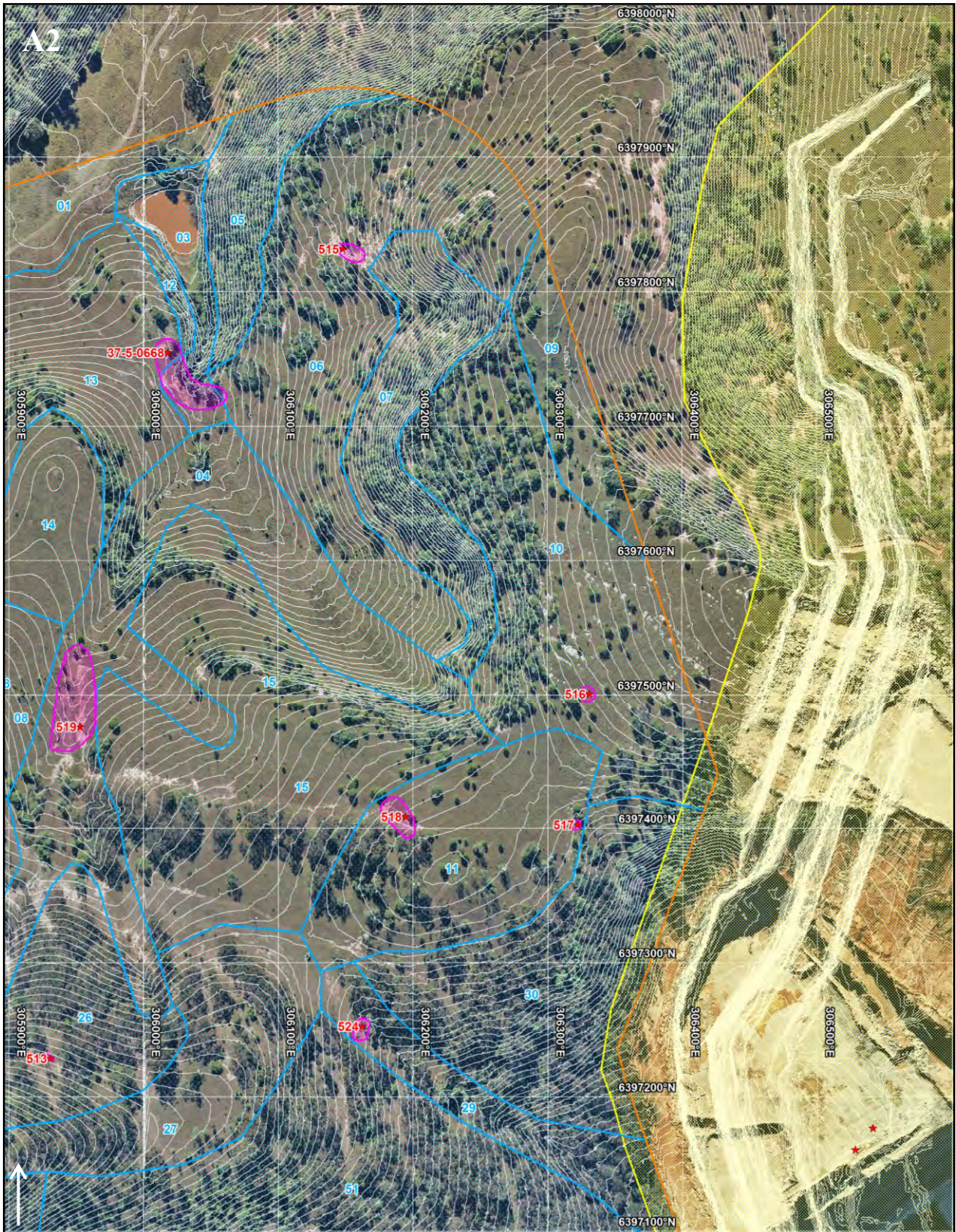






KEY:

- Longwalls 24-26 Modification Investigation Area
- Longwalls 24-26 Modification Archaeological Survey Area (February 2022)
- Aboriginal Open Artefact Site - Extent of Visible Evidence
- 515 * Aboriginal Heritage Site Location

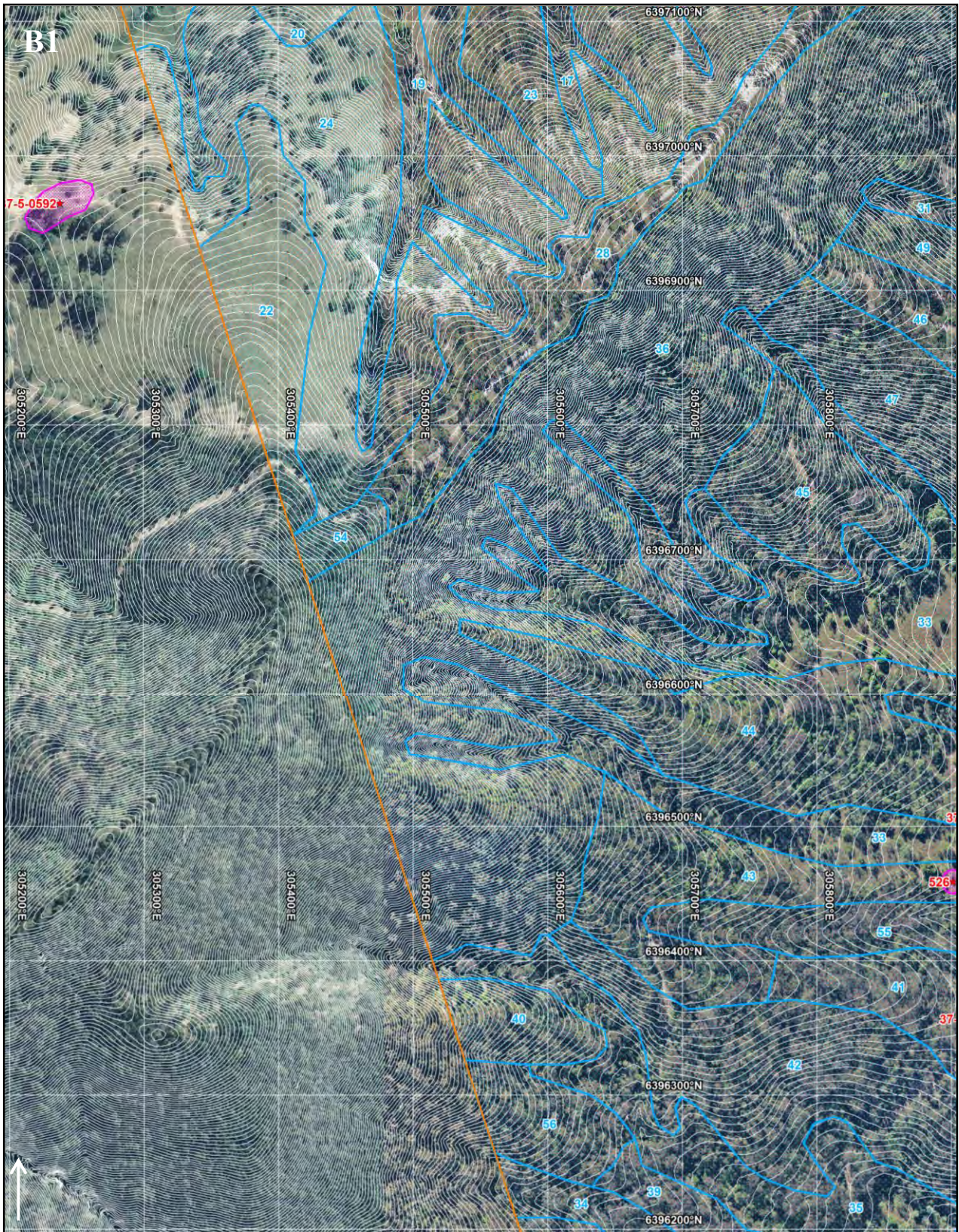
(aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid)








KEY:

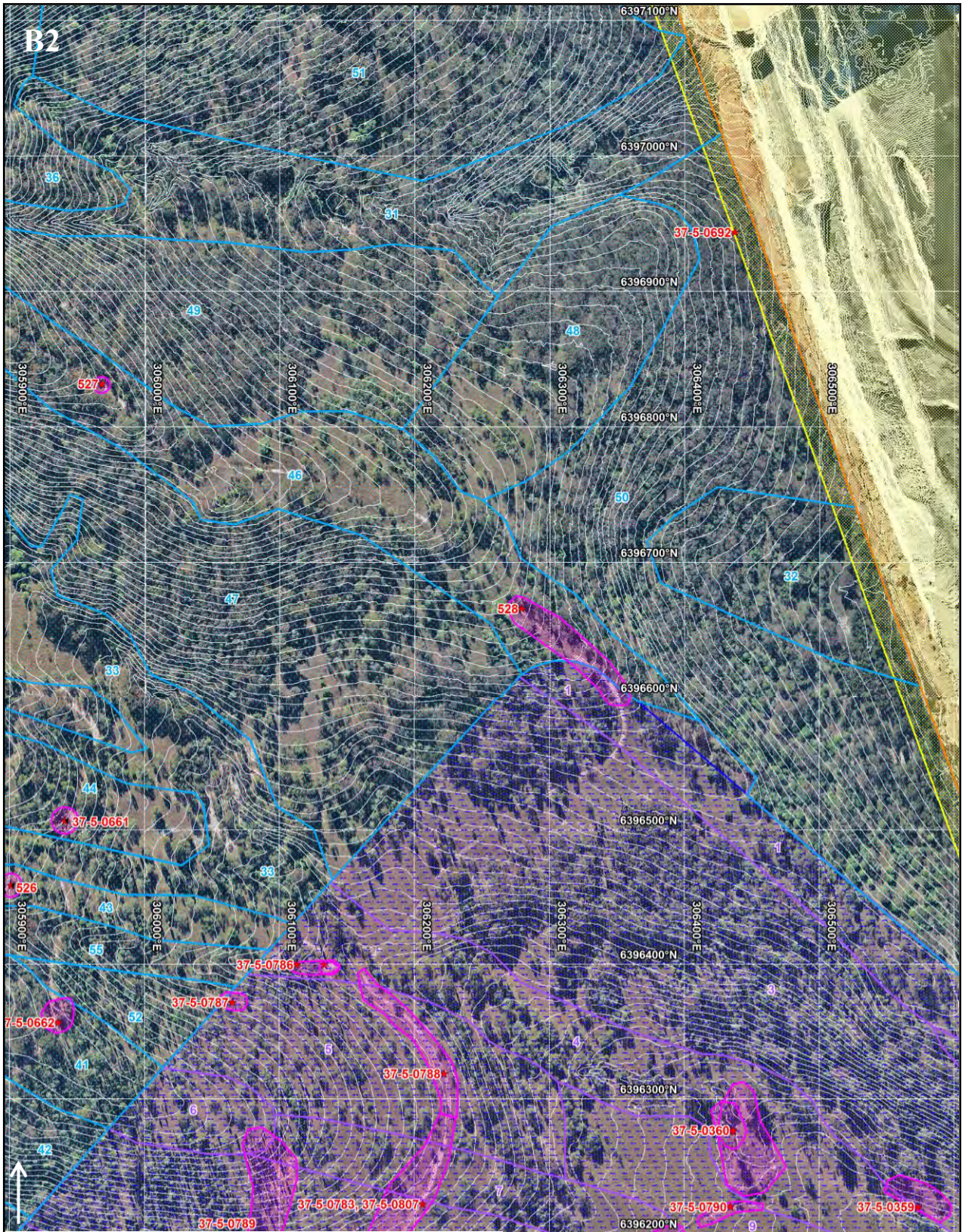
 Longwalls 24-26 Modification Investigation Area	 Aboriginal Open Artefact Site - Extent of Visible Evidence
 Longwalls 24-26 Modification Archaeological Survey Area (February 2022)	 AHIP #2222 Area
 515 * Aboriginal Heritage Site Location	

(aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid)



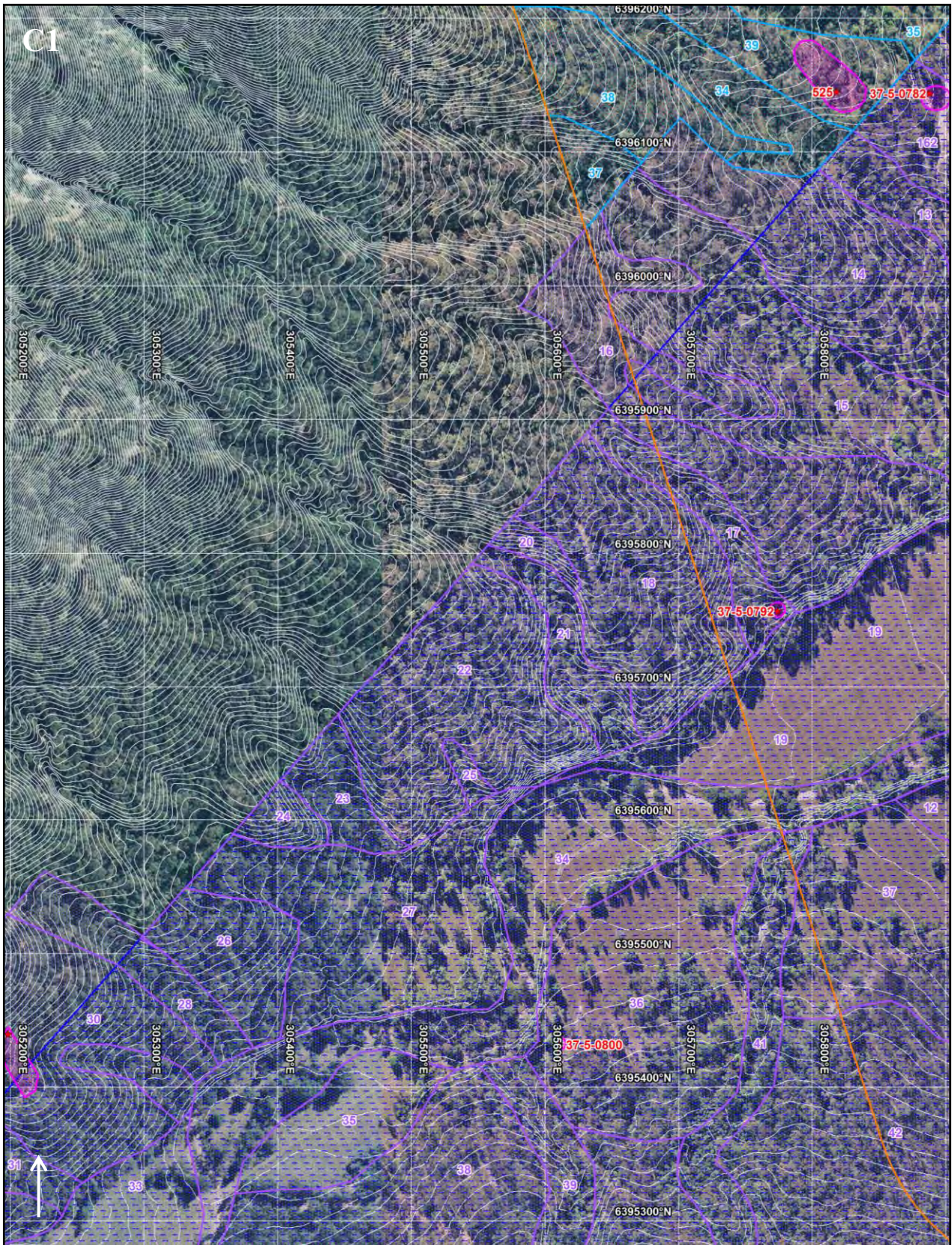
KEY:






	Longwalls 24-26 Modification Investigation Area		Longwalls 24-26 Modification Archaeological Survey Area (February 2022)		Aboriginal Open Artefact Site - Extent of Visible Evidence
	Aboriginal Heritage Site Location	 (aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid)			

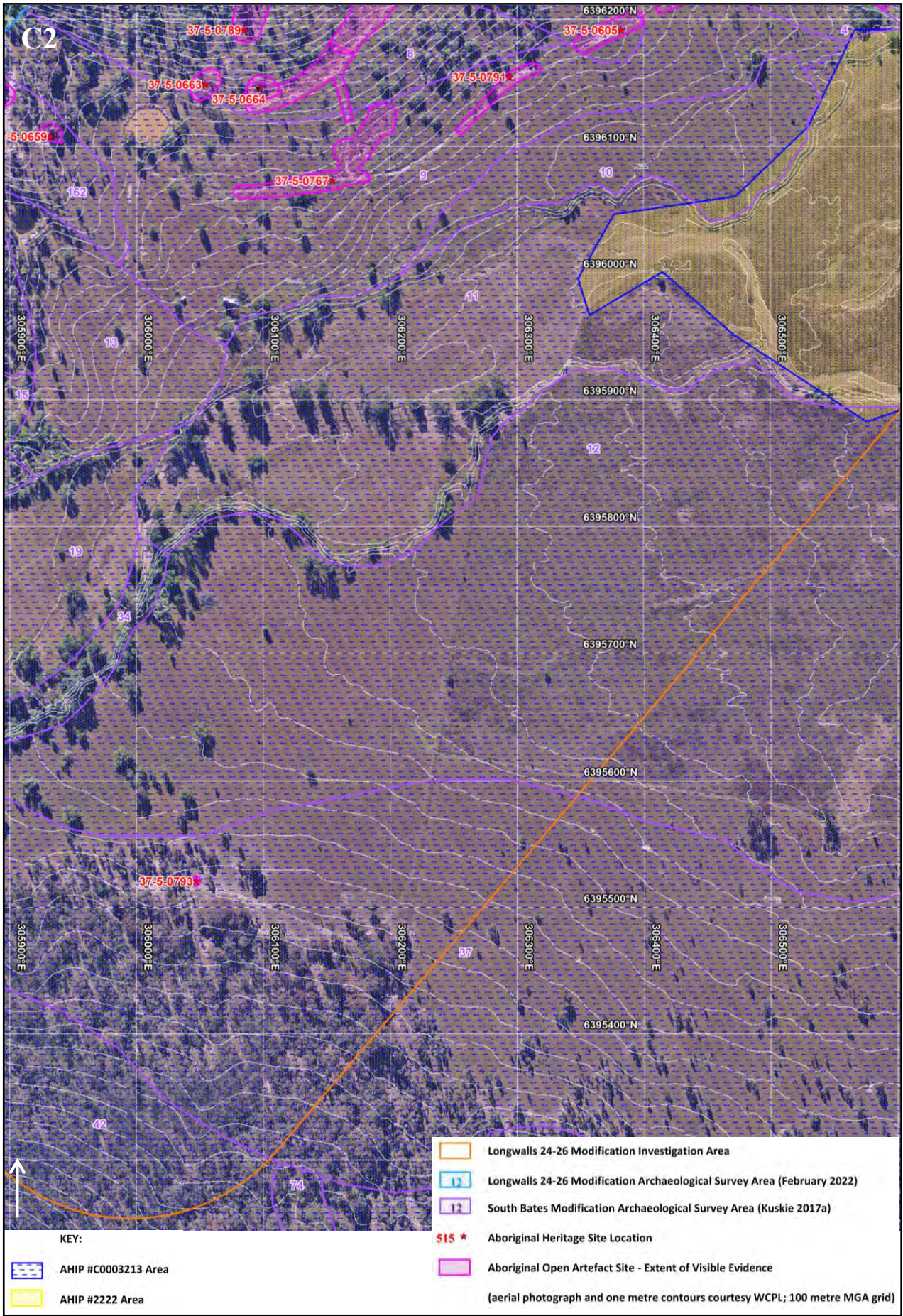


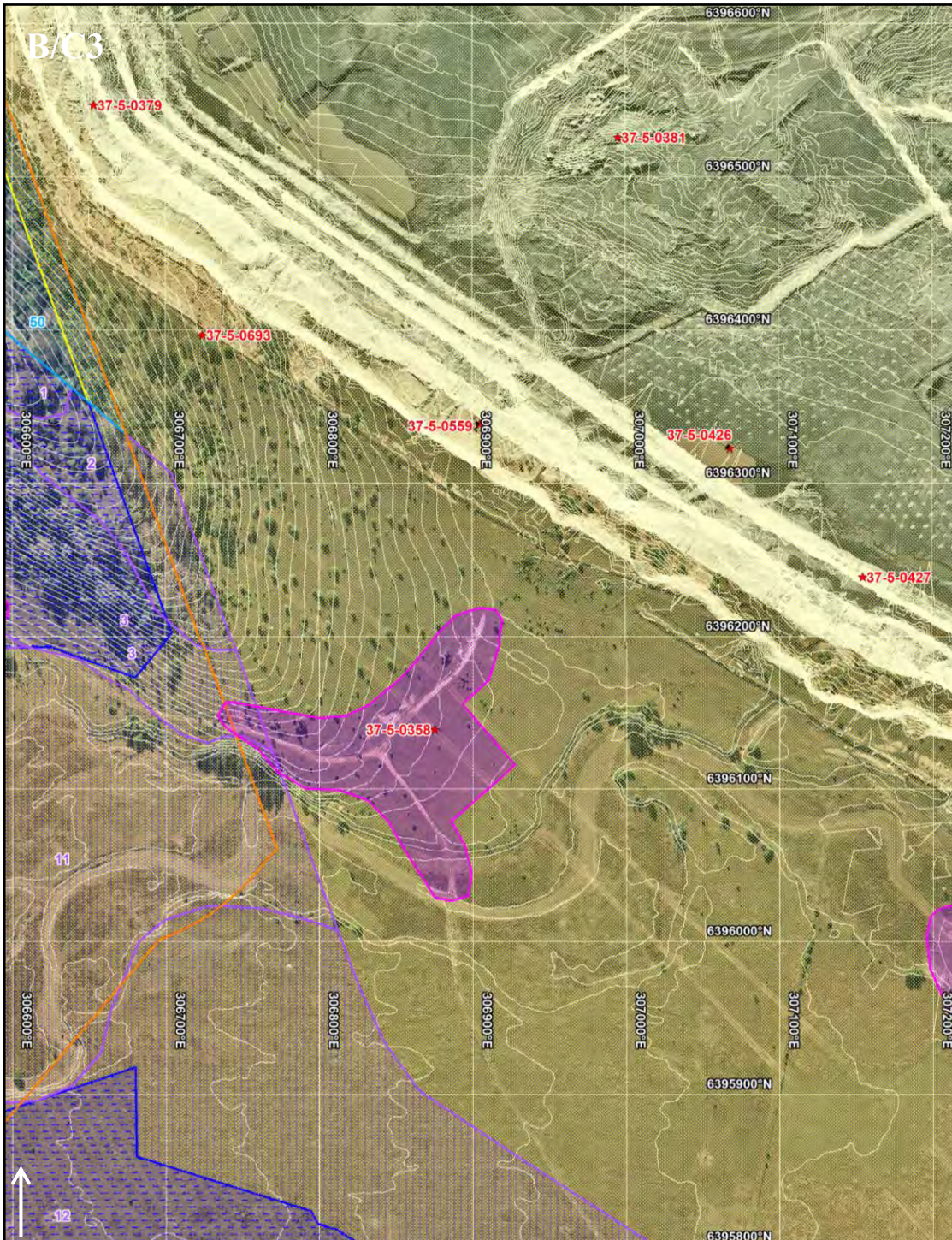
KEY:

	AHIP #C0003213 Area		South Bates Modification Archaeological Survey Area (Kuskie 2017a)
	AHIP #2222 Area		Aboriginal Heritage Site Location
	Longwalls 24-26 Modification Investigation Area		Aboriginal Open Artefact Site - Extent of Visible Evidence
	Longwalls 24-26 Modification Archaeological Survey Area (February 2022)		(aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid)



KEY:	
	AHIP #C0003213 Area
	Longwalls 24-26 Modification Investigation Area
	Longwalls 24-26 Modification Archaeological Survey Area (February 2022)
	South Bates Modification Archaeological Survey Area (Kuskie 2017a)
	Aboriginal Heritage Site Location
	Aboriginal Open Artefact Site - Extent of Visible Evidence
(aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid)	





KEY:

	AHIP #C0003213 Area		South Bates Modification Archaeological Survey Area (Kuskie 2017a)
	AHIP #2222 Area		Aboriginal Heritage Site Location
	Longwalls 24-26 Modification Investigation Area		Aboriginal Open Artefact Site - Extent of Visible Evidence
	Longwalls 24-26 Modification Archaeological Survey Area (February 2022)		(aerial photograph and one metre contours courtesy WCPL; 100 metre MGA grid)

APPENDIX 5.

**ABORIGINAL HERITAGE
SITE DESCRIPTIONS¹**

¹ For Aboriginal sites identified and recorded during the present survey within the Modification investigation area (refer to Appendix 2 for descriptions of all previously recorded sites).

SITE NAME: WAMBO SITE 515

Site Type: *Artefact Scatter*
 Date Recorded: *15/02/2022*
 Recorder: *Michael Marsh*

MGA Grid Reference: *306418:6397832*
 Topographic Map: *Doyles Creek 9032-I-N*

Landform Element: *Simple Slope*
 Slope: *Moderate*
 Distance to Water: *>50 metres*

Vegetation: *Cleared/Regrowth*
 Ground Disturbance: *High*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
50	7	15	5	75	80%	70%	52	4	0.077	possible

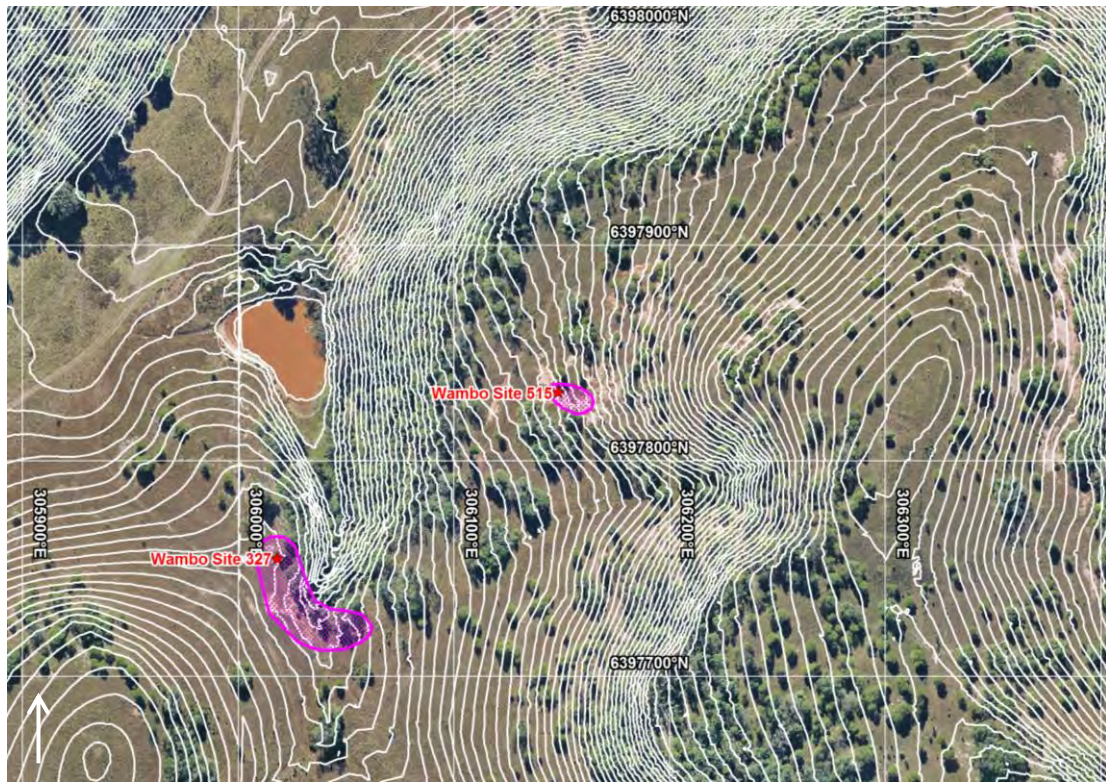
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	grey	tuff	flake	19x12x4				306148	6397832
2	brown/red	rhyolite	flake	25x26x5				306150	6397832
3	green	volcanic	flake	15x20x3	5	ww	secondary flake	306153	6397827
4	grey	tuff	flake	18x15x5	90	ww		306160	6397828

Additional Comments:

- Identified during LW24-26 Modification survey;
- Artefacts on surface of large erosion scour;
- High disturbance from erosion but very shallow deposit may remain;
- Low potential for deposit of research value.

Site Location: Wambo Site 515 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 515



Photograph: Wambo Site 515



Photograph: Wambo Site 515 artefacts #1-4



SITE NAME: WAMBO SITE 516

Site Type: *Isolated Find* MGA Grid Reference: *306331:6397501*
 Date Recorded: *15/02/2022* Topographic Map: *Doyles Creek 9032-I-N*
 Recorder: *Michael Marsh*

Landform Element: *Simple Slope* Vegetation: *Cleared/Regrowth*
 Slope: *Moderate* Ground Disturbance: *Low*
 Distance to Water: *>50 metres*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
3	2	1	1	1	90%	90%	0.9	1	1.111	unlikely

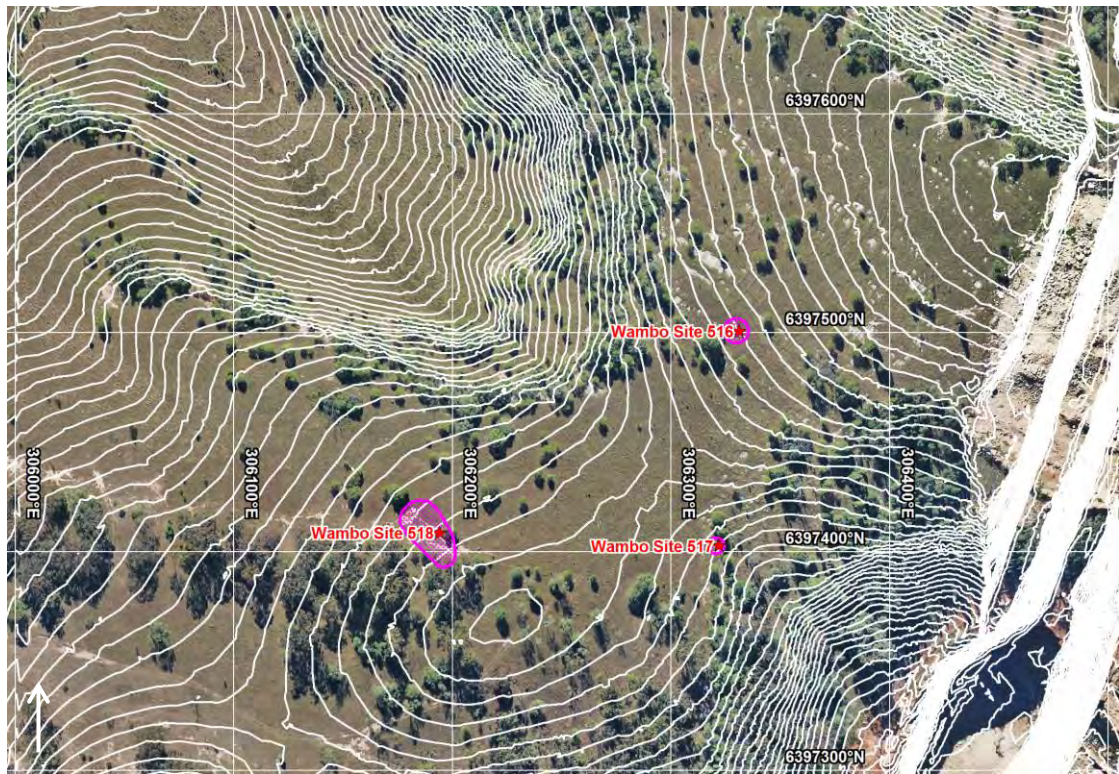
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	pink/red	silcrete	flake - proximal	5x6x2	10	ww		306331	6397501

Additional Comments:

- Identified during LW24-26 Modification survey;
- Isolated artefact on small area of exposed sandstone bedrock;
- Low research potential.

Site Location: Wambo Site 516 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 516 (inset – artefact #1)



SITE NAME: WAMBO SITE 517

Site Type: *Isolated Find* MGA Grid Reference: *306322:6397403*
 Date Recorded: *15/02/2022* Topographic Map: *Doyles Creek 9032-I-N*
 Recorder: *Michael Marsh*

Landform Element: *Ridge Crest* Vegetation: *Cleared/Regrowth*
 Slope: *Gentle* Ground Disturbance: *Low*
 Distance to Water: *>50 metres*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
7	3	1	1	1	70	70%	0.7	1	1.429	unlikely

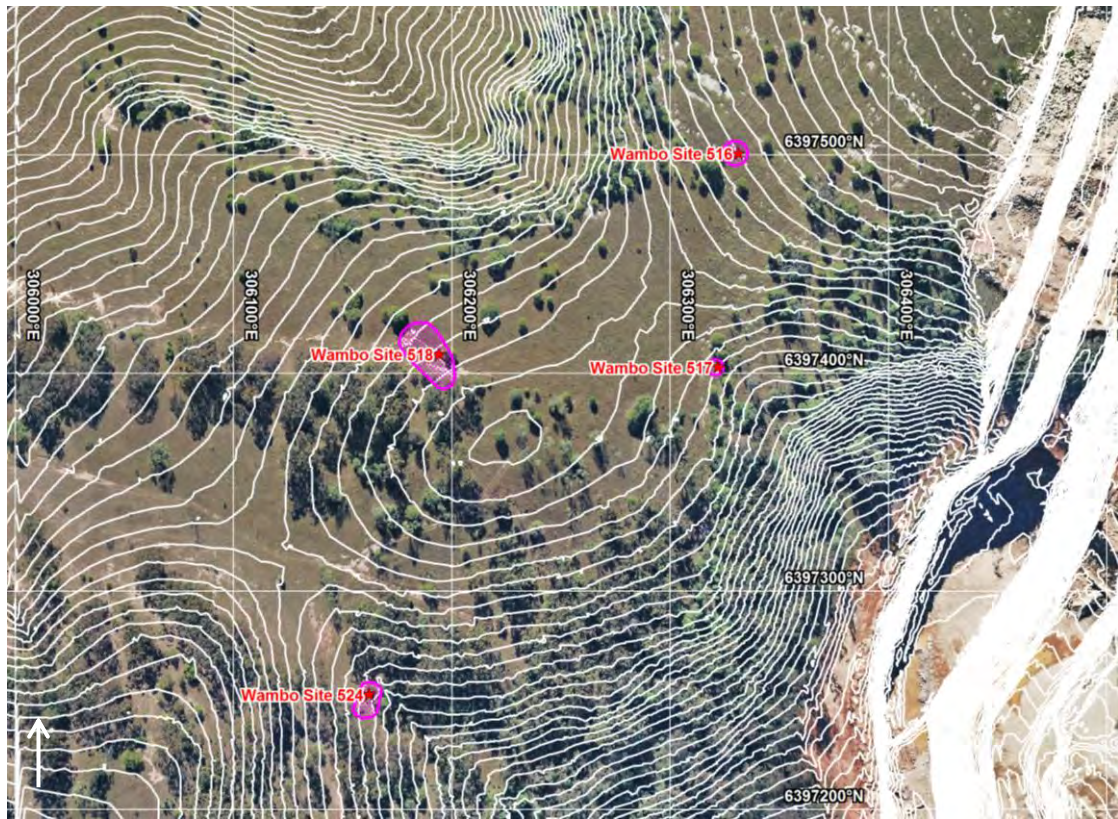
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	brown	silcrete	retouched flake	51x50x20			lateral margin retouched	306322	6397403

Additional Comments:

- Identified during LW24-26 Modification survey;
- Isolated artefact on small area of exposed sandstone bedrock;
- Low research potential.

Site Location: Wambo Site 517 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 517



Photograph: Wambo Site 517



Photograph: Wambo Site 517 artefact #1



SITE NAME: WAMBO SITE 518

Site Type: *Artefact Scatter*
 Date Recorded: *15/02/2022*
 Recorder: *Michael Marsh*

MGA Grid Reference: *306194:6397409*
 Topographic Map: *Doyles Creek 9032-I-N*

Landform Element: *Ridge Crest*
 Slope: *Gentle*
 Distance to Water: *>50 metres*

Vegetation: *Cleared/Regrowth*
 Ground Disturbance: *Moderate*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
varies	varies	30	10	300	50%	50%	150	4	0.027	possible

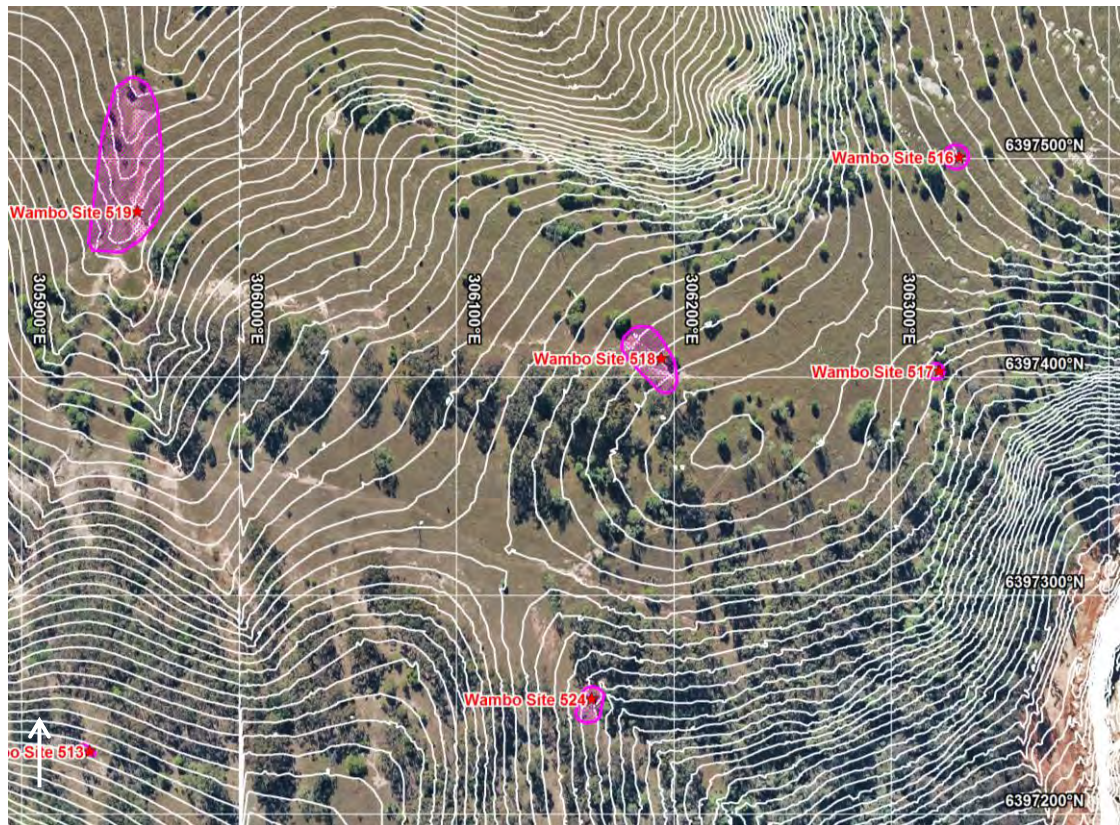
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	grey	silcrete	flake - proximal	31x11x6				306195	6397398
2	pink	tuff	flake - medial	30x25x6				306194	6397409
3	orange	tuff	flake	40x41x10				306185	6397419
4	brown	petrified wood	flake	10x10x3				306182	6397416

Additional Comments:

- Identified during LW24-26 Modification survey;
- Small artefact scatter on erosion scours;
- Dense grass elsewhere;
- Moderate disturbance from erosion;
- Shallow sub-surface deposit of low research potential may be present.

Site Location: Wambo Site 518 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 518



Photograph: Wambo Site 518



Photograph: Wambo Site 518 artefacts #1-4



SITE NAME: WAMBO SITE 519

Site Type: *Artefact Scatter* MGA Grid Reference: *305953:6397476*
 Date Recorded: *16/02/2022* Topographic Map: *Doyles Creek 9032-I-N*
 Recorder: *Michael Marsh*

Landform Element: *Drainage Depression* Vegetation: *Cleared/Regrowth*
 Slope: *Moderate* Ground Disturbance: *Moderate - High*
 Distance to Water: *<50 metres*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
varies	varies	70	20	1400	50%	50%	700	17	0.024	probable

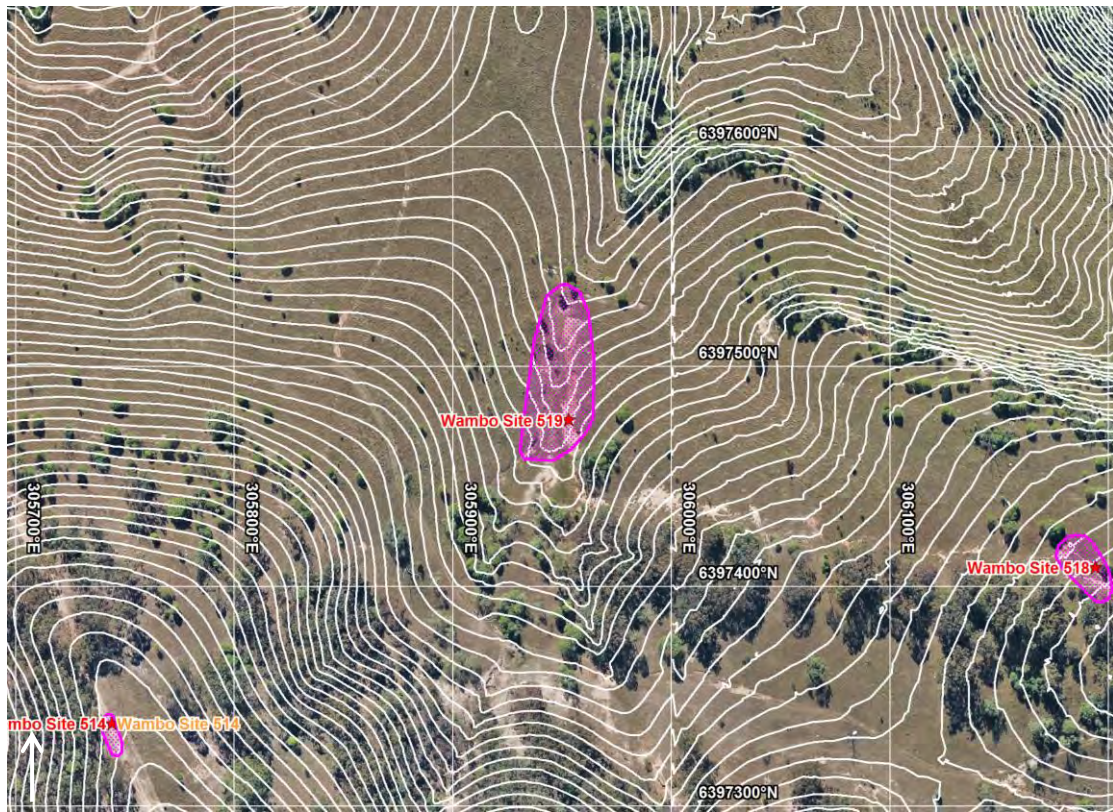
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	pink	tuff	flake	60x40x20	90	ww		305949	6397528
2	pink/orange	tuff	flake	20x30x10			step termination, broken lateral margin	305953	6397476
3	red/orange	silcrete	flake	50x22x5	25	ww		305959	6397484
4	red	tuff	flake - distal	20x10x5				305940	6397469
5	red	tuff	flake	20x20x5				305941	6397480
6	red	tuff	flake	15x15x5			bending initiation	305943	6397500

Additional Comments:

- Identified during LW24-26 Modification survey;
- Artefact scatter on erosion scours and exposed bedrock in drainage;
- Dense grass elsewhere;
- Six artefacts recorded, eleven others observed;
- Moderate to high disturbance from erosion;
- Low potential for sub-surface deposit of research value, although deposits will be present in adjacent areas as indicated by A unit soil exposed in creek bank.

Site Location: Wambo Site 519 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 519



Photographs: Wambo Site 519



Photograph: Wambo Site 519 artefacts #1-6



SITE NAME: WAMBO SITE 520

Site Type: *Isolated Find* MGA Grid Reference: *305636:6397408*
 Date Recorded: *17/02/2022* Topographic Map: *Doyles Creek 9032-I-N*
 Recorder: *Michael Marsh*

Landform Element: *Spur Crest* Vegetation: *Cleared/Regrowth*
 Slope: *Moderate* Ground Disturbance: *High*
 Distance to Water: *>50 metres*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
varies	varies	1	1	1	90%	80%	0.8	1	1.250	unlikely

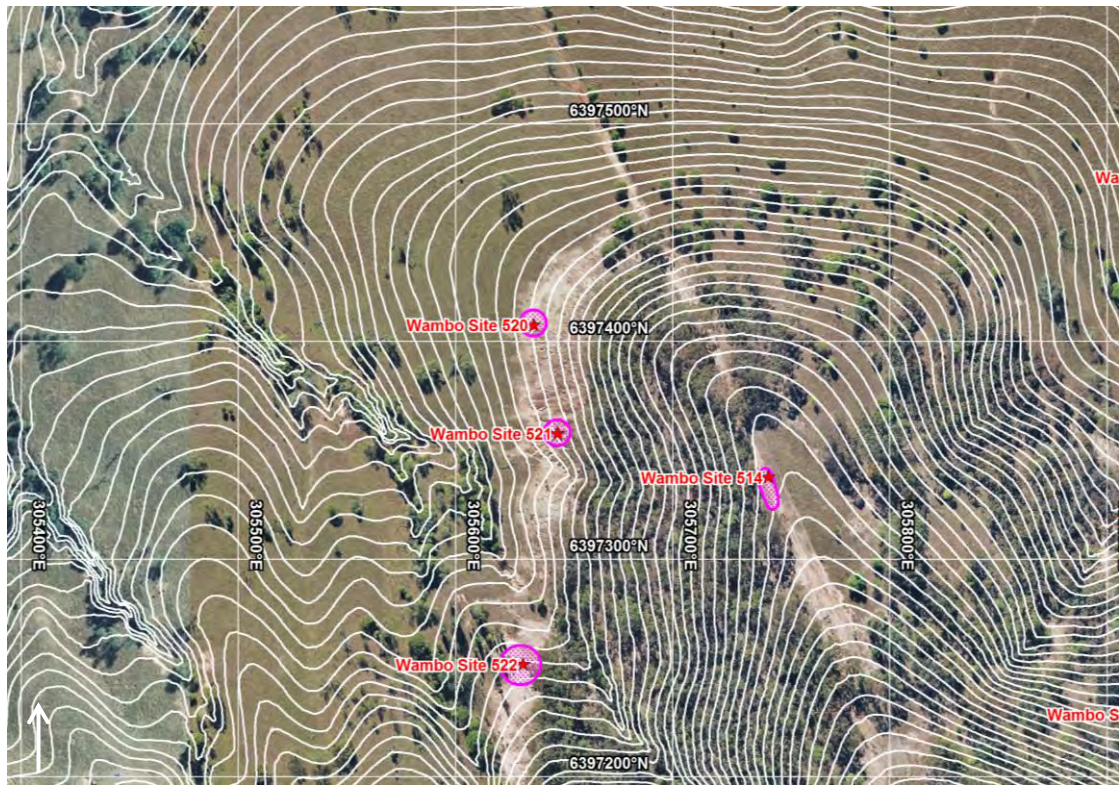
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	red	silcrete	core	38x36x20			three negative scars, heat affected	305636	6397408

Additional Comments:

- Identified during LW24-26 Modification survey;
- Artefact on extensive erosion scours;
- High impacts from vegetation removal and erosion;
- Despite broad exposures very little evidence present;
- Low potential for sub-surface deposit of research value.

Site Location: Wambo Site 520 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 520



Photograph: Wambo Site 520



Photograph: Wambo Site 520 artefact #1



SITE NAME: WAMBO SITE 521

Site Type:	<i>Isolated Find</i>	MGA Grid Reference:	<i>305647:6397358</i>
Date Recorded:	<i>17/02/2022</i>	Topographic Map:	<i>Doyles Creek 9032-I-N</i>
Recorder:	<i>Michael Marsh</i>		
Landform Element:	<i>Simple Slope</i>	Vegetation:	<i>Cleared/Regrowth</i>
Slope:	<i>Moderate</i>	Ground Disturbance:	<i>High</i>
Distance to Water:	<i><50 metres</i>		

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
varies	varies	1	1	1	90%	80%	0.8	1	1.250	unlikely

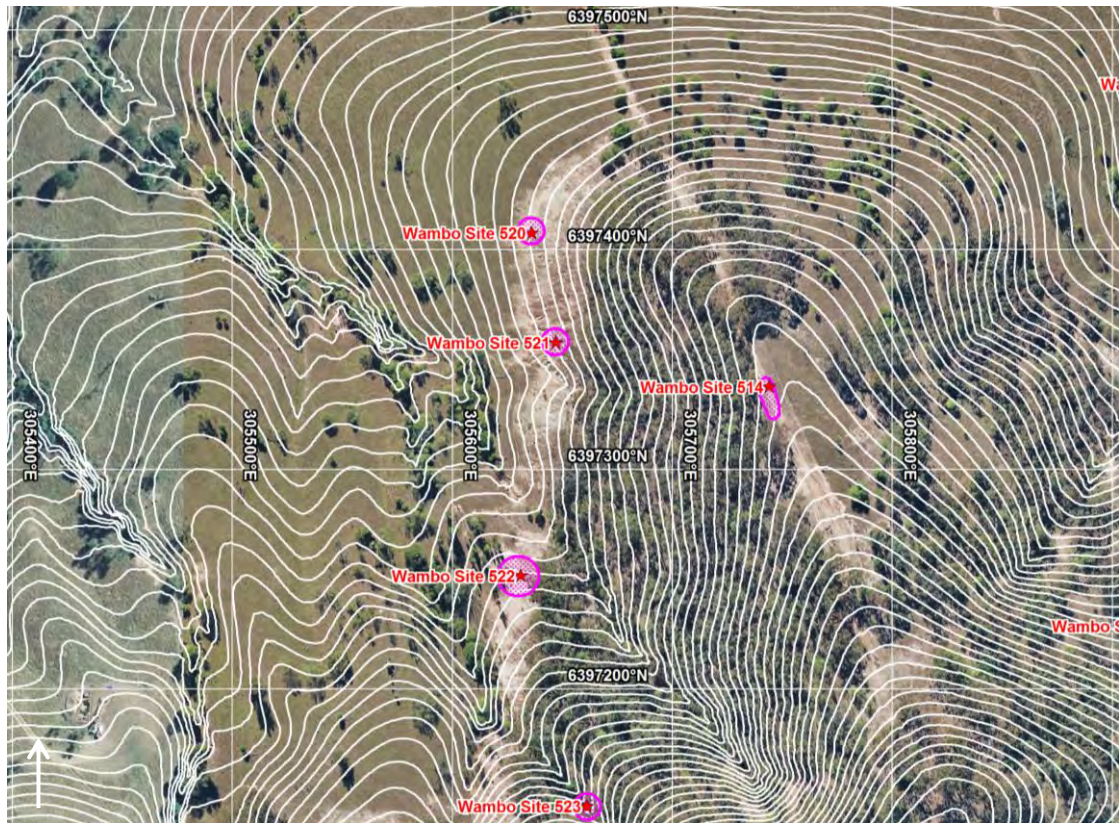
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	red	silcrete	core fragment	45x40x21				305647	6397358

Additional Comments:

- Identified during LW24-26 Modification survey;
- Artefact on extensive erosion scours;
- High impacts from vegetation removal and erosion;
- Despite broad exposures very little evidence present;
- Low potential for sub-surface deposit of research value.

Site Location: Wambo Site 521 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 521 (inset – artefact #1)



SITE NAME: WAMBO SITE 522

Site Type: *Artefact Scatter*
 Date Recorded: *17/02/2022*
 Recorder: *Michael Marsh*

MGA Grid Reference: *305631:6397252*
 Topographic Map: *Doyles Creek 9032-I-N*

Landform Element: *Simple Slope*
 Slope: *Moderate*
 Distance to Water: *<50 metres*

Vegetation: *Cleared/Regrowth*
 Ground Disturbance: *High*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
60+	20	4	4	16	90%	80%	12.8	6	0.469	unlikely

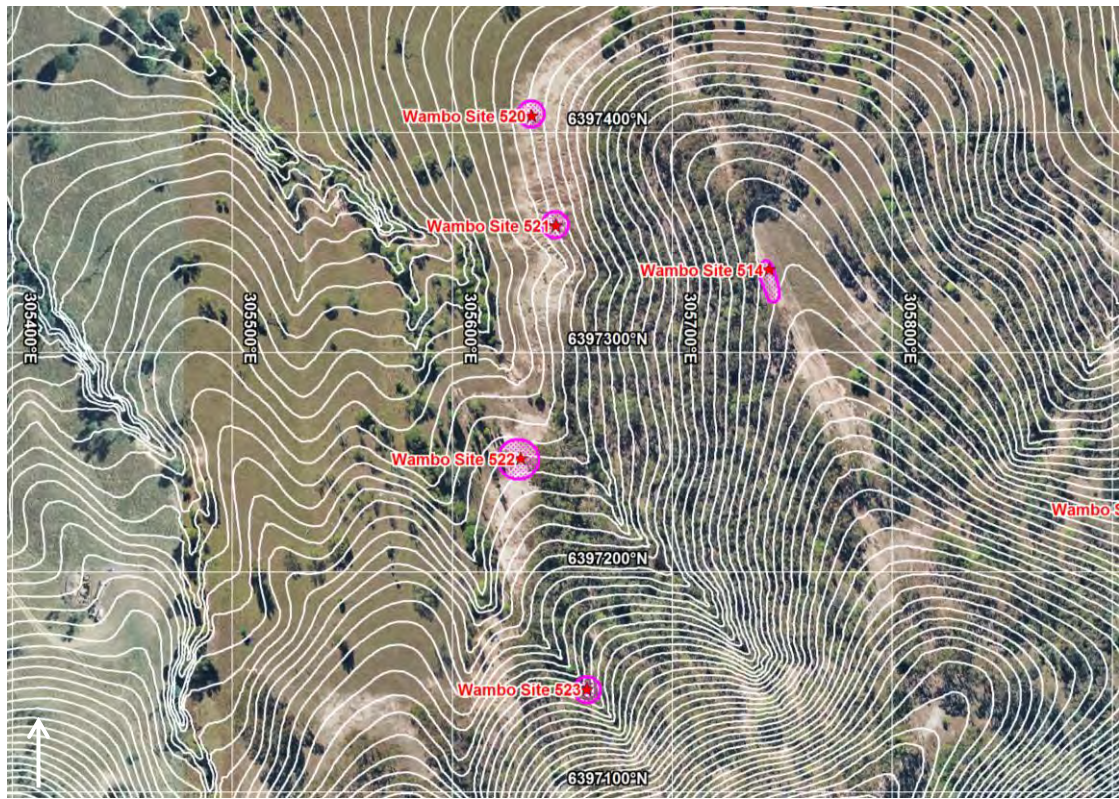
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	red	tuff	core fragment	33x26x12				305631	6397252
2	yellow	tuff	flake	21x28x5				305631	6397252
3	red	tuff	flake	41x12x7	50	ww		305631	6397252

Additional Comments:

- Identified during LW24-26 Modification survey;
- Artefacts on extensive erosion scours;
- Six artefacts present, three recorded;
- High impacts from vegetation removal and erosion;
- Despite broad exposures very little evidence present;
- Low potential for sub-surface deposit of research value.

Site Location: Wambo Site 522 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 522



Photograph: Wambo Site 522



Photograph: Wambo Site 522 - artefacts #1-3



SITE NAME: WAMBO SITE 523

Site Type: *Isolated Find* MGA Grid Reference: *305661:6397147*
 Date Recorded: *17/02/2022* Topographic Map: *Doyles Creek 9032-I-N*
 Recorder: *Michael Marsh*

Landform Element: *Drainage Depression* Vegetation: *Cleared/Regrowth*
 Slope: *Moderate* Ground Disturbance: *High*
 Distance to Water: *<50 metres*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
2	2	1	1	1	70	50%	0.5	1	2.000	unlikely

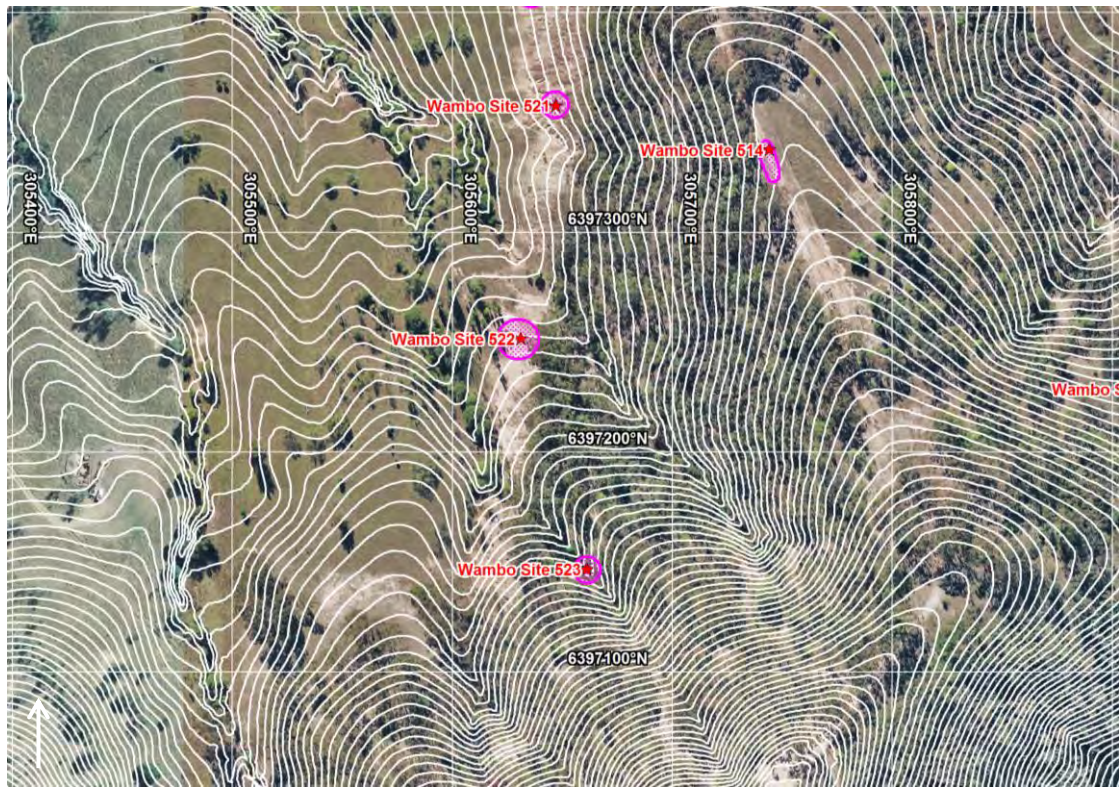
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	yellow	tuff	geometric microlith	22x18x5				305661	6397147

Additional Comments:

- Identified during LW24-26 Modification survey;
- Artefact on erosion in drainage;
- Low potential for sub-surface deposit of research value;
- High impacts from vegetation removal and erosion.

Site Location: Wambo Site 523 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 523 (inset – artefact #1)



SITE NAME: WAMBO SITE 524

Site Type: *Artefact Scatter* MGA Grid Reference: *306162:6397253*
 Date Recorded: *21/02/2022* Topographic Map: *Doyles Creek 9032-I-N*
 Recorder: *Michael Marsh*

Landform Element: *Drainage Depression* Vegetation: *Cleared/Regrowth*
 Slope: *Moderate* Ground Disturbance: *Moderate - High*
 Distance to Water: *<50 metres*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
30	10	8	2	16	50%	40%	6	2	0.313	possible

Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	red	tuff	flake - proximal	11x20x5				306162	6397253
2	red	tuff	flake	10x5x5				306159	6397246

Additional Comments:

- Identified during LW24-26 Modification survey;
- Erosion exposure at head of first order drainage;
- Disturbance from vegetation removal and erosion;
- Low potential for sub-surface deposit of research value.

Site Location: Wambo Site 524 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 524



Photograph: Wambo Site 524



Photograph: Wambo Site 524 artefacts #1 and 2



SITE NAME: WAMBO SITE 525

Site Type: *Artefact Scatter*
 Date Recorded: *23/02/2022*
 Recorder: *Michael Marsh*

MGA Grid Reference: *305818:6396145*
 Topographic Map: *Doyles Creek 9032-I-N*

Landform Element: *Spur Crest*
 Slope: *Gentle*
 Distance to Water: *<50 metres*

Vegetation: *Cleared/Forest*
 Ground Disturbance: *High*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
varies	varies	50	5	250	30%	20%	50	4	0.080	unlikely

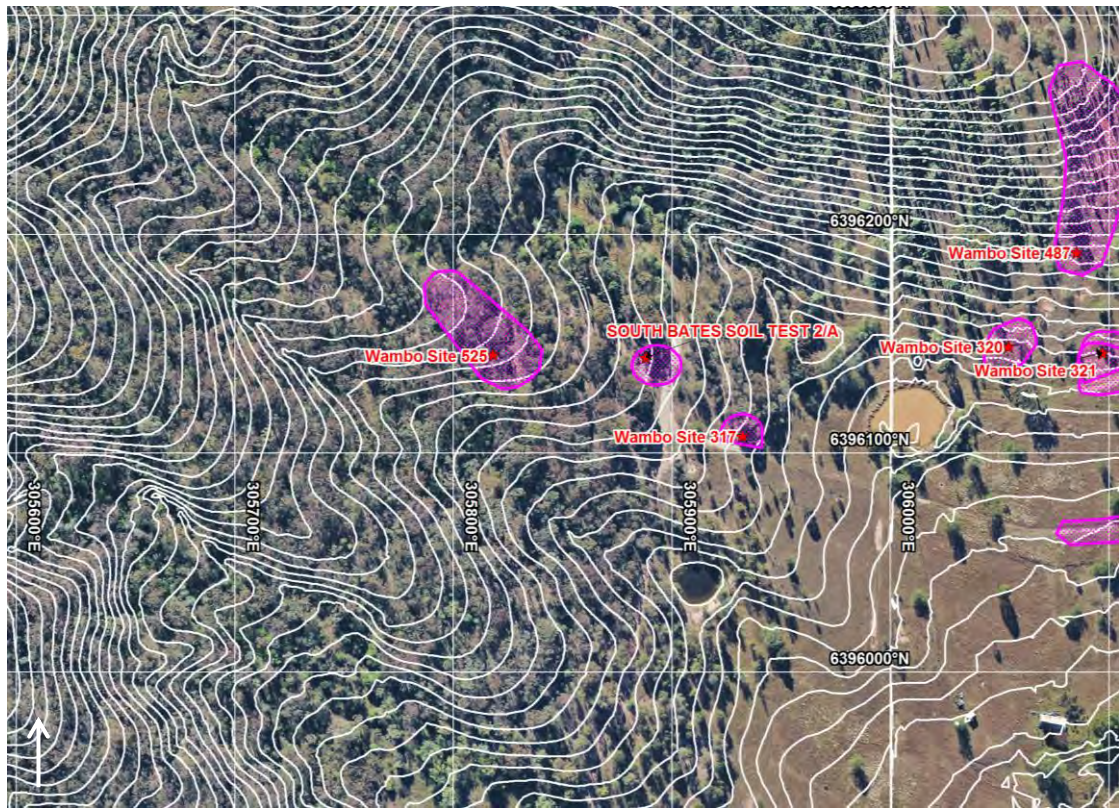
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	yellow	tuff	flake	36x40x25	50	ww		305823	6396140
2	brown	petrified wood	flake	48x18x10				305818	6396145
3	green	rhyolite	core	80x70x40				305818	6396145
4	red	silcrete	flake - proximal	22x10x2				305798	6396174

Additional Comments:

- Identified during LW24-26 Modification survey;
- Previously cleared area in forest;
- Large erosion scour, sandstone bedrock exposed, but low visibility;
- Disturbance from vegetation removal and erosion;
- Very low potential for sub-surface deposit of research value.

Site Location: Wambo Site 525 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 525



Photograph: Wambo Site 525



Photograph: Wambo Site 525 artefacts #1-4



SITE NAME: WAMBO SITE 526

Site Type: *Isolated Find* MGA Grid Reference: *305901:6396459*
 Date Recorded: *23/02/2022* Topographic Map: *Doyles Creek 9032-I-N*
 Recorder: *Michael Marsh*

Landform Element: *Spur Crest* Vegetation: *Cleared/Forest*
 Slope: *Moderate* Ground Disturbance: *Moderate - High*
 Distance to Water: *<50 metres*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
5	3	1	1	1	40%	30%	0.3	1	3.333	possible

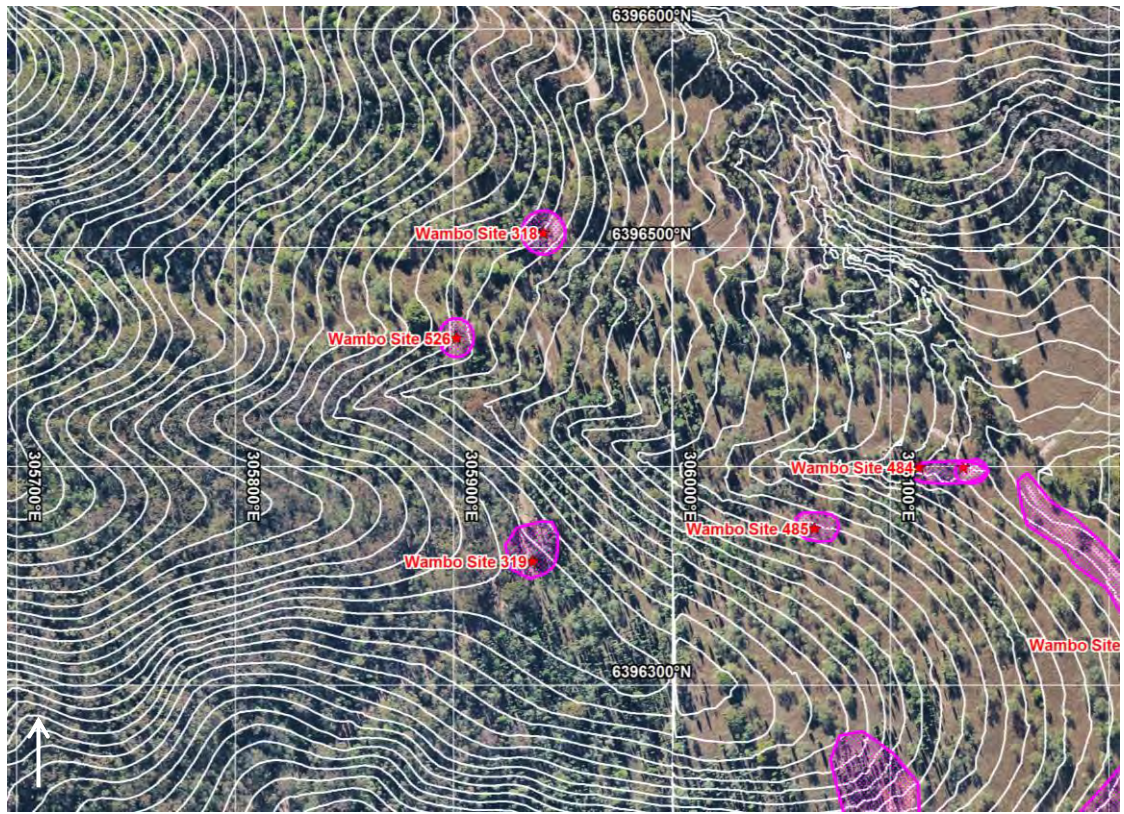
Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	red	silcrete	flake	22x20x5	100	ww	primary flake	305901	6396459

Additional Comments:

- Identified during LW24-26 Modification survey;
- Small erosion scour in cleared area in regrowth forest;
- Low visibility elsewhere;
- Disturbance from vegetation removal and erosion;
- Shallow A unit soil;
- Low potential for sub-surface deposit of research value.

Site Location: Wambo Site 526 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 526 (inset – artefact #1)



SITE NAME: WAMBO SITE 527

Site Type: *Isolated Find* MGA Grid Reference: *305968:6396832*
 Date Recorded: *21/02/2022* Topographic Map: *Doyles Creek 9032-I-N*
 Recorder: *Michael Marsh*

Landform Element: *Ridge Crest* Vegetation: *Cleared/Forest*
 Slope: *Moderate* Ground Disturbance: *Moderate - High*
 Distance to Water: *>50 metres*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
50+	3	1	1	1	80	70%	0.7	1	1.429	unlikely

Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	cream	tuff	flake	36x28x10				305968	6396832

Additional Comments:

- Identified during LW24-26 Modification survey;
- Artefact on exposure on access track, dense vegetation off track;
- Probable pathway between mountains and North Wambo Creek;
- Impacts from track, vegetation removal, erosion and ants;
- Very low potential for sub-surface deposit of research value.

Site Location: Wambo Site 527 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 527 (inset – artefact #1)



SITE NAME: WAMBO SITE 528

Site Type: *Artefact Scatter*
 Date Recorded: *21/02/2022*
 Recorder: *Michael Marsh*

MGA Grid Reference: *306279:6396666*
 Topographic Map: *Doyles Creek 9032-I-N*

Landform Element: *Ridge Crest*
 Slope: *Moderate*
 Distance to Water: *>50 metres*

Vegetation: *Cleared/Forest*
 Ground Disturbance: *Moderate - High*

Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m ²)	Mean Surface Visibility of Locus (%)	Mean Arch. Visibility of Locus (%)	Effective Locus Area (m ²)	# of Artefacts	# of Artefacts per m ² of Effective Locus Area	Sub-Surface Deposit
50+	3	100	3	300	90	80%	240	6	0.025	possible

Artefact Database:

Artefact #	Colour	Stone Material	Lithic Item Type	Dimensions (mm)	Cortex Amount (%)	Cortex Type	Comments	MGA Easting	MGA Northing
1	red	tuff	flake	22x22x8				306279	6396666
2	red	tuff	flake	14x20x5				306279	6396666
3	yellow/brown	tuff	core	48x40x25			multiplatform	306328	6396628
4	red	tuff	flake	32x22x10				306350	6396601
5	red	tuff	flake - distal	22x24x5	100	ww		306350	6396601
6	red	tuff	flake - proximal	10x6x3	50	ww		306350	6396601

Additional Comments:

- Identified during LW24-26 Modification survey;
- Artefacts on exposure on access track, dense vegetation off track;
- Probable pathway between mountains and North Wambo Creek;
- Impacts from track, vegetation removal and erosion;
- Shallow A unit soil;
- Low potential for sub-surface deposit of research value but more artefacts highly likely.

Site Location: Wambo Site 528 (100 metre MGA grid; one metre contours)



Photograph: Wambo Site 528



Photograph: Wambo Site 528 artefacts #1-6



APPENDIX 6.

PLATES

Note: Refer also to Appendices 2 and 5 for Aboriginal site photographs and to Kuskie (2017a Appendices 2, 5 and 6) for photographs of the survey areas and Aboriginal sites within the South Bates Modification Extension portion of the LW24-26 Modification investigation area.



Plate 1: View from south-eastern corner of LW24-26 Modification investigation area south across the southern portion of the investigation area that was previously surveyed for the South Bates Extension Modification (Kuskie 2017a), including Survey Area 3 (moderate simple slope), Survey Area 11 (North Wambo Creek), Survey Area 12 (valley flats) and Survey Area 37 (gently inclined slopes), to the moderately and steeply inclined slopes descending from the cliff-lined Southern Mountains south-west of the LW24-26 Modification investigation area.



Plate 2: View north-east across the southern portion of the LW24-26 Modification investigation area, including portions that were previously surveyed for the South Bates Extension Modification (Kuskie 2017a), and the prominent ridgeline and associated spurlines descending from the Southern Mountains to North Wambo Creek and representing a probable corridor for movement.



Plate 3: View south-west of LW24-26 Modification Survey Area 1 (level to very gentle drainage depression), the third order section of Waterfall Creek on the northern boundary of the Modification investigation area.



Plate 4: LW24-26 Modification Survey Area 2 (moderate simple slope) adjacent to the third order section of Waterfall Creek on the northern boundary of the Modification investigation area, showing exposed sandstone bedrock.



Plate 5: Sandstone boulders in Survey Area 3 (moderate drainage depression), a small section of a second order tributary of Waterfall Creek.



Plate 6: View south across a large farm dam in Survey Area 3 (moderate drainage depression), a second order tributary of Waterfall Creek, and adjacent moderate and steep simple slopes (Survey Areas 5 and 12).



Plate 7: Survey Area 4 (moderate drainage depression), comprising first and second order headwater tributaries of Waterfall Creek, highlighting the dense grass cover at the time of the survey in February 2022.



Plate 8: View south-west across Survey Area 6 (moderate simple slope) and northern portion of LW24-26 Modification investigation area.



Plate 9: View north across Survey Area 6 (moderate simple slope) to Survey Area 7 (steep simple slope) in the northern portion of LW24-26 Modification investigation area.



Plate 10: View north across Survey Area 6 (moderate simple slope) to the Hunter River 2-3 kilometres north of the LW24-26 Modification investigation area.



Plate 11: View south-west from Survey Area 9 (level to very gentle ridge crest) across the northern portion of the LW24-26 Modification investigation area (foreground) to the Southern Mountains.



Plate 12: View south-west across Survey Area 11 (gentle ridge crest), highlighting the dense grass cover at the time of the survey in February 2022.



Plate 13: Survey Area 13 (moderate simple slope) in northern portion of the LW24-26 Modification investigation area.



Plate 14: Major spur and ridgeline in north-central portion of investigation area, with Survey Areas 8, 14, 25 and 53.



Plate 15: Survey Area 17 (moderate drainage depression) in north-western portion of the LW24-26 Modification investigation area.



Plate 16: Survey Area 18 (gentle spur crest) in north-western portion of the LW24-26 Modification investigation area.



Plate 17: Survey Area 20 (moderate spur crest) in north-western portion of the LW24-26 Modification investigation area.



Plate 18: View west of Survey Areas 19 (moderate drainage depression), 24 (moderate simple slope) and 22 (moderate spur crest) in north-western portion of the LW24-26 Modification investigation area.



Plate 19: View north of Survey Areas 23 (moderate spur crest), 24 (moderate simple slope) and 19 (moderate drainage depression) in north-western portion of the LW24-26 Modification investigation area.



Plate 20: Survey Area 26 (moderate simple slope) in north-central portion of the investigation area.



Plate 21: Survey Area 28 (gentle ridge crest), a potential pathway between the mountains and Hunter River, in the north-central portion of the investigation area.



Plate 22: Survey Area 36 (steep simple slope) on the sides of the ridgeline (Survey Area 28) that is a potential pathway between the mountains and Hunter River, in the north-central portion of the investigation area.



Plate 23: View north of Survey Areas 41 (gentle spur crest), 55 (moderate drainage depression) and 43 (moderate spur crest) in central portion of the LW24-26 Modification investigation area.



Plate 24: Survey Area 43 (moderate spur crest) in central portion of the LW24-26 Modification investigation area.



Plate 25: Survey Area 46 (moderate ridge crest) in central portion of the LW24-26 Modification investigation area.



Plate 26: Survey Area 47 (moderate simple slope) in central portion of the LW24-26 Modification investigation area.



Plate 27: Survey Area 49 (moderate simple slope) in central portion of the LW24-26 Modification investigation area.



Plate 28: Survey Area 52 (moderate simple slope) in central portion of the LW24-26 Modification investigation area.

APPENDIX 7.

ABORIGINAL COMMUNITY CONSULTATION

**Heritage NSW Aboriginal Cultural Heritage Consultation Requirements for Proponents
2010 (DECCW 2010c) – Longwalls 24-26 Modification – Consultation Database:**

Date	Person Contacted	Organisation	How Contacted	Contacted By	Organisation	Description
9/11/2021	Various	Heritage NSW, Singleton Shire Council, Hunter Local Land Services, Wanaruah Local Aboriginal Land Council, Native Title Services Corporation Limited, National Native Title Tribunal, Office of the Registrar Aboriginal Land Rights Act 1983	Letter via email	Peter Jaeger	Wambo Coal Pty Ltd	Initial letter sent requesting details of Aboriginal persons or groups who hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal objects and/or places in the Area of Interest for the Longwalls 24-26 Modification, with a request to respond by 23/11/2021. The letters also provided a list of all Registered Aboriginal Parties automatically considered to be registered for the Modification.
23/11/2021	Peter Jaeger	Wambo Coal Pty Ltd	Email	Paul Houston	Heritage NSW	Response to letter of 9/11/21 provided, listing additional Aboriginal persons/organisations to contact.
24/11/2021	Various	All existing Registered Aboriginal Parties at the Wambo Coal Mine	Letter/Email	Peter Jaeger	Wambo Coal Pty Ltd	Letters sent out to all 68 existing RAPs at the Wambo Coal Mine to advise them of the Longwalls 24-26 Modification and to notify them that they have been automatically registered as RAPs for the Modification.
24/11/2021	Various	Aboriginal Stakeholders notified about through above correspondence.	Letter/Email	Peter Jaeger	Wambo Coal Pty Ltd	Letters sent out to groups/individuals identified during Step 1 above who were not already automatically registered by WCPL for the Modification, inviting Aboriginal persons or groups who hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal object(s) and/or place(s) in the Area of Interest to register an interest in the Longwalls 24-26 Modification, with a closing date for registrations of 8 December 2021.
25/11/2021	General Public	Singleton Argus - Public Notice	Public Notice	Peter Jaeger	Wambo Coal Pty Ltd	A public notice was published in the Singleton Argus on 25 November 2021, inviting Aboriginal persons or groups who hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal object(s) and/or place(s) in the Area of Interest to register an interest in the Modification, with a closing date for registrations of 8 December 2021.
30/11/2021	Peter Jaeger	Wambo Coal Pty Ltd	Email	Kerrie Brauer	Awabakal Traditional Owners Aboriginal Corporation	Advised not registering an interest for the Modification.
1/12/2021	Peter Jaeger	Wambo Coal Pty Ltd	Email	Paul Boyd and Lilly Carroll	Didge Ngunawal Clan	Registered for the Modification.

Date	Person Contacted	Organisation	How Contacted	Contacted By	Organisation	Description
14/12/2021	Various	All Registered Aboriginal Parties for the Longwalls 24-26 Modification at the Wambo Coal Mine	Letter/Email	Peter Jaeger	Wambo Coal Pty Ltd	Letters sent out to all RAPs identified for the Longwalls 24-26 Modification enclosing the Proposed Methodology for review, with a request for comment by 28 January 2022.
21/12/2021	Lorraine Towney	Warragil Cultural Services	Email	Nicole Dobbins	Wambo Coal Pty Ltd	Requested current postal address after return to sender notification from Australia Post regarding methodology letter.
21/12/2021	Luke Hickey	Hunter Traditional Owner	Email	Nicole Dobbins	Wambo Coal Pty Ltd	Requested current postal address after return to sender notification from Australia Post regarding methodology letter.
29/12/2021	Clifford Matthews	Minnga Consultants	Telephone	Nicole Dobbins	Wambo Coal Pty Ltd	Rang various known telephone numbers and left message where available after return to sender notification from Australia Post regarding methodology letter.
29/12/2021	Rodney Matthews and Michele Stair	Giwiir Consultants	Telephone	Nicole Dobbins	Wambo Coal Pty Ltd	Rang various known telephone numbers and left message where available after return to sender notification from Australia Post regarding methodology letter.
4/1/2022	Peter Jaeger	Wambo Coal Pty Ltd	Email	Non-Disclosure Requested		Sought to register for the Modification almost one month after the closing date for registrations of interest. Non-disclosure to LALC requested.
11/1/2022	Non-Disclosure Requested		Letter/Email	Peter Jaeger	Wambo Coal Pty Ltd	Proposed Methodology enclosed for review with a request for comment by 28 January 2022.
7/2/2022	Georgia Pascoe	Wanaruah LALC	Letter/Email	Nicole Dobbins	Wambo Coal Pty Ltd	Invited Wanaruah LALC to participate in field survey.
7/2/2022	Scott Franks	Tocomwall	Letter/Email	Nicole Dobbins	Wambo Coal Pty Ltd	Invited Tocomwall to participate in field survey.
7/2/2022	Kevin Sampson	Bawurra Consultants	Letter/Email	Nicole Dobbins	Wambo Coal Pty Ltd	Invited Bawurra to participate in field survey.
7/2/2022	Allen Paget, Taasha Layer	Ungooroo Aboriginal Corporation	Letter/Email	Nicole Dobbins	Wambo Coal Pty Ltd	Invited Ungooroo to participate in field survey.
8/2/2022	Nicole Dobbins	Wambo Coal Pty Ltd	Email	Tania Riley	Wanaruah LALC	Advised that Christine Paul would attend field survey.
10/2/2022	Nicole Dobbins	Wambo Coal Pty Ltd	Telephone	Kevin Sampson	Bawurra Consultants	Kevin advised that they could not attend the field survey due to expired insurance.
10/2/2022	Nicole Dobbins	Wambo Coal Pty Ltd	Telephone	Scott Franks	Tocomwall	Scott advised that they could not attend the field survey but requested a call to Mary Franks.
10/2/2022	Mary Franks	Tocomwall	Telephone	Nicole Dobbins	Wambo Coal Pty Ltd	Spoke with Mary who advised that she could not attend the survey.
11/2/2022	Administration	Ungooroo Aboriginal Corporation	Telephone	Nicole Dobbins	Wambo Coal Pty Ltd	Invited Ungooroo to participate in field survey. Ungooroo confirmed that Allen Paget could participate.
11/2/2022	Donna Sampson	Cacatua Culture Consultants	Telephone	Nicole Dobbins	Wambo Coal Pty Ltd	Invited Cacatua to participate in field survey. Donna confirmed that a representative could participate 21-23/2/22.
14/2/2022	Georgia Pascoe	Wanaruah LALC	Email	Nicole Dobbins	Wambo Coal Pty Ltd	Noted that representative had not attended survey and requested that someone could attend.

Date	Person Contacted	Organisation	How Contacted	Contacted By	Organisation	Description
14/2/2022	Allen Paget	Ungooroo Aboriginal Corporation	Fieldwork	Michael Marsh, Annie Backshall	South East Archaeology	LW24-26 Modification extension heritage survey.
15/2/2022	Allen Paget	Ungooroo Aboriginal Corporation	Fieldwork	Michael Marsh, Annie Backshall	South East Archaeology	LW24-26 Modification extension heritage survey.
16/2/2022	Allen Paget	Ungooroo Aboriginal Corporation	Fieldwork	Michael Marsh, Annie Backshall	South East Archaeology	LW24-26 Modification extension heritage survey.
16/2/2022	Admin	Wanaruah LALC	Telephone	Nicole Dobbins	Wambo Coal Pty Ltd	Sought to confirm representative for field survey. No response.
17/2/2022	Admin	Wanaruah LALC	Telephone	Nicole Dobbins	Wambo Coal Pty Ltd	Sought to confirm representative for field survey. No response.
17/2/2022	Allen Paget	Ungooroo Aboriginal Corporation	Fieldwork	Michael Marsh, Annie Backshall	South East Archaeology	LW24-26 Modification extension heritage survey.
17/2/2022	Larry Foley	Buudang	Telephone	Nicole Dobbins	Wambo Coal Pty Ltd	Left message enquiring if someone was available to participate in field survey. No reply.
18/2/2022	Admin	Wanaruah LALC	Telephone	Nicole Dobbins	Wambo Coal Pty Ltd	Sought to confirm representative for field survey. No response.
21/2/2022	Jeffery Matthews	Crimson-Rosie	Telephone	Nicole Dobbins	Wambo Coal Pty Ltd	Left message enquiring if someone was available to participate in field survey. No reply.
21/2/2022	Tracey Skene	Culturally Aware	Telephone	Nicole Dobbins	Wambo Coal Pty Ltd	Left message enquiring if someone was available to participate in field survey. No reply.
21/2/2022	Admin	Carrawonga Consultants	Telephone	Nicole Dobbins	Wambo Coal Pty Ltd	Left message enquiring if someone was available to participate in field survey. No reply.
21/2/2022	Allen Paget	Ungooroo Aboriginal Corporation	Fieldwork	Michael Marsh, Annie Backshall	South East Archaeology	LW24-26 Modification extension heritage survey.
22/2/2022	Allen Paget; Wayne French	Ungooroo Aboriginal Corporation; Cacatua Culture Consultants	Fieldwork	Michael Marsh, Annie Backshall	South East Archaeology	LW24-26 Modification extension heritage survey.
23/2/2022	Marcus Sproule; Wayne French	Ungooroo Aboriginal Corporation; Cacatua Culture Consultants	Fieldwork	Michael Marsh, Annie Backshall	South East Archaeology	LW24-26 Modification extension heritage survey.
14/3/2022	Georgia Pascoe	Wanaruah LALC	Letter/Email	Peter Jaeger	Wambo Coal Pty Ltd	List of RAPs and copies of associated correspondence were provided.
14/3/2022	Manager	Office of Environment and Heritage	Letter/Email	Peter Jaeger	Wambo Coal Pty Ltd	List of RAPs and copies of associated correspondence were provided.
7/4/2022	Various	All Registered Aboriginal Parties for the Longwalls 24-26 Modification at the Wambo Coal Mine	Letter/Email	Peter Jaeger	Wambo Coal Pty Ltd	Letters or emails sent out to all RAPs identified for the Longwalls 24-26 Modification enclosing the draft Aboriginal Cultural Heritage Assessment Report for review, with a request for comment by 12 May 2022.

Date	Person Contacted	Organisation	How Contacted	Contacted By	Organisation	Description
8/4/2022	Various	Several Registered Aboriginal Parties for the Longwalls 24-26 Modification at the Wambo Coal Mine	Letter	Peter Jaeger	Wambo Coal Pty Ltd	Emails sent on 7/4/22 enclosing the draft Aboriginal Cultural Heritage Assessment Report for review bounced, therefore letters were posted to the known physical addresses.
22/4/2022	Lorraine Towney	-	Telephone	Lucas Burns	Wambo Coal Pty Ltd	Letter sent on 7/4/22 enclosing the draft Aboriginal Cultural Heritage Assessment Report for review was returned. Three telephone attempts were made to establish contact but the calls were unanswered/unreturned.
26/4/2022	Krystal Saunders	KL.KG Saunders Trading Services	Telephone	Lucas Burns	Wambo Coal Pty Ltd	Letter sent on 7/4/22 enclosing the draft Aboriginal Cultural Heritage Assessment Report for review was returned. Three telephone attempts were made to establish contact but the calls were unanswered/unreturned.
20/5/2022	Peter Kuskie	South East Archaeology	Email	George Sampson; Ashley Sampson	Cacatua Culture Consultants; AGA Services	Both RAPs endorsed the draft ACHAR.
24/5/2022	Peter Kuskie	South East Archaeology	Telephone	Allen Paget	Ungooroo Aboriginal Corporation	Allen endorsed the draft ACHAR.

Heritage NSW *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010c) – Longwalls 24-26 Modification – Relevant Correspondence

Example of correspondence sent in Stage 1 (Step 4.1.2) of consultation process:



9 November 2021

Heritage NSW
NSW Department of Premier and Cabinet
Hunter Valley Regional Office

By email only: heritagemailbox@environment.nsw.gov.au

To Whom it May Concern,

**RE: WAMBO COAL MINE SOUTH BATES EXTENSION UNDERGROUND MINE
LONGWALLS 24-26 MODIFICATION – ABORIGINAL CULTURAL HERITAGE
ASSESSMENT**

Wambo Coal Pty Ltd (WCPL) owns and operates the Wambo Coal Mine, located approximately 15 kilometres west of Singleton in the Hunter Valley, New South Wales (NSW), in the Singleton Local Government Area.

WCPL is investigating an extension to the approved South Bates Extension Underground Mine, including the reorientation of existing longwalls panels and mining of one additional longwall panel in the Whybrow Seam. If WCPL elects to proceed, a Modification to Development Consent (DA 305-7-2003) for the Wambo Coal Mine will be sought under the NSW *Environmental Planning and Assessment Act 1979* and the NSW *Environmental Planning and Assessment Regulation 2000*. The subject area of the Modification is depicted as the "Area of Interest" as shown on the enclosed plan.

As part of the Modification process, WCPL will be preparing an Aboriginal Cultural Heritage Assessment in respect of the "Area of Interest". If that assessment identifies that the mining activities of the Modification are likely to have an impact on Aboriginal cultural heritage including on objects and/or places, WCPL will seek an Aboriginal Heritage Impact Permit (AHIP) under section 90 of the NSW *National Parks and Wildlife Act 1974*.

For the purposes of assisting in the preparation of a proper Aboriginal Cultural Heritage Assessment, and meeting its consultation requirements as set out in the *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water, 2010) (Consultation Guidelines) issued by Heritage NSW, WCPL hereby notifies you that it would like to consult with any Aboriginal persons or groups who may hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal objects and/or places in the "Area of Interest".

The Aboriginal parties previously involved at the Wambo Coal Mine listed in Enclosure 1 will be automatically registered for the consultation process associated with the Modification.

Should you know of any other Aboriginal person or group who may wish to be consulted in relation to the process described above, could you please provide their details before **5.00 pm on Tuesday 23 November 2021** to WCPL via the following contact details:

Peter Jaeger
Manager: Environment & Community
Wambo Coal Pty Ltd
PMB1, Singleton NSW 2330
Phone: (02) 6570 2206
Email: pjaeger@peabodyenergy.com

WAMBO COAL PTY LTD

ABN: 13 000 668 057

100 Melbourne Street
South Brisbane Qld 4101

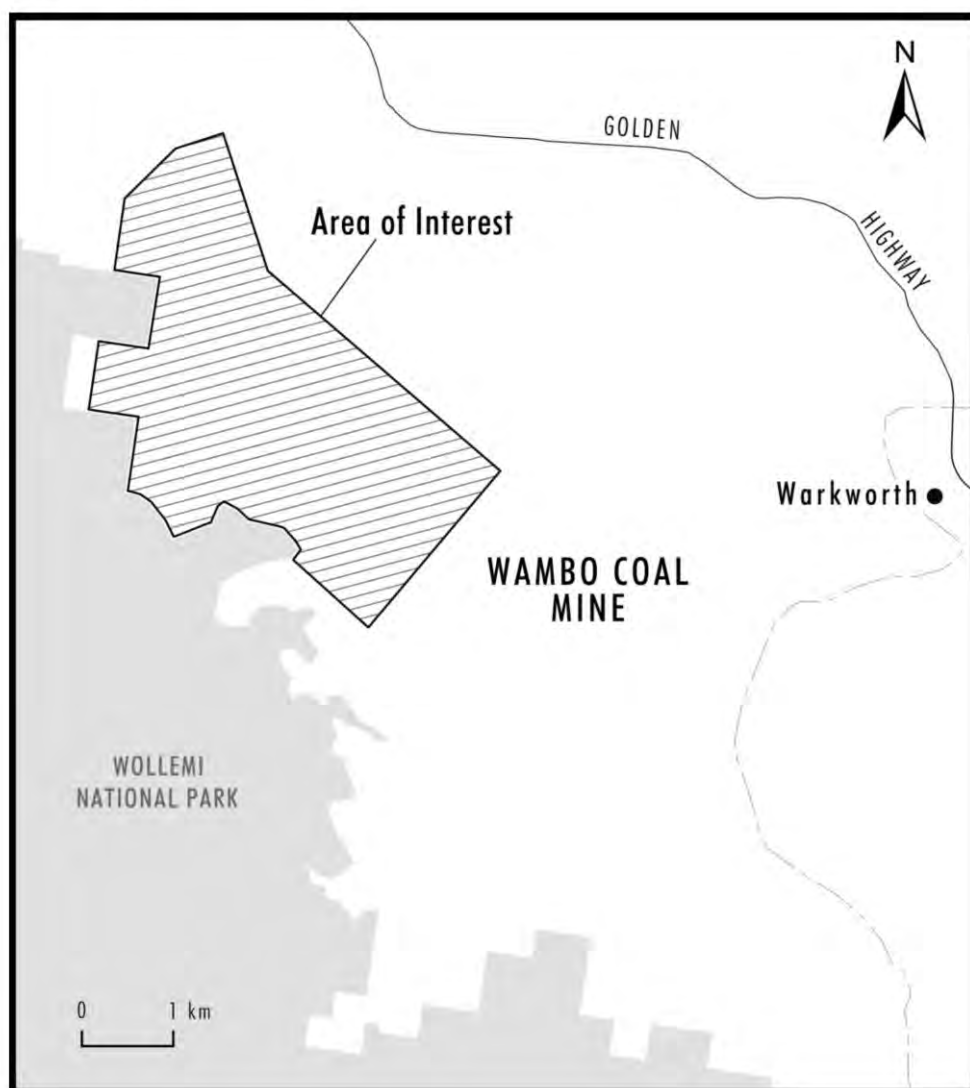
PMB 1
Singleton NSW 2330
Australia
Tel + 61 (0) 2 6570 2200
Fax+ 61 (0) 2 6570 2290

WCPL will then write to each Aboriginal person or group whose details are provided by you to notify them of the process and invite them to register an interest in the process of community consultation to be carried out in accordance with the Consultation Guidelines.

WCPL advises that the details of any Aboriginal person or group who registers an interest in the Wambo Coal Mine will be forwarded to Heritage NSW and the Wanaruah Local Aboriginal Land Council in accordance with Section 4.1.5 of the Consultation Guidelines, unless they specify that they do not want their details released.

Yours faithfully,

Peter Jaeger
Manager: Environment & Community
WAMBO COAL PTY LTD



Enclosure 1
Aboriginal Parties Already Registered at the Wambo Coal Mine

Registered Aboriginal Party	Registered Aboriginal Party
A1 Indigenous Services	L.J. Cultural Management
Aboriginal Native Title Consultants	Lorraine Towney
AGA Services	Lower Hunter Aboriginal Incorporated
Bawurra Consultants	Lower Hunter Wonnarua Cultural Services
Breeza Plains Cultural Heritage Consultants	Maree /TA Wallangan Cultural Services
Buudang	Mingga Consultants
Cacatua Culture Consultants	Moreeites
Carrowonga Consultants	Muswellbrook Cultural Consultants
Culturally Aware	Myland Cultural Heritage Group
Deslee Talbott Consultants	Ngarramang-Kuri Aboriginal Culture & Heritage Group
DFTV Enterprises	Plains Clans of the Wonnarua People's Registered Native Title Claimants
DRM Cultural Management	Roger Noel Matthews
EMT Cultural & Heritage	Roslyn Sampson
Galamaay Consultant	Scott Smith
Gidawaa Walang Cultural Heritage Consultancy	Smith Dhagaans Cultural Group
Giwir Consultants	T & G Culture Consultants
HECMO Consultants	Tocomwall Pty Ltd
Heilamon Cultural Consultants	Ungooroo Aboriginal Corporation
HTO Environmental Management Services	Ungooroo Cultural & Community Services
Hunter Valley Aboriginal Corporation	Upper Hunter Heritage Consultants
Hunter Valley Cultural Consultants	Upper Hunter Wonnarua Council
Hunter Valley Cultural Surveying	Valley Culture
Hunter Valley Environment Land & Mining Services	Waabi Gabinya Cultural Consultancy
Hunter Valley Natural & Cultural Resource Management	Wanaruah Custodians Aboriginal Corporation
I & E Aboriginal Culture and Heritage	Wanaruah Local Aboriginal Land Council
Janet Fenwick	Warragil Cultural Services
Janbant Mugrebea	Wattaka Wonnarua Cultural Consultancy Services
Jeffery Matthews	Widescope Indigenous Group
Jill Green	Wonnarua Culture Heritage
JLC Cultural Services	Wonnarua Nation Aboriginal Corporation
Kauwul (Wonn1)	Wonnarua Traditional Custodians
Kawul Cultural Services	Wonnarua Traditional Owners
Kayaway Eco Cultural & Heritage Services	Wurrumay Consultants
KL.KG Saunders Trading Services	Yinaar Cultural Services

Responses received in relation to Stage 1 (Step 4.1.2) of Heritage NSW (DECCW 2010c) consultation process from Government agencies and LALC:



Reference: DOC21/990200-1

Peter Jaeger
Manager: Environment & Community
Wambo Coal Pty Ltd
PMB1, Singleton NSW 2330
Email: pjaeger@peabodyenergy.com

RE: Request for information on Aboriginal stakeholders for an Aboriginal cultural heritage assessment for the "Wambo Coal Mine, South Bates extension underground mine Longwall 24-26, Modification, within the Singleton Local Government Area"

Dear Penny,

Thank you for your letter of 9 November 2021 about Aboriginal cultural heritage consultation for the "Wambo Coal Mine, South Bates extension underground mine Longwall 24-26, Modification, within the Singleton Local Government Area. I appreciate the opportunity to provide input.

Please find enclosed a list of known Aboriginal parties for the Singleton local government area (Attachment 1) that we consider likely to have an interest in the proposal. Note this is not an exhaustive list of all interested Aboriginal parties. Receipt of this list does not remove the requirement for a proponent/consultant to advertise the proposal in the local print media and contact other bodies and community groups seeking interested Aboriginal parties, in accordance with the 'Aboriginal cultural heritage consultation requirements for proponents 2010' (the CRs).

We would also like to take this opportunity to remind the proponent and consultant to:

- Ensure that consultation is fair, equitable and transparent. If the Aboriginal parties express concern or are opposed to parts of or the entire project, we expect that evidence will be provided to demonstrate the efforts made to find common ground between the

52 Martin Place Sydney ■ GPO Box 5341 Sydney NSW 2001 ■ P: (02) 9228 5555 ■ F: (02) 9228 3935 ■ dpc.nsw.gov.au

opponents and the proponent.

If you have any questions about this advice, please do not hesitate to contact me via paul.houston@environment.nsw.gov.au or 02 68835361.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Paul Houston'.

Paul Houston
Aboriginal Heritage Planning Officer
Aboriginal Cultural Heritage Regulation - Northern
Heritage NSW
Department of Premier and Cabinet
23 November 2021

Table 1: List of Aboriginal stakeholder groups within the Singleton LGA. - that may have an interest in the project; provided as per the "OEH Aboriginal cultural heritage requirement for proponents 2010".

Singleton Local Government Area

Organisation/ Individual	Contact Name	Email Address/ Fax / Phone	Postal Address	Additional information
A1 Indigenous Services	Carolyn Hickey	Cazadirect@live.com 0411 650 057	10 Marie Pitt Place GLENMORE PARK NSW 2745	
Corroboree Aboriginal Corporation	Carroll-Johnson Marilyn	corroboreecorp@bigpond.com 0415 911 159 0288 244 324	PO Box 3340 ROUSE HILL NSW 2155	
Kawul Pty Ltd trading as Wonn1 Sites	Arthur Fletcher	Wonn1sites@gmail.com 0402 146 193 02 4954 7751	619 Main Road GLENDALE NSW 2285	
Lower Hunter Aboriginal Incorporated	David Ahoy	lowerhunterai@gmail.com 0421 329 520	5 Killara Drive CARDIFF SOUTH NSW 2285	
Michael Green Cultural Heritage Consultant	Michael Green	bunyipnick50@gmail.com 0497120032	115A Lakeview Parade BLACKSMITHS NSW 2281	
Wattaka Wonnarua CC Service	Des Hickey	deshickey@bigpond.com 0432 977 178 02 6573 3786	4 Kennedy Street SINGLETON NSW 2330	
Widescope Indigenous Group	Steven Hickey	Widescope.group@live.com 0425 230 693 0425 232 056	73 Russell Street EMU PLAINS NSW 2750	
Murra Bidgee Mullangari Aboriginal Corporation	Ryan Johnson & Darleen Johnson-Carroll	murrabidgeemullangari@yahoo.com.au 0497 983 332	PO Box 3035 Rouse Hill NSW 2155	
Didge Ngunawal Clan	Paul Boyd & Lilly Carroll	didgengunawalclan@yahoo.com.au 0426 823 944	33 Carlyle Crescent 2747CAMBRIDGE GARDENS NSW	
Lower Hunter Wonnarua Cultural Services	Lea-Anne Ball	lhwcs.lea@gmail.com 0472 698 659	712 Maitland Street KURRI KURRI NSW 2327	
Wonnarua Elders Council	Richard Edwards		PO Box 844 CESSNOCK NSW 2325	
Crimson-Rosie	Jeffery Matthews	02 6543 4791	6 Eucalypt Avenue MUSWELLBROOK NSW 2333	
Steve Talbott	Steve Talbott	gomerol.namoi@outlook.com 0429 662 911	73 Kiah Road GILLIESTON HEIGHTS NSW 2321	
AGA Services	Ashley, Gregory & Adam Sampson	aga.services@hotmail.com Ashley Sampson 0401 958 050 Donna Sampson 0403 765 018	22 Ibis Parade WOODBERRY NSW 2322	
Cacatua Culture Consultants	Donna & George Sampson	cacatua4service@tpg.com.au 0403 765 019 0434 877 016	22 Ibis Parade WOODBERRY NSW 2322	
Mindaribba Local Aboriginal Land Council	CEO	ceo@mindaribbalalc.org 02 4934 8511	1A Chelmsford Drive METFORD NSW 2323	
Hunters & Collectors	Tania Matthews	Tamatthews10@hotmail.com 407348384	Unit 1/19 South Street Gunnedah NSW 2320	
Robert Syron	Robert Syron	bobsam1@bigpond.com.au 0407209553	6a Cockshell Drive Gawler East SA 5118	
Karuah Local Aboriginal Land Council	CEO	office@karuahaboriginal.com.au 02 4997 5733	16 Muston Road KARUAH NSW 2324	
Carol Ridgeway-Bissett	Carol Ridgeway-Bissett	02 4984 3113	33 Ullora Road NELSON BAY NSW 2315	
Yinarr Cultural Services	Kathleen Steward Kinchela	yinarrculturalservices@bigpond.com dontminemeay@gmail.com 0475 436 589	Lot 5 Westwood Estate MERRIWA NSW 2329	
Myland Cultural & Heritage Group	Warren Schillings	warren@yamteen.com.au 0431 392 554	30 Taurus Street ELERMORE VALE NSW 2287	
Deslee Talbott Consultants	Deslee Matthews	m-desley@hotmail.com 0431 205 336	Unit 2 / 19 South Street GUNNEDAH NSW 2380	
Gidawaa Walang & Barkuma Neighbourhood Centre Inc.	Craig Horne Debbie Dacey-Sullivan	gidawaa.walang@hotmail.com Craig 0432 336 163 02 4937 1094	76 Lang Street KURRI KURRI NSW 2327	
Tocomwall Pty Ltd	Scott Franks	scott@tocomwall.com.au 0404 171 544	Po Box 145, Miranda NSW 1490	
Aliera French Trading	Aliera French	alierafrenchtrading@outlook.com 0421 299 963	17 Kalinda St BLACKSMITHS NSW 2281	
Indigenous Learning	Craig Archibald	indiglearning@gmail.com	2 Victoria Street BELLBIRD HEIGHTS	

		0467 229 507 0455 550 549	NSW 2325
Jumbunna Traffic Management Group Pty Ltd	Norm Archibald	jtmanagement@live.com.au 0413 718 149	17 Flobern Ave WAUCHOPE NSW 2446
D F T V Enterprises	Derrick Vale Snr	deckavale@hotmail.com 0438 812 197	5 Mountbatten Close RUTHERFORD NSW 2320
Jarban & Mugrebea	Les Atkinson	Les.atkinson@hotmail.com 0466 316 069	11 Nelson Street CESSNOCK NSW 2325
Wonnarua Culture Heritage	Gordon Griffiths	0401 028 807 02 4934 6437	19 O'Donnell Crescent METFORD NSW 2323
Awabakal Traditional Owners Aboriginal Corporation	Kerrie Brauer	Kerrie@awabakal.com.au 0412 866 357	PO Box 122 RUTHERFORD NSW 2320
Kauma Pondee Inc.	Jill Green	kaumapondee@live.com.au 0434 210 190	Unit 6/1 Central Street LAMBTON NSW 2305
Hunter Valley Cultural Surveying	Luke Hickey	Microolith99@gmail.com 0435 911 820	165 Susan Street SCONE NSW 2337
Ungooroo Aboriginal Corporation	Alan Paget	admin@ungooroo.com.au 02 6571 5111	PO Box 3095 SINGLETON NSW 2330
Wonnarua Nation Aboriginal Corporation	Laurie Perry	l.perry@optusnet.com.au 0412 593 020 02 6571 5419	254 John St SINGLETON NSW 2330
Culturally Aware	Tracey Skene	tracey@marrung-pa.com.au 0474 106 537	7 Crawford Place MILFIELD NSW 2325
Hunter Traditional Owner	Paulette Ryan	hto.paulette@gmail.com 0431 109 001	165 Susan Street SCONE NSW 2337
Lower Wonnaruah Tribal Consultancy Pty Ltd	Barry Anderson	0417 403 153 02 6574 5303	156 The Inlet Road BULGA NSW 2330
Wallagan Cultural Services	Maree Waugh	wallangan@outlook.com 0439 813 078	PO Box 40 CESSNOCK NSW 2325
Wanaruah Local Aboriginal Land Council	CEO	ceo.wanaruah@bigpond.com 02 6543 1288	17-19 Maitland Street MUSWELLBROOK NSW 2333
Nunawanna Aboriginal Corporation	Colin Ahoy	cahoy7@myune.edu.au 0421 655 192	10 Dale Crescent ARMIDALE NSW 2350
Hunter Valley Aboriginal Corporation	Rhonda Griffiths	h973809@bigpond.net.au 0427 989 878 02 6543 1180	182 Bridge St MUSWELLBROOK NSW 2333
Bathurst Local Aboriginal Land	CEO	bathlalc2@bigpond.com	149 Russell St BATHURST NSW
Council		02 6332 6835	2795
Mayaroo	Tracey White	rara02@bigpond.com 0438 909 797	PO Box 168 KURRI KURRI NSW 2327
Metropolitan Local Aboriginal Land Council	Nathan Moran	officeadmin@metrolalc.org.au (02) 83949666	PO Box 1103 Strawberry Hills nsw 2016
Aboriginal Native Title Consultants	Christine Paul	christinepaul737@gmail.com 0484 327 664	68 Tindale Street Muswellbrook NSW 2333
The Men's Shack Indigenous Corporations	Rod Hickey	rod.hickey@hotmail.com 0403655284	33 Gardner Circuit Singleton Heights NSW 2330
Wurrumay Pty Ltd	Vicky Slater	0421077521 E: Wurrumay@hotmail.com	33 Gardner Cct Singleton NSW 2330.
Warragil Cultural Services	Aaron Slater	M: 0422231989 E: warragil_c.s@hotmail.com	33 Gardner Circuit Singleton NSW 2566.

Media advertisement placed for Stage 1 (Step 4.1.3) Heritage NSW (DECCW 2010c) consultation process:

Singleton Argus 25 November 2021:

Connect with Classifieds

The Singleton Argus

Phone: 02 6572 2611

Email: classifiedshunter@austcommunitymedia.com.au



Public Notices

NSW ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 NSW NATIONAL PARKS AND WILDLIFE ACT 1974 – SECTION 90

Wambo Coal Pty Ltd (WCPL) owns and operates the Wambo Coal Mine, located approximately 15 kilometres west of Singleton in the Hunter Valley, New South Wales (NSW), in the Singleton Local Government Area.

WCPL is investigating an opportunity for the continuation and improved efficiency of the approved South Bates Extension Underground Mine, including the reorientation of existing longwalls panels and mining of one additional longwall panel in the Whybrow Seam. If WCPL elects to proceed, a Modification to Development Consent (DA305-7-2003) for the Wambo Coal Mine will be sought under the *NSW Environmental Planning and Assessment Act 1979* and the *NSW Environmental Planning and Assessment Regulation 2000*.

As part of the modification request, WCPL will be preparing an Aboriginal Cultural Heritage Assessment, and therefore may seek an Aboriginal Heritage Impact Permit (AHIP) under section 90 of the *NSW National Parks and Wildlife Act 1974*. The subject area of the Modification and any such application is depicted as the "Area of Interest" as shown on the enclosed plan.

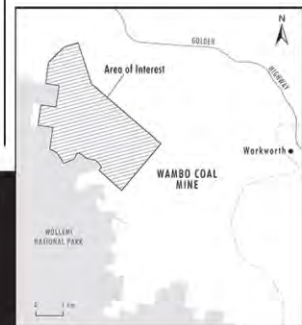
In accordance with the requirements as set out in the *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water, 2010) (Consultation Guidelines) issued by Heritage NSW, WCPL is required to conduct a community consultation process with

relevant Aboriginal people to assist in the preparation of the Aboriginal Cultural Heritage Assessment referred to above.

Also in accordance with the requirements of the Consultation Guidelines, Aboriginal persons or groups who may hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal objects and/or places in the "Area of Interest" are invited to register an interest in a process of community consultation with WCPL regarding the Modification by **5.00pm on Wednesday 8 December 2021**.

WCPL advises that the details of any Aboriginal person or group who registers an interest in the Wambo Coal Mine will be forwarded to the Heritage NSW and the Wanarua Local Aboriginal Land Council in accordance with Section 4.1.5 of the Consultation Guidelines, unless they specify that they do not want their details released.

Please note that any opportunities for employment would be separate to the consultation process.



Contact details for registration are as follows:
Peter Jaeger
Manager - Environment & Community
Wambo Coal Pty Ltd
PMB1
Singleton NSW 2330
Phone: (02) 6570 2206
Email: pjaeger@peabodyenergy.com

AW7187500

Example of correspondence sent in Stage 1 (Step 4.1.2) of consultation process to all existing Registered Aboriginal Parties for Wambo:



24 November 2021

A1 Indigenous Services
73 Russell Street
Emu Plains NSW 2750

WAMBO COAL PTY LTD

ABN: 13 000 668 057

100 Melbourne Street
South Brisbane Qld 4101

PMB 1
Singleton NSW 2330
Australia
Tel + 61 (0) 2 6570 2200
Fax + 61 (0) 2 6570 2290

Dear Carolyn Hickey,

**RE: WAMBO COAL MINE SOUTH BATES EXTENSION UNDERGROUND
MINE LONGWALLS 24-26 MODIFICATION – ABORIGINAL
CULTURAL HERITAGE ASSESSMENT**

Wambo Coal Pty Ltd (WCPL) owns and operates the Wambo Coal Mine, located approximately 15 kilometres west of Singleton in the Hunter Valley, New South Wales (NSW), in the Singleton Local Government Area.

WCPL is investigating an opportunity for the continuation and improved efficiency of the approved South Bates Extension Underground Mine, including the reorientation of existing longwall panels and mining of one additional longwall panel in the Whybrow Seam. If WCPL elects to proceed, a Modification to Development Consent (DA 305-7-2003) for the Wambo Coal Mine would be sought under the NSW *Environmental Planning and Assessment Act 1979* and the NSW *Environmental Planning and Assessment Regulation 2000*.

As part of the Modification request, WCPL will be preparing an Aboriginal Cultural Heritage Assessment, and therefore may seek an Aboriginal Heritage Impact Permit (AHIP) under section 90 of the NSW *National Parks and Wildlife Act 1974*. The subject area of the Modification and any such application is depicted as the "Area of Interest" as shown on the enclosed plan.

In accordance with the consultation requirements as set out in the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (NSW Department of Environment, Climate Change and Water, 2010) (Consultation Guidelines) issued by Heritage NSW, WCPL is required to conduct a community consultation process with relevant Aboriginal people to assist in the preparation of the Aboriginal Cultural Heritage Assessment referred to above. This includes:

- Contacting various government organisations and requesting a list of any Aboriginal persons or groups who may hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal objects and/or places in the "Area of Interest".
- Writing to the Aboriginal persons or groups identified by the above process to notify them of the Modification and invite them to register an interest in the community consultation process.
- Placing a notice in a local newspaper explaining the Modification and inviting Aboriginal persons or groups to register an interest in the community consultation process.

Due to your previous involvement in Aboriginal Cultural Heritage Assessments at the Wambo Coal Mine, you have been automatically registered for the consultation process associated with the Modification. You do NOT need to contact WCPL to re-register for the Modification.

WCPL advises that as a Registered Aboriginal Party, your details will be forwarded to Heritage NSW and the Wanaruah Local Aboriginal Land Council in accordance with Section 4.1.5 of the Consultation Guidelines, unless you specify that you do not want your details released.

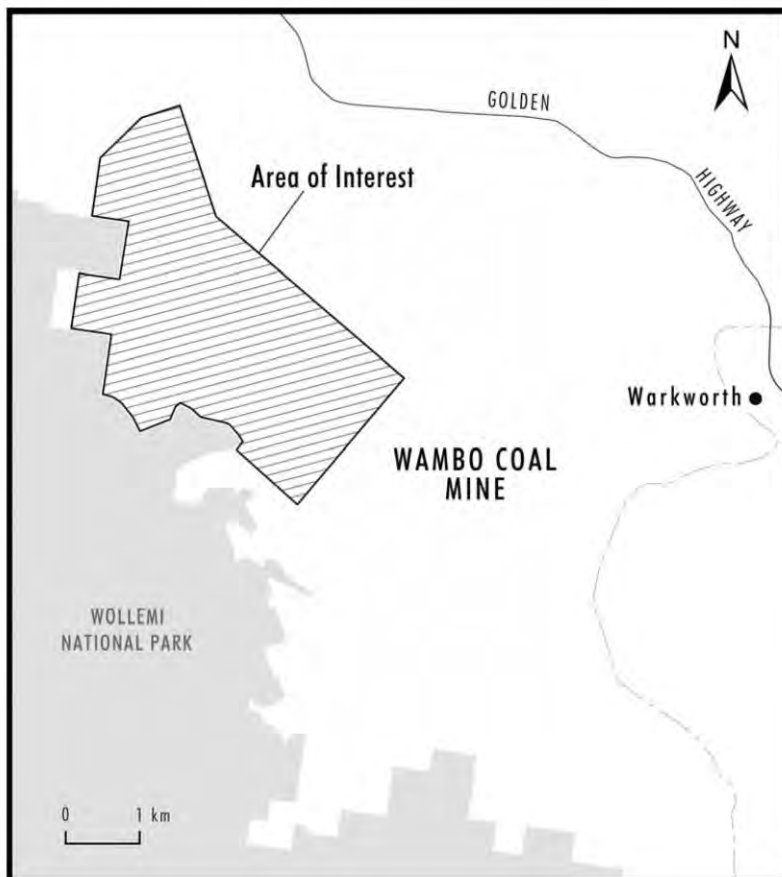
Should you have any queries regarding your registration, please do not hesitate to contact WCPL via the following contact details:

Peter Jaeger
Manager: Environment & Community
Wambo Coal Pty Ltd
PMB1, Singleton NSW 2330
Phone: (02) 6570 2206
Email: pjaeger@peabodyenergy.com

Yours faithfully,



Peter Jaeger
Manager: Environment & Community
WAMBO COAL PTY LTD



Existing RAPs above correspondence sent to (source: WCPL):

RAP	Representative	Address 2
A1 Indigenous Services	Carolyn Hickey	Emu Plains NSW 2750
Aboriginal Native Title Consultants	John and Margaret Matthews & Christine Paul	Muswellbrook NSW 2333
AGA Services	Patricia Kennedy & Ashley, Gregory and Adam Sampson	Wybong NSW 2333
Bawurra Consultants	Kevin Sampson	Breeza NSW 2831
Breeza Plains Cultural Heritage Consultants	Terry Matthews	Tamworth NSW 2340
Buudang	Larry Foley & Debbie Foley	Mudgee NSW 2850
Cacatua Culture Consultants	George Sampson & Donna Sampson	Woodberry NSW 2322
Carrawonga Consultants	Justin Matthews	Muswellbrook NSW 2333
Crimson-Rosie	Jeffrey Matthews	Muswellbrook NSW 2333
Culturally Aware	Tracy Skene	Milfield NSW 2325
Deslee Talbott Consultants	Deslee Matthews	Gunnedah NSW 2380
DFTV Enterprises	Derrick Vale Senior	Rutherford NSW 2320
DRM Cultural Management	Helen Faulkner	Cardiff NSW 2285
EMT Cultural & Heritage	Mervyn Lesley	Gunnedah NSW 2380
Galamaay Consultant	Karen Matthews	Gunnedah NSW 2380
Gidawaa Walang Cultural Heritage Consultancy	Ann Hickey	Kurri Kurri NSW 2327
Giwiir Consultants	Rodney Matthews & Michele Stair	Muswellbrook NSW 2333
HECMO Consultants	Kerren Boyd	Breeza NSW 2381
Heilamon Cultural Consultants	Clifford Johnson	Muswellbrook NSW 2333
Hunter Traditional Owner	Paulette Ryan	Scone NSW 2337
Hunter Valley Aboriginal Corporation	Kylie Pascoe	Muswellbrook NSW 2333
Hunter Valley Cultural Consultants	Christine Archbold	Muswellbrook NSW 2333
Hunter Valley Cultural Surveying	Luke Hickey	Scone NSW 2337
Hunter Valley Environment Land & Mining Services	Des Hickey	Singleton NSW 2330
Hunter Valley Natural & Cultural Resource Management	David French	Muswellbrook NSW 2333
I & E Aboriginal Culture and Heritage	Ivy Jaeger	Cardiff NSW 2285
Janet Fenwick	Janet Fenwick	Singleton NSW 2330
Jarban & Mugrebea	Les Atkinson	Cessnock NSW 2325
Jill Green	Jill Green	Lambton NSW 2299
JLC Cultural Services	Jenny-Lee Chambers	Sandy Hollow NSW 2333
Kawul Cultural Services	Vicky Slater	Emu Plains NSW 2750
Kawul Pty Ltd (trading as Wonn1 Sites)	Arthur Fletcher	Glendale NSW 2285
Kayaway Eco Cultural & Heritage Services	Mark Hickey	Thornton NSW 2322
KL.KG Saunders Trading Services	Krystal Saunders	Muswellbrook NSW 2333
L.J. Cultural Management	Les Field	Gunnedah NSW 2380
Lorraine Towney	Lorraine Towney	Quirindi NSW 2343
Lower Hunter Aboriginal Incorporated	David Ahoy	Cardiff South NSW 2285
Lower Hunter Wonnarua Cultural Services	Tom Miller & Lea-Anne Ball	Heddon Greta NSW 2321

RAP	Representative	Address 2
Minnga Consultants	Clifford Matthews	Muswellbrook NSW 2333
Moreeites	Susan Cutmore	Muswellbrook NSW 2333
Muswellbrook Cultural Consultants	Brian Horton	Muswellbrook NSW 2333
Myland Cultural & Heritage Group	Warren Schillings	Gunnedah NSW 2380
Ngarramang-Kuri Aboriginal Culture & Heritage Group	Abie Wright	Glendale NSW 2285
Plains Clans of the Wonnarua People's Registered Native Title Claimants	Scott Franks & Robert Lester	Caringbar NSW 1495
Roger Noel Matthews	Roger Noel	Muswellbrook NSW 2333
Roslyn Sampson	Roslyn Sampson	Tamworth NSW 2340
Scott Smith	Scott Smith	Port Macquarie NSW 2444
Smith Dhagaans Cultural Group	Timothy Smith	Cameron Park NSW 2285
T & G Culture Consultants	Tony Griffiths	Gunnedah NSW 2380
Tocomwall Pty Ltd	Scott Franks	Caringbar NSW 1495
Ungooroo Aboriginal Corporation	Alan Paget & Tasha Layer	Singleton NSW 2330
Ungooroo Cultural & Community Services	Rhonda Ward	Singleton NSW 2330
Upper Hunter Heritage Consultants	Darrell Matthews & Melissa Matthews	Muswellbrook NSW 2333
Upper Hunter Wonnarua Council	Rhonda Perry	Singleton NSW 2330
Valley Culture	Larry Van Vliet	Muswellbrook NSW 2333
Waabi Gabinya Cultural Consultancy	Elizabeth Howard	Muswellbrook NSW 2333
Wallangan Cultural Services	Maree Waugh	Cessnock NSW 2325
Wanaruah Custodians Aboriginal Corporation	Reginald Eveleigh	Singleton NSW 2330
Wanaruah Local Aboriginal Land Council	Georgia Pascoe	Muswellbrook NSW 2333
Warragil Cultural Services	Aaron Slater	Rooty Hill NSW 2766
Wattaka Wonnarua Cultural Consultancy Services	Des Hickey	Singleton NSW 2330
Widescope Indigenous Group	Amanda Hickey & Steven Hickey	Emu Plains NSW 2750
Wonnarua Culture Heritage	Gordon Griffiths	Metford NSW 2323
Wonnarua Nation Aboriginal Corporation	Laurie Perry	Singleton NSW 2330
Wonnarua Traditional Custodians	Des Hickey	Singleton NSW 2330
Wonnarua Traditional Owners	Des Hickey	Singleton NSW 2330
Wurrumay Consultants	Kerrie Slater & Vicky Slater	89 Pyramid Street
Yinarr Cultural Services	Kathleen Steward Kinchela	Gungal NSW 2333

Example of correspondence sent in Stage 1 (Step 4.1.3) of Heritage NSW (DECCW 2010c) consultation process¹:



24 November 2021

Aliera French Trading
17 Kalinda St
Blacksmiths NSW 2281

WAMBO COAL PTY LTD

ABN: 13 000 668 057

100 Melbourne Street
South Brisbane Qld 4101

PMB 1
Singleton NSW 2330
Australia
Tel + 61 (0) 2 6570 2200
Fax + 61 (0) 2 6570 2290

Dear Aliera French,

**RE: WAMBO COAL MINE SOUTH BATES EXTENSION UNDERGROUND
MINE LONGWALLS 24-26 MODIFICATION – ABORIGINAL
CULTURAL HERITAGE ASSESSMENT**

Wambo Coal Pty Ltd (WCPL) owns and operates the Wambo Coal Mine, located approximately 15 kilometres west of Singleton in the Hunter Valley, New South Wales (NSW), in the Singleton Local Government Area.

WCPL is investigating an opportunity for the continuation and improved efficiency of the approved South Bates Extension Underground Mine, including the reorientation of existing longwall panels and mining of one additional longwall panel in the Whybrow Seam. If WCPL elects to proceed, a Modification to Development Consent (DA 305-7-2003) for the Wambo Coal Mine would be sought under the NSW *Environmental Planning and Assessment Act 1979* and the NSW *Environmental Planning and Assessment Regulation 2000*.

As part of the Modification request, WCPL will be preparing an Aboriginal Cultural Heritage Assessment, and therefore may seek an Aboriginal Heritage Impact Permit (AHIP) under section 90 of the NSW *National Parks and Wildlife Act 1974*. The subject area of the Modification and any such application is depicted as the "Area of Interest" as shown on the enclosed plan.

In accordance with the consultation requirements as set out in the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (NSW Department of Environment, Climate Change and Water, 2010) (Consultation Guidelines) issued by Heritage NSW, WCPL is required to conduct a community consultation process with relevant Aboriginal people to assist in the preparation of the Aboriginal Cultural Heritage Assessment referred to above.

Also in accordance with the requirements of the Consultation Guidelines, Aboriginal persons or groups who may hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal objects and/or places in the "Area of Interest" are invited to register an interest in a process of community consultation with WCPL regarding the Modification.

¹ Sent to all organisations/individuals notified about in responses provided by government agencies and LALC in relation to Step 4.1.2 of Heritage NSW (DECCW 2010c) consultation process.

Should you wish to register an interest in the community consultation process described above, could you please provide your details before **5.00 pm on Wednesday 8 December 2021** to WCPL via the following contact details:

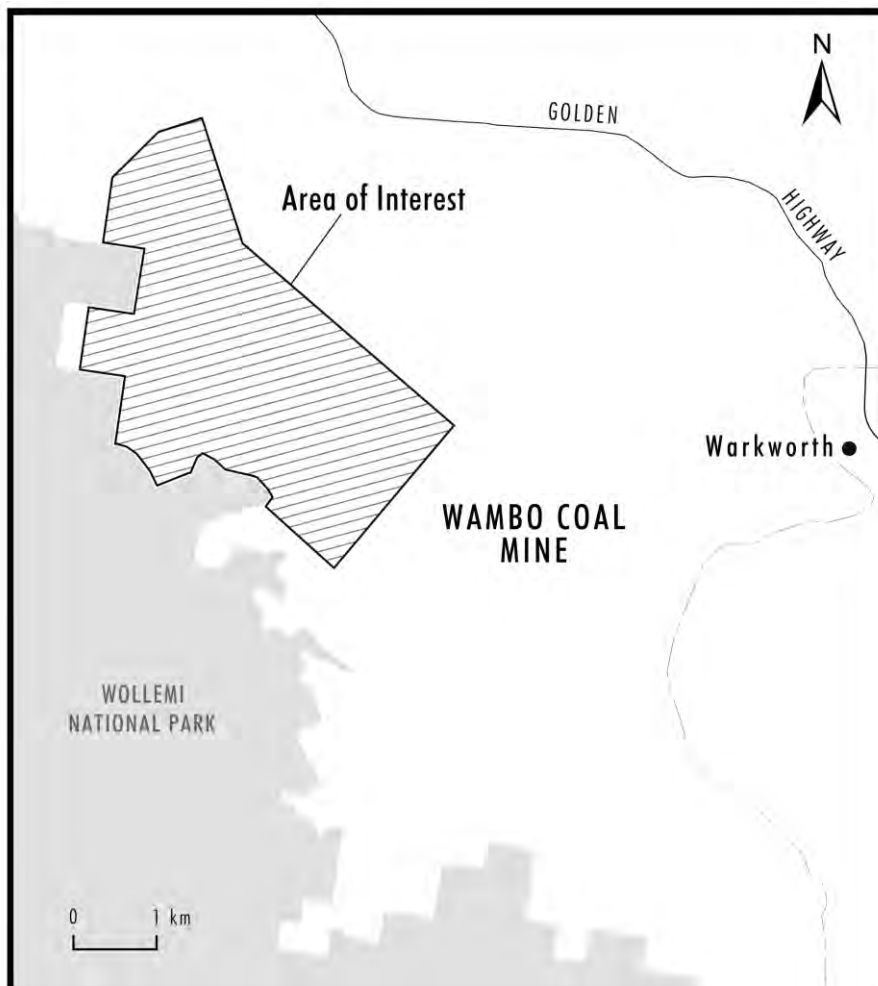
Peter Jaeger
Manager: Environment & Community
Wambo Coal Pty Ltd
PMB1, Singleton NSW 2330
Phone: (02) 6570 2206
Email: pjaeger@peabodyenergy.com

WCPL advises that the details of any Aboriginal person or group who registers an interest in the Wambo Coal Mine will be forwarded to Heritage NSW and the Wanaruah Local Aboriginal Land Council in accordance with Section 4.1.5 of the Consultation Guidelines, unless they specify that they do not want their details released.

Yours faithfully,



Peter Jaeger
Manager: Environment & Community
WAMBO COAL PTY LTD



Aboriginal organisations above correspondence sent to (source: WCPL, details provided by Heritage NSW 23 November 2021):

RAP	Representative	Address 2
Aliera French Trading	Aliera French	Blacksmiths NSW 2281
Awabakal Traditional Owners Aboriginal Corporation	Kerrie Brauer	Rutherford NSW 2320
Bathurst Local Aboriginal Land Council	CEO	Bathurst NSW 2795
Carol Ridgeway-Bissett	Carol Ridgeway-Bissett	Nelson Bay NSW 2315
Corroboree Aboriginal Corporation	Marilyn Carroll-Johnson	Rouse Hill NSW 2155
Didge Ngunawal Clan	Paul Boyd & Lilly Carroll	Cambridge Gardens NSW 2747
Gidawaa Walang & Barkuma Neighbourhood Centre Inc.	Craig Horne & Debbie Dacey-Sullivan	Kurri Kurri NSW 2327
Hunters & Collectors	Tania Matthews	Gunnedah NSW 2320
Indigenous Learning	Craig Archibald	Bellbird Heights NSW 2325
Jumbunna Traffic Management Group Pty Ltd	Norm Archibald	Wauchope NSW 2446
Karuah Local Aboriginal Land Council	CEO	Karuah NSW 2324
Kauma Pondee Inc.	Jill Green	Lambton NSW 2305
Lower Wonnaruah Tribal Consultancy Pty Ltd	Barry Anderson	Bulga NSW 2330
Mayaroo	Tracey White	Kurri Kurri NSW 2327
Metropolitan Local Aboriginal Land Council	Nathan Moran	Strawberry Hills NSW 2016
Michael Green Cultural Heritage Consultant	Michael Green	Blacksmiths NSW 2281
Mindaribba Local Aboriginal Land Council	CEO	Metford NSW 2323
Murra Bidgee Mullangari Aboriginal Corporation	Ryan Johnson & Darleen Johnson-Carroll	Rouse Hill NSW 2155
Nunawanna Aboriginal Corporation	Colin Ahoy	Armidale NSW 2350
Robert Syron	Robert Syron	Gawler East SA 5118
Steve Talbott	Steve Talbott	Gillieston Heights NSW 2321
The Men's Shack Indigenous Corporations	Rod Hickey	Singleton Heights NSW 2330
Wonnarua Elders Council	Richard Edwards	Cessnock NSW 2325

Responses received in relation to Stage 1 (Steps 4.1.2 and 4.1.3) of Heritage NSW (DECCW 2010c) consultation process and media advertisement from Aboriginal parties:

From: Kerrie Brauer <kerrie@awabakal.com.au>
Sent: 30 November 2021 17:38
To: Jaeger, Peter F <PJaeger@peabodyenergy.com>
Subject: Re: Declining Notification of Interest

Dear Peter,

Thank you for your letter dated 24 November 2021 regarding the Wambo Coal Mine South Bates Aboriginal Cultural Heritage Assessment.

The Awabakal Traditional Owners Aboriginal Corporation appreciates Wambo Coal in contacting us regarding the South Bates Extension Underground Mine Longwalls 24-26 Modification Aboriginal Cultural Heritage Assessment and Invitation to Register an Interest.

The Awabakal People would like to inform Wambo Coal that the Project is not within our Cultural Boundary and therefore are unable Register an Interest and/or to make any comments on the Aboriginal Cultural Heritage within the area.

If you require any further information please do not hesitate in contacting me.

Kind regards,
Kerrie Brauer

ATOAC

Kerrie Brauer | Director | Administration | Awabakal Traditional Owners Aboriginal Corporation
M: 04 12 86 63 57 | E: kerrie@awabakal.com.au | www.awabakal.com.au
PO Box 172 Rutherford NSW 2320 Australia

CONFIDENTIALITY NOTICE: This e-mail is confidential and intended for the addressee only. The use, copying or distribution of this message or any information it contains, by anyone other than the addressee is prohibited by the sender. If you have received this e-mail in error, please delete it and notify the original author immediately. Every reasonable precaution has been taken to ensure that this e-mail, including attachments, does not contain any viruses. However, no liability can be accepted for any damage sustained as a result of such viruses, and recipients are advised to carry out their own checks. Please consider the environment before printing this correspondence.

From: lilly carroll <didgengunawalclan@yahoo.com.au>
Sent: 01 December 2021 20:08
To: Jaeger, Peter F <PJaeger@peabodyenergy.com>
Subject: Expression of interest

Hi Peter

DNC would like to register an interest into the Wambo Coal mine South bates extension underground longwalls 24 to 26 modification
ABHA

Fully insured and experienced/ vaccinated site officers

Kind regards
Paul Boyd & Lilly Carroll
Directors DNC
0426823944

Notifications to Heritage NSW and Wanaruah LALC in relation to Step 4.1.6 of Heritage NSW (DECCW 2010c) consultation process:



14 March 2022

Heritage NSW
Hunter Valley Regional Office

By email only: heritagemailbox@environment.nsw.gov.au

To Whom it May Concern,

**RE: WAMBO COAL MINE SOUTH BATES EXTENSION UNDERGROUND
MINE LONGWALLS 24-26 MODIFICATION – ABORIGINAL
CULTURAL HERITAGE ASSESSMENT**

In accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water, 2010), a list of the Registered Aboriginal Parties that registered an interest in the community consultation process with Wambo Coal Pty Ltd for the South Bates Extension Underground Mine Longwalls 24-26 Modification is provided in Enclosure A.

Copies of the notification letters sent to the Aboriginal stakeholder and the public notice published in accordance with Section 4.1.6 of the *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water, 2010) are provided in Enclosures B and C, respectively.

Yours faithfully,

A handwritten signature in blue ink, appearing to read "P. F. Jaeger", is written over a light blue horizontal line.

Peter Jaeger
Manager: Environment & Community
WAMBO COAL PTY LTD

WAMBO COAL PTY LTD

ABN: 13 000 668 057

100 Melbourne Street
South Brisbane Qld 4101

PMB 1
Singleton NSW 2330
Australia
Tel + 61 (0) 2 6570 2200
Fax + 61 (0) 2 6570 2290

Enclosure A
Registered Aboriginal Parties for the South Bates Extension Modification

Registered Aboriginal Party	Registered Aboriginal Party
A1 Indigenous Services	L.J. Cultural Management
Aboriginal Native Title Consultants	Lorraine Towney
AGA Services	Lower Hunter Aboriginal Incorporated
Bawurra Consultants	Lower Hunter Wonnarua Cultural Services
Breeza Plains Cultural Heritage Consultants	Maree /TA Wallangan Cultural Services
Buudang	Minnga Consultants
Cacatua Culture Consultants	Moreeites
Carrawonga Consultants	Muswellbrook Cultural Consultants
Culturally Aware	Myland Cultural Heritage Group
Deslee Talbott Consultants	Ngarramang-Kuri Aboriginal Culture & Heritage Group
DFTV Enterprises	Plains Clans of the Wonnarua People's Registered Native Title Claimants
DRM Cultural Management	Roger Noel Matthews
EMT Cultural & Heritage	Roslyn Sampson
Galamaay Consultant	Scott Smith
Gidawaa Walang Cultural Heritage Consultancy	Smith Dhagaans Cultural Group
Giwiir Consultants	T & G Culture Consultants
HECMO Consultants	Tocomwall Pty Ltd
Heilamon Cultural Consultants	Ungooroo Aboriginal Corporation
HTO Environmental Management Services	Ungooroo Cultural & Community Services
Hunter Valley Aboriginal Corporation	Upper Hunter Heritage Consultants
Hunter Valley Cultural Consultants	Upper Hunter Wonnarua Council
Hunter Valley Cultural Surveying	Valley Culture
Hunter Valley Environment Land & Mining Services	Waabi Gabinya Cultural Consultancy
Hunter Valley Natural & Cultural Resource Management	Wanaruah Custodians Aboriginal Corporation
I & E Aboriginal Culture and Heritage	Wanaruah Local Aboriginal Land Council
Janet Fenwick	Warragil Cultural Services
Janbant Mugrebea	Wattaka Wonnarua Cultural Consultancy Services
Jeffery Matthews	Widescope Indigenous Group
Jill Green	Wonnarua Culture Heritage
JLC Cultural Services	Wonnarua Nation Aboriginal Corporation
Kauwul (Wonn1)	Wonnarua Traditional Custodians
Kawul Cultural Services	Wonnarua Traditional Owners
Kayaway Eco Cultural & Heritage Services	Wurrumay Consultants
KL.KG Saunders Trading Services	Yinaar Cultural Services
Woka Aboriginal Corporation	Didge Ngunawal Clan

Enclosure B
Correspondence Sent to Registered Aboriginal Parties

(refer to example in preceding section).

Enclosure C
Public Notice

(refer to preceding section).



WAMBO COAL PTY LTD

ABN: 13 000 668 057

100 Melbourne Street
South Brisbane Qld 4101

PMB 1
Singleton NSW 2330
Australia
Tel + 61 (0) 2 6570 2200
Fax + 61 (0) 2 6570 2290

14 March 2022

Wanaruah Local Aboriginal Land Council
PO Box 127
Muswellbrook NSW 2333

Dear Georgia Pascoe,

**RE: WAMBO COAL MINE SOUTH BATES EXTENSION UNDERGROUND
MINE LONGWALLS 24-26 MODIFICATION – ABORIGINAL
CULTURAL HERITAGE ASSESSMENT FIELD SURVEYS**

In accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water, 2010), a list of the Registered Aboriginal Parties that registered an interest in the community consultation process with Wambo Coal Pty Ltd for the South Bates Extension Underground Mine Longwalls 24-26 Modification is provided in Enclosure A.

Copies of the notification letters sent to the Aboriginal stakeholder and the public notice published in accordance with Section 4.1.6 of the *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water, 2010) are provided in Enclosures B and C, respectively.

Yours faithfully,

Peter Jaeger
Manager: Environment & Community
WAMBO COAL PTY LTD

Responses received in relation to Stage 1 (Steps 4.1.2 and 4.1.3) of Heritage NSW (DECCW 2010c) consultation process and media advertisement from Aboriginal stakeholders after closing date for acceptance of registrations of interest:

Non-Disclosure Requested

Example of correspondence sent in Steps 4.2 and 4.3 of Heritage NSW (DECCW 2010c) consultation process (provision of draft ACHA methodology and project information)² and related consultation, including arrangement of field survey:



14 December 2021

A1 Indigenous Services
73 Russell Street
Emu Plains NSW 2750

Dear Carolyn Hickey,

**RE: WAMBO COAL MINE SOUTH BATES EXTENSION UNDERGROUND MINE
LONGWALLS 24-26 MODIFICATION – ABORIGINAL CULTURAL HERITAGE
ASSESSMENT**

Please find enclosed for your review, a copy of the Proposed Methodology for the South Bates Extension Underground Mine Longwalls 24-26 Modification (the Modification) Aboriginal Cultural Heritage Assessment.

In accordance with the consultation requirements as set out in the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (New South Wales [NSW] Department of Environment, Climate Change and Water, 2010) (Consultation Guidelines) issued by Heritage NSW, we have provided the Proposed Methodology for your review and feedback. Your feedback may include the identification of issues or areas of cultural significance that may be used to affect, inform or refine the proposed Methodology.

If you wish to provide input on the following, please make a submission to Wambo Coal Pty Ltd (WCPL) (via the contact details provided at the end of this letter) by **5.00pm Friday 28 January 2022**:

- The nature of the Proposed Methodology.
- Any Aboriginal objects or places of cultural value within the investigation area, or issues of cultural significance, that you are aware of.
- Any restrictions or protocols you may consider necessary in relation to any information of sensitivity that you may provide.
- Any other factors you consider to be relevant to the heritage assessment.

All comments received will be taken into consideration as the Proposed Methodology is finalised.

WAMBO COAL PTY LTD

ABN: 13 000 668 057

100 Melbourne Street
South Brisbane Qld 4101

PMB 1
Singleton NSW 2330
Australia
Tel + 61 (0) 2 6570 2200
Fax + 61 (0) 2 6570 2290

² Sent to all Registered Aboriginal Parties.

Any feedback with respect to the Proposed Methodology is to be provided by **5.00pm Friday 28 January 2022**. Please provide your feedback to WCPL via the following contact details:

Peter Jaeger
Manager: Environment & Community
Wambo Coal Pty Ltd
PMB1, Singleton NSW 2330
Phone: (02) 6570 2206
Email: pjaeger@peabodyenergy.com

Yours faithfully,



Peter Jaeger
Manager: Environment & Community
WAMBO COAL PTY LTD

From: Dobbins, Nicole <NDobbins@peabodyenergy.com>
Sent: Tuesday, 21 December 2021 11:51 AM
To: warragil_c.s@hotmail.com
Subject: FW: Wambo Coal Mine - Registered Aboriginal Party Contact Details

Dear Lorraine,

As you may be aware, you are registered for consultation purposes for Aboriginal cultural heritage assessments at the Wambo Coal Mine.

We recently sent you some correspondence in relation to an upcoming Aboriginal Cultural Heritage Assessment to the postal details we have on file (32 Dewhurst Street). This correspondence was returned to us.

Can you please provide your current postal address for our records?

Thankyou,

Nicole

Nicole Dobbins
Senior Environmental Advisor - Contract
Peabody Australia
PMB 1, Singleton NSW 2330
Office: (02) 6570 2209
ndobbins@peabodyenergy.com

The Peabody logo consists of the word "Peabody" in a bold, blue, sans-serif font. The letter "P" is significantly larger than the other letters. A horizontal blue line is positioned directly beneath the word.

From: Dobbins, Nicole <NDobbins@peabodyenergy.com>
Sent: Tuesday, 21 December 2021 11:55 AM
To: scottosmith@live.com.au
Subject: FW: Wambo Coal Mine - Registered Aboriginal Party Contact Details

Dear Luke,

As you may be aware, you are registered under Hunter Valley Cultural Surveying for consultation purposes for Aboriginal cultural heritage assessments at the Wambo Coal Mine.

We recently sent you some correspondence in relation to an upcoming Aboriginal Cultural Heritage Assessment to the postal details we have on file (165 Susan Street). This correspondence was returned to us.

Can you please provide your current postal address for our records?

Thanks,
Nicole

Nicole Dobbins

Senior Environmental Advisor - Contract

Peabody Australia

PMB 1, Singleton NSW 2330

Office: 02 6570 2209

ndobbins@peabodyenergy.com



Example of correspondence to selected RAPs regarding field survey:



WAMBO COAL PTY LTD

ABN: 13 000 668 057

100 Melbourne Street
South Brisbane Qld 4101

PMB 1
Singleton NSW 2330
Australia
Tel + 61 (0) 2 6570 2200
Fax + 61 (0) 2 6570 2290

7 February 2022

Wanaruah Local Aboriginal Land Council
PO Box 127
Muswellbrook NSW 2333

Via email - admin@wanaruahlandcouncil.com.au, ceo.wanaruah@bigpond.com,
CEO@wanaruahlandcouncil.com.au

Dear Georgia Pascoe,

**RE: WAMBO COAL MINE SOUTH BATES EXTENSION UNDERGROUND
MINE LONGWALLS 24-26 MODIFICATION – ABORIGINAL
CULTURAL HERITAGE ASSESSMENT FIELD SURVEYS**

Wambo Coal Pty Ltd (WCPL) owns and operates the Wambo Coal Mine, located approximately 15 kilometres west of Singleton in the Hunter Valley, New South Wales (NSW), in the Singleton Local Government Area.

As you would be aware, an Aboriginal Cultural Heritage Assessment (ACHA) is being prepared for the South Bates Extension Underground Mine Longwalls 24-26 Modification (the Modification).

To support preparation of the ACHA for the Modification, WCPL proposes to undertake field work at the Wambo Coal Mine. Accordingly, Wanaruah Local Aboriginal Land Council (WLALC) is invited to participate and send one (1) field officer.

If WLALC is interested in being part of the field work, could you please provide WCPL with the name and contact phone number for the representative attending the field works, via the contact details provided at the end of this letter?

Scope of Works

Field work under direction of an Archaeologist will consist of survey in the Modification area.

Works are planned to occur Monday 14 February 2022 to Friday 18 February 2022. It is possible the work may extend for a couple of days into the following week.

To attend the field works, participants must not be experiencing any symptoms of COVID (i.e. fever, headache, sore throat, shortness of breath, runny nose or fatigue) or be considered a 'high risk' exposure for COVID (i.e. live with someone with COVID, or have been advised by someone you spent a long time with closely, without wearing a mask, that they are COVID positive) and must follow NSW Health Advice. Participants must maintain social distance where possible. There are no specific COVID testing requirements at WCPL, however participants will be required to complete a COVID health questionnaire as part of the login process. Face masks must be worn while indoors and when travelling in vehicles.

It is expected that workers will be onsite and fit for work, works will commence at 8:00am. The daily meeting place will be at the Wambo Coal Mine car park: **Jerrys Plains Road, Warkworth NSW 2330**. It is expected that works will be finished at approximately 4:00pm each day.

Terms of Engagement

WCPL provide this opportunity under the following rate \$550/day plus \$150/day for travel and meal allowance.

Should you have any queries regarding your registration, please do not hesitate to contact WCPL via the following contact details:

Peter Jaeger
Manager: Environment & Community
Wambo Coal Pty Ltd
PMB1, Singleton NSW 2330
Phone: (02) 6570 2206
Email: pjaeger@peabodyenergy.com

Yours faithfully,



Peter Jaeger
Manager: Environment & Community
WAMBO COAL PTY LTD

From: CEO Wanaruah <ceo@wanaruahlandcouncil.com.au>
Sent: Tuesday, 8 February 2022 10:33 AM
To: Dobbins, Nicole
Subject: RE: Wambo Coal - ACHA Field Surveys - LW24-26 Modification

Good Morning Nicole

I will have Christine Paul attending

Kind Regards
Tania Riley
CEO Wanaruah Local Aboriginal Land Council



19 Maitland Road
Muswellbrook
02 65431222

From: Dobbins, Nicole <NDobbins@peabodyenergy.com>
Sent: Monday, 7 February 2022 4:04 PM
To: admin@wanaruahlandcouncil.com.au; ceo.wanarua@bigpond.com; CEO@wanaruahlandcouncil.com.au
Subject: Wambo Coal - ACHA Field Surveys - LW24-26 Modification

Good afternoon,

Please find attached correspondence relating to the field work for an Aboriginal Cultural Heritage Survey at Wambo Coal Pty Ltd.

If you could please advise of your availability to participate ASAP it would be greatly appreciated.

Kind regards,
Nicole

Nicole Dobbins
Senior Environmental Advisor - Contract
Peabody Australia
PMB 1, Singleton NSW 2330
Office: 0408 96 9988
ndobbins@peabodyenergy.com



From: Dobbins, Nicole <NDobbins@peabodyenergy.com>
Sent: Monday, 7 February 2022 2:58 PM
To: yarrowalk@tpg.com.au; scott@toconwall.com.au
Subject: Wambo Coal - Field work for ACHA for LW24-26 Modification
Attachments: 220207 LTR Tocomwall - Notification of Surveys (Longwalls 24-26 Modification ACHA).pdf

Good afternoon,

Please find attached correspondence relating to the field work for an Aboriginal Cultural Heritage Survey at Wambo Coal Pty Ltd.

If you could please advise of your availability to participate ASAP it would be greatly appreciated.

Kind regards,
Nicole

Nicole Dobbins

Senior Environmental Advisor - Contaminants

Peabody Australia

PMB 1, Singleton NSW 2330

Office: 0408 96 9988

ndobbins@peabodyenergy.com





WAMBO COAL PTY LTD

ABN: 13 000 668 057

100 Melbourne Street
South Brisbane Qld 4101

PMB 1
Singleton NSW 2330
Australia
Tel + 61 (0) 2 6570 2200
Fax + 61 (0) 2 6570 2290

7 February 2022

Tocomwall Pty Ltd
PO Box 76
Caringbar NSW 1495

Via email yarrowalk@tpg.com.au & scott@tocomwall.com.au

Dear Scott Franks,

**RE: WAMBO COAL MINE SOUTH BATES EXTENSION UNDERGROUND
MINE LONGWALLS 24-26 MODIFICATION – ABORIGINAL
CULTURAL HERITAGE ASSESSMENT FIELD SURVEYS**

Wambo Coal Pty Ltd (WCPL) owns and operates the Wambo Coal Mine, located approximately 15 kilometres west of Singleton in the Hunter Valley, New South Wales (NSW), in the Singleton Local Government Area.

As you would be aware, an Aboriginal Cultural Heritage Assessment (ACHA) is being prepared for the South Bates Extension Underground Mine Longwalls 24-26 Modification (the Modification).

To support preparation of the ACHA for the Modification, WCPL proposes to undertake field work at the Wambo Coal Mine. Accordingly, Tocomwall Pty Ltd is invited to participate and send one (1) field officer.

If you are interested in being part of the field work, could you please provide WCPL with the name and contact phone number for the representative attending the field works, via the contact details provided at the end of this letter?

Scope of Works

Field work under direction of an Archaeologist will consist of survey in the Modification area.

Works are planned to occur Monday 14 February 2022 to Friday 18 February 2022. It is possible the work may extend for a couple of days into the following week.

All participants will be required to have and use full personal protective equipment including: HI-VIS Long Pants; Long Sleeve Shirt and Safety Boots. WCPL will provide Helmet; Safety Glasses; and Gloves. All participants will also be required to bring their food and drinks for the day.

To attend the field works, participants must not be experiencing any symptoms of COVID (i.e. fever, headache, sore throat, shortness of breath, runny nose or fatigue) or be considered a 'high risk' exposure for COVID (i.e. live with someone with COVID, or have been advised by someone you spent a long time with closely, without wearing a mask, that they are COVID positive) and must follow NSW Health Advice. Participants must maintain social distance where possible. There are no specific COVID testing requirements at WCPL, however

participants will be required to complete a COVID health questionnaire as part of the login process. Face masks must be worn while indoors and when travelling in vehicles.

It is expected that workers will be onsite and fit for work, works will commence at 8:00am. The daily meeting place will be at the Wambo Coal Mine car park: **Jerrys Plains Road, Warkworth NSW 2330**. It is expected that works will be finished at approximately 4:00pm each day.

Terms of Engagement

WCPL provide this opportunity under the following rate \$550/day plus \$150/day for travel and meal allowance.

Should you have any queries regarding your registration, please do not hesitate to contact WCPL via the following contact details:

Peter Jaeger
Manager: Environment & Community
Wambo Coal Pty Ltd
PMB1, Singleton NSW 2330
Phone: (02) 6570 2206
Email: pjaeger@peabodyenergy.com

Yours faithfully,



Peter Jaeger
Manager: Environment & Community
WAMBO COAL PTY LTD

From: Dobbins, Nicole <NDobbins@peabodyenergy.com>
Sent: Monday, 7 February 2022 3:10 PM
To: classic_black_sampson@hotmail.com
Subject: Wambo Coal - Field Surveys for ACHA - LW24-26 Modification
Attachments: 220207 LTR Bawurra - Notification of Surveys (Longwalls 24-26 Modification ACHA).pdf

Good afternoon,

Please find attached correspondence relating to the field work for an Aboriginal Cultural Heritage Survey at Wambo Coal Pty Ltd.

If you could please advise of your availability to participate ASAP it would be greatly appreciated.

Kind regards,
Nicole

Nicole Dobbins

Senior Environmental Advisor - Contract

Peabody Australia

PMB 1, Singleton NSW 2330

Office: 0408 96 9988

ndobbins@peabodyenergy.com





WAMBO COAL PTY LTD

ABN: 13 000 668 057

100 Melbourne Street
South Brisbane Qld 4101

PMB 1
Singleton NSW 2330
Australia
Tel + 61 (0) 2 6570 2200
Fax + 61 (0) 2 6570 2290

7 February 2022

Bawurra Consultants
1 Martyn Street
Breeza NSW 2831

Via email - classic_black_sampson@hotmail.com

Dear Kevin Sampson,

**RE: WAMBO COAL MINE SOUTH BATES EXTENSION UNDERGROUND
MINE LONGWALLS 24-26 MODIFICATION – ABORIGINAL
CULTURAL HERITAGE ASSESSMENT FIELD SURVEYS**

Wambo Coal Pty Ltd (WCPL) owns and operates the Wambo Coal Mine, located approximately 15 kilometres west of Singleton in the Hunter Valley, New South Wales (NSW), in the Singleton Local Government Area.

As you would be aware, an Aboriginal Cultural Heritage Assessment (ACHA) is being prepared for the South Bates Extension Underground Mine Longwalls 24-26 Modification (the Modification).

To support preparation of the ACHA for the Modification, WCPL proposes to undertake field work at the Wambo Coal Mine. Accordingly, Bawurra Consultants is invited to participate and send one (1) field officer.

If you are interested in being part of the field work, could you please provide WCPL with the name and contact phone number for the representative attending the field works, via the contact details provided at the end of this letter?

Scope of Works

Field work under direction of an Archaeologist will consist of survey in the Modification area.

Works are planned to occur Monday 14 February 2022 to Wednesday 16 February 2022.

To attend the field works, participants must not be experiencing any symptoms of COVID (i.e. fever, headache, sore throat, shortness of breath, runny nose or fatigue) or be considered a 'high risk' exposure for COVID (i.e. live with someone with COVID, or have been advised by someone you spent a long time with closely, without wearing a mask, that they are COVID positive) and must follow NSW Health Advice. Participants must maintain social distance where possible. There are no specific COVID testing requirements at WCPL, however participants will be required to complete a COVID health questionnaire as part of the login process. Face masks must be worn while indoors and when travelling in vehicles.

It is expected that workers will be onsite and fit for work, works will commence at 8:00am. The daily meeting place will be at the Wambo Coal Mine car park: **Jerrys Plains Road, Warkworth NSW 2330**. It expected that works will be finished at approximately 4:00pm each day.

Terms of Engagement

WCPL provide this opportunity under the following rate \$550/day plus \$150/day for travel and meal allowance.

Should you have any queries regarding your registration, please do not hesitate to contact WCPL via the following contact details:

Peter Jaeger
Manager: Environment & Community
Wambo Coal Pty Ltd
PMB1, Singleton NSW 2330
Phone: (02) 6570 2206
Email: pjaeger@peabodyenergy.com

Yours faithfully,



Peter Jaeger
Manager: Environment & Community
WAMBO COAL PTY LTD

From: Dobbins, Nicole <NDobbins@peabodyenergy.com>
Sent: Monday, 7 February 2022 3:23 PM
To: admin@ungooroo.com.au; ungooroo@bigpond.com
Subject: FW: Wambo Coal - Field Surveys for ACHA - LW24-26 Modification
Attachments: 220207 LTR Ungooroo Aboriginal Corporation - Notification of ACHA Surveys.pdf

Good afternoon,

Please find attached correspondence relating to the field work for an Aboriginal Cultural Heritage Survey at Wambo Coal Pty Ltd.

If you could please advise of your availability to participate ASAP it would be greatly appreciated.

Kind regards,
Nicole

Nicole Dobbins
Senior Environmental Advisor - Contract
Peabody Australia
PMB 1, Singleton NSW 2330
Office: 0408 96 9988
ndobbins@peabodyenergy.com





WAMBO COAL PTY LTD

ABN: 13 000 668 057

100 Melbourne Street
South Brisbane Qld 4101

PMB 1
Singleton NSW 2330
Australia
Tel + 61 (0) 2 6570 2200
Fax + 61 (0) 2 6570 2290

7 February 2022

Ungooroo Aboriginal Corporation
PO Box 3095
Singleton NSW 2330

Via email - admin@ungooroo.com.au & ungooroo@bigpond.com

Dear Alan Paget & Tasha Layer,

**RE: WAMBO COAL MINE SOUTH BATES EXTENSION UNDERGROUND
MINE LONGWALLS 24-26 MODIFICATION – ABORIGINAL
CULTURAL HERITAGE ASSESSMENT FIELD SURVEYS**

Wambo Coal Pty Ltd (WCPL) owns and operates the Wambo Coal Mine, located approximately 15 kilometres west of Singleton in the Hunter Valley, New South Wales (NSW), in the Singleton Local Government Area.

As you would be aware, an Aboriginal Cultural Heritage Assessment (ACHA) is being prepared for the South Bates Extension Underground Mine Longwalls 24-26 Modification (the Modification).

To support preparation of the ACHA for the Modification, WCPL proposes to undertake field work at the Wambo Coal Mine. Accordingly, Ungooroo Aboriginal Corporation is invited to participate and send one (1) field officer.

If Ungooroo Aboriginal Corporation is interested in being part of the field work, could you please provide WCPL with the name and contact phone number for the representative attending the field works, via the contact details provided at the end of this letter?

Scope of Works

Field work under direction of an Archaeologist will consist of survey in the Modification area.

Works are planned to occur Thursday 17 February 2022 and Friday 18 February 2022. There is some possibility that the surveys may extend into the following week.

All participants will be required to have and use full personal protective equipment including: high visibility Long Pants; Long Sleeve Shirt and Safety Boots. WCPL will provide Helmet; Safety Glasses; and Gloves. All participants will also be required to bring their food and drinks for the day.

To attend the field works, participants must not be experiencing any symptoms of COVID (i.e. fever, headache, sore throat, shortness of breath, runny nose or fatigue) or be considered a 'high risk' exposure for COVID (i.e. live with someone with COVID, or have been advised by someone you spent a long time with closely, without wearing a mask, that they are COVID positive) and must follow NSW Health Advice. Participants must maintain social distance where

possible. There are no specific COVID testing requirements at WCPL, however participants will be required to complete a COVID health questionnaire as part of the login process. Face masks must be worn while indoors and when travelling in vehicles.

It is expected that workers will be onsite and fit for work, works will commence at 8:00am. The daily meeting place will be at the Wambo Coal Mine car park: **Jerrys Plains Road, Warkworth NSW 2330**. It is expected that works will be finished at approximately 4:00pm each day.

Terms of Engagement

WCPL provide this opportunity under the following rate \$550/day plus \$150/day for travel and meal allowance.

Should you have any queries regarding your registration, please do not hesitate to contact WCPL via the following contact details:

Peter Jaeger
Manager: Environment & Community
Wambo Coal Pty Ltd
PMB1, Singleton NSW 2330
Phone: (02) 6570 2206
Email: pjaeger@peabodyenergy.com

Yours faithfully,



Peter Jaeger
Manager: Environment & Community
WAMBO COAL PTY LTD

Responses received from Registered Aboriginal Parties in relation to Steps 4.2 and 4.3 of Heritage NSW (DECCW 2010c) consultation process (provision of draft heritage assessment methodology and project information):

No responses received in relation to draft methodology or project information.

Example of correspondence sent in Steps 4.3 and 4.4 of Heritage NSW (DECCW 2010c) consultation process regarding provision of draft Aboriginal Cultural Heritage Assessment Report for comment³:

From: Dobbins, Nicole <NDobbins@peabodyenergy.com>
Sent: Thursday, 7 April 2022 11:22 AM
Subject: FW: Wambo - South Bates Extension Underground Mine LW24-26 Modification Draft ACHA
Attachments: 220407 LTR-RAPs Draft ACHA Report.pdf

Dear Registered Aboriginal Stakeholder,

Please find attached correspondence from Wambo Coal Pty Ltd (WCPL) regarding the draft Aboriginal Cultural Heritage Assessment (ACHA) prepared by South East Archaeology for South Bates Extension Underground Mine Longwalls 24-26 Modification (MOD 19).

A link to download a copy of the draft ACHA is included in the correspondence. If you require any further information, please do not hesitate to get in touch.

Kind regards,
Nicole

Nicole Dobbins

Senior Environmental Advisor - Contract

Peabody Australia

PMB 1, Singleton NSW 2330

Office: 0408 96 9988

ndobbins@peabodyenergy.com



³ Sent to all Registered Aboriginal Parties by email (where email address available) and by post (where only postal address available), and by post to RAPs whose email addresses subsequently bounced.



WAMBO COAL PTY LTD

ABN: 13 000 668 057

100 Melbourne Street
South Brisbane Qld 4101

PMB 1
Singleton NSW 2330
Australia
Tel + 61 (0) 2 6570 2200
Fax + 61 (0) 2 6570 2290

7 April 2022

Dear Registered Aboriginal Stakeholders

**RE: WAMBO COAL MINE SOUTH BATES EXTENSION UNDERGROUND MINE
LONGWALLS 24-26 MODIFICATION - DRAFT ABORIGINAL CULTURAL HERITAGE
ASSESSMENT**

The Wambo Coal Mine is situated approximately 15 kilometres west of Singleton, near the village of Warkworth, New South Wales (NSW). The Wambo Coal Mine is owned and operated by Wambo Coal Pty Ltd (WCPL), a subsidiary of Peabody Energy Australia Pty Ltd.

As you would be aware, WCPL is preparing an application to modify the DA 305-7-2003 for the Wambo Coal Mine (the South Bates Extension Underground Mine Longwalls 24-26 Modification [MOD 19]).

Please find enclosed for your review, a copy of the draft Aboriginal Cultural Heritage Assessment (ACHA) for South Bates Extension Underground Mine Longwalls 24-26 Modification (MOD 19).

If you received this letter via email, the full draft ACHA can be downloaded from the following link: [Full Draft ACHA](#)

If you have received this letter via post, the draft ACHA can be downloaded from the enclosed USB.

Please contact WCPL (via contact details provided at the end of the letter) if you wish to request a hard copy of the draft ACHA.

Review of draft *Aboriginal Cultural Heritage Assessment*

In accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water, 2010), we have provided the draft ACHA for your review and feedback. Your feedback may include the identification of areas of cultural significance or issues that may be used to affect, inform, or refine the draft ACHA.

If you wish to provide input on following, please make a submission to the WCPL (via contact details provided at the end of the letter) by **5:00pm Thursday 12 May 2022**:

- Identification of issues.
- Any issues of cultural significance, or any Aboriginal objects or places of cultural value within the investigation area, that you are aware of.
- Any protocols or restrictions you may consider necessary in relation to any information of sensitivity that you may provide.
- Any other factors you consider to be relevant to the heritage assessment.

Received comments will be taken into consideration upon finalisation of the ACHA.
Please provide your feedback to WCPL via the following contact details.

Peter Jaeger
Manager: Environment & Community
Wambo Coal Pty Ltd.
PMB1 Singleton NSW 2330
Phone: (02) 6570 2209
Email: PJaeger@peabodyenergy.com

Please do not hesitate to contact the undersigned should you wish to discuss further.

Yours Faithfully,



Peter Jaeger,
Manager: Environment and Community
WAMBO COAL PTY LTD.

Responses received from Registered Aboriginal Parties in relation to draft Aboriginal Cultural Heritage Assessment Report:

From: cacatua4service <cacatua4service@tpg.com.au>
Sent: Friday, 20 May 2022 6:10 PM
To: peter@southeastarchaeology.com.au
Subject: Wambo

Peter,

Sorry for the delay.

Cacatua General Services and AGA Services, tabled all the supplied information with regards to ACHA for Wambo Coal mine South bates extension on Friday the 13th of May 2022.

After all discussions on this matter we agree that all efforts will be undertaken to show the importance of the Aboriginal use of this area.

Agree all

Disagree 0

Yours truly
George Sampson
Cacatua manager

Thank you
Ashley Sampson
AGA Services manager

APPENDIX 8.

SUBSIDENCE IMPACT ASSESSMENT

(MSEC 2022)

6.6.2. Aboriginal heritage sites located within the Aboriginal Heritage Study Area

There are 38 open sites located within the Aboriginal Heritage Study Area, being Sites 37-5-0358, 37-5-0359, 37-5-0360, 37-5-0605, 37-5-0659, 37-5-0661, 37-5-0662, 37-5-0663, 37-5-0664, 37-5-0668, 37-5-0692, 37-5-0767, 37-5-0782, 37-5-0783 and 37-5-0807, 37-5-0786, 37-5-0787, 37-5-0788, 37-5-0789, 37-5-0790, 37-5-0791, 37-5-0792, 37-5-0793 and Wambo Sites 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527 and 528.

The maximum predicted total subsidence effects for each of the Aboriginal heritage sites located within the Aboriginal Heritage Study Area are provided in Table D.01, in Appendix D. The values are the maximum predicted values within 20 m of the identified locations of each of the sites.

SUBSIDENCE PREDICTIONS AND IMPACT ASSESSMENTS FOR THE SOUTH BATES EXTENSION WYLW24 TO WYLW26 MODIFICATION
© MSEC MARCH 2022 | REPORT NUMBER MSEC1224 | REVISION 04
PAGE 71

A summary of the maximum predicted total subsidence effects for the Aboriginal heritage sites located within the Aboriginal Heritage Study Area is provided in Table 6.2. The values are the maximum predicted values within 20 m of the identified locations of each of the sites.

Table 6.2 Maximum predicted total subsidence, tilts and curvatures for the Aboriginal heritage sites located within the Aboriginal Heritage Study Area

Site type	Maximum predicted total subsidence (mm)	Maximum predicted total tilt (mm/m)	Maximum predicted total hogging curvature (km ⁻¹)	Maximum predicted total sagging curvature (km ⁻¹)
Open sites	1950	80	> 3.0	> 3.0

The maximum predicted total tilt for the Aboriginal heritage sites located within the Aboriginal Heritage Study Area is 80 mm/m (i.e. 8 %, or 1 in 13). The maximum predicted total curvatures are greater than 3.0 km⁻¹ hogging and sagging, which represents a minimum radius of curvature of less than 0.3 km.

The maximum predicted conventional strains for the Aboriginal heritage sites located within the Aboriginal Heritage Study Area, based on applying a factor of 10 to the maximum predicted curvatures, are greater than 30 mm/m tensile and compressive.

The range of strains will vary considerably across the mining area due to, amongst other factors, variation in the depth of cover. The greatest strains are predicted to occur where the depths of cover are shallowest and lesser strains where the depths of cover are higher.

The distribution of the predicted strains due to the extraction of the longwalls is described in Section 4.4. The maximum predicted strains for the Aboriginal heritage sites located above the mining area (i.e. minimum depths of cover less than 100 m) are 12 mm/m tensile and 17 mm/m compressive based on the 95 % confidence levels.

Non-conventional movements can also occur and have occurred in the NSW Coalfields as a result of, amongst other things, anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The maximum predicted subsidence effects for the Aboriginal heritage sites located within the Aboriginal Heritage Study Area, based on based on the Modified Layout, are the same as or slightly less than the maximum predicted values based on the MOD 17 Layout. The maximum predicted values occur at the sites located above the proposed WYLW24 to WYLW26 for the Modified Layout and occur at the sites above the approved WYLW23 and WYLW24 for the MOD 17 Layout.

While the maximum predicted subsidence effects do not change, the predicted values for the individual sites increase in most cases but reduce in other cases. The number of sites predicted to experience more than 20 mm vertical subsidence is 31 based on the Modified Layout and 17 based on the MOD 17 Layout. That is 14 additional sites are predicted to experience more than 20 mm vertical subsidence due to the proposed modifications.

The mining-induced curvatures and strains could cause surface cracking in the vicinity of the open sites, within the Aboriginal Heritage Study Area, where they are located directly above the mining area. It is unlikely that the artefacts and deposits themselves would be impacted by surface cracking. It is possible, however, that if remediation of the surface were required after mining, that these works could potentially impact the open sites.

It is recommended that WCPL develop appropriate protocols and seek the required approvals from the appropriate authorities in the event that remediation of the surface is required in the locations of the open sites. Further assessments of the potential impacts on these sites are provided by South East Archaeology (2022).

Table D.01 - Maximum predicted subsidence effects for the Aboriginal heritage sites within the Aboriginal Heritage Study Area

Reference	Type	Located within the Aboriginal Heritage Study Area	Maximum Predicted Total Subsidence based on Previous Layout (mm)			Maximum Predicted Total Hogging Curvature based on Previous Layout (1/km)			Maximum Predicted Total Tilt based on Previous Layout (mm/m)			Maximum Predicted Total Subsidence based on Modified Layout (mm)			Maximum Predicted Total Hogging Curvature based on Modified Layout (1/km)			Maximum Predicted Total Tilt based on Modified Layout (1/km)		
			Maximum Predicted Total Subsidence based on Previous Layout (mm)	Maximum Predicted Total Hogging Curvature based on Previous Layout (1/km)	Maximum Predicted Total Tilt based on Previous Layout (mm/m)	Maximum Predicted Total Subsidence based on Modified Layout (mm)	Maximum Predicted Total Hogging Curvature based on Modified Layout (1/km)	Maximum Predicted Total Tilt based on Modified Layout (mm/m)	Maximum Predicted Total Subsidence based on Previous Layout (mm)	Maximum Predicted Total Hogging Curvature based on Previous Layout (1/km)	Maximum Predicted Total Tilt based on Previous Layout (mm/m)	Maximum Predicted Total Subsidence based on Modified Layout (mm)	Maximum Predicted Total Hogging Curvature based on Modified Layout (1/km)	Maximum Predicted Total Tilt based on Modified Layout (mm/m)	Maximum Predicted Total Subsidence based on Previous Layout (mm)	Maximum Predicted Total Hogging Curvature based on Previous Layout (1/km)	Maximum Predicted Total Tilt based on Previous Layout (mm/m)			
37-5-0358	Open site	Yes	1950	> 3.0	90	> 3.0	< 0.5	< 20	< 0.01	< 0.5	< 0.01	< 20	< 0.01	< 0.5	< 0.01					
37-5-0359	Open site	Yes	1950	> 3.0	6	> 3.0	20	150	2.5	20	2.5	1900	2.5	80	0.02					
37-5-0360	Open site	Yes	1950	> 3.0	75	> 3.0	80	1900	> 3.0	80	> 3.0	1900	> 3.0	80	> 3.0					
37-5-0605	Open site	Yes	1800	> 3.0	70	> 3.0	80	950	> 3.0	80	> 3.0	950	> 3.0	80	> 3.0					
37-5-0659	Open site	Yes	1400	> 3.0	55	> 3.0	3	1800	> 3.0	3	> 3.0	1800	> 3.0	3	> 3.0					
37-5-0661	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	8	250	0.6	8	0.6	250	0.6	8	0.2					
37-5-0662	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	35	1550	1.5	35	1.5	1550	1.5	35	1.5					
37-5-0663	Open site	Yes	1950	> 3.0	20	> 3.0	35	500	2.5	35	2.5	500	2.5	35	0.8					
37-5-0664	Open site	Yes	1950	> 3.0	50	> 3.0	55	1900	> 3.0	55	> 3.0	1900	> 3.0	55	> 3.0					
37-5-0668	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	80	1800	> 3.0	80	> 3.0	1800	> 3.0	80	> 3.0					
37-5-0692	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	25	25	0.1	2	0.1	25	0.1	2	0.1					
37-5-0767	Open site	Yes	1950	> 3.0	60	> 3.0	55	1850	> 3.0	55	> 3.0	1850	> 3.0	55	> 3.0					
37-5-0782	Open site	Yes	50	0.2	4	0.2	10	1800	2.5	10	2.5	1800	2.5	10	3					
37-5-0783 and 37-5-0807	Open site	Yes	1950	> 3.0	7	> 3.0	25	1900	> 3.0	25	> 3.0	1900	> 3.0	25	> 3.0					
37-5-0786	Open site	Yes	150	0.8	9	0.8	4	1950	> 3.0	4	> 3.0	1950	> 3.0	4	> 3.0					
37-5-0787	Open site	Yes	< 20	0.1	1	0.1	50	1900	0.02	50	0.02	1900	0.02	50	> 3.0					
37-5-0788	Open site	Yes	1950	> 3.0	60	> 3.0	50	1950	> 3.0	50	> 3.0	1950	> 3.0	50	> 3.0					
37-5-0789	Open site	Yes	1950	> 3.0	50	> 3.0	55	1800	> 3.0	55	> 3.0	1800	> 3.0	55	> 3.0					
37-5-0790	Open site	Yes	1950	> 3.0	70	> 3.0	80	1600	> 3.0	80	> 3.0	1600	> 3.0	80	> 3.0					
37-5-0791	Open site	Yes	400	2.5	40	2.5	60	1850	> 3.0	60	> 3.0	1850	> 3.0	60	> 3.0					
37-5-0792	Open site	Yes	1800	> 3.0	2	> 3.0	< 0.5	< 20	< 0.01	< 0.5	< 0.01	< 20	< 0.01	< 0.5	< 0.01					
37-5-0793	Open site	Yes	1700	> 3.0	50	> 3.0	< 0.5	< 20	< 0.01	< 0.5	< 0.01	< 20	< 0.01	< 0.5	< 0.01					
Wambo Site 513	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	35	1650	1	35	1	1650	1	35	1					
Wambo Site 514	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	40	1600	1.5	40	1.5	1600	1.5	40	1.5					
Wambo Site 515	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	< 20	< 0.01	< 0.01	< 0.5	< 0.01	< 20	< 0.01	< 0.5	< 0.01					
Wambo Site 516	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	< 20	< 0.01	< 0.01	< 0.5	< 0.01	< 20	< 0.01	< 0.5	< 0.01					
Wambo Site 517	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	< 20	< 0.01	< 0.01	< 0.5	< 0.01	< 20	< 0.01	< 0.5	< 0.01					
Wambo Site 518	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	1750	1750	> 3.0	50	> 3.0	1750	> 3.0	50	> 3.0					
Wambo Site 519	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	1600	1600	> 3.0	70	> 3.0	1600	> 3.0	70	> 3.0					
Wambo Site 520	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	< 20	< 0.01	< 0.01	1	< 0.01	< 20	< 0.01	1	< 0.01					
Wambo Site 521	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	25	25	0.2	3	0.2	25	0.2	3	0.1					
Wambo Site 522	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	50	50	0.1	2	0.1	50	0.1	2	0.02					
Wambo Site 523	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	1300	1300	> 3.0	30	> 3.0	1300	> 3.0	30	> 3.0					
Wambo Site 524	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	1900	1900	> 3.0	3	> 3.0	1900	> 3.0	3	> 3.0					
Wambo Site 525	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	1700	1700	> 3.0	40	> 3.0	1700	> 3.0	40	2					
Wambo Site 526	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	1550	1550	1.5	35	1.5	1550	1.5	35	1					
Wambo Site 527	Open site	Yes	< 20	< 0.01	< 0.5	< 0.01	1850	1850	1.5	10	1.5	1850	1.5	10	2					
Wambo Site 528	Open site	Yes	< 20	0.6	1	0.6	1850	1850	> 3.0	55	> 3.0	1850	> 3.0	55	> 3.0					
Maximum			1950	> 3.0	90	> 3.0	1950	1950	> 3.0	80	> 3.0	1950	> 3.0	80	> 3.0					