

**MANDALONG MINE LW 30-31
EXTRACTION PLAN
ASSESSMENT**

Heritage Management Plan

FINAL

June 2021



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Heritage Management Plan

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Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Centennial Mandalong Pty Ltd

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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
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Acknowledgement

Umwelt Environmental and Social Consultants (Umwelt) and Centennial Mandalong Pty Limited (Centennial Mandalong) would like to acknowledge the traditional custodians of the Mandalong area and pay respect to their cultural heritage, beliefs and continuing relationship with the land.

Umwelt and Centennial Mandalong would also like to acknowledge the post-contact experiences of Aboriginal people who have attachment to the Mandalong area.

We pay our respect to the Elders – past, present and future – for they hold the memories, traditions, culture and hopes of Aboriginal people in the area.

Statements of Aboriginal Cultural Significance

As discussed throughout this document, the key objective of this document is to recognise and provide appropriate management strategies for Aboriginal cultural values associated with the Project Area. In recognition of this, the following section documents previous statements provided by registered Aboriginal parties regarding the Aboriginal cultural significance of the Mandalong area. These statements have been extracted from a previous assessment for the Mandalong Southern Extension Project (RPS 2013).

The registered Aboriginal parties were provided with the opportunity to revisit or supplement these statements of significance in relation to the specifics of the current Project. An updated statement of significance was received on 3 March 2021 from the Awabakal Traditional Owners Aboriginal Corporation and the Awabakal and Guringai Pty Ltd, as provided unedited below.

Statement of Significance by the Awabakal and Guringai Peoples

'Awabakal and Guringai is one of the 600 or more language groups or "nations" that existed across Australia at the time of European contact and are part of the oldest and continuous living Culture in human history.

Our People were recorded within our Traditional Country and acknowledged in the first records ever made of the Aboriginal People of the wider Lake Macquarie, Newcastle, Maitland, Wollombi, Cessnock, Kurri Kurri, Central Coast, Hawkesbury, North Shore and various Sydney areas. Prominent people such as L.E. Threlkeld, Jonathon Warner and many others documented our Peoples Cultural Heritage and Language in detail going back to the very early 1800's.

Our people believe that all our sites and Traditional Culture that has existed for many thousands of years within our area are a tangible link to our Ancestors and our past. Surveys and assessments within our Traditional Country have identified Aboriginal Cultural Heritage Sites (the tangible evidence of occupation) and (the intangible evidence) of landscape features of cultural value embedded within a landscape that provided physical and spiritual sustenance to the Awabakal and Guringai Peoples.

The survival of these sites is significant to the continuation of the collective knowledge and inspiration for our young people and coming generations of Awabakal and Guringai Peoples, and those Aboriginal People that are invited into our Country. We acknowledge our Ancestors for passing on knowledge and also the legacy for us to continue what they put into place, to pass on our Cultural Heritage and Values to protect our sites for all those in the future.

The Awabakal and Guringai presence extends from the present day back many thousands of years and is reflected in both tangible and intangible aspects of Aboriginal Culture, Heritage, Value and history. As Awabakal and Guringai Peoples, we hold Cultural Knowledge that has been passed down from our Ancestors about our Traditional Country for thousands of years and a spiritual awareness, connectedness, presence, and value of place that connects us with the Land of our People. Therefore, the Awabakal and Guringai People have a continuing, contemporary history of obligation to protect and preserve the Cultural Heritage within our traditional cultural boundary areas.

We maintain concerns over Mining and Development licences being approved within our Traditional Cultural Boundary, and the adverse impacts this has on our Cultural Heritage, Values, landscape and sea country features, and the footprints of our Ancestors which are being impacted through cumulative and overlapping development, mining and unmonitored and unmanaged human recreational activities. The mental, physical and spiritual wellbeing of the Awabakal and Guringai Peoples and those Aboriginal Peoples

that feel an association to this landscape is also a contemporary phenomenon and not just “a thing of the past”.

The Awabakal and Guringai Aboriginal Cultural Heritage sites are identified as having significant Cultural and Spiritual Value and are numerous within our Traditional Cultural Boundary. These sites and landscape features link contemporary Awabakal and Guringai Peoples through generations of their Ancestors and are extremely important teaching places and places of spiritual renewal.

The custodial rights and obligations of our people Caring for Country underpin the principles of this statement of significance. It is highlighted, however, that the Awabakal and Guringai Peoples in no way support any impact to our sites, landscape features and cultural value or any aspect of the natural environment within our Awabakal and Guringai Traditional Boundary. Aboriginal people inherit the right and obligation to Care for Country and endorsing any form of harm in our view is assessed as culturally and ethically inappropriate.’ (© **Awabakal & Guringai 2013**)

Awabakal Descendants Traditional Owners Aboriginal Corporation (ADTOAC)

‘This area, as part of what is the Traditional Awabakal Country, is considered by our People to be of great importance within our Cultural Heritage. There are a variety of reasons our People have benefited from using this location over thousands of years.

One of the earliest documented accounts of the importance of the areas around Lake Macquarie for the Awabakal is attributed to the Reverend L.E. Threlkeld. For us, this area has not just a physical presence within the Cultural Heritage of our People, but it is part of our oral history and incorporates places of spiritual significance. The landforms and resources of this locale fulfilled not just the basic needs that underpinned our Peoples subsistence but also satisfied the many other aspects that made up what can only be described here as being part of the very cultural foundations of our People.

Needless to say, our People have had a long history within this area which is unsurpassed. Our apical Ancestor, Mahrahkah, an Awabakal woman and her two daughters were recorded by the Reverend L.E. Threlkeld and Jonathan Warner as living in and around these areas which all formed part of their Traditional Country. This apart from everything else makes it a very important location for our family, knowing that Mahrahkah walked these areas before any white man was ever seen in the Newcastle and Lake Macquarie region. She was intrinsically acquainted with her Land and she has left a legacy for us to carry on in this day and age and to pass onto our Descendants.

This area is of very high significance to the Awabakal and therefore it would be expected that after many generations of our People that have walked the pathways of their Ancestors it should be obvious there would be many areas that contain evidence of this connection resulting from thousands of years of occupation on varying levels by our People. Traditionally these areas were the supply of rich resources of which our People have depended on over millennia. There are physical reminders left by our Ancestors, some in the form of middens, scarred trees or stone tools (artefacts) and grinding grooves which provide us as Descendants of the Awabakal People an opportunity to make a connection through time with our Ancestors. This connection is manifest in a variety of ways; one is through the physical senses such as knowing we are seeing where they lived or touching what they used. By holding or touching something our Ancestors handled, something they made, possibly many thousands of years previously, gives rise to a sense of perception, appreciation, familiarity and recognition of who we are and reinforces where we belong and our birthright as Awabakal Descendants’.

(Shane Frost, Managing Director – Awabakal Descent Traditional Owner Aboriginal Corporation March 2012)

Bahtabah Local Aboriginal Land Council

‘We acknowledge the Elders past and present and the Aboriginal people who are the traditional custodians of the Mandalong area. Aboriginal people have utilised this area for their cultural, spiritual and ceremonial purposes. The Mandalong landscape is covered with the traditions and customs of Aboriginal people and the flora and fauna that inhabit these areas have a special significance to the Aboriginal people of the Mandalong area. The Aboriginal people of Mandalong took a holistic approach to incorporate the environment into their way of life.

Today, the Bahtabah Local Aboriginal Land Council our sites officers that participate in the recording of sites for this management plan are still working to protect our cultural heritage sites to ensure that the Aboriginal traditional and customary values of Mandalong are sustainable for the current and future generations to enjoy’.

(Michael Green CEO Bahtabah Local Aboriginal Land Council 2012)

Darkinjung Local Aboriginal Land Council

‘To the Darkinjung people, the significance of the Mandalong area lies within the landscape, the hills, valleys, creeks and rivers, including areas surrounding an Aboriginal cultural heritage site. These places can be seen in a spiritual sense and is very important to them. The landscape can be an extension of a site, or the landforms and features within the landscape can be the Aboriginal cultural heritage site. These sites can also be connected intangibly through sight lines or connected through walking and trading tracks, including dreaming tracks to other sites or places of significance. These features are all part of the Darkinjung cultural landscape.

Darkinjung cultural heritage sites, sight lines, walking, trading tracks and dreaming tracks are associated with stories. These stories connect sites with other sites across Darkinjung country and beyond and could have been utilised and handed down over hundreds of years. The spiritual and cultural connection that the Darkinjung people have to the land, cultural heritage sites and the cultural landscape provides a physical and intangible link to ancestors and the past. This connection attaches the Aboriginal community to land, traditions and strengthens bonds within the Darkinjung Aboriginal community.’

(Sharon Hodgetts Project Officer Culture and Heritage and Suzanne Naden Operations Manager Darkinjung Local Aboriginal Land Council 5 October 2012)

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1.0 Introduction

Mandalong Mine is an existing underground longwall coal mining operation producing thermal coal that is supplied to domestic and export markets. It is located approximately 35 kilometres south-west of Newcastle near Morisset in New South Wales (Figure 1.1). Mandalong Mine is 100 percent owned and operated by Centennial Mandalong Pty. Limited (Centennial Mandalong), a subsidiary of Centennial Coal Company Limited. Centennial Coal Company Limited is a wholly owned subsidiary of Banpu Public Company Limited. Mandalong Mine operates under Development Consent SSD-5144 which was granted on 12 October 2015 by the NSW Planning Assessment Commission under Part 4, Division 4.1 of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act) (NSW Government 1979) and provided for extension of the mining area with a production limit of 6 million tonnes per annum of thermal coal from the West Wallarah and Wallarah-Great Northern Seams.

The currently approved Mandalong Mine comprises the underground workings and surface infrastructure of the following:

- The Mandalong Mine Access Site, encompassing underground workings and associated surface infrastructure near Morisset.
- Delivery of run-of-mine coal from the underground workings to the Cooranbong Entry Site. The Cooranbong Entry Site coal handling and processing facilities are approved under the Northern Coal Logistic Project (SSD-5145).
- Delivery of run-of-mine coal from the underground workings to the Delta Entry Site, located near Wyee at the Vales Point Rail Unloader Facility. The coal handling facility is approved under DA35-2-2004.
- Mandalong South Surface Site (MSSS), which under construction, encompassing ventilation shafts, ventilation fans and underground delivery boreholes located approximately 6 kilometres south-west of the Mandalong Mine Access Site.

Centennial Mandalong has prepared an Extraction Plan to address the requirements of Schedule 4, Condition 6 of SSD-5144. The proposed works within LW30-31, including the boundary of subsidence predicted for LW30-31 and the Environmental Protection area projected for these longwalls are hereafter referred to as the Project Area.

Centennial Mandalong has engaged Umwelt Environmental and Social Consultants (Umwelt) to work with the registered Aboriginal parties to complete a Heritage Management Plan (HMP) for the Extraction Plan being prepared for the Project Area. Umwelt and Centennial Mandalong recognise that the registered Aboriginal parties have primary responsibility for assessing the cultural significance of the lands for which they are traditional custodians and/or to which they have contemporary connection and all comments and feedback provided by Aboriginal parties are documented in this report.

1.1 Purpose of the HMP

The HMP was prepared to support an Extraction Plan (EP) for the extraction of coal for the Mandalong Mine LW30-31. The HMP addresses specific heritage components of Development Consent SSD-5144. Schedule 4, Condition 6(l) of Development Consent SSD-5144 requires Centennial Mandalong to develop and implement a HMP as part of the EP for LW30-31. This condition requires that the HMP be prepared in consultation with Heritage NSW and the registered Aboriginal parties, to manage the potential environmental consequences of the proposed second workings on Aboriginal and non-Aboriginal heritage items and reflect the requirements of condition 22 of Schedule 3. The relevant requirements of the HMP

are listed in Table 1.1 and Table 1.2 with reference to the sections of the HMP or Northern Region ACHMP where these requirements have been addressed.

Mandalong Mine currently operates in accordance with the Centennial Northern Region Aboriginal Cultural Heritage Management Plan (ACHMP), with additional Heritage Management Plans (HMPs) developed to inform Extraction Plans for prior extraction.

It is noted that as part of the Heritage Impact Assessment (RPS 2013) prepared for the Environmental Impact Statement (EIS) for the Mandalong South project, a number of land parcels within the proposed future impact area for Mandalong South project were not surveyed. This was the result of land access agreements not being finalised between landholders and Centennial Mandalong to allow for access for the completion of the in-field surveys. Surveys undertaken as part of this HMP have been undertaken in all areas within the Project Area that were not previously subject to archaeological survey.

This HMP has been developed to meet the requirements of Condition 6(l) and ensure consistency with the approved ACHMP and prior HMP. It identifies the monitoring and mitigation measures for heritage sites within the Project Area that are required to be implemented to demonstrate that the relevant performance measures are achieved.

Table 1.1 Relevant Conditions SSD-5144

Schedule	Condition	Where addressed
2	2. The Applicant must carry out the development: (b) generally in accordance with the EIS, SEE (Mod 1), SEE (Mod 2), SEE (Mod 3), SEE (Mod 4), SEE (Mod 5), SEE (Mod 6), See (Mod 8) and MR (Mod 9)	1, 9, 10, 11
3	21. The Applicant must: (a) engage a suitable qualified archaeologist, whose appointment has been approved by the Secretary, to undertake sub-surface archaeological testing in areas A, B and C within the MSSS as shown on Figure 2 of Appendix 6 (b) undertake surveys prior to the commencement of construction of the MSSS, in consultation with Heritage NSW and Registered Aboriginal Parties (c) provide the results of these surveys to the Department, Heritage NSW and the Registered Aboriginal Parties (d) analyse the significance of any heritage sites/items identified during the surveys; and (e) detail appropriate measures to avoid, minimise and/or mitigate impacts to these sites/items in the Heritage Management Plan required under condition 22 below for surface disturbance impacts, and under condition 6(l) of Schedule 4 for subsidence impacts, to the satisfaction of the Secretary	Northern Region ACHMP (Centennial 2016a) Construction Heritage Management Summary Mandalong South Surface Site and Access Road (Centennial 2016b) This HMP

Schedule	Condition	Where addressed
3	<p>22. The Applicant must prepare a Heritage Management Plan for the development to the satisfaction of the Secretary. This plan must:</p> <p>(a) be prepared in consultation with Heritage NSW and Registered Aboriginal Parties</p> <p>(b) be submitted to the Secretary for approval, prior to commencement of construction of the MSSS, or by 31 March 2016, whichever is sooner; and:</p> <p>(c) include:</p> <ul style="list-style-type: none"> • A description of the measures that would be implemented to: <ul style="list-style-type: none"> ○ Protect, monitor and/or manage Aboriginal Cultural Heritage sites/items (including any proposed archaeological investigations and/or salvaged measures) ○ Manage the discovery of previously unidentified Aboriginal items ○ Maintaining and managing reasonable access for Aboriginal stakeholders to heritage items on the Applicants land ○ Ongoing consultation with Aboriginal stakeholders in the conservation and management of Aboriginal cultural heritage • A short-term and long-term strategy for the storage of any Aboriginal Cultural Heritage items salvaged on site • A protocol for the management of impacts to Historic Heritage sites/items, including previously unidentified sites/items, including archival recording where impacts to Historic Heritage sites/items cannot be avoided. <p>The Applicant must implement the approved management plan as approved from time to time by the Secretary.</p>	<p>Northern Region ACHMP</p> <p>Construction Heritage Management Summary</p> <p>Mandalong South Surface Site and Access Road (Centennial 2016b)</p>
4	<p>1. The Applicant must ensure that the development complies with the performance measures in Table 6, to the satisfaction of the Secretary.</p> <p>Table 6 references the following in relation to heritage sites:</p> <ul style="list-style-type: none"> • Stone Arrangement RPS TBM 32: negligible subsidence impacts or environmental consequences • All other Aboriginal Cultural Heritage sites/items at the site: no subsidence impact or environmental consequence greater than predicted in the documents listed in condition 2(b) of Schedule 2 	<p>Northern Region ACHMP</p>

Schedule	Condition	Where addressed
4	<p>6. the Applicant must prepare an Extraction Plan for all second workings on site, to the satisfaction of the Secretary. Each Extraction Plan must:</p> <p>(l) include a Heritage Management Plan, which has been prepared in consultation with Heritage NSW and Registered Aboriginal Parties, to manage the potential environmental consequences of the proposed second working on both Aboriginal and non-Aboriginal heritage items, and reflects the requirements of condition 22 of Schedule 3</p>	This HMP
4	<p>8. The Applicant must:</p> <p>(a) use its best endeavours to undertake archaeological surveys of privately owned land which was not surveyed in the documents listed in condition 2(b) of Schedule 2, prior to subsidence impacts occurring on that land;</p> <p>(b) analyse the significance of any heritage sites/items identified during the surveys; and</p> <p>(c) include appropriate measures to avoid, minimise and/or mitigate impacts to the identified sites/items in the Heritage Management Plan required under condition 6(l) above, to the satisfaction of the Secretary</p>	<p>Sections 6 & 7 of this HMP</p> <p>Section 8 of this HMP</p>
4	<p>9. Prior to the extraction of Longwall 25, the Applicant must undertake trial mitigation works at grinding groove sites RPS DF04 and RPS PS11, in consultation with Forestry Corporation of NSW, Heritage NSW and Registered Aboriginal Parties, and to the satisfaction of the Secretary</p>	Grinding Grooves DF04 and PS11. Grinding Groove Trial Mitigation Report (RPS 2018)
4	<p>10. The Applicant must:</p> <p>(a) monitor the effectiveness of the trial mitigation works during and following the extraction of Longwall 25;</p> <p>(b) provide a report on the monitoring to the Secretary, Heritage NSW and Registered Aboriginal Parties; and</p> <p>(c) use the report to inform the impact avoidance, management and mitigation strategies in future Extraction Plans covering other grinding groove sites, to the satisfaction of the Secretary</p>	<p>Grinding Grooves DF04 and PS11. Grinding Groove Trial Mitigation Report (RPS 2018)</p> <p>Section 11 of this HMP</p>

Schedule	Condition	Where addressed
4	<p>11. The Applicant must implement a monitoring program of subsidence effects at rock shelter sites 45-3-1228 and 45-3-1233 in the Extraction Plan for Longwalls 30-33, or if access to these sites is not granted by the landowner, other rock shelter sites as agreed to in writing with the Secretary. This monitoring must be:</p> <p>(a) undertaken by a suitably qualified archaeologist, whose appointment has been approved by the Secretary,</p> <p>(b) undertaken in consultation with Heritage NSW and Registered Aboriginal Parties; and</p> <p>(c) used to inform impact management of rock shelter sites under future Extraction Plans required under this consent,</p> <p>to the satisfaction of the Secretary</p>	<p>Site 45-3-1233 is outside the LW30-31 Project Area and will not be subject to subsidence as a result of extraction of LW30-31</p> <p>A separate rock shelter monitoring program will be prepared for all shelter sites within the LW30-31 EP area.</p>

Table 1.2 Statement of Commitments (as from SSD-5144)

Desired Outcome	Commitment/Action	Where addressed
Enable Centennial Mandalong to conduct exploration activities in an environmentally responsible manner with due consideration to the community	<ul style="list-style-type: none"> Prior to the commencement of works, Centennial Mandalong will ensure that the <i>Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales</i> (DECCW 2010) is followed prior to the commencement of works. Proposed drill sites and access tracks will be inspected according to the protocols in the approved ACHMP. 	<p>Northern Region ACHMP</p> <p>Construction Heritage Management Summary Mandalong South Surface Site and Access Road (Centennial 2016b)</p>
Monitor, mitigate and manage impacts to Aboriginal heritage sites	<ul style="list-style-type: none"> Centennial Mandalong will update the Centennial Northern Holdings ACHMP (in consultation with the relevant government agencies and registered Aboriginal parties) to take into consideration the commitments made in the EIS and any relevant consent conditions Immediately prior to and during construction of the Mandalong South Surface Site, Centennial Mandalong will ensure that a combination of silt and protective fencing is installed to ensure that run-off does not impact Aboriginal sites down slope of this area and that Aboriginal sites upslope are not inadvertently impacted by construction activities Centennial Mandalong will develop a cultural heritage awareness component of the induction for contractors involved in the construction activities in consultation with the Aboriginal community. Centennial Mandalong will ensure all employees and contractors working within the Southern Extension Area are made aware of their statutory obligations for Aboriginal heritage under the NPW Act 1974 as part of the site induction 	<p>Northern Region ACHMP</p> <p>Construction Heritage Management Summary Mandalong South Surface Site and Access Road (Centennial 2016b)</p>

Desired Outcome	Commitment/Action	Where addressed
Offset the Aboriginal heritage impacts of the Project	<ul style="list-style-type: none"> Within 12 months following development consent, Centennial Mandalong will formalise an agreement to authorise the local Aboriginal community access to suitable areas within its land holdings in the Southern Extension Area that contain Aboriginal cultural heritage sites 	Northern Region ACHMP
The CEMP will include the following	<ul style="list-style-type: none"> 'No go zone' to be established at sites AHIMS#45-3-1227, AHIMS#45-3-3534, AHIMS#45-3-3539, AHIMS#45-3-3541 and AHIMS#45-3-3540 for the duration of the proposed works; If unrecorded Aboriginal objects are identified in the TL24 Easement during future works, all works in the immediate area must cease and the area should be cordoned off as appropriate with high visibility tape. OEH must be notified via the Enviroline (131 555) so that the site can be adequately assessed and managed; If skeletal remains are identified all work must cease in the immediate area to prevent any further harm to the remains. Local NSW Police must be contacted immediately. No action is to be undertaken until police provide written notification. If the remains are identified as Aboriginal, the OEH Enviroline (131 555) must be contacted. No work is to continue until OEH provides written notification about the action pack for the management of the skeletal remains and formulated a management plan if required; If during the course of development works, suspected historic cultural heritage material is uncovered, work should cease in that area immediately. The OEH Enviroline (131 555) should be notified and works only recommence when an approved management strategy has been developed; 	Construction Environmental Management Plan Mandalong Transmission Line TL24 Relocation (Centennial 2017)
Mod – 6 MSSS Discharge	Review and revise where necessary the Northern Regional Aboriginal Cultural Heritage Management Plan to reflect the outcomes of the modification	Northern Region ACHMP

Desired Outcome	Commitment/Action	Where addressed
Mod – 7, Construction of a 33kV powerline. The following mitigation measures will be implemented	<ul style="list-style-type: none"> Centennial Mandalong will ensure that its employees and contractors are aware that it is an offence under Section 86 of the NPW Act to harm or desecrate an Aboriginal object unless that harm of desecration is authorised by an approved ACHMP (as applicable to the current Project) and the requirements of that plan have been met in relation to mitigation activities. The CEMP will include all heritage commitments from the Aboriginal Cultural Heritage Assessment Report and will address specific management requirements for the Project; The three newly identified isolated artefacts (Mandalong IF 1-3) located within the existing power line easement will be subject to surface collection in accordance with the methodology provided in the Aboriginal Cultural Heritage and Archaeological Assessment (Umwelt, 2019) For the duration of the Project, temporary protection (in the form of high visibility fencing) will be put in place at grinding groove sites AHIMS 45-3-3470, 45-3-3526 and 45-3-3527 to prevent incidental impacts during Project Works; Due to the potential for additional grinding groove sites to be present (but not visible) along minor drainage lines within the Project Area, heavy vehicle movements will be avoided across any areas of sandstone exposure on minor drainage lines; Following the completion of vegetation clearance in the areas of low-moderate archaeological potential an opportunity will be provided for an additional inspection of these areas by an archaeologist and Aboriginal party representatives. Any surface artefacts may be subject to surface collection in accordance with the Aboriginal Cultural Heritage and Archaeological Assessment (Umwelt, 2019). The opportunity will be provided to an archaeologist and the registered Aboriginal parties to monitor removal of topsoil within the area of low-moderate archaeological potential (Including that disturbed for excavation of the pole location) and to collection any Aboriginal objects that may be identified, and; In the event that a previously unrecorded Aboriginal object is identified within the Project Area, it will be managed in accordance with the unexpected finds protocol included in the ACHMP. 	Construction Environmental Management Plan. Mandalong 33kV Power Line (Centennial 2019)

1.2 Report Authorship

This report has been prepared by Ashley O’Sullivan (Umwelt Senior Archaeologist) and Nicola Roche (Umwelt Manager, Cultural Heritage). Drafting input was provided by Umwelt’s drafting team. Survey to support the HMP was undertaken by Ashley O’Sullivan, with support from Alison Fenwick (Umwelt Archaeologist) and representatives of the registered Aboriginal parties (further discussed in **Section 2.0**). Nicola, Ashley and Alison have been approved by the Department of Planning, Industry and Environment as suitably qualified experts to complete this HMP (refer to **Appendix 1**).

During the process of the development of this report, information relevant to the assessment of Aboriginal cultural heritage values within the Project Area was provided by representatives of registered Aboriginal parties who participated in the survey. Correspondence and comments provided by Aboriginal parties are reviewed in **Section 2**.



 Mandalong Mine Longwalls
 Road
 Drainage Line
 Railway Line

Proposed LW30-31 Layout

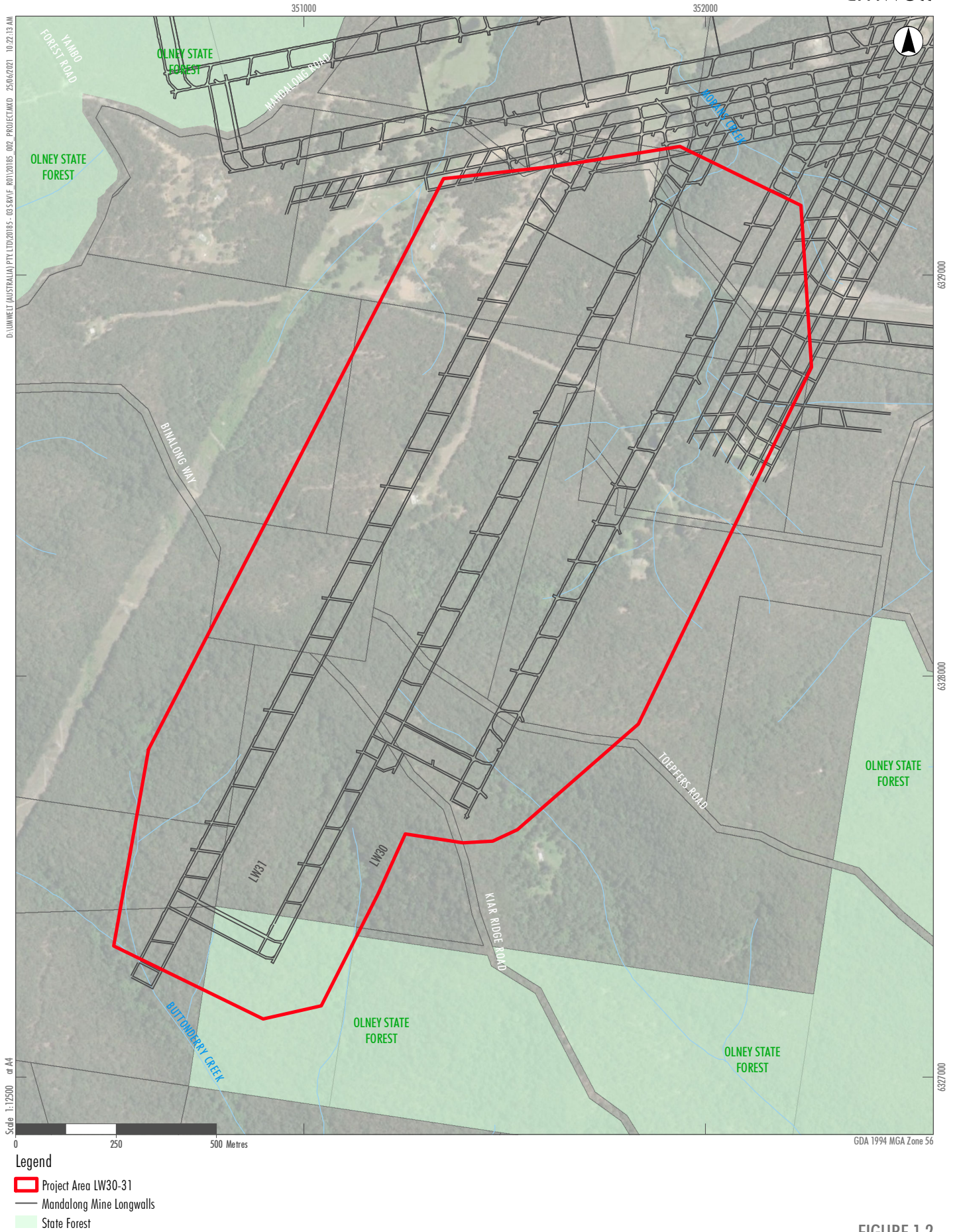


FIGURE 1.2
Project Area

2.0 Aboriginal Party Consultation

Aboriginal people are the primary determinants of the significance of Aboriginal objects and/or places. Consultation with Aboriginal parties is therefore required to document the significance of Aboriginal objects and/or places and to obtain an Aboriginal cultural perspective on determining and carrying out appropriate strategies to mitigate impacts to Aboriginal heritage. In accordance with current requirements and expectations, consultation with Aboriginal parties regarding the proposal was undertaken in accordance with the relevant aspects of Division 2, Clause 60 of the NPW Regulation and the *Aboriginal cultural heritage consultation requirements for proponents* (DECCW 2010a). The Aboriginal party consultation process and the outcomes of consultation regarding the proposal are documented in this report as required by the *Guide to investigating assessing and reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011).

2.1 Identification of Registered Aboriginal Parties

Consultation with Aboriginal parties in relation to approved activities at Mandalong Mine and the development of *Aboriginal Cultural Heritage Management Plan* (ACHMP) has been ongoing since 2011 and has been undertaken in accordance with all relevant requirements and to the satisfaction of the regulatory authorities. Consultation with the registered Aboriginal parties identified in the Centennial Northern Region ACHMP has been consistent and ongoing. The registered Aboriginal parties for the current assessment are:

- Awabakal Descendants Traditional Owners Aboriginal Corporation
- Awabakal Traditional Owners Aboriginal Corporation
- Bahtahbah Local Aboriginal Land Council
- Biraban Local Aboriginal Land Council
- Cacatua Cultural Consultants
- Darkinjung Local Aboriginal Land Council
- Guringai Tribal Link Aboriginal Corporation
- Wonn1 Contracting
- Yula-Punaal Education and Healing Aboriginal Corporation.

2.2 Notification and Consultation Regarding Assessment Methodology

A letter providing information regarding the Project and incorporating a draft methodology for the assessment was provided to all registered Aboriginal parties on 12 August 2020. It was requested that all Aboriginal parties provide comment on the proposed assessment methodology. Copies of all communication regarding the draft methodology are provided in full in **Appendix 1** and summarised in **Table 2.1** below.

Table 2.1 Summary of Aboriginal Party Consultation

Date	Type of Consultation	Aboriginal Parties Contacted	Outcome
12 August 2020	Provision of assessment methodology to RAPs for review and comment.	Awabakal Descendants Traditional Owners Aboriginal Corporation	Expression of Interest (EOI) received. Comments on the methodology were supportive of the proposed approach.
		Awabakal Traditional Owners Aboriginal Corporation	Expression of Interest (EOI) received. Comments on the methodology were supportive of the proposed approach.
		Bahtahbah Local Aboriginal Land Council	Expression of Interest (EOI) received. No comment on the methodology was provided.
		Biraban Local Aboriginal Land Council	No response to methodology provided.
		Cacatua Cultural Consultants	Expression of Interest (EOI) received. No comment on the methodology was provided.
		Darkinjung Local Aboriginal Land Council	Expression of Interest (EOI) received. No comment on the methodology was provided.
		Guringai Tribal Link Aboriginal Corporation	Expression of Interest (EOI) received. Comments on the methodology were supportive of the proposed approach.
		Wonn1 Contracting	Expression of Interest (EOI) received. No comment on the methodology was provided.
		Yula-Punaal Education and Healing Aboriginal Corporation	No response provided
14 – 17 September 2020	Survey of Project Area with registered Aboriginal parties	Awabakal Descendants Traditional Owners Aboriginal Corporation	Field survey undertaken by Peter Leven

Date	Type of Consultation	Aboriginal Parties Contacted	Outcome
	that submitted EOI in undertaking fieldwork	Awabakal Traditional Owners Aboriginal Corporation	Field survey undertaken by Kyle Howie / Tori Leven
		Bahtahbah Local Aboriginal Land Council	Field survey undertaken by Norman Archibald
		Cacatua Cultural Consultants	Field survey undertaken by Ashley Sampson
		Darkinjung Local Aboriginal Land Council	Field survey undertaken by Barry Williams
		Guringai Tribal Link Aboriginal Corporation	Field survey undertaken by Tracey Howie
		Wonn1 Contracting	Field survey undertaken by Arthur Fletcher

Date	Type of Consultation	Aboriginal Parties Contacted	Outcome
15 February 2021	Provision of draft HMP to registered Aboriginal parties for review and comment	Awabakal Descendants Traditional Owners Aboriginal Corporation	
		Awabakal Traditional Owners Aboriginal Corporation	Email response received 3/3 providing an updated statement of significance
		Bahtahbah Local Aboriginal Land Council	
		Biraban Local Aboriginal Land Council	
		Cacatua Cultural Consultants	
		Darkinjung Local Aboriginal Land Council	
		Guringai Tribal Link Aboriginal Corporation	Email response received 3/3 providing an updated statement of significance
		Wonn1 Contracting	Email response provided 25/02 stating that HMP had been reviewed and Wonn1 is happy to support the HMP
		Yula-Punaal Education and Healing Aboriginal Corporation	

2.3 Aboriginal Party Participation in Survey

The survey of the Project Area was undertaken with the Aboriginal party representatives listed in Table 2.2.

Table 2.2 Aboriginal party survey representatives

Date	Organisation	Name
14 – 17 September 2020	Awabakal Descendants Traditional Owners Aboriginal Corporation	Peter Leven Tori Leven
	Awabakal Traditional Owners Aboriginal Corporation	Kyle Howie
	Biraban Local Aboriginal Land Council	Norman Archibald
	Cacatua Cultural Consultants	Ashley Sampson
	Darkinjung Local Aboriginal Land Council	Barry Williams
	Guringai Tribal Link Aboriginal Corporation	Tracey Howie
	Wonn1 Contracting	Arthur Fletcher

2.3.1 Outcomes of In-Field Consultation

This section documents specific feedback received from Aboriginal party representatives during the survey.

During the survey, the Aboriginal party representatives identified that they were aware of the relatively high numbers of sites in the surrounding landscape, and the cultural value of the broader landscape to Aboriginal people. Aboriginal party representatives identified that sites present within the Project Area further demonstrated that Aboriginal people intensively utilised this landscape for the purposes of camping, resource gathering and general subsistent practices. It was noted that all sites within this landscape (that is generally subject to low disturbance due to the challenging terrain and unsuitability for residential or commercial development) should be protected to ensure that these are not damaged by any of the proposed works.

In particular, rock shelter sites were seen as significant because it is very likely that Aboriginal people historically would have utilised these and similar sites for camping, protection from the elements or opportunistically when using the landscape more generally.

2.4 Cultural Heritage Significance Workshop

Centennial Mandalong conducted a cultural heritage significance workshop with members of the Aboriginal community to understand the Aboriginal cultural significance of sites identified within the Modification 9 area. Based on the outcomes of this workshop, cultural significance ratings were attributed to each site based on the assessment process described in the Northern Region ACHMP. Further information on this can be found in **Section 8.1**. A copy of the cultural heritage significance workshop minutes can be found in **Appendix 1**.

In relation to specific information about key sites, Peter Leven identified that the names of some of his relatives who lived in the general area are present within site 45-3-1228 (Moran's Creek rock shelter).

2.5 Consultation Regarding the Draft Assessment

A copy of the draft HMP was provided to all registered Aboriginal parties on 15 February 2021 with an invitation to review and comment on all aspects of the document.

On behalf of Wonn1 Contracting/Kauwul, Arthur and Lynne Fletcher provided an email on 25 February stating that they had reviewed the HMP and are happy to support the HMP.

On 3 March 2021, Kerrie Brauer provided an updated statement of significance relating to Mandalong Mine on behalf of the Awabakal Traditional Owners Aboriginal Corporation and Guringai Tribal Link Aboriginal Corporation. This statement has been included at the commencement of the HMP.

3.0 Environmental Context

The decisions that people make regarding such things as where they live, the range of resources they use and other aspects of daily life may be influenced by the environment in which they live. The preservation and visibility of sites is also affected by environmental factors such as vegetation cover, past land-use and disturbance. A review of the environmental context of the Project Area is therefore integral to considerations of site visibility, preservation and occurrence within the Project Area.

This section provides a summary of key environmental information for the Project Area and discusses the implications of this information for the archaeological evaluation of the Project Area.

3.1 Landforms and Hydrology

For the purposes of this HMP, the Project Area has been divided into landform types based on slope and geomorphic classification and disturbance types. A range of landforms have been identified across the Project Area, with ridgelines and slopes being the most common (refer to Table 3.1). Gently inclined and moderately inclined slopes are the most dominant slope types, however there are instances of steeply inclined slopes across the area that are susceptible to slope wash and erosion where the topsoil is exposed. Other key landform elements identified include disturbed terrain (heavily impacted as a result of historical land use activities) and drainage lines/watercourses.

Table 3.1 Landform Types

Landform Types
Ridges
Crests
Drainage Lines/watercourses
Disturbed Terrain
Slopes comprising: <ul style="list-style-type: none"> • Gently inclined • Moderately inclined • Steep slopes

The main topographic features of the Project Area are steeply inclined ridges and wide valley floors (Department of Lands 2006, RPS 2013). The majority of ridges are associated with the Yambo Trigonometry Station (264m elevation AHD) at the top of Toepfers and Buangi Roads. A number of watercourses and their first order tributaries intersect the Project Area, primarily being Buttonderry Creek and Moran's Creek. Moran's Creek drains the northern portion of the Project Area and is associated with a wide valley floor. The upper tributaries of Buttonderry Creek, along the western part of the Project Area, are relatively steep and only join the valley floor further to the west and south of the Project Area. The steep ridges are dissected by a number of narrow watercourses which drain into both Moran's and Buttonderry Creek within the Project Area. Many of the smaller watercourses are not shown on topographic maps for the area. These are very limited in catchment relative to the larger watercourses.

3.2 Geology and Soils

The Project Area is located on the Narabeen group and the Quaternary deposits. The Narabeen group is characterised by sandstone, interbedded sandstone, siltstone, and claystone. The Quaternary deposits are characterised by undifferentiated alluvial deposits, sand, clay, and gravel.

Based on the geological description of this formation, it does not appear that stone raw materials suitable for artefact manufacture would have been available within the Project Area but would have been sourced from other locations within the region. However, the presence of sandstone in the Project Area shows that there is a likelihood of identifying grinding grooves and rock shelters.

The Project Area is underlain by the Gorokan, Mandalong, Watagan and Woodbury's Bridge soil landscapes. The depth of topsoil is a critical consideration for the likely presence of sub-surface archaeological deposits because intact deposits are typically only found within A horizon soils. Within the project area, the soil landscapes provide a varying level of A horizon soil depths, as outlined further below.

The Gorokan soil landscape is highly acidic and prone to toxic concentration of aluminium (Murphy, 1993). Typical soil profiles vary according to the landform, as described in Table 3.2. Based on the information provided in this table, it is clear that soils within this soil landscape are typically relatively shallow. These soils are typically highly erodible and subject to seasonal, localised waterlogging, with levels of erosion linked to landform.

The Mandalong soil landscape is typically moderately acidic. Typical soil profiles are consistently shallow throughout the soil landscape, as described in **Table 3.2**. Based on the information provided, it is clear that these soils are highly erodible and subject to exposure of subsoil clays where erosion is present. On crests within this soil landscape, and upon slopes, soils generally develop on either siltstone and mudstone substrate, or sandstone substrate.

The Watagan soil landscape is typically moderately acidic. Typical soil profiles vary by landform and by underlying parent rock, with sandstone extrusions common on steeper slopes and on crests. As shown in **Table 3.2**, the soil profiles are generally deepest on slopes upon exposed sandstone outcrop.

Table 3.2 Summary of the soil landscape information relevant to the Project Area (from Murphy 1993)

Soil Landscape	A ¹ soil horizon	A ² soil horizon	B soil horizon	Typical topsoil depth
Gorokan	10 to 15 cm of loose dark brown loamy sand	10 to 50 cm of yellowish-brown hard setting clayey sand	Yellowish brown strongly pedal clay	Up to 65 cm
Mandalong	Up to 10cm of hardsetting stony brown sandy clay loam	-	On crests or sandstone, yellowish brown pedal clay with sand grains upon underlying sandstone parent material. On slopes overlying siltstone or mudstone substrate, slaking cracking plastic pedal clay generally overlies.	Up to 10cm

Soil Landscape	A ¹ soil horizon	A ² soil horizon	B soil horizon	Typical topsoil depth
Watagan	20-100cm when overlying sandstone. Often deepest on slopes. Typically up to 40cm when overlying fine-grained bedrock	Typically up to 40cm when overlying fine-grained bedrock	Mottled, coarse-grained light sandy clay loam to medium clay on sandstone colluvium. Brown strongly pedal clay on fine-grained bedrock. Light grey mottled clay on shale bedrock.	20 – 100cm, with >100cm present in drainage flats.

3.3 Flora and Fauna

The Project Area is generally comprised of low open forest with a grassy understorey. Parts of the Project Area have been previously cleared of all vegetation to support historical land use practices, with the vegetated areas of the Project Area comprising regrowth vegetation dominated by Eucalypt species. This vegetation clearance would have initially occurred in association with the historical mining activity, with subsequent clearance associated with construction of adjacent infrastructure (including roads and services) and the establishment and ongoing operation of Mandalong Mine.

Prior to this vegetation clearance, key species present within the area would have included smooth barked-apple (*Angophora costata*), scribbly gum (*Eucalyptus haemastoma*), red bloodwood (*E.gummifera*), brown stringybark (*E. capitellata*), and forest oak (*Allocasuarina torulosa*). Common understorey species include mountain devil (*Lambertia formosa*), hill banksia (*Banksia spinulosa* var. *collina*), banksia (*Banksia oblongifolia*), flaky-barked tea-tree (*Leptospermum attenuatum*), broad-leaf drumsticks (*Isopogon anemonifolius*).

This vegetation community would have provided a range of plant resources that would have been used by Aboriginal people for food, medicine, shelter and the manufacture of artefacts. In addition, this vegetation community would have hosted a variety of fauna which would also have been utilised by past Aboriginal peoples for food and raw material.

3.4 Land Use History

As recounted by RPS (2013), the Mandalong area was primarily settled from the early 1830s however substantial land clearance and development is unlikely to have commenced until the mid-late 1800s. From this early period, the trade in timber was reportedly one of the key economic activities in the area in addition to grazing/dairying. In general terms, the importance of timber harvesting as an economic activity in the region has implications for the preservation of archaeological evidence. Harvesting of mature trees substantially reduces the likelihood that Aboriginal scarred trees will remain in the area.

In addition, vegetation clearance often results in substantial changes in erosion regimes, increasing rates of erosion, particularly on steeply inclined landforms. Changes in erosion can in turn impact drainage line morphology, potentially resulting in incision of tributary streams and extension of gullies, erosion and sedimentation during major floods, and in some places, increases in water salinity (Dean-Jones and Mitchell 1993:4).

A review of aerial imagery clearly shows that the cleared portions of the Project Area have been impacted by erosion over time, and that the impacts of this erosion have likely been exacerbated by previous vegetation clearance and ongoing vegetation maintenance for the existing electrical easement and tracks throughout.

4.0 Cultural Context

In order to adequately undertake an assessment of Aboriginal cultural heritage within an area, it is necessary to also understand the cultural context of the area. The term cultural context encompasses both ethnohistoric information regarding how Aboriginal people lived in the region during the period of non-Aboriginal settlement, and the information that we currently have access to regarding the patterns of distribution of archaeological evidence, based largely on the outcomes of previous archaeological assessments.

4.1 Ethnohistoric Information

Historical records, such as official records and personal observations recorded in diaries or publications, can provide information on the Aboriginal history of a region since European contact. Although a valuable source of information, the limitations of these documents must be recognised as colonial observers generally tended to record unusual rather than everyday events, religious and social life rather than economic activity, and men's behaviour rather than that of women and children. As such, ethnohistoric records are neither unbiased nor complete, and they cannot provide a complete understanding of Aboriginal beliefs and practices at the time of contact.

For the reasons discussed above, there are often issues with using ethnohistoric accounts to identify specific boundaries for Aboriginal nations or clans. There are different versions of Awabakal tribal boundaries documented by various sources however, it is generally understood that Awabakal country extended south from the Hunter River to Norah Head and Wyong and extended west to include the coastal bordering ranges (refer to Umwelt 2010). Awabakal country was bounded to the north by the Worimi, to the west by the Wonnarua, to the south-west by the Darkinjung and to the south along the coast by the Kurring-gai people. Threlkeld (a key source of information about the Awabakal, as discussed below) noted that different Aboriginal tribes were linked to specific areas but recognised that 'the natives here are connected in a kind of circle extending to the Hawkesbury and Port Stephens' (Threlkeld 1825 in Gunson 1974).

In terms of records specific to the vicinity of the Project Area, records relating to Aboriginal people being issued with blankets at Lake Macquarie in 1833 reference three Aboriginal woman and 13 men who collected blankets as 'deriving their designation' from the Kurungbong tribe and frequenting the Kurungbong and Lake districts (Gunson 1974:362-364). The modern township of Cooranbong is located within 10 km of the Project Area and, while it is a broad assumption, the designation of the 'Kurungbong' tribe is indicative that these may have been people who lived in the vicinity of the Project Area.

Much of the information that is currently understood about the Awabakal people comes from the writings of missionary Lancelot Threlkeld, who initially established a mission at Belmont in 1825-6. This mission proved very costly and was considered unsustainable by the London Missionary Society. Threlkeld subsequently obtained a second land grant at Toronto and established the Ebenezer mission which he operated until 1841. During this time, Threlkeld devoted substantial time and effort to recording the Awabakal language and also documented key aspects of Awabakal life, including aspects of material culture, spiritual beliefs, family structures, ceremonial practices and general aspects of day-to-day life. These are summarised and discussed in Umwelt (2010, 2011).

In broad terms, these records demonstrate that the Aboriginal people that Threlkeld wrote about were a society with highly developed beliefs and customs, who placed importance on key features in the landscape that were linked to beliefs and practices and who had a highly evolved understanding of how to live within their country in a manner that was sustainable prior to non-Aboriginal invasion.

However, Threlkeld was keenly aware of the negative impacts of this invasion and the ongoing growth of non-Aboriginal settlement in Newcastle and Lake Macquarie. He noted that the number of Aboriginal people occupying the Belmont, and subsequently Toronto missions, significantly decreased as a result of both the effects of disease and the ongoing attraction of employment in Newcastle (Threlkeld in Gunson 1974). His letters frequently documented the ‘lamentable’ treatment of Aboriginal people in the local area.

No further comments regarding the inclusion of other specific ethnohistoric information were provided by the registered Aboriginal parties in their review of the draft HMP.

4.2 Archaeological Context

A review of available archaeological information is crucial to the archaeological assessment process, as it informs our understanding of archaeological site patterning, site survival and the potential for detection of extant archaeological sites. This information is discussed with reference to the outcomes of a search of the Aboriginal Heritage Information Management System (AHIMS) database (which documents the location and nature of sites for which site cards have been lodged) and a summary of the outcomes of previous archaeological investigations in the local area.

This information is then considered with reference to key environmental characteristics discussed above to establish a predictive archaeological model for the Project Area.

4.2.1 AHIMS Results

A search of the Aboriginal Heritage Information Management Systems (AHIMS) register was undertaken on 29 August 2020 and confirmed on 20 December 2020. The search encompassed an area of Easting: 349000 – 353000 and Northing: 6325800 and 6329600. The extensive search is attached at **Appendix 2** The relative frequency of site types within the search area is outlined in Error! Reference source not found. with the site status summary of the AHIMS results outlined in Table 4.2.

As shown in the below table, sites associated with sandstone outcrops (either grinding grooves or habitation structures – which are rock shelters in this case) comprise over 53% of the total sites recorded within the search area. Further to this, the majority of Potential Archaeological Deposit (PAD) and Art (Pigment or Engraved) sites within the search area are located within rock shelters, leaving a total of approximately 78% of sites recorded within the search area being located upon or within sandstone outcrop locations (such as sandstone benches or rock shelters). This is largely reflective of the nature of investigation in this area, as sites upon these sandstone formations are the most likely to be subject to impacts through longwall mining (such as cracking). This is also supported by the heavily vegetated nature of the search area, with surface artefact sites generally observed upon areas with significant exposure due to disturbance or erosional processes. The level of vegetation within the Project Area is likely to have minimised visibility and exposure, and in turn has reduced the number of surface sites that are identifiable.

A number of modified trees (Carved or Scarred) are also recorded within the search area. The presence of trees of this nature are likely associated with areas where historical logging practices have not occurred.

Table 4.1 Relative frequency of site types in the search area

Site Type	Frequency	Percentage
Aboriginal Resource and Gathering	8	7.92%
Art (Pigment or Engraved)	8	7.92%
Artefact	11	10.89%
Artefact, Art (Pigment or Engraved)	1	0.99%
Grinding Groove	33	32.67%
Habitation Structure	21	20.79%
Modified Tree (Carved or Scarred)	5	4.95%
Potential Archaeological Deposit (PAD)	13	12.87%
Water Hole	1	0.99%
Total	101	

Table 4.2 Site status of sites within the search area

Site Status	Frequency	Percentage
Valid	86	85.19%
Deleted	15	14.85%
Grand Total	101	

Based on the AHIMS data, 19 previously recorded sites are listed as being located within the Project Area, of which one is a duplicate record. However, during the review of information for this HMP, it was identified that coordinates listed on AHIMS for some sites do not match with the coordinates provided by RPS, who recorded sites as discussed in **Section 5.2.1**. Table 4.3 includes information on where these discrepancies occur. For the purpose of this HMP, it is understood that the coordinates provided by RPS are correct (as confirmed by selected ground-truthing) and that the sites recorded within the Project Area are as in Table 4.4. On this basis, there are 16 previously recorded sites within the Project Area. As discussed in **Section 4.2.2**, during the review of information for these 16 sites, where the site card/report information indicated that the key feature recorded on AHIMS was incorrect, this was adjusted. On this basis, the 16 previously recorded sites within the Project Area comprise one artefact scatter, two isolated artefacts, three sites containing grinding grooves, three rock shelters (one containing art and two identified on the basis of the presence of potential archaeological deposit) and seven locations identified as habitation structures but not associated with any Aboriginal objects or areas of potential archaeological deposit. Further information on recorded sites is included in **Section 5.2.1**.

Corrections to AHIMS data will be made as required.

Table 4.3 Summary of AHIMS registered sites within the LW30-31 Project Area with reference to corrected coordinates (as provided by RPS)

Site ID	Site name	Feature	Does AHIMS data match RPS (2013)
45-3-1223	Moran's Creek	Artefact scatter	NA (recorded by Dyll)
45-3-1226	Buttonderry Creek	Grinding Groove	NA (recorded by Dyll)
45-3-1228	Moran's Creek	Art (Pigment or Engraved)	NA (recorded by Dyll)
45-3-3492	RPS MAND STH CYL05	Grinding Groove	Yes
45-3-3511/ 45-3-3447	RPS MAND STH PS25	Isolated artefact	Yes
45-3-3512	RPS MAND STH PS26	Grinding Groove	No (corrected location is within project area)
45-3-3513	RPS MAND STH PS28	Potential Archaeological Deposit (PAD)	Yes
45-3-3514	RPS MAND STH PS32	Potential Archaeological Deposit (PAD)	Yes
45-3-3586	RPS MAND STH PS01	Habitation Structure	Yes
45-3-3594	RPS MAND STH PS27	Habitation Structure	No (correct site location is within the project area)
45-3-3595	RPS MAND STH PS29	Habitation Structure	No (correct site location is within the project area)
45-3-3596	RPS MAND STH PS30	Habitation Structure	No (correct site location is outside the project area)
45-3-3639	RPS MAND STH PS02	Aboriginal Resource and Gathering	Yes
45-3-3640	RPS MAND STH PS03	Aboriginal Resource and Gathering	Yes
45-3-3641	RPS MAND STH PS04	Aboriginal Resource and Gathering	Yes
45-3-3642	RPS MAND STH PS05	Aboriginal Resource and Gathering	Yes
45-3-3644	RPS MAND STH PS24	Aboriginal Resource and Gathering	No (corrected site location is outside project area)
45-3-3536	RPS MAND STH TBM29	Isolated artefact	Yes

Table 4.4 Corrected list of sites recorded within the LW30-31 Project Area)

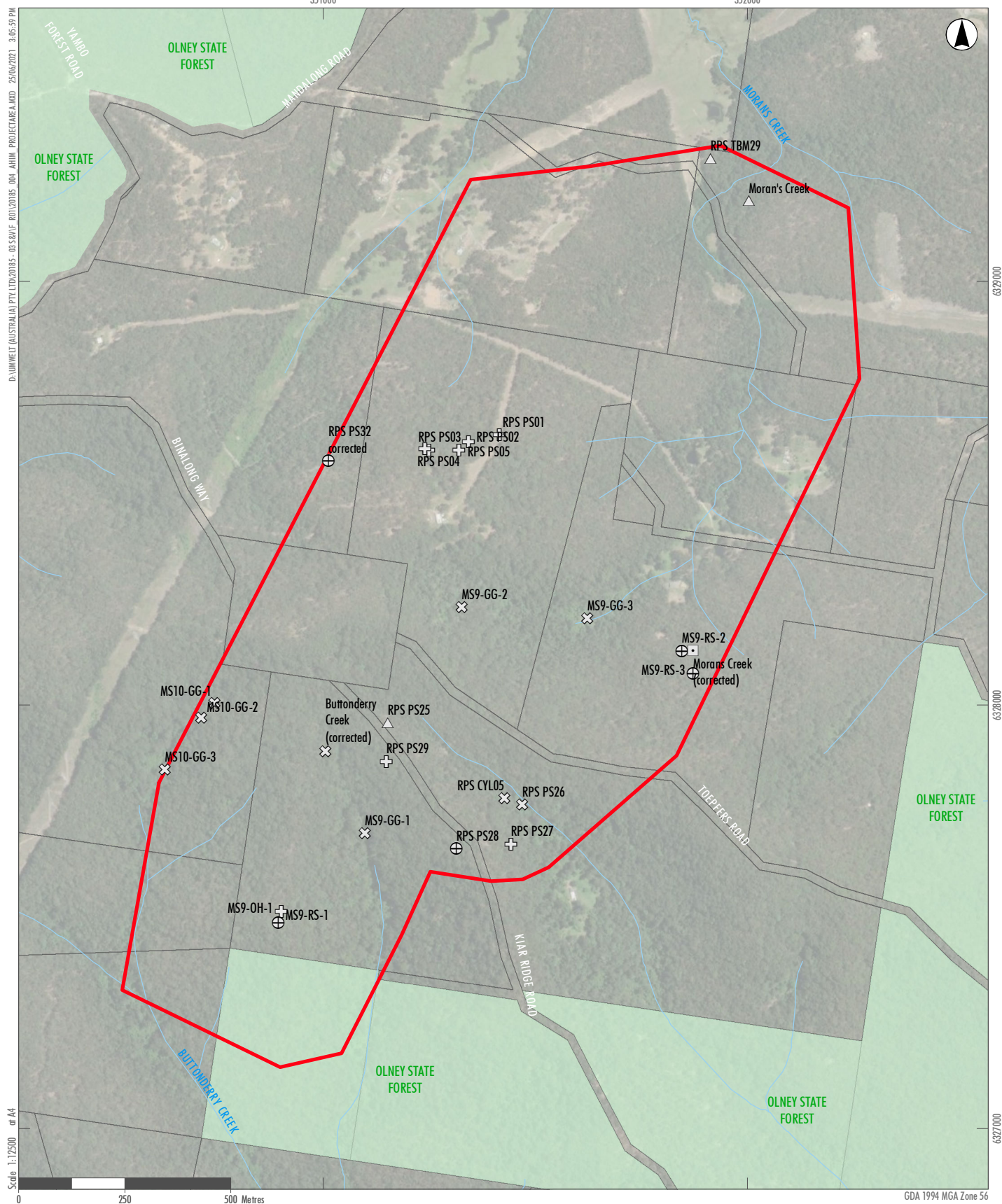
AHIMS #	Site Name	Site feature (corrected)
45-3-1226 (corrected)	Buttonderry Creek (corrected)	Grinding groove
45-3-1223	Moran's Creek	Artefact scatter
45-3-1228 (corrected)	Morans Creek (corrected)	Rock shelter with art
45-3-4548	MS10-GG-1	Grinding groove
45-3-4549	MS10-GG-2	Grinding groove
45-3-4550	MS10-GG-3	Grinding groove
45-3-4551	MS9-GG-1	Grinding groove
45-3-4552	MS9-GG-2	Grinding groove
45-3-4545	MS9-GG-3	Grinding groove
MS9-OH-1	MS9-OH-1	Habitation structure (no PAD or objects)
45-3-4547	MS9-RS-1	Rock shelter with PAD
45-3-4546	MS9-RS-2	Rock shelter with PAD
45-3-4544	MS9-RS-3	Rock shelter with artefacts & PAD
45-3-3492	RPS CYL05	Grinding groove
45-3-3586	RPS PS01	Habitation structure (no PAD or objects)
45-3-3639	RPS PS02	Habitation structure (no PAD or objects)
45-3-3640	RPS PS03	Habitation structure (no PAD or objects)
45-3-3641	RPS PS04	Habitation structure (no PAD or objects)
45-3-3642	RPS PS05	Habitation structure (no PAD or objects)
45-3-3511	RPS PS25	Isolated artefact
45-3-3512	RPS PS26	Grinding groove
45-3-3594	RPS PS27	Habitation structure (no PAD or objects)
45-3-3513	RPS PS28	Rock shelter with PAD
45-3-3595	RPS PS29	Habitation structure (no PAD or objects)
45-3-3514 (corrected)	RPS PS32 corrected	Rock shelter with PAD
45-3-3536	RPS TBM29	Isolated artefact



- Legend**
- Project Area LW30-31
 - State Forest
 - Aboriginal Resource and Gathering
 - Art (Pigment or Engraved)
 - Artefact
 - Grinding Groove
 - Habitation Structure
 - Potential Archaeological Deposit (PAD)

FIGURE 4.1

Results of the AHIMS Search



- Legend
- Project Area LW30-31
 - State Forest
 - △ Artefact scatter
 - ⊗ Grinding groove
 - + Habitation structure (no PAD or objects)
 - ⊕ PAD
 - ⊠ Rock shelter with art

FIGURE 4.2

AHIMS Sites within the Project Area (including current survey results)

4.2.2 Regional Archaeological Context

The regional distribution of sites within the Lake Macquarie Local Government Area is reviewed by Umwelt (2011) with reference to major landscape elements, noting key variations between the type and nature of archaeological sites located in varying contexts including the coast, lake shore and inland elevated ranges. Based on the model provided by Umwelt (2011) sites such as middens and large stone artefact scatters are most commonly found bordering Lake Macquarie and key estuarine watercourses that flow into Lake Macquarie but are also linked to the occurrence of suitable freshwater resources.

Within freshwater creek lines, site types will include stone artefact scatters and grinding grooves (where suitable sandstone exposures are present), noting that site occurrence is affected both by the reliability of the water sources and the inclination of bordering slopes. These creek lines were also used as a means of passage through the landscape from the coast and lowlands into the elevated ranges such as the Sugarloaf Range. Within these elevated mountain places, Umwelt (2011) note the potential for ceremonial sites but also reference the occurrence of sites such as rock shelters and grinding grooves (where the geology and topography is suitable).

These general predictions are considered with reference to the specific archaeological record of the Project Area and its immediate surrounds, as discussed below.

The registered sites have primarily been recorded as a result of previous Aboriginal cultural heritage assessments conducted in relation to proposed developments in the local area. These are discussed below.

Umwelt (2018)

Umwelt (2018) completed an Aboriginal cultural heritage assessment of a (then) proposed 7.7 km long 33kV power line, which extended from Mandalong Road to the Mandalong South Surface Site (MSSS). The assessment area comprised a variety of landforms, including modified slopes, slopes, drainage lines and crests. As a result of the survey undertaken to inform the assessment, three new archaeological sites were identified, all of which were recorded as isolated finds.

‘Mandalong IF1’ consists of a single broken flake of tuff identified within a moderately inclined slope landform within the existing powerline easement, ‘Mandalong IF2’ consists of a broken flake of silcrete located within the existing powerline easement on a gently inclined slope leading towards a minor drainage line, and ‘Mandalong IF3’ consist of a broken flake of chert located in a moderately inclined slope landform within the existing powerline easement. Based on the nature of the landform, the limited depths of remnant topsoil and the level of disturbance at each of the sites, it was assessed that the potential for additional artefacts to be present within a sub-surface context in association with the sites was low.

In addition to the three sites described above, two specific areas within Survey Unit 7 and Survey Unit 20 were assessed to have low to moderate archaeological potential, due to their proximity to drainage lines and being located on relatively level ground with topsoil deposit present.

In consultation with the registered Aboriginal parties, the report recommended surface collection for the three newly identified sites (isolated finds), and an inspection of the areas of low to moderate archaeological potential by Aboriginal parties and an archaeologist following vegetation clearance in those areas.

The remainder of the Project Area was assessed to have low archaeological potential as it comprises landforms that do not provide direct access to reliable water sources, have a slope inclination that is not conducive to camping/occupation activities, have a limited depth of remnant topsoil and have been subject to varying levels of disturbance.

RPS (2013)

RPS (2013) completed an assessment of 2,360 ha of private and public land for the now approved Mandalong Southern Extension project, including the current Project Area. The assessment resulted in the recording of 130 new archaeological sites in addition to 20 previously recorded sites. The most common site types were grinding grooves, rock shelters with PAD and scarred trees, although several artefact scatters were recorded in addition to stone arrangements.

The Mandalong Southern Extension Area is characterised by steeply inclined ridges with first and second order streams/drainage lines that drain into Morans Creek in the north and east. Typically, rock shelters were located on or within 200 m of the ridge crests and were formed from weathering sheets of sandstone or large boulders.

Grinding groove sites were located in the first and second order drainage lines and were typically identified on smooth, fine-grained sandstone sheets at elevations between 80 and 100 m AHD. It was observed that sandstone exposed in drainage lines above 100 m elevation tended to be rough and unsuitable for grinding grooves. Sandstone below 80 m tended to be more 'blocky' and did not have flat surfaces suitable for grinding grooves. Larger sandstone sheets were noted at the confluence of drainage lines and thus provided larger surfaces for grinding grooves. The numbers of grooves within each site ranged from single grooves to over 25 grooves at three sites. The majority of grinding grooves appeared to be for sharpening stone hatchet heads and typically were between 20 and 40 centimetres (cm) in length. Often pools of water were identified in close proximity to the grooves.

Artefact scatters were identified on the passes between catchments or on the gently sloped valley floor where Morans Creek became a third order stream. There was no distinct spatial patterning for scarred trees, however it was recognised that the area had previously been logged and thus the scarred trees identified probably represented a very small sample of their original distribution. In general, scarred trees were identified in areas that were inaccessible to logging, such as on steep slopes for which there was no vehicle access, or near steeply sided watercourses. Stone arrangements were generally comprised of vertically heaped blocks of stone or arranged in a circle; the stone blocks tended to be over 40 cm in length.

In reviewing these results, RPS (2013) suggested that the distribution of sites indicates that Aboriginal camping activities took place on the valley floors and in rock shelters and benching landforms on the ridgelines and upper slope/crest landforms and that the transition between these areas was potentially undertaken along watercourses (first and second order) as evidenced by the regular occurrence of grinding grooves. RPS (2013) noted that the Mandalong Southern Extension area may have been utilised as a transit route between the low-lying lacustrine environments and the Watagan uplands. The presence of grinding groove sites with more than 20 grooves was considered to support the proposition that the area may have supported larger groups of Aboriginal people than previously thought.

In relation to potential impacts and mitigation requirements for the identified sites regarding the original Mandalong Southern Extension Project, it was assessed that the majority of the sites were 'unlikely' or 'very unlikely' to be impacted by proposed longwall mining.

As this assessment was undertaken to inform the EIS for the Mandalong South extension area, it included the current Project Area however, at the time of survey, access was not available to all land parcels within the current Project Area. RPS (2013) recorded 13 sites within the current Project Area, with an additional site (RPS MAND STH PS07) located approximately 10m outside the current Project Area. There are some discrepancies between the recorded data and the access arrangement that were in place for the EIS, with select sites identified by RPS (2013) located within areas where access was technically not available in 2013 and that are subject to survey as part of this HMP. These sites are highlighted in bold below. Given the proximity of these recorded sites to existing tracks or roads, it is likely that these recordings were a result of slight extension to the survey undertaken by RPS (2013).

Of the sites listed in Table 4.5, 7 (as shown in *italics* in the table) are not described within the Aboriginal Cultural Heritage Assessment (RPS 2013) but were discussed in a subsequent Response to Submission regarding the project. These sites comprise rock overhangs that were not originally recorded as archaeological sites based on the absence of Aboriginal objects and any identified areas of archaeological deposit. However, based on consultation with the registered Aboriginal parties for the project, these sites were subsequently registered and subsidence predictions documented in the Response to Submissions.

Table 4.5 Sites Identified by RPS (2013) within the project area.

AHIMS ID	Site name	Site identified
45-3-3492	RPS MAND STH CYL05	Grinding Groove
45-3-3586	<i>RPS MAND STH PS01</i>	<i>Habitation Structure. RPS clarified that this site comprises a rock overhang that did not contain any archaeological deposit or objects</i>
45-3-3639	<i>RPS MAND STH PS02</i>	<i>Aboriginal Resource and Gathering. RPS clarified that this site comprises a rock overhang that did not contain any archaeological deposit or objects</i>
45-3-3640	<i>RPS MAND STH PS03</i>	<i>Aboriginal Resource and Gathering. RPS clarified that this site comprises a rock overhang that did not contain any archaeological deposit or objects</i>
45-3-3641	<i>RPS MAND STH PS04</i>	<i>Aboriginal Resource and Gathering. RPS clarified that this site comprises a rock overhang that did not contain any archaeological deposit or objects</i>
45-3-3642	<i>RPS MAND STH PS05</i>	<i>Aboriginal Resource and Gathering. RPS clarified that this site comprises a rock overhang that did not contain any archaeological deposit or objects</i>
45-3-3511	RPS MAND STH PS25	Isolated artefact
45-3-3512	RPS MAND STH PS26	Grinding Groove
45-3-3594	<i>RPS MAND STH PS27</i>	<i>Habitation Structure. RPS clarified that this site comprises a rock overhang that did not contain any archaeological deposit or objects</i>
45-3-3513	RPS MAND STH PS28	Potential Archaeological Deposit (PAD) – for clarity, it is noted that PAD is within a habitation structure
45-3-3595	<i>RPS MAND STH PS29</i>	<i>Habitation Structure. RPS clarified that this site comprises a rock overhang that did not contain any archaeological deposit or objects</i>
45-3-3514	RPS MAND STH PS32	Potential Archaeological Deposit (PAD) – for clarity, it is noted that PAD is within a habitation structure
45-3-3536	RPS MAND STH TBM29	Artefact scatter

*sites in *italics* were registered by RPS (2013) as part of a Response to Submissions regarding the EIS for the project.

RPS (2016a)

RPS (2016) completed an Aboriginal cultural heritage assessment for the Mandalong Transmission Line TL24 Relocation Project (SSD-5144 Mod 1), the easement for which is located approximately 6 km to the southwest of the current Project Area. Four previously recorded sites (three sets of grinding grooves, a scarred tree and a stone arrangement) were inspected. The proposed works were assessed as unlikely to result in impact to the identified sites, which were protected with a suitable buffer.

RPS (2016b)

RPS (2016) completed an Aboriginal cultural heritage assessment for a proposed extension to longwall panel 24 and the addition of longwall panel 24A within the Mandalong Southern Extension Area (SSD-5144 Mod 5). The area assessed was approximately five kilometres to the west of the current Project Area. The assessment resulted in the identification of one scarred tree. Based on the low likelihood of impacts to the site, it was recommended that it be subject to monitoring under the provisions of Centennial's Northern Region ACHMP (2016).

Insite Heritage (2008)

This assessment was conducted to support a rezoning application. The site was located at Morisset Park Road, Morisset Park, approximately 5 km east of the current Project Area. No surface archaeological evidence was identified. However, it was assessed that there was a low to moderate potential for small artefact scatter/s to be concealed under topsoil, with a recommendation that the area be designated a PAD (Insite Heritage 2008).

Besant (2001)

As a result of the assessment for a proposed school site on the lake foreshore approximately 5 km southeast of the current Project Area, a series of test excavations were conducted. A total of 88 artefacts were recovered from a former beach ridge landform. The artefacts included geometric microliths and a knapping floor. It was considered that some of these artefacts were located undisturbed and in situ, while other artefacts appeared to have been re-deposited by wave action, displaying water worn features.

4.3 Predictive Model

Given that there are 16 previously existing sites recorded within the Project Area, it is important to consider how these sites relate to the known environmental context and the regional archaeological context. The presence of these sites within the Project Area helps inform the discussion regarding potential for additional sites to be present and not previously recorded, particularly in areas that have not yet been subject to archaeological survey. When the archaeological pattern for the region and local area is considered with reference to the environmental context of the Project Area, the following predictions may be made in terms of the potential for additional (previously unidentified) sites to be present within the Project Area:

- Scarred trees may be present within an area if suitable mature trees remain extant. Based on the occurrence of logging activity throughout the area, this likelihood is greatest in areas that may formerly have been difficult to access and/or remove logged timber. The potential for this site type to be present within the Project Area is therefore assessed as low.

- Artefact scatters/isolated artefacts may be present within the Project Area. While there is evidence of Aboriginal use of the area throughout the Mandalong South project, sites containing artefact scatters are generally poorly represented. This is likely due to the nature of archaeological survey focusing on areas of sandstone outcrop, where sites are more likely to be significantly impacted by undermining. Given the level of vegetation identified throughout the project area, visibility may be a significant factor in identification of any surface artefact sites. There is also the possibility, given the disturbance history of the Project Area, that any artefacts present may have been relocated or disturbed. However, should sites of this nature be present, it would be expected that they would be located upon flat or gently sloping landforms in proximity to watercourses, with perennial watercourses usually preferred. The potential for this site type to be identified within the project area is therefore assessed as low due to the absence of perennial watercourse and the elevated or inclined nature of the majority of the area.
- Grinding groove sites occur most often in association with watercourses, where sandstone outcrops of a quality/inclination to provide a suitable grinding matrix occur. Given the number of drainage lines that traverse the Project Area (including larger drainage lines such as Buttonderry Creek and Moran's Creek), should suitable sandstone exposure within these drainage lines be present, there is moderate to high potential for these site types to be present. This is supported by the presence of previously recorded grinding groove sites within the Project Area.
- The potential for rock shelter sites to be present depends on the presence of suitable sandstone outcrops or boulders in areas of suitable topography for weathering of the outcrops/boulders to form shelters. Based on the landforms within which the Project Area is located, should suitable outcrop be identified, the potential to identify additional rock shelters to those already recorded is considered to be moderate. Rock shelters are typically an easier site type to identify however the potential for additional sites of this type recognises that the Project Area was not previously exhaustively surveyed.
- Stone arrangements are more likely to occur on high points such as crests. Stone arrangements are very susceptible to disturbance. As already noted, based on the landforms within which the Project Area is located, as well as the proximity of the Project Area to contemporary disturbance (including infrastructure, roadways and private residences) it is highly unlikely for any stone arrangements to be present in areas subject to disturbance. Where disturbance within the Project Area is limited, stone arrangements may be present.

5.0 Non-Indigenous Heritage

This section provides an overview of the non-Indigenous history of the region and provides a framework and context in which potential non-Indigenous heritage items can be assessed and managed.

5.1 Historical Overview

In 1797, a whaleboat party led by Lieutenant Shortland searching for runaway convicts first observed the mouth of the Hunter River (Newcastle Council 2010). Lieutenant Shortland became the first European to explore the area and upon returning to Sydney he brought sketches of the river and reports of coal. In the following years, several boats visited the area and gathered enough coal for an export shipment to be sent to Bengal. Before long, a small penal settlement had been established at Newcastle, however due to the difficulty faced in administering a convict group at such a distance from Sydney, the settlement was abandoned in 1802 (Zierer Jan. 1941).

Two years later, the site was re-established as a penal colony to be populated by those convicts considered too dangerous and unruly to remain in the Sydney penal settlements. These convicts worked a drift mine beneath Beacon Head. In addition to coal, cedar logging became a major product of the area now known as Maitland. It is believed that around 700 convicts were stationed in the area in 1818. However, with such industry being successfully established, free settlers followed and arrived in growing numbers. By 1822, Newcastle was released from martial law and ceased to operate as a convict centre. The remaining convicts were sent to the penal colony of Port Macquarie (Zierer Jan. 1941).

The earliest European occupants around Lake Macquarie were most likely timber getters targeting the cedar of the Watagan Mountains to the west and the stands of timber around the lake foreshore. There is record of a land selection in 1830 by Thomas Walker over the present-day Wyee Point area, though there is no evidence that the land was developed (Clouten 1967: 53). From the 1830's onward the south-western boundary of Lake Macquarie was a known haunt of cattle thieves. Nearby Wyee was an important crossroads and a stopping point on Aboriginal and European tracks as it was here that the track diverged in one direction, to the east of Lake Macquarie and the other, westward towards Maitland (Bennett 1969: 16).

5.2 Local History

Mandalong, part of the original 2,000 acre grant of John Simpson, was settled as a result of Simpsons Track (Section 11.4.1). The Track followed the main valley which later intersected Stockton Creek, which drained the hill country west of Cooranbong (Clouten 1967: 19). The earliest settlement in the Mandalong area is documented with the purchase of blocks by Henry Osborne and Thomas Walker sometime between 1838 and 1840. In the 1840s a new route for the Old Maitland Road was surveyed through the district but, with a severe economic depression, the project was shelved.

In 1852 Carl F. Solling purchased the first block in Mandalong but he had probably occupied the area from an earlier date. It would appear there were few permanent residents with Osborne, Walkers and Capes referred to as running cattle in the area, but not as residents. From 1861 onward, farmers were moving to the area with family names of Bonnell, Kelly, Frost, Moran, Booth, Tobin, Durrington, Carroll and Kennedy recorded. The main industries appeared to be timber extraction, dairying, raising horse and cattle.

The local population was mainly Roman Catholic with the first church built in 1876 also serving as a private school. In 1878 'Mandelong' Provisional School was first opened. Mandalong's prosperity depended on the timber trade, as the availability and need for timber dwindled so did the village. By 1953 the school and church had permanently closed. With poor soil quality and a decline in the timber industry, Mandalong remained a quiet rural area for much of the twentieth century. (History of Mandalong).

5.3 Heritage Databases

5.3.1 World Heritage List

The World Heritage List was established by United Nations Educational, Scientific and Cultural Organization (UNESCO) to protect, safeguard and manage tangible and intangible heritage through the promotion of diversity of cultural expressions and the dialogue of cultures with a view to fostering a culture of peace. The World Heritage List consists of properties of cultural and natural heritage which the World Heritage Committee considers as having outstanding universal value.

A search of the World Heritage List found no references for the Mandalong area.

5.3.2 Australian Heritage Database

The Australian Heritage Database incorporates: The National Heritage List; the Register of the National Estate and the Commonwealth Heritage List.

The National Heritage List is now the lead statutory document for the protection of heritage places considered to have national importance. This list comprises Indigenous, natural and historic places that are of outstanding national heritage significance to Australia. Listed places are protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). There are no items within the LW30-31 project area on the National Heritage List.

Prior to this, the Register of the National Estate was the primary document. While the Register of the National Estate still exists, it is now frozen and no longer has statutory status. The Register is now maintained on a non-statutory basis as a publicly available archive and educational resource.

The Commonwealth Heritage List comprises natural, Aboriginal and historical heritage places owned or controlled by the Commonwealth. Places on this list are also protected under the EPBC Act.

A search of the Australian Heritage Database, that incorporates all of the above lists, found no references for the Mandalong area.

5.3.3 NSW Heritage Register

The NSW Heritage Register comprises items registered by the NSW Heritage Council under the NSW Heritage Act (1977) and deemed to be of State significance. Those items are protected under Section 136 of the NSW Heritage Act (1977) or are under an Interim Heritage Order.

A search of the NSW Heritage Register found no references to items of State Significance in the Mandalong area.

5.3.4 Local Government Registers

Items of significance at the local government level are listed in the Council's Local Environmental Plan(s) (LEP) in Heritage Schedules. This comprises a list of non-Indigenous and some Aboriginal items which have been listed with council as having heritage value. The Project Area extends across two Local Government Areas, being Central Coast Council and Lake Macquarie City Council. A search of the Lake Macquarie Local Environmental Plan 2014 and the Wyong Local Environmental Plan 2013 were undertaken to determine if any sites of heritage or archaeological significance were registered within the Project Area.

No sites on either LEPs have been recorded within the Project Area.

5.4 Previous Heritage Investigations of the Mandalong South Area

RPS (2013) undertook detailed historical archaeological and heritage investigations for the Mandalong South Expansion area, including the current Project Area. While there were no registered heritage items in the Mandalong South Expansion Area, desktop research and in-field investigation indicated that potential heritage items may exist within the wider Mandalong South Expansion area. These items were:

- Simpsons Track
- Brisbane Water to Wallis Plains Road
- Remnants of previous forestry practices, including:
 - OSF20 Olney Road Camping and Shield Tree
 - OSF27 Frog Hollow Board Tree
 - OSF30 Former residence and gardens
 - Landing Skid 1 - 4

Simpsons Track and the Brisbane Water to Wallis Plains Road were early thoroughfares on the NSW Central Coast and RPS (2013) suggest that these routes may have traversed part of the Project Area. While these items were considered to be of historical significance, it was determined during the investigation that as these tracks were never formalised (and have been absorbed into modern road infrastructure or tracks), evidence for them is unlikely to remain.

Forestry was one of the earliest industries in the western Lake Macquarie area with remnants existing in the Mandalong area. The OSF20 Olney Road Camping and Shield Tree was described as a former camp in a grassy clearing. No physical evidence of the site was identified by RPS (2013), though it was recognised that archaeological remains may remain. A shield tree used to identify a benchmark for road construction occurs on the northern side of the road. The OSF27 Frog Hollow Board Tree was described as a four-metre high blackbutt stump with two sets of board holes. The OSF30 former residence and gardens were described as a former private residence later used as a forestry camp (now known as Curtis's Paddock). While the house has been removed, a corrugated iron shed, and remains of a post and rail stockyard remained (RPS 2013). Of the house, the timber stumps and a brick and stone fireplace remained together with plantings of mature exotic trees. A rubbish dump was also recorded. None of the Forestry sites identified during desktop investigations by RPS (2013) are located within the current Project Area.

During the course of the in-field investigation for the EIS, RPS identified four landing skids (also known as log landings). All of these items were related to the area's recent logging history and each displayed chainsaw cut marks on the end grains where they had been cut. The earliest portable chainsaw has been attributed to the German mechanical engineer, Andreas Stihl who patented the "Cut-off Chain Saw for Electric Power" in 1926 (Bellis, 2012: para. 5). Later, in 1929, Stihl patented the first gasoline-powered chainsaw. These were the first successful patents for hand-held mobile chainsaws designed for woodcutting in the world. There is ample evidence to confirm chainsaws did not appear for logging purposes in the world prior to the late 1920s, with the penetration of them into the Australian forestry sector not occurring until the mid to late 1950s. Their use was not widespread until the 1960s.

Landings skids or log landings are neither rare nor in this case historically significant, with the practice of fashioning them still being practiced in the timber industry today in order to aid the loading of logs onto trucks for transportation elsewhere. Supporting evidence for this position is taken from the Forests NSW prime facts sheet 693 of October 2008 which states;

"A bulldozer or skidder then takes the tree to a log landing, or log dump, where an excavator removes bark. The logs are then sorted and graded by a qualified log grader before being hauled by truck to a timber mill".

In almost all cases logging skids are roughly fashioned to assist the job at hand. Intended for immediate use there is no intention to construct them in such a way as to ensure their life beyond the immediate need. They generally represent a haphazard utilitarian construction based on surrounding and immediately available material to suit the general topographic conditions encountered. They are, by virtue of being built to assist log loading onto trucks, almost always situated alongside access tracks.

A total of four landing skid sites were observed throughout the Mandalong South area, being Landing Skid 1 – 4.

5.4.1 Sites within the Project Area

While four of the landing skid sites were identified across the wider Mandalong South expansion area assessed by RPS (2013), only one of these sites is located within the current Project Area, being Landing Skid 1. This feature displayed two elevated ramps either side at the end of a track in the Olney State Forest (**Plate 5.2**). The soil is cut on both the east and west of the termination of the track, with horizontal and vertical timber supports placed in the cuts as retaining walls. When viewed from the south, the entire feature forms a rough, inverted "U" shape, with the track substantially lower than the sides.

On the west, the horizontal timber supports running parallel to the track measure approximately 13.72 metres in length and approximately 86 centimetres in height from the track surface to the raised earth surface above. Two split log skids protrude from the embankment at a slight angle. The skids measured approximately 12 metres in length running west to east and are partially overgrown with grass (**Plate 5.2**). On the east, the horizontal timber supports measure 5.51 metres in length and the uprights approximately one metre in height.

While RPS identified that these sites were of importance to the local history of the area and its ties to the forestry industry, the condition of all the landing skids formed part of the assessment of significance. The sites were described as being in poor condition and crudely constructed, with their construction roughly fashioned and representative of haphazard utilitarian construction based on surrounding and immediately available material. Given that the landing skids exhibited chainsaw marks where the logs had been cut off, it is likely that the Landing Skids all date from the 1970s or later. All of the research undertaken by RPS (2013) indicated that the landing skids are not rare, are not old and are not unique in any way.

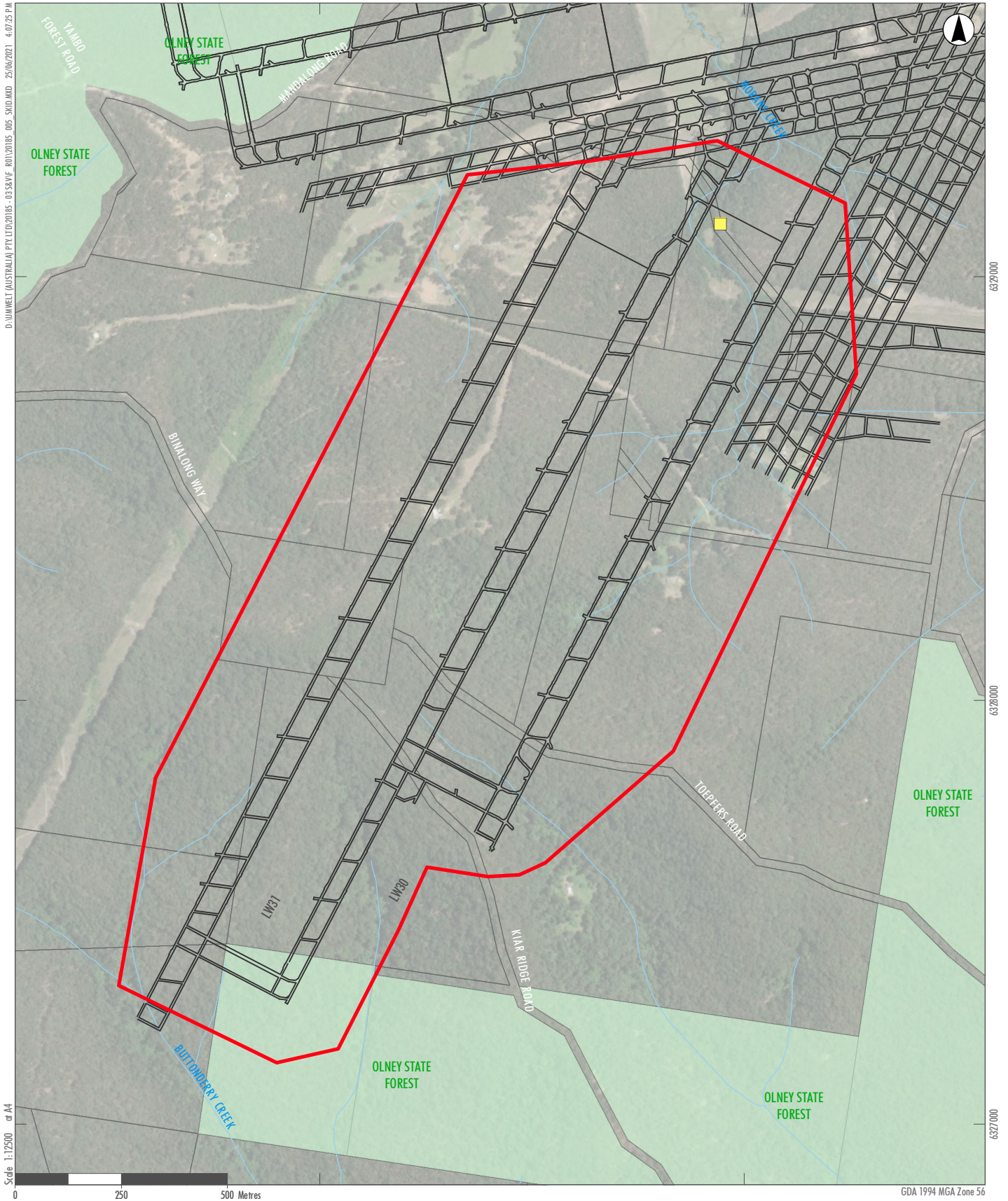
As such, it was identified that there was no possible connection between these sites and the early 19th century logging of the Onley State Forest. It was concluded that all the sites identified as part of the historical heritage assessment did not meet the criteria for State or local heritage significance, including Landing Skid 1 within the current Project Area.



Plate 5.1 Landing Skid 1 (from RPS 2013)



Plate 5.2 Landing Skid 1 – split log protruding from earthen bank (from RPS 2013)



- Legend**
- Project Area LW30-31
 - Mandalong Mine Longwalls
 - State Forest
 - Approximate Location of Landing Skid 1

FIGURE 5.1

Location of Landing Skid 1

6.0 Survey Methodology

As discussed in **Section 4** above, the Project Area was included within the larger area assessed as part of the original Aboriginal cultural heritage assessment (RPS 2013) undertaken to inform the application for SSD-5144. At the time of the assessment, four land parcels within the Project Area could not be surveyed due to lack of landholder consent. The intent of the current survey was to revisit the previously recorded sites where necessary and where access was granted to confirm site location and condition, to undertake detailed survey of the land parcels not previously accessed and to identify any additional sites that may be present. This means that, of the sites previously recorded within the current Project Area, 11 were not reinspected as part of the current survey but had already been subject to detailed recording and evaluation as part of previous assessments.

6.1 Survey Strategy

The survey was undertaken to ensure that a representative sample of all landforms within the area was surveyed, as required to ensure compliance with *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (the Code of Practice).

Based on the nature of the proposed impacts, the portions of the Project Area that were predicted to be subject to the greatest amount of potential subsidence impacts were subject to intensive survey. This included drainage lines (in association with which grinding grooves may be identified), slope areas likely to contain rock outcrop suitable for use as shelter (in association with which rock shelter sites may be identified) and crests and ridges (in association with which stone arrangements may be identified) where these landforms are mapped as intersecting with areas of subsidence.

All efforts were made to achieve maximum survey coverage via pedestrian survey. It is noted, however, that vehicle transects were used in select locations where suitable based on archaeological potential and/or where vegetation limited access and visibility.

Based on the size of the Project Area and the access arrangements organised by Centennial Mandalong, the Project Area was surveyed in units that reflected the property boundaries. All properties within the Project Area were subject to pedestrian survey.

Consideration of the potential for Aboriginal archaeological deposits to be present but not visible was a key component of the survey, as will be discussed further in **Section 6.4**.

6.2 Information Recorded During Survey

The survey units were defined and named with reference to Requirement 5c of the Code of Practice, including recording start and finish points and/or boundaries for all survey units using a hand-held GPS receiver (set to allow recording of data with datum MGA94) and topographic mapping (where relevant), with track logs to be recorded for all pedestrian transects. Start and finish points/boundaries for survey units were defined based on landforms, project area boundaries, access or other arbitrary terminations (as specified in the Code of Practice). The spacing between individuals was also be recorded for each survey unit.

For the reasons already discussed, the boundaries of the survey unit were defined based on information provided by the client and the anticipated spatial extent of the subsidence within the Project Area. Specifically, this was related to the known property boundaries within the Project Area, given the access arrangement provided during the course of the survey. The distribution of survey participants across the survey units was discussed in the field with survey participants. Survey participants were generally spaced between 5 to 20 metres apart where possible, dependent on ground surface visibility and density of vegetation.

Photographs were taken within the survey unit. Information recorded for the survey unit included:

- the landform
- gradient (where relevant)
- vegetation
- geology and soils (where suitable areas of exposure/visibility were present)
- identified Aboriginal resources
- levels of average ground surface visibility within the survey unit (in accordance with the Requirement 9 of the Code of Practice)
- extent and type of exposures within the survey unit (with reference to the factors leading to the exposure such as erosion, earth-moving activities, proximal construction works, etc.)
- any site or area of identified Aboriginal archaeological potential present within the survey unit
- any site or area of identified historical archaeological potential present within the survey unit.

6.3 Survey Coverage

In accordance with the Code of Practice, the survey coverage description includes landform unit, the total area surveyed within the landform unit and the quantification of the level of ground surface visibility and exposure. Ground surface visibility is defined as 'the amount of bare ground (or visibility) on the exposures which might reveal artefacts or other archaeological materials' (DECCW 2010:13). Exposure is defined as 'the percentage of land for which erosion and exposure was sufficient to reveal archaeological material on the surface of the ground' (DECCW 2010:13). As such, exposure refers to the potential for an area to reveal subsurface artefacts or deposits rather than the mere observation of the amount of bare ground.

The calculation of effective survey coverage is undertaken in order to designate the proportion of the Project Area in which it is possible to accurately assess the presence or absence of archaeological material. Survey coverage is calculated by multiplying the total survey area by the percentage of ground surface visibility and exposure within the survey unit. The survey coverage is then expressed as a percentage for the whole survey unit.

6.4 Unsurveyed Areas

As discussed in the above sections, previous investigations of the LW30-31 Project Area have been undertaken by RPS (2013) to support the wider Mandalong South EIS. This section of the Project Area was instead assessed via desktop analysis, with the archaeological potential considered based on the outcomes of the previous archaeological investigations in the area in conjunction with the environmental context of the area. Any Aboriginal archaeological sites within this area previously surveyed are still considered within the impact assessment of this HMP.

6.5 Assessment of Sub-Surface Archaeological Potential

The assessment was undertaken with reference to factors including the archaeological context of the local area, the evaluation of the soil profile (based on soil landscape mapping, exposed soil profiles identified during the survey and geomorphic understandings of the area) and the identification of landforms that may have greater archaeological sensitivity. The following terms will be employed to classify the sub-surface archaeological potential of specific locations:

- **no archaeological potential:** areas where the natural soil profile has been removed through geomorphic processes or human action, thereby removing any archaeological resource of the location. Examples of this category would include a landslide or industrial quarry sites.
- **low archaeological potential:** landscape areas that may have been utilised by Aboriginal people in the past, but at a lower intensity than all surrounding landforms. The density of artefacts deposited within these areas would therefore be low. This category also includes landscape areas of low terrain integrity, where geomorphic processes or human action may have redistributed artefacts from their deposited locations, resulting in site disturbance or destruction.
- **moderate archaeological potential:** landscape areas that are predicted to have been utilised by Aboriginal people in the past, but not intensively or repeatedly. There is therefore potential for artefact deposition, but at a lower frequency and density than in areas of high archaeological potential. Terrain integrity in these areas may be variable, but the majority of open camp sites are expected to be of low to moderate integrity only, with geomorphic processes not acting to bury deposits *in situ*.
- **high archaeological potential:** landscape areas predicted to have been intensively or repeatedly utilised by Aboriginal people in the past, such as creek confluences or elevated terraces above major watercourses. Terrain integrity in these areas may be variable, but the majority of open camp sites are expected to be of low to moderate integrity only, with geomorphic processes not acting to bury deposits *in situ*.
- **very high archaeological potential:** landscape areas predicted to have been more intensively or repeatedly utilised than all surrounding landforms by Aboriginal people in the past, such as major creek confluences or lagoons. Terrain integrity in these areas may be variable, but these landforms may include areas of high terrain integrity, where geomorphic processes may have acted to bury deposits *in situ*. Sites may therefore be of very high archaeological potential.

6.6 Habitation Structures (Rock Shelters and Rock Overhangs)

Given previous complexities in recording rock shelters for the assessment completed by RPS (2013), recognition of the use of the landscape from an archaeological perspective versus a cultural perspective was determined as an important aspect for this project. Heritage NSW includes habitation structures (typically rock shelters) as a site feature. This category includes the potential archaeological deposits within the shelter, the shell or artefact deposits clearly spilling from the shelter, and the art on the rock shelter itself. As a result, it was determined throughout the recording of sites within the Project Area, that any sites defined as rock shelters would only be ones that contained either areas of potential archaeological deposit, stone artefacts, culturally deposited shell or art. That is, rock shelters were only identified where Aboriginal objects were present or had the potential to be present within deposits within the shelter.

However, it is recognised that shelters that do not contain this evidence of Aboriginal occupation were still likely utilised by Aboriginal people in the past. Recognition of this was deemed as important to the registered Aboriginal parties, who identified that these other shelters that do not contain evidence of occupation may have either been utilised opportunistically or their evidence of occupation may have been removed by historical or environmental impacts. As a result, these shelters that do not contain evidence of occupation (either as Aboriginal objects or deposit with the potential to contain Aboriginal objects) are recognised as rock overhangs. On this basis, rock overhangs typically have a bare stone base with no retained sediment. These overhangs will not be recommended for listing on the AHIMS database, however their significance to registered Aboriginal parties is recognised through their ongoing management.

7.0 Results

The survey of the Project Area was conducted by an archaeologist and registered Aboriginal party representatives between 14 and 17 September 2020. Participants in the survey are listed in Table 7.1.

Table 7.1 Survey Participants

Date	Organisation	Name
14 – 17 September 2020	Awabakal Descendants Traditional Owners Aboriginal Corporation	Peter Leven Tori Leven
	Awabakal Traditional Owners Aboriginal Corporation	Kyle Howie
	Biraban Local Aboriginal Land Council	Norman Archibald
	Cacatua Cultural Consultants	Ashley Sampson
	Darkinjung Local Aboriginal Land Council	Barry Williams
	Guringai Tribal Link Aboriginal Corporation	Tracey Howie
	Wonn1 Contracting	Arthur Fletcher

7.1 Information Provided by Aboriginal Party Representatives

In accordance with the approved methodology, Aboriginal party representatives who participated in the survey were requested to provide information on any Aboriginal cultural values that they identified within the Project Area. Key information provided by Aboriginal party representatives is documented in **Section 2.5** and is not repeated here.

7.2 Description of the Landscape and Survey Coverage

The following information is provided with reference to the available environmental context information, and with reference to the results of in-field investigations and the landforms within the Project Area identified in **Section 3.1**. This discussion is specific to the area surveyed over the course of this assessment, and do not reflect the wider landscape of the Project Area and areas previously subject to survey. Consideration of the survey results and how they compare to areas previously assessed and the predictive model is made in **Section 7.5**.

As identified in **Section 3.1**, the Project Area was largely comprised of steeply inclined ridges and wide valley floors. The survey area proposed for the LW30-31 Project Area comprised three properties, with access required to reach important landform features sometimes resulting in the traversal of areas subject to archaeological inspection during the RPS (2013) assessment for the EIS. Generally, ridgelines located within the Project Area were closely associated with the existing tracks, with these areas providing the highest level of visibility throughout. As identified in **Section 3.1**, most of the ridgelines within the Project Area were associated with Yambo, with this recognised as the high point of the area. The survey transects undertaken for the project are shown in Figure 7.1.

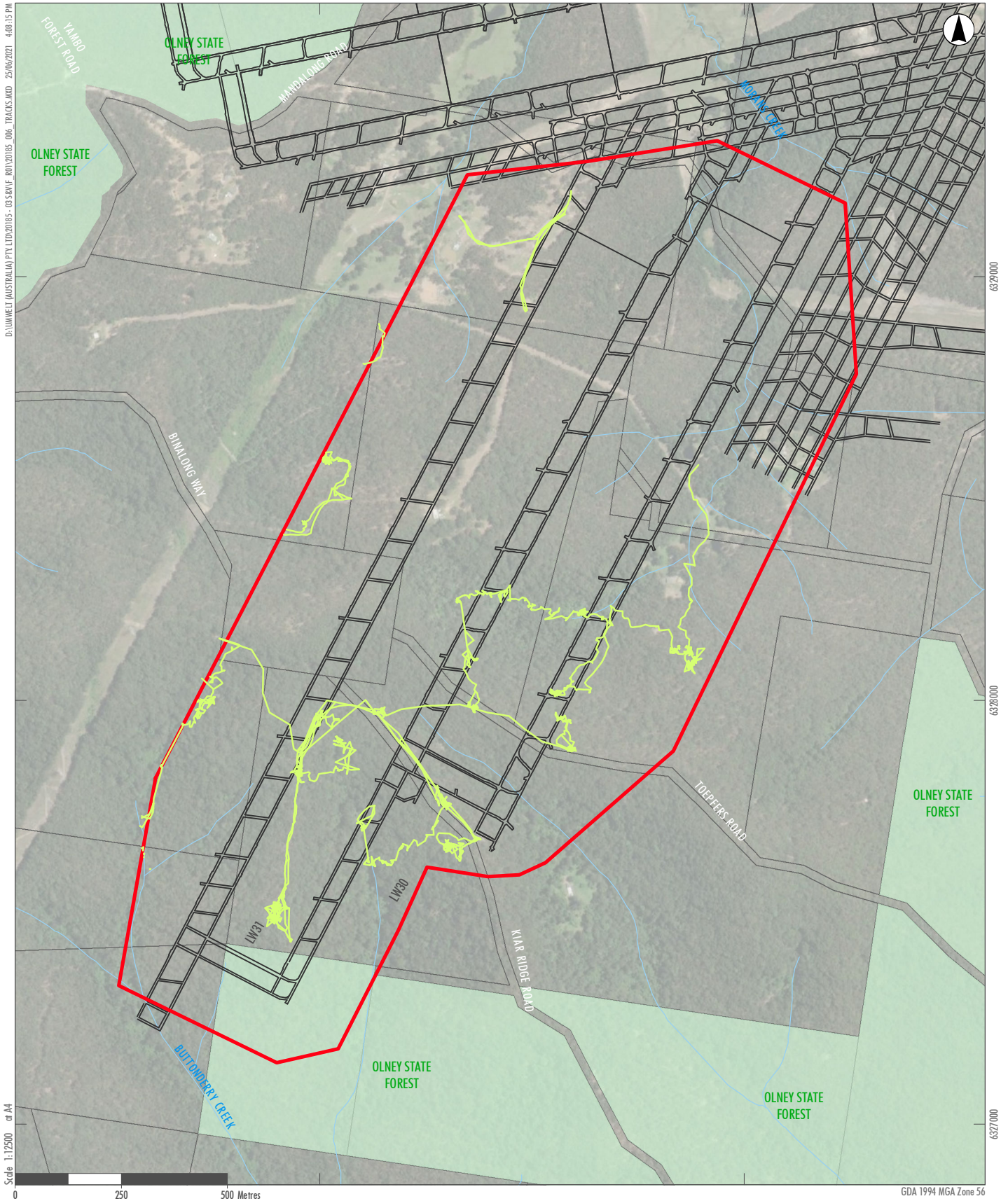
Terrain to the south of Yambo Trigonometry Station was generally more steeply inclined than that to the north and west within the Project Area. The steeper terrain was delineated by two ridgelines that extended south along the western and eastern extents of the Property 3 (the southernmost property) within the Project Area, with steep slopes extending to the east and west of these ridgelines. Either side of the westernmost ridgeline were the upper tributaries of Buttonderry Creek, which were both extremely steep to traverse and retained very dense vegetation along the creek lines. The eastern side of the easternmost ridgeline (extending outside of the survey area) was a low order tributary of Mannering Creek. These tributaries were deeply incised into the terrain, with use of the surrounding slopes highly unlikely for any activity outside of traversing between the lower creek lines and upper ridges. It is likely that Aboriginal people would have just followed the creek lines when traversing the area, as these steep ridges were very challenging to climb when compared to climbing the creek line. The vegetation identified on the south side of Yambo reflected the presence of these tributaries higher up the slopes, with very dense vegetation located at the base of slopes where water appears to be relatively consistent in flow.

To the west of Yambo, the landscape is largely defined by the ridgeline that extends along Toepfers Road. Property 2 (the western property) was bound to the south by this ridgeline, with slopes steeply extending away from both Yambo and this ridgeline, before becoming moderately inclined mid-slope. The tributary creek lines located upon these slopes were generally quite narrow and were not incised in the same way as creek lines to the south of Yambo. At the base of the slopes were more typically valley floor landforms associated with Moran's Creek, as described in **Section 3.1**. At this point, a number of smaller tributary creek lines feed Moran's Creek from the surrounding slopes, with the rock shelter complex containing the existing Moran's Creek shelter and the two newly identified rock shelters located at the confluence of these tributaries (described further in **Section 7.4**). This valley floor area extends north beyond the extent of Property 2 to the north along the Moran's Creek floodplain. While this valley floor area within Property 2 may have previously retained some potential for subsurface deposits, the area has been subject to significant clearance and landscaping by the property owner. A large dwelling/house, formed driveway, landscaping and two constructed dams located at the northern extent of the property have significantly impacted this area and its potential for any evidence of Aboriginal occupation.

On the northern side of Yambo, within survey transects in Property 1 (the northernmost property), terrain and vegetation were very different to that of the southern and western side. Generally, while slopes moving away from Yambo were steep, there were not as steep as those observed on the southern side. Ridgelines were similarly large identified by tracks within the landscape. It was noted that the vegetation on this side of Yambo was much drier, and largely reflected a landscape that did not retain consistent water flow during larger rain events. This was also evident through the sandstone outcrop observed within the creek lines within Property 1, with the sandstone much coarser than that observed anywhere else, and likely unsuitable for grinding purposes. The northern extent of the property levelled out significantly and was similar to that of the northern extent Property 2, in that it started to form part of valley floor / floodplain landscape identified in association with Moran's Creek.

Typically, grinding grooves (including previously recorded and newly identified) were located within creek lines on steeper inclined slopes where suitable outcrop was located. As discussed above, sandstone outcrop observed within Property 1 was much drier and coarser when compared to the more preferable outcrop observed in Properties 2 and 3 (and areas traversed to access these properties), where geological conditions and consistent waterflow within these creek lines has resulted in fine-grained, smooth sandstone outcrop. Rock shelters (including previously recorded and newly identified) were observed either upon ridgelines with suitable sandstone outcrop, or within the complex of large sandstone boulders that have been subject to erosion in proximity to Moran's Creek. The site distribution across different landforms and landscape features largely compares to that of the predictive model and is further discussed in **Section 7.5**.

The level of effective coverage within the Project Area was generally very low. The main factor contributing to low coverage was dense vegetation cover (leaf litter, grass, general vegetation). Areas with the highest levels of effective coverage were modified landforms with significant disturbance, such as access tracks, infilled banks and cleared areas. Areas of sandstone outcrop (either sandstone benches or larger outcrop) typically also displayed good visibility, with the exception of sandstone benches in creek lines that were covered with moss or similar vegetation. As discussed, typically disturbances throughout the area were limited to the presence of formalised tracks, clearance activities associated with historical logging and modern disturbances such as houses, damming of creek lines and earthworks.



Legend

- Project Area LW30-31
- Mandalong Mine Longwalls
- Survey Tracks
- State Forest

FIGURE 7.1

**MOD 9/LW30-31 EP Surveys
(excluding RPS EIS 2013 survey areas)**

7.3 Previously Recorded Aboriginal Sites

As discussed in **Section 5**, portions of the Project Area have previously been subject to archaeological survey, resulting in the recording of 6 sites within or in close proximity to the parts of the Project Area that had been identified as not yet previously surveyed. These sites are:

- 45-3-1226 (Buttonderry Creek)
- 45-3-1228 (Moran's Creek rock shelter)
- 45-3-3511 (RPS MAND STH PS25)
- 45-3-3512 (RPS MAND STH PS26)
- 45-3-3513 (RPS MAND STH PS28)
- 45-3-3514 (RPS MAND STH PS32).

These sites were revisited during the survey to confirm that the recorded coordinates and locations were accurate and to obtain updated information regarding site condition. Of the previously recorded sites, three were not able to be reidentified (45-3-1226, 45-3-3511 and 45-3-3512). Further to this, one site that was previously recorded was identified in a different location to the recorded point (45-3-1228). Further information on the previously recorded sites is discussed below in Table 7.2 and they are shown in Figure 7.2 .

Table 7.2 Previously Recorded Aboriginal Sites

AHIMS ID	Site Name	Site identified	Site description
45-3-1226	Buttonderry Creek	Grinding Groove	<p>Site was not reidentified, visibility very low due to heavy leaf litter and dense vegetation growth at the recorded location. No photos were available of the recorded site given the age of the recording, with detailed drawings of the grinding grooves and description of the site locality the only way to identify the site.</p> <p>This site was recorded during the same inspection as the below rock shelter, and given that this site recorded location is incorrect, there is a strong likelihood that this site location is also incorrectly recorded.</p> <p>Survey efforts along the remainder of Buttonderry Creek in proximity were unable to re-identify the site. It was noted that the vegetation along this portion of Buttonderry Creek was extremely dense, with very limited visibility across sandstone benches. Without evidence to the contrary, for the purposes of this assessment, it is assumed that 45-3-1226 occurs at or near the recorded location.</p>

AHIMS ID	Site Name	Site identified	Site description
45-3-1228	Moran's Creek	Rock shelter with art	<p>The rock shelter is as described in the original recording, with art present internally re-identified. Entrance is east facing with a moderately sized opening leading to a large, cavernous space internally. The shelter itself is part of a complex of larger boulders that have been subject to significant erosional processes, resulting in shelter spaces like this one. A number of other shelters in proximity to have formed similarly but do not contain art. Site is located east of ephemeral creek. Various artworks are present on the shelter walls, as recorded by Dyll in 1983.</p> <p>Max internal depth: 4.3m Max opening height: 135cm max opening width: 4.3m max height: 2.2m</p> <p>The recorded location of the site is incorrect, with the correct location some 200m south of the recording. Correct coordinates to be provided in an updated site card. Figures used in this report place this site at its corrected location.</p>
45-3-3511	RPS MAND STH PS 25	Isolated Artefact	<p>Site was described as being located on the left side of a forked dirt road. The recorded location of the site was identified during the Umwelt 2020 survey, with green mesh fencing on either side of the site area identified. The area has been heavily disturbed due to vehicle use and the creation of shallow drainage channels along either side of the road. Visibility in the recorded location was low due to extensive leaf litter and grass coverage. The isolated artefact was not able to be reidentified during the survey.</p>
45-3-3512	RPS MAND STH PS26	Grinding Groove	<p>The site was recorded by RPS during the survey for the EIS. The site is described by RPS (2013) as containing a large number (between 6-31) of grooves incised upon one sandstone bench, with no further grinding grooves observed on other benches in the area. While this property was not accessible during the EIS survey, the proximity of the grinding grooves to an existing track and no clear property boundary is likely why this was recorded at this time.</p> <p>Attempts to reidentify the grinding grooves were made from both downslope and upslope, however the sandstone bench in which the grooves were located was not able to be re-identified. While many small sandstone outcrops were observed during the inspection in the general area, no grooves on these were identified.</p> <p>Following the completion of the survey, Jeff Dunwoodie (Centennial) inspected the corrected coordinates for the site location and identified the site at the corrected location.</p>

AHIMS ID	Site Name	Site identified	Site description
45-3-3513	RPS MAND STH PS28	Rock shelter with PAD)	<p>Very large rock shelter located amongst prominent sandstone formation at the top of a ridgeline. Shelter provides full protection from weather and is divided into three distinct spaces. A large open space with standing room is found at the opening, a middle area of shoulder height and a raised rock bed and a third area of crawling space. The internal walls of the shelter are formed of actively eroding sandstone that has eroded in such a way for form a series of ledges with a gently sloping internal gradient. No artwork or cultural material was identified, however it is likely that this shelter has been used historically given the modern items found (bottles and ceramics). An area of PAD was previously identified within the shelter, however it is quite shallow deposit and only retains limited potential.</p> <p>Max opening width: 690cm Max depth: 690cm Max internal width: 19.5m Max opening height: 1.5m Max internal height: 2.3m Max main area length: 11m</p> <p>A small secondary shelter is located approx. 50 metres to the south/south east with a crawl space opening. This space extends into a larger cavity capable of sheltering multiple individuals.</p>
45-3-3514	RPS MAND STH PS32	Rock shelter with PAD	<p>Site reidentified approximately 200m from dirt road down a steep slope, as described in original report. Evidence of modern use, with imported logs, metal cans and a degrading hessian sack/tarp all identified. In discussions with one of the local community members, he identified that this cliff face and shelter were previously utilised for abseiling by a previous landholder and it is likely that the modern materials identified were associated with this activity. Three fault lines are evident, to the centre, west and eastern walls of the shelter. The area of PAD identified within the rock shelter is located in the area most protected by the conditions, as the entrance to the shelter.</p> <p>The dimensions of the shelter are all as previously recorded by RPS during the EIS survey.</p>



Plate 7.1 45-3-1228 Moran's Creek Rock Shelter



Plate 7.2 45-3-1228 Moran's Creek Rock Shelter, art identified internally



Plate 7.3 45-3-1228 Moran's Creek Rock Shelter, art identified internally with modern disturbances



Plate 7.4 45-3-3513 PS28 rock shelter with PAD



Plate 7.5 45-3-3513 PS28 rock shelter, internal view with small area of PAD



Plate 7.6 45-3-3513 PS28 rock shelter, internal view along full extent of shelter opening



Plate 7.7 45-3-3514 PS32 rock shelter with PAD



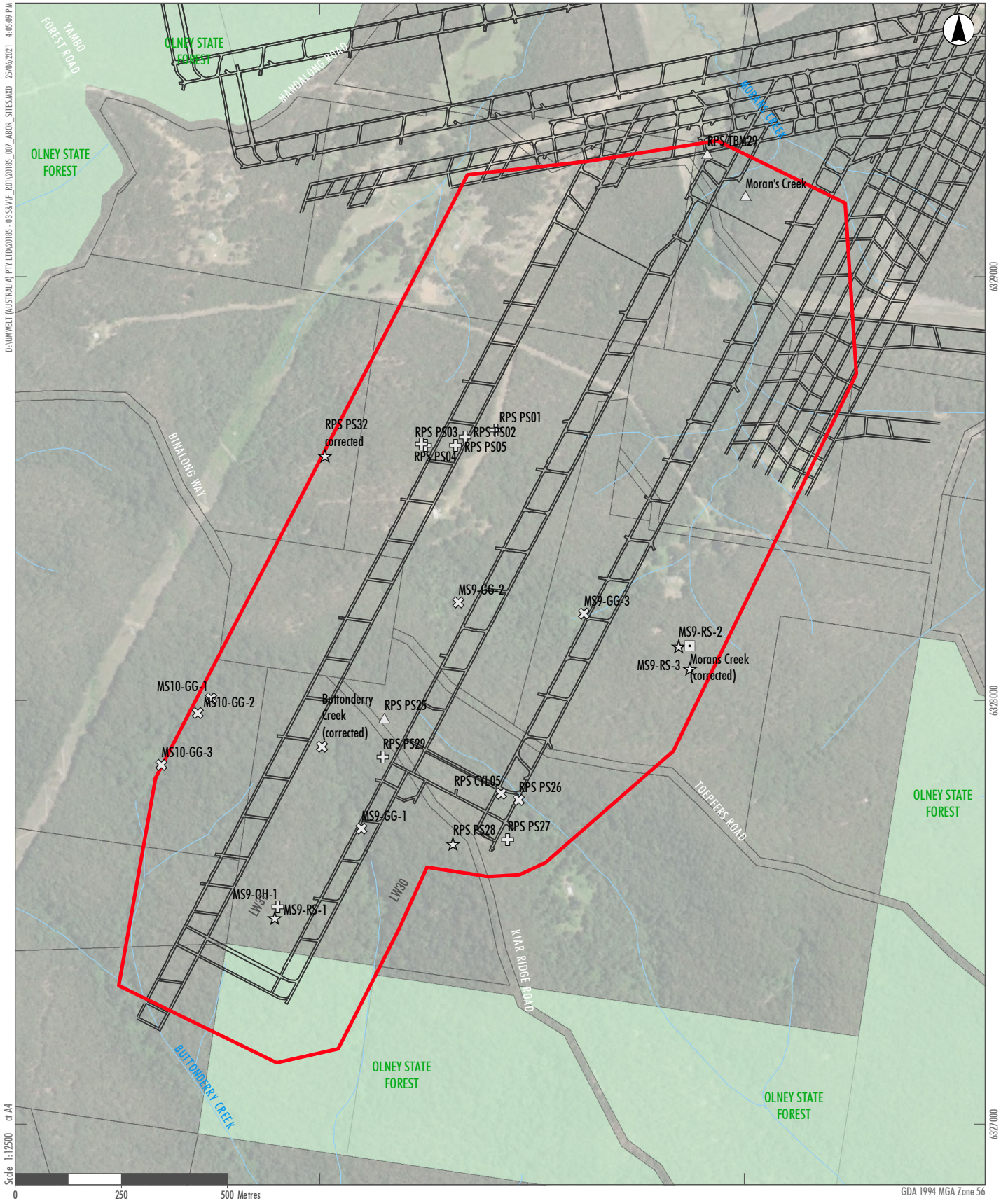
Plate 7.8 45-3-3514 PS32 rock shelter, view internally toward area of PAD



Plate 7.9 45-3-3514 PS32 rock shelter, open expanse and steep drop off down the slope



Plate 7.10 45-3-3514 PS32 rock shelter, area of modern disturbances



Legend

- Project Area LW30-31
- Mandalong Mine Longwalls
- State Forest
- Artefact scatter
- Grinding groove
- Habitation structure (no PAD or objects)
- PAD
- Rock shelter with art

FIGURE 7.2

All Sites within Project Area

7.4 Newly Recorded Aboriginal Sites

Over the course of the survey for Modification 9, 9 new Aboriginal archaeological sites and one rock overhang were identified. These sites were not all limited to the survey units described above, as some properties were not directly accessible from their boundary. These areas where sites were identified outside of the properties identified had previously been subject to survey during works for the original EIS. As a result, some of the sites described below were identified outside the areas scoped for the Modification 9 HMP.

Overall, within the subsidence footprint for LW30 – 31, 9 Aboriginal archaeological sites were identified. The sites comprise six grinding groove sites, three rock shelters (with PAD). In addition, one rock overhang site was recorded. The rock overhang is a site that was recommended for recording by the Registered Aboriginal Party member (MS9-OH-1). However, it does not meet the necessary criteria for listing as a rock shelter and is discussed further below as a rock overhang. While not recommended to be listed on the AHIMS database, the site will be managed in accordance with the HMP.

Generally, the sites described below were discrete and represented a wider use of the landscape by Aboriginal people. However, three sites comprising the previously recorded Moran's Creek rock shelter and two newly identified rock shelters (being MS9-RS-2 and MS9-RS-3) were located in close proximity to each other. Two of these shelters clearly demonstrate use of the area by Aboriginal people (one with art, one with artefacts located within), with the third containing an area of subsurface deposit where it is anticipated that further evidence of this use of the landscape would be observed (that is, an area of PAD).

Detailed site cards for the newly recorded sites can be found in **Appendix 3**. Site locations are shown in Figure 7.2 .

Table 7.3 Description of newly recorded sites

Site Name	Easting	Northing	Site Feature	Description	Recommend Listing on AHIMS
MS9-GG-1	351098	6327697	Grinding groove	Minimum of three grinding grooves located at the midpoint of a steep incline of a tributary of Buttonderry Creek. There may be additional grooves present, however visibility is limited due to leaf litter and moss growth. Origin of the creek line is at the top of the ridge. One smaller sandstone block had evidence of three further grooves. These grooves were relatively indistinct and have not been recorded as cultural.	Yes
MS9-GG-2	351327	6328231	Grinding groove	Minimum of four grinding grooves located at the midpoint of a steep slope of a tributary of Moran's Creek. There may be additional grooves present across benches in proximity, however visibility was extremely limited due to leaf litter and moss growth. Origin of the creek line is at the top of the ridge. Sandstone outcrop to the south and overhanging the grooves.	Yes

Site Name	Easting	Northing	Site Feature	Description	Recommend Listing on AHIMS
MS9-GG-3	351622	6328204	Grinding groove	Minimum of four grinding grooves located along an ephemeral creek, upon a sandstone platform. Dense vegetation is present in the surrounding area, however, visibility across the sandstone benches was good. The grooves were located across two sandstone benches.	Yes
MS9-OH-1	350901	6327512	Rock overhang (no PAD or Aboriginal objects)	Small overhang located at the top of a small sandstone ridge. Overhang is located upslope from a major creek-line associated with an identified grinding groove. Site likely used opportunistically. Max width: 170cm Max height: 105cm Max depth: 168cm	No
MS9-RS-1	350893	6327486	Rock shelter with PAD	Rock shelter located on the other side of the same sandstone formation as MS9-OH-1. Ground soil is loose, potentially 20cm deep with potential for subsurface deposits. Vegetation growth is moderate, with poor ground visibility surrounding the site. Sandstone is prevalent in the area, with large rock formations evident. Site contained an area of potential deposit, with one fractured shell piece, multiple animal bone fragments and multiple charcoal fragments noted. Max internal height: 218cm Max height: 110cm Max depth: 345cm Main occupiable space: 210cm Max height at dripline: 168cm Max length: 460cm	Yes

Site Name	Easting	Northing	Site Feature	Description	Recommend Listing on AHIMS
MS9-RS-2	351846	6328128	Rock shelter with PAD	<p>Large rock shelter identified mid-way up a steep slope, south of ephemeral creek. No artefactual or cultural material recovered, however a small area of deposit with the potential to contain evidence of Aboriginal occupation was identified within the shelter. Recorded as a shelter given proximity to both the previously recorded site 45-3-1228 (Moran's Creek) and the newly identified MS9-RS-3 (containing PAD and two artefacts) and the present of deposits in one portions of the shelter. Shelter is well protected from the elements, and has formed through erosional processes impacting a large sandstone boulder that has broken away from up slope at some stage. Internal space is gently sloped, with pitting along the roof surface. Entrance is facing west.</p> <p>Max opening height: 464cm Total height approx.: 7-8m Max opening length: 6.75m Max depth: 6.7m</p>	Yes
MS9-RS-3	351874	6328077	Rock shelter with artefacts and PAD	<p>Rock shelter located approx. 60 metres south of MS9-RS-2. Entrance is north facing with a small shallow opening with crawl space only. Two chert flakes were identified, potentially in situ.</p> <p>1 broken chert flake with no retouch, pot-lidding identified on this flake suggesting it may have been heat-treated (or just burnt at some stage)</p> <p>1 broken chert flake with 50% cortex</p> <p>Fragmented long bone of a mammal or marsupial also identified, however likely modern. Shelter has a large angular shelf to the southern wall, with deeply incised angular grooving due to erosion. Within the shelter itself, a shallow area of potential deposit was observed.</p> <p>Max entrance height: 140cm Max internal depth: 350cm Max entrance length: 5m Max height: 4.2m</p>	Yes

Site Name	Easting	Northing	Site Feature	Description	Recommend Listing on AHIMS
MS10-GG-1	350743	6328005	Grinding Groove	Minimum of 13 grinding grooves identified along an extended bench on Buttondery Creek. Dense vegetation surrounds the site. Consists of two platforms in close proximity, with 10 and 3 grooves respectively.	Yes
MS10-GG-2	350711	6327970	Grinding groove	One grinding groove located approx. 200 metres down the creek line from MS10-GG-1. Located on Buttondery Creek with dense vegetation surrounding.	Yes
MS10-GG-3	350626	6327847	Grinding Groove	One grinding grove located approx. 20 metres down from MS10-GG-2. Located on Buttondery Creek with dense vegetation surrounding.	Yes



Plate 7.11 View of the three grooves at MS9-GG-1



Plate 7.12 Three potential grooves utilised for smaller tools at MS9-GG-1



Plate 7.13 View of the location of MS9-GG-2



Plate 7.14 Close up view of MS9-GG-2



Plate 7.15 View across the MS9-GG-3 site



Plate 7.16 Close-up views of grooves located on one bench within MS9-GG-3



Plate 7.17 View of the MS9-RS-1 shelter with PAD



Plate 7.18 View of the MS9-RS-2 shelter with PAD



Plate 7.19 MS9-RS-3 shelter, with artefact location denoted by scale on the left



Plate 7.20 Artefacts identified within MS9-RS-3



Plate 7.21 MS10-GG-1 site



Plate 7.22 Example of grooves identified at the MS10-GG-1 site



Plate 7.23 MS10-GG-2 site



Plate 7.24 Singular groove identified at the MS10-GG-2 site



Plate 7.25 MS10-GG-3 site



Plate 7.26 Singular groove identified at the MS10-GG-3 site

7.5 Summary of Archaeological Results

The survey of the Project Area comprised a pedestrian survey in accordance with the sampling strategy outlined in **Section 6.1**. Overall, a total of 9 new Aboriginal archaeological sites and one rock overhang have been recorded within the LW30-31 Project Area. This includes six grinding grooves, three rock shelters (two with PAD, one with artefacts and PAD) and one rock overhang. Including the existing sites previously recorded as part of the RPS (2013) assessment and sites recorded by Len Dyll (1983), a total of 26 Aboriginal sites (including the rock overhang) have now been identified within the LW30-31 project area.

Newly identified sites within the Project Area are largely reflective of the predictive model for the area, entirely comprising sites found on sandstone outcrop (being grinding grooves and rock shelters). Similarly, these sites were identified where the model anticipated them to be, with grooves identified on flat sandstone benches within creek lines and rock shelters identified upon outcrop in proximity to ridgelines with good local visibility. The presence of grinding grooves within previously unsurveyed areas was anticipated within the predictive model, particularly given the prevalence of grinding groove sites across the Mandalong South area.

All newly identified rock shelter sites within the Project Area were recorded based on either containing evidence of Aboriginal occupation or the potential for this evidence to be present in subsurface contexts. MS9-RS-1 and MS9-RS-3 contained evidence of Aboriginal occupation, with remnant shell and stone artefacts present respectively. With regard to MS9-RS-2, while no specific evidence of occupation was observed, an area of subsurface deposit was observed and recorded. The close proximity of MS9-RS-2 site to the MS9-RS-3 and Moran's Creek shelters (both within 100m of both of these sites) shows that this area in proximity to Moran's Creek was likely utilised by Aboriginal people. As a result, it was considered that this area of deposit within MS9-RS2 has a strong likelihood of containing further evidence of Aboriginal occupation.

In some instances, throughout the survey (including areas outside of the current Project Area), rock shelter sites were found in association with a number of smaller overhang sites (including one identified within the Project Area). It is likely that these overhangs were utilised opportunistically by Aboriginal people given their proximity to areas that have demonstrated use, however no evidence of this use remains. As discussed throughout this document, the rock overhang location was not registered as a site as it did not meet the specified criteria.

Low levels of visibility do not preclude the potential for additional Aboriginal stone artefacts to be present within a subsurface context throughout the Project Area. The landforms mentioned in **Section 3.1** are, based on a review of the associated soil landscapes, typically associated with relatively shallow soil profiles that are subject to erosion, which was observed during the survey in areas of exposure and reduced vegetation.

The Project Area has also been subject to a range of impacts as a result of modern land uses, largely relating to the establishment of infrastructure such as access tracks and powerline easements, as well as vegetation clearance in some portions. These activities are likely to have exacerbated the rate and severity of erosion in these areas, which in turn may have resulted in disturbance to topsoil profiles. During the survey of the Project Area, the majority of soil profiles observed comprised exposed, hardened B horizon soils or shallow A horizon sands over B horizon soils or bedrock. The majority of exposed soil profiles were observed in conjunction with modern disturbances such as access track establishment or powerline easement access. It is likely, however, that these areas are not completely representative of the soil profiles within the Project Area, as remnant vegetation will have acted to retain soils where present. What is clear from the environmental context of the Project Area is that the soil profiles within are highly susceptible to erosion and are generally poorly formed. Given the generally sloping nature of landforms within the Project Area, in-field observations reflected the prediction that areas where soil can be retained are very limited.

When considered with reference to the archaeological pattern identified within the local area, the criteria for differing levels of archaeological potential as described in Table 7.2, and the discussions held around the existing registered sites across the Project Area, the Project Area is assessed as having an overall low subsurface archaeological potential with subsurface deposits primarily associated with rock shelter sites. With reference to this level of potential, it is recognised that additional isolated artefacts or low-density artefact scatters may be present, but these are not likely to be common and will typically have been subject to disturbance.

It is noted that the predictive model and archaeological results within the Project Area are largely reflective of the nature of sites focused on within the survey methodology. As previously discussed, sites formed upon sandstone are the most susceptible to disturbance through longwall mining due to subsidence, which may result in cracking. While the survey of the Project Area undertaken as part of this assessment was comprehensive, areas of visibility were largely tied to tracks, sandstone outcrop of ridges and sandstone benches within creek lines and as such, survey focused on these areas. There may be potential for further sites or site types to be present within the Project Area because of this focused survey. However, this potential is deemed to be low, as the regional archaeological model demonstrates that artefact sites or dense artefact deposits have been identified upon elevated, level platforms in association with perennial creek lines. Landforms of this nature were not observed consistently within the Project Area, and where they were observed, demonstrated no evidence of containing surface or subsurface archaeological deposit.

With regard to identification of further sites that were the focus of this investigation (being grinding grooves and rock shelters), while some potential remains for sites of this nature to be further identified, this potential is considered to be low. Further grinding grooves may be observed along creek lines within the Project Area not subject to survey (primarily where vegetation was too dense to traverse the creek lines), or where vegetation coverage (predominantly moss growth) has covered the presence of grooves upon the sandstone benches. Further rock shelter sites may be observed upon rock outcrop not identified or accessible during the survey of the Project Area. However, as mentioned above, given the comprehensive nature of the in-field survey targeting the landforms where these sites would be located, this potential for further sites to be identified is low.

Based on the criteria for the assessment of archaeological potential the Project Area is deemed to have low archaeological potential for further Aboriginal archaeological sites to be identified across its entirety. Should further sites be present, it is considered that these are most likely to be grinding grooves located upon sandstone benches where visibility was very poor, or rock shelters located on outcrop that were not identified during the survey of the Project Area.

8.0 Significance Assessment

The Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance (Australia ICOMOS 2013) (the Burra Charter) defines cultural significance as the sum of the qualities or values that a place embodies. The Burra Charter identifies the values – aesthetic, historic, archaeological, social or cultural and spiritual – that contribute to cultural significance.

- **Social or cultural** value refers to the spiritual, traditional, historical and contemporary associations and attachments of a place (OEH 2011:8). It is noted that a consensus as to the cultural value of an object or place is not always possible as people experience places and events differently.
- **Spiritual** value refers to the intangible values embodied in a place, which give it importance in the spiritual identity.
- **Archaeological** value refers to the potential physical remains and the ability of those remains to provide an understanding about an aspect of the past.
- **Aesthetic** value refers to the sensory and perceptual experience of a place. It may consider form, scale, texture and material of the fabric or landscape and may also include smell and sounds associated with the place (OEH 2011:9).
- **Historic** value encompasses all aspects of history and as such is often underlying other values. A place may have historic value because it has influenced, or been influenced by, an historic event, phase, movement or activity, person or group of people.

8.1 Social or Cultural Value

Cultural value refers to the spiritual, traditional, historical or contemporary associations and attachments a place has for Aboriginal people (OEH 2011:8). There is not always consensus about the cultural value of a place as people experience places and events differently, and in some instances cultural values may be in direct conflict. Cultural significance can only be determined by Aboriginal people, and is identified through Aboriginal community consultation.

It is noted that the registered Aboriginal parties have previously identified the local area as being of very high significance, as documented in the preface to this report.

It was recognised that registered Aboriginal parties may wish to provide information regarding the cultural significance of the Project Area. In accordance with the approach included within the Centennial Northern Region ACHMP and developed in consultation with the registered Aboriginal parties, it was requested that the registered Aboriginal parties specifically consider the cultural significance of the Project Area against the agreed criteria provided in Table 8.1. The significance ranking point system used to attribute significance against these criteria is provided in Table 8.2.

Table 8.1 Criteria from ACHMP for assessment of Aboriginal cultural significance

Criteria	Description
Ceremonial/Spiritual/Dreaming Connection	This criterion refers to any ceremonial, spiritual or dreaming connection that the site may have to the Traditional Owner Group/s. This criterion also considers its past teaching potential.
Rarity	This criterion refers to how rare the site is in reference to location, site type, site integrity on a local and regional scale. Rarity is also assessed on its archaeological potential.
Inter-relatedness	This criterion refers to whether the site is believed to be related or associated to another site in the landscape.
Teaching potential	This criterion refers to any potential future and/or present use for educational purposes in the teaching of culture and history.
Aesthetics	This criterion refers to the sites aesthetic qualities. Please note that the notion of visual appeal is a subjective concept.
Outlook	Outlook refers to whether the site has an extensive outlook over country and/or if the area of the site has an attractive perspective to the Traditional Owners.

Table 8.2 Cultural significance ranking system from ACHMP

Ranking System	Points
High Cultural Significance	1 Point
High to Very High Cultural Significance	2 Points
Very High Cultural Significance	3 Points
Very High to Extremely High Cultural Significance	4 Points
Extremely High Cultural Significance	5 Points

8.1.1 Cultural Significance of the Newly Identified Sites and Existing Sites

Centennial Mandalong conducted a cultural heritage significance workshop with members of the Aboriginal community to understand the Aboriginal cultural significance of sites identified within the Modification 9 area. Based on the outcomes of this assessment, the assessments of cultural significance for sites identified during the survey in **Table 8.3** were agreed upon by those in attendance. A copy of the cultural heritage significance workshop minutes can be found in **Appendix 1**. The significance of other previously recorded sites was also previously assessed in accordance with the agreed methodology, with the outcomes of the prior assessments also included in Table 8.3.

Table 8.3 Cultural significance attributed to the sites within the Project Area

AHIMS #	Site Name	Overall Cultural Significance
45-3-4551	MS9-GG-1	4 (very high to extremely high)
45-3-4552	MS9-GG-2	4 (very high to extremely high)
45-3-4545	MS9-GG-3	4 (very high to extremely high)
NA	MS9-OH-1	5 (extremely high)
45-3-4547	MS9-RS-1	5 (extremely high)
45-3-4546	MS9-RS-2	5 (extremely high)

AHIMS #	Site Name	Overall Cultural Significance
45-3-4544	MS9-RS-3	5 (extremely high)
45-3-4548	MS10-GG-1	4 (very high to extremely high)
45-3-4549	MS10-GG-2	4 (very high to extremely high)
45-3-4550	MS10-GG-3	4 (very high to extremely high)
45-2-1223	Moran's Creek	Very high
45-3-1226	Buttonderry Creek;	Extremely high
45-3-1228	Moran's Creek;	Extremely high
45-3-3492	RPS MAND STH CYL05	Extremely high
45-3-3586	RPS MAND STH PS01	Not assessed
45-3-3639	RPS MAND STH PS02	Not assessed
45-3-3640	RPS MAND STH PS03	Not assessed
45-3-3641	RPS MAND STH PS04	Not assessed
45-3-3642	RPS MAND STH PS05	Not assessed
45-3-3511	RPS MAND STH PS25	Extremely high
45-3-3512	RPS MAND STH PS26	Extremely high
45-3-3594	RPS MAND STH PS27	Not assessed
45-3-3513	RPS MAND STH PS28	Extremely high
45-3-3595	RPS MAND STH PS29	Not assessed
45-3-3514	RPS MAND STH PS32	Extremely high
45-3-3536	RPS MAND STH TBM29	Not assessed

*Sites in bold are those identified during the current survey. Cultural significance for the other previously recorded sites is taken from the Northern Region ACHMP

No further comments regarding site specific values were provided by the registered Aboriginal parties in response to their review of the draft HMP, noting that information regarding the cultural values of the area as a whole (including the sites it contains) are provided in the statements of significance included at the commencement of this document.

8.2 Scientific Values and Significance Assessment

Archaeological significance is determined by assessing Aboriginal sites/places/objects against a number of archaeological criteria as set out in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*. The assessment of Aboriginal archaeological significance is used to develop a series of cultural heritage management and impact mitigation strategies. The archaeological significance of the Project area has been assessed in accordance with the criteria provided below.

Table 8.4 Archaeological significance assessment criteria

Criterion	Low	Moderate	High
Rarity	The site within the surrounding landscape, its integrity, contents and/or potential for subsurface artefacts, are common within the local and regional context.	The site within the surrounding landscape, its integrity, contents and/or potential for subsurface artefacts, are common within the local context but not the regional context.	The site within the surrounding landscape, its integrity, contents and/or potential for subsurface artefacts, are rare within the local and regional context.
Representativeness	This site, when viewed in relation to its integrity, contents and/or potential for subsurface artefacts is common within a local and regional context and sites of similar nature (or in better condition) are already set aside for conservation within the region.	This site, when viewed in relation to its integrity, contents and/or potential for subsurface artefacts, is uncommon within a local context but common in a regional context and sites of similar nature (or in better condition) are already set aside for conservation within the region.	This site, when viewed in relation to its integrity, contents and/or potential for subsurface artefacts is uncommon within a local and regional context and sites of similar nature (or in better condition) are not already set aside for conservation within the locality or region.
Research potential	The site, when viewed in relation to its integrity, contents and/or potential for subsurface artefacts has limited potential to contribute to a greater understanding of how Aboriginal people lived within this area or region.	The site, when viewed in relation to its integrity, contents and/or potential for subsurface artefacts has moderate potential to contribute to a greater understanding of how Aboriginal people lived within this area or region.	The site, when viewed in relation to its integrity, contents and/or potential for subsurface artefacts has high potential to contribute to a greater understanding of how Aboriginal people lived within this area or region.
Education potential	The site is not readily accessible and/or when viewed in relation to its contents, integrity and location in the landscape has limited suitability to be used for educational purposes. Other sites with higher education potential are known to be present in the local area and region.	The site is not readily accessible and/or when viewed in relation to its contents, integrity and location in the landscape provides a tangible example that is suitable to assist in educating people regarding how Aboriginal people lived in this area or region. However, other sites with higher education potential are known or expected to be present in the local area or region.	The site is readily accessible and/or when viewed in relation to its contents, integrity and location in the landscape, provides a very good tangible example that is suitable to assist in educating people regarding how Aboriginal people lived in this area or region. Other sites of higher education potential are generally not known to exist in the local area or region.
Integrity	Stratigraphic integrity of the site has clearly been destroyed due to major disturbance/loss of topsoil. The level of	The site appears to have been subject to moderate levels of disturbance, however, there is a moderate possibility that	The site appears relatively undisturbed and there is a high possibility that useful spatial information can still be

Criterion	Low	Moderate	High
	disturbance is likely to have removed all spatial and chronological information.	useful spatial information can still be obtained from subsurface investigation of the site, even if it is unlikely that any useful chronological evidence survives.	obtained from subsurface investigation of the site, even if it is still unlikely that any useful chronological evidence survives.

As noted above, nine new Aboriginal sites were identified within the Project Area. With regard to MS9-OH-1, while this site holds cultural significance through its likely use by Aboriginal people of the area, from a scientific perspective, this site retains no evidence of this use. As a result, the scientific significance of this site is not considered. Consideration of the scientific significance of newly identified Aboriginal sites within the Project Area is discussed further in Table 8.5. A summary of the scientific significance of sites previously provided by RPS (2013) of sites is presented in Table 8.6.

Table 8.5 Scientific significance of newly identified Aboriginal sites

Site Name	Overall Scientific Significance	Statement of Significance
MS9-GG-1	Moderate - High	While grinding grooves are common within the local context of the Mandalong area, regionally sites of this nature are not common and provide significant information on how Aboriginal people utilised the landscape. In the context of this site specifically, grinding groove sites containing multiple grooves are of particular significance, indicating repeated and long-term use of the sandstone bench that they are located. However, high significance is generally attributed to sites with grooves that contain >6 grooves (RPS 2013). This site is considered to have high significance in research potential, educational potential, and integrity. It is considered to have moderate significance in rarity and representativeness.
MS9-GG-2	Moderate - High	As above, grinding grooves are locally common but regionally rare. Grinding groove sites containing multiple grooves are of particular significance. However, high significance is generally attributed to sites with grooves that contain >6 grooves (RPS 2013). This site is considered to have high significance in research potential, educational potential, and integrity. It is considered to have moderate significance in rarity and representativeness.
MS9-GG-3	Moderate - High	As above, grinding grooves are locally common but regionally rare. Grinding groove sites containing multiple grooves are of particular significance. However, high significance is generally attributed to sites with grooves that contain >6 grooves (RPS 2013). This site is considered to have high significance in research potential, educational potential, and integrity. It is considered to have moderate significance in rarity and representativeness.
MS9-OH-1	Not Assessed	As discussed, given this overhang does not meet the criteria for listing on the AHIMS register as a rock shelter, a significance assessment has not been undertaken.

Site Name	Overall Scientific Significance	Statement of Significance
MS9-RS-1	High	<p>While rock shelter sites are relatively common within the Mandalong area, regionally shelters with evidence of occupation are especially rare. In the context of this site specifically, it contains potential evidence of Aboriginal occupation in the form of shell identified within the shelter, and an area of potential deposit that may contain further evidence of Aboriginal occupation.</p> <p>This site is considered of high significance in all categories.</p>
MS9-RS-2	Moderate - High	<p>As above, rock shelters are locally commonly but regionally rare. In the context of this site specifically, it does not display evidence or demonstrate Aboriginal occupation, but rather contains an area of potential deposit that may demonstrate this occupation. This rock shelter holds significance in its association with other rock shelter sites (being MS9-RS-3 and Moran's Creek shelter site), given it is located less than 100m from both of these sites.</p> <p>This site is considered of high significance in rarity, educational potential and integrity. It is considered to hold moderate significance in representativeness and research potential.</p>
MS9-RS-3	High	<p>As above, rock shelters are locally commonly but regionally rare. In the context of this site specifically, it contains direct evidence of Aboriginal use and occupation of the area through the presence of two stone artefacts. Given this, its proximity to the Moran's Creek shelter which contains art (and was originally described as containing objects, however none were located) and an area of potential deposit that may contain further evidence of Aboriginal occupation, this site is exceptionally rare.</p> <p>This site is considered of high significance in all categories.</p>
MS10-GG-1	High	<p>As above, grinding grooves are locally common but regionally rare. Grinding groove sites containing multiple grooves are of particular significance. High significance is generally attributed to sites with grooves that contain >6 grooves (RPS 2013).</p> <p>This site is considered of high significance in all categories.</p>
MS10-GG-2	Moderate - High	<p>As above, grinding grooves are locally common but regionally rare. In the context of this site specifically, the presence of one groove on this bench indicates that while it was used, other locations in proximity were preferred.</p> <p>This site is considered to have high significance in research potential, educational potential, and integrity. It is considered to have moderate significance in rarity and representativeness.</p>
MS10-GG-3	Moderate	<p>As above, grinding grooves are locally common but regionally rare. In the context of this site specifically, the presence of one groove on this bench indicates that while it was used, other locations in proximity were preferred.</p> <p>Specifically relating to this site, the groove identified had been subject to heavy weathering, and its current condition is poor.</p> <p>This site is considered to have moderate significance in all categories.</p>

Table 8.6 Summary of Archaeological Significance for Previously Recorded Sites with the Project Area

AHIMS #	Site Name	Local Archaeological Significance (Northern Region ACHMP)
45-3-1223	Moran's Creek	Not assessed
45-3-1226	Buttonderry Creek	Not assessed
45-3-1228	Moran's Creek	High
45-3-3492	RPS MAND STH CYL05	High
45-3-3586	RPS MAND STH PS01	High (from RPS 2013)
45-3-3639	RPS MAND STH PS02	Not assessed
45-3-3640	RPS MAND STH PS03	Not assessed
45-3-3641	RPS MAND STH PS04	Not assessed
45-3-3642	RPS MAND STH PS05	Not assessed
45-3-3511	RPS MAND STH PS25	High
45-3-3512	RPS MAND STH PS26	High
45-3-3594	RPS MAND STH PS27	High (from RPS 2013)
45-3-3513	RPS MAND STH PS28	High
45-3-3595	RPS MAND STH PS29	High (from RPS 2013)
45-3-3514	RPS MAND STH PS32	High`
45-3-3536	RPS MAND STH TBM29	High

*Significance assessment for this site references it as 'shelter with art' which differs from all other records for this site. Possible error in ACHMP

8.3 Historic Value

Historic value encompasses all aspects of history and often underlies other values. A place may have historic value because it has influenced or been influenced by a historic event, phase, movement, activity, person or group of people.

While the Project Area has written historical evidence of connection to the forestry industry, one of the earliest industries in the Lake Macquarie area, no physical evidence of early forestry practices remain. The only site within the Project Area that retains links to the forestry industry is Landing Skid 1, which has been previously assessed by RPS (2013) as having no State or local significance due to its recent construction (potentially as recently as the 1970s).

No specific areas or items of historical value (including those with a direct association with Aboriginal people) were identified in the Project Area during the survey assessment.

No comments specific to the historical value of the area were provided by the registered Aboriginal parties, noting that general information is provided in the statements of significance included at the commencement of this document.

8.4 Aesthetic Value

Aesthetic value refers to the sensory and perceptual experience of a place. It may consider form, scale, texture and material of the fabric of the landscape and may also include smell and sounds associated with the place (OEH 2011:9).

No comments specific to the aesthetic value of the area were provided by the registered Aboriginal parties, noting that general information is provided in the statements of significance included at the commencement of this document.

9.0 Impact Assessment

Subsidence predictions for Longwall 30 and 31 have been provided by Centennial Mandalong (DgS 24 June 2021). The below section considers the impacts of the predicted subsidence levels of Aboriginal heritage sites within the Project Area.

Impacts are expressed in terms of the likelihood of impact from cracking or erosion. The subsidence assessment for the Project (DgS 2021) specifies the following ranges for potential subsidence impacts:

- Very unlikely (<5% probability)
- Unlikely (5-10% probability)
- Possible (10-50% probability)
- Likely (>50% probability).

9.1 Impact to Aboriginal Heritage Sites

Twenty-six Aboriginal sites have been identified within the Project Area, comprising 16 previously recorded sites, 9 newly identified sites and one newly identified rock overhang. The consideration for impact for the sites previously recorded within the Project Area but not revisited as part of the current survey is based on the recorded coordinates and site descriptions provided by RPS (2013).

A summary of subsidence impacts by site type is provided in **Table 9.2**. Subsidence impacts are considered with reference to site feature, with cracking the key subsidence risk for rock shelters, grinding grooves and habitation structures while erosion is the key subsidence risk for artefact scatters/isolated artefacts. Of the 26 sites within the Project Area, impacts are very unlikely at 15 sites, unlikely at 7 and possible at 4.

Eight of the sites recorded with the Project Area are identified by the feature 'Aboriginal resource and gathering' or habitation structure (with no deposit or archaeological evidence). These sites comprise rock overhangs that do not contain any tangible archaeological evidence nor do they contain deposit where Aboriginal objects might occur. However, it is understood that these sites have cultural values and therefore subsidence predictions are provided. As shown in Table 9.1, subsidence impacts (in the form of cracking) are possible at one of these locations, unlikely at three and are very unlikely at the remaining four locations.

Artefact scatters/isolated artefacts comprise surface stone artefacts (of variable dimensions but often less than 5cm) which have been exposed usually due to erosion and sometimes displaced by sheet wash and rainfall. Cracking is unlikely or very unlikely at sites of this type and erosion is assessed as very unlikely at each of these three sites.

Grinding grooves sites comprise sandstone sheets which have been utilised for sharpening stone tools such as hatchets. Due to the physical characteristics of the sandstone sheets, high level of tilts, strains or vertical subsidence has the potential to crack the sandstone sheets and harm this type of Aboriginal site. Of the nine grinding grooves sites, subsidence impacts (in the form of cracking) are assessed as possible at two sites, unlikely at four sites and very unlikely at the remaining three sites.

For the six rock shelter sites (some of which are identified as containing potential archaeological deposits), subsidence impacts (in the form of cracking) are very unlikely at five sites (including 45-3-1228, which contains art) and possible at the one site (MS9-RS-1).

Further discussion of subsidence impacts with reference to specified performance indicators is provided in **Section 10**.

Table 9.1 Predicted Subsidence Levels for Aboriginal Sites for LW30-31 (Source: Table 2B Dgs June 2021)

AHIMS #	Site Name	Site Feature (corrected)	Cracking Damage Potential	Erosion Damage Potential
45-3-1226	Buttonderry Creek	Grinding groove	Unlikely	Unlikely
45-3-1223	Moran's Creek	Artefact scatter	Unlikely	Very unlikely
45-3-1228	Morans Creek	Rock shelter with art	Very unlikely	Very unlikely
45-3-4548	MS10-GG-1	Grinding groove	Very unlikely	Very unlikely
45-3-4549	MS10-GG-2	Grinding groove	Very unlikely	Very unlikely
45-3-4550	MS10-GG-3	Grinding groove	Very unlikely	Very unlikely
45-3-4551	MS9-GG-1	Grinding groove	Unlikely	Possible
45-3-4552	MS9-GG-2	Grinding groove	Possible	Unlikely
45-3-4545	MS9-GG-3	Grinding groove	Possible	Possible
MS9-OH-1	MS9-OH-1	Habitation structure (no PAD or objects)	Possible	Unlikely
45-3-4547	MS9-RS-1	Rock shelter with PAD	Possible	Unlikely
45-3-4546	MS9-RS-2	Rock shelter with PAD	Very unlikely	Very unlikely
45-3-4544	MS9-RS-3	Rock shelter with artefacts & PAD	Very unlikely	Very unlikely
45-3-3492	RPS CYL05	Grinding groove	Unlikely	Unlikely
45-3-3586	RPS PS01	Habitation structure (no PAD or objects)	Very unlikely	Possible
45-3-3639	RPS PS02	Habitation structure (no PAD or objects)	Unlikely	Unlikely
45-3-3640	RPS PS03	Habitation structure (no PAD or objects)	Very unlikely	Very unlikely
45-3-3641	RPS PS04	Habitation structure (no PAD or objects)	Very unlikely	Very unlikely
45-3-3642	RPS PS05	Habitation structure (no PAD or objects)	Unlikely	Unlikely
45-3-3511	RPS PS25	Isolated artefact	Unlikely	Very unlikely
45-3-3512	RPS PS26	Grinding groove	Unlikely	Unlikely
45-3-3594	RPS PS27	Habitation structure (no PAD or objects)	Very unlikely	Very unlikely
45-3-3513	RPS PS28	Rock shelter with PAD	Very unlikely	Very unlikely
45-3-3595	RPS PS29	Habitation structure (no PAD or objects)	Unlikely	Possible
45-3-3514	RPS PS32	Rock shelter with PAD	Very unlikely	Very unlikely
45-3-3536	RPS TBM29	Isolated artefact	Very unlikely	Very unlikely

Table 9.2 Summary of predicted subsidence impacts with reference to site types

Level of Predicted Subsidence	Site Types
Very unlikely (applicable to 15 sites)	1 rock shelter with art 3 grinding groove sites 4 rock shelters with PAD/artefacts 4 rock overhangs with no associated archaeological evidence or PAD 2 isolated artefacts 1 artefact scatter
Unlikely (applicable to 7 sites)	4 grinding groove sites 3 rock overhangs with no associated archaeological evidence or PAD
Possible (applicable to 4 sites)	2 grinding groove sites 1 rock shelters with PAD 1 rock overhang with no associated archaeological evidence or PAD

9.2 Impact to Aboriginal Cultural Value

Information regarding impacts to Aboriginal cultural values is provided in the statements of significance included at the commencement of this document. No further clarification was provided by the registered Aboriginal parties in response to the draft HMP.

10.0 Performance Measures

Performance measures for Aboriginal sites are provided in Table 6 of Schedule 4 of SSD 5144 conditions of consent and summarised in Table 10.2 below.

Table 10.1 SSD 5144 Performance Measures for Aboriginal Sites

Site Type	Performance Measure
All Aboriginal Cultural Heritage sites/items at the site	No greater subsidence impact or environmental consequence greater than predicted in the documents listed in condition 2(b) of Schedule 2.

Table 10.2 compares the predicted impact from the LW30-31 EP subsidence assessment (DgS Jan 2021) with the impacts predicted in the Mod 9 Modification Report and associated documents.

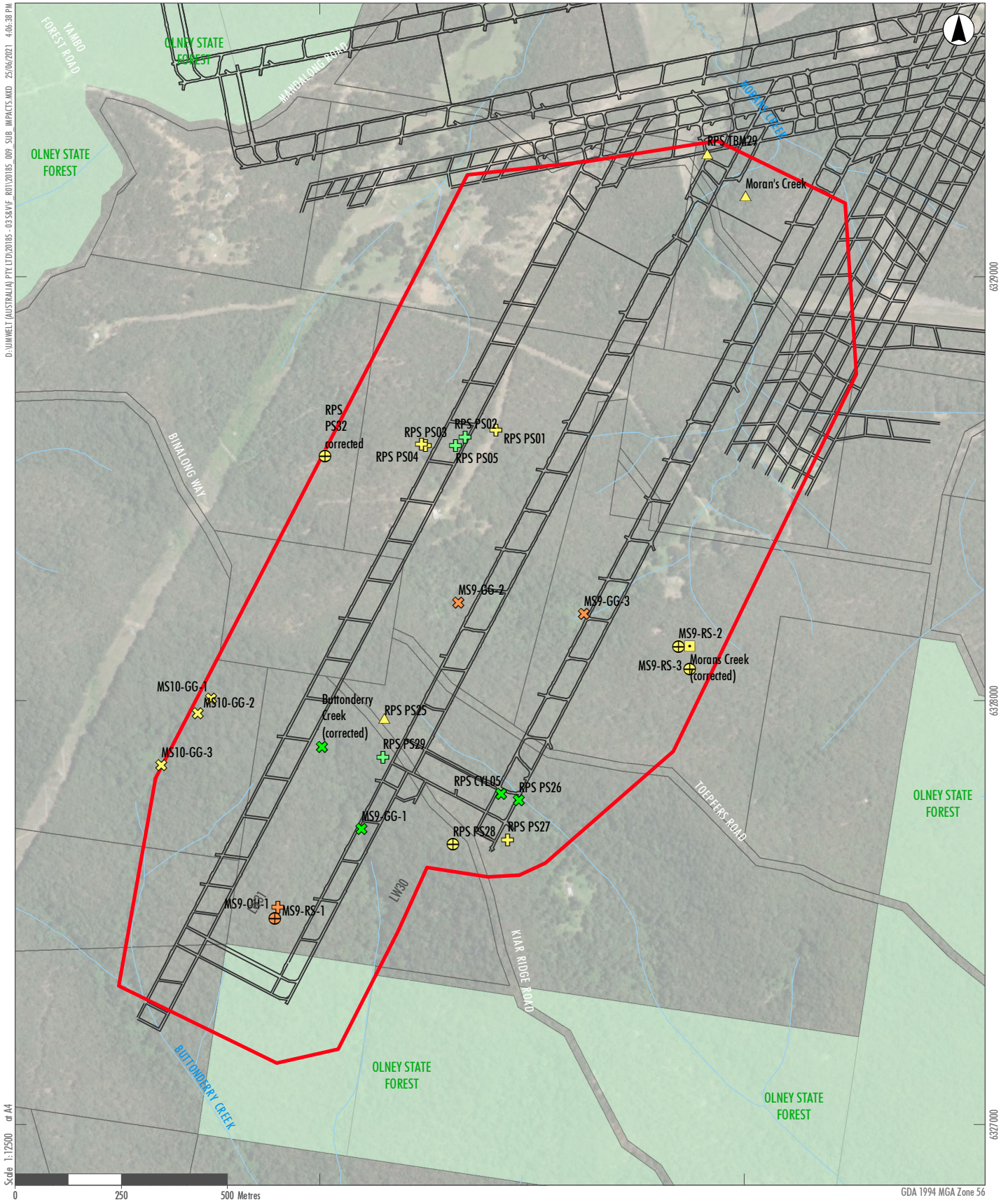
Table 10.2 Approved and Predicted Impact or Environmental Consequence

Site Name	AHIMS Number	Site Type	Predicted level of impact (Mod 9 Modification Report)	LW30/31 Extraction Plan predicted level of Impact (DgS, 2021)
Moran's Creek	45-3-1223	Artefact scatter	Unlikely (cracking) Very unlikely (erosion)	Unlikely (cracking) Very unlikely (erosion)
Buttonderry Creek	45-3-1226	Grinding Groove	Possible	<i>Unlikely (lower than approved)</i>
Moran's Creek	45-3-1228	Art (Pigment/Engraved), Habitation Structure	Very Unlikely	Very Unlikely
MS9-OH-1	NA	Habitation Structure	Possible	Possible
MS9-GG-1	45-3-4551	Grinding Groove	Likely	<i>Unlikely (lower than approved)</i>
MS9-GG-2	45-3-4552	Grinding Groove	Possible	Possible
MS9-GG-3	45-3-4545	Grinding Groove	Likely	<i>Possible (lower than approved)</i>
MS9-RS-1	45-3-4547	Habitation Structure	Possible	Possible
MS9-RS-2	45-3-4546	Habitation Structure	Unlikely	<i>Very Unlikely (lower than approved)</i>
MS9-RS-3	45-3-4544	Habitation Structure	Unlikely	<i>Very Unlikely (lower than approved)</i>

Site Name	AHIMS Number	Site Type	Predicted level of impact (Mod 9 Modification Report)	LW30/31 Extraction Plan predicted level of Impact (DgS, 2021)
MS10-GG-1	45-3-4548	Grinding Groove	Possible	Very Unlikely (<i>lower than approved</i>)
MS10-GG-2	45-3-4549	Grinding Groove	Possible	Very Unlikely (<i>lower than approved</i>)
MS10-GG-3	45-3-4550	Grinding Groove	Likely	Very Unlikely (<i>lower than approved</i>)
RPS MAND STH CYL05	45-3-3492	Grinding Groove	Likely	<i>Unlikely (lower than approved)</i>
RPS MAND STH PS01	45-3-3586	Habitation Structure	Possible	Very Unlikely (<i>lower than approved</i>)
RPS MAND STH PS02	45-3-3639	Aboriginal Resource and Gathering	Unlikely	Unlikely
RPS MAND STH PS03	45-3-3640	Aboriginal Resource and Gathering	Possible	Very Unlikely (<i>lower than approved</i>)
RPS MAND STH PS04	45-3-3641	Aboriginal Resource and Gathering	Possible	Very Unlikely (<i>lower than approved</i>)
RPS MAND STH PS05	45-3-3642	Aboriginal Resource and Gathering	Very Unlikely	Unlikely (higher than approved)
RPS MAND STH PS25	45-3-3511	Isolated Artefact	Possible	<i>Unlikely cracking, very unlikely erosion (lower than approved)</i>
RPS MAND STH PS26	45-3-3512	Grinding Groove	Possible	<i>Unlikely (lower than approved)</i>
RPS MAND STH PS27	45-3-3594	Habitation Structure	Unlikely	Very Unlikely (<i>lower than approved</i>)
RPS MAND STH PS28	45-3-3513	Habitation structure	Possible	Very Unlikely (<i>lower than approved</i>)
RPS MAND STH PS29	45-3-3595	Habitation Structure	Unlikely	Unlikely
RPS MAND STH PS32	45-3-3514	Potential Archaeological Deposit (PAD)	Possible	Very Unlikely (<i>lower than approved</i>)
RPS MAND STH TBM29	45-3-3536	Isolated artefact	Very unlikely	Very unlikely

Subsidence predictions are lower than the required performance measure at 17 sites, consistent at eight sites and higher at one site. The level of predicted subsidence at 45-3-3642 (PS05 – a rock overhang with no associated archaeological evidence or PAD) has increased slightly from very unlikely to unlikely.

DGS (2021) concludes that LWs 30-31 will generally have a decreased risk of impact on the sites when compared to the Mod 9 MR.



Legend

 Project Area LW30-31

— Mandalong Mine Longwalls

State Forest

Subsidence Impact Possible

✕ Grinding groove

⊕ Habitation structure (no PAD or objects)

⊗ Rock shelter with PAD/artefacts

Subsidence Impact Unlikely

✕ Grinding groove

⊕ Habitation structure (no PAD or objects)

Subsidence Impact Very Unlikely

△ Artefact scatter

✕ Grinding groove

⊕ Habitation structure (no PAD or objects)

⊗ Rock shelter with PAD/artefacts

⊕ Rock shelter with art

FIGURE 10.1

Predicted Subsidence Impacts
for Aboriginal Sites

11.0 Management Strategies

This section provides detailed management strategies to be applied to the Project Area in accordance with the modified conditions of SSD5144. These management strategies are developed with reference to the results of previous and current survey of the Project Area, the cultural and archaeological significance of the sites within the Project Area and the impact assessment provided in the preceding section.

These management strategies were provided in the draft HMP for review by the registered Aboriginal parties. No changes to the management strategies were recommended by the registered Aboriginal parties.

11.1 Mitigation of Predicted Impacts

As documented in **Section 10**, subsidence predictions are lower than the required performance measure at 17 sites, consistent at eight sites and higher at one site (45-3-3642 RPS MAND STH PS05). In addition, subsidence associated with LW30-31 extraction is considered possible at two grinding groove sites (MS9-GG-2 and MS9-GG-3), one rock shelter containing PAD (MS9-RS-1). Possible impacts as a result of cracking have also been identified at one rock overhang site (MS9-OH-1) not associated with Aboriginal objects or PAD) within the Project Area, however mitigation of this impacts is considered unnecessary given the lack of Aboriginal objects or PAD. Subsidence impacts associated with LW30-31 extraction are unlikely or very unlikely at all other recorded sites. Prior to the commencement of activities that are predicted to result in possible subsidence at the rock shelter with PAD (MS9-RS-1) and grinding groove sites (MS9-GG-2 and MS9-GG-3), further consideration will be given to whether additional works will be required to mitigate subsidence impacts at these sites. This approach has been developed supplementary to the minimum compliance requirements addressed in the Trigger, Action, Response Plan (TARP) developed by Centennial for Aboriginal archaeological sites at Mandalong, as provided in **Section 12**.

A review of the nature of subsidence impacts in the adjoining areas will be conducted based on available data as mining progresses. Where the predicted level of subsidence for the rock shelter is possible or higher, Centennial will engage a suitably qualified geotechnical expert or similar to provide advice on ways in which subsidence impacts can be mitigated at the identified sites. This may include consideration of the introduction of non-permanent support systems to prevent cracking and structural damage to the rock shelter. Any proposed mitigation strategy based on geotechnical or similar advice will be subject to consultation with the registered Aboriginal parties and a suitably qualified archaeologist to ensure that it is appropriate to the nature and significance of the site. The agreed methodology for any such works will be provided to Heritage NSW prior to implementation.

Where the review of the outcomes of subsidence in adjoining areas indicates that the likelihood of subsidence remains possible or greater at the rock shelter with PAD (MS9-RS-1) and the potential impacts cannot be mitigated based on geotechnical advice, consultation will be undertaken with registered Aboriginal parties and an archaeologist in relation to undertaking excavations to confirm the nature and extent of sub-surface deposits and, if required, salvage of the deposit. Any such excavations will be the subject of a methodology to be developed by the registered Aboriginal parties and the archaeologist and this methodology will be provided to Heritage NSW prior to the commencement of any such excavations.

Where updated subsidence predictions are unlikely or lower, the sites will be subject to ongoing monitoring, as detailed in **Section 11.2**.

11.2 Monitoring Program

The aim of the monitoring program is to identify whether there is a risk of harm to Aboriginal sites as a result of mining activities and to identify appropriate mitigation strategies, if required. The monitoring program is a key component of the approved Northern Region ACHMP and the approach taken in this HMP ensures consistency with the approved ACHMP. Throughout the monitoring program, consideration must be given to the relevant TARPs provided in **Section 12**.

The monitoring program needs to record the condition of the site before mining (baseline survey and baseline check) and the condition of the site after mining (post mining initial condition and post mining secondary condition check) and thus has been separated into three phases.

- Phase 1: Baseline recording (prior to the occurrence of undermining in the vicinity of the site). This involves the recording of the condition of the site before mining.
- Phase 2: Post mining primary recording (immediately after undermining in the vicinity of the site). The purpose of this monitoring is to evaluate whether there has been any change to the site and if any change that has occurred is the result of subsidence.
- Phase 3: Post mining secondary recording (approximately 8 months after undermining). The purpose of this monitoring is to identify whether there has been any change to the site in the period since mining and to make an assessment on whether conditions have stabilised. If conditions have stabilised, no further monitoring is required. If subsidence has not stabilised further monitoring will be required.

The methodology for site monitoring involves documentation of site condition with the minimum information to be recorded comprising the location of the site (including GPS coordinates), provision of a site plan (where relevant), completion of detailed digital photography and field notes documenting general condition.

11.2.1 Monitoring Protocols for Grinding Grooves and Rock shelters

The monitoring requirements for grinding groove and rock shelter sites are provided below with reference to each relevant phase.

Phase 1: In order to manage and assess any impacts to grinding groove/rock shelter sites, a baseline recording must be undertaken before the commencement of mining. The baseline recording must include the following:

- Detailed archaeological recording
- Archival-quality photos
- The designation of survey control points for monitoring, to be completed by suitably qualified surveyors.

The suitably qualified archaeologist responsible for undertaking the detailed recording will complete detailed photography and observations of the rock morphology (surface) will be recorded, including the presence of any existing cracking and weathering. The archival-quality photographs will be taken in accordance with NSW Heritage guidelines. A 3D terrestrial scan of the rock shelter/grinding groove site(s) will be considered if appropriate. The condition and depth of any potential archaeological deposits within a rock shelter will also be documented.

A minimum of six (6) control points will be nominated on the rock shelter/grinding groove site(s). The recording of control points must be undertaken by a suitably qualified surveyor (appointed by Centennial or suitably qualified archaeologist) in consultation with the archaeologist using a total station or better equipment if available. The purpose of the control points is to provide points of reference on the rock shelter/grinding groove in order to later monitor the effects of subsidence. The location of these control points will preferably be tied to known surveyed points outside the zone of influence and/or other permanent points such as electricity transmission towers.

Phase 2: Within a reasonable timeframe after the completion of undermining, the condition of the site must be reinspected, and the condition of the site compared to the last documented results. Again, observations of the rock morphology (surface) will also be recorded, particularly if there is widening of existing cracks and/or development of new cracks. Signs of sheet erosion or exfoliation must also be recorded and archived. This data must be compared to recorded information in Phase 1.

If the site is assessed to be at greater risk of harm as a result of mining activities, Centennial's Environmental team must notify Heritage NSW and the registered Aboriginal parties that there is potential for harm to the site and consult on appropriate management/mitigation strategies.

Phase 3: The post mining secondary check must be undertaken approximately 8 months after the mining activity was finished. A final check of the six (6) control point measurements must be undertaken and compared to previous results. If there are no changes to the rock surface morphology, widening of existing cracks or signs of sheet erosion/surface exfoliation, then no further monitoring is required.

If there is a discrepancy from the baseline recording and determined to be as a result of subsidence, Centennial must consult with the registered Aboriginal parties and a suitably qualified archaeologist to assess the potential risk of harm to the site. The appropriate mitigation measures developed by the registered Aboriginal parties and archaeologist must be followed. Where these mitigation measures are provided to repair impacts to a site or may result in changes to the integrity of the site, consultation will be required with Heritage NSW.

Phase 3a: In instances where final subsidence is not achieved until after a number of longwall extractions have taken place, then additional inspections by the registered Aboriginal parties and a suitably qualified archaeologist will be required to assess any further risks to Aboriginal sites. The same provisions for mitigation works as provided in Phase 2 will apply.

11.2.2 Monitoring Protocols for Artefact Sites

The monitoring requirements for sites containing stone artefacts are provided below with reference to each relevant phase.

Phase 1: Immediately before the commencement of mining activity, a baseline check of the sites condition must be undertaken. The purpose of this exercise is to document the condition of the site immediately before mining related activities take place and gauge whether there are impacts to the site related to natural processes rather than mining activities. Monitoring of the site will be undertaken using the following documentation methods:

- Detailed archaeological recording
- Archival-quality photos
- Survey control points to create a polygon of the site curtilage (for scatters).

During the baseline recording, the location of the site must be verified using a GPS and the site dimensions and content must be confirmed. Photos of the site need to be taken so that the overall condition can be documented.

If at the time of baseline recording, the registered Aboriginal parties and archaeologist are concerned that the site may be unduly impacted by erosion, consideration will be given to collect the artefacts with the aim of returning the objects to their original location after the completion of mining. Should this occur, Heritage NSW will be advised in writing and an Aboriginal Site Impact Recording form will be completed.

Phase 2: Within a reasonable timeframe after the completion of undermining, the condition of the site must be reinspected, and the condition of the site compared to the last documented results. If the level of harm to the site becomes evident immediately post-mining, Centennial must endeavour to protect the site from further harm for example, by using non-invasive barrier fencing to prevent erosion or temporarily collecting surface artefacts, as discussed above. Should this occur, Heritage NSW will be advised in writing and an Aboriginal Site Impact Recording form will be completed.

Phase 3: The post mining secondary check must be undertaken approximately 8 months after the mining activity has finished. The inspection is required to make an assessment on whether the ground surface conditions have stabilised. If ground conditions have stabilised and no changes to site condition is observed, then no further monitoring will be required. If noticeable amounts of erosion or disturbance is identified, the Centennial Environmental Team, registered Aboriginal parties and an archaeologist will develop appropriate mitigation strategies, as discussed for Phase 2.

Phase 3a: In instances where final subsidence is not achieved until after a number of longwall extractions have taken place, then additional inspections by the registered Aboriginal parties and a suitably qualified archaeologist will be required to assess any further risks to Aboriginal sites. The same provisions for mitigation works as provided in Phase 2 will apply.

11.2.3 Monitoring Reporting

Following the completion Phase 1 and Phase 3 (which will include both Phase 2 and Phase 3 results) of monitoring works, a report will be prepared detailing the outcomes of the monitoring. For the combined Phase 2 and 3 monitoring report this will include an evaluation of site condition with reference to the baseline record and will include any recommendations regarding identified impacts/potential impacts (as discussed above). A copy of each monitoring report will be supplied to the registered Aboriginal parties for review and comment.

11.3 Identification of Previously Unknown Aboriginal Cultural Heritage Sites

Should previously unidentified Aboriginal cultural heritage sites be identified over the course of activities within the Project Area the following procedure will be applied:

- Works in the immediate vicinity of the site will cease and the area around the site will be cordoned off.
- The Centennial Environmental Co-ordinator will be contacted and advised of the location and condition of the site.
- The Co-ordinator will then contact the registered Aboriginal parties and Heritage NSW to provide information about the newly identified site and determine an appropriate management strategy.

11.4 Consultation with Registered Aboriginal Parties

Consultation will remain ongoing with the registered Aboriginal parties as detailed throughout this document and in accordance with the provisions of the Northern Region ACHMP.

11.5 Historical Heritage Management

The Project Area does not contain any identified heritage items with local or higher significance, including the previously recorded Landing Skid 1 item (as assessed by RPS 2013). As a result, there is no requirement for further monitoring of this item or any specific historical heritage monitoring works within the Project Area.

Should previously unidentified historical heritage sites be identified over the course of activities within the Project Area the following procedure will be applied:

- Works in the immediate vicinity of the site will cease and the area around the site will be cordoned off.
- The Centennial Environmental Co-ordinator will be contacted and advised of the location and condition of the site.
- The Co-ordinator will then contact a suitably qualified cultural heritage consultant to evaluate the potential historical heritage item. Where it is identified as having local or higher significance, Centennial will contact Heritage NSW to provide information about the newly identified site and determine an appropriate management strategy.

11.6 Review of this Framework

In accordance with the requirements of the Northern Region ACHMP, this HMP will be updated when deemed necessary and reviewed annually for the period of mining of LW30-31 to ensure the document remains current. Any information regarding new sites recording within the Project Area will be incorporated into the framework and the site's significance will be evaluated. In addition, where strategies incorporated into this HMP require update or alteration based on outcomes of works undertaken in the preceding year, this will be considered as part of the review.

12.0 Trigger Action Response Plan

A Trigger Action Response Plan (TARP) has been developed by Mandalong to define the minimum set of corrective actions that are required by site personnel in response to unpredicted impacts or deviation in the mine conditions from normality.

The TARP defines what is “normal” by way of a set of criteria for a range of aspects and are shown as green in the TARP. Criteria relating to abnormal conditions including trigger values are also defined in the TARP and are rated based on increased risk and potential impact and shown as orange or red. Corresponding corrective actions for each risk level are also clearly defined. It is noted that the TARPs relate to compliance requirements only.

Table 12.1 Trigger Action Response Plan

Aspect	Condition Green	Condition Orange	Condition Red
Aboriginal Heritage	Trigger		
	<p>Subsidence monitoring indicates actual subsidence is within predictions listed in condition 2(b) of Schedule 2.</p> <p>AND</p> <p>Aboriginal heritage site monitoring indicates:</p> <ul style="list-style-type: none"> Nil cracking to sites deemed <i>V. Unlikely</i> and <i>Unlikely</i>. Cracking detected at no more than 11 sites deemed <i>Possible</i>. Cracking detected at no more than 2 sites deemed <i>Likely</i>. 	<p>Subsidence monitoring indicates actual subsidence is greater than that predicted in condition 2(b) of Schedule 2.</p> <p>AND</p> <p>Aboriginal heritage site monitoring indicates:</p> <ul style="list-style-type: none"> Nil cracking to sites deemed <i>V. Unlikely</i> and <i>Unlikely</i>. Cracking detected at no more than 11 sites deemed <i>Possible</i>. Cracking detected at no more than 2 sites deemed <i>Likely</i>. 	<p>Aboriginal heritage site monitoring indicates:</p> <ul style="list-style-type: none"> Cracking detected at sites deemed <i>V. Unlikely</i> and <i>Unlikely</i>. Cracking detected at more than 11 sites deemed <i>Possible</i>. Cracking detected at more than 2 sites deemed <i>Likely</i>. Impacts greater than cracking detected at any sites.
	Action		
	<ul style="list-style-type: none"> No response required. Continue subsidence monitoring program. Continue monitoring/management of sites in accordance with the Northern Region ACHMP and Extraction Plan HMP. 	<ul style="list-style-type: none"> Confirm monitoring results (QA check). Investigate exceedance of subsidence prediction. Implement any additional management measures as required in consultation with the Registered Aboriginal Parties. Continue monitoring / management of site in accordance with the Northern Region ACHMP and Extraction Plan HMP. 	<ul style="list-style-type: none"> Notify Registered Aboriginal Parties and coordinate a site inspection with the Registered Aboriginal Parties. Notify DPIE and Heritage NSW. Investigate exceedance of subsidence predictions. Investigate and implement additional management measures as required in consultation with the Registered Aboriginal

			Parties, DPIE and Heritage NSW. <ul style="list-style-type: none"> Continue monitoring / management of site in accordance with the Northern Region ACHMP and Extraction Plan HMP.
Aspect	Condition Green	Condition Orange	Condition Red
Historical Heritage	Trigger		
	Subsidence monitoring indicates actual subsidence is within predictions listed in condition 2(b) of Schedule 2. AND Historic heritage site monitoring indicates environmental consequences is within approved criteria (Table 6, Condition 1 of Schedule 4 of the Consent SSD-5144)	Subsidence monitoring indicates actual subsidence is greater than that predicted in condition 2(b) of Schedule 2. AND Historic heritage site monitoring indicates environmental consequences is within approved criteria (Table 6, Condition 1 of Schedule 4 of the Consent SSD-5144)	Aboriginal heritage site monitoring indicates environmental consequences greater than approved criteria (Table 6, Condition 1 of Schedule 4 of the Consent SSD-5144)
	Action		
	<ul style="list-style-type: none"> No response required. Continue subsidence monitoring program. Continue monitoring / management of sites in accordance with the Northern Region Historic Heritage MP. 	<ul style="list-style-type: none"> Confirm monitoring results (QA check). Investigate exceedance of subsidence prediction. Continue monitoring / management of sites in accordance with the Northern Region Historic Heritage MP. 	<ul style="list-style-type: none"> Notify DPIE and NSW Heritage as per Condition 2 of Schedule 4 and Condition 10 of Schedule 6 in the Consent SSD-5144. Investigate and implement additional management measures and a contingency plan as required in consultation with, DPIE and Heritage NSW. Investigate exceedance of subsidence predictions. Continue monitoring / management of site in accordance with the Northern Regional Historic Heritage MP.

13.0 Conclusions

This HMP has been produced to address Condition 6 (I), Schedule 4 of SSD-5144, for the inclusion in the Mandalong Mine Extraction Plan for Longwalls 30 to 31.

The Project Area does not contain any identified heritage items with local or higher significance, including the previously recorded Landing Skid 1 item (as assessed by RPS 2013). As a result, there is no requirement for further monitoring of this item or any specific historical heritage monitoring works within the Project Area.

Twenty-six Aboriginal sites are located within the LW30-31 Project Area and thus may be impacted by subsidence. Based on the subsidence predictions provided by Centennial Mandalong, the following assessments of impact provided in Table 13.1 have been identified.

Table 13.1 Impacts Predicted for Aboriginal Sites within the Project Area

Level of Predicted Subsidence	Site Types
Very unlikely (applicable to 15 sites)	1 rock shelter with art 3 grinding groove sites 4 rock shelters with PAD/artefacts 4 rock overhangs with no associated archaeological evidence or PAD 2 isolated artefacts 1 artefact scatter
Unlikely (applicable to 7 sites)	4 grinding groove sites 3 rock overhangs with no associated archaeological evidence or PAD
Possible (applicable to 4 sites)	2 grinding groove sites 1 rock shelters with PAD 1 rock overhang with no associated archaeological evidence or PAD

Subsidence impacts are predicted to exceed the original approved predictions at one site (45-3-3642 RPS MAND STH PS05) and are predicted to be lower than the required performance measure at 17 sites. Subsidence associated with LW30-31 extraction is considered possible at two grinding groove sites (MS9-GG-2 and MS9-GG-3), one rock shelter containing PAD (MS9-RS-1). Possible impacts as a result of cracking have also been identified at one rock overhang site (MS9-OH-1) not associated with Aboriginal objects or PAD within the Project Area, however mitigation of this impacts is considered unnecessary given the lack of Aboriginal objects or PAD. Subsidence impacts associated with LW30-31 extraction are unlikely or very unlikely at all other recorded sites. Prior to the commencement of activities that are predicted to result in possible subsidence at the rock shelter with PAD (MS9-RS-1) and grinding groove sites (MS9-GG-2 and MS9-GG-3), further consideration will be given to whether additional works will be required to mitigate subsidence impacts at these sites. This approach has been developed supplementary to the minimum compliance requirements addressed in the Trigger, Action, Response Plan (TARP) developed by Centennial for Aboriginal archaeological sites at Mandalong, as provided in **Section 12**.

A review of the nature of subsidence impacts in the adjoining areas will be conducted based on available data as mining progresses. Where the predicted level of subsidence for the rock shelter is possible or

higher, Centennial will engage a suitably qualified geotechnical expert or similar to provide advice on ways in which subsidence impacts can be mitigated at the identified sites. This may include consideration of the introduction of non-permanent support systems to prevent cracking and structural damage to the rock shelter. Any proposed mitigation strategy based on geotechnical or similar advice will be subject to consultation with the registered Aboriginal parties and a suitably qualified archaeologist to ensure that it is appropriate to the nature and significance of the site. The agreed methodology for any such works will be provided to Heritage NSW prior to implementation.

Where the review of the outcomes of subsidence in adjoining areas indicates that the likelihood of subsidence remains possible or greater at the rock shelter with PAD (MS9-RS-1) and the potential impacts cannot be mitigated based on geotechnical advice, consultation will be undertaken with registered Aboriginal parties and an archaeologist in relation to undertaking excavations to confirm the nature and extent of sub-surface deposits and, if required, salvage of the deposit. Any such excavations will be the subject of a methodology to be developed by the registered Aboriginal parties and the archaeologist and this methodology will be provided to Heritage NSW prior to the commencement of any such excavations.

A series of risk control measures and procedures has been outlined in **Section 9 – 11** in response to both Aboriginal and historical archaeological sites (either identified or as yet identified). The implementation of the risk control and procedures will be through the Trigger Action Response Plan (**Section 12.0**) and the three-phase monitoring system detailed in Centennial's Northern Region Aboriginal Cultural Heritage Management Plan (RPS 2016):

- Phase 1 monitoring to be undertaken on all archaeological sites prior to site undermining.
- Phase 2 is to be initiated after the completion of the undermining. Phase 2 monitoring will be required on all archaeological sites on the EP Area.
- Phase 3 is to be undertaken approximately 8 months after the mining activity has finished.
- Phase 3a may be required in cases where final subsidence is not achieved until after a number of longwall extractions have taken place.

A rock shelter monitoring program is required in accordance with the requirements of SSD-5144, Schedule 4, Condition 11. The effectiveness of any mitigation works will be monitored and used to inform impact avoidance, management, and mitigation strategies in relation to future works.

In the event of unpredicted impacts or deviation in the mine conditions from normality, site personnel will follow the corrective actions outlined in the TARP.

Whilst not expected, should any previously unidentified Aboriginal sites be encountered, Centennial Mandalong will follow the procedures outlined in Section 11 of the Northern Region Aboriginal Cultural Heritage Management Plan.

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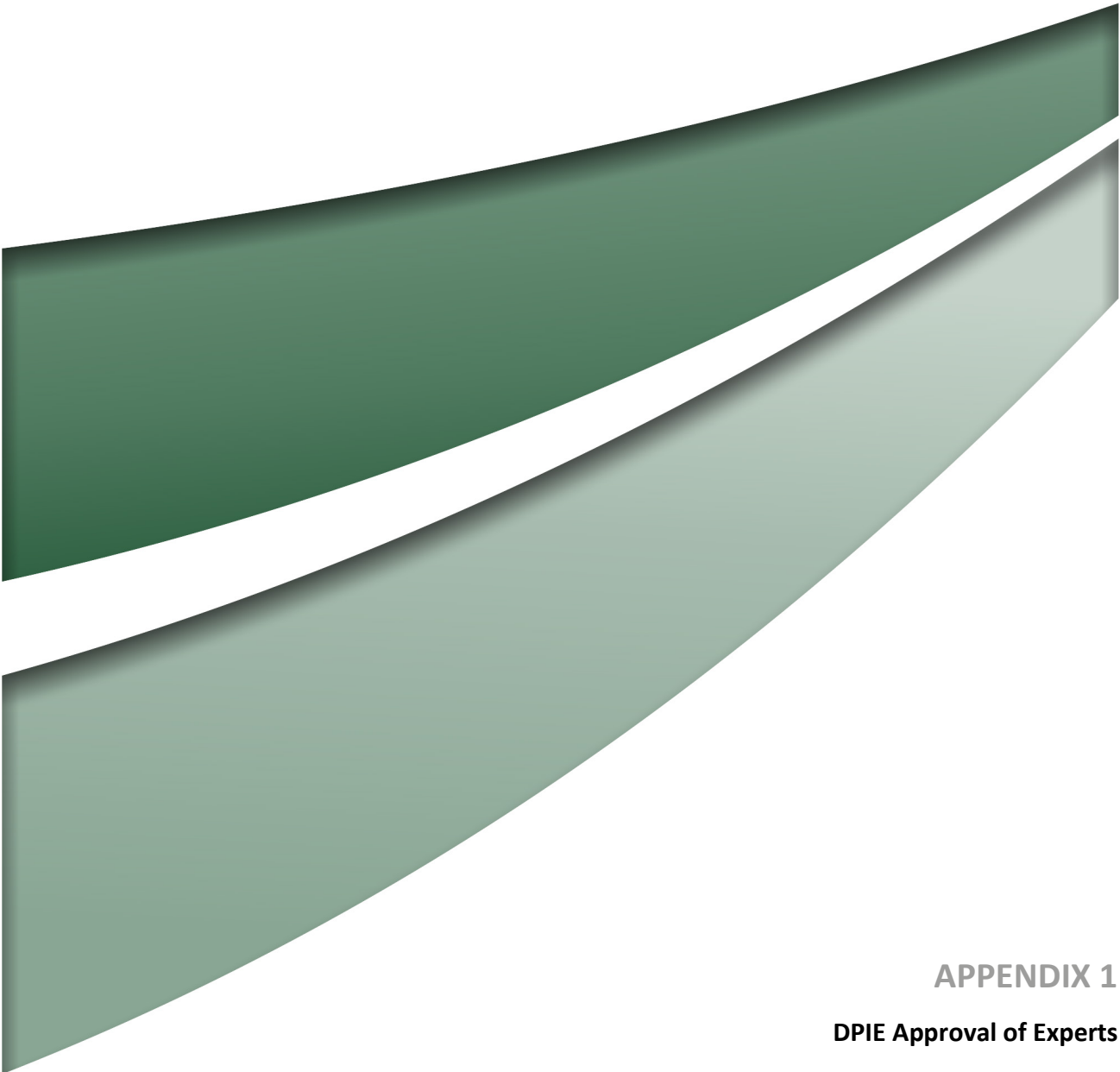
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APPENDIX 1

DPIE Approval of Experts

Mr James Wearne
Group Approvals Manager
Centennial Mandalong Pty Limited
PO Box 1000
Toronto, NSW, 2283

22/10/2020

Dear Mr Wearne

Mandalong Southern Extension Project (SSD-5144)
Approval of Experts to Prepare an Extraction Plan for Longwalls 30-33

I refer to your request, which was submitted in accordance with condition 6 of Schedule 4 of the consent for the Mandalong Southern Extension Project (SSD-5144), for the approval of nominated experts to prepare the Extraction Plan for Longwalls 30-33.

The Department has carefully reviewed the CVs and experience of the nominated experts and is satisfied that they are suitably qualified and experienced to prepare the component plans within the Extraction Plan as set out below:

- Phil Enright – Centennial Coal – Extraction Plan Main Document, Built Features Management Plan, Property Subsidence Management Plans, Land Management Plan, Public Safety Management Plan, Subsidence Monitoring Program, Trigger Action Response Plans and Contingency Plans;
- Stuart Gray, Tyler Tinkler and Ian Gilmore – GHD – Water Management Plan;
- Arne Bishop, Lauren Eather and Hayden Beck – RPS – Biodiversity Management Plan; and
- Alison Fenwick, Ashley O’Sullivan, Nicola Roche and Tim Adams – Umwelt – Heritage Management Plan.

Accordingly, the Planning Secretary has approved the nominated experts.

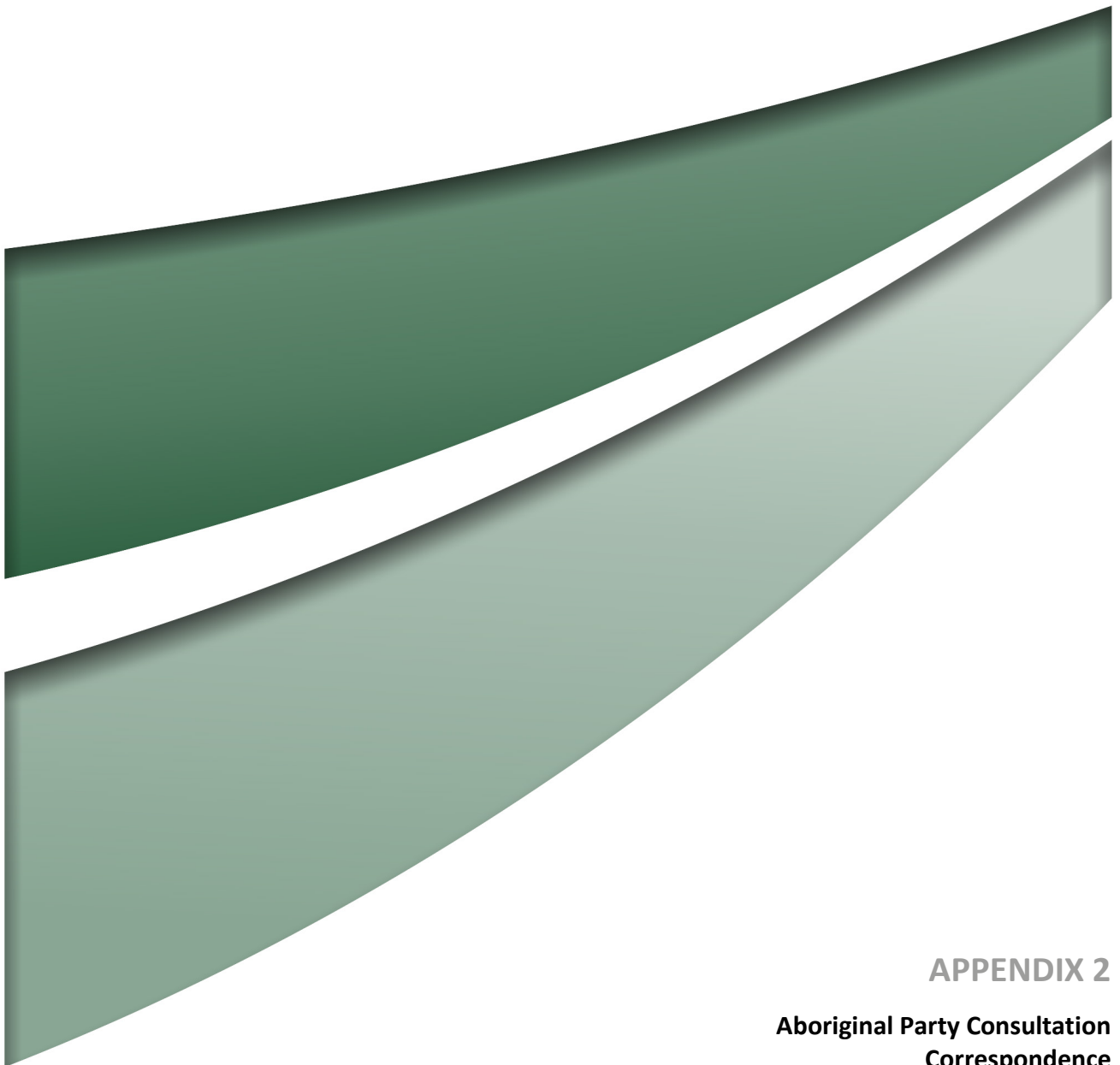
If you wish to discuss the matter further, please contact Colin Phillips on 9274 6483.

Yours sincerely



Matthew Sprott
Director
Resource Assessments (Coal & Quarries)

As nominee of the Planning Secretary



APPENDIX 2

Aboriginal Party Consultation Correspondence

Our Ref: 20133/NR/AO/11082020

11 August 2020

Awabakal Descendents Traditional Owners Aboriginal Corporation
Peter Leven
PO Box 137
BUDGEWOI NSW 2262

Email: peterleven@y7mail.com

Dear Sir/Madam

Re: Methodology for Aboriginal Cultural Heritage Assessment, Proposed Extension of Longwalls 30-33 (Modification 10) and Further Survey for Modification 9 Extraction Plan, Mandalong Mine

Centennial Mandalong is currently seeking approval for the continuation of mining with the Mandalong South area associated with both Modification 9 and Modification 10. This project, herein after referred to as 'Mandalong South Assessment Area', comprises both further survey required to support a Heritage Management Plan (HMP) associated with an Extraction Plan required for Modification 9 and an Aboriginal Cultural Heritage Assessment (ACHA) associated with Modification 10. The project area, including all areas of proposed works, is shown in **Plate 1.1** and **Plate 1.2**.

Umwelt Environmental and Social Consultants (Umwelt) have been engaged by Centennial Mandalong to prepare a HMP for Modification 9 and an ACHA (incorporating an archaeological technical report) for Modification 10 in consultation with the registered Aboriginal parties, including your organisation.

The HMP for Modification 9 will be completed in accordance with the relevant conditions of approval. The ACHA will form part of the Environmental Impact Statement (EIS) for the proposed modification (Modification 10), and will be undertaken in accordance with the requirements of the *National Parks and Wildlife Act 1974* (NPW Act), the *National Parks and Wildlife Regulation 2019* (NPW Regulation), the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (Office of Environment and Heritage [OEH] 2011), the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (Department of Environment, Climate Change and Water [DECCW] 2010) (the consultation requirements) and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice).

As a registered Aboriginal party for Mandalong Mine, we are writing to provide you with the draft methodology for the ACHA and a methodology for additional survey to inform the HMP for your review and comment.

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1.0 Description of the Project

A summary of both projects are provided below, with reference to the requirements satisfied by this methodology and accompanying assessments.

1.1 Modification 9 HMP

Modification 9 relates to the proposed re-orientation of a number of existing longwall panels due to challenging geological conditions. The Modification 9 area was included within the larger area assessed as part of the original Aboriginal cultural heritage assessment (RPS 2013) undertaken to inform the application for SSD-5144. At the time of the assessment, six land parcels within the Modification 9 area could not be surveyed due to lack of landholder consent. In accordance with Schedule 4, Condition 8 of the Mandalong Mine consent (SSD-5144), best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. An additional assessment of part of the Modification 9 area was conducted by Umwelt (2020) and the former Native Title claimant parties to satisfy the conditions of a Section 31 Deed of Agreement. These parcels comprised areas of State Forest already partially assessed by RPS (2013).

As a result of the RPS (2013) assessment, 21 Aboriginal archaeological sites are listed on the Aboriginal Heritage Information Management System (AHIMS) as being located within the Modification 9 area, of which one is a duplicate record. These sites comprise six rockshelters, four sets of grinding grooves, five sites identified as being associated with Aboriginal resources, three sites containing stone artefacts and two areas of Potential Archaeological Deposit (PAD). One historical heritage item (L1 – log landing site) was identified within the Mod 9 area however, based on subsidence predictions, it is understood that this site is unlikely to be impacted.

Of the parcels of land assessed by Umwelt (2020) within the Modification 9 area, Lot 175 DP755271 did not contain any identified sites and the potential for sites to be present (but not currently visible) within this parcel was assessed as low based on the extent of survey and the nature of landforms within this area. On this basis, it is not proposed to resurvey this lot as part of the development of the HMP. Lot 115 and 122 DP755238 were also assessed by Umwelt (2019) and no new sites were identified. However, it was noted that these lots were largely inaccessible at the time of survey.

The HMP is required to meet the relevant conditions of the Modification 9 consent. As this has not yet been issued (Centennial Mandalong are currently preparing responses to the public / agency submissions), it is assumed that conditions will be consistent with those in the Modification 8 consent. Schedule 6, Condition 6(l) specifies that an extraction plan must be developed and must include a HMP 'which has been prepared in consultation with the Biodiversity Conservation Division and Registered Aboriginal parties, to manage the potential environmental consequences of the proposed second workings on both Aboriginal and non-Aboriginal heritage items, and reflects the requirements of condition 22 of Schedule 3.' Condition 22 of Schedule 3 specifies requirements to be addressed in the HMP.

1.2 Modification 10

Further to the reorientation of longwall panels under Modification 9, Mandalong is proposing to extend the reorientated panels, with this proposal referred to as Modification 10.

Modification 10 will involve the extensions of LW30-33 to the south of the current longwall plan, as shown by the increase in project footprint in **Plate 1.1** and **Plate 1.2**.

An Aboriginal Cultural Heritage Assessment (ACHA) has been determined as being required to assess the impact of proposed Modification 10 to identified Aboriginal sites (one is located within the boundary of the Modification 10 extension) or as yet unidentified Aboriginal objects or sites.

1.3 Combined Survey Effort

As there are a number of either overlapping areas or blocks in close proximity related to the Modification 9 HMP and Modification 10 ACHA, Umwelt is proposing to undertake the survey as one concerted survey effort. This information is summarised in **Plate 1.1** and **Plate 1.2** below. Green shading shows areas previously surveyed and not requiring further survey and yellow shading indicates the areas that will be surveyed for the Mod 10 Aboriginal cultural heritage assessment. The remaining properties within the Mod 9 area that have not been subject to prior survey are shaded in aqua. In accordance with Schedule 4, Condition 8 of the Modification 8 consent, best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. The previously unsurveyed properties shown in aqua in **Plate 1.2** will be therefore surveyed as part of the development of the Modification 9 HMP and Modification 10 ACHA.

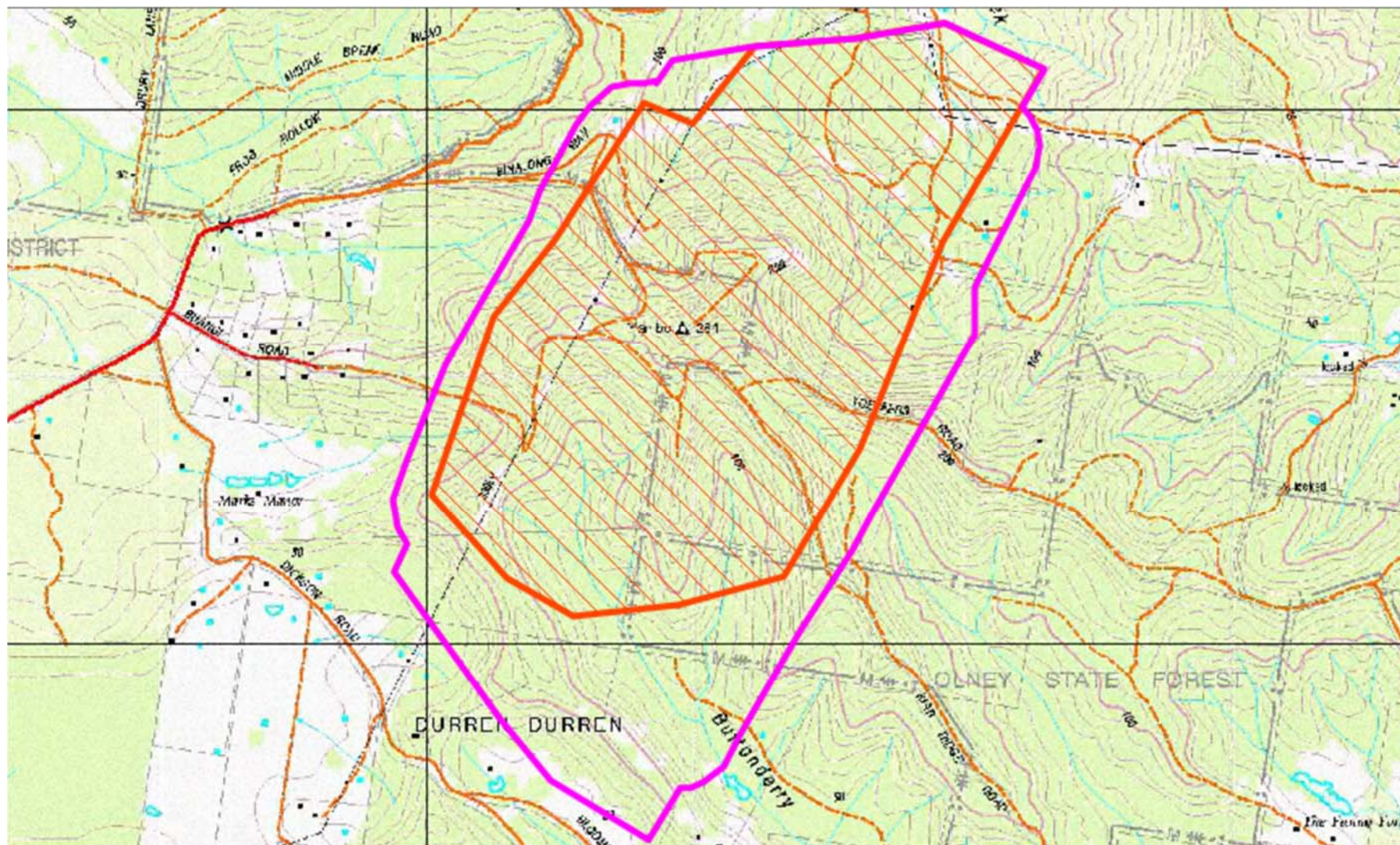


Plate 1.1 Mod 9 and Mod 10 areas (red hatching is Mod 9 area) showing the increase in footprint. Specifically, the increase in footprint to the south includes areas that have not yet been assessed during previous submissions.

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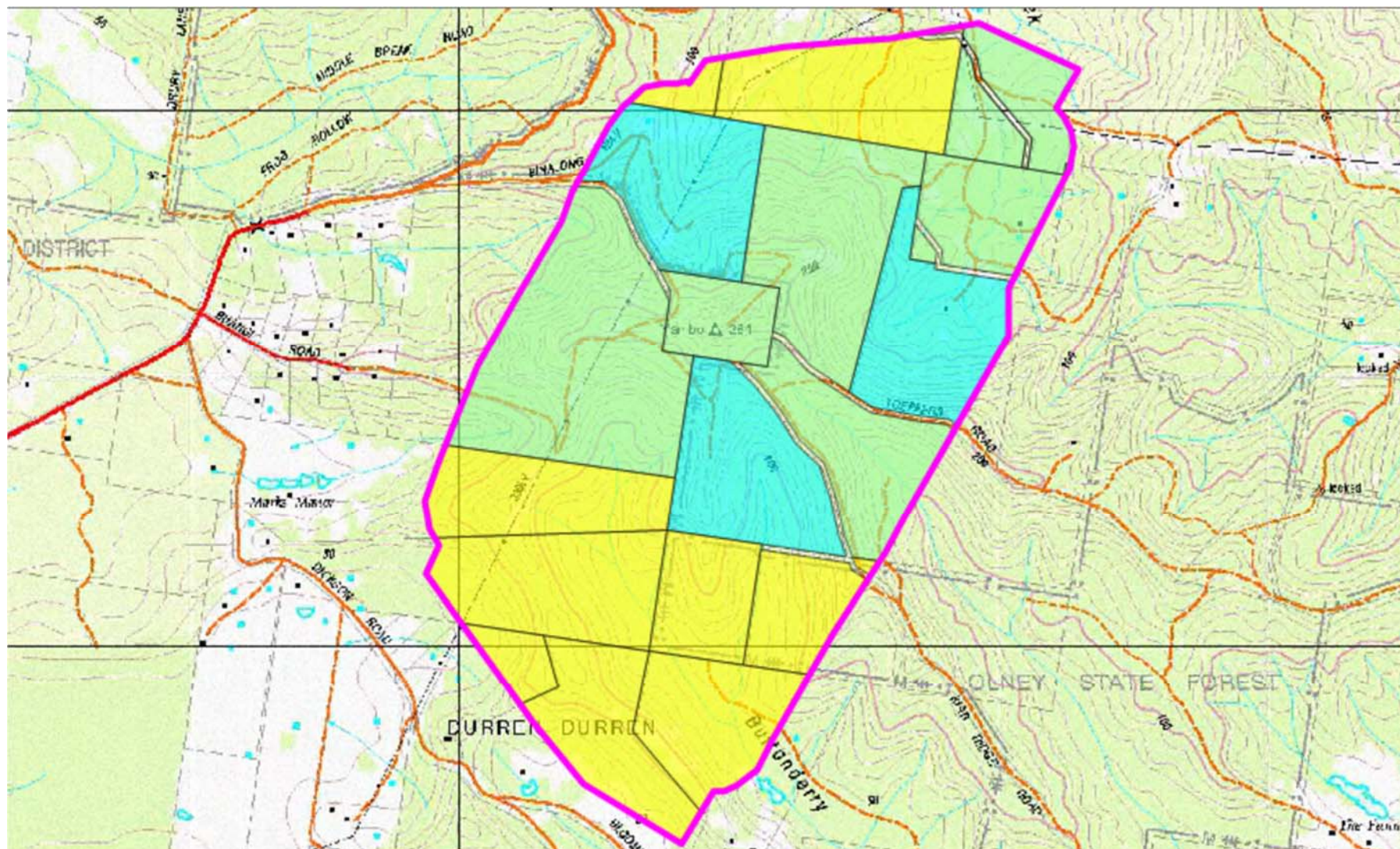


Plate 1.2 Mod 9 and Mod 10 areas showing survey requirements (green = does not require additional survey, yellow = to be surveyed for Mod 10 ACHA, aqua = to be surveyed for Mod 9 HMP)

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2.0 Description of the Project Area

For the purposes of the ACHA, the area proposed for impact as a result of the project comprises the proposed re-alignment area of LW30-33 (Modification 9) and the proposed extension of LW30-33 (Modification 10), the 'assessment area'.

The assessment area is located within the Narrabeen Group geological group, specifically the Patonga Claystone and Tuggerah Formations within the Clifton Subgroup. These formations comprise deposits of siltstones, claystones and areas of sandstone (Murphy 1993). Based on the geological description of mudstones within this formation, it is unlikely that they were of a quality suitable for the manufacture of stone artefacts (with the mudstone typically referenced in archaeological sites better technically described as an indurated rhyolitic tuff). It does not appear that stone raw materials suitable for artefact manufacture would have been available within the assessment area, but would have been sourced from other locations within the region. In terms of other archaeological implications, the presence of sandstone within the geology of the assessment area indicates that, should sandstone outcrops be present, it may be possible that site types such as grinding grooves or engravings may occur.

The assessment area is underlain by the Mandalong, Gorokan and Woodburys Bridge soil landscapes, as shown in **Plate 2.1**. These three soil landscapes are highly acidic and prone to toxic concentration of aluminium (Murphy, 1993). Typical soil profiles vary with landform/geology, but are typically relatively shallow. These soils are typically moderately erodible, with levels of erosion linked to landform. The depth of topsoil is a critical consideration for the likely presence of sub-surface archaeological deposits because intact deposits are typically only found within A horizon soils. Erosion acts to expose deposits that were formerly sub-surface and impacts on the potential for deposits to retain archaeological integrity.

The areas surrounding the Mandalong South assessment area have been subject to previous archaeological assessments, and these previous assessments have resulted in the identification of a number of archaeological sites. The most common site type recorded in the search area is artefact scatters, followed by modified trees (carved or scarred). Within the surrounding landscape, these site types have not been recorded in association with specific landforms but do seem to correlate with less disturbed land. Shell midden sites have also been recorded, particularly in proximity to the foreshore of Lake Macquarie (located outside of the assessment area). Potential archaeological deposits, habitation structures and Aboriginal Ceremony and Dreaming sites have also been recorded, though these site types are all located outside of the current assessment area.

Within the assessment area itself, five Aboriginal archaeological sites have been recorded, including:

- Two potential archaeological deposits (45-3-3513 and 45-3-3514)
- Two grinding grooves (45-3-1226, 45-3-3512)
- One art engraving site (45-3-1228).

2.1 Previous Investigations

RPS (2013) completed an assessment of 2,360 ha of private and public land for the now approved Mandalong Southern Extension project. The assessment resulted in the recording of 130 new archaeological sites in addition to 20 previously recorded sites. The most common site types were grinding grooves, rockshelters with PAD and scarred trees, although several artefact scatters were recorded in addition to stone arrangements.

The Mandalong Southern Extension Area is characterised by steeply inclined ridges with first and second order streams/drainage lines that drain into Morans Creek in the north and east. Typically rockshelters were located on or within 200 m of the ridge crests and were formed from weathering sheets of sandstone or large boulders.

Grinding groove sites were located in the first and second order drainage lines and were typically identified on smooth, fine-grained sandstone sheets at elevations between 80 and 100 m AHD. It was observed that sandstone exposed in drainage lines above 100 m elevation tended to be rough and unsuitable for grinding grooves. Sandstone below 80 m tended to be more 'blocky' and did not have flat surfaces suitable for grinding grooves. Larger sandstone sheets were noted at the confluence of drainage lines and thus provided larger surfaces for grinding grooves. The numbers of grooves within each site ranged from single grooves to over 25 grooves at three sites. The majority of grinding grooves appeared to be for sharpening stone hatchet heads and typically were between 20 and 40 centimetres (cm) in length. Often pools of water were identified in close proximity to the grooves.

Artefact scatters were identified on the passes between catchments or on the gently sloped valley floor where Morans Creek became a third order stream. There was no distinct spatial patterning for scarred trees, however it was recognised that the area had previously been logged and thus the scarred trees identified probably represented a very small sample of their original distribution. In general, scarred trees were identified in areas that were inaccessible to logging, such as on steep slopes for which there was no vehicle access, or near steeply sided watercourses. Stone arrangements were generally comprised of vertically heaped blocks of stone, or arranged in a circle; the stone blocks tended to be over 40 cm in length.

In reviewing these results, RPS (2013) suggested that the distribution of sites indicates that Aboriginal camping activities took place on the valley floors and in rockshelters and benching landforms on the ridgelines and upper slope/crest landforms and that the transition between these areas was potentially undertaken along watercourses (first and second order) as evidenced by the regular occurrence of grinding grooves. RPS (2013) noted that the Mandalong Southern Extension area may have been utilised as a transit route between the low-lying lacustrine environments and the Watagan uplands. The presence of grinding groove sites with more than 20 grooves was considered to support the proposition that the area may have supported larger groups of Aboriginal people than previously thought.

In relation to potential impacts and mitigation requirements for the identified sites regarding the original Mandalong Southern Extension Project, it was assessed that the majority of the sites were 'unlikely' or 'very unlikely' to be impacted by proposed longwall mining.

It is anticipated that the above described spatial distribution of sites in the landscape will be applicable to the current project areas. The results of RPS' survey, as well as other surveys undertaken in the area will be used to formulate the predictive model for the ACHA currently being prepared.

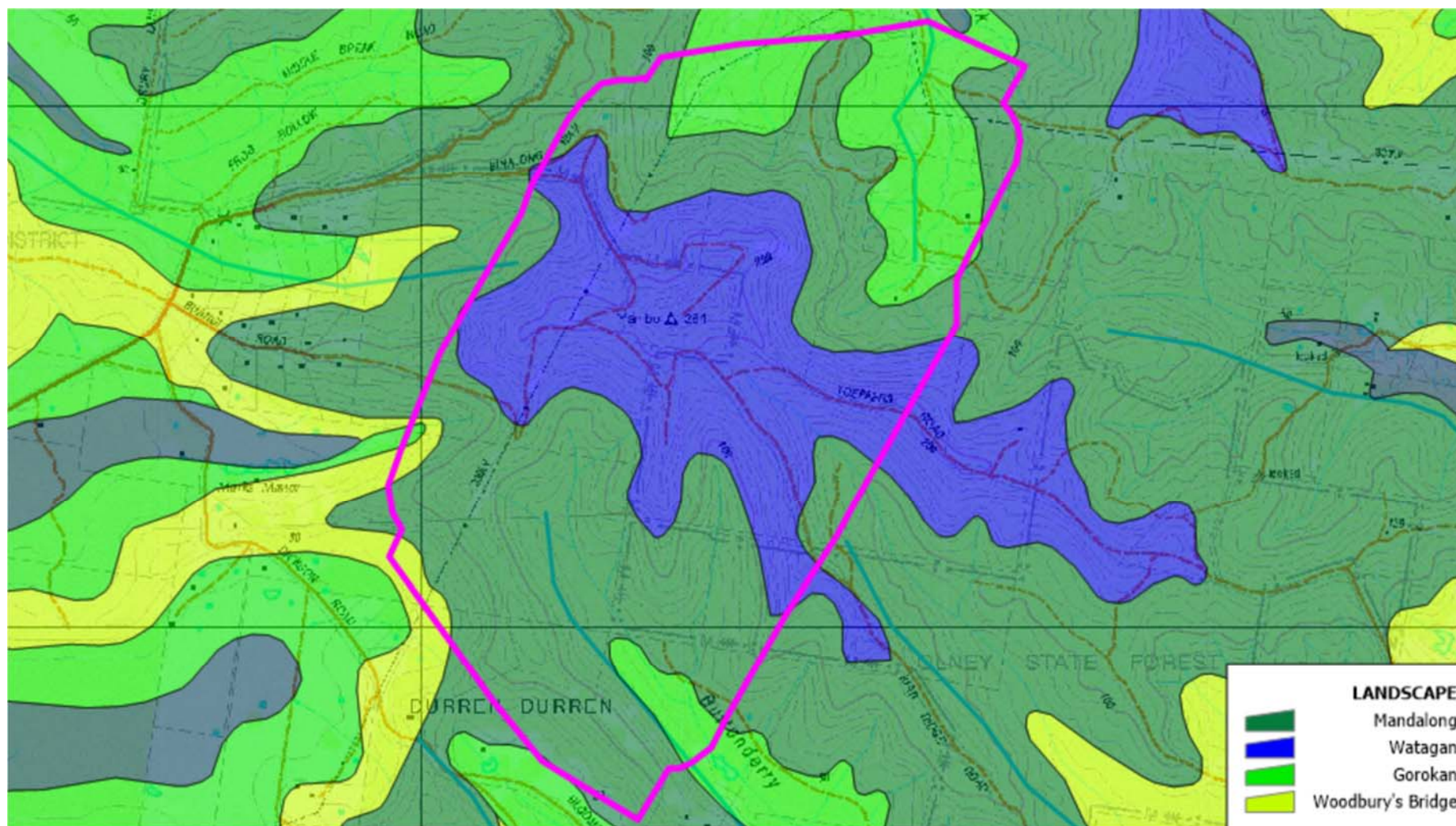


Plate 2.1 Soil Landscape located within the wider project area.

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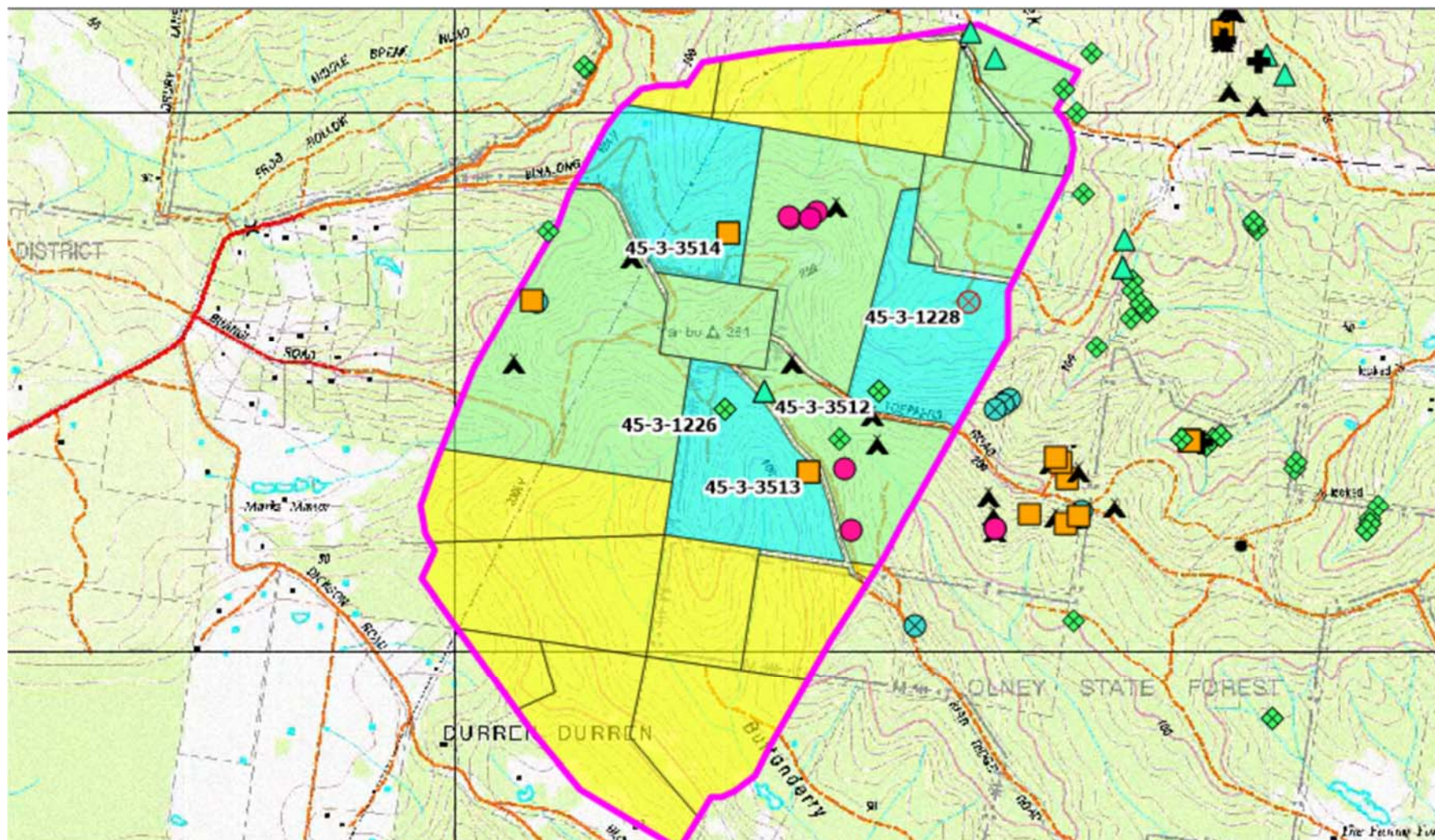


Plate 2.2 AHIMS results in proximity to the wider project area, with the three sites within the assessment area labelled above.

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3.0 Methodology for the Aboriginal Cultural Heritage and Archaeological Assessment

As discussed in **Section 1.0**, the consultation process will be undertaken in accordance with the consultation requirements (DECCW 2010). The proposed methodology for the ACHA (pending comments from registered Aboriginal parties) is as follows:

1. Provide information to all registered Aboriginal parties regarding the project, including a draft methodology for review and comment (this letter).
2. Provision of a review period during which Aboriginal parties can provide comment and propose amendments to the draft methodology (up to 28 days from receipt of this letter, with comments due by close of business **7 September 2020**).
3. Completion of a survey of the project area in accordance with the draft methodology provided in this assessment (refer to **Section 5.0**).
4. Develop a draft ACHA report to include:
 - details of the nature of the project
 - details of the assessment requirements regarding Aboriginal cultural heritage, and how the ACHA report addresses these requirements, including:
 - identification of the Aboriginal cultural heritage values that exist across the area that will be impacted by the development. Identification of these values should be guided by the *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011)*.
 - consultation with Aboriginal people in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW)*. Full details of this consultation process will be captured.
 - documentation of the potential impacts of the development on Aboriginal cultural heritage values, and demonstration of attempts to avoid impact and identify any conservation outcomes.
 - records of any objects identified during the assessment and provision of this documentation to OEH
 - the results of an Aboriginal Heritage Information Management System (AHIMS) search and Native Title search
 - a review of the cultural context of the area that will draw heavily on information provided by registered Aboriginal parties and the results of previous cultural heritage and archaeological assessments undertaken in the area
 - a review of background information related to the environmental characteristics of the Mod 10 assessment area that may have determined how Aboriginal people may have occupied/utilised the area and the likelihood of site survival
 - the preparation of a predictive model drawing on all of the above
 - details of the survey methodology and results
 - details of any sites/objects/potential archaeological deposits located during the survey

- an assessment of the Aboriginal cultural heritage significance (as provided by the registered Aboriginal parties) of the Mod 10 assessment area
 - an assessment of the archaeological significance of any sites/objects/potential archaeological deposits identified within the Mod 10 assessment area
 - an assessment of the potential impact by the project to any sites/objects/potential archaeological deposits identified within the Mod 10 assessment area
 - a discussion of management options and
 - management recommendations.
5. The provision of the draft ACHA report to registered Aboriginal parties for review and comment (comment period extends for 28 days from date of provision of the draft ACHA).
 6. Discussion/incorporation of comments/responses received from Aboriginal parties to develop and finalise the ACHA report.
 7. Provision of the final ACHA report to registered Aboriginal parties and to Centennial Coal for inclusion within the EIS.

4.0 Consultation with Aboriginal Parties During the Assessment Process

Umwelt acknowledges and understands that cultural values, by definition, relate to values outside those associated with specific archaeological sites/objects. Throughout the assessment process, we invite comment from Aboriginal parties regarding any cultural values associated with the Mod 10 assessment area and will ensure that any information provided regarding cultural values (be they associated with a specific site or provided with reference to a landscape feature or within a broader context) are documented and recorded in accordance with the wishes of the relevant Aboriginal party for inclusion in the ACHA report. We note that the inclusion of any such information in the final assessment is dependent on its provision by the Aboriginal parties.

We note that Section 3.2 of the consultation requirements specifies that the objective of consultation is to ensure ‘that Aboriginal people have the opportunity to improve assessment outcomes’. Factors specified as assisting in meeting this objective include providing Aboriginal parties with the opportunity to provide information on cultural values (as invited in this draft methodology), influence methods regarding assessment of significance for Aboriginal objects/places (which can be undertaken in response to this draft methodology, during fieldwork and in commenting on the draft ACHA report) and commenting on the draft ACHA report. Our approach is designed to ensure compliance with this objective, including the potential for in-field consultation with Aboriginal party representatives during fieldwork. Umwelt archaeologists are trained to seek and document cultural feedback provided by Aboriginal party representatives during fieldwork. This is not limited to cultural values associated with archaeological sites but may encompass any values identified by Aboriginal people.

We look forward to working with your organisation throughout the project to ensure that we adequately document any information you wish to provide regarding Aboriginal cultural values. Please feel free to contact us to request any additional information or assistance you may require to facilitate the provision of your input.

5.0 Survey Methodology

The draft survey methodology is designed to ensure compliance with requirements for archaeological survey as established in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice). This includes development of an appropriate sampling strategy and recording of information during survey. This survey methodology will be utilised for both the reporting required within the HMP and ACHA.

5.1 Sampling Strategy

The survey will be undertaken to ensure that a representative sample of all landforms within the area is surveyed, as required to ensure compliance with Code of Practice.

Areas that will be subject to the greatest amount of potential subsidence impact (subsidence contours are shown in **Plate 5.1**) will be subject to intensive survey. This includes drainage lines (in association with which grinding grooves may be identified), slope areas likely to contain rock outcrop suitable for use as shelter (in association with which rockshelter sites may be identified) and crests and ridges (in association with which stone arrangements may be identified) where these landforms are mapped as intersecting with areas of subsidence.

All efforts will be made to achieve maximum survey coverage via pedestrian survey. It is noted, however, that vehicle transects may be used in some areas based on limited archaeological potential and/or where vegetation limits access and visibility. It is intended that the survey will be conducted over the course of up to 6-8 days by two archaeologists and up to four Aboriginal party representatives however this may be subject to change based on the number of sites recorded, ground surface visibility and other variables.

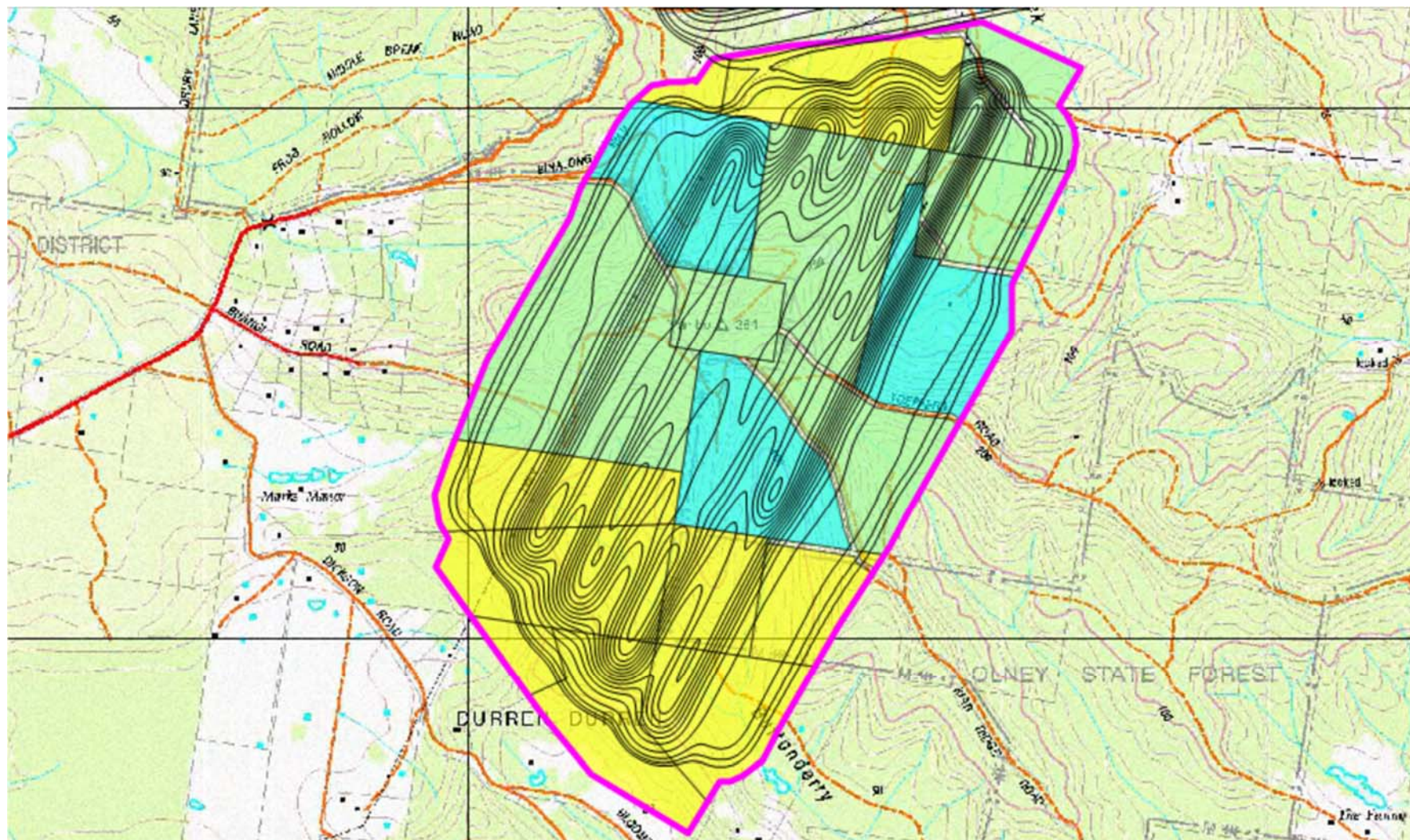


Plate 5.1 Subsidence predictions of LW30-33 within the wider project area.

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5.2 Recording of Information During Survey

Survey units will be defined and named with reference to Requirement 5c of the Code of Practice, including recording start and finish points and/or boundaries for all survey units using a hand-held GPS receiver (set to allow recording of data with datum MGA94) and topographic mapping (where relevant), with track logs to be recorded for all pedestrian transects. Start and finish points/boundaries for survey units will be defined based on landforms, project area boundaries, access or other arbitrary terminations (as specified in the Code of Practice). The spacing between individuals will also be recorded for each survey unit.

Photographs will be undertaken for landforms/survey units (where informative). Information recorded for each survey unit will include

- Landform (in units based on those established by McDonald et al 2009)
- Gradient (where relevant)
- Vegetation
- Geology and soils (where suitable areas of exposure/visibility are present)
- Identified Aboriginal resources (food and medicine plants, prey animals, stone and water)
- Levels of average ground surface visibility within the survey unit (in accordance with the Requirement 9 of the Code of Practice)
- Extent and type of exposures within the survey unit (with reference to the factors leading to the exposure such as erosion, earth-moving activities, track establishment etc.)
- Any information provided by the registered Aboriginal parties in relation to cultural values, noting that such information will be recorded in accordance with the wishes of the party providing the information and
- Any site, area of Potential Archaeological Deposit (PAD) or landscape feature of Aboriginal cultural value present within the survey unit (see below for further information on site/PAD recording).

Any Aboriginal archaeological sites identified during the survey will be assessed with reference to the site boundaries. Factors that will be taken into consideration in defining and mapping site boundaries may include the distribution of surface artefacts, landforms or physical boundaries and cultural information.

Sufficient information will be recorded for all sites to meet Requirement 7 of the Code of Practice. The archaeological and Aboriginal cultural significance of any site will be discussed with the registered Aboriginal parties participating in the survey.

The archaeological potential of landforms/specific areas within the assessment area will be assessed with reference to factors including the archaeological context of the local area, the evaluation of the soil profile (based on soil landscape mapping, exposed soil profiles identified during the survey and geomorphic understandings of the area) and the identification of landforms that may have greater archaeological sensitivity. The extent of any area of identified archaeological potential will be defined and documented for inclusion in subsequent reporting. The archaeological and Aboriginal cultural significance of any area of identified archaeological potential will be discussed with the registered Aboriginal parties participating in the survey.

In relation to the assessment of rockshelter sites, it is proposed that a rockshelter will only be recorded as an archaeological site where archaeological evidence is identified in association with the rockshelter. However, the commitment to record archaeological potential will apply and therefore the final assessment will note where suitable rock overhangs/shelters occur but within which no archaeological evidence was identified.

5.3 Survey Arrangements

At this stage, it is proposed to undertake the survey in early **September 2020**, however this is subject to confirmation. Further correspondence regarding survey arrangements will be provided at least two weeks prior to the proposed survey date. Additional information relating to engagement to undertake the survey is attached to this letter.

6.0 Other Requirements

The following will be required to enable commercial engagement for the work:

- Insurances are current (Workers Compensation, Public Liability and Product Liability). If you are unsure when your last insurance was entered into the Centennial system please call to confirm.
- Undertake a visitors induction at Mandalong Mine Administration Office prior to the commencement of works.
- A medical for each person attending must be provided stating fitness to complete usual tasks.
- Minimum personal protective equipment (PPE) requirements are long pants and long sleeve high visibility shirt, steel toe capped boots and hard hat in construction areas.
- Each individual will bring their own food and water.
- Adhere to a minimum expectation of behaviour where all parties behave in an appropriate and respectful manner, and that culturally sensitivity is considered.
- Arrive on time and by own travel methods.

7.0 Summary

This letter provides details of the proposed methodology for an Aboriginal Cultural Heritage Assessment associated with the Project. In accordance with the consultation requirements (DECCW 2010), we ask that your group provides comments on the draft methodology by no later than close of business **7 September 2020**. Comments regarding the draft methodology can be provided verbally or in writing to:

Ashley O'Sullivan,
Senior Archaeologist
Umwelt Environmental and Social Consultants (Umwelt)
Phone: 02 4950 5322.

Should you require any further information or wish to discuss any aspect of the Project, please do not hesitate to contact Ashley or Centennial's Iain Hornshaw (Approvals Coordinator) on 4935 8901 / iain.hornshaw@centennialcoal.com.au.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'Ashley O'Sullivan', with a fluid, cursive style.

Ashley O'Sullivan
Senior Archaeologist

Enclosures: Archaeological Fieldwork Engagement Form

**Archaeological Fieldwork Engagement Form
Mandalong Mod 9 and 10, NSW**

To: Centennial Coal
Email: iain.hornshaw@centennialcoal.com.au
Phone: 4935 8901
Attention: Iain Hornshaw (Approvals Coordinator)

Item	Response (circle response and provide detail)
Nominated field work representative and representative contact phone number.	Name: _____ Phone: _____
Our organisation has certificates of currency demonstrating a minimum of \$20,000 cover for workers compensation, public liability and product liability).	Y / N Certificates of currency must be provided before engagement can be finalised
Our organisation understands that payment terms and conditions are in accordance with those previously negotiated with Centennial, with a specified rate of pay of \$1000 per Aboriginal organisation per day. Travel will be paid at ATO rates.	Y / N
Our organisation will provide their representative with appropriate Personal Protective Equipment and Clothing (PPE&C). As a minimum, this must include: <ul style="list-style-type: none"> • Long trousers • High visibility long sleeve shirt • Steel toe capped safety boots • Hard hat (for construction areas) • Soft hat (outside construction areas). 	Y / N
Has completed the medical as required by Centennial.	Y / N Provide details/copy of completed medical.
Our representative understands that they will need to bring with them sufficient food and water for the day's work.	Y / N
Our representative has demonstrated appropriate experience, ability and reliability.	Y / N

Item	Response (circle response and provide detail)
Our representative will commit to arrive on site on time and free from the effects of drugs, alcohol and fatigue (noting that your representative may be required to undergo drug and alcohol testing in accordance with site requirements).	Y / N
Our representative will commit to behaving in a culturally appropriate manner whilst on site and will work collaboratively with the archaeologist and other Aboriginal parties (where relevant)	Y / N

Organisation: _____

Name of Authorised Person: _____

Signature: _____

Date: _____

Our Ref: 20133/NR/AO/11082020

11 August 2020

Awabakal Traditional Owners Aboriginal Corporation
Kerrie Brauer
PO Box 122
RUTHERFORD NSW 2320

Email: kerrie@awabakal.com.au

Dear Sir/Madam

Re: Methodology for Aboriginal Cultural Heritage Assessment, Proposed Extension of Longwalls 30-33 (Modification 10) and Further Survey for Modification 9 Extraction Plan, Mandalong Mine

Centennial Mandalong is currently seeking approval for the continuation of mining with the Mandalong South area associated with both Modification 9 and Modification 10. This project, herein after referred to as 'Mandalong South Assessment Area', comprises both further survey required to support a Heritage Management Plan (HMP) associated with an Extraction Plan required for Modification 9 and an Aboriginal Cultural Heritage Assessment (ACHA) associated with Modification 10. The project area, including all areas of proposed works, is shown in **Plate 1.1** and **Plate 1.2**.

Umwelt Environmental and Social Consultants (Umwelt) have been engaged by Centennial Mandalong to prepare a HMP for Modification 9 and an ACHA (incorporating an archaeological technical report) for Modification 10 in consultation with the registered Aboriginal parties, including your organisation.

The HMP for Modification 9 will be completed in accordance with the relevant conditions of approval. The ACHA will form part of the Environmental Impact Statement (EIS) for the proposed modification (Modification 10), and will be undertaken in accordance with the requirements of the *National Parks and Wildlife Act 1974* (NPW Act), the *National Parks and Wildlife Regulation 2019* (NPW Regulation), the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (Office of Environment and Heritage [OEH] 2011), the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (Department of Environment, Climate Change and Water [DECCW] 2010) (the consultation requirements) and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice).

As a registered Aboriginal party for Mandalong Mine, we are writing to provide you with the draft methodology for the ACHA and a methodology for additional survey to inform the HMP for your review and comment.

Newcastle | Orange |
Sydney | Canberra |
Brisbane | Perth

T | 1300 793 267
E | info@umwelt.com.au

www.umwelt.com.au

Umwelt (Australia) Pty Limited
ABN 18 059 519 041

1.0 Description of the Project

A summary of both projects are provided below, with reference to the requirements satisfied by this methodology and accompanying assessments.

1.1 Modification 9 HMP

Modification 9 relates to the proposed re-orientation of a number of existing longwall panels due to challenging geological conditions. The Modification 9 area was included within the larger area assessed as part of the original Aboriginal cultural heritage assessment (RPS 2013) undertaken to inform the application for SSD-5144. At the time of the assessment, six land parcels within the Modification 9 area could not be surveyed due to lack of landholder consent. In accordance with Schedule 4, Condition 8 of the Mandalong Mine consent (SSD-5144), best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. An additional assessment of part of the Modification 9 area was conducted by Umwelt (2020) and the former Native Title claimant parties to satisfy the conditions of a Section 31 Deed of Agreement. These parcels comprised areas of State Forest already partially assessed by RPS (2013).

As a result of the RPS (2013) assessment, 21 Aboriginal archaeological sites are listed on the Aboriginal Heritage Information Management System (AHIMS) as being located within the Modification 9 area, of which one is a duplicate record. These sites comprise six rockshelters, four sets of grinding grooves, five sites identified as being associated with Aboriginal resources, three sites containing stone artefacts and two areas of Potential Archaeological Deposit (PAD). One historical heritage item (L1 – log landing site) was identified within the Mod 9 area however, based on subsidence predictions, it is understood that this site is unlikely to be impacted.

Of the parcels of land assessed by Umwelt (2020) within the Modification 9 area, Lot 175 DP755271 did not contain any identified sites and the potential for sites to be present (but not currently visible) within this parcel was assessed as low based on the extent of survey and the nature of landforms within this area. On this basis, it is not proposed to resurvey this lot as part of the development of the HMP. Lot 115 and 122 DP755238 were also assessed by Umwelt (2019) and no new sites were identified. However, it was noted that these lots were largely inaccessible at the time of survey.

The HMP is required to meet the relevant conditions of the Modification 9 consent. As this has not yet been issued (Centennial Mandalong are currently preparing responses to the public / agency submissions), it is assumed that conditions will be consistent with those in the Modification 8 consent. Schedule 6, Condition 6(l) specifies that an extraction plan must be developed and must include a HMP 'which has been prepared in consultation with the Biodiversity Conservation Division and Registered Aboriginal parties, to manage the potential environmental consequences of the proposed second workings on both Aboriginal and non-Aboriginal heritage items, and reflects the requirements of condition 22 of Schedule 3.' Condition 22 of Schedule 3 specifies requirements to be addressed in the HMP.

1.2 Modification 10

Further to the reorientation of longwall panels under Modification 9, Mandalong is proposing to extend the reorientated panels, with this proposal referred to as Modification 10.

Modification 10 will involve the extensions of LW30-33 to the south of the current longwall plan, as shown by the increase in project footprint in **Plate 1.1** and **Plate 1.2**.

An Aboriginal Cultural Heritage Assessment (ACHA) has been determined as being required to assess the impact of proposed Modification 10 to identified Aboriginal sites (one is located within the boundary of the Modification 10 extension) or as yet unidentified Aboriginal objects or sites.

1.3 Combined Survey Effort

As there are a number of either overlapping areas or blocks in close proximity related to the Modification 9 HMP and Modification 10 ACHA, Umwelt is proposing to undertake the survey as one concerted survey effort. This information is summarised in **Plate 1.1** and **Plate 1.2** below. Green shading shows areas previously surveyed and not requiring further survey and yellow shading indicates the areas that will be surveyed for the Mod 10 Aboriginal cultural heritage assessment. The remaining properties within the Mod 9 area that have not been subject to prior survey are shaded in aqua. In accordance with Schedule 4, Condition 8 of the Modification 8 consent, best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. The previously unsurveyed properties shown in aqua in **Plate 1.2** will be therefore surveyed as part of the development of the Modification 9 HMP and Modification 10 ACHA.

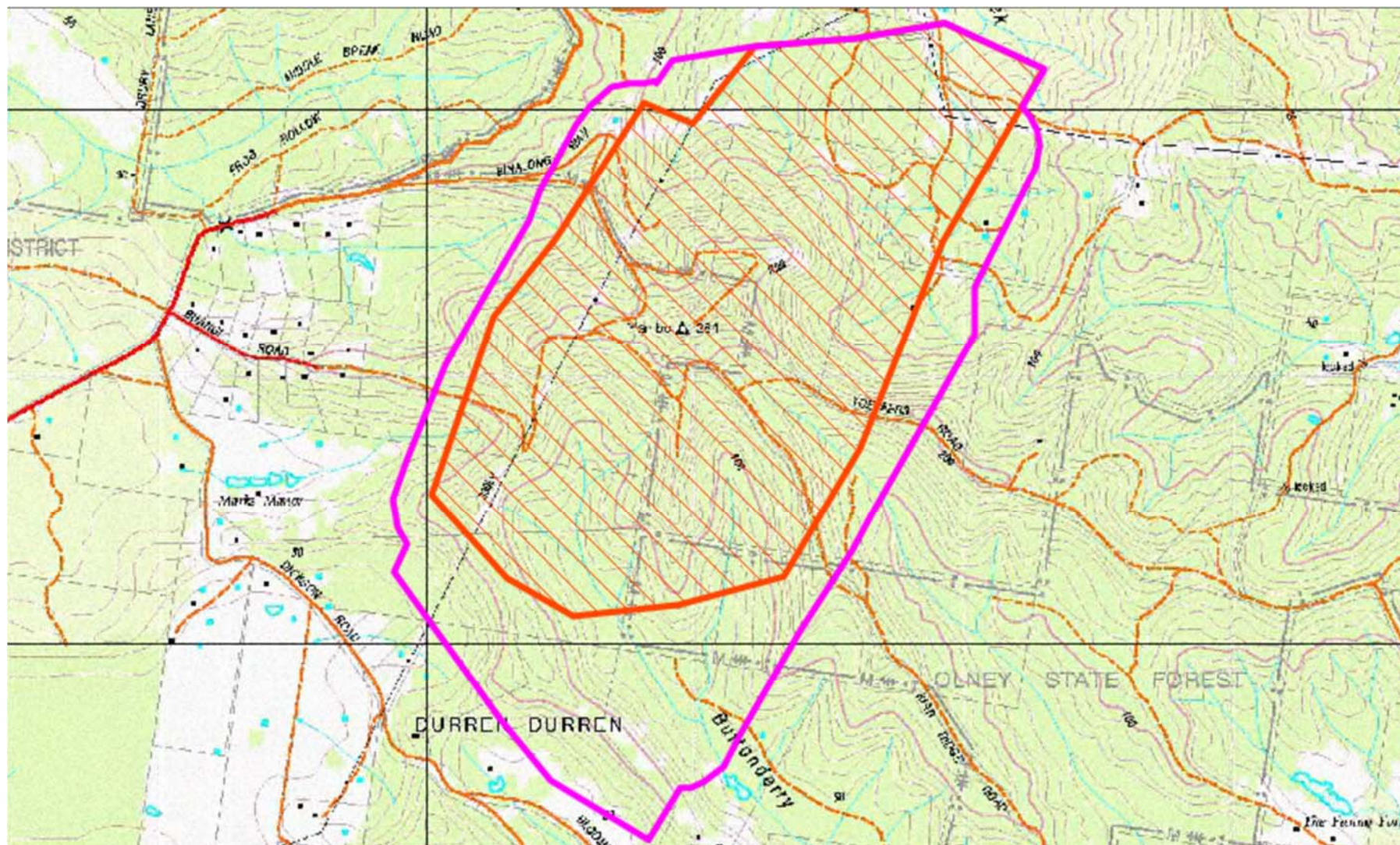


Plate 1.1 Mod 9 and Mod 10 areas (red hatching is Mod 9 area) showing the increase in footprint. Specifically, the increase in footprint to the south includes areas that have not yet been assessed during previous submissions.

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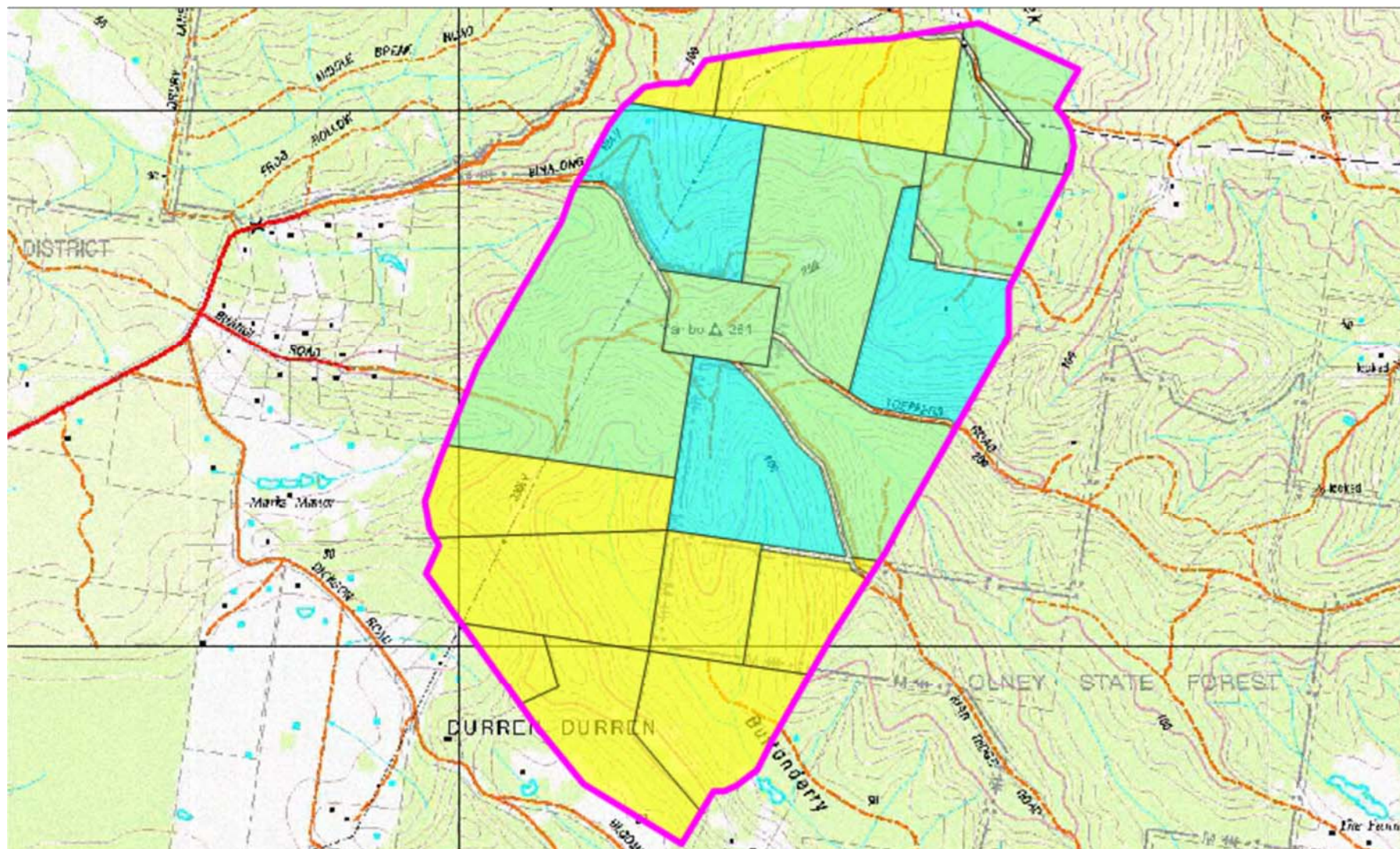


Plate 1.2 Mod 9 and Mod 10 areas showing survey requirements (green = does not require additional survey, yellow = to be surveyed for Mod 10 ACHA, aqua = to be surveyed for Mod 9 HMP)

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2.0 Description of the Project Area

For the purposes of the ACHA, the area proposed for impact as a result of the project comprises the proposed re-alignment area of LW30-33 (Modification 9) and the proposed extension of LW30-33 (Modification 10), the 'assessment area'.

The assessment area is located within the Narrabeen Group geological group, specifically the Patonga Claystone and Tuggerah Formations within the Clifton Subgroup. These formations comprise deposits of siltstones, claystones and areas of sandstone (Murphy 1993). Based on the geological description of mudstones within this formation, it is unlikely that they were of a quality suitable for the manufacture of stone artefacts (with the mudstone typically referenced in archaeological sites better technically described as an indurated rhyolitic tuff). It does not appear that stone raw materials suitable for artefact manufacture would have been available within the assessment area, but would have been sourced from other locations within the region. In terms of other archaeological implications, the presence of sandstone within the geology of the assessment area indicates that, should sandstone outcrops be present, it may be possible that site types such as grinding grooves or engravings may occur.

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In reviewing these results, RPS (2013) suggested that the distribution of sites indicates that Aboriginal camping activities took place on the valley floors and in rockshelters and benching landforms on the ridgelines and upper slope/crest landforms and that the transition between these areas was potentially undertaken along watercourses (first and second order) as evidenced by the regular occurrence of grinding grooves. RPS (2013) noted that the Mandalong Southern Extension area may have been utilised as a transit route between the low-lying lacustrine environments and the Watagan uplands. The presence of grinding groove sites with more than 20 grooves was considered to support the proposition that the area may have supported larger groups of Aboriginal people than previously thought.

In relation to potential impacts and mitigation requirements for the identified sites regarding the original Mandalong Southern Extension Project, it was assessed that the majority of the sites were 'unlikely' or 'very unlikely' to be impacted by proposed longwall mining.

It is anticipated that the above described spatial distribution of sites in the landscape will be applicable to the current project areas. The results of RPS' survey, as well as other surveys undertaken in the area will be used to formulate the predictive model for the ACHA currently being prepared.

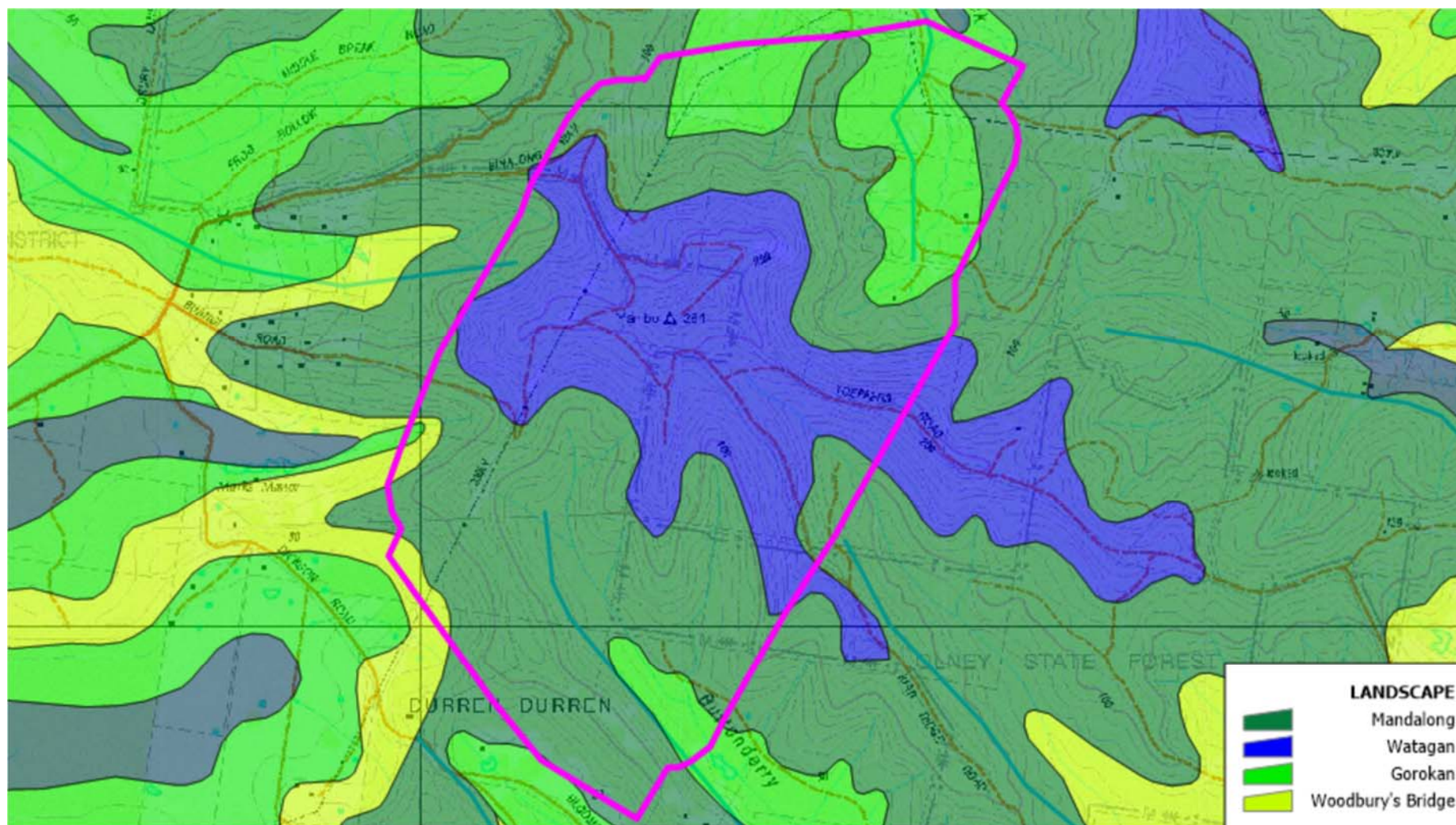


Plate 2.1 Soil Landscape located within the wider project area.

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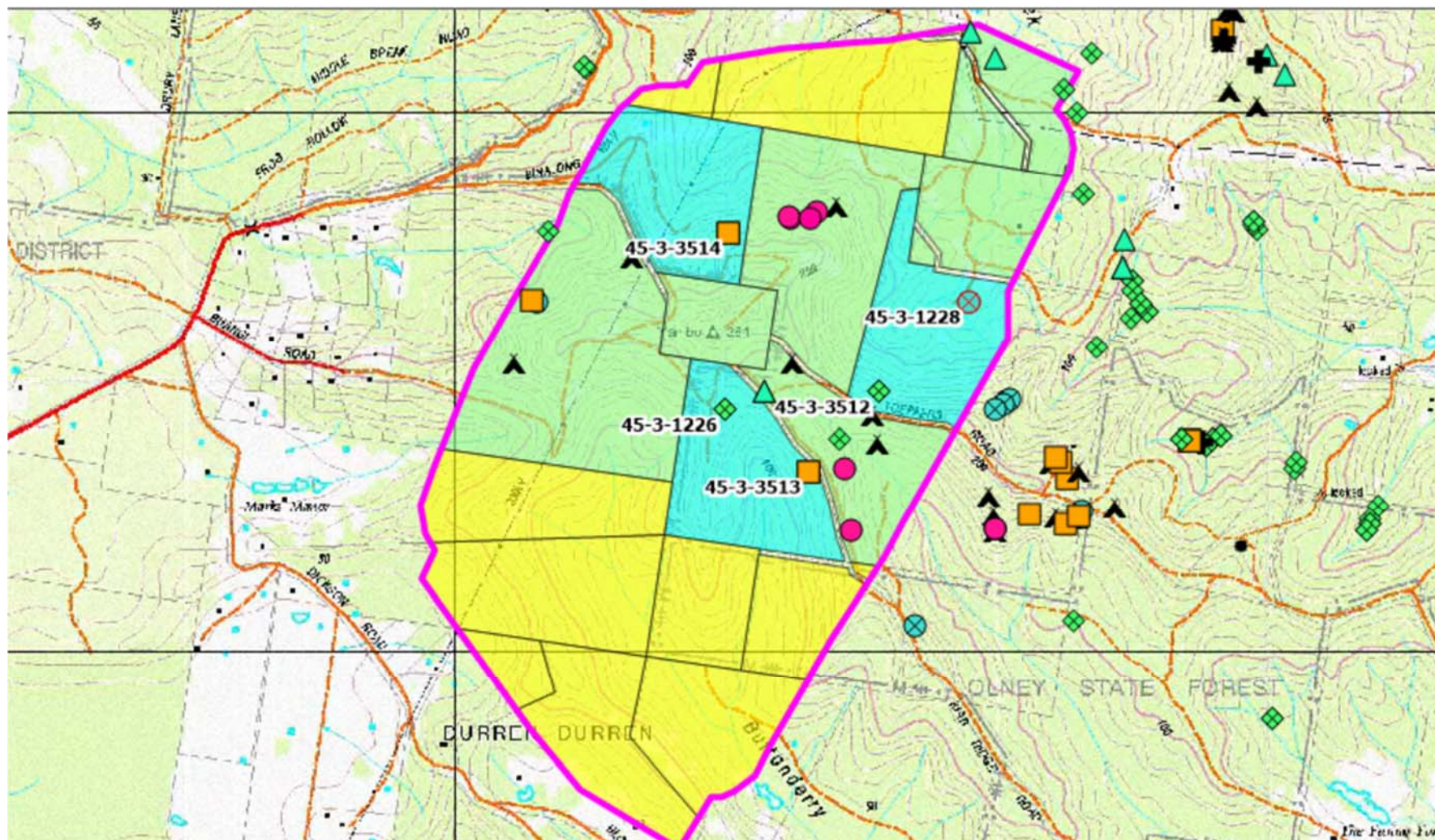


Plate 2.2 AHIMS results in proximity to the wider project area, with the three sites within the assessment area labelled above.

© Umwelt, 2020 based on data provided by Centennial and AHIMS

3.0 Methodology for the Aboriginal Cultural Heritage and Archaeological Assessment

As discussed in **Section 1.0**, the consultation process will be undertaken in accordance with the consultation requirements (DECCW 2010). The proposed methodology for the ACHA (pending comments from registered Aboriginal parties) is as follows:

1. Provide information to all registered Aboriginal parties regarding the project, including a draft methodology for review and comment (this letter).
2. Provision of a review period during which Aboriginal parties can provide comment and propose amendments to the draft methodology (up to 28 days from receipt of this letter, with comments due by close of business **7 September 2020**).
3. Completion of a survey of the project area in accordance with the draft methodology provided in this assessment (refer to **Section 5.0**).
4. Develop a draft ACHA report to include:
 - details of the nature of the project
 - details of the assessment requirements regarding Aboriginal cultural heritage, and how the ACHA report addresses these requirements, including:
 - identification of the Aboriginal cultural heritage values that exist across the area that will be impacted by the development. Identification of these values should be guided by the *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011)*.
 - consultation with Aboriginal people in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW)*. Full details of this consultation process will be captured.
 - documentation of the potential impacts of the development on Aboriginal cultural heritage values, and demonstration of attempts to avoid impact and identify any conservation outcomes.
 - records of any objects identified during the assessment and provision of this documentation to OEH
 - the results of an Aboriginal Heritage Information Management System (AHIMS) search and Native Title search
 - a review of the cultural context of the area that will draw heavily on information provided by registered Aboriginal parties and the results of previous cultural heritage and archaeological assessments undertaken in the area
 - a review of background information related to the environmental characteristics of the Mod 10 assessment area that may have determined how Aboriginal people may have occupied/utilised the area and the likelihood of site survival
 - the preparation of a predictive model drawing on all of the above
 - details of the survey methodology and results
 - details of any sites/objects/potential archaeological deposits located during the survey

- an assessment of the Aboriginal cultural heritage significance (as provided by the registered Aboriginal parties) of the Mod 10 assessment area
 - an assessment of the archaeological significance of any sites/objects/potential archaeological deposits identified within the Mod 10 assessment area
 - an assessment of the potential impact by the project to any sites/objects/potential archaeological deposits identified within the Mod 10 assessment area
 - a discussion of management options and
 - management recommendations.
5. The provision of the draft ACHA report to registered Aboriginal parties for review and comment (comment period extends for 28 days from date of provision of the draft ACHA).
 6. Discussion/incorporation of comments/responses received from Aboriginal parties to develop and finalise the ACHA report.
 7. Provision of the final ACHA report to registered Aboriginal parties and to Centennial Coal for inclusion within the EIS.

4.0 Consultation with Aboriginal Parties During the Assessment Process

Umwelt acknowledges and understands that cultural values, by definition, relate to values outside those associated with specific archaeological sites/objects. Throughout the assessment process, we invite comment from Aboriginal parties regarding any cultural values associated with the Mod 10 assessment area and will ensure that any information provided regarding cultural values (be they associated with a specific site or provided with reference to a landscape feature or within a broader context) are documented and recorded in accordance with the wishes of the relevant Aboriginal party for inclusion in the ACHA report. We note that the inclusion of any such information in the final assessment is dependent on its provision by the Aboriginal parties.

We note that Section 3.2 of the consultation requirements specifies that the objective of consultation is to ensure ‘that Aboriginal people have the opportunity to improve assessment outcomes’. Factors specified as assisting in meeting this objective include providing Aboriginal parties with the opportunity to provide information on cultural values (as invited in this draft methodology), influence methods regarding assessment of significance for Aboriginal objects/places (which can be undertaken in response to this draft methodology, during fieldwork and in commenting on the draft ACHA report) and commenting on the draft ACHA report. Our approach is designed to ensure compliance with this objective, including the potential for in-field consultation with Aboriginal party representatives during fieldwork. Umwelt archaeologists are trained to seek and document cultural feedback provided by Aboriginal party representatives during fieldwork. This is not limited to cultural values associated with archaeological sites but may encompass any values identified by Aboriginal people.

We look forward to working with your organisation throughout the project to ensure that we adequately document any information you wish to provide regarding Aboriginal cultural values. Please feel free to contact us to request any additional information or assistance you may require to facilitate the provision of your input.

5.0 Survey Methodology

The draft survey methodology is designed to ensure compliance with requirements for archaeological survey as established in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice). This includes development of an appropriate sampling strategy and recording of information during survey. This survey methodology will be utilised for both the reporting required within the HMP and ACHA.

5.1 Sampling Strategy

The survey will be undertaken to ensure that a representative sample of all landforms within the area is surveyed, as required to ensure compliance with Code of Practice.

Areas that will be subject to the greatest amount of potential subsidence impact (subsidence contours are shown in **Plate 5.1**) will be subject to intensive survey. This includes drainage lines (in association with which grinding grooves may be identified), slope areas likely to contain rock outcrop suitable for use as shelter (in association with which rockshelter sites may be identified) and crests and ridges (in association with which stone arrangements may be identified) where these landforms are mapped as intersecting with areas of subsidence.

All efforts will be made to achieve maximum survey coverage via pedestrian survey. It is noted, however, that vehicle transects may be used in some areas based on limited archaeological potential and/or where vegetation limits access and visibility. It is intended that the survey will be conducted over the course of up to 6-8 days by two archaeologists and up to four Aboriginal party representatives however this may be subject to change based on the number of sites recorded, ground surface visibility and other variables.

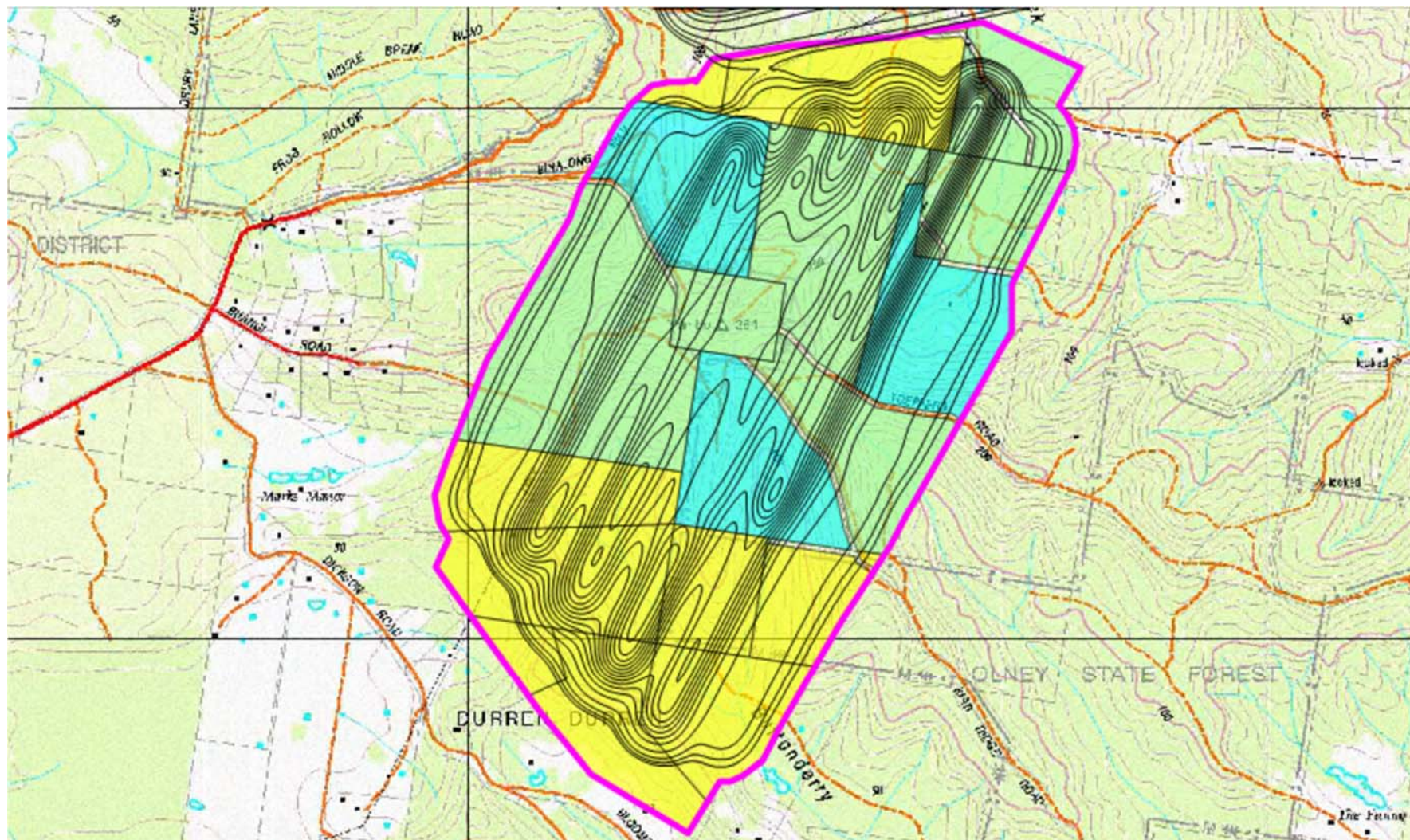


Plate 5.1 Subsidence predictions of LW30-33 within the wider project area.

© Umwelt, 2020 based on data provided by Centennial

5.2 Recording of Information During Survey

Survey units will be defined and named with reference to Requirement 5c of the Code of Practice, including recording start and finish points and/or boundaries for all survey units using a hand-held GPS receiver (set to allow recording of data with datum MGA94) and topographic mapping (where relevant), with track logs to be recorded for all pedestrian transects. Start and finish points/boundaries for survey units will be defined based on landforms, project area boundaries, access or other arbitrary terminations (as specified in the Code of Practice). The spacing between individuals will also be recorded for each survey unit.

Photographs will be undertaken for landforms/survey units (where informative). Information recorded for each survey unit will include

- Landform (in units based on those established by McDonald et al 2009)
- Gradient (where relevant)
- Vegetation
- Geology and soils (where suitable areas of exposure/visibility are present)
- Identified Aboriginal resources (food and medicine plants, prey animals, stone and water)
- Levels of average ground surface visibility within the survey unit (in accordance with the Requirement 9 of the Code of Practice)
- Extent and type of exposures within the survey unit (with reference to the factors leading to the exposure such as erosion, earth-moving activities, track establishment etc.)
- Any information provided by the registered Aboriginal parties in relation to cultural values, noting that such information will be recorded in accordance with the wishes of the party providing the information and
- Any site, area of Potential Archaeological Deposit (PAD) or landscape feature of Aboriginal cultural value present within the survey unit (see below for further information on site/PAD recording).

Any Aboriginal archaeological sites identified during the survey will be assessed with reference to the site boundaries. Factors that will be taken into consideration in defining and mapping site boundaries may include the distribution of surface artefacts, landforms or physical boundaries and cultural information.

Sufficient information will be recorded for all sites to meet Requirement 7 of the Code of Practice. The archaeological and Aboriginal cultural significance of any site will be discussed with the registered Aboriginal parties participating in the survey.

The archaeological potential of landforms/specific areas within the assessment area will be assessed with reference to factors including the archaeological context of the local area, the evaluation of the soil profile (based on soil landscape mapping, exposed soil profiles identified during the survey and geomorphic understandings of the area) and the identification of landforms that may have greater archaeological sensitivity. The extent of any area of identified archaeological potential will be defined and documented for inclusion in subsequent reporting. The archaeological and Aboriginal cultural significance of any area of identified archaeological potential will be discussed with the registered Aboriginal parties participating in the survey.

In relation to the assessment of rockshelter sites, it is proposed that a rockshelter will only be recorded as an archaeological site where archaeological evidence is identified in association with the rockshelter. However, the commitment to record archaeological potential will apply and therefore the final assessment will note where suitable rock overhangs/shelters occur but within which no archaeological evidence was identified.

5.3 Survey Arrangements

At this stage, it is proposed to undertake the survey in early **September 2020**, however this is subject to confirmation. Further correspondence regarding survey arrangements will be provided at least two weeks prior to the proposed survey date. Additional information relating to engagement to undertake the survey is attached to this letter.

6.0 Other Requirements

The following will be required to enable commercial engagement for the work:

- Insurances are current (Workers Compensation, Public Liability and Product Liability). If you are unsure when your last insurance was entered into the Centennial system please call to confirm.
- Undertake a visitors induction at Mandalong Mine Administration Office prior to the commencement of works.
- A medical for each person attending must be provided stating fitness to complete usual tasks.
- Minimum personal protective equipment (PPE) requirements are long pants and long sleeve high visibility shirt, steel toe capped boots and hard hat in construction areas.
- Each individual will bring their own food and water.
- Adhere to a minimum expectation of behaviour where all parties behave in an appropriate and respectful manner, and that culturally sensitivity is considered.
- Arrive on time and by own travel methods.

7.0 Summary

This letter provides details of the proposed methodology for an Aboriginal Cultural Heritage Assessment associated with the Project. In accordance with the consultation requirements (DECCW 2010), we ask that your group provides comments on the draft methodology by no later than close of business **7 September 2020**. Comments regarding the draft methodology can be provided verbally or in writing to:

Ashley O'Sullivan,
Senior Archaeologist
Umwelt Environmental and Social Consultants (Umwelt)
Phone: 02 4950 5322.

Should you require any further information or wish to discuss any aspect of the Project, please do not hesitate to contact Ashley or Centennial's Iain Hornshaw (Approvals Coordinator) on 4935 8901 / iain.hornshaw@centennialcoal.com.au.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'Ashley O'Sullivan', with a long, sweeping horizontal line extending to the right.

Ashley O'Sullivan
Senior Archaeologist

Enclosures: Archaeological Fieldwork Engagement Form

**Archaeological Fieldwork Engagement Form
Mandalong Mod 9 and 10, NSW**

To: Centennial Coal
Email: iain.hornshaw@centennialcoal.com.au
Phone: 4935 8901
Attention: Iain Hornshaw (Approvals Coordinator)

Item	Response (circle response and provide detail)
Nominated field work representative and representative contact phone number.	Name: _____ Phone: _____
Our organisation has certificates of currency demonstrating a minimum of \$20,000 cover for workers compensation, public liability and product liability).	Y / N Certificates of currency must be provided before engagement can be finalised
Our organisation understands that payment terms and conditions are in accordance with those previously negotiated with Centennial, with a specified rate of pay of \$1000 per Aboriginal organisation per day. Travel will be paid at ATO rates.	Y / N
Our organisation will provide their representative with appropriate Personal Protective Equipment and Clothing (PPE&C). As a minimum, this must include: <ul style="list-style-type: none"> • Long trousers • High visibility long sleeve shirt • Steel toe capped safety boots • Hard hat (for construction areas) • Soft hat (outside construction areas). 	Y / N
Has completed the medical as required by Centennial.	Y / N Provide details/copy of completed medical.
Our representative understands that they will need to bring with them sufficient food and water for the day's work.	Y / N
Our representative has demonstrated appropriate experience, ability and reliability.	Y / N

Item	Response (circle response and provide detail)
Our representative will commit to arrive on site on time and free from the effects of drugs, alcohol and fatigue (noting that your representative may be required to undergo drug and alcohol testing in accordance with site requirements).	Y / N
Our representative will commit to behaving in a culturally appropriate manner whilst on site and will work collaboratively with the archaeologist and other Aboriginal parties (where relevant)	Y / N

Organisation: _____

Name of Authorised Person: _____

Signature: _____

Date: _____

Our Ref: 20133/NR/AO/11082020

11 August 2020

Bahtabah Local Aboriginal Land Council
Michael Green
PO Box 3018
BLACKSMITHS NSW 2281

Email: bahtabahmick@hotmail.com

Dear Sir/Madam

Re: Methodology for Aboriginal Cultural Heritage Assessment, Proposed Extension of Longwalls 30-33 (Modification 10) and Further Survey for Modification 9 Extraction Plan, Mandalong Mine

Centennial Mandalong is currently seeking approval for the continuation of mining with the Mandalong South area associated with both Modification 9 and Modification 10. This project, herein after referred to as 'Mandalong South Assessment Area', comprises both further survey required to support a Heritage Management Plan (HMP) associated with an Extraction Plan required for Modification 9 and an Aboriginal Cultural Heritage Assessment (ACHA) associated with Modification 10. The project area, including all areas of proposed works, is shown in **Plate 1.1** and **Plate 1.2**.

Umwelt Environmental and Social Consultants (Umwelt) have been engaged by Centennial Mandalong to prepare a HMP for Modification 9 and an ACHA (incorporating an archaeological technical report) for Modification 10 in consultation with the registered Aboriginal parties, including your organisation.

The HMP for Modification 9 will be completed in accordance with the relevant conditions of approval. The ACHA will form part of the Environmental Impact Statement (EIS) for the proposed modification (Modification 10), and will be undertaken in accordance with the requirements of the *National Parks and Wildlife Act 1974* (NPW Act), the *National Parks and Wildlife Regulation 2019* (NPW Regulation), the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (Office of Environment and Heritage [OEH] 2011), the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (Department of Environment, Climate Change and Water [DECCW] 2010) (the consultation requirements) and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice).

As a registered Aboriginal party for Mandalong Mine, we are writing to provide you with the draft methodology for the ACHA and a methodology for additional survey to inform the HMP for your review and comment.

Newcastle | Orange |
Sydney | Canberra |
Brisbane | Perth

T | 1300 793 267
E | info@umwelt.com.au

www.umwelt.com.au

Umwelt (Australia) Pty Limited
ABN 18 059 519 041

1.0 Description of the Project

A summary of both projects are provided below, with reference to the requirements satisfied by this methodology and accompanying assessments.

1.1 Modification 9 HMP

Modification 9 relates to the proposed re-orientation of a number of existing longwall panels due to challenging geological conditions. The Modification 9 area was included within the larger area assessed as part of the original Aboriginal cultural heritage assessment (RPS 2013) undertaken to inform the application for SSD-5144. At the time of the assessment, six land parcels within the Modification 9 area could not be surveyed due to lack of landholder consent. In accordance with Schedule 4, Condition 8 of the Mandalong Mine consent (SSD-5144), best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. An additional assessment of part of the Modification 9 area was conducted by Umwelt (2020) and the former Native Title claimant parties to satisfy the conditions of a Section 31 Deed of Agreement. These parcels comprised areas of State Forest already partially assessed by RPS (2013).

As a result of the RPS (2013) assessment, 21 Aboriginal archaeological sites are listed on the Aboriginal Heritage Information Management System (AHIMS) as being located within the Modification 9 area, of which one is a duplicate record. These sites comprise six rockshelters, four sets of grinding grooves, five sites identified as being associated with Aboriginal resources, three sites containing stone artefacts and two areas of Potential Archaeological Deposit (PAD). One historical heritage item (L1 – log landing site) was identified within the Mod 9 area however, based on subsidence predictions, it is understood that this site is unlikely to be impacted.

Of the parcels of land assessed by Umwelt (2020) within the Modification 9 area, Lot 175 DP755271 did not contain any identified sites and the potential for sites to be present (but not currently visible) within this parcel was assessed as low based on the extent of survey and the nature of landforms within this area. On this basis, it is not proposed to resurvey this lot as part of the development of the HMP. Lot 115 and 122 DP755238 were also assessed by Umwelt (2019) and no new sites were identified. However, it was noted that these lots were largely inaccessible at the time of survey.

The HMP is required to meet the relevant conditions of the Modification 9 consent. As this has not yet been issued (Centennial Mandalong are currently preparing responses to the public / agency submissions), it is assumed that conditions will be consistent with those in the Modification 8 consent. Schedule 6, Condition 6(l) specifies that an extraction plan must be developed and must include a HMP 'which has been prepared in consultation with the Biodiversity Conservation Division and Registered Aboriginal parties, to manage the potential environmental consequences of the proposed second workings on both Aboriginal and non-Aboriginal heritage items, and reflects the requirements of condition 22 of Schedule 3.' Condition 22 of Schedule 3 specifies requirements to be addressed in the HMP.

1.2 Modification 10

Further to the reorientation of longwall panels under Modification 9, Mandalong is proposing to extend the reorientated panels, with this proposal referred to as Modification 10.

Modification 10 will involve the extensions of LW30-33 to the south of the current longwall plan, as shown by the increase in project footprint in **Plate 1.1** and **Plate 1.2**.

An Aboriginal Cultural Heritage Assessment (ACHA) has been determined as being required to assess the impact of proposed Modification 10 to identified Aboriginal sites (one is located within the boundary of the Modification 10 extension) or as yet unidentified Aboriginal objects or sites.

1.3 Combined Survey Effort

As there are a number of either overlapping areas or blocks in close proximity related to the Modification 9 HMP and Modification 10 ACHA, Umwelt is proposing to undertake the survey as one concerted survey effort. This information is summarised in **Plate 1.1** and **Plate 1.2** below. Green shading shows areas previously surveyed and not requiring further survey and yellow shading indicates the areas that will be surveyed for the Mod 10 Aboriginal cultural heritage assessment. The remaining properties within the Mod 9 area that have not been subject to prior survey are shaded in aqua. In accordance with Schedule 4, Condition 8 of the Modification 8 consent, best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. The previously unsurveyed properties shown in aqua in **Plate 1.2** will be therefore surveyed as part of the development of the Modification 9 HMP and Modification 10 ACHA.

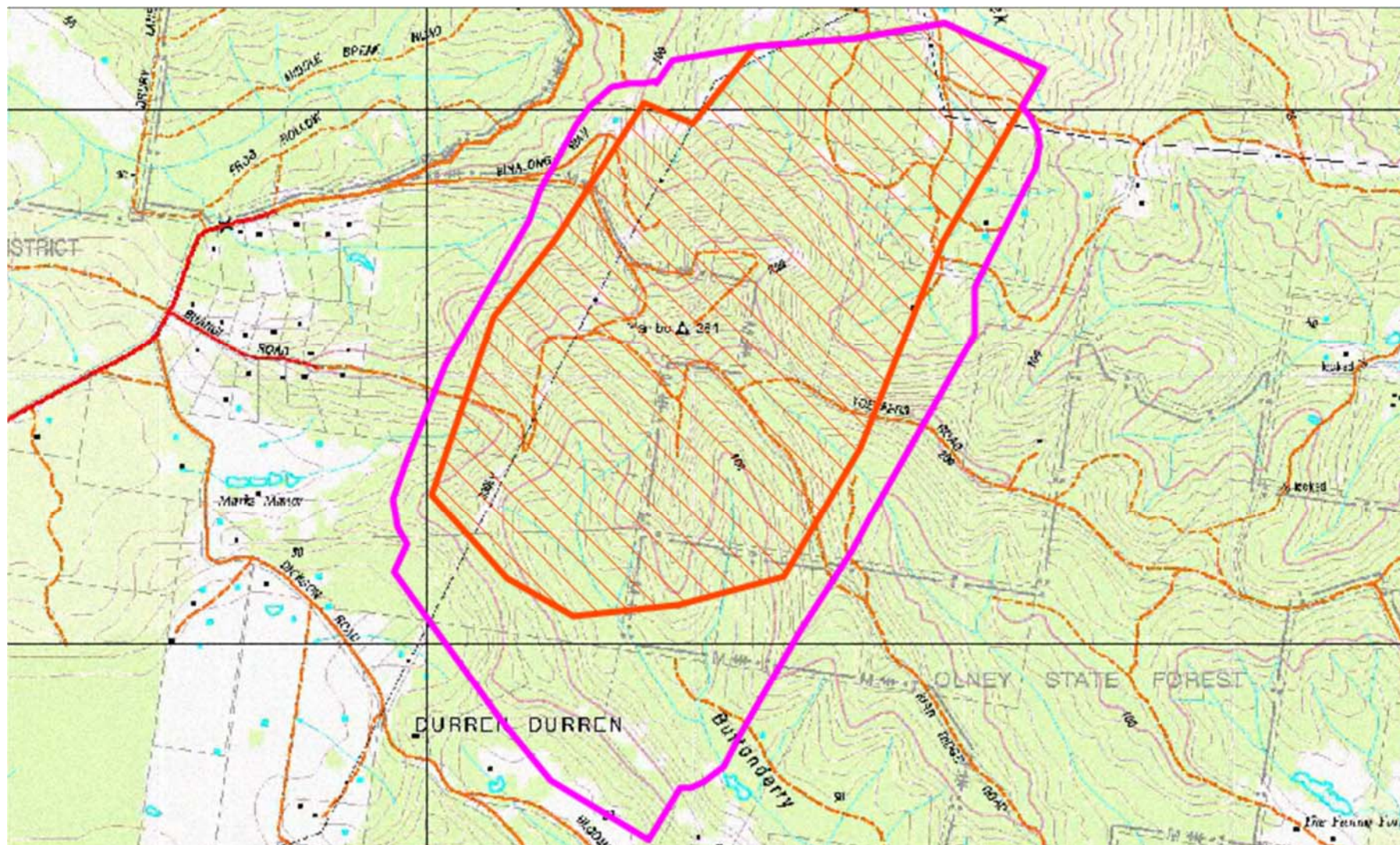


Plate 1.1 Mod 9 and Mod 10 areas (red hatching is Mod 9 area) showing the increase in footprint. Specifically, the increase in footprint to the south includes areas that have not yet been assessed during previous submissions.

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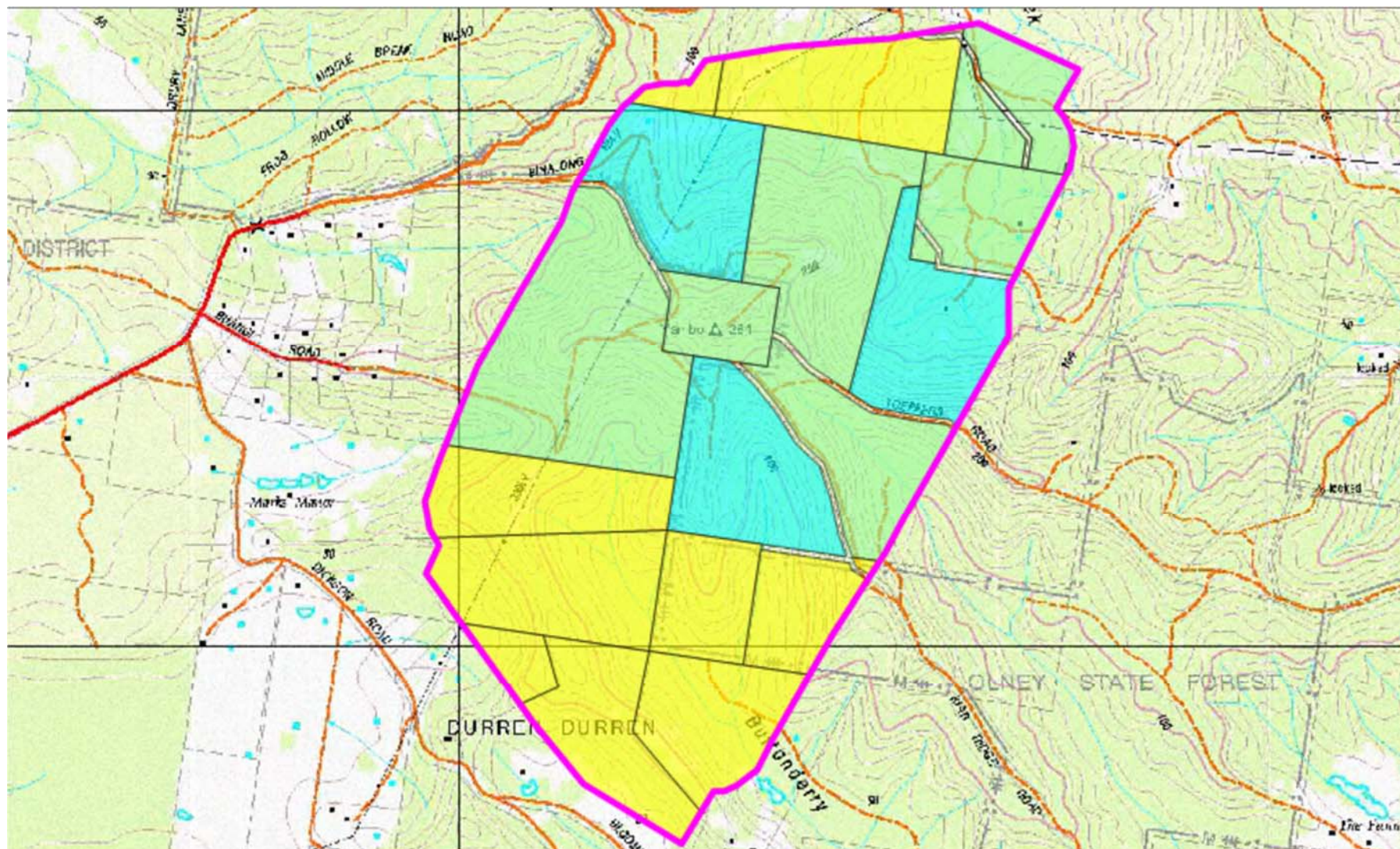


Plate 1.2 Mod 9 and Mod 10 areas showing survey requirements (green = does not require additional survey, yellow = to be surveyed for Mod 10 ACHA, aqua = to be surveyed for Mod 9 HMP)

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2.0 Description of the Project Area

For the purposes of the ACHA, the area proposed for impact as a result of the project comprises the proposed re-alignment area of LW30-33 (Modification 9) and the proposed extension of LW30-33 (Modification 10), the 'assessment area'.

The assessment area is located within the Narrabeen Group geological group, specifically the Patonga Claystone and Tuggerah Formations within the Clifton Subgroup. These formations comprise deposits of siltstones, claystones and areas of sandstone (Murphy 1993). Based on the geological description of mudstones within this formation, it is unlikely that they were of a quality suitable for the manufacture of stone artefacts (with the mudstone typically referenced in archaeological sites better technically described as an indurated rhyolitic tuff). It does not appear that stone raw materials suitable for artefact manufacture would have been available within the assessment area, but would have been sourced from other locations within the region. In terms of other archaeological implications, the presence of sandstone within the geology of the assessment area indicates that, should sandstone outcrops be present, it may be possible that site types such as grinding grooves or engravings may occur.

The assessment area is underlain by the Mandalong, Gorokan and Woodburys Bridge soil landscapes, as shown in **Plate 2.1** These three soil landscapes are highly acidic and prone to toxic concentration of aluminium (Murphy, 1993). Typical soil profiles vary with landform/geology, but are typically relatively shallow. These soils are typically moderately erodible, with levels of erosion linked to landform. The depth of topsoil is a critical consideration for the likely presence of sub-surface archaeological deposits because intact deposits are typically only found within A horizon soils. Erosion acts to expose deposits that were formerly sub-surface and impacts on the potential for deposits to retain archaeological integrity.

The areas surrounding the Mandalong South assessment area have been subject to previous archaeological assessments, and these previous assessments have resulted in the identification of a number of archaeological sites. The most common site type recorded in the search area is artefact scatters, followed by modified trees (carved or scarred). Within the surrounding landscape, these site types have not been recorded in association with specific landforms but do seem to correlate with less disturbed land. Shell midden sites have also been recorded, particularly in proximity to the foreshore of Lake Macquarie (located outside of the assessment area). Potential archaeological deposits, habitation structures and Aboriginal Ceremony and Dreaming sites have also been recorded, though these site types are all located outside of the current assessment area.

Within the assessment area itself, five Aboriginal archaeological sites have been recorded, including:

- Two potential archaeological deposits (45-3-3513 and 45-3-3514)
- Two grinding grooves (45-3-1226, 45-3-3512)
- One art engraving site (45-3-1228).

2.1 Previous Investigations

RPS (2013) completed an assessment of 2,360 ha of private and public land for the now approved Mandalong Southern Extension project. The assessment resulted in the recording of 130 new archaeological sites in addition to 20 previously recorded sites. The most common site types were grinding grooves, rockshelters with PAD and scarred trees, although several artefact scatters were recorded in addition to stone arrangements.

The Mandalong Southern Extension Area is characterised by steeply inclined ridges with first and second order streams/drainage lines that drain into Morans Creek in the north and east. Typically rockshelters were located on or within 200 m of the ridge crests and were formed from weathering sheets of sandstone or large boulders.

Grinding groove sites were located in the first and second order drainage lines and were typically identified on smooth, fine-grained sandstone sheets at elevations between 80 and 100 m AHD. It was observed that sandstone exposed in drainage lines above 100 m elevation tended to be rough and unsuitable for grinding grooves. Sandstone below 80 m tended to be more 'blocky' and did not have flat surfaces suitable for grinding grooves. Larger sandstone sheets were noted at the confluence of drainage lines and thus provided larger surfaces for grinding grooves. The numbers of grooves within each site ranged from single grooves to over 25 grooves at three sites. The majority of grinding grooves appeared to be for sharpening stone hatchet heads and typically were between 20 and 40 centimetres (cm) in length. Often pools of water were identified in close proximity to the grooves.

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In reviewing these results, RPS (2013) suggested that the distribution of sites indicates that Aboriginal camping activities took place on the valley floors and in rockshelters and benching landforms on the ridgelines and upper slope/crest landforms and that the transition between these areas was potentially undertaken along watercourses (first and second order) as evidenced by the regular occurrence of grinding grooves. RPS (2013) noted that the Mandalong Southern Extension area may have been utilised as a transit route between the low-lying lacustrine environments and the Watagan uplands. The presence of grinding groove sites with more than 20 grooves was considered to support the proposition that the area may have supported larger groups of Aboriginal people than previously thought.

In relation to potential impacts and mitigation requirements for the identified sites regarding the original Mandalong Southern Extension Project, it was assessed that the majority of the sites were 'unlikely' or 'very unlikely' to be impacted by proposed longwall mining.

It is anticipated that the above described spatial distribution of sites in the landscape will be applicable to the current project areas. The results of RPS' survey, as well as other surveys undertaken in the area will be used to formulate the predictive model for the ACHA currently being prepared.

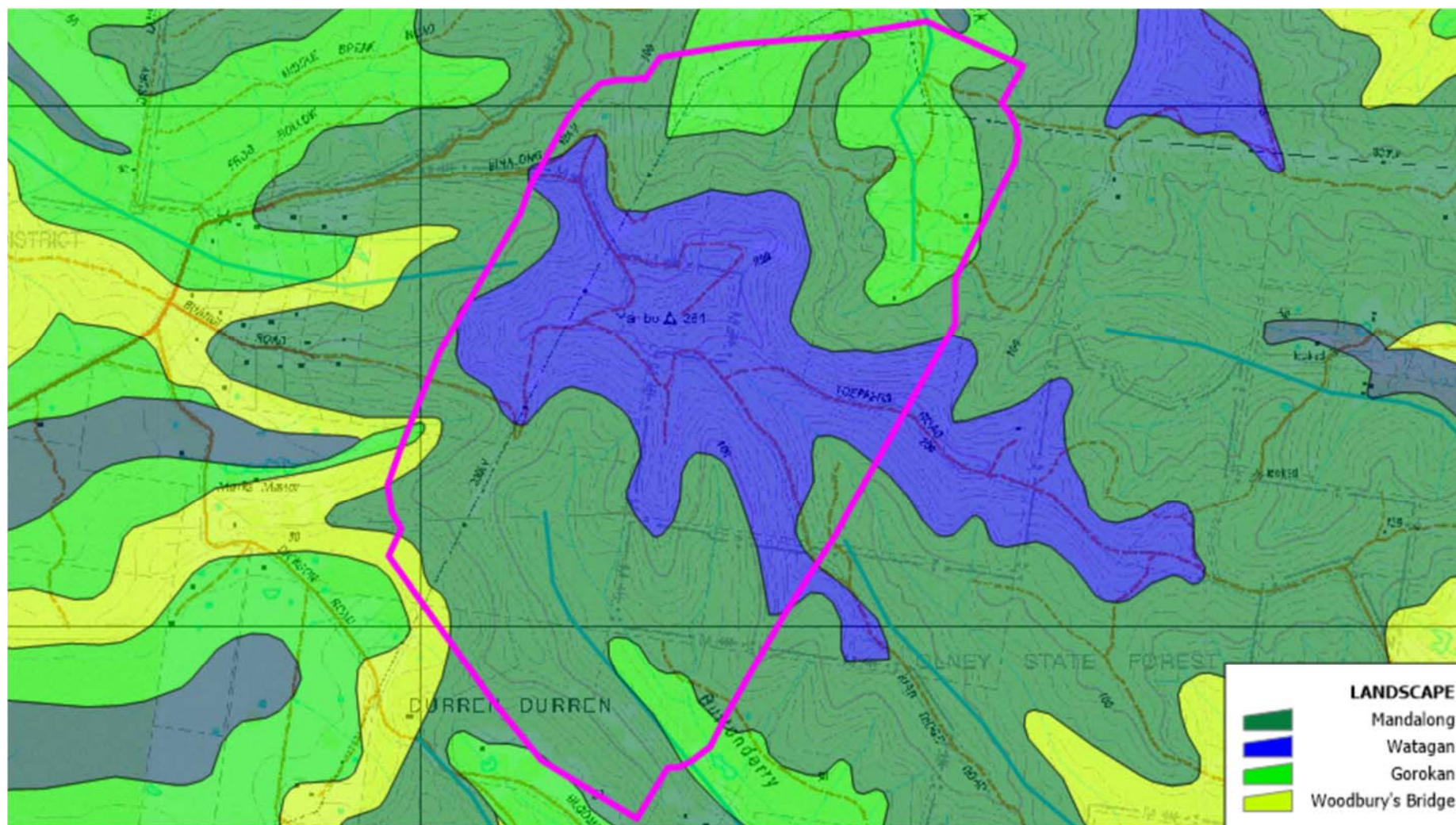


Plate 2.1 Soil Landscape located within the wider project area.

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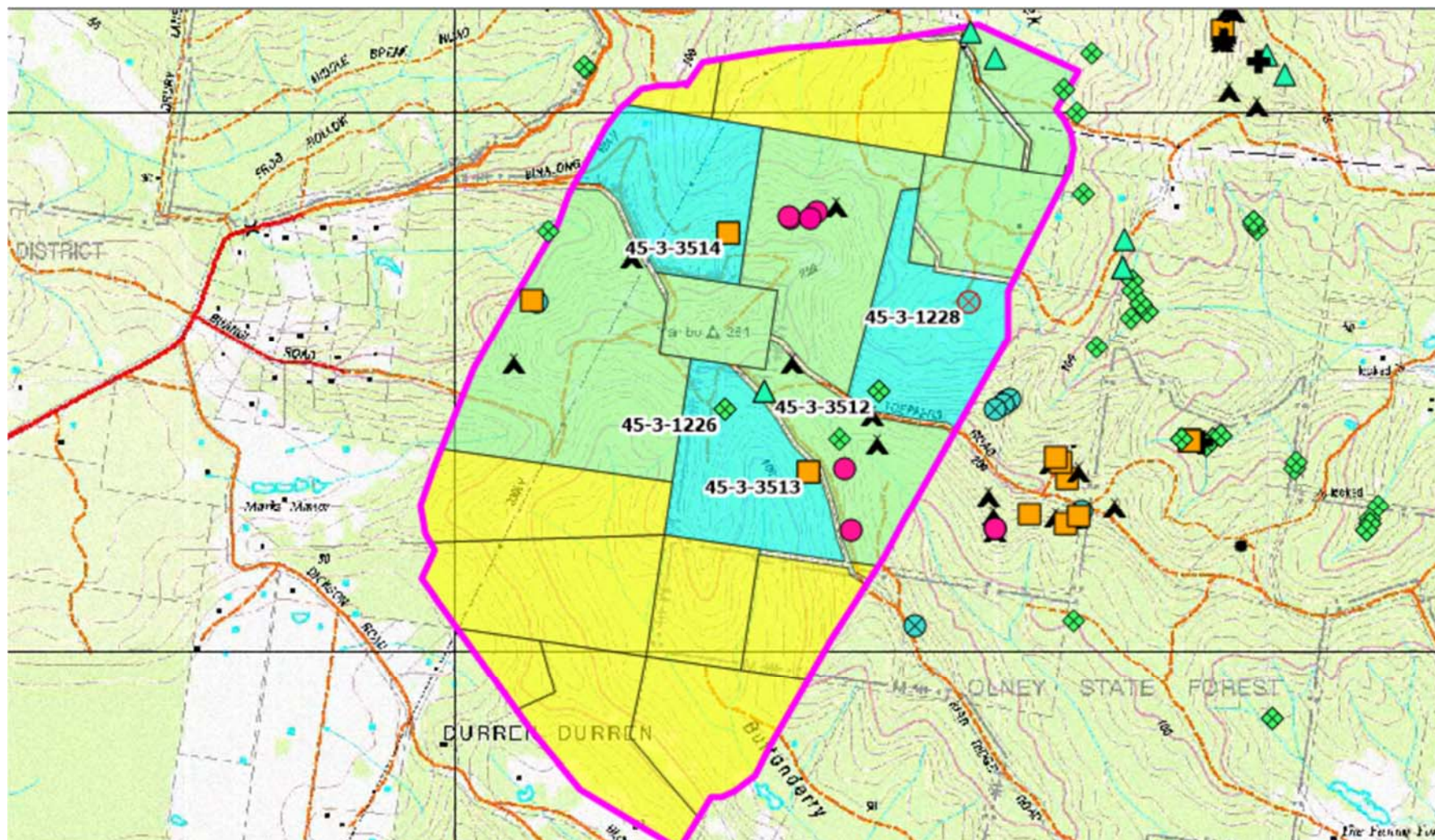


Plate 2.2 AHIMS results in proximity to the wider project area, with the three sites within the assessment area labelled above.

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3.0 Methodology for the Aboriginal Cultural Heritage and Archaeological Assessment

As discussed in **Section 1.0**, the consultation process will be undertaken in accordance with the consultation requirements (DECCW 2010). The proposed methodology for the ACHA (pending comments from registered Aboriginal parties) is as follows:

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 - the preparation of a predictive model drawing on all of the above
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 - details of any sites/objects/potential archaeological deposits located during the survey

- an assessment of the Aboriginal cultural heritage significance (as provided by the registered Aboriginal parties) of the Mod 10 assessment area
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4.0 Consultation with Aboriginal Parties During the Assessment Process

Umwelt acknowledges and understands that cultural values, by definition, relate to values outside those associated with specific archaeological sites/objects. Throughout the assessment process, we invite comment from Aboriginal parties regarding any cultural values associated with the Mod 10 assessment area and will ensure that any information provided regarding cultural values (be they associated with a specific site or provided with reference to a landscape feature or within a broader context) are documented and recorded in accordance with the wishes of the relevant Aboriginal party for inclusion in the ACHA report. We note that the inclusion of any such information in the final assessment is dependent on its provision by the Aboriginal parties.

We note that Section 3.2 of the consultation requirements specifies that the objective of consultation is to ensure ‘that Aboriginal people have the opportunity to improve assessment outcomes’. Factors specified as assisting in meeting this objective include providing Aboriginal parties with the opportunity to provide information on cultural values (as invited in this draft methodology), influence methods regarding assessment of significance for Aboriginal objects/places (which can be undertaken in response to this draft methodology, during fieldwork and in commenting on the draft ACHA report) and commenting on the draft ACHA report. Our approach is designed to ensure compliance with this objective, including the potential for in-field consultation with Aboriginal party representatives during fieldwork. Umwelt archaeologists are trained to seek and document cultural feedback provided by Aboriginal party representatives during fieldwork. This is not limited to cultural values associated with archaeological sites but may encompass any values identified by Aboriginal people.

We look forward to working with your organisation throughout the project to ensure that we adequately document any information you wish to provide regarding Aboriginal cultural values. Please feel free to contact us to request any additional information or assistance you may require to facilitate the provision of your input.

5.0 Survey Methodology

The draft survey methodology is designed to ensure compliance with requirements for archaeological survey as established in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice). This includes development of an appropriate sampling strategy and recording of information during survey. This survey methodology will be utilised for both the reporting required within the HMP and ACHA.

5.1 Sampling Strategy

The survey will be undertaken to ensure that a representative sample of all landforms within the area is surveyed, as required to ensure compliance with Code of Practice.

Areas that will be subject to the greatest amount of potential subsidence impact (subsidence contours are shown in **Plate 5.1**) will be subject to intensive survey. This includes drainage lines (in association with which grinding grooves may be identified), slope areas likely to contain rock outcrop suitable for use as shelter (in association with which rockshelter sites may be identified) and crests and ridges (in association with which stone arrangements may be identified) where these landforms are mapped as intersecting with areas of subsidence.

All efforts will be made to achieve maximum survey coverage via pedestrian survey. It is noted, however, that vehicle transects may be used in some areas based on limited archaeological potential and/or where vegetation limits access and visibility. It is intended that the survey will be conducted over the course of up to 6-8 days by two archaeologists and up to four Aboriginal party representatives however this may be subject to change based on the number of sites recorded, ground surface visibility and other variables.

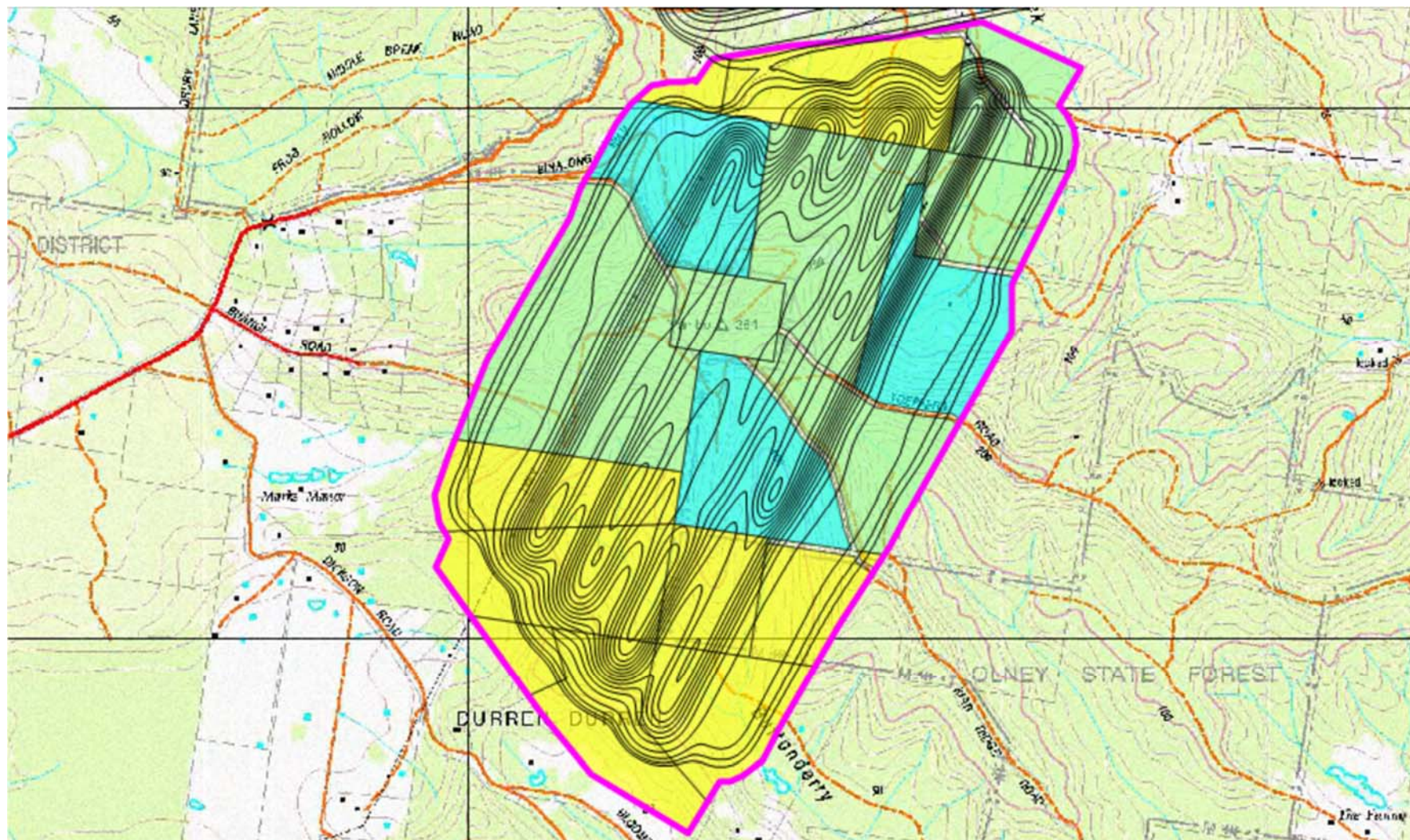


Plate 5.1 Subsidence predictions of LW30-33 within the wider project area.

© Umwelt, 2020 based on data provided by Centennial

5.2 Recording of Information During Survey

Survey units will be defined and named with reference to Requirement 5c of the Code of Practice, including recording start and finish points and/or boundaries for all survey units using a hand-held GPS receiver (set to allow recording of data with datum MGA94) and topographic mapping (where relevant), with track logs to be recorded for all pedestrian transects. Start and finish points/boundaries for survey units will be defined based on landforms, project area boundaries, access or other arbitrary terminations (as specified in the Code of Practice). The spacing between individuals will also be recorded for each survey unit.

Photographs will be undertaken for landforms/survey units (where informative). Information recorded for each survey unit will include

- Landform (in units based on those established by McDonald et al 2009)
- Gradient (where relevant)
- Vegetation
- Geology and soils (where suitable areas of exposure/visibility are present)
- Identified Aboriginal resources (food and medicine plants, prey animals, stone and water)
- Levels of average ground surface visibility within the survey unit (in accordance with the Requirement 9 of the Code of Practice)
- Extent and type of exposures within the survey unit (with reference to the factors leading to the exposure such as erosion, earth-moving activities, track establishment etc.)
- Any information provided by the registered Aboriginal parties in relation to cultural values, noting that such information will be recorded in accordance with the wishes of the party providing the information and
- Any site, area of Potential Archaeological Deposit (PAD) or landscape feature of Aboriginal cultural value present within the survey unit (see below for further information on site/PAD recording).

Any Aboriginal archaeological sites identified during the survey will be assessed with reference to the site boundaries. Factors that will be taken into consideration in defining and mapping site boundaries may include the distribution of surface artefacts, landforms or physical boundaries and cultural information.

Sufficient information will be recorded for all sites to meet Requirement 7 of the Code of Practice. The archaeological and Aboriginal cultural significance of any site will be discussed with the registered Aboriginal parties participating in the survey.

The archaeological potential of landforms/specific areas within the assessment area will be assessed with reference to factors including the archaeological context of the local area, the evaluation of the soil profile (based on soil landscape mapping, exposed soil profiles identified during the survey and geomorphic understandings of the area) and the identification of landforms that may have greater archaeological sensitivity. The extent of any area of identified archaeological potential will be defined and documented for inclusion in subsequent reporting. The archaeological and Aboriginal cultural significance of any area of identified archaeological potential will be discussed with the registered Aboriginal parties participating in the survey.

In relation to the assessment of rockshelter sites, it is proposed that a rockshelter will only be recorded as an archaeological site where archaeological evidence is identified in association with the rockshelter. However, the commitment to record archaeological potential will apply and therefore the final assessment will note where suitable rock overhangs/shelters occur but within which no archaeological evidence was identified.

5.3 Survey Arrangements

At this stage, it is proposed to undertake the survey in early **September 2020**, however this is subject to confirmation. Further correspondence regarding survey arrangements will be provided at least two weeks prior to the proposed survey date. Additional information relating to engagement to undertake the survey is attached to this letter.

6.0 Other Requirements

The following will be required to enable commercial engagement for the work:

- Insurances are current (Workers Compensation, Public Liability and Product Liability). If you are unsure when your last insurance was entered into the Centennial system please call to confirm.
- Undertake a visitors induction at Mandalong Mine Administration Office prior to the commencement of works.
- A medical for each person attending must be provided stating fitness to complete usual tasks.
- Minimum personal protective equipment (PPE) requirements are long pants and long sleeve high visibility shirt, steel toe capped boots and hard hat in construction areas.
- Each individual will bring their own food and water.
- Adhere to a minimum expectation of behaviour where all parties behave in an appropriate and respectful manner, and that culturally sensitivity is considered.
- Arrive on time and by own travel methods.

7.0 Summary

This letter provides details of the proposed methodology for an Aboriginal Cultural Heritage Assessment associated with the Project. In accordance with the consultation requirements (DECCW 2010), we ask that your group provides comments on the draft methodology by no later than close of business **7 September 2020**. Comments regarding the draft methodology can be provided verbally or in writing to:

Ashley O'Sullivan,
Senior Archaeologist
Umwelt Environmental and Social Consultants (Umwelt)
Phone: 02 4950 5322.

Should you require any further information or wish to discuss any aspect of the Project, please do not hesitate to contact Ashley or Centennial's Iain Hornshaw (Approvals Coordinator) on 4935 8901 / iain.hornshaw@centennialcoal.com.au.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'Ashley O'Sullivan', with a long, sweeping horizontal line extending to the right.

Ashley O'Sullivan
Senior Archaeologist

Enclosures: Archaeological Fieldwork Engagement Form

**Archaeological Fieldwork Engagement Form
Mandalong Mod 9 and 10, NSW**

To: Centennial Coal
Email: iain.hornshaw@centennialcoal.com.au
Phone: 4935 8901
Attention: Iain Hornshaw (Approvals Coordinator)

Item	Response (circle response and provide detail)
Nominated field work representative and representative contact phone number.	Name: _____ Phone: _____
Our organisation has certificates of currency demonstrating a minimum of \$20,000 cover for workers compensation, public liability and product liability).	Y / N Certificates of currency must be provided before engagement can be finalised
Our organisation understands that payment terms and conditions are in accordance with those previously negotiated with Centennial, with a specified rate of pay of \$1000 per Aboriginal organisation per day. Travel will be paid at ATO rates.	Y / N
Our organisation will provide their representative with appropriate Personal Protective Equipment and Clothing (PPE&C). As a minimum, this must include: <ul style="list-style-type: none"> • Long trousers • High visibility long sleeve shirt • Steel toe capped safety boots • Hard hat (for construction areas) • Soft hat (outside construction areas). 	Y / N
Has completed the medical as required by Centennial.	Y / N Provide details/copy of completed medical.
Our representative understands that they will need to bring with them sufficient food and water for the day's work.	Y / N
Our representative has demonstrated appropriate experience, ability and reliability.	Y / N

Item	Response (circle response and provide detail)
Our representative will commit to arrive on site on time and free from the effects of drugs, alcohol and fatigue (noting that your representative may be required to undergo drug and alcohol testing in accordance with site requirements).	Y / N
Our representative will commit to behaving in a culturally appropriate manner whilst on site and will work collaboratively with the archaeologist and other Aboriginal parties (where relevant)	Y / N

Organisation: _____

Name of Authorised Person: _____

Signature: _____

Date: _____

Our Ref: 20133/NR/AO/11082020

11 August 2020

Biraban Local Aboriginal Land Council
Craig Foresheaw
PO Box 212
TORONTO NSW 2283

Email: craig@biraban.com.au ceo@biraban.com.au

Dear Sir/Madam

Re: Methodology for Aboriginal Cultural Heritage Assessment, Proposed Extension of Longwalls 30-33 (Modification 10) and Further Survey for Modification 9 Extraction Plan, Mandalong Mine

Centennial Mandalong is currently seeking approval for the continuation of mining with the Mandalong South area associated with both Modification 9 and Modification 10. This project, herein after referred to as 'Mandalong South Assessment Area', comprises both further survey required to support a Heritage Management Plan (HMP) associated with an Extraction Plan required for Modification 9 and an Aboriginal Cultural Heritage Assessment (ACHA) associated with Modification 10. The project area, including all areas of proposed works, is shown in **Plate 1.1** and **Plate 1.2**.

Umwelt Environmental and Social Consultants (Umwelt) have been engaged by Centennial Mandalong to prepare a HMP for Modification 9 and an ACHA (incorporating an archaeological technical report) for Modification 10 in consultation with the registered Aboriginal parties, including your organisation.

The HMP for Modification 9 will be completed in accordance with the relevant conditions of approval. The ACHA will form part of the Environmental Impact Statement (EIS) for the proposed modification (Modification 10), and will be undertaken in accordance with the requirements of the *National Parks and Wildlife Act 1974* (NPW Act), the *National Parks and Wildlife Regulation 2019* (NPW Regulation), the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (Office of Environment and Heritage [OEH] 2011), the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (Department of Environment, Climate Change and Water [DECCW] 2010) (the consultation requirements) and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice).

As a registered Aboriginal party for Mandalong Mine, we are writing to provide you with the draft methodology for the ACHA and a methodology for additional survey to inform the HMP for your review and comment.

Newcastle | Orange |
Sydney | Canberra |
Brisbane | Perth

T | 1300 793 267
E | info@umwelt.com.au

www.umwelt.com.au

Umwelt (Australia) Pty Limited
ABN 18 059 519 041

1.0 Description of the Project

A summary of both projects are provided below, with reference to the requirements satisfied by this methodology and accompanying assessments.

1.1 Modification 9 HMP

Modification 9 relates to the proposed re-orientation of a number of existing longwall panels due to challenging geological conditions. The Modification 9 area was included within the larger area assessed as part of the original Aboriginal cultural heritage assessment (RPS 2013) undertaken to inform the application for SSD-5144. At the time of the assessment, six land parcels within the Modification 9 area could not be surveyed due to lack of landholder consent. In accordance with Schedule 4, Condition 8 of the Mandalong Mine consent (SSD-5144), best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. An additional assessment of part of the Modification 9 area was conducted by Umwelt (2020) and the former Native Title claimant parties to satisfy the conditions of a Section 31 Deed of Agreement. These parcels comprised areas of State Forest already partially assessed by RPS (2013).

As a result of the RPS (2013) assessment, 21 Aboriginal archaeological sites are listed on the Aboriginal Heritage Information Management System (AHIMS) as being located within the Modification 9 area, of which one is a duplicate record. These sites comprise six rockshelters, four sets of grinding grooves, five sites identified as being associated with Aboriginal resources, three sites containing stone artefacts and two areas of Potential Archaeological Deposit (PAD). One historical heritage item (L1 – log landing site) was identified within the Mod 9 area however, based on subsidence predictions, it is understood that this site is unlikely to be impacted.

Of the parcels of land assessed by Umwelt (2020) within the Modification 9 area, Lot 175 DP755271 did not contain any identified sites and the potential for sites to be present (but not currently visible) within this parcel was assessed as low based on the extent of survey and the nature of landforms within this area. On this basis, it is not proposed to resurvey this lot as part of the development of the HMP. Lot 115 and 122 DP755238 were also assessed by Umwelt (2019) and no new sites were identified. However, it was noted that these lots were largely inaccessible at the time of survey.

The HMP is required to meet the relevant conditions of the Modification 9 consent. As this has not yet been issued (Centennial Mandalong are currently preparing responses to the public / agency submissions), it is assumed that conditions will be consistent with those in the Modification 8 consent. Schedule 6, Condition 6(l) specifies that an extraction plan must be developed and must include a HMP 'which has been prepared in consultation with the Biodiversity Conservation Division and Registered Aboriginal parties, to manage the potential environmental consequences of the proposed second workings on both Aboriginal and non-Aboriginal heritage items, and reflects the requirements of condition 22 of Schedule 3.' Condition 22 of Schedule 3 specifies requirements to be addressed in the HMP.

1.2 Modification 10

Further to the reorientation of longwall panels under Modification 9, Mandalong is proposing to extend the reorientated panels, with this proposal referred to as Modification 10.

Modification 10 will involve the extensions of LW30-33 to the south of the current longwall plan, as shown by the increase in project footprint in **Plate 1.1** and **Plate 1.2**.

An Aboriginal Cultural Heritage Assessment (ACHA) has been determined as being required to assess the impact of proposed Modification 10 to identified Aboriginal sites (one is located within the boundary of the Modification 10 extension) or as yet unidentified Aboriginal objects or sites.

1.3 Combined Survey Effort

As there are a number of either overlapping areas or blocks in close proximity related to the Modification 9 HMP and Modification 10 ACHA, Umwelt is proposing to undertake the survey as one concerted survey effort. This information is summarised in **Plate 1.1** and **Plate 1.2** below. Green shading shows areas previously surveyed and not requiring further survey and yellow shading indicates the areas that will be surveyed for the Mod 10 Aboriginal cultural heritage assessment. The remaining properties within the Mod 9 area that have not been subject to prior survey are shaded in aqua. In accordance with Schedule 4, Condition 8 of the Modification 8 consent, best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. The previously unsurveyed properties shown in aqua in **Plate 1.2** will be therefore surveyed as part of the development of the Modification 9 HMP and Modification 10 ACHA.

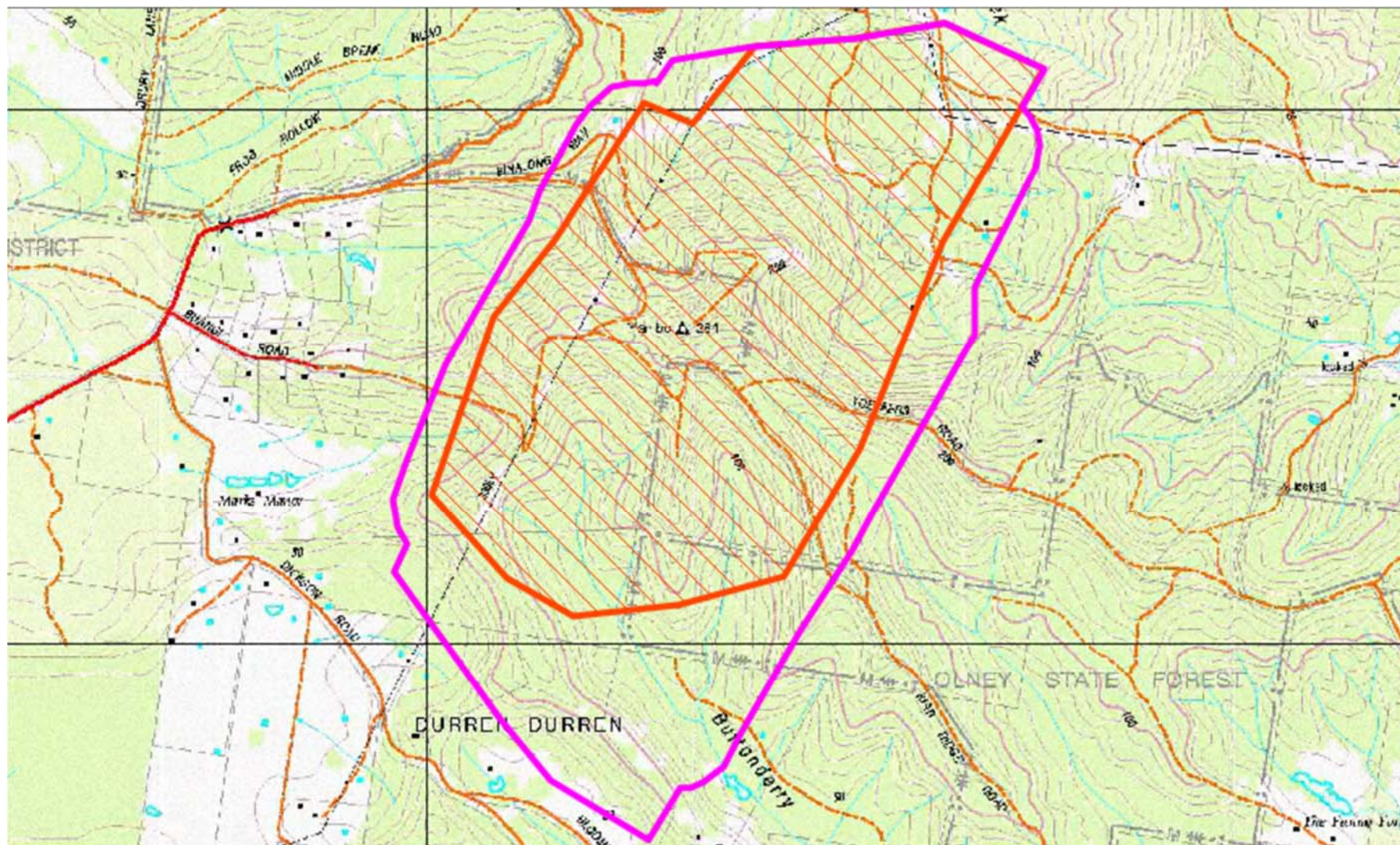


Plate 1.1 Mod 9 and Mod 10 areas (red hatching is Mod 9 area) showing the increase in footprint. Specifically, the increase in footprint to the south includes areas that have not yet been assessed during previous submissions.

© Umwelt, 2020 based on data provided by Centennial

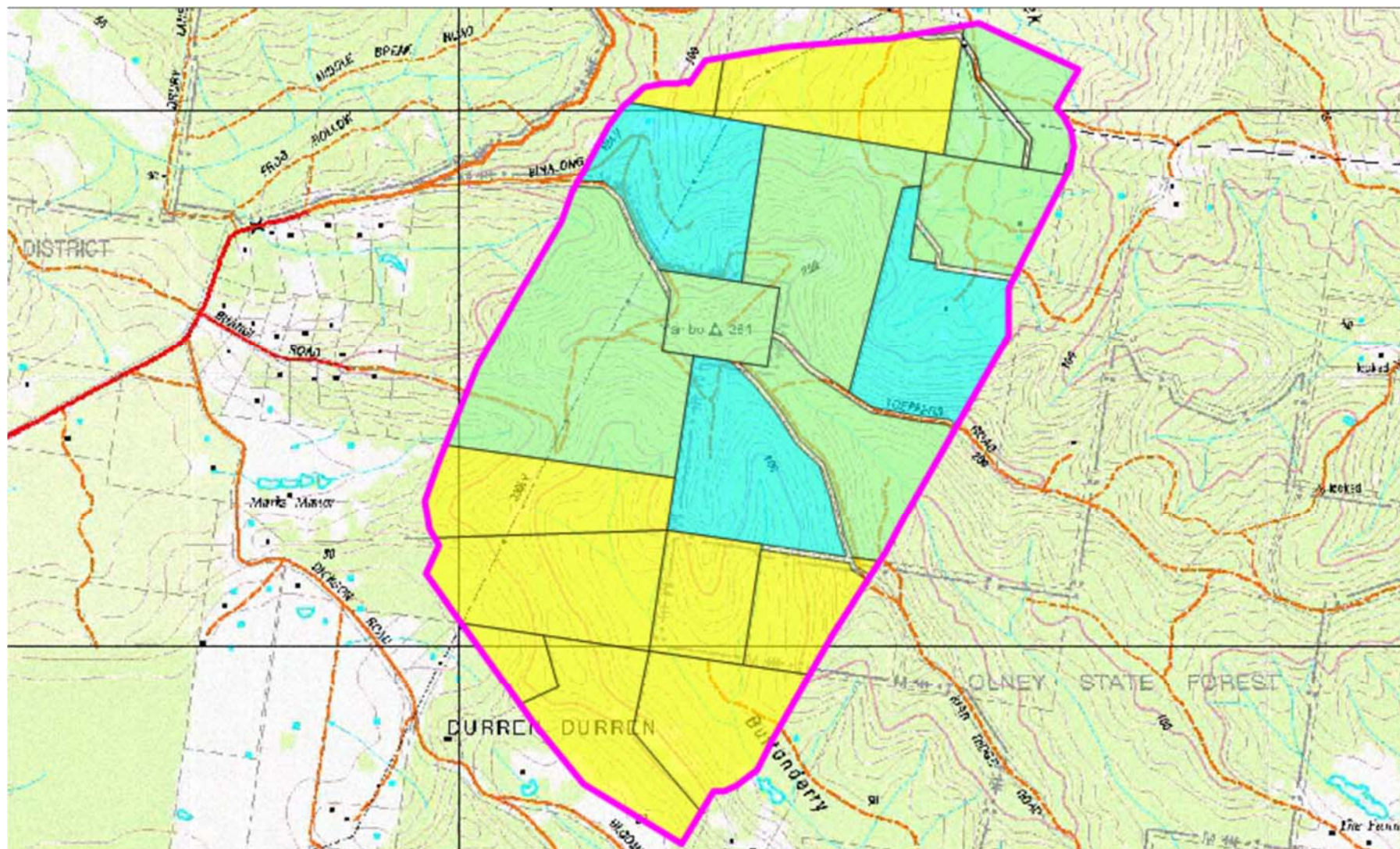


Plate 1.2 Mod 9 and Mod 10 areas showing survey requirements (green = does not require additional survey, yellow = to be surveyed for Mod 10 ACHA, aqua = to be surveyed for Mod 9 HMP)

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2.0 Description of the Project Area

For the purposes of the ACHA, the area proposed for impact as a result of the project comprises the proposed re-alignment area of LW30-33 (Modification 9) and the proposed extension of LW30-33 (Modification 10), the 'assessment area'.

The assessment area is located within the Narrabeen Group geological group, specifically the Patonga Claystone and Tuggerah Formations within the Clifton Subgroup. These formations comprise deposits of siltstones, claystones and areas of sandstone (Murphy 1993). Based on the geological description of mudstones within this formation, it is unlikely that they were of a quality suitable for the manufacture of stone artefacts (with the mudstone typically referenced in archaeological sites better technically described as an indurated rhyolitic tuff). It does not appear that stone raw materials suitable for artefact manufacture would have been available within the assessment area, but would have been sourced from other locations within the region. In terms of other archaeological implications, the presence of sandstone within the geology of the assessment area indicates that, should sandstone outcrops be present, it may be possible that site types such as grinding grooves or engravings may occur.

The assessment area is underlain by the Mandalong, Gorokan and Woodburys Bridge soil landscapes, as shown in **Plate 2.1**. These three soil landscapes are highly acidic and prone to toxic concentration of aluminium (Murphy, 1993). Typical soil profiles vary with landform/geology, but are typically relatively shallow. These soils are typically moderately erodible, with levels of erosion linked to landform. The depth of topsoil is a critical consideration for the likely presence of sub-surface archaeological deposits because intact deposits are typically only found within A horizon soils. Erosion acts to expose deposits that were formerly sub-surface and impacts on the potential for deposits to retain archaeological integrity.

The areas surrounding the Mandalong South assessment area have been subject to previous archaeological assessments, and these previous assessments have resulted in the identification of a number of archaeological sites. The most common site type recorded in the search area is artefact scatters, followed by modified trees (carved or scarred). Within the surrounding landscape, these site types have not been recorded in association with specific landforms but do seem to correlate with less disturbed land. Shell midden sites have also been recorded, particularly in proximity to the foreshore of Lake Macquarie (located outside of the assessment area). Potential archaeological deposits, habitation structures and Aboriginal Ceremony and Dreaming sites have also been recorded, though these site types are all located outside of the current assessment area.

Within the assessment area itself, five Aboriginal archaeological sites have been recorded, including:

- Two potential archaeological deposits (45-3-3513 and 45-3-3514)
- Two grinding grooves (45-3-1226, 45-3-3512)
- One art engraving site (45-3-1228).

2.1 Previous Investigations

RPS (2013) completed an assessment of 2,360 ha of private and public land for the now approved Mandalong Southern Extension project. The assessment resulted in the recording of 130 new archaeological sites in addition to 20 previously recorded sites. The most common site types were grinding grooves, rockshelters with PAD and scarred trees, although several artefact scatters were recorded in addition to stone arrangements.

The Mandalong Southern Extension Area is characterised by steeply inclined ridges with first and second order streams/drainage lines that drain into Morans Creek in the north and east. Typically rockshelters were located on or within 200 m of the ridge crests and were formed from weathering sheets of sandstone or large boulders.

Grinding groove sites were located in the first and second order drainage lines and were typically identified on smooth, fine-grained sandstone sheets at elevations between 80 and 100 m AHD. It was observed that sandstone exposed in drainage lines above 100 m elevation tended to be rough and unsuitable for grinding grooves. Sandstone below 80 m tended to be more 'blocky' and did not have flat surfaces suitable for grinding grooves. Larger sandstone sheets were noted at the confluence of drainage lines and thus provided larger surfaces for grinding grooves. The numbers of grooves within each site ranged from single grooves to over 25 grooves at three sites. The majority of grinding grooves appeared to be for sharpening stone hatchet heads and typically were between 20 and 40 centimetres (cm) in length. Often pools of water were identified in close proximity to the grooves.

Artefact scatters were identified on the passes between catchments or on the gently sloped valley floor where Morans Creek became a third order stream. There was no distinct spatial patterning for scarred trees, however it was recognised that the area had previously been logged and thus the scarred trees identified probably represented a very small sample of their original distribution. In general, scarred trees were identified in areas that were inaccessible to logging, such as on steep slopes for which there was no vehicle access, or near steeply sided watercourses. Stone arrangements were generally comprised of vertically heaped blocks of stone, or arranged in a circle; the stone blocks tended to be over 40 cm in length.

In reviewing these results, RPS (2013) suggested that the distribution of sites indicates that Aboriginal camping activities took place on the valley floors and in rockshelters and benching landforms on the ridgelines and upper slope/crest landforms and that the transition between these areas was potentially undertaken along watercourses (first and second order) as evidenced by the regular occurrence of grinding grooves. RPS (2013) noted that the Mandalong Southern Extension area may have been utilised as a transit route between the low-lying lacustrine environments and the Watagan uplands. The presence of grinding groove sites with more than 20 grooves was considered to support the proposition that the area may have supported larger groups of Aboriginal people than previously thought.

In relation to potential impacts and mitigation requirements for the identified sites regarding the original Mandalong Southern Extension Project, it was assessed that the majority of the sites were 'unlikely' or 'very unlikely' to be impacted by proposed longwall mining.

It is anticipated that the above described spatial distribution of sites in the landscape will be applicable to the current project areas. The results of RPS' survey, as well as other surveys undertaken in the area will be used to formulate the predictive model for the ACHA currently being prepared.

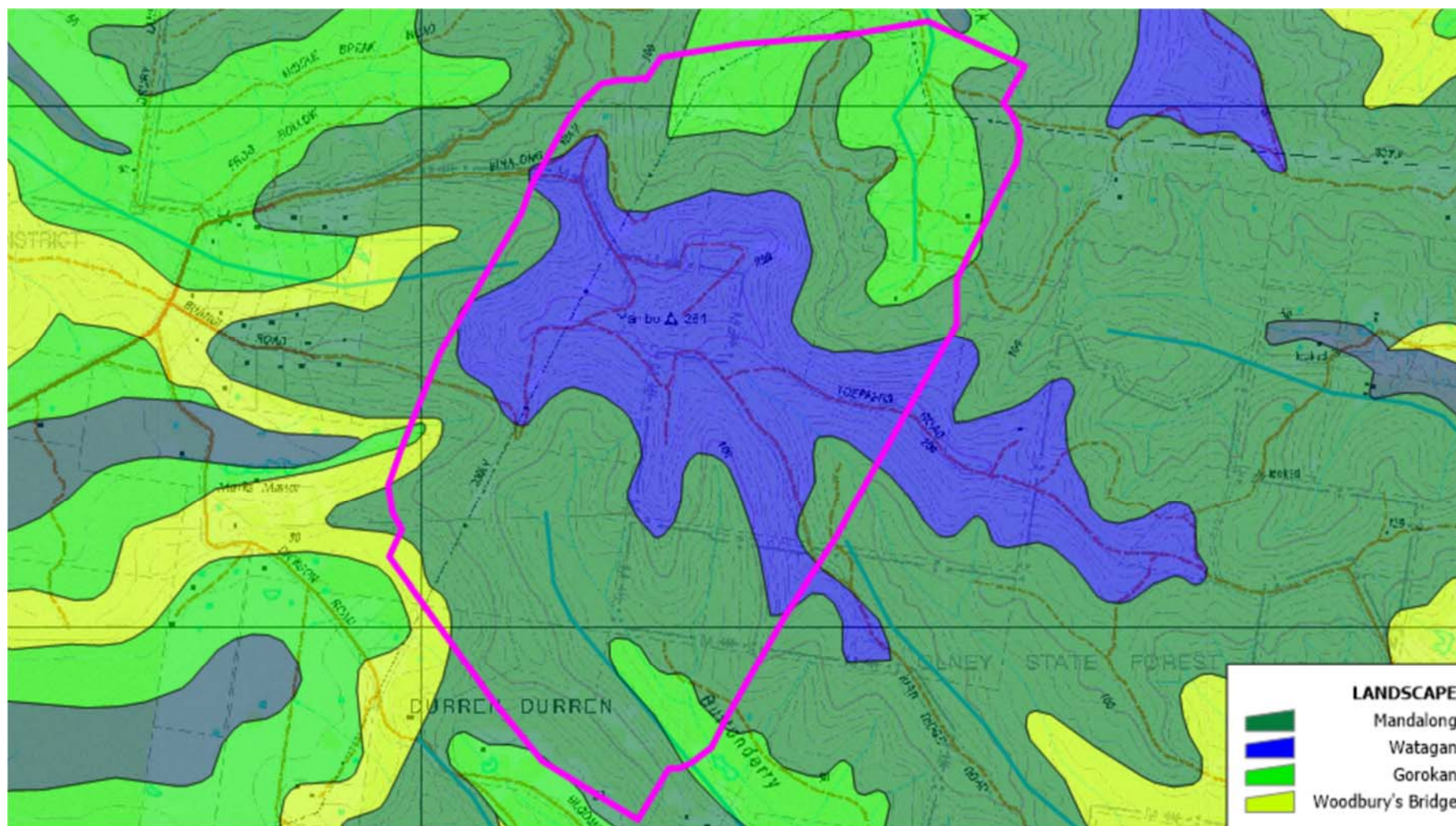


Plate 2.1 Soil Landscape located within the wider project area.

© Umwelt, 2020 based on data provided by Centennial

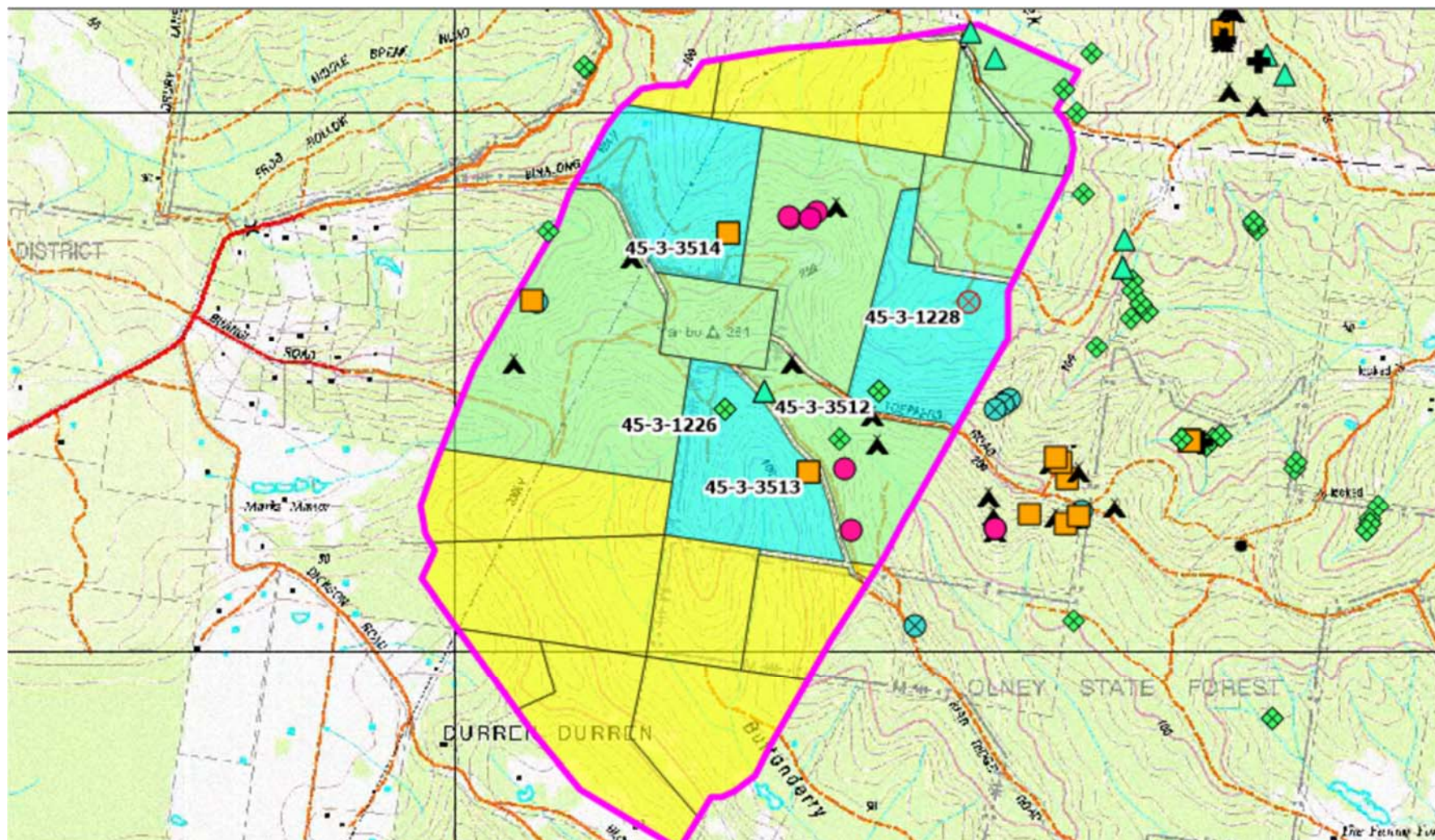


Plate 2.2 AHIMS results in proximity to the wider project area, with the three sites within the assessment area labelled above.

© Umwelt, 2020 based on data provided by Centennial and AHIMS

3.0 Methodology for the Aboriginal Cultural Heritage and Archaeological Assessment

As discussed in **Section 1.0**, the consultation process will be undertaken in accordance with the consultation requirements (DECCW 2010). The proposed methodology for the ACHA (pending comments from registered Aboriginal parties) is as follows:

1. Provide information to all registered Aboriginal parties regarding the project, including a draft methodology for review and comment (this letter).
2. Provision of a review period during which Aboriginal parties can provide comment and propose amendments to the draft methodology (up to 28 days from receipt of this letter, with comments due by close of business **7 September 2020**).
3. Completion of a survey of the project area in accordance with the draft methodology provided in this assessment (refer to **Section 5.0**).
4. Develop a draft ACHA report to include:
 - details of the nature of the project
 - details of the assessment requirements regarding Aboriginal cultural heritage, and how the ACHA report addresses these requirements, including:
 - identification of the Aboriginal cultural heritage values that exist across the area that will be impacted by the development. Identification of these values should be guided by the *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011)*.
 - consultation with Aboriginal people in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW)*. Full details of this consultation process will be captured.
 - documentation of the potential impacts of the development on Aboriginal cultural heritage values, and demonstration of attempts to avoid impact and identify any conservation outcomes.
 - records of any objects identified during the assessment and provision of this documentation to OEH
 - the results of an Aboriginal Heritage Information Management System (AHIMS) search and Native Title search
 - a review of the cultural context of the area that will draw heavily on information provided by registered Aboriginal parties and the results of previous cultural heritage and archaeological assessments undertaken in the area
 - a review of background information related to the environmental characteristics of the Mod 10 assessment area that may have determined how Aboriginal people may have occupied/utilised the area and the likelihood of site survival
 - the preparation of a predictive model drawing on all of the above
 - details of the survey methodology and results
 - details of any sites/objects/potential archaeological deposits located during the survey

- an assessment of the Aboriginal cultural heritage significance (as provided by the registered Aboriginal parties) of the Mod 10 assessment area
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We note that Section 3.2 of the consultation requirements specifies that the objective of consultation is to ensure ‘that Aboriginal people have the opportunity to improve assessment outcomes’. Factors specified as assisting in meeting this objective include providing Aboriginal parties with the opportunity to provide information on cultural values (as invited in this draft methodology), influence methods regarding assessment of significance for Aboriginal objects/places (which can be undertaken in response to this draft methodology, during fieldwork and in commenting on the draft ACHA report) and commenting on the draft ACHA report. Our approach is designed to ensure compliance with this objective, including the potential for in-field consultation with Aboriginal party representatives during fieldwork. Umwelt archaeologists are trained to seek and document cultural feedback provided by Aboriginal party representatives during fieldwork. This is not limited to cultural values associated with archaeological sites but may encompass any values identified by Aboriginal people.

We look forward to working with your organisation throughout the project to ensure that we adequately document any information you wish to provide regarding Aboriginal cultural values. Please feel free to contact us to request any additional information or assistance you may require to facilitate the provision of your input.

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The draft survey methodology is designed to ensure compliance with requirements for archaeological survey as established in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice). This includes development of an appropriate sampling strategy and recording of information during survey. This survey methodology will be utilised for both the reporting required within the HMP and ACHA.

5.1 Sampling Strategy

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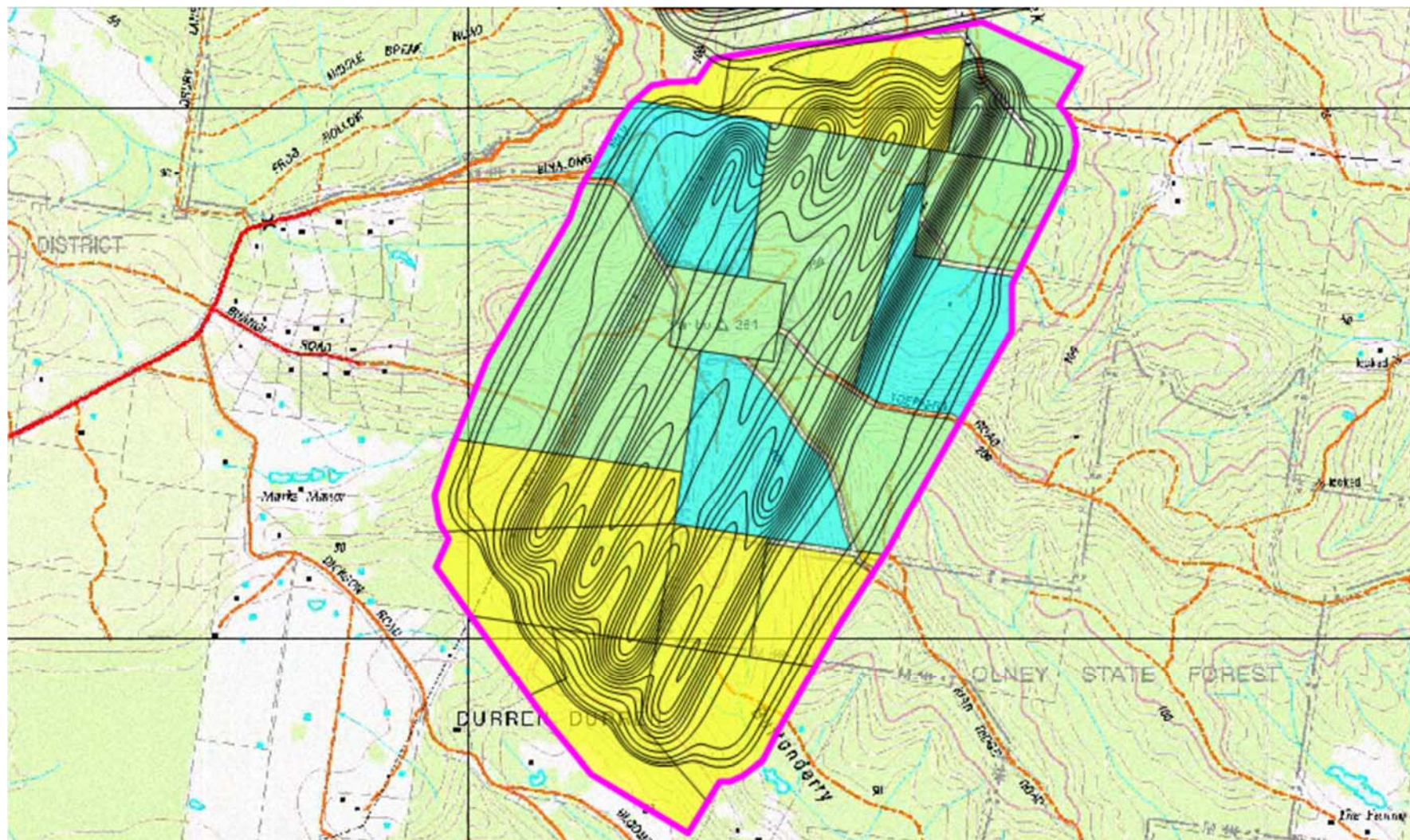


Plate 5.1 Subsidence predictions of LW30-33 within the wider project area.

© Umwelt, 2020 based on data provided by Centennial

5.2 Recording of Information During Survey

Survey units will be defined and named with reference to Requirement 5c of the Code of Practice, including recording start and finish points and/or boundaries for all survey units using a hand-held GPS receiver (set to allow recording of data with datum MGA94) and topographic mapping (where relevant), with track logs to be recorded for all pedestrian transects. Start and finish points/boundaries for survey units will be defined based on landforms, project area boundaries, access or other arbitrary terminations (as specified in the Code of Practice). The spacing between individuals will also be recorded for each survey unit.

Photographs will be undertaken for landforms/survey units (where informative). Information recorded for each survey unit will include

- Landform (in units based on those established by McDonald et al 2009)
- Gradient (where relevant)
- Vegetation
- Geology and soils (where suitable areas of exposure/visibility are present)
- Identified Aboriginal resources (food and medicine plants, prey animals, stone and water)
- Levels of average ground surface visibility within the survey unit (in accordance with the Requirement 9 of the Code of Practice)
- Extent and type of exposures within the survey unit (with reference to the factors leading to the exposure such as erosion, earth-moving activities, track establishment etc.)
- Any information provided by the registered Aboriginal parties in relation to cultural values, noting that such information will be recorded in accordance with the wishes of the party providing the information and
- Any site, area of Potential Archaeological Deposit (PAD) or landscape feature of Aboriginal cultural value present within the survey unit (see below for further information on site/PAD recording).

Any Aboriginal archaeological sites identified during the survey will be assessed with reference to the site boundaries. Factors that will be taken into consideration in defining and mapping site boundaries may include the distribution of surface artefacts, landforms or physical boundaries and cultural information.

Sufficient information will be recorded for all sites to meet Requirement 7 of the Code of Practice. The archaeological and Aboriginal cultural significance of any site will be discussed with the registered Aboriginal parties participating in the survey.

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In relation to the assessment of rockshelter sites, it is proposed that a rockshelter will only be recorded as an archaeological site where archaeological evidence is identified in association with the rockshelter. However, the commitment to record archaeological potential will apply and therefore the final assessment will note where suitable rock overhangs/shelters occur but within which no archaeological evidence was identified.

5.3 Survey Arrangements

At this stage, it is proposed to undertake the survey in early **September 2020**, however this is subject to confirmation. Further correspondence regarding survey arrangements will be provided at least two weeks prior to the proposed survey date. Additional information relating to engagement to undertake the survey is attached to this letter.

6.0 Other Requirements

The following will be required to enable commercial engagement for the work:

- Insurances are current (Workers Compensation, Public Liability and Product Liability). If you are unsure when your last insurance was entered into the Centennial system please call to confirm.
- Undertake a visitors induction at Mandalong Mine Administration Office prior to the commencement of works.
- A medical for each person attending must be provided stating fitness to complete usual tasks.
- Minimum personal protective equipment (PPE) requirements are long pants and long sleeve high visibility shirt, steel toe capped boots and hard hat in construction areas.
- Each individual will bring their own food and water.
- Adhere to a minimum expectation of behaviour where all parties behave in an appropriate and respectful manner, and that culturally sensitivity is considered.
- Arrive on time and by own travel methods.

7.0 Summary

This letter provides details of the proposed methodology for an Aboriginal Cultural Heritage Assessment associated with the Project. In accordance with the consultation requirements (DECCW 2010), we ask that your group provides comments on the draft methodology by no later than close of business **7 September 2020**. Comments regarding the draft methodology can be provided verbally or in writing to:

Ashley O'Sullivan,
Senior Archaeologist
Umwelt Environmental and Social Consultants (Umwelt)
Phone: 02 4950 5322.

Should you require any further information or wish to discuss any aspect of the Project, please do not hesitate to contact Ashley or Centennial's Iain Hornshaw (Approvals Coordinator) on 4935 8901 / iain.hornshaw@centennialcoal.com.au.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'Ashley O'Sullivan', with a long, sweeping horizontal stroke at the end.

Ashley O'Sullivan
Senior Archaeologist

Enclosures: Archaeological Fieldwork Engagement Form

**Archaeological Fieldwork Engagement Form
Mandalong Mod 9 and 10, NSW**

To: Centennial Coal
Email: iain.hornshaw@centennialcoal.com.au
Phone: 4935 8901
Attention: Iain Hornshaw (Approvals Coordinator)

Item	Response (circle response and provide detail)
Nominated field work representative and representative contact phone number.	Name: _____ Phone: _____
Our organisation has certificates of currency demonstrating a minimum of \$20,000 cover for workers compensation, public liability and product liability).	Y / N Certificates of currency must be provided before engagement can be finalised
Our organisation understands that payment terms and conditions are in accordance with those previously negotiated with Centennial, with a specified rate of pay of \$1000 per Aboriginal organisation per day. Travel will be paid at ATO rates.	Y / N
Our organisation will provide their representative with appropriate Personal Protective Equipment and Clothing (PPE&C). As a minimum, this must include: <ul style="list-style-type: none"> • Long trousers • High visibility long sleeve shirt • Steel toe capped safety boots • Hard hat (for construction areas) • Soft hat (outside construction areas). 	Y / N
Has completed the medical as required by Centennial.	Y / N Provide details/copy of completed medical.
Our representative understands that they will need to bring with them sufficient food and water for the day's work.	Y / N
Our representative has demonstrated appropriate experience, ability and reliability.	Y / N

Item	Response (circle response and provide detail)
Our representative will commit to arrive on site on time and free from the effects of drugs, alcohol and fatigue (noting that your representative may be required to undergo drug and alcohol testing in accordance with site requirements).	Y / N
Our representative will commit to behaving in a culturally appropriate manner whilst on site and will work collaboratively with the archaeologist and other Aboriginal parties (where relevant)	Y / N

Organisation: _____

Name of Authorised Person: _____

Signature: _____

Date: _____

Our Ref: 20133/NR/AO/11082020

11 August 2020

Cacatua Culture Consultants
George Sampson
22 Ibis Parade
WOODBERRY NSW 2322

Email: cacatua4service@tpg.com.au

Dear Sir/Madam

Re: Methodology for Aboriginal Cultural Heritage Assessment, Proposed Extension of Longwalls 30-33 (Modification 10) and Further Survey for Modification 9 Extraction Plan, Mandalong Mine

Centennial Mandalong is currently seeking approval for the continuation of mining with the Mandalong South area associated with both Modification 9 and Modification 10. This project, herein after referred to as 'Mandalong South Assessment Area', comprises both further survey required to support a Heritage Management Plan (HMP) associated with an Extraction Plan required for Modification 9 and an Aboriginal Cultural Heritage Assessment (ACHA) associated with Modification 10. The project area, including all areas of proposed works, is shown in **Plate 1.1** and **Plate 1.2**.

Umwelt Environmental and Social Consultants (Umwelt) have been engaged by Centennial Mandalong to prepare a HMP for Modification 9 and an ACHA (incorporating an archaeological technical report) for Modification 10 in consultation with the registered Aboriginal parties, including your organisation.

The HMP for Modification 9 will be completed in accordance with the relevant conditions of approval. The ACHA will form part of the Environmental Impact Statement (EIS) for the proposed modification (Modification 10), and will be undertaken in accordance with the requirements of the *National Parks and Wildlife Act 1974* (NPW Act), the *National Parks and Wildlife Regulation 2019* (NPW Regulation), the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (Office of Environment and Heritage [OEH] 2011), the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (Department of Environment, Climate Change and Water [DECCW] 2010) (the consultation requirements) and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice).

As a registered Aboriginal party for Mandalong Mine, we are writing to provide you with the draft methodology for the ACHA and a methodology for additional survey to inform the HMP for your review and comment.

1.0 Description of the Project

A summary of both projects are provided below, with reference to the requirements satisfied by this methodology and accompanying assessments.

1.1 Modification 9 HMP

Modification 9 relates to the proposed re-orientation of a number of existing longwall panels due to challenging geological conditions. The Modification 9 area was included within the larger area assessed as part of the original Aboriginal cultural heritage assessment (RPS 2013) undertaken to inform the application for SSD-5144. At the time of the assessment, six land parcels within the Modification 9 area could not be surveyed due to lack of landholder consent. In accordance with Schedule 4, Condition 8 of the Mandalong Mine consent (SSD-5144), best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. An additional assessment of part of the Modification 9 area was conducted by Umwelt (2020) and the former Native Title claimant parties to satisfy the conditions of a Section 31 Deed of Agreement. These parcels comprised areas of State Forest already partially assessed by RPS (2013).

As a result of the RPS (2013) assessment, 21 Aboriginal archaeological sites are listed on the Aboriginal Heritage Information Management System (AHIMS) as being located within the Modification 9 area, of which one is a duplicate record. These sites comprise six rockshelters, four sets of grinding grooves, five sites identified as being associated with Aboriginal resources, three sites containing stone artefacts and two areas of Potential Archaeological Deposit (PAD). One historical heritage item (L1 – log landing site) was identified within the Mod 9 area however, based on subsidence predictions, it is understood that this site is unlikely to be impacted.

Of the parcels of land assessed by Umwelt (2020) within the Modification 9 area, Lot 175 DP755271 did not contain any identified sites and the potential for sites to be present (but not currently visible) within this parcel was assessed as low based on the extent of survey and the nature of landforms within this area. On this basis, it is not proposed to resurvey this lot as part of the development of the HMP. Lot 115 and 122 DP755238 were also assessed by Umwelt (2019) and no new sites were identified. However, it was noted that these lots were largely inaccessible at the time of survey.

The HMP is required to meet the relevant conditions of the Modification 9 consent. As this has not yet been issued (Centennial Mandalong are currently preparing responses to the public / agency submissions), it is assumed that conditions will be consistent with those in the Modification 8 consent. Schedule 6, Condition 6(l) specifies that an extraction plan must be developed and must include a HMP 'which has been prepared in consultation with the Biodiversity Conservation Division and Registered Aboriginal parties, to manage the potential environmental consequences of the proposed second workings on both Aboriginal and non-Aboriginal heritage items, and reflects the requirements of condition 22 of Schedule 3.' Condition 22 of Schedule 3 specifies requirements to be addressed in the HMP.

1.2 Modification 10

Further to the reorientation of longwall panels under Modification 9, Mandalong is proposing to extend the reorientated panels, with this proposal referred to as Modification 10.

Modification 10 will involve the extensions of LW30-33 to the south of the current longwall plan, as shown by the increase in project footprint in **Plate 1.1** and **Plate 1.2**.

An Aboriginal Cultural Heritage Assessment (ACHA) has been determined as being required to assess the impact of proposed Modification 10 to identified Aboriginal sites (one is located within the boundary of the Modification 10 extension) or as yet unidentified Aboriginal objects or sites.

1.3 Combined Survey Effort

As there are a number of either overlapping areas or blocks in close proximity related to the Modification 9 HMP and Modification 10 ACHA, Umwelt is proposing to undertake the survey as one concerted survey effort. This information is summarised in **Plate 1.1** and **Plate 1.2** below. Green shading shows areas previously surveyed and not requiring further survey and yellow shading indicates the areas that will be surveyed for the Mod 10 Aboriginal cultural heritage assessment. The remaining properties within the Mod 9 area that have not been subject to prior survey are shaded in aqua. In accordance with Schedule 4, Condition 8 of the Modification 8 consent, best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. The previously unsurveyed properties shown in aqua in **Plate 1.2** will be therefore surveyed as part of the development of the Modification 9 HMP and Modification 10 ACHA.

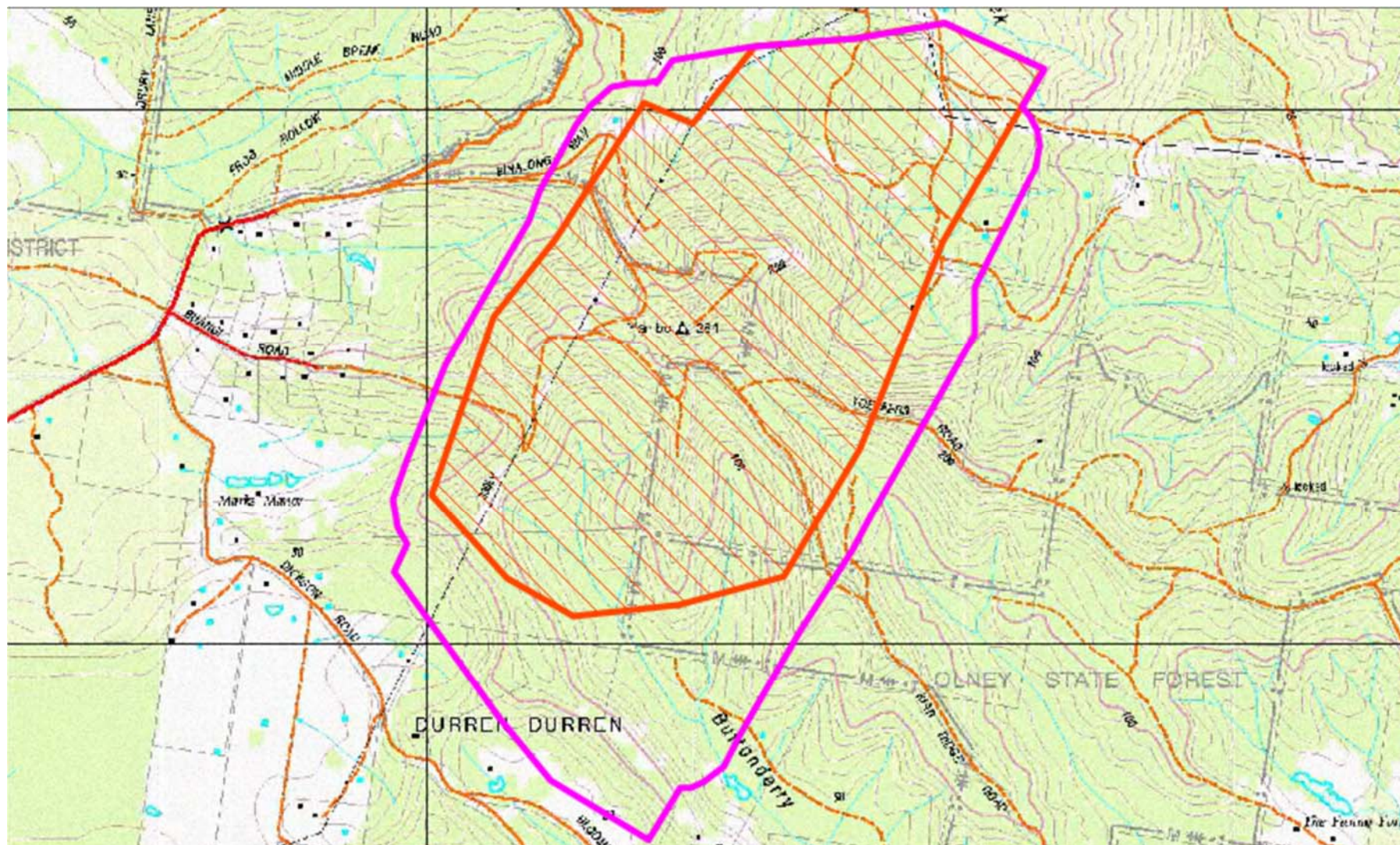


Plate 1.1 Mod 9 and Mod 10 areas (red hatching is Mod 9 area) showing the increase in footprint. Specifically, the increase in footprint to the south includes areas that have not yet been assessed during previous submissions.

© Umwelt, 2020 based on data provided by Centennial

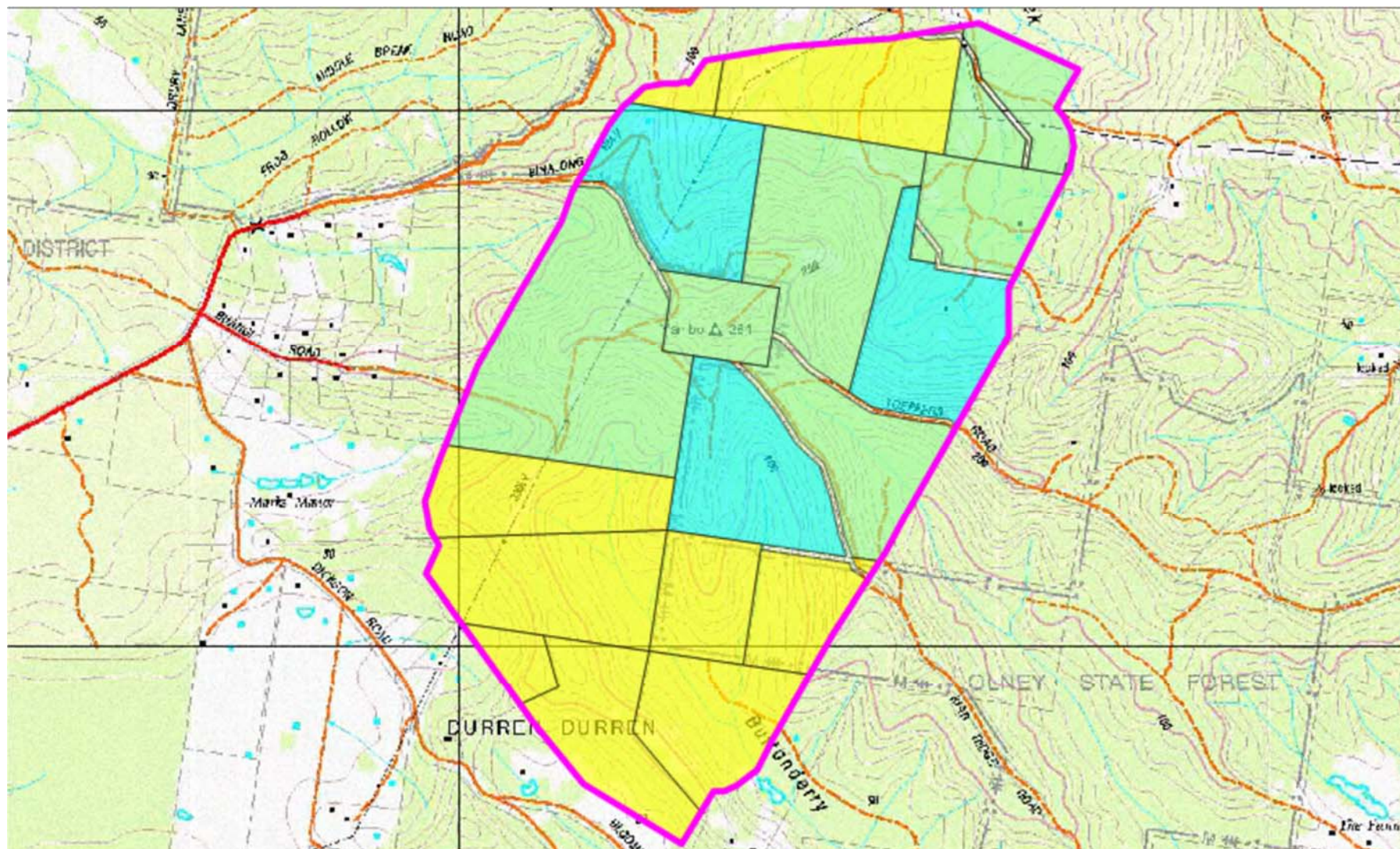


Plate 1.2 Mod 9 and Mod 10 areas showing survey requirements (green = does not require additional survey, yellow = to be surveyed for Mod 10 ACHA, aqua = to be surveyed for Mod 9 HMP)

© Umwelt, 2020 based on data provided by Centennial

2.0 Description of the Project Area

For the purposes of the ACHA, the area proposed for impact as a result of the project comprises the proposed re-alignment area of LW30-33 (Modification 9) and the proposed extension of LW30-33 (Modification 10), the 'assessment area'.

The assessment area is located within the Narrabeen Group geological group, specifically the Patonga Claystone and Tuggerah Formations within the Clifton Subgroup. These formations comprise deposits of siltstones, claystones and areas of sandstone (Murphy 1993). Based on the geological description of mudstones within this formation, it is unlikely that they were of a quality suitable for the manufacture of stone artefacts (with the mudstone typically referenced in archaeological sites better technically described as an indurated rhyolitic tuff). It does not appear that stone raw materials suitable for artefact manufacture would have been available within the assessment area, but would have been sourced from other locations within the region. In terms of other archaeological implications, the presence of sandstone within the geology of the assessment area indicates that, should sandstone outcrops be present, it may be possible that site types such as grinding grooves or engravings may occur.

The assessment area is underlain by the Mandalong, Gorokan and Woodburys Bridge soil landscapes, as shown in **Plate 2.1**. These three soil landscapes are highly acidic and prone to toxic concentration of aluminium (Murphy, 1993). Typical soil profiles vary with landform/geology, but are typically relatively shallow. These soils are typically moderately erodible, with levels of erosion linked to landform. The depth of topsoil is a critical consideration for the likely presence of sub-surface archaeological deposits because intact deposits are typically only found within A horizon soils. Erosion acts to expose deposits that were formerly sub-surface and impacts on the potential for deposits to retain archaeological integrity.

The areas surrounding the Mandalong South assessment area have been subject to previous archaeological assessments, and these previous assessments have resulted in the identification of a number of archaeological sites. The most common site type recorded in the search area is artefact scatters, followed by modified trees (carved or scarred). Within the surrounding landscape, these site types have not been recorded in association with specific landforms but do seem to correlate with less disturbed land. Shell midden sites have also been recorded, particularly in proximity to the foreshore of Lake Macquarie (located outside of the assessment area). Potential archaeological deposits, habitation structures and Aboriginal Ceremony and Dreaming sites have also been recorded, though these site types are all located outside of the current assessment area.

Within the assessment area itself, five Aboriginal archaeological sites have been recorded, including:

- Two potential archaeological deposits (45-3-3513 and 45-3-3514)
- Two grinding grooves (45-3-1226, 45-3-3512)
- One art engraving site (45-3-1228).

2.1 Previous Investigations

RPS (2013) completed an assessment of 2,360 ha of private and public land for the now approved Mandalong Southern Extension project. The assessment resulted in the recording of 130 new archaeological sites in addition to 20 previously recorded sites. The most common site types were grinding grooves, rockshelters with PAD and scarred trees, although several artefact scatters were recorded in addition to stone arrangements.

The Mandalong Southern Extension Area is characterised by steeply inclined ridges with first and second order streams/drainage lines that drain into Morans Creek in the north and east. Typically rockshelters were located on or within 200 m of the ridge crests and were formed from weathering sheets of sandstone or large boulders.

Grinding groove sites were located in the first and second order drainage lines and were typically identified on smooth, fine-grained sandstone sheets at elevations between 80 and 100 m AHD. It was observed that sandstone exposed in drainage lines above 100 m elevation tended to be rough and unsuitable for grinding grooves. Sandstone below 80 m tended to be more 'blocky' and did not have flat surfaces suitable for grinding grooves. Larger sandstone sheets were noted at the confluence of drainage lines and thus provided larger surfaces for grinding grooves. The numbers of grooves within each site ranged from single grooves to over 25 grooves at three sites. The majority of grinding grooves appeared to be for sharpening stone hatchet heads and typically were between 20 and 40 centimetres (cm) in length. Often pools of water were identified in close proximity to the grooves.

Artefact scatters were identified on the passes between catchments or on the gently sloped valley floor where Morans Creek became a third order stream. There was no distinct spatial patterning for scarred trees, however it was recognised that the area had previously been logged and thus the scarred trees identified probably represented a very small sample of their original distribution. In general, scarred trees were identified in areas that were inaccessible to logging, such as on steep slopes for which there was no vehicle access, or near steeply sided watercourses. Stone arrangements were generally comprised of vertically heaped blocks of stone, or arranged in a circle; the stone blocks tended to be over 40 cm in length.

In reviewing these results, RPS (2013) suggested that the distribution of sites indicates that Aboriginal camping activities took place on the valley floors and in rockshelters and benching landforms on the ridgelines and upper slope/crest landforms and that the transition between these areas was potentially undertaken along watercourses (first and second order) as evidenced by the regular occurrence of grinding grooves. RPS (2013) noted that the Mandalong Southern Extension area may have been utilised as a transit route between the low-lying lacustrine environments and the Watagan uplands. The presence of grinding groove sites with more than 20 grooves was considered to support the proposition that the area may have supported larger groups of Aboriginal people than previously thought.

In relation to potential impacts and mitigation requirements for the identified sites regarding the original Mandalong Southern Extension Project, it was assessed that the majority of the sites were 'unlikely' or 'very unlikely' to be impacted by proposed longwall mining.

It is anticipated that the above described spatial distribution of sites in the landscape will be applicable to the current project areas. The results of RPS' survey, as well as other surveys undertaken in the area will be used to formulate the predictive model for the ACHA currently being prepared.

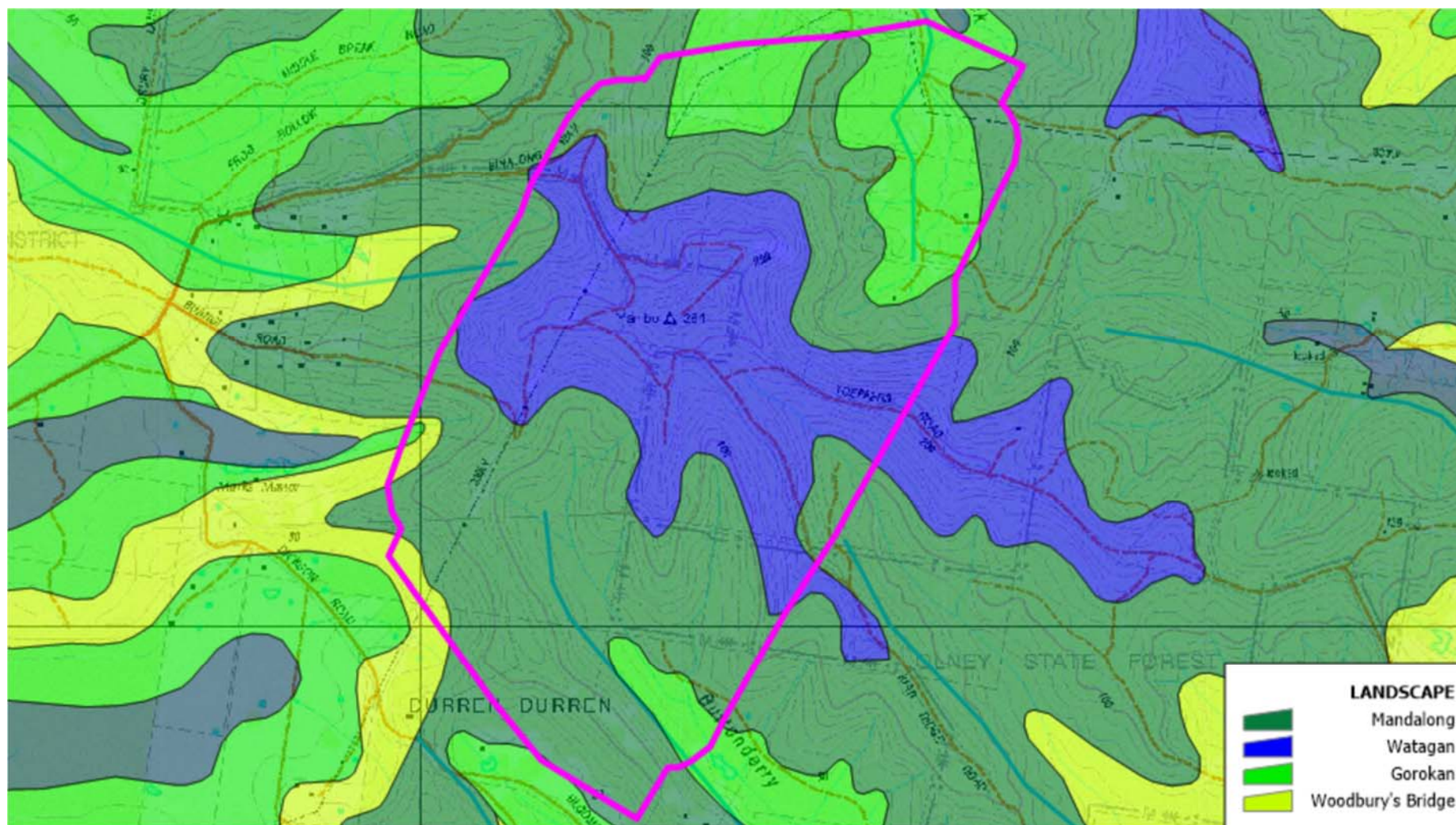


Plate 2.1 Soil Landscape located within the wider project area.

© Umwelt, 2020 based on data provided by Centennial

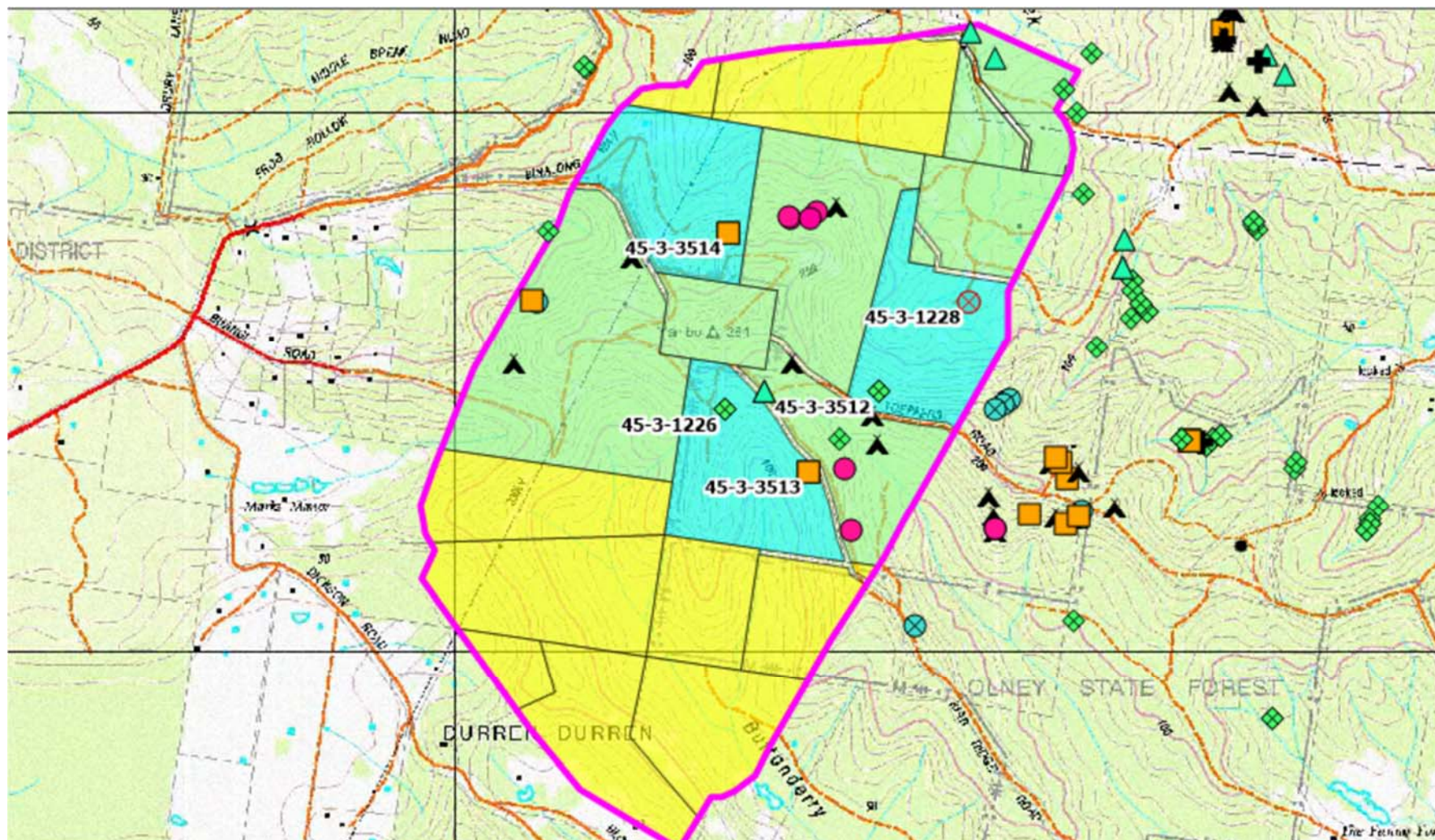


Plate 2.2 AHIMS results in proximity to the wider project area, with the three sites within the assessment area labelled above.

© Umwelt, 2020 based on data provided by Centennial and AHIMS

3.0 Methodology for the Aboriginal Cultural Heritage and Archaeological Assessment

As discussed in **Section 1.0**, the consultation process will be undertaken in accordance with the consultation requirements (DECCW 2010). The proposed methodology for the ACHA (pending comments from registered Aboriginal parties) is as follows:

1. Provide information to all registered Aboriginal parties regarding the project, including a draft methodology for review and comment (this letter).
2. Provision of a review period during which Aboriginal parties can provide comment and propose amendments to the draft methodology (up to 28 days from receipt of this letter, with comments due by close of business **7 September 2020**).
3. Completion of a survey of the project area in accordance with the draft methodology provided in this assessment (refer to **Section 5.0**).
4. Develop a draft ACHA report to include:
 - details of the nature of the project
 - details of the assessment requirements regarding Aboriginal cultural heritage, and how the ACHA report addresses these requirements, including:
 - identification of the Aboriginal cultural heritage values that exist across the area that will be impacted by the development. Identification of these values should be guided by the *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011)*.
 - consultation with Aboriginal people in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW)*. Full details of this consultation process will be captured.
 - documentation of the potential impacts of the development on Aboriginal cultural heritage values, and demonstration of attempts to avoid impact and identify any conservation outcomes.
 - records of any objects identified during the assessment and provision of this documentation to OEH
 - the results of an Aboriginal Heritage Information Management System (AHIMS) search and Native Title search
 - a review of the cultural context of the area that will draw heavily on information provided by registered Aboriginal parties and the results of previous cultural heritage and archaeological assessments undertaken in the area
 - a review of background information related to the environmental characteristics of the Mod 10 assessment area that may have determined how Aboriginal people may have occupied/utilised the area and the likelihood of site survival
 - the preparation of a predictive model drawing on all of the above
 - details of the survey methodology and results
 - details of any sites/objects/potential archaeological deposits located during the survey

- an assessment of the Aboriginal cultural heritage significance (as provided by the registered Aboriginal parties) of the Mod 10 assessment area
 - an assessment of the archaeological significance of any sites/objects/potential archaeological deposits identified within the Mod 10 assessment area
 - an assessment of the potential impact by the project to any sites/objects/potential archaeological deposits identified within the Mod 10 assessment area
 - a discussion of management options and
 - management recommendations.
5. The provision of the draft ACHA report to registered Aboriginal parties for review and comment (comment period extends for 28 days from date of provision of the draft ACHA).
 6. Discussion/incorporation of comments/responses received from Aboriginal parties to develop and finalise the ACHA report.
 7. Provision of the final ACHA report to registered Aboriginal parties and to Centennial Coal for inclusion within the EIS.

4.0 Consultation with Aboriginal Parties During the Assessment Process

Umwelt acknowledges and understands that cultural values, by definition, relate to values outside those associated with specific archaeological sites/objects. Throughout the assessment process, we invite comment from Aboriginal parties regarding any cultural values associated with the Mod 10 assessment area and will ensure that any information provided regarding cultural values (be they associated with a specific site or provided with reference to a landscape feature or within a broader context) are documented and recorded in accordance with the wishes of the relevant Aboriginal party for inclusion in the ACHA report. We note that the inclusion of any such information in the final assessment is dependent on its provision by the Aboriginal parties.

We note that Section 3.2 of the consultation requirements specifies that the objective of consultation is to ensure 'that Aboriginal people have the opportunity to improve assessment outcomes'. Factors specified as assisting in meeting this objective include providing Aboriginal parties with the opportunity to provide information on cultural values (as invited in this draft methodology), influence methods regarding assessment of significance for Aboriginal objects/places (which can be undertaken in response to this draft methodology, during fieldwork and in commenting on the draft ACHA report) and commenting on the draft ACHA report. Our approach is designed to ensure compliance with this objective, including the potential for in-field consultation with Aboriginal party representatives during fieldwork. Umwelt archaeologists are trained to seek and document cultural feedback provided by Aboriginal party representatives during fieldwork. This is not limited to cultural values associated with archaeological sites but may encompass any values identified by Aboriginal people.

We look forward to working with your organisation throughout the project to ensure that we adequately document any information you wish to provide regarding Aboriginal cultural values. Please feel free to contact us to request any additional information or assistance you may require to facilitate the provision of your input.

5.0 Survey Methodology

The draft survey methodology is designed to ensure compliance with requirements for archaeological survey as established in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice). This includes development of an appropriate sampling strategy and recording of information during survey. This survey methodology will be utilised for both the reporting required within the HMP and ACHA.

5.1 Sampling Strategy

The survey will be undertaken to ensure that a representative sample of all landforms within the area is surveyed, as required to ensure compliance with Code of Practice.

Areas that will be subject to the greatest amount of potential subsidence impact (subsidence contours are shown in **Plate 5.1**) will be subject to intensive survey. This includes drainage lines (in association with which grinding grooves may be identified), slope areas likely to contain rock outcrop suitable for use as shelter (in association with which rockshelter sites may be identified) and crests and ridges (in association with which stone arrangements may be identified) where these landforms are mapped as intersecting with areas of subsidence.

All efforts will be made to achieve maximum survey coverage via pedestrian survey. It is noted, however, that vehicle transects may be used in some areas based on limited archaeological potential and/or where vegetation limits access and visibility. It is intended that the survey will be conducted over the course of up to 6-8 days by two archaeologists and up to four Aboriginal party representatives however this may be subject to change based on the number of sites recorded, ground surface visibility and other variables.

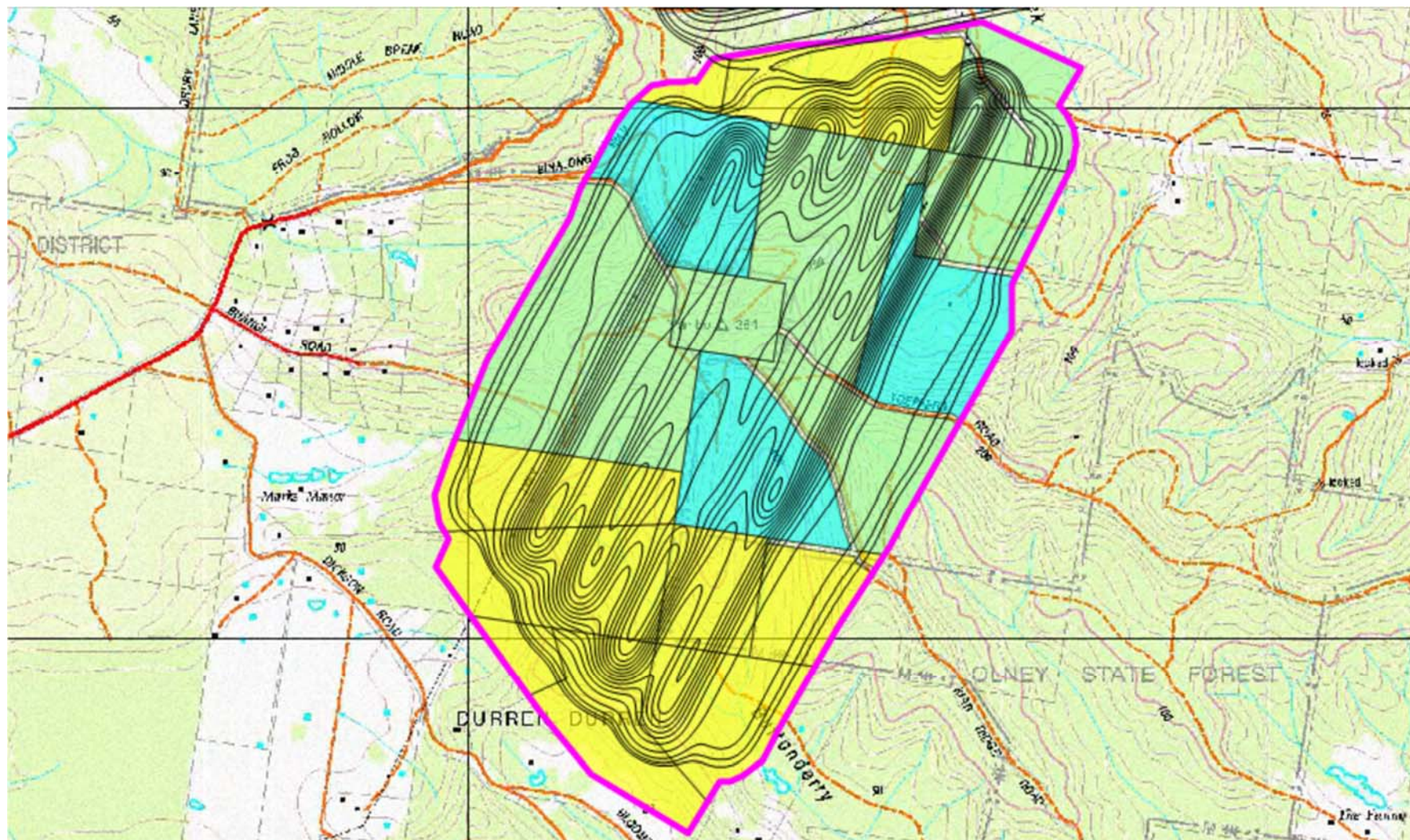


Plate 5.1 Subsidence predictions of LW30-33 within the wider project area.

© Umwelt, 2020 based on data provided by Centennial

5.2 Recording of Information During Survey

Survey units will be defined and named with reference to Requirement 5c of the Code of Practice, including recording start and finish points and/or boundaries for all survey units using a hand-held GPS receiver (set to allow recording of data with datum MGA94) and topographic mapping (where relevant), with track logs to be recorded for all pedestrian transects. Start and finish points/boundaries for survey units will be defined based on landforms, project area boundaries, access or other arbitrary terminations (as specified in the Code of Practice). The spacing between individuals will also be recorded for each survey unit.

Photographs will be undertaken for landforms/survey units (where informative). Information recorded for each survey unit will include

- Landform (in units based on those established by McDonald et al 2009)
- Gradient (where relevant)
- Vegetation
- Geology and soils (where suitable areas of exposure/visibility are present)
- Identified Aboriginal resources (food and medicine plants, prey animals, stone and water)
- Levels of average ground surface visibility within the survey unit (in accordance with the Requirement 9 of the Code of Practice)
- Extent and type of exposures within the survey unit (with reference to the factors leading to the exposure such as erosion, earth-moving activities, track establishment etc.)
- Any information provided by the registered Aboriginal parties in relation to cultural values, noting that such information will be recorded in accordance with the wishes of the party providing the information and
- Any site, area of Potential Archaeological Deposit (PAD) or landscape feature of Aboriginal cultural value present within the survey unit (see below for further information on site/PAD recording).

Any Aboriginal archaeological sites identified during the survey will be assessed with reference to the site boundaries. Factors that will be taken into consideration in defining and mapping site boundaries may include the distribution of surface artefacts, landforms or physical boundaries and cultural information.

Sufficient information will be recorded for all sites to meet Requirement 7 of the Code of Practice. The archaeological and Aboriginal cultural significance of any site will be discussed with the registered Aboriginal parties participating in the survey.

The archaeological potential of landforms/specific areas within the assessment area will be assessed with reference to factors including the archaeological context of the local area, the evaluation of the soil profile (based on soil landscape mapping, exposed soil profiles identified during the survey and geomorphic understandings of the area) and the identification of landforms that may have greater archaeological sensitivity. The extent of any area of identified archaeological potential will be defined and documented for inclusion in subsequent reporting. The archaeological and Aboriginal cultural significance of any area of identified archaeological potential will be discussed with the registered Aboriginal parties participating in the survey.

In relation to the assessment of rockshelter sites, it is proposed that a rockshelter will only be recorded as an archaeological site where archaeological evidence is identified in association with the rockshelter. However, the commitment to record archaeological potential will apply and therefore the final assessment will note where suitable rock overhangs/shelters occur but within which no archaeological evidence was identified.

5.3 Survey Arrangements

At this stage, it is proposed to undertake the survey in early **September 2020**, however this is subject to confirmation. Further correspondence regarding survey arrangements will be provided at least two weeks prior to the proposed survey date. Additional information relating to engagement to undertake the survey is attached to this letter.

6.0 Other Requirements

The following will be required to enable commercial engagement for the work:

- Insurances are current (Workers Compensation, Public Liability and Product Liability). If you are unsure when your last insurance was entered into the Centennial system please call to confirm.
- Undertake a visitors induction at Mandalong Mine Administration Office prior to the commencement of works.
- A medical for each person attending must be provided stating fitness to complete usual tasks.
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- Each individual will bring their own food and water.
- Adhere to a minimum expectation of behaviour where all parties behave in an appropriate and respectful manner, and that culturally sensitivity is considered.
- Arrive on time and by own travel methods.

7.0 Summary

This letter provides details of the proposed methodology for an Aboriginal Cultural Heritage Assessment associated with the Project. In accordance with the consultation requirements (DECCW 2010), we ask that your group provides comments on the draft methodology by no later than close of business **7 September 2020**. Comments regarding the draft methodology can be provided verbally or in writing to:

Ashley O'Sullivan,
Senior Archaeologist
Umwelt Environmental and Social Consultants (Umwelt)
Phone: 02 4950 5322.

Should you require any further information or wish to discuss any aspect of the Project, please do not hesitate to contact Ashley or Centennial's Iain Hornshaw (Approvals Coordinator) on 4935 8901 / iain.hornshaw@centennialcoal.com.au.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'Ashley O'Sullivan', with a long, sweeping horizontal line extending to the right.

Ashley O'Sullivan
Senior Archaeologist

Enclosures: Archaeological Fieldwork Engagement Form

**Archaeological Fieldwork Engagement Form
Mandalong Mod 9 and 10, NSW**

To: Centennial Coal
Email: iain.hornshaw@centennialcoal.com.au
Phone: 4935 8901
Attention: Iain Hornshaw (Approvals Coordinator)

Item	Response (circle response and provide detail)
Nominated field work representative and representative contact phone number.	Name: _____ Phone: _____
Our organisation has certificates of currency demonstrating a minimum of \$20,000 cover for workers compensation, public liability and product liability).	Y / N Certificates of currency must be provided before engagement can be finalised
Our organisation understands that payment terms and conditions are in accordance with those previously negotiated with Centennial, with a specified rate of pay of \$1000 per Aboriginal organisation per day. Travel will be paid at ATO rates.	Y / N
Our organisation will provide their representative with appropriate Personal Protective Equipment and Clothing (PPE&C). As a minimum, this must include: <ul style="list-style-type: none"> • Long trousers • High visibility long sleeve shirt • Steel toe capped safety boots • Hard hat (for construction areas) • Soft hat (outside construction areas). 	Y / N
Has completed the medical as required by Centennial.	Y / N Provide details/copy of completed medical.
Our representative understands that they will need to bring with them sufficient food and water for the day's work.	Y / N
Our representative has demonstrated appropriate experience, ability and reliability.	Y / N

Item	Response (circle response and provide detail)
Our representative will commit to arrive on site on time and free from the effects of drugs, alcohol and fatigue (noting that your representative may be required to undergo drug and alcohol testing in accordance with site requirements).	Y / N
Our representative will commit to behaving in a culturally appropriate manner whilst on site and will work collaboratively with the archaeologist and other Aboriginal parties (where relevant)	Y / N

Organisation: _____

Name of Authorised Person: _____

Signature: _____

Date: _____

Our Ref: 20133/NR/AO/11082020

11 August 2020

Darkinjung Local Aboriginal Land Council
CEO / Cultural Officer
PO Box 401
WYONG NSW 2259

Email: amanda.shields@dlalc.org.au

Dear Sir/Madam

Re: Methodology for Aboriginal Cultural Heritage Assessment, Proposed Extension of Longwalls 30-33 (Modification 10) and Further Survey for Modification 9 Extraction Plan, Mandalong Mine

Centennial Mandalong is currently seeking approval for the continuation of mining with the Mandalong South area associated with both Modification 9 and Modification 10. This project, herein after referred to as 'Mandalong South Assessment Area', comprises both further survey required to support a Heritage Management Plan (HMP) associated with an Extraction Plan required for Modification 9 and an Aboriginal Cultural Heritage Assessment (ACHA) associated with Modification 10. The project area, including all areas of proposed works, is shown in **Plate 1.1** and **Plate 1.2**.

Umwelt Environmental and Social Consultants (Umwelt) have been engaged by Centennial Mandalong to prepare a HMP for Modification 9 and an ACHA (incorporating an archaeological technical report) for Modification 10 in consultation with the registered Aboriginal parties, including your organisation.

The HMP for Modification 9 will be completed in accordance with the relevant conditions of approval. The ACHA will form part of the Environmental Impact Statement (EIS) for the proposed modification (Modification 10), and will be undertaken in accordance with the requirements of the *National Parks and Wildlife Act 1974* (NPW Act), the *National Parks and Wildlife Regulation 2019* (NPW Regulation), the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (Office of Environment and Heritage [OEH] 2011), the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (Department of Environment, Climate Change and Water [DECCW] 2010) (the consultation requirements) and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice).

As a registered Aboriginal party for Mandalong Mine, we are writing to provide you with the draft methodology for the ACHA and a methodology for additional survey to inform the HMP for your review and comment.

1.0 Description of the Project

A summary of both projects are provided below, with reference to the requirements satisfied by this methodology and accompanying assessments.

1.1 Modification 9 HMP

Modification 9 relates to the proposed re-orientation of a number of existing longwall panels due to challenging geological conditions. The Modification 9 area was included within the larger area assessed as part of the original Aboriginal cultural heritage assessment (RPS 2013) undertaken to inform the application for SSD-5144. At the time of the assessment, six land parcels within the Modification 9 area could not be surveyed due to lack of landholder consent. In accordance with Schedule 4, Condition 8 of the Mandalong Mine consent (SSD-5144), best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. An additional assessment of part of the Modification 9 area was conducted by Umwelt (2020) and the former Native Title claimant parties to satisfy the conditions of a Section 31 Deed of Agreement. These parcels comprised areas of State Forest already partially assessed by RPS (2013).

As a result of the RPS (2013) assessment, 21 Aboriginal archaeological sites are listed on the Aboriginal Heritage Information Management System (AHIMS) as being located within the Modification 9 area, of which one is a duplicate record. These sites comprise six rockshelters, four sets of grinding grooves, five sites identified as being associated with Aboriginal resources, three sites containing stone artefacts and two areas of Potential Archaeological Deposit (PAD). One historical heritage item (L1 – log landing site) was identified within the Mod 9 area however, based on subsidence predictions, it is understood that this site is unlikely to be impacted.

Of the parcels of land assessed by Umwelt (2020) within the Modification 9 area, Lot 175 DP755271 did not contain any identified sites and the potential for sites to be present (but not currently visible) within this parcel was assessed as low based on the extent of survey and the nature of landforms within this area. On this basis, it is not proposed to resurvey this lot as part of the development of the HMP. Lot 115 and 122 DP755238 were also assessed by Umwelt (2019) and no new sites were identified. However, it was noted that these lots were largely inaccessible at the time of survey.

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1.2 Modification 10

Further to the reorientation of longwall panels under Modification 9, Mandalong is proposing to extend the reorientated panels, with this proposal referred to as Modification 10.

Modification 10 will involve the extensions of LW30-33 to the south of the current longwall plan, as shown by the increase in project footprint in **Plate 1.1** and **Plate 1.2**.

An Aboriginal Cultural Heritage Assessment (ACHA) has been determined as being required to assess the impact of proposed Modification 10 to identified Aboriginal sites (one is located within the boundary of the Modification 10 extension) or as yet unidentified Aboriginal objects or sites.

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As there are a number of either overlapping areas or blocks in close proximity related to the Modification 9 HMP and Modification 10 ACHA, Umwelt is proposing to undertake the survey as one concerted survey effort. This information is summarised in **Plate 1.1** and **Plate 1.2** below. Green shading shows areas previously surveyed and not requiring further survey and yellow shading indicates the areas that will be surveyed for the Mod 10 Aboriginal cultural heritage assessment. The remaining properties within the Mod 9 area that have not been subject to prior survey are shaded in aqua. In accordance with Schedule 4, Condition 8 of the Modification 8 consent, best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. The previously unsurveyed properties shown in aqua in **Plate 1.2** will be therefore surveyed as part of the development of the Modification 9 HMP and Modification 10 ACHA.

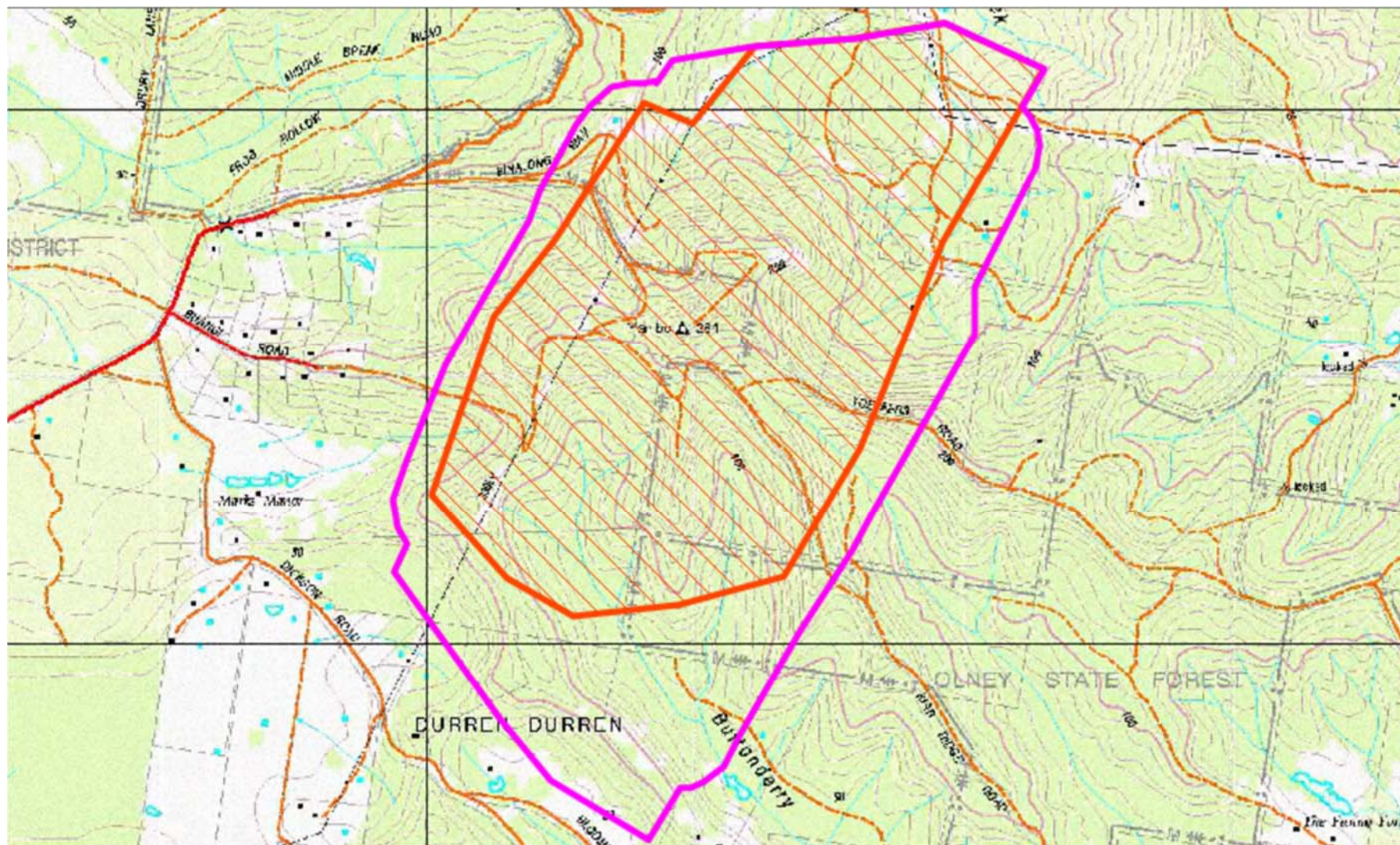


Plate 1.1 Mod 9 and Mod 10 areas (red hatching is Mod 9 area) showing the increase in footprint. Specifically, the increase in footprint to the south includes areas that have not yet been assessed during previous submissions.

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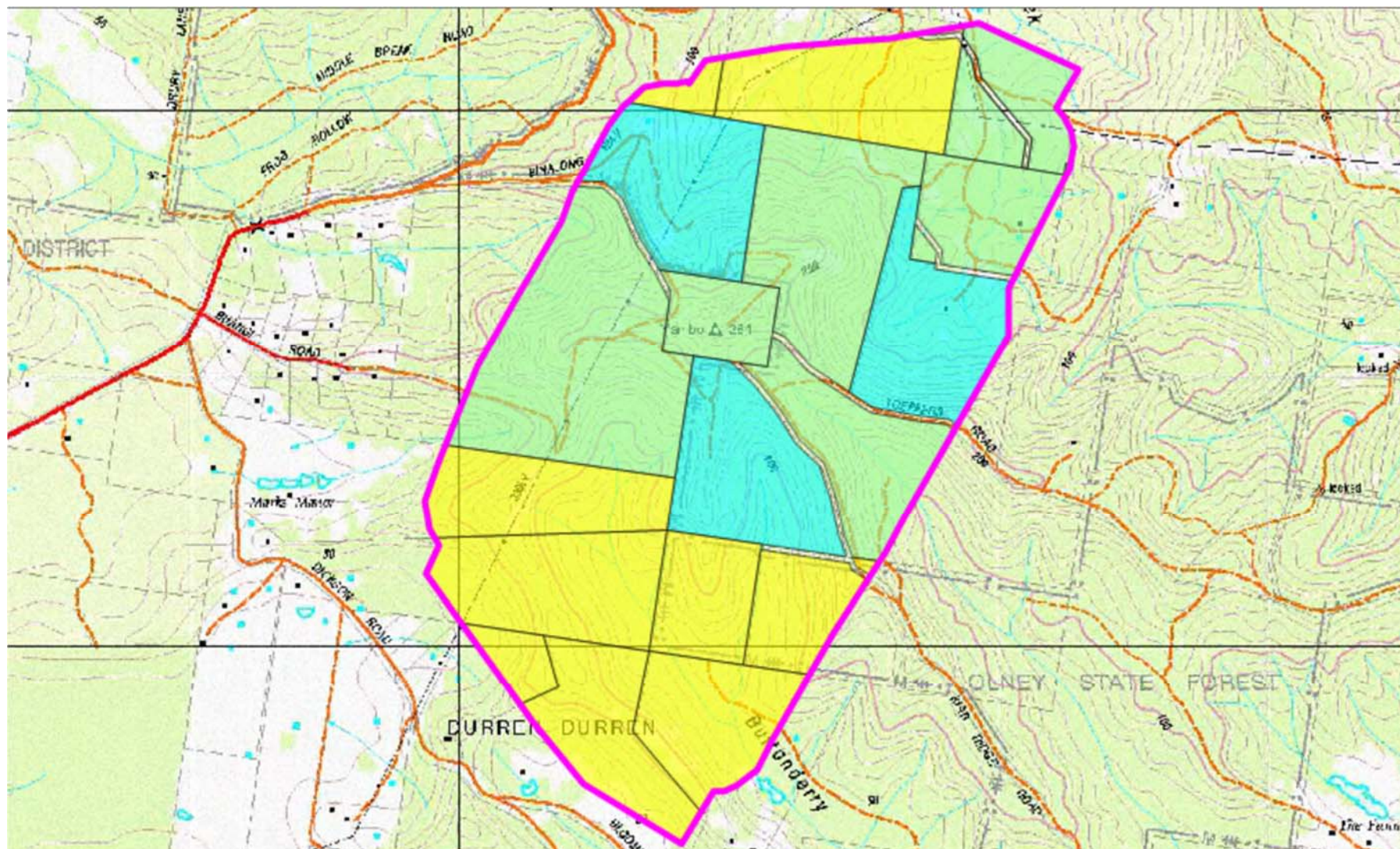


Plate 1.2 Mod 9 and Mod 10 areas showing survey requirements (green = does not require additional survey, yellow = to be surveyed for Mod 10 ACHA, aqua = to be surveyed for Mod 9 HMP)

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2.0 Description of the Project Area

For the purposes of the ACHA, the area proposed for impact as a result of the project comprises the proposed re-alignment area of LW30-33 (Modification 9) and the proposed extension of LW30-33 (Modification 10), the 'assessment area'.

The assessment area is located within the Narrabeen Group geological group, specifically the Patonga Claystone and Tuggerah Formations within the Clifton Subgroup. These formations comprise deposits of siltstones, claystones and areas of sandstone (Murphy 1993). Based on the geological description of mudstones within this formation, it is unlikely that they were of a quality suitable for the manufacture of stone artefacts (with the mudstone typically referenced in archaeological sites better technically described as an indurated rhyolitic tuff). It does not appear that stone raw materials suitable for artefact manufacture would have been available within the assessment area, but would have been sourced from other locations within the region. In terms of other archaeological implications, the presence of sandstone within the geology of the assessment area indicates that, should sandstone outcrops be present, it may be possible that site types such as grinding grooves or engravings may occur.

The assessment area is underlain by the Mandalong, Gorokan and Woodburys Bridge soil landscapes, as shown in **Plate 2.1**. These three soil landscapes are highly acidic and prone to toxic concentration of aluminium (Murphy, 1993). Typical soil profiles vary with landform/geology, but are typically relatively shallow. These soils are typically moderately erodible, with levels of erosion linked to landform. The depth of topsoil is a critical consideration for the likely presence of sub-surface archaeological deposits because intact deposits are typically only found within A horizon soils. Erosion acts to expose deposits that were formerly sub-surface and impacts on the potential for deposits to retain archaeological integrity.

The areas surrounding the Mandalong South assessment area have been subject to previous archaeological assessments, and these previous assessments have resulted in the identification of a number of archaeological sites. The most common site type recorded in the search area is artefact scatters, followed by modified trees (carved or scarred). Within the surrounding landscape, these site types have not been recorded in association with specific landforms but do seem to correlate with less disturbed land. Shell midden sites have also been recorded, particularly in proximity to the foreshore of Lake Macquarie (located outside of the assessment area). Potential archaeological deposits, habitation structures and Aboriginal Ceremony and Dreaming sites have also been recorded, though these site types are all located outside of the current assessment area.

Within the assessment area itself, five Aboriginal archaeological sites have been recorded, including:

- Two potential archaeological deposits (45-3-3513 and 45-3-3514)
- Two grinding grooves (45-3-1226, 45-3-3512)
- One art engraving site (45-3-1228).

2.1 Previous Investigations

RPS (2013) completed an assessment of 2,360 ha of private and public land for the now approved Mandalong Southern Extension project. The assessment resulted in the recording of 130 new archaeological sites in addition to 20 previously recorded sites. The most common site types were grinding grooves, rockshelters with PAD and scarred trees, although several artefact scatters were recorded in addition to stone arrangements.

The Mandalong Southern Extension Area is characterised by steeply inclined ridges with first and second order streams/drainage lines that drain into Morans Creek in the north and east. Typically rockshelters were located on or within 200 m of the ridge crests and were formed from weathering sheets of sandstone or large boulders.

Grinding groove sites were located in the first and second order drainage lines and were typically identified on smooth, fine-grained sandstone sheets at elevations between 80 and 100 m AHD. It was observed that sandstone exposed in drainage lines above 100 m elevation tended to be rough and unsuitable for grinding grooves. Sandstone below 80 m tended to be more 'blocky' and did not have flat surfaces suitable for grinding grooves. Larger sandstone sheets were noted at the confluence of drainage lines and thus provided larger surfaces for grinding grooves. The numbers of grooves within each site ranged from single grooves to over 25 grooves at three sites. The majority of grinding grooves appeared to be for sharpening stone hatchet heads and typically were between 20 and 40 centimetres (cm) in length. Often pools of water were identified in close proximity to the grooves.

Artefact scatters were identified on the passes between catchments or on the gently sloped valley floor where Morans Creek became a third order stream. There was no distinct spatial patterning for scarred trees, however it was recognised that the area had previously been logged and thus the scarred trees identified probably represented a very small sample of their original distribution. In general, scarred trees were identified in areas that were inaccessible to logging, such as on steep slopes for which there was no vehicle access, or near steeply sided watercourses. Stone arrangements were generally comprised of vertically heaped blocks of stone, or arranged in a circle; the stone blocks tended to be over 40 cm in length.

In reviewing these results, RPS (2013) suggested that the distribution of sites indicates that Aboriginal camping activities took place on the valley floors and in rockshelters and benching landforms on the ridgelines and upper slope/crest landforms and that the transition between these areas was potentially undertaken along watercourses (first and second order) as evidenced by the regular occurrence of grinding grooves. RPS (2013) noted that the Mandalong Southern Extension area may have been utilised as a transit route between the low-lying lacustrine environments and the Watagan uplands. The presence of grinding groove sites with more than 20 grooves was considered to support the proposition that the area may have supported larger groups of Aboriginal people than previously thought.

In relation to potential impacts and mitigation requirements for the identified sites regarding the original Mandalong Southern Extension Project, it was assessed that the majority of the sites were 'unlikely' or 'very unlikely' to be impacted by proposed longwall mining.

It is anticipated that the above described spatial distribution of sites in the landscape will be applicable to the current project areas. The results of RPS' survey, as well as other surveys undertaken in the area will be used to formulate the predictive model for the ACHA currently being prepared.

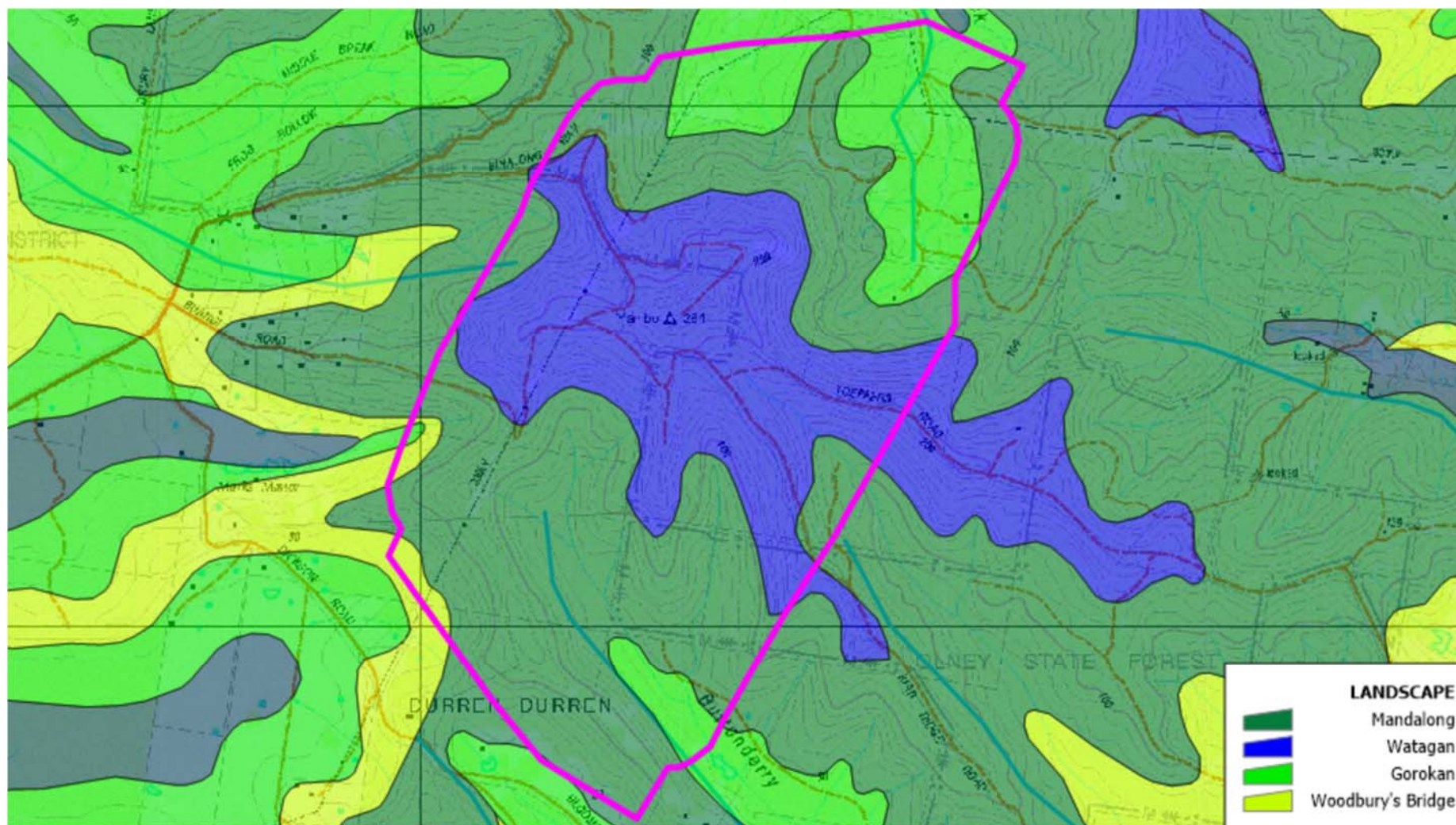


Plate 2.1 Soil Landscape located within the wider project area.

© Umwelt, 2020 based on data provided by Centennial

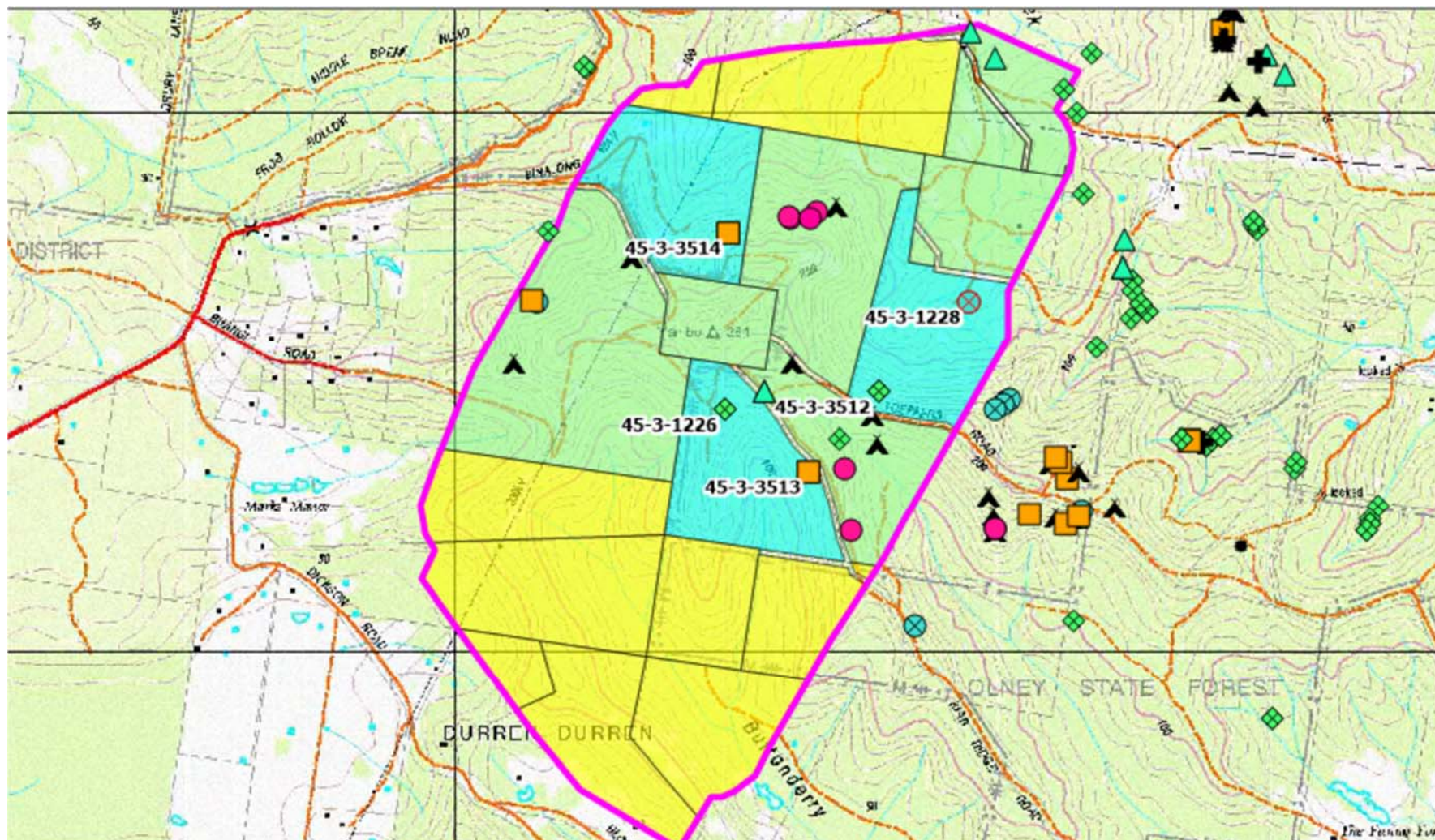


Plate 2.2 AHIMS results in proximity to the wider project area, with the three sites within the assessment area labelled above.

© Umwelt, 2020 based on data provided by Centennial and AHIMS

3.0 Methodology for the Aboriginal Cultural Heritage and Archaeological Assessment

As discussed in **Section 1.0**, the consultation process will be undertaken in accordance with the consultation requirements (DECCW 2010). The proposed methodology for the ACHA (pending comments from registered Aboriginal parties) is as follows:

1. Provide information to all registered Aboriginal parties regarding the project, including a draft methodology for review and comment (this letter).
2. Provision of a review period during which Aboriginal parties can provide comment and propose amendments to the draft methodology (up to 28 days from receipt of this letter, with comments due by close of business **7 September 2020**).
3. Completion of a survey of the project area in accordance with the draft methodology provided in this assessment (refer to **Section 5.0**).
4. Develop a draft ACHA report to include:
 - details of the nature of the project
 - details of the assessment requirements regarding Aboriginal cultural heritage, and how the ACHA report addresses these requirements, including:
 - identification of the Aboriginal cultural heritage values that exist across the area that will be impacted by the development. Identification of these values should be guided by the *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011)*.
 - consultation with Aboriginal people in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW)*. Full details of this consultation process will be captured.
 - documentation of the potential impacts of the development on Aboriginal cultural heritage values, and demonstration of attempts to avoid impact and identify any conservation outcomes.
 - records of any objects identified during the assessment and provision of this documentation to OEH
 - the results of an Aboriginal Heritage Information Management System (AHIMS) search and Native Title search
 - a review of the cultural context of the area that will draw heavily on information provided by registered Aboriginal parties and the results of previous cultural heritage and archaeological assessments undertaken in the area
 - a review of background information related to the environmental characteristics of the Mod 10 assessment area that may have determined how Aboriginal people may have occupied/utilised the area and the likelihood of site survival
 - the preparation of a predictive model drawing on all of the above
 - details of the survey methodology and results
 - details of any sites/objects/potential archaeological deposits located during the survey

- an assessment of the Aboriginal cultural heritage significance (as provided by the registered Aboriginal parties) of the Mod 10 assessment area
 - an assessment of the archaeological significance of any sites/objects/potential archaeological deposits identified within the Mod 10 assessment area
 - an assessment of the potential impact by the project to any sites/objects/potential archaeological deposits identified within the Mod 10 assessment area
 - a discussion of management options and
 - management recommendations.
5. The provision of the draft ACHA report to registered Aboriginal parties for review and comment (comment period extends for 28 days from date of provision of the draft ACHA).
 6. Discussion/incorporation of comments/responses received from Aboriginal parties to develop and finalise the ACHA report.
 7. Provision of the final ACHA report to registered Aboriginal parties and to Centennial Coal for inclusion within the EIS.

4.0 Consultation with Aboriginal Parties During the Assessment Process

Umwelt acknowledges and understands that cultural values, by definition, relate to values outside those associated with specific archaeological sites/objects. Throughout the assessment process, we invite comment from Aboriginal parties regarding any cultural values associated with the Mod 10 assessment area and will ensure that any information provided regarding cultural values (be they associated with a specific site or provided with reference to a landscape feature or within a broader context) are documented and recorded in accordance with the wishes of the relevant Aboriginal party for inclusion in the ACHA report. We note that the inclusion of any such information in the final assessment is dependent on its provision by the Aboriginal parties.

We note that Section 3.2 of the consultation requirements specifies that the objective of consultation is to ensure 'that Aboriginal people have the opportunity to improve assessment outcomes'. Factors specified as assisting in meeting this objective include providing Aboriginal parties with the opportunity to provide information on cultural values (as invited in this draft methodology), influence methods regarding assessment of significance for Aboriginal objects/places (which can be undertaken in response to this draft methodology, during fieldwork and in commenting on the draft ACHA report) and commenting on the draft ACHA report. Our approach is designed to ensure compliance with this objective, including the potential for in-field consultation with Aboriginal party representatives during fieldwork. Umwelt archaeologists are trained to seek and document cultural feedback provided by Aboriginal party representatives during fieldwork. This is not limited to cultural values associated with archaeological sites but may encompass any values identified by Aboriginal people.

We look forward to working with your organisation throughout the project to ensure that we adequately document any information you wish to provide regarding Aboriginal cultural values. Please feel free to contact us to request any additional information or assistance you may require to facilitate the provision of your input.

5.0 Survey Methodology

The draft survey methodology is designed to ensure compliance with requirements for archaeological survey as established in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice). This includes development of an appropriate sampling strategy and recording of information during survey. This survey methodology will be utilised for both the reporting required within the HMP and ACHA.

5.1 Sampling Strategy

The survey will be undertaken to ensure that a representative sample of all landforms within the area is surveyed, as required to ensure compliance with Code of Practice.

Areas that will be subject to the greatest amount of potential subsidence impact (subsidence contours are shown in **Plate 5.1**) will be subject to intensive survey. This includes drainage lines (in association with which grinding grooves may be identified), slope areas likely to contain rock outcrop suitable for use as shelter (in association with which rockshelter sites may be identified) and crests and ridges (in association with which stone arrangements may be identified) where these landforms are mapped as intersecting with areas of subsidence.

All efforts will be made to achieve maximum survey coverage via pedestrian survey. It is noted, however, that vehicle transects may be used in some areas based on limited archaeological potential and/or where vegetation limits access and visibility. It is intended that the survey will be conducted over the course of up to 6-8 days by two archaeologists and up to four Aboriginal party representatives however this may be subject to change based on the number of sites recorded, ground surface visibility and other variables.

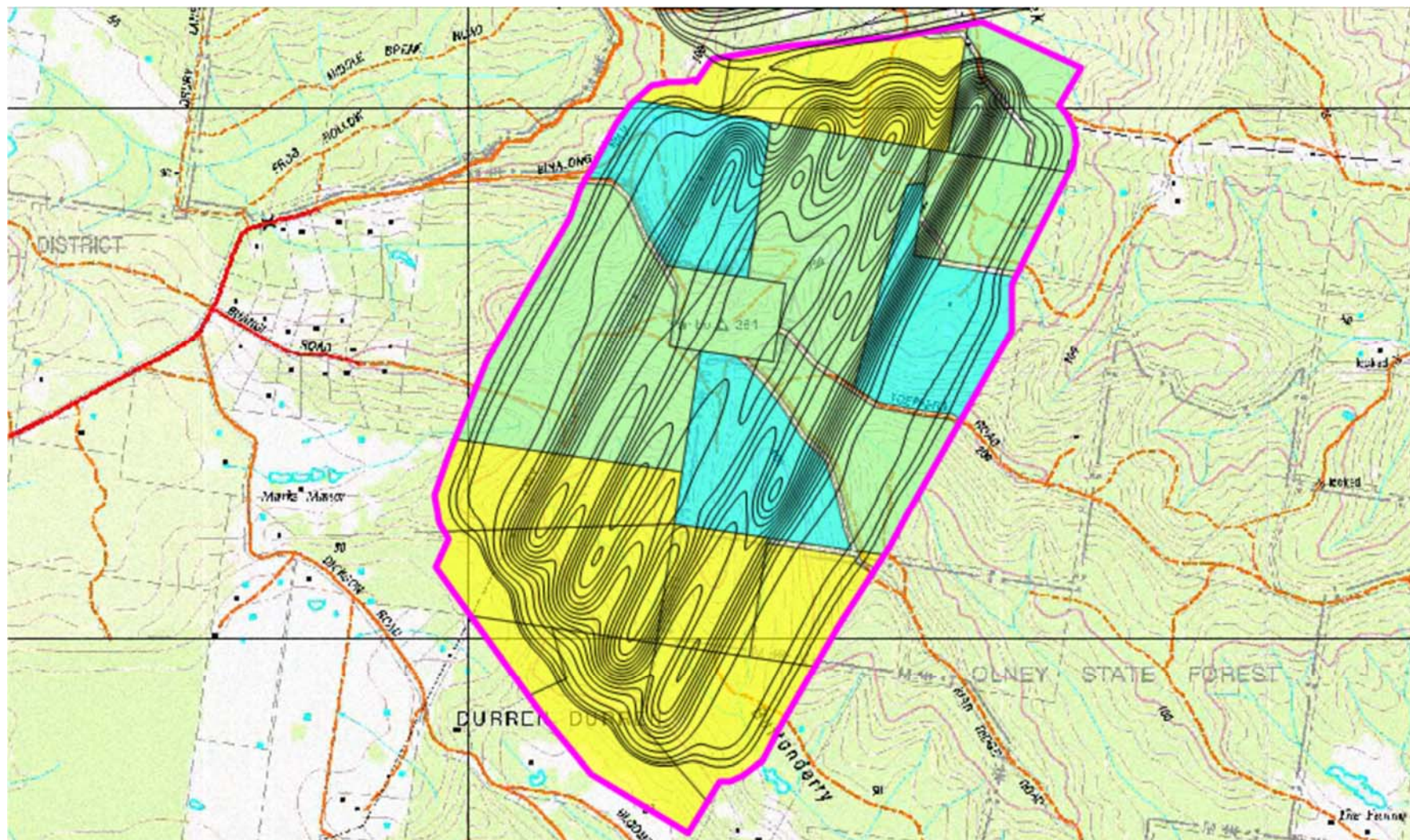


Plate 5.1 Subsidence predictions of LW30-33 within the wider project area.

© Umwelt, 2020 based on data provided by Centennial

5.2 Recording of Information During Survey

Survey units will be defined and named with reference to Requirement 5c of the Code of Practice, including recording start and finish points and/or boundaries for all survey units using a hand-held GPS receiver (set to allow recording of data with datum MGA94) and topographic mapping (where relevant), with track logs to be recorded for all pedestrian transects. Start and finish points/boundaries for survey units will be defined based on landforms, project area boundaries, access or other arbitrary terminations (as specified in the Code of Practice). The spacing between individuals will also be recorded for each survey unit.

Photographs will be undertaken for landforms/survey units (where informative). Information recorded for each survey unit will include

- Landform (in units based on those established by McDonald et al 2009)
- Gradient (where relevant)
- Vegetation
- Geology and soils (where suitable areas of exposure/visibility are present)
- Identified Aboriginal resources (food and medicine plants, prey animals, stone and water)
- Levels of average ground surface visibility within the survey unit (in accordance with the Requirement 9 of the Code of Practice)
- Extent and type of exposures within the survey unit (with reference to the factors leading to the exposure such as erosion, earth-moving activities, track establishment etc.)
- Any information provided by the registered Aboriginal parties in relation to cultural values, noting that such information will be recorded in accordance with the wishes of the party providing the information and
- Any site, area of Potential Archaeological Deposit (PAD) or landscape feature of Aboriginal cultural value present within the survey unit (see below for further information on site/PAD recording).

Any Aboriginal archaeological sites identified during the survey will be assessed with reference to the site boundaries. Factors that will be taken into consideration in defining and mapping site boundaries may include the distribution of surface artefacts, landforms or physical boundaries and cultural information.

Sufficient information will be recorded for all sites to meet Requirement 7 of the Code of Practice. The archaeological and Aboriginal cultural significance of any site will be discussed with the registered Aboriginal parties participating in the survey.

The archaeological potential of landforms/specific areas within the assessment area will be assessed with reference to factors including the archaeological context of the local area, the evaluation of the soil profile (based on soil landscape mapping, exposed soil profiles identified during the survey and geomorphic understandings of the area) and the identification of landforms that may have greater archaeological sensitivity. The extent of any area of identified archaeological potential will be defined and documented for inclusion in subsequent reporting. The archaeological and Aboriginal cultural significance of any area of identified archaeological potential will be discussed with the registered Aboriginal parties participating in the survey.

In relation to the assessment of rockshelter sites, it is proposed that a rockshelter will only be recorded as an archaeological site where archaeological evidence is identified in association with the rockshelter. However, the commitment to record archaeological potential will apply and therefore the final assessment will note where suitable rock overhangs/shelters occur but within which no archaeological evidence was identified.

5.3 Survey Arrangements

At this stage, it is proposed to undertake the survey in early **September 2020**, however this is subject to confirmation. Further correspondence regarding survey arrangements will be provided at least two weeks prior to the proposed survey date. Additional information relating to engagement to undertake the survey is attached to this letter.

6.0 Other Requirements

The following will be required to enable commercial engagement for the work:

- Insurances are current (Workers Compensation, Public Liability and Product Liability). If you are unsure when your last insurance was entered into the Centennial system please call to confirm.
- Undertake a visitors induction at Mandalong Mine Administration Office prior to the commencement of works.
- A medical for each person attending must be provided stating fitness to complete usual tasks.
- Minimum personal protective equipment (PPE) requirements are long pants and long sleeve high visibility shirt, steel toe capped boots and hard hat in construction areas.
- Each individual will bring their own food and water.
- Adhere to a minimum expectation of behaviour where all parties behave in an appropriate and respectful manner, and that culturally sensitivity is considered.
- Arrive on time and by own travel methods.

7.0 Summary

This letter provides details of the proposed methodology for an Aboriginal Cultural Heritage Assessment associated with the Project. In accordance with the consultation requirements (DECCW 2010), we ask that your group provides comments on the draft methodology by no later than close of business **7 September 2020**. Comments regarding the draft methodology can be provided verbally or in writing to:

Ashley O'Sullivan,
Senior Archaeologist
Umwelt Environmental and Social Consultants (Umwelt)
Phone: 02 4950 5322.

Should you require any further information or wish to discuss any aspect of the Project, please do not hesitate to contact Ashley or Centennial's Iain Hornshaw (Approvals Coordinator) on 4935 8901 / iain.hornshaw@centennialcoal.com.au.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'Ashley O'Sullivan', with a long, sweeping horizontal line extending to the right.

Ashley O'Sullivan
Senior Archaeologist

Enclosures: Archaeological Fieldwork Engagement Form

**Archaeological Fieldwork Engagement Form
Mandalong Mod 9 and 10, NSW**

To: Centennial Coal
Email: iain.hornshaw@centennialcoal.com.au
Phone: 4935 8901
Attention: Iain Hornshaw (Approvals Coordinator)

Item	Response (circle response and provide detail)
Nominated field work representative and representative contact phone number.	Name: _____ Phone: _____
Our organisation has certificates of currency demonstrating a minimum of \$20,000 cover for workers compensation, public liability and product liability).	Y / N Certificates of currency must be provided before engagement can be finalised
Our organisation understands that payment terms and conditions are in accordance with those previously negotiated with Centennial, with a specified rate of pay of \$1000 per Aboriginal organisation per day. Travel will be paid at ATO rates.	Y / N
Our organisation will provide their representative with appropriate Personal Protective Equipment and Clothing (PPE&C). As a minimum, this must include: <ul style="list-style-type: none"> • Long trousers • High visibility long sleeve shirt • Steel toe capped safety boots • Hard hat (for construction areas) • Soft hat (outside construction areas). 	Y / N
Has completed the medical as required by Centennial.	Y / N Provide details/copy of completed medical.
Our representative understands that they will need to bring with them sufficient food and water for the day's work.	Y / N
Our representative has demonstrated appropriate experience, ability and reliability.	Y / N

Item	Response (circle response and provide detail)
Our representative will commit to arrive on site on time and free from the effects of drugs, alcohol and fatigue (noting that your representative may be required to undergo drug and alcohol testing in accordance with site requirements).	Y / N
Our representative will commit to behaving in a culturally appropriate manner whilst on site and will work collaboratively with the archaeologist and other Aboriginal parties (where relevant)	Y / N

Organisation: _____

Name of Authorised Person: _____

Signature: _____

Date: _____

Our Ref: 20133/NR/AO/11082020

11 August 2020

Guringai Tribal Link Aboriginal Corporation
Tracey Howie
PO Box 4061
WYONGAH NSW 2259

Email: tracey@guringai.com.au

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As there are a number of either overlapping areas or blocks in close proximity related to the Modification 9 HMP and Modification 10 ACHA, Umwelt is proposing to undertake the survey as one concerted survey effort. This information is summarised in **Plate 1.1** and **Plate 1.2** below. Green shading shows areas previously surveyed and not requiring further survey and yellow shading indicates the areas that will be surveyed for the Mod 10 Aboriginal cultural heritage assessment. The remaining properties within the Mod 9 area that have not been subject to prior survey are shaded in aqua. In accordance with Schedule 4, Condition 8 of the Modification 8 consent, best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. The previously unsurveyed properties shown in aqua in **Plate 1.2** will be therefore surveyed as part of the development of the Modification 9 HMP and Modification 10 ACHA.

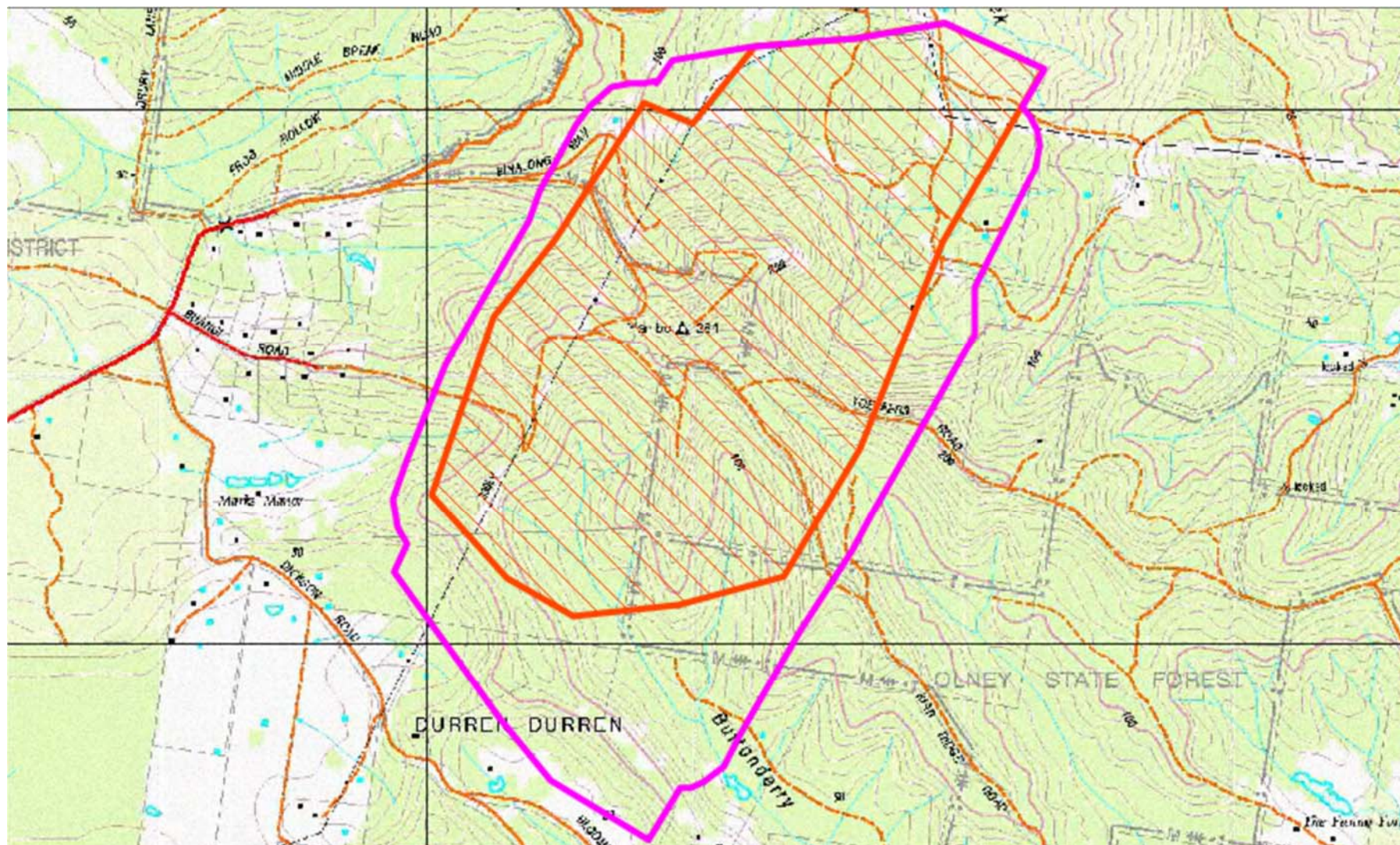


Plate 1.1 Mod 9 and Mod 10 areas (red hatching is Mod 9 area) showing the increase in footprint. Specifically, the increase in footprint to the south includes areas that have not yet been assessed during previous submissions.

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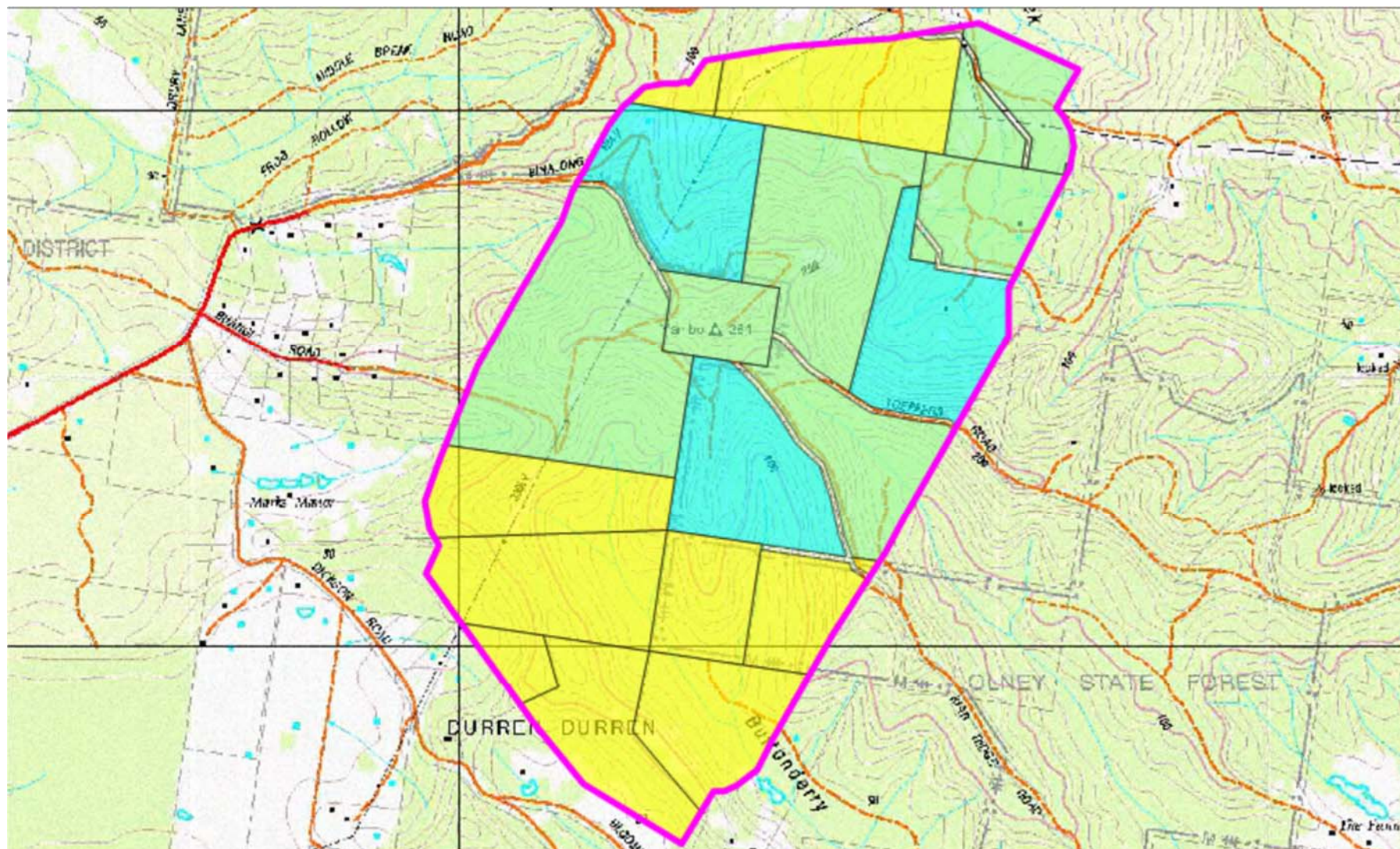


Plate 1.2 Mod 9 and Mod 10 areas showing survey requirements (green = does not require additional survey, yellow = to be surveyed for Mod 10 ACHA, aqua = to be surveyed for Mod 9 HMP)

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2.0 Description of the Project Area

For the purposes of the ACHA, the area proposed for impact as a result of the project comprises the proposed re-alignment area of LW30-33 (Modification 9) and the proposed extension of LW30-33 (Modification 10), the 'assessment area'.

The assessment area is located within the Narrabeen Group geological group, specifically the Patonga Claystone and Tuggerah Formations within the Clifton Subgroup. These formations comprise deposits of siltstones, claystones and areas of sandstone (Murphy 1993). Based on the geological description of mudstones within this formation, it is unlikely that they were of a quality suitable for the manufacture of stone artefacts (with the mudstone typically referenced in archaeological sites better technically described as an indurated rhyolitic tuff). It does not appear that stone raw materials suitable for artefact manufacture would have been available within the assessment area, but would have been sourced from other locations within the region. In terms of other archaeological implications, the presence of sandstone within the geology of the assessment area indicates that, should sandstone outcrops be present, it may be possible that site types such as grinding grooves or engravings may occur.

The assessment area is underlain by the Mandalong, Gorokan and Woodburys Bridge soil landscapes, as shown in **Plate 2.1**. These three soil landscapes are highly acidic and prone to toxic concentration of aluminium (Murphy, 1993). Typical soil profiles vary with landform/geology, but are typically relatively shallow. These soils are typically moderately erodible, with levels of erosion linked to landform. The depth of topsoil is a critical consideration for the likely presence of sub-surface archaeological deposits because intact deposits are typically only found within A horizon soils. Erosion acts to expose deposits that were formerly sub-surface and impacts on the potential for deposits to retain archaeological integrity.

The areas surrounding the Mandalong South assessment area have been subject to previous archaeological assessments, and these previous assessments have resulted in the identification of a number of archaeological sites. The most common site type recorded in the search area is artefact scatters, followed by modified trees (carved or scarred). Within the surrounding landscape, these site types have not been recorded in association with specific landforms but do seem to correlate with less disturbed land. Shell midden sites have also been recorded, particularly in proximity to the foreshore of Lake Macquarie (located outside of the assessment area). Potential archaeological deposits, habitation structures and Aboriginal Ceremony and Dreaming sites have also been recorded, though these site types are all located outside of the current assessment area.

Within the assessment area itself, five Aboriginal archaeological sites have been recorded, including:

- Two potential archaeological deposits (45-3-3513 and 45-3-3514)
- Two grinding grooves (45-3-1226, 45-3-3512)
- One art engraving site (45-3-1228).

2.1 Previous Investigations

RPS (2013) completed an assessment of 2,360 ha of private and public land for the now approved Mandalong Southern Extension project. The assessment resulted in the recording of 130 new archaeological sites in addition to 20 previously recorded sites. The most common site types were grinding grooves, rockshelters with PAD and scarred trees, although several artefact scatters were recorded in addition to stone arrangements.

The Mandalong Southern Extension Area is characterised by steeply inclined ridges with first and second order streams/drainage lines that drain into Morans Creek in the north and east. Typically rockshelters were located on or within 200 m of the ridge crests and were formed from weathering sheets of sandstone or large boulders.

Grinding groove sites were located in the first and second order drainage lines and were typically identified on smooth, fine-grained sandstone sheets at elevations between 80 and 100 m AHD. It was observed that sandstone exposed in drainage lines above 100 m elevation tended to be rough and unsuitable for grinding grooves. Sandstone below 80 m tended to be more 'blocky' and did not have flat surfaces suitable for grinding grooves. Larger sandstone sheets were noted at the confluence of drainage lines and thus provided larger surfaces for grinding grooves. The numbers of grooves within each site ranged from single grooves to over 25 grooves at three sites. The majority of grinding grooves appeared to be for sharpening stone hatchet heads and typically were between 20 and 40 centimetres (cm) in length. Often pools of water were identified in close proximity to the grooves.

Artefact scatters were identified on the passes between catchments or on the gently sloped valley floor where Morans Creek became a third order stream. There was no distinct spatial patterning for scarred trees, however it was recognised that the area had previously been logged and thus the scarred trees identified probably represented a very small sample of their original distribution. In general, scarred trees were identified in areas that were inaccessible to logging, such as on steep slopes for which there was no vehicle access, or near steeply sided watercourses. Stone arrangements were generally comprised of vertically heaped blocks of stone, or arranged in a circle; the stone blocks tended to be over 40 cm in length.

In reviewing these results, RPS (2013) suggested that the distribution of sites indicates that Aboriginal camping activities took place on the valley floors and in rockshelters and benching landforms on the ridgelines and upper slope/crest landforms and that the transition between these areas was potentially undertaken along watercourses (first and second order) as evidenced by the regular occurrence of grinding grooves. RPS (2013) noted that the Mandalong Southern Extension area may have been utilised as a transit route between the low-lying lacustrine environments and the Watagan uplands. The presence of grinding groove sites with more than 20 grooves was considered to support the proposition that the area may have supported larger groups of Aboriginal people than previously thought.

In relation to potential impacts and mitigation requirements for the identified sites regarding the original Mandalong Southern Extension Project, it was assessed that the majority of the sites were 'unlikely' or 'very unlikely' to be impacted by proposed longwall mining.

It is anticipated that the above described spatial distribution of sites in the landscape will be applicable to the current project areas. The results of RPS' survey, as well as other surveys undertaken in the area will be used to formulate the predictive model for the ACHA currently being prepared.

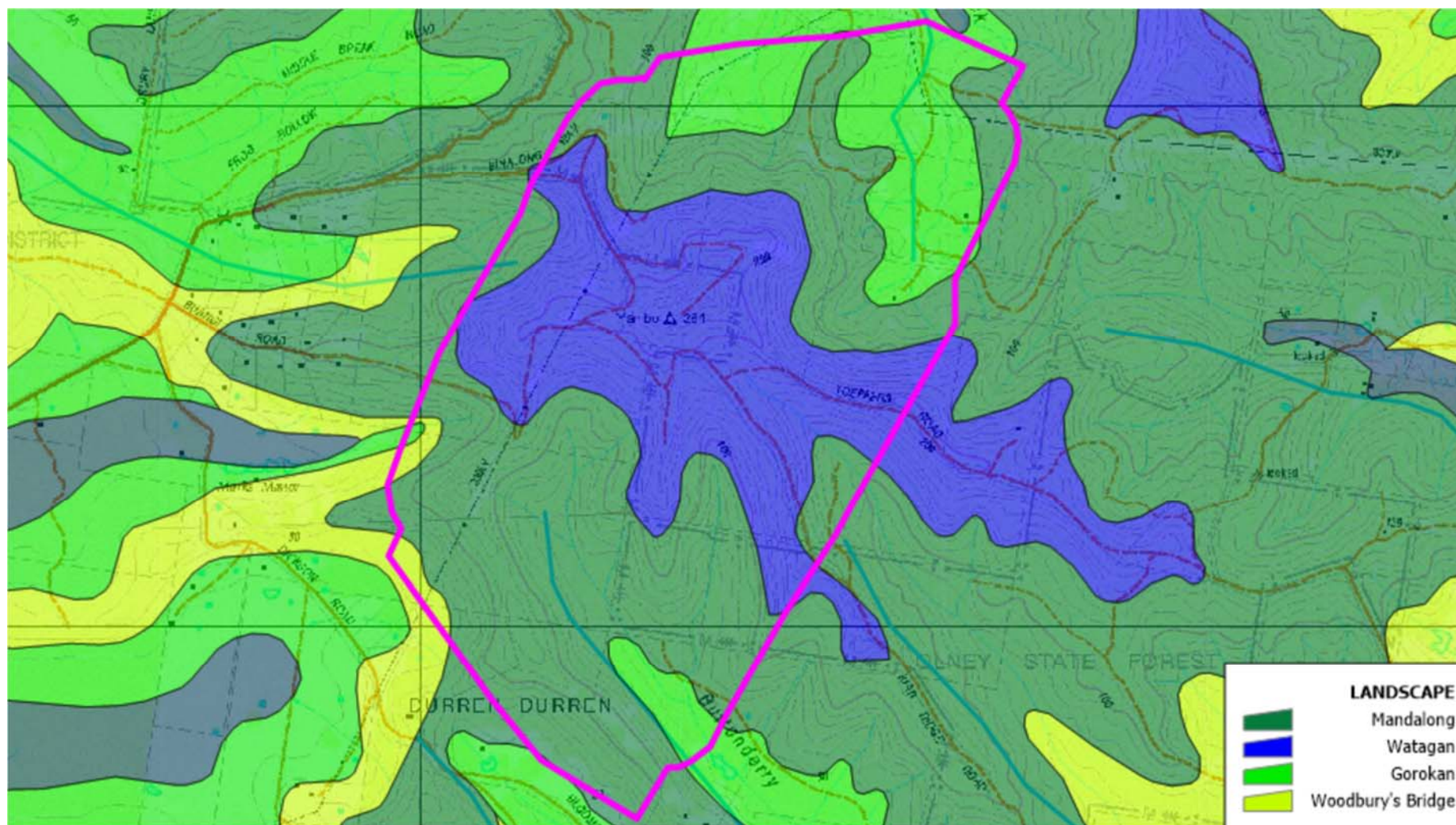


Plate 2.1 Soil Landscape located within the wider project area.

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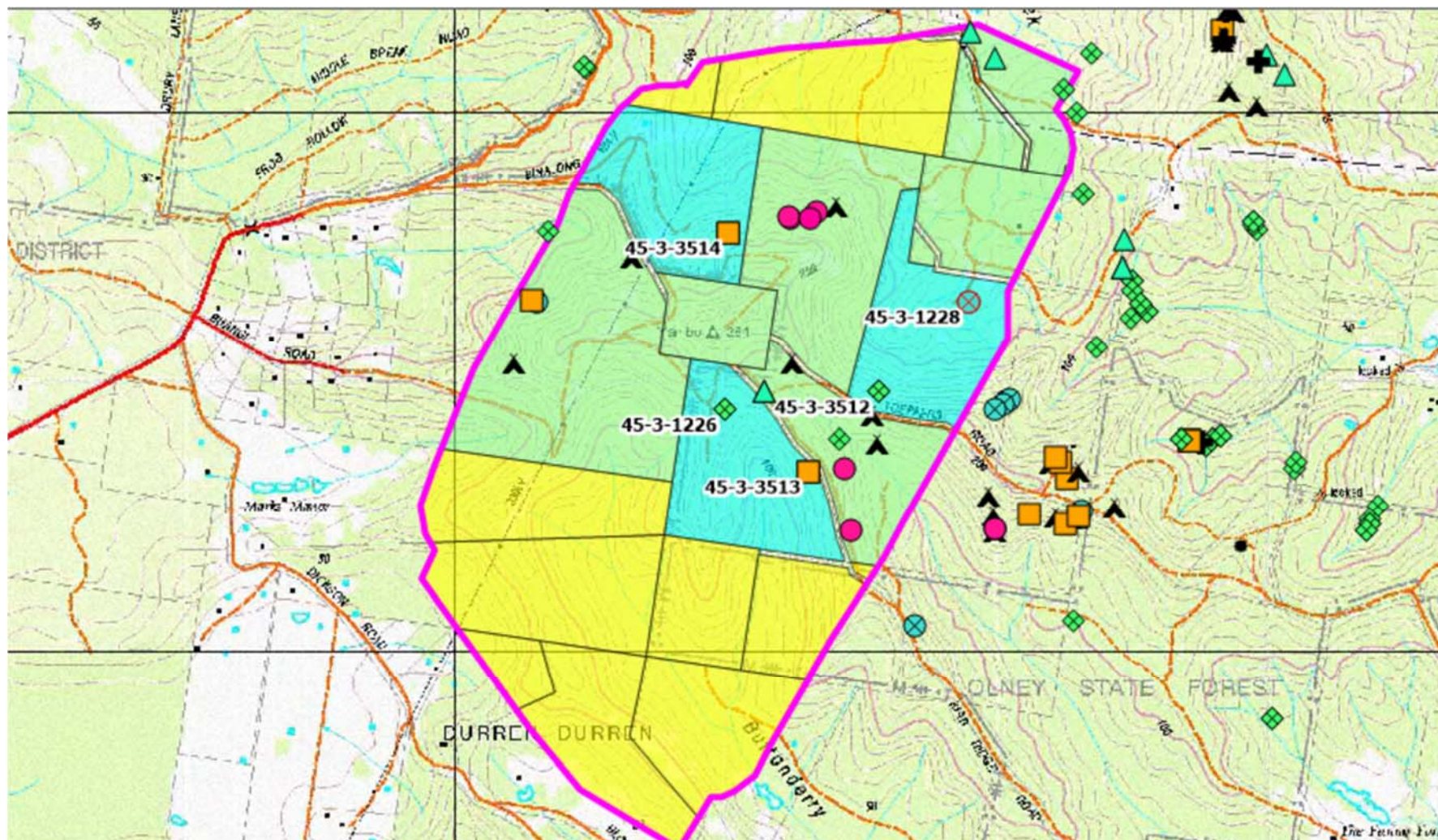


Plate 2.2 AHIMS results in proximity to the wider project area, with the three sites within the assessment area labelled above.

© Umwelt, 2020 based on data provided by Centennial and AHIMS

3.0 Methodology for the Aboriginal Cultural Heritage and Archaeological Assessment

As discussed in **Section 1.0**, the consultation process will be undertaken in accordance with the consultation requirements (DECCW 2010). The proposed methodology for the ACHA (pending comments from registered Aboriginal parties) is as follows:

1. Provide information to all registered Aboriginal parties regarding the project, including a draft methodology for review and comment (this letter).
2. Provision of a review period during which Aboriginal parties can provide comment and propose amendments to the draft methodology (up to 28 days from receipt of this letter, with comments due by close of business **7 September 2020**).
3. Completion of a survey of the project area in accordance with the draft methodology provided in this assessment (refer to **Section 5.0**).
4. Develop a draft ACHA report to include:
 - details of the nature of the project
 - details of the assessment requirements regarding Aboriginal cultural heritage, and how the ACHA report addresses these requirements, including:
 - identification of the Aboriginal cultural heritage values that exist across the area that will be impacted by the development. Identification of these values should be guided by the *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011)*.
 - consultation with Aboriginal people in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW)*. Full details of this consultation process will be captured.
 - documentation of the potential impacts of the development on Aboriginal cultural heritage values, and demonstration of attempts to avoid impact and identify any conservation outcomes.
 - records of any objects identified during the assessment and provision of this documentation to OEH
 - the results of an Aboriginal Heritage Information Management System (AHIMS) search and Native Title search
 - a review of the cultural context of the area that will draw heavily on information provided by registered Aboriginal parties and the results of previous cultural heritage and archaeological assessments undertaken in the area
 - a review of background information related to the environmental characteristics of the Mod 10 assessment area that may have determined how Aboriginal people may have occupied/utilised the area and the likelihood of site survival
 - the preparation of a predictive model drawing on all of the above
 - details of the survey methodology and results
 - details of any sites/objects/potential archaeological deposits located during the survey

- an assessment of the Aboriginal cultural heritage significance (as provided by the registered Aboriginal parties) of the Mod 10 assessment area
 - an assessment of the archaeological significance of any sites/objects/potential archaeological deposits identified within the Mod 10 assessment area
 - an assessment of the potential impact by the project to any sites/objects/potential archaeological deposits identified within the Mod 10 assessment area
 - a discussion of management options and
 - management recommendations.
5. The provision of the draft ACHA report to registered Aboriginal parties for review and comment (comment period extends for 28 days from date of provision of the draft ACHA).
 6. Discussion/incorporation of comments/responses received from Aboriginal parties to develop and finalise the ACHA report.
 7. Provision of the final ACHA report to registered Aboriginal parties and to Centennial Coal for inclusion within the EIS.

4.0 Consultation with Aboriginal Parties During the Assessment Process

Umwelt acknowledges and understands that cultural values, by definition, relate to values outside those associated with specific archaeological sites/objects. Throughout the assessment process, we invite comment from Aboriginal parties regarding any cultural values associated with the Mod 10 assessment area and will ensure that any information provided regarding cultural values (be they associated with a specific site or provided with reference to a landscape feature or within a broader context) are documented and recorded in accordance with the wishes of the relevant Aboriginal party for inclusion in the ACHA report. We note that the inclusion of any such information in the final assessment is dependent on its provision by the Aboriginal parties.

We note that Section 3.2 of the consultation requirements specifies that the objective of consultation is to ensure 'that Aboriginal people have the opportunity to improve assessment outcomes'. Factors specified as assisting in meeting this objective include providing Aboriginal parties with the opportunity to provide information on cultural values (as invited in this draft methodology), influence methods regarding assessment of significance for Aboriginal objects/places (which can be undertaken in response to this draft methodology, during fieldwork and in commenting on the draft ACHA report) and commenting on the draft ACHA report. Our approach is designed to ensure compliance with this objective, including the potential for in-field consultation with Aboriginal party representatives during fieldwork. Umwelt archaeologists are trained to seek and document cultural feedback provided by Aboriginal party representatives during fieldwork. This is not limited to cultural values associated with archaeological sites but may encompass any values identified by Aboriginal people.

We look forward to working with your organisation throughout the project to ensure that we adequately document any information you wish to provide regarding Aboriginal cultural values. Please feel free to contact us to request any additional information or assistance you may require to facilitate the provision of your input.

5.0 Survey Methodology

The draft survey methodology is designed to ensure compliance with requirements for archaeological survey as established in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice). This includes development of an appropriate sampling strategy and recording of information during survey. This survey methodology will be utilised for both the reporting required within the HMP and ACHA.

5.1 Sampling Strategy

The survey will be undertaken to ensure that a representative sample of all landforms within the area is surveyed, as required to ensure compliance with Code of Practice.

Areas that will be subject to the greatest amount of potential subsidence impact (subsidence contours are shown in **Plate 5.1**) will be subject to intensive survey. This includes drainage lines (in association with which grinding grooves may be identified), slope areas likely to contain rock outcrop suitable for use as shelter (in association with which rockshelter sites may be identified) and crests and ridges (in association with which stone arrangements may be identified) where these landforms are mapped as intersecting with areas of subsidence.

All efforts will be made to achieve maximum survey coverage via pedestrian survey. It is noted, however, that vehicle transects may be used in some areas based on limited archaeological potential and/or where vegetation limits access and visibility. It is intended that the survey will be conducted over the course of up to 6-8 days by two archaeologists and up to four Aboriginal party representatives however this may be subject to change based on the number of sites recorded, ground surface visibility and other variables.

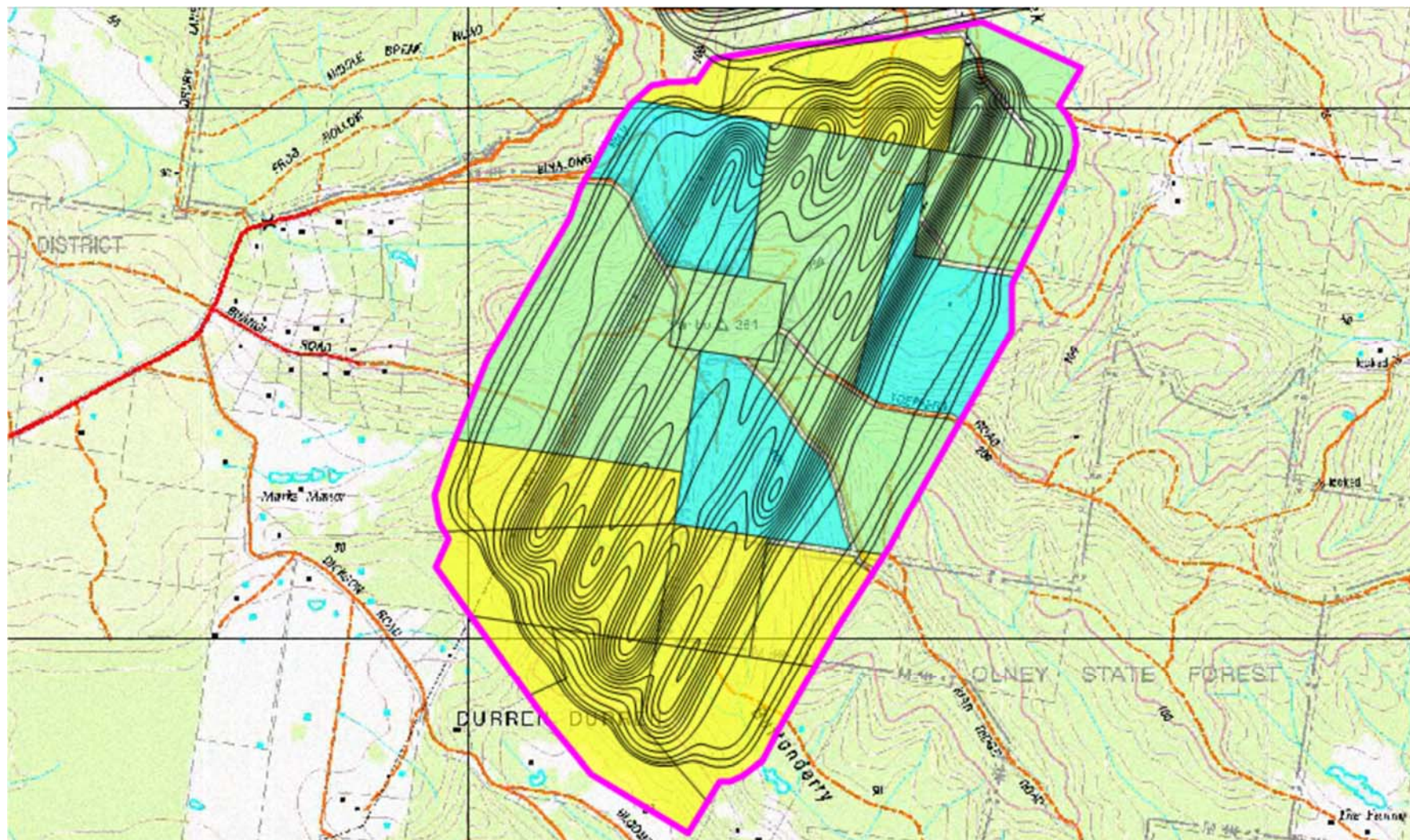


Plate 5.1 Subsidence predictions of LW30-33 within the wider project area.

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5.2 Recording of Information During Survey

Survey units will be defined and named with reference to Requirement 5c of the Code of Practice, including recording start and finish points and/or boundaries for all survey units using a hand-held GPS receiver (set to allow recording of data with datum MGA94) and topographic mapping (where relevant), with track logs to be recorded for all pedestrian transects. Start and finish points/boundaries for survey units will be defined based on landforms, project area boundaries, access or other arbitrary terminations (as specified in the Code of Practice). The spacing between individuals will also be recorded for each survey unit.

Photographs will be undertaken for landforms/survey units (where informative). Information recorded for each survey unit will include

- Landform (in units based on those established by McDonald et al 2009)
- Gradient (where relevant)
- Vegetation
- Geology and soils (where suitable areas of exposure/visibility are present)
- Identified Aboriginal resources (food and medicine plants, prey animals, stone and water)
- Levels of average ground surface visibility within the survey unit (in accordance with the Requirement 9 of the Code of Practice)
- Extent and type of exposures within the survey unit (with reference to the factors leading to the exposure such as erosion, earth-moving activities, track establishment etc.)
- Any information provided by the registered Aboriginal parties in relation to cultural values, noting that such information will be recorded in accordance with the wishes of the party providing the information and
- Any site, area of Potential Archaeological Deposit (PAD) or landscape feature of Aboriginal cultural value present within the survey unit (see below for further information on site/PAD recording).

Any Aboriginal archaeological sites identified during the survey will be assessed with reference to the site boundaries. Factors that will be taken into consideration in defining and mapping site boundaries may include the distribution of surface artefacts, landforms or physical boundaries and cultural information.

Sufficient information will be recorded for all sites to meet Requirement 7 of the Code of Practice. The archaeological and Aboriginal cultural significance of any site will be discussed with the registered Aboriginal parties participating in the survey.

The archaeological potential of landforms/specific areas within the assessment area will be assessed with reference to factors including the archaeological context of the local area, the evaluation of the soil profile (based on soil landscape mapping, exposed soil profiles identified during the survey and geomorphic understandings of the area) and the identification of landforms that may have greater archaeological sensitivity. The extent of any area of identified archaeological potential will be defined and documented for inclusion in subsequent reporting. The archaeological and Aboriginal cultural significance of any area of identified archaeological potential will be discussed with the registered Aboriginal parties participating in the survey.

In relation to the assessment of rockshelter sites, it is proposed that a rockshelter will only be recorded as an archaeological site where archaeological evidence is identified in association with the rockshelter. However, the commitment to record archaeological potential will apply and therefore the final assessment will note where suitable rock overhangs/shelters occur but within which no archaeological evidence was identified.

5.3 Survey Arrangements

At this stage, it is proposed to undertake the survey in early **September 2020**, however this is subject to confirmation. Further correspondence regarding survey arrangements will be provided at least two weeks prior to the proposed survey date. Additional information relating to engagement to undertake the survey is attached to this letter.

6.0 Other Requirements

The following will be required to enable commercial engagement for the work:

- Insurances are current (Workers Compensation, Public Liability and Product Liability). If you are unsure when your last insurance was entered into the Centennial system please call to confirm.
- Undertake a visitors induction at Mandalong Mine Administration Office prior to the commencement of works.
- A medical for each person attending must be provided stating fitness to complete usual tasks.
- Minimum personal protective equipment (PPE) requirements are long pants and long sleeve high visibility shirt, steel toe capped boots and hard hat in construction areas.
- Each individual will bring their own food and water.
- Adhere to a minimum expectation of behaviour where all parties behave in an appropriate and respectful manner, and that culturally sensitivity is considered.
- Arrive on time and by own travel methods.

7.0 Summary

This letter provides details of the proposed methodology for an Aboriginal Cultural Heritage Assessment associated with the Project. In accordance with the consultation requirements (DECCW 2010), we ask that your group provides comments on the draft methodology by no later than close of business **7 September 2020**. Comments regarding the draft methodology can be provided verbally or in writing to:

Ashley O'Sullivan,
Senior Archaeologist
Umwelt Environmental and Social Consultants (Umwelt)
Phone: 02 4950 5322.

Should you require any further information or wish to discuss any aspect of the Project, please do not hesitate to contact Ashley or Centennial's Iain Hornshaw (Approvals Coordinator) on 4935 8901 / iain.hornshaw@centennialcoal.com.au.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'Ashley O'Sullivan', with a long, sweeping horizontal stroke at the end.

Ashley O'Sullivan
Senior Archaeologist

Enclosures: Archaeological Fieldwork Engagement Form

**Archaeological Fieldwork Engagement Form
Mandalong Mod 9 and 10, NSW**

To: Centennial Coal
Email: iain.hornshaw@centennialcoal.com.au
Phone: 4935 8901
Attention: Iain Hornshaw (Approvals Coordinator)

Item	Response (circle response and provide detail)
Nominated field work representative and representative contact phone number.	Name: _____ Phone: _____
Our organisation has certificates of currency demonstrating a minimum of \$20,000 cover for workers compensation, public liability and product liability).	Y / N Certificates of currency must be provided before engagement can be finalised
Our organisation understands that payment terms and conditions are in accordance with those previously negotiated with Centennial, with a specified rate of pay of \$1000 per Aboriginal organisation per day. Travel will be paid at ATO rates.	Y / N
Our organisation will provide their representative with appropriate Personal Protective Equipment and Clothing (PPE&C). As a minimum, this must include: <ul style="list-style-type: none"> • Long trousers • High visibility long sleeve shirt • Steel toe capped safety boots • Hard hat (for construction areas) • Soft hat (outside construction areas). 	Y / N
Has completed the medical as required by Centennial.	Y / N Provide details/copy of completed medical.
Our representative understands that they will need to bring with them sufficient food and water for the day's work.	Y / N
Our representative has demonstrated appropriate experience, ability and reliability.	Y / N

Item	Response (circle response and provide detail)
Our representative will commit to arrive on site on time and free from the effects of drugs, alcohol and fatigue (noting that your representative may be required to undergo drug and alcohol testing in accordance with site requirements).	Y / N
Our representative will commit to behaving in a culturally appropriate manner whilst on site and will work collaboratively with the archaeologist and other Aboriginal parties (where relevant)	Y / N

Organisation: _____

Name of Authorised Person: _____

Signature: _____

Date: _____

Our Ref: 20133/NR/AO/11082020

11 August 2020

Wonn1 Contracting
Arthur Fletcher
619 Main Rd
GLENDALE NSW 2285

Email: arthur.c.fletcher@gmail.com

Dear Sir/Madam

Re: Methodology for Aboriginal Cultural Heritage Assessment, Proposed Extension of Longwalls 30-33 (Modification 10) and Further Survey for Modification 9 Extraction Plan, Mandalong Mine

Centennial Mandalong is currently seeking approval for the continuation of mining with the Mandalong South area associated with both Modification 9 and Modification 10. This project, herein after referred to as 'Mandalong South Assessment Area', comprises both further survey required to support a Heritage Management Plan (HMP) associated with an Extraction Plan required for Modification 9 and an Aboriginal Cultural Heritage Assessment (ACHA) associated with Modification 10. The project area, including all areas of proposed works, is shown in **Plate 1.1** and **Plate 1.2**.

Umwelt Environmental and Social Consultants (Umwelt) have been engaged by Centennial Mandalong to prepare a HMP for Modification 9 and an ACHA (incorporating an archaeological technical report) for Modification 10 in consultation with the registered Aboriginal parties, including your organisation.

The HMP for Modification 9 will be completed in accordance with the relevant conditions of approval. The ACHA will form part of the Environmental Impact Statement (EIS) for the proposed modification (Modification 10), and will be undertaken in accordance with the requirements of the *National Parks and Wildlife Act 1974* (NPW Act), the *National Parks and Wildlife Regulation 2019* (NPW Regulation), the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (Office of Environment and Heritage [OEH] 2011), the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (Department of Environment, Climate Change and Water [DECCW] 2010) (the consultation requirements) and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice).

As a registered Aboriginal party for Mandalong Mine, we are writing to provide you with the draft methodology for the ACHA and a methodology for additional survey to inform the HMP for your review and comment.

Newcastle | Orange |
Sydney | Canberra |
Brisbane | Perth

T | 1300 793 267
E | info@umwelt.com.au

www.umwelt.com.au

Umwelt (Australia) Pty Limited
ABN 18 059 519 041

1.0 Description of the Project

A summary of both projects are provided below, with reference to the requirements satisfied by this methodology and accompanying assessments.

1.1 Modification 9 HMP

Modification 9 relates to the proposed re-orientation of a number of existing longwall panels due to challenging geological conditions. The Modification 9 area was included within the larger area assessed as part of the original Aboriginal cultural heritage assessment (RPS 2013) undertaken to inform the application for SSD-5144. At the time of the assessment, six land parcels within the Modification 9 area could not be surveyed due to lack of landholder consent. In accordance with Schedule 4, Condition 8 of the Mandalong Mine consent (SSD-5144), best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. An additional assessment of part of the Modification 9 area was conducted by Umwelt (2020) and the former Native Title claimant parties to satisfy the conditions of a Section 31 Deed of Agreement. These parcels comprised areas of State Forest already partially assessed by RPS (2013).

As a result of the RPS (2013) assessment, 21 Aboriginal archaeological sites are listed on the Aboriginal Heritage Information Management System (AHIMS) as being located within the Modification 9 area, of which one is a duplicate record. These sites comprise six rockshelters, four sets of grinding grooves, five sites identified as being associated with Aboriginal resources, three sites containing stone artefacts and two areas of Potential Archaeological Deposit (PAD). One historical heritage item (L1 – log landing site) was identified within the Mod 9 area however, based on subsidence predictions, it is understood that this site is unlikely to be impacted.

Of the parcels of land assessed by Umwelt (2020) within the Modification 9 area, Lot 175 DP755271 did not contain any identified sites and the potential for sites to be present (but not currently visible) within this parcel was assessed as low based on the extent of survey and the nature of landforms within this area. On this basis, it is not proposed to resurvey this lot as part of the development of the HMP. Lot 115 and 122 DP755238 were also assessed by Umwelt (2019) and no new sites were identified. However, it was noted that these lots were largely inaccessible at the time of survey.

The HMP is required to meet the relevant conditions of the Modification 9 consent. As this has not yet been issued (Centennial Mandalong are currently preparing responses to the public / agency submissions), it is assumed that conditions will be consistent with those in the Modification 8 consent. Schedule 6, Condition 6(l) specifies that an extraction plan must be developed and must include a HMP 'which has been prepared in consultation with the Biodiversity Conservation Division and Registered Aboriginal parties, to manage the potential environmental consequences of the proposed second workings on both Aboriginal and non-Aboriginal heritage items, and reflects the requirements of condition 22 of Schedule 3.' Condition 22 of Schedule 3 specifies requirements to be addressed in the HMP.

1.2 Modification 10

Further to the reorientation of longwall panels under Modification 9, Mandalong is proposing to extend the reorientated panels, with this proposal referred to as Modification 10.

Modification 10 will involve the extensions of LW30-33 to the south of the current longwall plan, as shown by the increase in project footprint in **Plate 1.1** and **Plate 1.2**.

An Aboriginal Cultural Heritage Assessment (ACHA) has been determined as being required to assess the impact of proposed Modification 10 to identified Aboriginal sites (one is located within the boundary of the Modification 10 extension) or as yet unidentified Aboriginal objects or sites.

1.3 Combined Survey Effort

As there are a number of either overlapping areas or blocks in close proximity related to the Modification 9 HMP and Modification 10 ACHA, Umwelt is proposing to undertake the survey as one concerted survey effort. This information is summarised in **Plate 1.1** and **Plate 1.2** below. Green shading shows areas previously surveyed and not requiring further survey and yellow shading indicates the areas that will be surveyed for the Mod 10 Aboriginal cultural heritage assessment. The remaining properties within the Mod 9 area that have not been subject to prior survey are shaded in aqua. In accordance with Schedule 4, Condition 8 of the Modification 8 consent, best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. The previously unsurveyed properties shown in aqua in **Plate 1.2** will be therefore surveyed as part of the development of the Modification 9 HMP and Modification 10 ACHA.

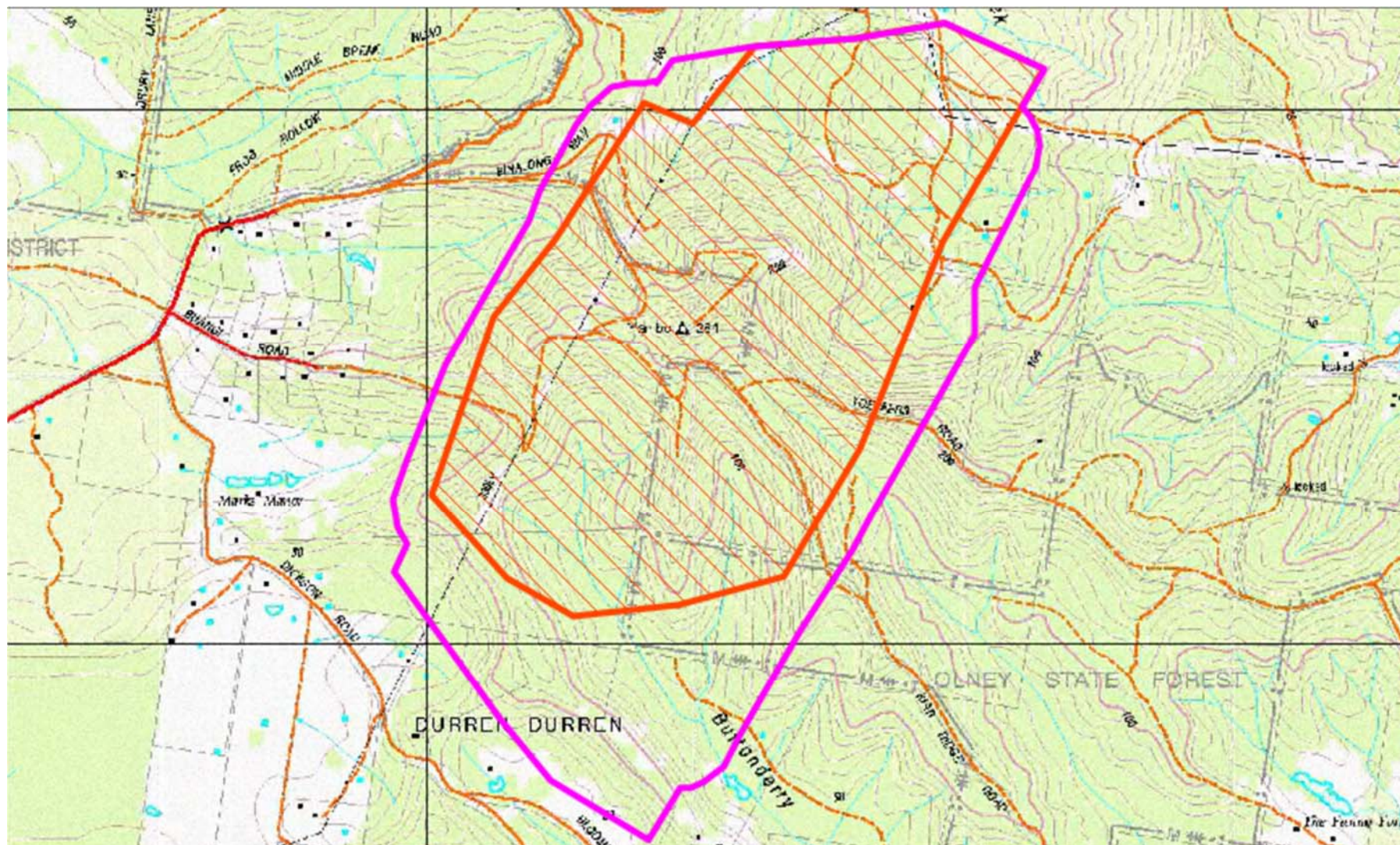


Plate 1.1 Mod 9 and Mod 10 areas (red hatching is Mod 9 area) showing the increase in footprint. Specifically, the increase in footprint to the south includes areas that have not yet been assessed during previous submissions.

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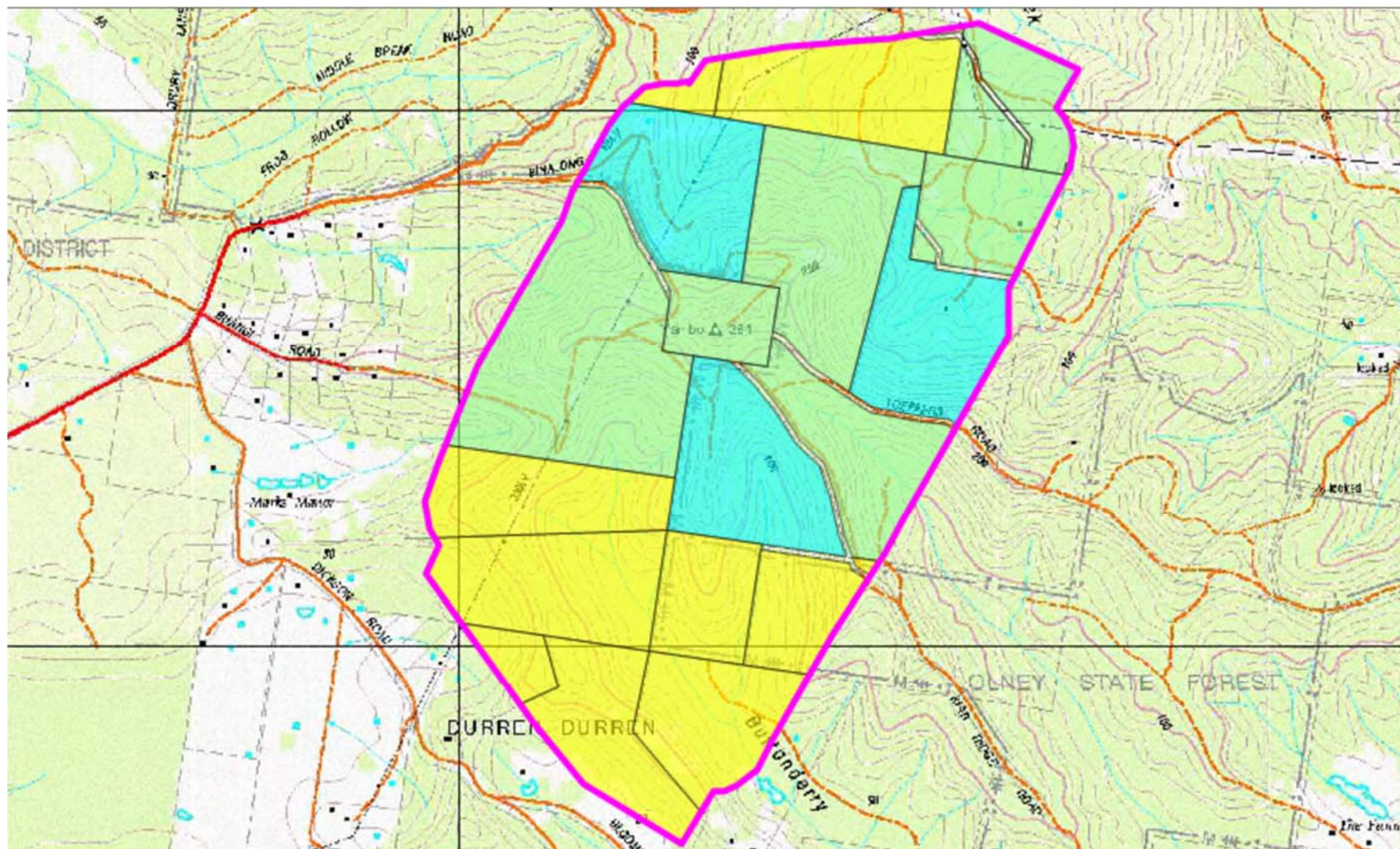


Plate 1.2 Mod 9 and Mod 10 areas showing survey requirements (green = does not require additional survey, yellow = to be surveyed for Mod 10 ACHA, aqua = to be surveyed for Mod 9 HMP)

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2.0 Description of the Project Area

For the purposes of the ACHA, the area proposed for impact as a result of the project comprises the proposed re-alignment area of LW30-33 (Modification 9) and the proposed extension of LW30-33 (Modification 10), the 'assessment area'.

The assessment area is located within the Narrabeen Group geological group, specifically the Patonga Claystone and Tuggerah Formations within the Clifton Subgroup. These formations comprise deposits of siltstones, claystones and areas of sandstone (Murphy 1993). Based on the geological description of mudstones within this formation, it is unlikely that they were of a quality suitable for the manufacture of stone artefacts (with the mudstone typically referenced in archaeological sites better technically described as an indurated rhyolitic tuff). It does not appear that stone raw materials suitable for artefact manufacture would have been available within the assessment area, but would have been sourced from other locations within the region. In terms of other archaeological implications, the presence of sandstone within the geology of the assessment area indicates that, should sandstone outcrops be present, it may be possible that site types such as grinding grooves or engravings may occur.

The assessment area is underlain by the Mandalong, Gorokan and Woodburys Bridge soil landscapes, as shown in **Plate 2.1**. These three soil landscapes are highly acidic and prone to toxic concentration of aluminium (Murphy, 1993). Typical soil profiles vary with landform/geology, but are typically relatively shallow. These soils are typically moderately erodible, with levels of erosion linked to landform. The depth of topsoil is a critical consideration for the likely presence of sub-surface archaeological deposits because intact deposits are typically only found within A horizon soils. Erosion acts to expose deposits that were formerly sub-surface and impacts on the potential for deposits to retain archaeological integrity.

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Within the assessment area itself, five Aboriginal archaeological sites have been recorded, including:

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In reviewing these results, RPS (2013) suggested that the distribution of sites indicates that Aboriginal camping activities took place on the valley floors and in rockshelters and benching landforms on the ridgelines and upper slope/crest landforms and that the transition between these areas was potentially undertaken along watercourses (first and second order) as evidenced by the regular occurrence of grinding grooves. RPS (2013) noted that the Mandalong Southern Extension area may have been utilised as a transit route between the low-lying lacustrine environments and the Watagan uplands. The presence of grinding groove sites with more than 20 grooves was considered to support the proposition that the area may have supported larger groups of Aboriginal people than previously thought.

In relation to potential impacts and mitigation requirements for the identified sites regarding the original Mandalong Southern Extension Project, it was assessed that the majority of the sites were 'unlikely' or 'very unlikely' to be impacted by proposed longwall mining.

It is anticipated that the above described spatial distribution of sites in the landscape will be applicable to the current project areas. The results of RPS' survey, as well as other surveys undertaken in the area will be used to formulate the predictive model for the ACHA currently being prepared.

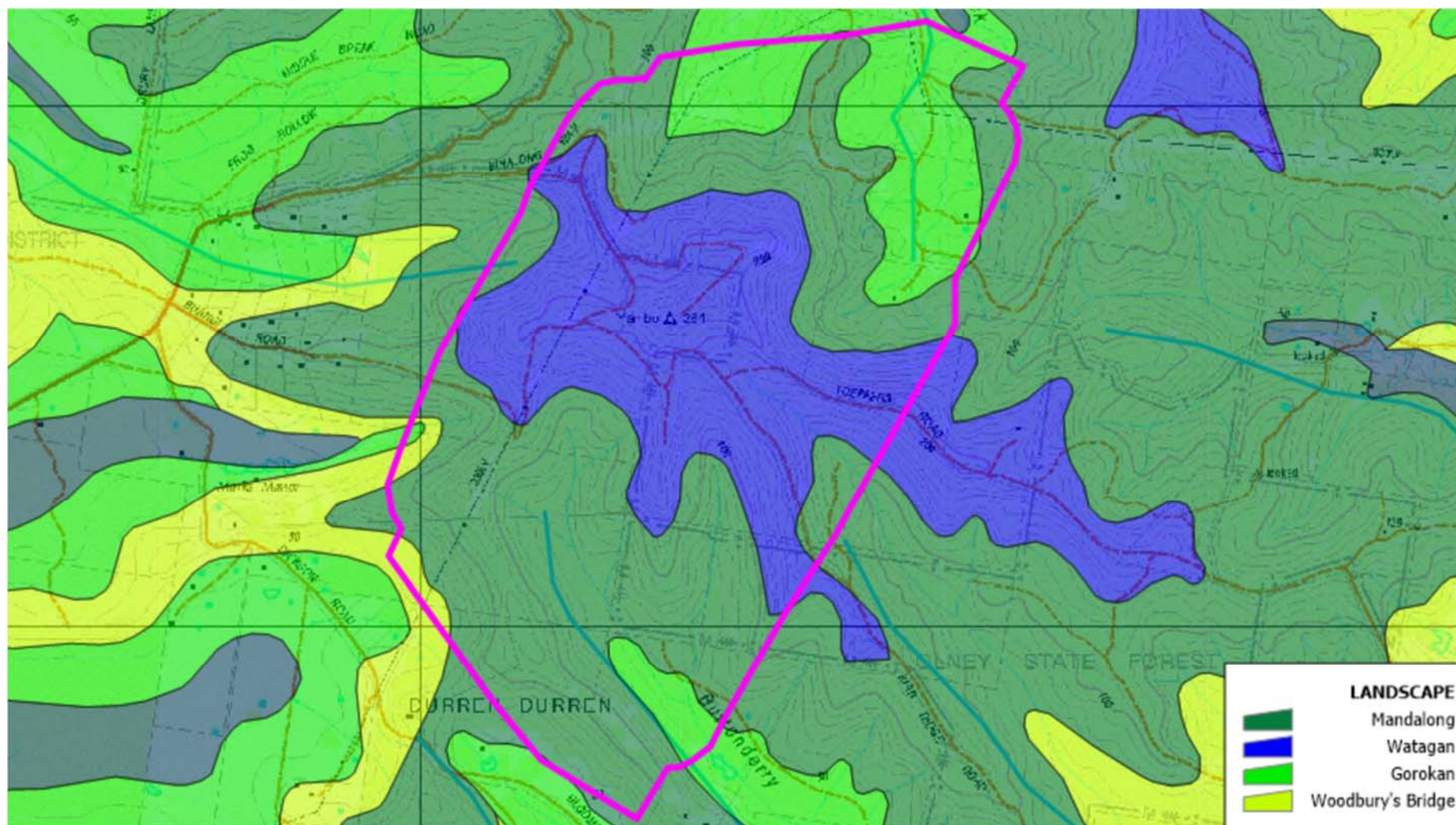


Plate 2.1 Soil Landscape located within the wider project area.

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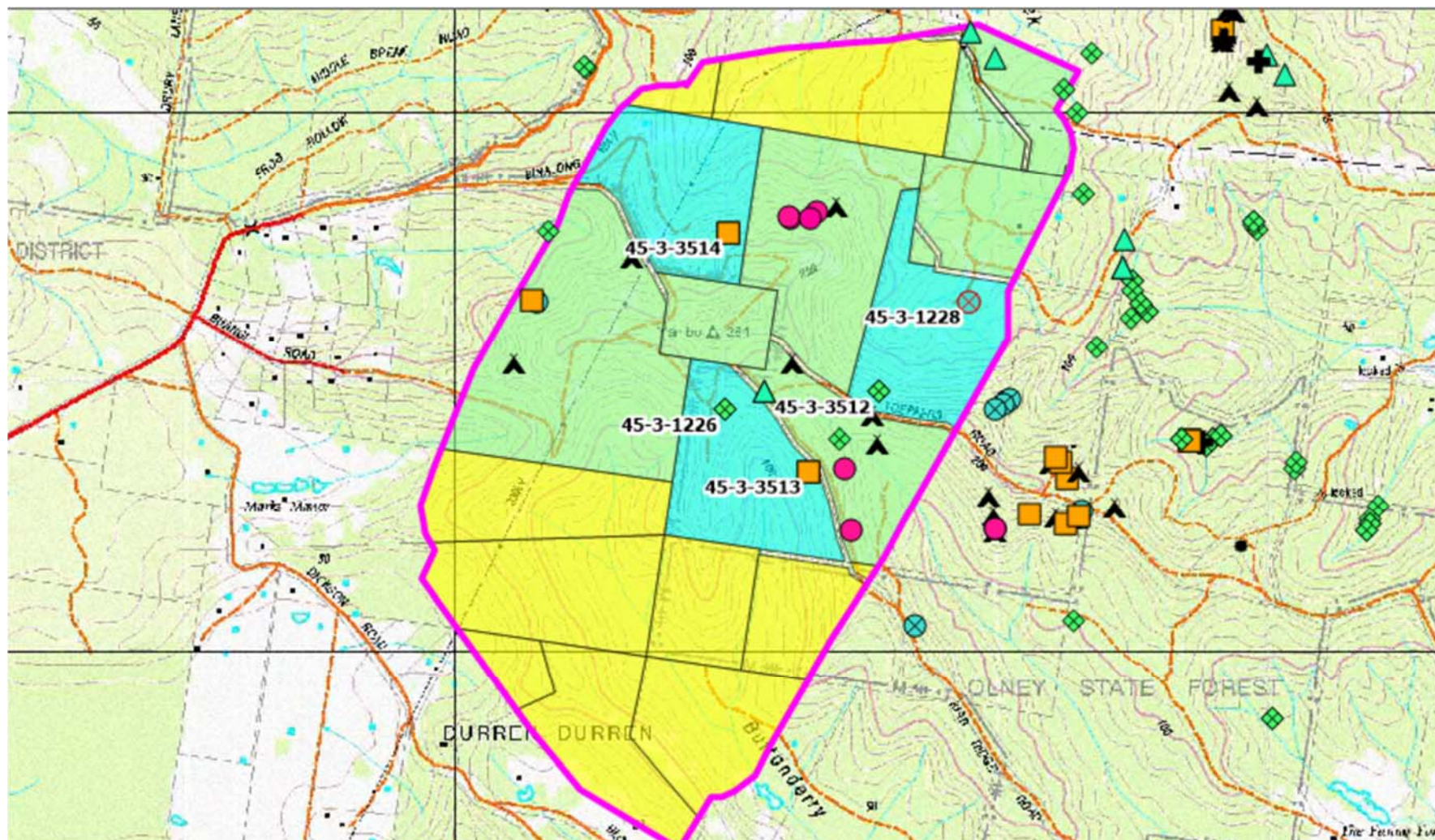


Plate 2.2 AHIMS results in proximity to the wider project area, with the three sites within the assessment area labelled above.

© Umwelt, 2020 based on data provided by Centennial and AHIMS

3.0 Methodology for the Aboriginal Cultural Heritage and Archaeological Assessment

As discussed in **Section 1.0**, the consultation process will be undertaken in accordance with the consultation requirements (DECCW 2010). The proposed methodology for the ACHA (pending comments from registered Aboriginal parties) is as follows:

1. Provide information to all registered Aboriginal parties regarding the project, including a draft methodology for review and comment (this letter).
2. Provision of a review period during which Aboriginal parties can provide comment and propose amendments to the draft methodology (up to 28 days from receipt of this letter, with comments due by close of business **7 September 2020**).
3. Completion of a survey of the project area in accordance with the draft methodology provided in this assessment (refer to **Section 5.0**).
4. Develop a draft ACHA report to include:
 - details of the nature of the project
 - details of the assessment requirements regarding Aboriginal cultural heritage, and how the ACHA report addresses these requirements, including:
 - identification of the Aboriginal cultural heritage values that exist across the area that will be impacted by the development. Identification of these values should be guided by the *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011)*.
 - consultation with Aboriginal people in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW)*. Full details of this consultation process will be captured.
 - documentation of the potential impacts of the development on Aboriginal cultural heritage values, and demonstration of attempts to avoid impact and identify any conservation outcomes.
 - records of any objects identified during the assessment and provision of this documentation to OEH
 - the results of an Aboriginal Heritage Information Management System (AHIMS) search and Native Title search
 - a review of the cultural context of the area that will draw heavily on information provided by registered Aboriginal parties and the results of previous cultural heritage and archaeological assessments undertaken in the area
 - a review of background information related to the environmental characteristics of the Mod 10 assessment area that may have determined how Aboriginal people may have occupied/utilised the area and the likelihood of site survival
 - the preparation of a predictive model drawing on all of the above
 - details of the survey methodology and results
 - details of any sites/objects/potential archaeological deposits located during the survey

- an assessment of the Aboriginal cultural heritage significance (as provided by the registered Aboriginal parties) of the Mod 10 assessment area
 - an assessment of the archaeological significance of any sites/objects/potential archaeological deposits identified within the Mod 10 assessment area
 - an assessment of the potential impact by the project to any sites/objects/potential archaeological deposits identified within the Mod 10 assessment area
 - a discussion of management options and
 - management recommendations.
5. The provision of the draft ACHA report to registered Aboriginal parties for review and comment (comment period extends for 28 days from date of provision of the draft ACHA).
 6. Discussion/incorporation of comments/responses received from Aboriginal parties to develop and finalise the ACHA report.
 7. Provision of the final ACHA report to registered Aboriginal parties and to Centennial Coal for inclusion within the EIS.

4.0 Consultation with Aboriginal Parties During the Assessment Process

Umwelt acknowledges and understands that cultural values, by definition, relate to values outside those associated with specific archaeological sites/objects. Throughout the assessment process, we invite comment from Aboriginal parties regarding any cultural values associated with the Mod 10 assessment area and will ensure that any information provided regarding cultural values (be they associated with a specific site or provided with reference to a landscape feature or within a broader context) are documented and recorded in accordance with the wishes of the relevant Aboriginal party for inclusion in the ACHA report. We note that the inclusion of any such information in the final assessment is dependent on its provision by the Aboriginal parties.

We note that Section 3.2 of the consultation requirements specifies that the objective of consultation is to ensure ‘that Aboriginal people have the opportunity to improve assessment outcomes’. Factors specified as assisting in meeting this objective include providing Aboriginal parties with the opportunity to provide information on cultural values (as invited in this draft methodology), influence methods regarding assessment of significance for Aboriginal objects/places (which can be undertaken in response to this draft methodology, during fieldwork and in commenting on the draft ACHA report) and commenting on the draft ACHA report. Our approach is designed to ensure compliance with this objective, including the potential for in-field consultation with Aboriginal party representatives during fieldwork. Umwelt archaeologists are trained to seek and document cultural feedback provided by Aboriginal party representatives during fieldwork. This is not limited to cultural values associated with archaeological sites but may encompass any values identified by Aboriginal people.

We look forward to working with your organisation throughout the project to ensure that we adequately document any information you wish to provide regarding Aboriginal cultural values. Please feel free to contact us to request any additional information or assistance you may require to facilitate the provision of your input.

5.0 Survey Methodology

The draft survey methodology is designed to ensure compliance with requirements for archaeological survey as established in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice). This includes development of an appropriate sampling strategy and recording of information during survey. This survey methodology will be utilised for both the reporting required within the HMP and ACHA.

5.1 Sampling Strategy

The survey will be undertaken to ensure that a representative sample of all landforms within the area is surveyed, as required to ensure compliance with Code of Practice.

Areas that will be subject to the greatest amount of potential subsidence impact (subsidence contours are shown in **Plate 5.1**) will be subject to intensive survey. This includes drainage lines (in association with which grinding grooves may be identified), slope areas likely to contain rock outcrop suitable for use as shelter (in association with which rockshelter sites may be identified) and crests and ridges (in association with which stone arrangements may be identified) where these landforms are mapped as intersecting with areas of subsidence.

All efforts will be made to achieve maximum survey coverage via pedestrian survey. It is noted, however, that vehicle transects may be used in some areas based on limited archaeological potential and/or where vegetation limits access and visibility. It is intended that the survey will be conducted over the course of up to 6-8 days by two archaeologists and up to four Aboriginal party representatives however this may be subject to change based on the number of sites recorded, ground surface visibility and other variables.

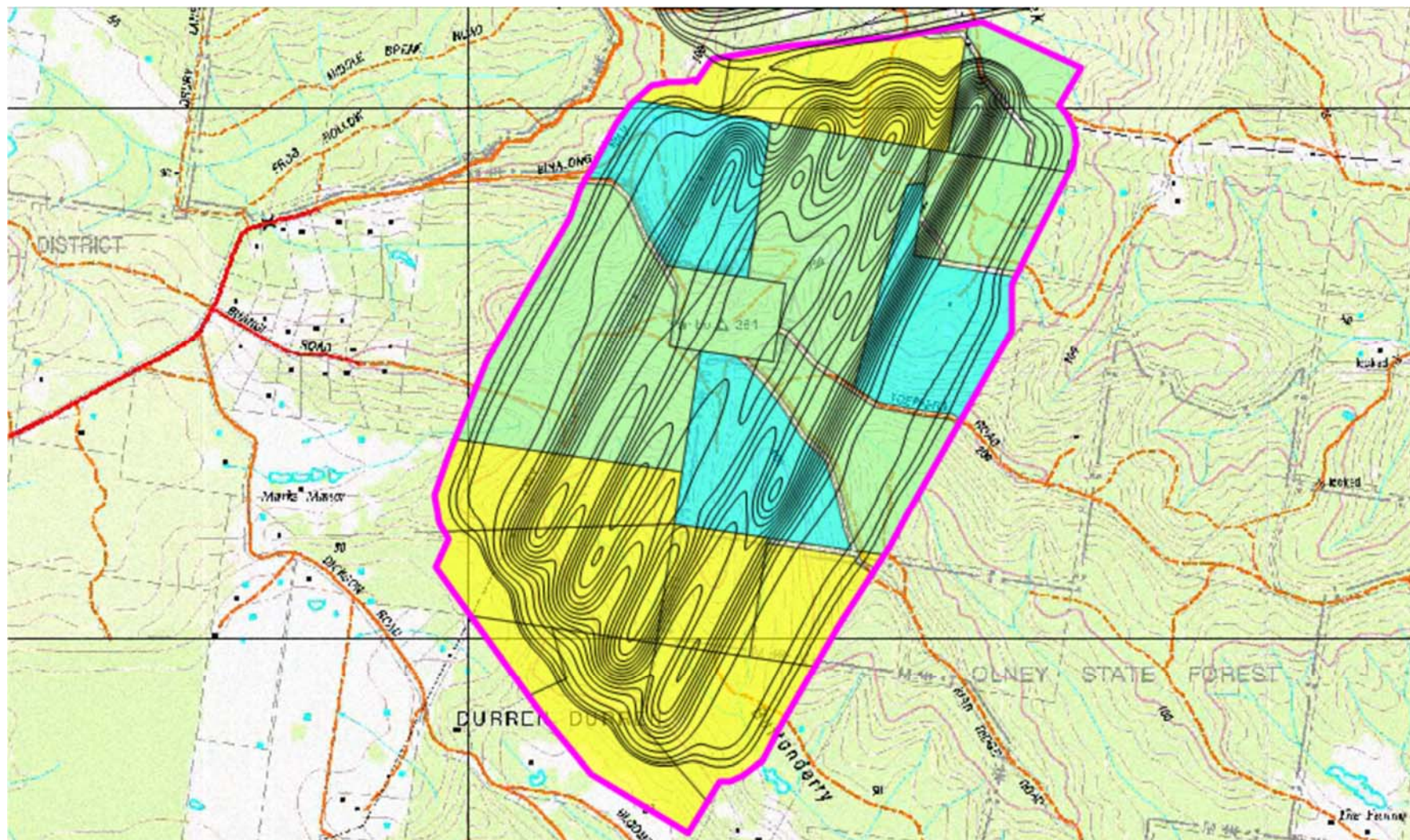


Plate 5.1 Subsidence predictions of LW30-33 within the wider project area.

© Umwelt, 2020 based on data provided by Centennial

5.2 Recording of Information During Survey

Survey units will be defined and named with reference to Requirement 5c of the Code of Practice, including recording start and finish points and/or boundaries for all survey units using a hand-held GPS receiver (set to allow recording of data with datum MGA94) and topographic mapping (where relevant), with track logs to be recorded for all pedestrian transects. Start and finish points/boundaries for survey units will be defined based on landforms, project area boundaries, access or other arbitrary terminations (as specified in the Code of Practice). The spacing between individuals will also be recorded for each survey unit.

Photographs will be undertaken for landforms/survey units (where informative). Information recorded for each survey unit will include

- Landform (in units based on those established by McDonald et al 2009)
- Gradient (where relevant)
- Vegetation
- Geology and soils (where suitable areas of exposure/visibility are present)
- Identified Aboriginal resources (food and medicine plants, prey animals, stone and water)
- Levels of average ground surface visibility within the survey unit (in accordance with the Requirement 9 of the Code of Practice)
- Extent and type of exposures within the survey unit (with reference to the factors leading to the exposure such as erosion, earth-moving activities, track establishment etc.)
- Any information provided by the registered Aboriginal parties in relation to cultural values, noting that such information will be recorded in accordance with the wishes of the party providing the information and
- Any site, area of Potential Archaeological Deposit (PAD) or landscape feature of Aboriginal cultural value present within the survey unit (see below for further information on site/PAD recording).

Any Aboriginal archaeological sites identified during the survey will be assessed with reference to the site boundaries. Factors that will be taken into consideration in defining and mapping site boundaries may include the distribution of surface artefacts, landforms or physical boundaries and cultural information.

Sufficient information will be recorded for all sites to meet Requirement 7 of the Code of Practice. The archaeological and Aboriginal cultural significance of any site will be discussed with the registered Aboriginal parties participating in the survey.

The archaeological potential of landforms/specific areas within the assessment area will be assessed with reference to factors including the archaeological context of the local area, the evaluation of the soil profile (based on soil landscape mapping, exposed soil profiles identified during the survey and geomorphic understandings of the area) and the identification of landforms that may have greater archaeological sensitivity. The extent of any area of identified archaeological potential will be defined and documented for inclusion in subsequent reporting. The archaeological and Aboriginal cultural significance of any area of identified archaeological potential will be discussed with the registered Aboriginal parties participating in the survey.

In relation to the assessment of rockshelter sites, it is proposed that a rockshelter will only be recorded as an archaeological site where archaeological evidence is identified in association with the rockshelter. However, the commitment to record archaeological potential will apply and therefore the final assessment will note where suitable rock overhangs/shelters occur but within which no archaeological evidence was identified.

5.3 Survey Arrangements

At this stage, it is proposed to undertake the survey in early **September 2020**, however this is subject to confirmation. Further correspondence regarding survey arrangements will be provided at least two weeks prior to the proposed survey date. Additional information relating to engagement to undertake the survey is attached to this letter.

6.0 Other Requirements

The following will be required to enable commercial engagement for the work:

- Insurances are current (Workers Compensation, Public Liability and Product Liability). If you are unsure when your last insurance was entered into the Centennial system please call to confirm.
- Undertake a visitors induction at Mandalong Mine Administration Office prior to the commencement of works.
- A medical for each person attending must be provided stating fitness to complete usual tasks.
- Minimum personal protective equipment (PPE) requirements are long pants and long sleeve high visibility shirt, steel toe capped boots and hard hat in construction areas.
- Each individual will bring their own food and water.
- Adhere to a minimum expectation of behaviour where all parties behave in an appropriate and respectful manner, and that culturally sensitivity is considered.
- Arrive on time and by own travel methods.

7.0 Summary

This letter provides details of the proposed methodology for an Aboriginal Cultural Heritage Assessment associated with the Project. In accordance with the consultation requirements (DECCW 2010), we ask that your group provides comments on the draft methodology by no later than close of business **7 September 2020**. Comments regarding the draft methodology can be provided verbally or in writing to:

Ashley O'Sullivan,
Senior Archaeologist
Umwelt Environmental and Social Consultants (Umwelt)
Phone: 02 4950 5322.

Should you require any further information or wish to discuss any aspect of the Project, please do not hesitate to contact Ashley or Centennial's Iain Hornshaw (Approvals Coordinator) on 4935 8901 / iain.hornshaw@centennialcoal.com.au.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'Ashley O'Sullivan', with a long, sweeping horizontal line extending to the right.

Ashley O'Sullivan
Senior Archaeologist

Enclosures: Archaeological Fieldwork Engagement Form

**Archaeological Fieldwork Engagement Form
Mandalong Mod 9 and 10, NSW**

To: Centennial Coal
Email: iain.hornshaw@centennialcoal.com.au
Phone: 4935 8901
Attention: Iain Hornshaw (Approvals Coordinator)

Item	Response (circle response and provide detail)
Nominated field work representative and representative contact phone number.	Name: _____ Phone: _____
Our organisation has certificates of currency demonstrating a minimum of \$20,000 cover for workers compensation, public liability and product liability).	Y / N Certificates of currency must be provided before engagement can be finalised
Our organisation understands that payment terms and conditions are in accordance with those previously negotiated with Centennial, with a specified rate of pay of \$1000 per Aboriginal organisation per day. Travel will be paid at ATO rates.	Y / N
Our organisation will provide their representative with appropriate Personal Protective Equipment and Clothing (PPE&C). As a minimum, this must include: <ul style="list-style-type: none"> • Long trousers • High visibility long sleeve shirt • Steel toe capped safety boots • Hard hat (for construction areas) • Soft hat (outside construction areas). 	Y / N
Has completed the medical as required by Centennial.	Y / N Provide details/copy of completed medical.
Our representative understands that they will need to bring with them sufficient food and water for the day's work.	Y / N
Our representative has demonstrated appropriate experience, ability and reliability.	Y / N

Item	Response (circle response and provide detail)
Our representative will commit to arrive on site on time and free from the effects of drugs, alcohol and fatigue (noting that your representative may be required to undergo drug and alcohol testing in accordance with site requirements).	Y / N
Our representative will commit to behaving in a culturally appropriate manner whilst on site and will work collaboratively with the archaeologist and other Aboriginal parties (where relevant)	Y / N

Organisation: _____

Name of Authorised Person: _____

Signature: _____

Date: _____

Our Ref: 20133/NR/AO/11082020

11 August 2020

Yula-Punaal Education and Healing Aboriginal Corporation
Victor Wright
PO Box 491
MORISSET NSW 2264

Email: shan.shell@bigpond.com

Dear Sir/Madam

Re: Methodology for Aboriginal Cultural Heritage Assessment, Proposed Extension of Longwalls 30-33 (Modification 10) and Further Survey for Modification 9 Extraction Plan, Mandalong Mine

Centennial Mandalong is currently seeking approval for the continuation of mining with the Mandalong South area associated with both Modification 9 and Modification 10. This project, herein after referred to as 'Mandalong South Assessment Area', comprises both further survey required to support a Heritage Management Plan (HMP) associated with an Extraction Plan required for Modification 9 and an Aboriginal Cultural Heritage Assessment (ACHA) associated with Modification 10. The project area, including all areas of proposed works, is shown in **Plate 1.1** and **Plate 1.2**.

Umwelt Environmental and Social Consultants (Umwelt) have been engaged by Centennial Mandalong to prepare a HMP for Modification 9 and an ACHA (incorporating an archaeological technical report) for Modification 10 in consultation with the registered Aboriginal parties, including your organisation.

The HMP for Modification 9 will be completed in accordance with the relevant conditions of approval. The ACHA will form part of the Environmental Impact Statement (EIS) for the proposed modification (Modification 10), and will be undertaken in accordance with the requirements of the *National Parks and Wildlife Act 1974* (NPW Act), the *National Parks and Wildlife Regulation 2019* (NPW Regulation), the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (Office of Environment and Heritage [OEH] 2011), the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (Department of Environment, Climate Change and Water [DECCW] 2010) (the consultation requirements) and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice).

As a registered Aboriginal party for Mandalong Mine, we are writing to provide you with the draft methodology for the ACHA and a methodology for additional survey to inform the HMP for your review and comment.

Newcastle | Orange |
Sydney | Canberra |
Brisbane | Perth

T | 1300 793 267
E | info@umwelt.com.au

www.umwelt.com.au

Umwelt (Australia) Pty Limited
ABN 18 059 519 041

1.0 Description of the Project

A summary of both projects are provided below, with reference to the requirements satisfied by this methodology and accompanying assessments.

1.1 Modification 9 HMP

Modification 9 relates to the proposed re-orientation of a number of existing longwall panels due to challenging geological conditions. The Modification 9 area was included within the larger area assessed as part of the original Aboriginal cultural heritage assessment (RPS 2013) undertaken to inform the application for SSD-5144. At the time of the assessment, six land parcels within the Modification 9 area could not be surveyed due to lack of landholder consent. In accordance with Schedule 4, Condition 8 of the Mandalong Mine consent (SSD-5144), best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. An additional assessment of part of the Modification 9 area was conducted by Umwelt (2020) and the former Native Title claimant parties to satisfy the conditions of a Section 31 Deed of Agreement. These parcels comprised areas of State Forest already partially assessed by RPS (2013).

As a result of the RPS (2013) assessment, 21 Aboriginal archaeological sites are listed on the Aboriginal Heritage Information Management System (AHIMS) as being located within the Modification 9 area, of which one is a duplicate record. These sites comprise six rockshelters, four sets of grinding grooves, five sites identified as being associated with Aboriginal resources, three sites containing stone artefacts and two areas of Potential Archaeological Deposit (PAD). One historical heritage item (L1 – log landing site) was identified within the Mod 9 area however, based on subsidence predictions, it is understood that this site is unlikely to be impacted.

Of the parcels of land assessed by Umwelt (2020) within the Modification 9 area, Lot 175 DP755271 did not contain any identified sites and the potential for sites to be present (but not currently visible) within this parcel was assessed as low based on the extent of survey and the nature of landforms within this area. On this basis, it is not proposed to resurvey this lot as part of the development of the HMP. Lot 115 and 122 DP755238 were also assessed by Umwelt (2019) and no new sites were identified. However, it was noted that these lots were largely inaccessible at the time of survey.

The HMP is required to meet the relevant conditions of the Modification 9 consent. As this has not yet been issued (Centennial Mandalong are currently preparing responses to the public / agency submissions), it is assumed that conditions will be consistent with those in the Modification 8 consent. Schedule 6, Condition 6(l) specifies that an extraction plan must be developed and must include a HMP 'which has been prepared in consultation with the Biodiversity Conservation Division and Registered Aboriginal parties, to manage the potential environmental consequences of the proposed second workings on both Aboriginal and non-Aboriginal heritage items, and reflects the requirements of condition 22 of Schedule 3.' Condition 22 of Schedule 3 specifies requirements to be addressed in the HMP.

1.2 Modification 10

Further to the reorientation of longwall panels under Modification 9, Mandalong is proposing to extend the reorientated panels, with this proposal referred to as Modification 10.

Modification 10 will involve the extensions of LW30-33 to the south of the current longwall plan, as shown by the increase in project footprint in **Plate 1.1** and **Plate 1.2**.

An Aboriginal Cultural Heritage Assessment (ACHA) has been determined as being required to assess the impact of proposed Modification 10 to identified Aboriginal sites (one is located within the boundary of the Modification 10 extension) or as yet unidentified Aboriginal objects or sites.

1.3 Combined Survey Effort

As there are a number of either overlapping areas or blocks in close proximity related to the Modification 9 HMP and Modification 10 ACHA, Umwelt is proposing to undertake the survey as one concerted survey effort. This information is summarised in **Plate 1.1** and **Plate 1.2** below. Green shading shows areas previously surveyed and not requiring further survey and yellow shading indicates the areas that will be surveyed for the Mod 10 Aboriginal cultural heritage assessment. The remaining properties within the Mod 9 area that have not been subject to prior survey are shaded in aqua. In accordance with Schedule 4, Condition 8 of the Modification 8 consent, best endeavours must be made to survey these properties, analyse the significance of sites/items they contain and incorporate measures for these sites/areas into a HMP prior to subsidence impacts. The previously unsurveyed properties shown in aqua in **Plate 1.2** will be therefore surveyed as part of the development of the Modification 9 HMP and Modification 10 ACHA.

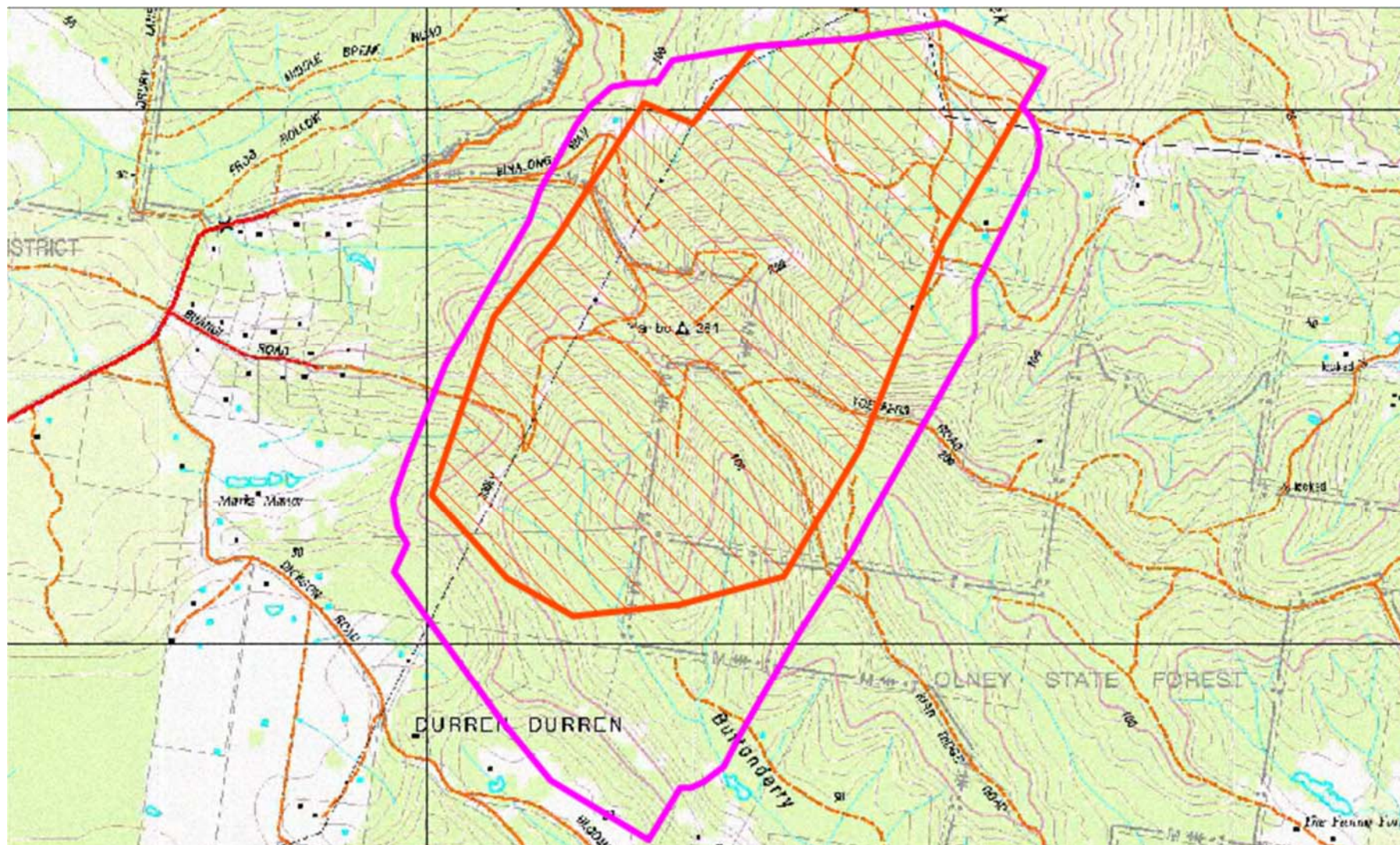


Plate 1.1 Mod 9 and Mod 10 areas (red hatching is Mod 9 area) showing the increase in footprint. Specifically, the increase in footprint to the south includes areas that have not yet been assessed during previous submissions.

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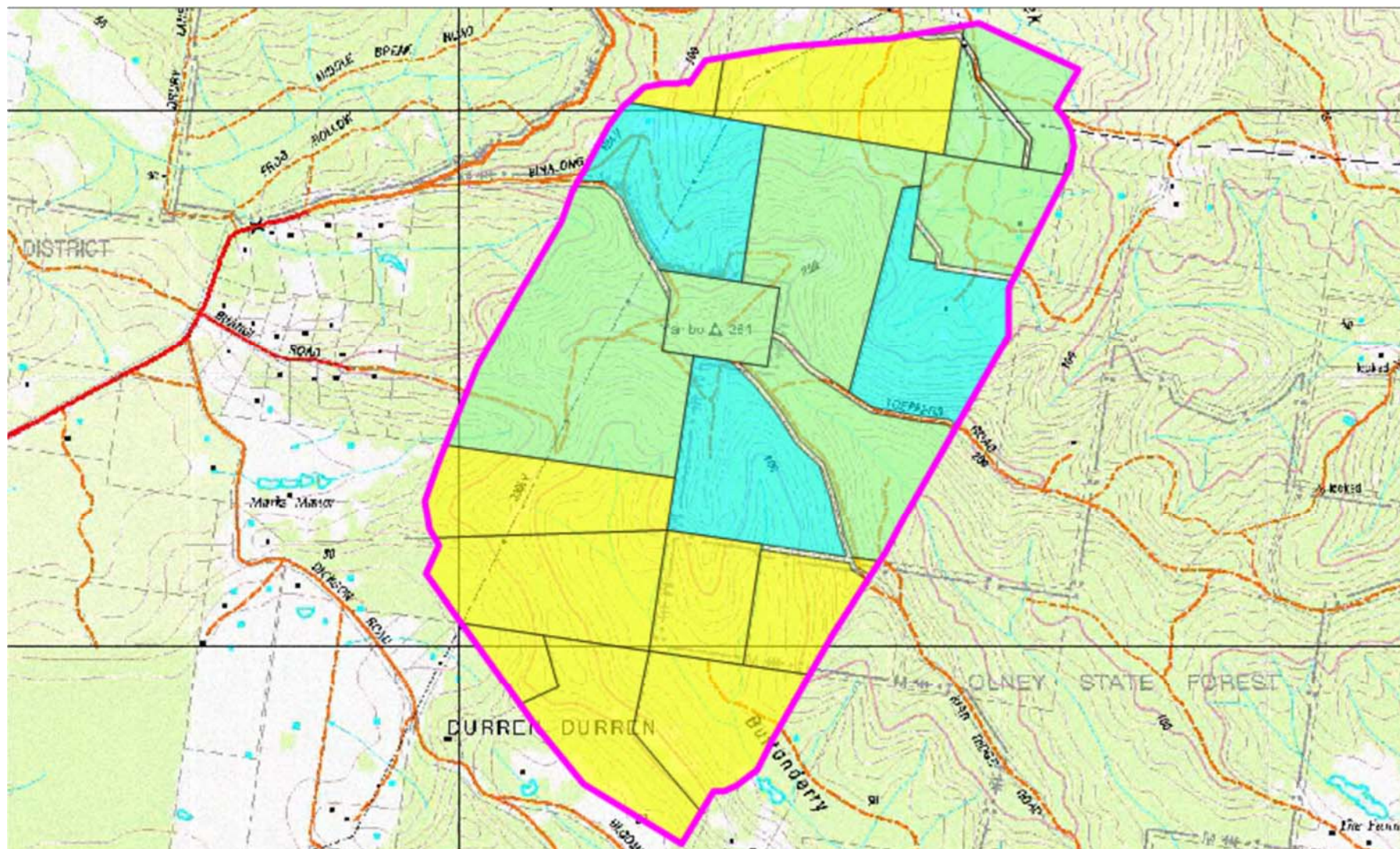


Plate 1.2 Mod 9 and Mod 10 areas showing survey requirements (green = does not require additional survey, yellow = to be surveyed for Mod 10 ACHA, aqua = to be surveyed for Mod 9 HMP)

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2.0 Description of the Project Area

For the purposes of the ACHA, the area proposed for impact as a result of the project comprises the proposed re-alignment area of LW30-33 (Modification 9) and the proposed extension of LW30-33 (Modification 10), the 'assessment area'.

The assessment area is located within the Narrabeen Group geological group, specifically the Patonga Claystone and Tuggerah Formations within the Clifton Subgroup. These formations comprise deposits of siltstones, claystones and areas of sandstone (Murphy 1993). Based on the geological description of mudstones within this formation, it is unlikely that they were of a quality suitable for the manufacture of stone artefacts (with the mudstone typically referenced in archaeological sites better technically described as an indurated rhyolitic tuff). It does not appear that stone raw materials suitable for artefact manufacture would have been available within the assessment area, but would have been sourced from other locations within the region. In terms of other archaeological implications, the presence of sandstone within the geology of the assessment area indicates that, should sandstone outcrops be present, it may be possible that site types such as grinding grooves or engravings may occur.

The assessment area is underlain by the Mandalong, Gorokan and Woodburys Bridge soil landscapes, as shown in **Plate 2.1**. These three soil landscapes are highly acidic and prone to toxic concentration of aluminium (Murphy, 1993). Typical soil profiles vary with landform/geology, but are typically relatively shallow. These soils are typically moderately erodible, with levels of erosion linked to landform. The depth of topsoil is a critical consideration for the likely presence of sub-surface archaeological deposits because intact deposits are typically only found within A horizon soils. Erosion acts to expose deposits that were formerly sub-surface and impacts on the potential for deposits to retain archaeological integrity.

The areas surrounding the Mandalong South assessment area have been subject to previous archaeological assessments, and these previous assessments have resulted in the identification of a number of archaeological sites. The most common site type recorded in the search area is artefact scatters, followed by modified trees (carved or scarred). Within the surrounding landscape, these site types have not been recorded in association with specific landforms but do seem to correlate with less disturbed land. Shell midden sites have also been recorded, particularly in proximity to the foreshore of Lake Macquarie (located outside of the assessment area). Potential archaeological deposits, habitation structures and Aboriginal Ceremony and Dreaming sites have also been recorded, though these site types are all located outside of the current assessment area.

Within the assessment area itself, five Aboriginal archaeological sites have been recorded, including:

- Two potential archaeological deposits (45-3-3513 and 45-3-3514)
- Two grinding grooves (45-3-1226, 45-3-3512)
- One art engraving site (45-3-1228).

2.1 Previous Investigations

RPS (2013) completed an assessment of 2,360 ha of private and public land for the now approved Mandalong Southern Extension project. The assessment resulted in the recording of 130 new archaeological sites in addition to 20 previously recorded sites. The most common site types were grinding grooves, rockshelters with PAD and scarred trees, although several artefact scatters were recorded in addition to stone arrangements.

The Mandalong Southern Extension Area is characterised by steeply inclined ridges with first and second order streams/drainage lines that drain into Morans Creek in the north and east. Typically rockshelters were located on or within 200 m of the ridge crests and were formed from weathering sheets of sandstone or large boulders.

Grinding groove sites were located in the first and second order drainage lines and were typically identified on smooth, fine-grained sandstone sheets at elevations between 80 and 100 m AHD. It was observed that sandstone exposed in drainage lines above 100 m elevation tended to be rough and unsuitable for grinding grooves. Sandstone below 80 m tended to be more 'blocky' and did not have flat surfaces suitable for grinding grooves. Larger sandstone sheets were noted at the confluence of drainage lines and thus provided larger surfaces for grinding grooves. The numbers of grooves within each site ranged from single grooves to over 25 grooves at three sites. The majority of grinding grooves appeared to be for sharpening stone hatchet heads and typically were between 20 and 40 centimetres (cm) in length. Often pools of water were identified in close proximity to the grooves.

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In reviewing these results, RPS (2013) suggested that the distribution of sites indicates that Aboriginal camping activities took place on the valley floors and in rockshelters and benching landforms on the ridgelines and upper slope/crest landforms and that the transition between these areas was potentially undertaken along watercourses (first and second order) as evidenced by the regular occurrence of grinding grooves. RPS (2013) noted that the Mandalong Southern Extension area may have been utilised as a transit route between the low-lying lacustrine environments and the Watagan uplands. The presence of grinding groove sites with more than 20 grooves was considered to support the proposition that the area may have supported larger groups of Aboriginal people than previously thought.

In relation to potential impacts and mitigation requirements for the identified sites regarding the original Mandalong Southern Extension Project, it was assessed that the majority of the sites were 'unlikely' or 'very unlikely' to be impacted by proposed longwall mining.

It is anticipated that the above described spatial distribution of sites in the landscape will be applicable to the current project areas. The results of RPS' survey, as well as other surveys undertaken in the area will be used to formulate the predictive model for the ACHA currently being prepared.

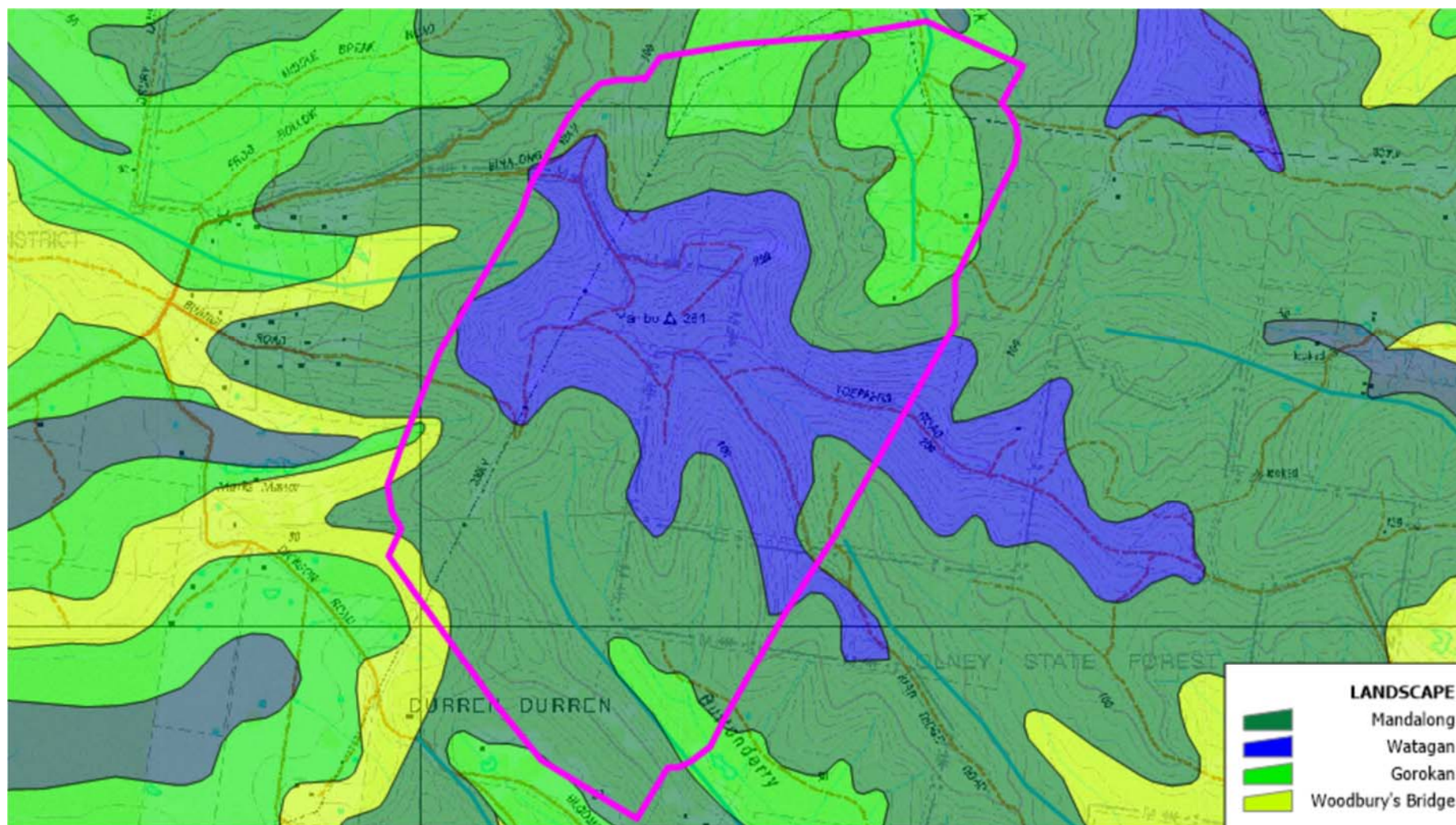


Plate 2.1 Soil Landscape located within the wider project area.

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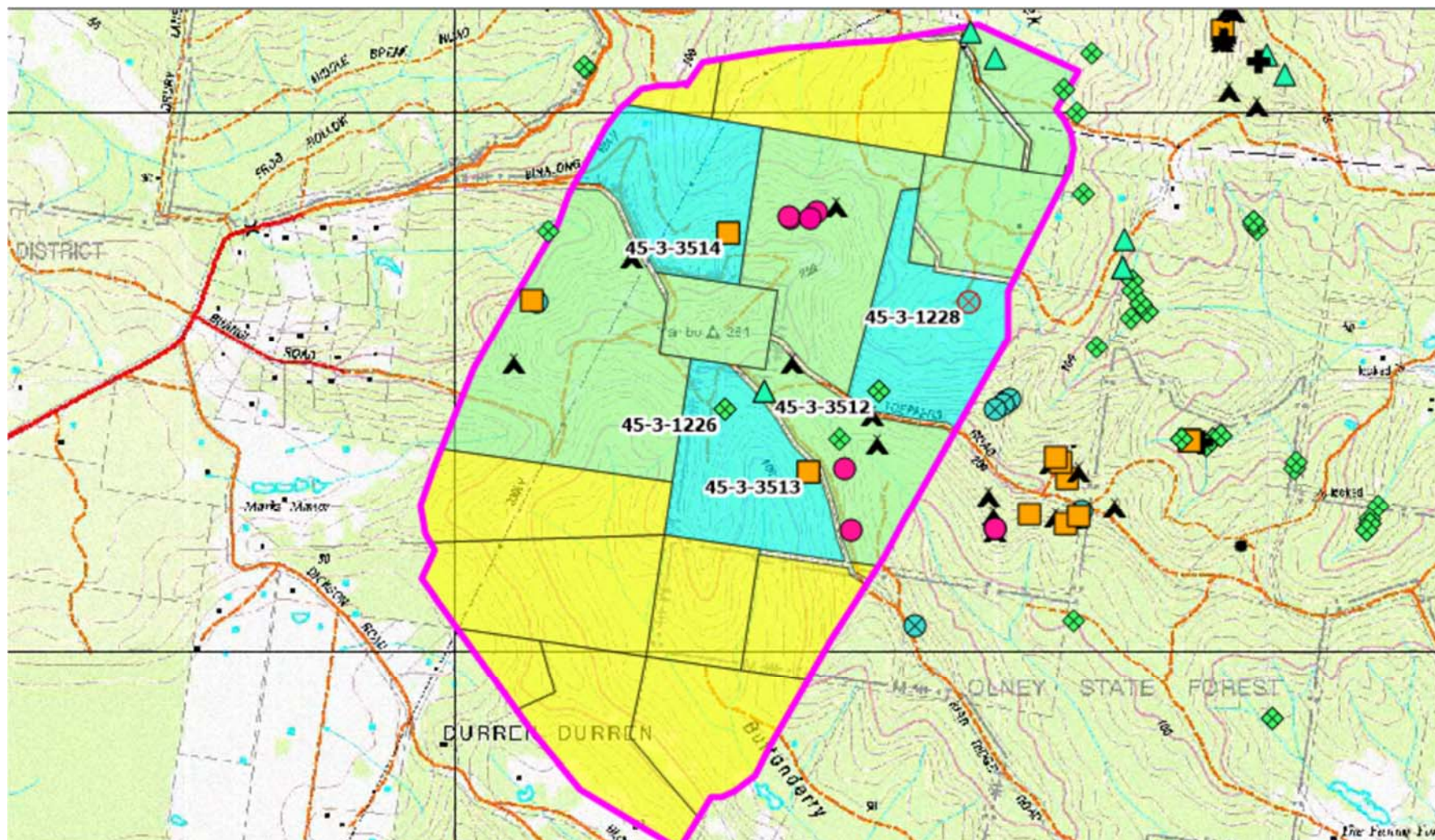


Plate 2.2 AHIMS results in proximity to the wider project area, with the three sites within the assessment area labelled above.

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3.0 Methodology for the Aboriginal Cultural Heritage and Archaeological Assessment

As discussed in **Section 1.0**, the consultation process will be undertaken in accordance with the consultation requirements (DECCW 2010). The proposed methodology for the ACHA (pending comments from registered Aboriginal parties) is as follows:

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 - consultation with Aboriginal people in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW)*. Full details of this consultation process will be captured.
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 - the preparation of a predictive model drawing on all of the above
 - details of the survey methodology and results
 - details of any sites/objects/potential archaeological deposits located during the survey

- an assessment of the Aboriginal cultural heritage significance (as provided by the registered Aboriginal parties) of the Mod 10 assessment area
 - an assessment of the archaeological significance of any sites/objects/potential archaeological deposits identified within the Mod 10 assessment area
 - an assessment of the potential impact by the project to any sites/objects/potential archaeological deposits identified within the Mod 10 assessment area
 - a discussion of management options and
 - management recommendations.
5. The provision of the draft ACHA report to registered Aboriginal parties for review and comment (comment period extends for 28 days from date of provision of the draft ACHA).
 6. Discussion/incorporation of comments/responses received from Aboriginal parties to develop and finalise the ACHA report.
 7. Provision of the final ACHA report to registered Aboriginal parties and to Centennial Coal for inclusion within the EIS.

4.0 Consultation with Aboriginal Parties During the Assessment Process

Umwelt acknowledges and understands that cultural values, by definition, relate to values outside those associated with specific archaeological sites/objects. Throughout the assessment process, we invite comment from Aboriginal parties regarding any cultural values associated with the Mod 10 assessment area and will ensure that any information provided regarding cultural values (be they associated with a specific site or provided with reference to a landscape feature or within a broader context) are documented and recorded in accordance with the wishes of the relevant Aboriginal party for inclusion in the ACHA report. We note that the inclusion of any such information in the final assessment is dependent on its provision by the Aboriginal parties.

We note that Section 3.2 of the consultation requirements specifies that the objective of consultation is to ensure ‘that Aboriginal people have the opportunity to improve assessment outcomes’. Factors specified as assisting in meeting this objective include providing Aboriginal parties with the opportunity to provide information on cultural values (as invited in this draft methodology), influence methods regarding assessment of significance for Aboriginal objects/places (which can be undertaken in response to this draft methodology, during fieldwork and in commenting on the draft ACHA report) and commenting on the draft ACHA report. Our approach is designed to ensure compliance with this objective, including the potential for in-field consultation with Aboriginal party representatives during fieldwork. Umwelt archaeologists are trained to seek and document cultural feedback provided by Aboriginal party representatives during fieldwork. This is not limited to cultural values associated with archaeological sites but may encompass any values identified by Aboriginal people.

We look forward to working with your organisation throughout the project to ensure that we adequately document any information you wish to provide regarding Aboriginal cultural values. Please feel free to contact us to request any additional information or assistance you may require to facilitate the provision of your input.

5.0 Survey Methodology

The draft survey methodology is designed to ensure compliance with requirements for archaeological survey as established in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice). This includes development of an appropriate sampling strategy and recording of information during survey. This survey methodology will be utilised for both the reporting required within the HMP and ACHA.

5.1 Sampling Strategy

The survey will be undertaken to ensure that a representative sample of all landforms within the area is surveyed, as required to ensure compliance with Code of Practice.

Areas that will be subject to the greatest amount of potential subsidence impact (subsidence contours are shown in **Plate 5.1**) will be subject to intensive survey. This includes drainage lines (in association with which grinding grooves may be identified), slope areas likely to contain rock outcrop suitable for use as shelter (in association with which rockshelter sites may be identified) and crests and ridges (in association with which stone arrangements may be identified) where these landforms are mapped as intersecting with areas of subsidence.

All efforts will be made to achieve maximum survey coverage via pedestrian survey. It is noted, however, that vehicle transects may be used in some areas based on limited archaeological potential and/or where vegetation limits access and visibility. It is intended that the survey will be conducted over the course of up to 6-8 days by two archaeologists and up to four Aboriginal party representatives however this may be subject to change based on the number of sites recorded, ground surface visibility and other variables.

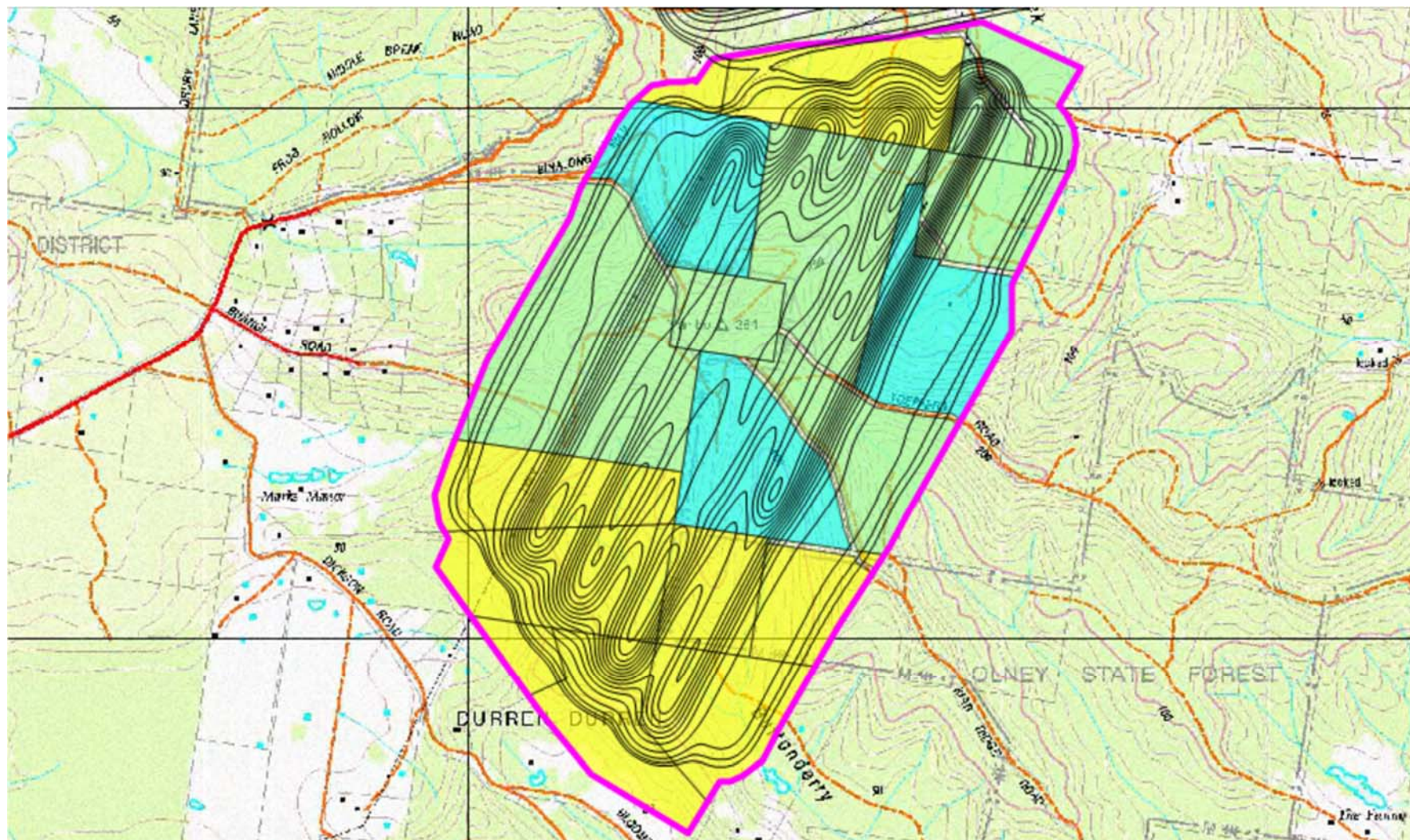


Plate 5.1 Subsidence predictions of LW30-33 within the wider project area.

© Umwelt, 2020 based on data provided by Centennial

5.2 Recording of Information During Survey

Survey units will be defined and named with reference to Requirement 5c of the Code of Practice, including recording start and finish points and/or boundaries for all survey units using a hand-held GPS receiver (set to allow recording of data with datum MGA94) and topographic mapping (where relevant), with track logs to be recorded for all pedestrian transects. Start and finish points/boundaries for survey units will be defined based on landforms, project area boundaries, access or other arbitrary terminations (as specified in the Code of Practice). The spacing between individuals will also be recorded for each survey unit.

Photographs will be undertaken for landforms/survey units (where informative). Information recorded for each survey unit will include

- Landform (in units based on those established by McDonald et al 2009)
- Gradient (where relevant)
- Vegetation
- Geology and soils (where suitable areas of exposure/visibility are present)
- Identified Aboriginal resources (food and medicine plants, prey animals, stone and water)
- Levels of average ground surface visibility within the survey unit (in accordance with the Requirement 9 of the Code of Practice)
- Extent and type of exposures within the survey unit (with reference to the factors leading to the exposure such as erosion, earth-moving activities, track establishment etc.)
- Any information provided by the registered Aboriginal parties in relation to cultural values, noting that such information will be recorded in accordance with the wishes of the party providing the information and
- Any site, area of Potential Archaeological Deposit (PAD) or landscape feature of Aboriginal cultural value present within the survey unit (see below for further information on site/PAD recording).

Any Aboriginal archaeological sites identified during the survey will be assessed with reference to the site boundaries. Factors that will be taken into consideration in defining and mapping site boundaries may include the distribution of surface artefacts, landforms or physical boundaries and cultural information.

Sufficient information will be recorded for all sites to meet Requirement 7 of the Code of Practice. The archaeological and Aboriginal cultural significance of any site will be discussed with the registered Aboriginal parties participating in the survey.

The archaeological potential of landforms/specific areas within the assessment area will be assessed with reference to factors including the archaeological context of the local area, the evaluation of the soil profile (based on soil landscape mapping, exposed soil profiles identified during the survey and geomorphic understandings of the area) and the identification of landforms that may have greater archaeological sensitivity. The extent of any area of identified archaeological potential will be defined and documented for inclusion in subsequent reporting. The archaeological and Aboriginal cultural significance of any area of identified archaeological potential will be discussed with the registered Aboriginal parties participating in the survey.

In relation to the assessment of rockshelter sites, it is proposed that a rockshelter will only be recorded as an archaeological site where archaeological evidence is identified in association with the rockshelter. However, the commitment to record archaeological potential will apply and therefore the final assessment will note where suitable rock overhangs/shelters occur but within which no archaeological evidence was identified.

5.3 Survey Arrangements

At this stage, it is proposed to undertake the survey in early **September 2020**, however this is subject to confirmation. Further correspondence regarding survey arrangements will be provided at least two weeks prior to the proposed survey date. Additional information relating to engagement to undertake the survey is attached to this letter.

6.0 Other Requirements

The following will be required to enable commercial engagement for the work:

- Insurances are current (Workers Compensation, Public Liability and Product Liability). If you are unsure when your last insurance was entered into the Centennial system please call to confirm.
- Undertake a visitors induction at Mandalong Mine Administration Office prior to the commencement of works.
- A medical for each person attending must be provided stating fitness to complete usual tasks.
- Minimum personal protective equipment (PPE) requirements are long pants and long sleeve high visibility shirt, steel toe capped boots and hard hat in construction areas.
- Each individual will bring their own food and water.
- Adhere to a minimum expectation of behaviour where all parties behave in an appropriate and respectful manner, and that culturally sensitivity is considered.
- Arrive on time and by own travel methods.

7.0 Summary

This letter provides details of the proposed methodology for an Aboriginal Cultural Heritage Assessment associated with the Project. In accordance with the consultation requirements (DECCW 2010), we ask that your group provides comments on the draft methodology by no later than close of business **7 September 2020**. Comments regarding the draft methodology can be provided verbally or in writing to:

Ashley O'Sullivan,
Senior Archaeologist
Umwelt Environmental and Social Consultants (Umwelt)
Phone: 02 4950 5322.

Should you require any further information or wish to discuss any aspect of the Project, please do not hesitate to contact Ashley or Centennial's Iain Hornshaw (Approvals Coordinator) on 4935 8901 / iain.hornshaw@centennialcoal.com.au.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'Ashley O'Sullivan', with a long, sweeping horizontal stroke at the end.

Ashley O'Sullivan
Senior Archaeologist

Enclosures: Archaeological Fieldwork Engagement Form

**Archaeological Fieldwork Engagement Form
Mandalong Mod 9 and 10, NSW**

To: Centennial Coal
Email: iain.hornshaw@centennialcoal.com.au
Phone: 4935 8901
Attention: Iain Hornshaw (Approvals Coordinator)

Item	Response (circle response and provide detail)
Nominated field work representative and representative contact phone number.	Name: _____ Phone: _____
Our organisation has certificates of currency demonstrating a minimum of \$20,000 cover for workers compensation, public liability and product liability).	Y / N Certificates of currency must be provided before engagement can be finalised
Our organisation understands that payment terms and conditions are in accordance with those previously negotiated with Centennial, with a specified rate of pay of \$1000 per Aboriginal organisation per day. Travel will be paid at ATO rates.	Y / N
Our organisation will provide their representative with appropriate Personal Protective Equipment and Clothing (PPE&C). As a minimum, this must include: <ul style="list-style-type: none"> • Long trousers • High visibility long sleeve shirt • Steel toe capped safety boots • Hard hat (for construction areas) • Soft hat (outside construction areas). 	Y / N
Has completed the medical as required by Centennial.	Y / N Provide details/copy of completed medical.
Our representative understands that they will need to bring with them sufficient food and water for the day's work.	Y / N
Our representative has demonstrated appropriate experience, ability and reliability.	Y / N

Item	Response (circle response and provide detail)
Our representative will commit to arrive on site on time and free from the effects of drugs, alcohol and fatigue (noting that your representative may be required to undergo drug and alcohol testing in accordance with site requirements).	Y / N
Our representative will commit to behaving in a culturally appropriate manner whilst on site and will work collaboratively with the archaeologist and other Aboriginal parties (where relevant)	Y / N

Organisation: _____

Name of Authorised Person: _____

Signature: _____

Date: _____

15 February 2021

BY EMAIL

Mr. Peter Leven
Awabakal Descendants Traditional Owners Aboriginal Corporation
PO Box 137
Budgewoi NSW 2262

Dear Peter,

Centennial Mandalong – LW30-31 Extraction Plan – Heritage Management Plan for Review

In accordance with Condition 6(l) of Schedule 4 of SSD-5144, a copy of the Extraction Plan – LW30-31 Heritage Management Plan has been enclosed for your review and comment. This Heritage Management Plan has been prepared specifically as a component of the LW30-31 Extraction Plan.

Please provide any feedback or comments you may have on the Heritage Management Plan by 5pm on **Friday 26 February 2021** to:

Jeffrey Dunwoodie

Centennial Mandalong

PO Box 1000

Toronto NSW 2283

Or

Email: Jeffrey.Dunwoodie@centennialcoal.com.au

If you have any questions or require any further information in regard to this Heritage Management Plan, please contact me on 0448 490 023.

Yours sincerely



Jeffrey Dunwoodie

Environment & Community Coordinator

Enclosed

- Extraction Plan – LW30-31 Heritage Management Plan (February 2021).

Centennial Mandalong Pty Limited

ABN 74 101 508 892

PO Box 1000

Toronto NSW 2283

T: +61 02 4973 0900

E: info@centennialcoal.com.au

www.centennialcoal.com.au



15 February 2021

BY EMAIL

Awabakal Traditional Owners Aboriginal Corporation
ATT: Kerrie Brauer
PO Box 253
Jesmond NSW 2299
Via email: kerrie@awabakal.com.au

Dear Kerrie,

Centennial Mandalong – LW30-31 Extraction Plan – Heritage Management Plan for Review

In accordance with Condition 6(l) of Schedule 4 of SSD-5144, a copy of the Extraction Plan – LW30-31 Heritage Management Plan has been enclosed for your review and comment. This Heritage Management Plan has been prepared specifically as a component of the LW30-31 Extraction Plan.

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Centennial Mandalong

PO Box 1000

Toronto NSW 2283

Or

Email: Jeffrey.Dunwoodie@centennialcoal.com.au

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Yours sincerely



Jeffrey Dunwoodie

Environment & Community Coordinator

Enclosed

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Toronto NSW 2283

T: +61 02 4973 0900

E: info@centennialcoal.com.au

www.centennialcoal.com.au



15 February 2021

BY EMAIL

Bahtabah Local Aboriginal Land Council
ATT: Mr Michael Green
PO Box 3018
Blacksmiths NSW, 2281
Via Email: bahtabahmick@hotmail.com

Dear Mr. Green,

Centennial Mandalong – LW30-31 Extraction Plan – Heritage Management Plan for Review

In accordance with Condition 6(l) of Schedule 4 of SSD-5144, a copy of the Extraction Plan – LW30-31 Heritage Management Plan has been enclosed for your review and comment. This Heritage Management Plan has been prepared specifically as a component of the LW30-31 Extraction Plan.

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PO Box 1000

Toronto NSW 2283

Or

Email: Jeffrey.Dunwoodie@centennialcoal.com.au

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Yours sincerely



Jeffrey Dunwoodie

Environment & Community Coordinator

Enclosed

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PO Box 1000

Toronto NSW 2283

T. +61 02 4973 0900

E: info@centennialcoal.com.au

www.centennialcoal.com.au



15 February 2021

BY EMAIL

Biraban Local Aboriginal Land Council
PO Box 212
Toronto NSW, 2283
Via email: ceo@birabanlalc.com.au

Dear Chief Executive Officer,

Centennial Mandalong – LW30-31 Extraction Plan – Heritage Management Plan for Review

In accordance with Condition 6(l) of Schedule 4 of SSD-5144, a copy of the Extraction Plan – LW30-31 Heritage Management Plan has been enclosed for your review and comment. This Heritage Management Plan has been prepared specifically as a component of the LW30-31 Extraction Plan.

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Centennial Mandalong

PO Box 1000

Toronto NSW 2283

Or

Email: Jeffrey.Dunwoodie@centennialcoal.com.au

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Yours sincerely



Jeffrey Dunwoodie

Environment & Community Coordinator

Enclosed

- Extraction Plan – LW30-31 Heritage Management Plan (February 2021).

15 February 2021

BY EMAIL

Cacatua Culture Consultants
ATT: Donna and George Sampson
22 Ibis Parade
Woodberry NSW, 2322
Via email: cacatua4service@tpg.com.au

Dear Mr and Mrs Sampson,

Centennial Mandalong – LW30-31 Extraction Plan – Heritage Management Plan for Review

In accordance with Condition 6(l) of Schedule 4 of SSD-5144, a copy of the Extraction Plan – LW30-31 Heritage Management Plan has been enclosed for your review and comment. This Heritage Management Plan has been prepared specifically as a component of the LW30-31 Extraction Plan.

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Jeffrey Dunwoodie

Centennial Mandalong

PO Box 1000

Toronto NSW 2283

Or

Email: Jeffrey.Dunwoodie@centennialcoal.com.au

If you have any questions or require any further information in regard to this Heritage Management Plan, please contact me on 0448 490 023.

Yours sincerely



Jeffrey Dunwoodie

Environment & Community Coordinator

Enclosed

- Extraction Plan – LW30-31 Heritage Management Plan (February 2021).

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ABN 74 101 508 892

PO Box 1000
Toronto NSW 2283
T. +61 02 4973 0900
E: info@centennialcoal.com.au
www.centennialcoal.com.au



15 February 2021

BY EMAIL

Darkinjung Local Aboriginal Land Council
ATT: Barry Williams
PO Box 401
Wyong NSW 2259
Via email: barry.williams@dlalc.org.au

Dear Barry,

Centennial Mandalong – LW30-31 Extraction Plan – Heritage Management Plan for Review

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Centennial Mandalong

PO Box 1000

Toronto NSW 2283

Or

Email: Jeffrey.Dunwoodie@centennialcoal.com.au

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Yours sincerely



Jeffrey Dunwoodie

Environment & Community Coordinator

Enclosed

- Extraction Plan – LW30-31 Heritage Management Plan (February 2021).

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ABN 74 101 508 892

PO Box 1000

Toronto NSW 2283

T: +61 02 4973 0900

E: info@centennialcoal.com.au

www.centennialcoal.com.au



15 February 2021

BY EMAIL

Guringai Tribal Link Aboriginal Corporation
ATT: Tracey Howie
PO Box 4061
Wyongah NSW, 2259
Via email: tracey@guringai.com.au

Dear Tracey,

Centennial Mandalong – LW30-31 Extraction Plan – Heritage Management Plan for Review

In accordance with Condition 6(l) of Schedule 4 of SSD-5144, a copy of the Extraction Plan – LW30-31 Heritage Management Plan has been enclosed for your review and comment. This Heritage Management Plan has been prepared specifically as a component of the LW30-31 Extraction Plan.

Please provide any feedback or comments you may have on the Heritage Management Plan by 5pm on **Friday 26 February 2021** to:

Jeffrey Dunwoodie

Centennial Mandalong

PO Box 1000

Toronto NSW 2283

Or

Email: Jeffrey.Dunwoodie@centennialcoal.com.au

If you have any questions or require any further information in regard to this Heritage Management Plan, please contact me on 0448 490 023.

Yours sincerely



Jeffrey Dunwoodie

Environment & Community Coordinator

Enclosed

- Extraction Plan – LW30-31 Heritage Management Plan (February 2021).

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ABN 74 101 508 892

PO Box 1000

Toronto NSW 2283

T: +61 02 4973 0900

E: info@centennialcoal.com.au

www.centennialcoal.com.au



15 February 2021

BY EMAIL

Wonn 1 Contracting
ATT: Arthur Fletcher
619 Main Road
Glendale NSW, 2285
Via email: arthur.c.fletcher@gmail.com

Dear Arthur,

Centennial Mandalong – LW30-31 Extraction Plan – Heritage Management Plan for Review

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Centennial Mandalong

PO Box 1000

Toronto NSW 2283

Or

Email: Jeffrey.Dunwoodie@centennialcoal.com.au

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Yours sincerely



Jeffrey Dunwoodie

Environment & Community Coordinator

Enclosed

- Extraction Plan – LW30-31 Heritage Management Plan (February 2021).

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ABN 74 101 508 892

PO Box 1000
Toronto NSW 2283
T. +61 02 4973 0900
E: info@centennialcoal.com.au
www.centennialcoal.com.au



15 February 2021

BY EMAIL

Yula – Punaal Education and Healing Aboriginal Corporation
PO Box 491
Morisset NSW, 2264

Dear Sir / Madam,

Centennial Mandalong – LW30-31 Extraction Plan – Heritage Management Plan for Review

In accordance with Condition 6(l) of Schedule 4 of SSD-5144, a copy of the Extraction Plan – LW30-31 Heritage Management Plan has been enclosed for your review and comment. This Heritage Management Plan has been prepared specifically as a component of the LW30-31 Extraction Plan.

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Jeffrey Dunwoodie

Centennial Mandalong

PO Box 1000

Toronto NSW 2283

Or

Email: Jeffrey.Dunwoodie@centennialcoal.com.au

If you have any questions or require any further information in regard to this Heritage Management Plan, please contact me on 0448 490 023.

Yours sincerely



Jeffrey Dunwoodie

Environment & Community Coordinator

Enclosed

- Extraction Plan – LW30-31 Heritage Management Plan (February 2021).



Re: Centennial Mandalong LW30-31 Extraction Plan - Heritage Management Plan
Fletcher to: Jeffrey Dunwoodie 25/02/2021 09:18 AM
From: Arthur Fletcher <wonn1sites@gmail.com>
To: Jeffrey Dunwoodie <Jeffrey.Dunwoodie@centennialcoal.com.au>

Ala Jeff. We hope all is well with you guys. First up thanks for the opportunity to respond to this H-M-P. After reviewing we are happy to support and move forward . Ps All stay safe and all the best .Regards Arthur-Kauwul and Lynne.

Sent from my iPad

On 15 Feb 2021, at 10:56 am, Jeffrey Dunwoodie
<Jeffrey.Dunwoodie@centennialcoal.com.au> wrote:

Dear Arthur,

Please find attached a covering letter regarding the Centennial Mandalong LW30-31 Extraction Plan - Heritage Management Plan for your review as required by SSD-5144.

I will shortly provide a Dropbox link for the HMP. Please let me know if there are any issues with the link.

Regards

Jeff Dunwoodie

Environment and Community Coordinator

p: +61 (0) 2 4973 0947 | m: +61 (0) 448 490 023 | Internal: 3947

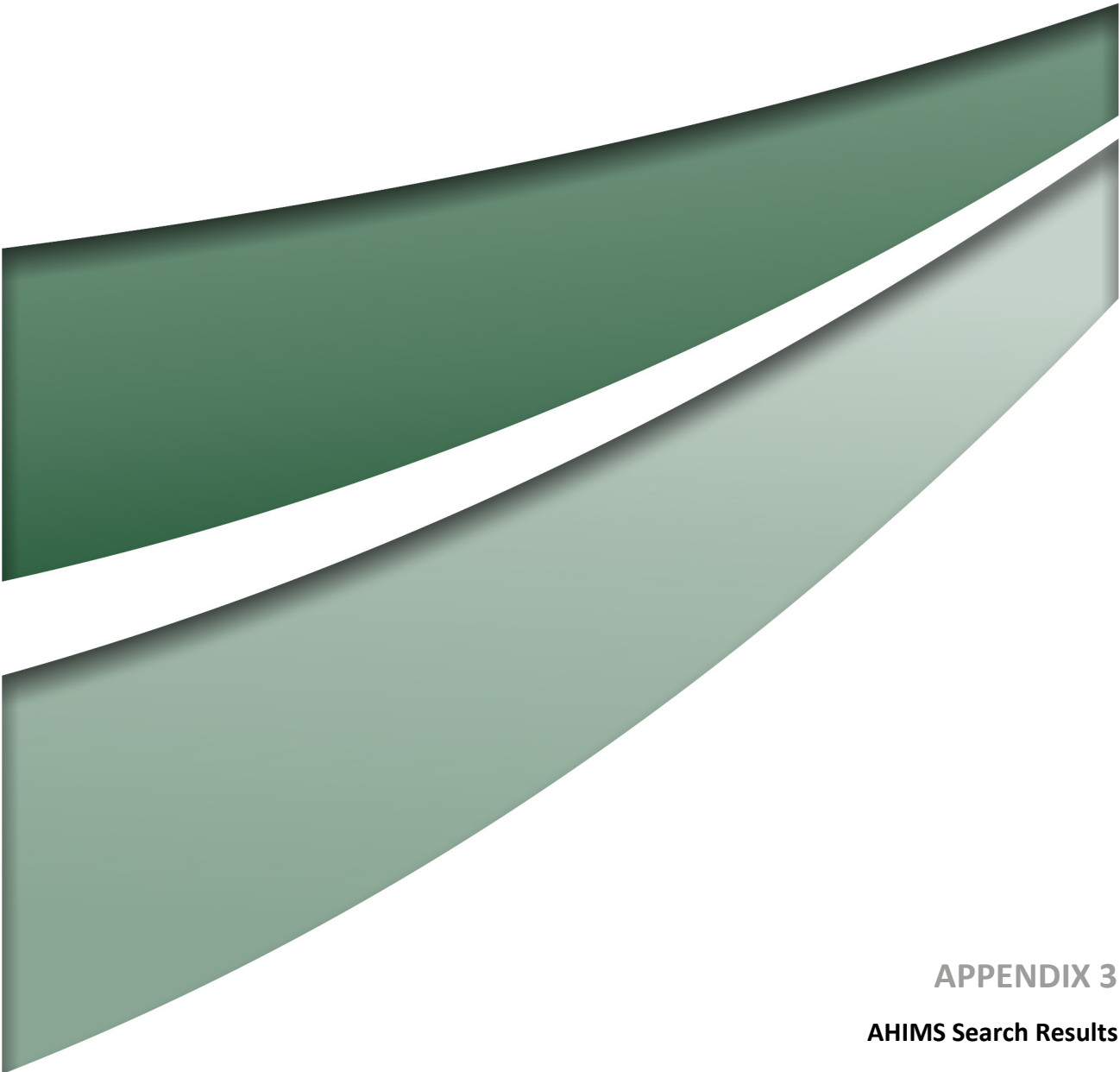
<mime-attachment.gif>

Centennial Coal Company Pty Limited | Mandalong
12 Kerry Anderson Drive, Mandalong NSW 2264 Australia
centennialcoal.com.au

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<HMP Letter_Wonn1 15_02_2021.pdf>



APPENDIX 3
AHIMS Search Results

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Mandalong

Client Service ID : 558414

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-3-3438	RPS Mandalong South 03	GDA	56	352856	6329404	Closed site	Valid	Artefact : -		
	Contact	Recorders	RPS Australia East Pty Ltd - Blacktown,Mrs.Tessa Boer-Mah							
45-3-2970	Olney 105	AGD	56	352190	6326920	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	101093
	Contact	Recorders	Brad Welsh							
45-3-2880	Toepfers road;	AGD	56	351940	6327730	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	1333,101093
	Contact	Recorders	Warren Bluff							
45-3-2881	Toepfers Road;	AGD	56	351950	6327740	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	1333,101093
	Contact	Recorders	Warren Bluff							
45-3-2889	Toepfers Road	AGD	56	351930	6327720	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	1333,101093
	Contact	Recorders	Warren Bluff							
45-3-3489	RPS CYL04	GDA	56	352959	6328590	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders	RPS East Australia Pty Ltd - Echuca Victoria							
45-3-3577	RPS MAND STH TBM 41	GDA	56	350661	6328450	Open site	Valid	Habitation Structure : 1		
	Contact	Recorders	RPS East Australia Pty Ltd - Echuca Victoria							
45-3-3575	RPS MAND STH TBM49	GDA	56	352837	6327793	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders	RPS East Australia Pty Ltd - Echuca Victoria							
45-3-3586	RPS MAND STH PS01	GDA	56	351415	6328638	Open site	Valid	Habitation Structure : 1		
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton							
45-3-3587	RPS MAND STH PS10	GDA	56	352207	6327686	Open site	Valid	Habitation Structure : 1		
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton							
45-3-3588	RPS MAND STH PS14	GDA	56	351981	6327567	Open site	Valid	Habitation Structure : 1		
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton							
45-3-3589	RPS MAND STH PS15	GDA	56	351999	6327494	Open site	Valid	Habitation Structure : 1		
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton							
45-3-3460	RPS MAND STH TBM2	GDA	56	352511	6328368	Open site	Valid	Grinding Groove : 3		
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton,Mrs.Tessa Boer-Mah							
45-3-3461	RPS MAND STH TBM03	GDA	56	352474	6328420	Open site	Valid	Artefact : 9		
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton,Mrs.Tessa Boer-Mah							
45-3-3462	RPS MAND STH TBM06	GDA	56	352540	6328283	Open site	Valid	Grinding Groove : 1		

Report generated by AHIMS Web Service on 20/12/2020 for Ashley O'Sullivan for the following area at Datum :GDA, Zone : 56, Eastings : 349000 - 353000, Northings : 6325800 - 6329600 with a Buffer of 0 meters. Additional Info : hmp and acha. Number of Aboriginal sites and Aboriginal objects found is 101

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

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Mandalong

Client Service ID : 558414

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders						Permits		
45-3-3463	RPS MAND STH TBM08	GDA	56	352915	6327374	Open site	Valid	Water Hole : 1		
	Contact	Recorders						Permits		
45-3-3590	Duplicate of RPS MAND STH PS17	GDA	56	352003	6327431	Open site	Deleted	Habitation Structure : 1		
	Contact	Recorders						Permits		
45-3-3591	RPS PS19	GDA	56	352323	6327515	Open site	Valid	Art (Pigment or Engraved) : 1		
	Contact	Recorders						Permits		
45-3-3592	RPS MAND STH PS21	GDA	56	352284	6327480	Open site	Valid	Habitation Structure : 1		
	Contact	Recorders						Permits		
45-3-3593	RPS MAND STH PS23	GDA	56	352224	6327486	Open site	Valid	Habitation Structure : 1		
	Contact	Recorders						Permits		
45-3-3472	RPS MAND STH AH06	GDA	56	349160	6328610	Open site	Valid	Artefact : 1		
	Contact	Recorders						Permits		
45-3-3473	Duplicate of RPS MAND STH AH06	GDA	56	349160	6328610	Open site	Deleted	Artefact : 1		
	Contact	Recorders						Permits		
45-3-3474	RPS MAND STH AH07	GDA	56	350483	6329160	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders						Permits		
45-3-3475	RPS MAND STH AH08	GDA	56	350491	6329156	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders						Permits		
45-3-3522	RPS MAND STH TBM07	GDA	56	352506	6328230	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders						Permits		
45-3-3523	RPS MAND STH TBM08a	GDA	56	352381	6328119	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders						Permits		
45-3-3529	RPS MAND STH TBM17	GDA	56	352843	6329468	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders						Permits		
45-3-3530	RPS MAND STH TBM19	GDA	56	352847	6329295	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders						Permits		
45-3-3531	RPS MAND STH TBM20	GDA	56	352853	6329261	Open site	Valid	Modified Tree (Carved or Scarred) : 1		

Report generated by AHIMS Web Service on 20/12/2020 for Ashley O'Sullivan for the following area at Datum :GDA, Zone : 56, Eastings : 349000 - 353000, Northings : 6325800 - 6329600 with a Buffer of 0 meters. Additional Info : hmp and acha. Number of Aboriginal sites and Aboriginal objects found is 101

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Mandalong

Client Service ID : 558414

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders						Permits		
45-3-3532	RPS MAND STH TBM22	GDA	56	352975	6329179	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders						Permits		
45-3-3533	RPS MAND STH TBM26	GDA	56	352258	6329078	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders						Permits		
45-3-3534	RPS MAND STH TBM27	GDA	56	352360	6329213	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders						Permits		
45-3-3535	RPS MAND STH TBM28	GDA	56	352450	6329394	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders						Permits		
45-3-3536	RPS MAND STH TBM29	GDA	56	351914	6329290	Open site	Valid	Artefact : 1		
	Contact	Recorders						Permits		
45-3-3543	RPS MAND STH TBM35	GDA	56	352268	6327639	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders						Permits		
45-3-3546	RPS MAND SOUTH TBM40	GDA	56	350352	6328553	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders						Permits		
45-3-3547	RPS MAND STH TBM53	GDA	56	352721	6327776	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders						Permits		
45-3-3548	RPS MAND STH TBM42	GDA	56	350290	6328294	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders						Permits		
45-3-3554	RPS MAND STH TBM50	GDA	56	352809	6327783	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders						Permits		
45-3-3555	RPS MAND STH TBM51	GDA	56	352785	6327759	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders						Permits		
45-3-3556	RPS MAND STH TBM52	GDA	56	352767	6327771	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders						Permits		
45-3-3557	Duplicate of RPS MAND STH TBM53	GDA	56	352721	6327776	Open site	Deleted	Potential Archaeological Deposit (PAD) : 1		

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Mandalong

Client Service ID : 558414

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports	
	Contact	Recorders	RPS East Australia Pty Ltd - Echuca Victoria,RPS East Australia Pty Ltd - Echuca Vic								Permits
45-3-3594	RPS MAND STH PS27	GDA	56	351546	6327861	Open site	Valid	Habitation Structure : 1			
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton								Permits
45-3-3595	RPS MAND STH PS29	GDA	56	351252	6328056	Open site	Valid	Habitation Structure : 1			
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton								Permits
45-3-3596	RPS MAND STH PS30	GDA	56	351568	6327757	Open site	Valid	Habitation Structure : 1			
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton								Permits
45-3-3598	RPS MAND STH TBM 15	GDA	56	352887	6329356	Open site	Valid	Habitation Structure : 1			
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton								Permits
45-3-3599	RPS MAND STH TBM 16	GDA	56	352918	6329416	Open site	Valid	Habitation Structure : 1			
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton								Permits
45-3-3579	RPS MAND STH CYL06	GDA	56	352564	6328256	Open site	Valid	Grinding Groove : 1			
	Contact	Recorders	RPS East Australia Pty Ltd - Echuca Victoria								Permits
45-3-3566	Duplicate of RPS MAND STH TBM50	GDA	56	352809	6327783	Open site	Deleted	Grinding Groove : 1			
	Contact	Recorders	RPS East Australia Pty Ltd - Echuca Victoria,RPS East Australia Pty Ltd - Echuca Vic								Permits
45-3-3567	Duplicate of RPS MAND STH TBM51	GDA	56	352785	6327759	Open site	Deleted	Grinding Groove : 1			
	Contact	Recorders	RPS East Australia Pty Ltd - Echuca Victoria,RPS East Australia Pty Ltd - Echuca Vic								Permits
45-3-3568	Duplicate of RPS MAND STG TBM52	GDA	56	352767	6327771	Open site	Deleted	Modified Tree (Carved or Scarred) : 1			
	Contact	Recorders	RPS East Australia Pty Ltd - Echuca Victoria,RPS East Australia Pty Ltd - Echuca Vic								Permits
45-3-3569	Duplicate of RPS MAND STH TBM53 (second)	GDA	56	352721	6327776	Open site	Deleted	Potential Archaeological Deposit (PAD) : 1			
	Contact	Recorders	RPS East Australia Pty Ltd - Echuca Victoria,RPS East Australia Pty Ltd - Echuca Vic								Permits
45-3-3570	Duplicate of RPS MAND STH TBM54	GDA	56	352695	6327785	Open site	Deleted	Grinding Groove : 1			
	Contact	Recorders	RPS East Australia Pty Ltd - Echuca Victoria,RPS East Australia Pty Ltd - Echuca Vic								Permits
45-3-3491	Duplicate of RPS MAND STH	GDA	56	352564	6328256	Open site	Deleted	Grinding Groove : 1			
	Contact	Recorders	R.R.P. Property Consultants Pty Ltd,RPS East Australia Pty Ltd - Echuca Victoria								Permits
45-3-3492	RPS MAND STH CYL05	GDA	56	351427	6327780	Open site	Valid	Grinding Groove : 1			
	Contact	Recorders	R.R.P. Property Consultants Pty Ltd								Permits
45-3-3493	RPS CYL04c	GDA	56	352972	6328558	Open site	Valid	Grinding Groove : 1			
	Contact	Recorders	R.R.P. Property Consultants Pty Ltd								Permits

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Mandalong

Client Service ID : 558414

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-3-3494	RPS CYL04b	GDA	56	352958	6328577	Open site	Valid	Grinding Groove : 1		
	<u>Contact</u>	<u>Recorders</u>				RPS East Australia Pty Ltd - Echuca Victoria		<u>Permits</u>		
45-3-3495	Duplicate of RPS CYL04	GDA	56	352959	6328590	Open site	Deleted	Grinding Groove : 1		
	<u>Contact</u>	<u>Recorders</u>				RPS East Australia Pty Ltd - Echuca Victoria,RPS East Australia Pty Ltd - Echuca Vic		<u>Permits</u>		
45-3-3503	RPS MAND STH PS06	GDA	56	352128	6327503	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	<u>Contact</u>	<u>Recorders</u>				RPS East Australia Pty Ltd - Echuca Victoria		<u>Permits</u>		
45-3-3504	RPS MAND STH PS08	GDA	56	352242	6327697	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	<u>Contact</u>	<u>Recorders</u>				RPS East Australia Pty Ltd - Echuca Victoria		<u>Permits</u>		
45-3-3505	RPS MAND STH PS09	GDA	56	352226	6327716	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	<u>Contact</u>	<u>Recorders</u>				RPS East Australia Pty Ltd - Echuca Victoria		<u>Permits</u>		
45-3-3558	RPS MAND STH TBM54	GDA	56	352695	6327785	Open site	Valid	Grinding Groove : 1		
	<u>Contact</u>	<u>Recorders</u>				RPS East Australia Pty Ltd - Echuca Victoria		<u>Permits</u>		
45-3-3509	RPS PS20	GDA	56	352313	6327498	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	<u>Contact</u>	<u>Recorders</u>				RPS East Australia Pty Ltd - Echuca Victoria		<u>Permits</u>		
45-3-3510	RPS MAND STH PS22	GDA	56	352265	6327465	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	<u>Contact</u>	<u>Recorders</u>				RPS East Australia Pty Ltd - Echuca Victoria		<u>Permits</u>		
45-3-3511	RPS MAND STH PS25	GDA	56	351152	6327958	Open site	Valid	Artefact : 1		
	<u>Contact</u>	<u>Recorders</u>				RPS East Australia Pty Ltd - Echuca Victoria		<u>Permits</u>		
45-3-3512	RPS MAND STH PS26	GDA	56	351572	6327955	Open site	Valid	Grinding Groove : 1		
	<u>Contact</u>	<u>Recorders</u>				RPS East Australia Pty Ltd - Echuca Victoria		<u>Permits</u>		
45-3-3513	RPS MAND STH PS28	GDA	56	351314	6327661	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	<u>Contact</u>	<u>Recorders</u>				RPS East Australia Pty Ltd - Echuca Victoria		<u>Permits</u>		
45-3-3514	RPS MAND STH PS32	GDA	56	351019	6328545	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	<u>Contact</u>	<u>Recorders</u>				RPS East Australia Pty Ltd - Echuca Victoria		<u>Permits</u>		

Report generated by AHIMS Web Service on 20/12/2020 for Ashley O'Sullivan for the following area at Datum :GDA, Zone : 56, Eastings : 349000 - 353000, Northings : 6325800 - 6329600 with a Buffer of 0 meters. Additional Info : hmp and acha. Number of Aboriginal sites and Aboriginal objects found is 101

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Mandalong

Client Service ID : 558414

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-3-3516	RPS MAND STH TBM01	GDA	56	352327	6328688	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders	RPS East Australia Pty Ltd - Echuca Victoria							Permits
45-3-3517	Duplicate of RPS MAND STH TBM02	GDA	56	352511	6328368	Open site	Deleted	Grinding Groove : 1		
	Contact	Recorders	RPS East Australia Pty Ltd - Echuca Victoria,RPS East Australia Pty Ltd - Echuca Vic							Permits
45-3-3518	Duplicate of RPS MAND STH TBM03	GDA	56	352474	6328420	Open site	Deleted	Artefact : 1		
	Contact	Recorders	RPS East Australia Pty Ltd - Echuca Victoria,RPS East Australia Pty Ltd - Echuca Vic							Permits
45-3-3519	RPS MAND STH TBM04	GDA	56	352479	6328518	Open site	Valid	Artefact : 1		
	Contact	Recorders	RPS East Australia Pty Ltd - Echuca Victoria							Permits
45-3-3520	RPS MAND STH TBM05	GDA	56	352510	6328336	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders	RPS East Australia Pty Ltd - Echuca Victoria							Permits
45-3-3521	Duplicate of RPS MAND STH TBM06	GDA	56	352540	6328283	Open site	Deleted	Grinding Groove : 1		
	Contact	Recorders	RPS East Australia Pty Ltd - Echuca Victoria,RPS East Australia Pty Ltd - Echuca Vic							Permits
45-3-3600	RPS MAND STH TBM 18	GDA	56	352863	6329360	Open site	Valid	Habitation Structure : 1		
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton							Permits
45-3-3601	RPS MAND STH TBM 21	GDA	56	352843	6329264	Open site	Valid	Habitation Structure : 1		
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton							Permits
45-3-3602	RPS MAND STH TBM 23	GDA	56	352843	6329249	Open site	Valid	Habitation Structure : 1		
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton							Permits
45-3-3603	RPS MAND STH TBM 24	GDA	56	352870	6329067	Open site	Valid	Habitation Structure : 1		
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton							Permits
45-3-3604	RPS MAND STH TBM 25	GDA	56	352973	6329010	Open site	Valid	Habitation Structure : 1		
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton							Permits
45-3-3605	RPS MAND STH TBM 36	GDA	56	352309	6327654	Open site	Valid	Habitation Structure : 1		
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton							Permits
45-3-3606	RPS MAND STH TBM 39	GDA	56	350226	6328052	Open site	Valid	Habitation Structure : 1		
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton							Permits
45-3-3607	RPS MAND STH TBM 48	GDA	56	352445	6327519	Open site	Valid	Habitation Structure : 1		
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton							Permits
45-3-3608	Duplicate of RPS MAND STH TBM 49	GDA	56	352837	6327793	Open site	Deleted	Grinding Groove : 1		
	Contact	Recorders	RPS Australia East Pty Ltd - Hamilton,RPS East Australia Pty Ltd - Echuca Victoria							Permits

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Mandalong

Client Service ID : 558414

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-3-3447	Duplicate of RPS MAND STH PS 25	GDA	56	351152	6327958	Open site	Deleted	Artefact : 12		
	Contact	Recorders				Miss.Philippa Sokol,RPS East Australia Pty Ltd - Echuca Victoria,RPS East Australia		Permits	4563	
45-3-1223	Moran's Creek;	AGD	56	351900	6329000	Open site	Valid	Artefact : -	Open Camp Site	294,101093
	Contact	Recorders				ASRSYS		Permits		
45-3-1226	Buttonderry Creek	AGD	56	350900	6327700	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	294,101093
	Contact	Recorders				ASRSYS		Permits		
45-3-1227	Moran's Creek	AGD	56	352200	6328800	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	294,101093
	Contact	Recorders				ASRSYS		Permits		
45-3-1228	Moran's Creek;	AGD	56	351800	6328100	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	294
	Contact	Recorders				ASRSYS		Permits		
45-3-1229	Olney;	AGD	56	351600	6326900	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	294,101093
	Contact	Recorders				ASRSYS		Permits		
45-3-1230	Moran's Creek	AGD	56	351900	6327700	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	294,101093
	Contact	Recorders				ASRSYS		Permits		
45-3-1231	Digary Creek	AGD	56	352200	6327300	Closed site	Valid	Artefact : -	Shelter with Deposit	294,101093
	Contact	Recorders				ASRSYS		Permits		
45-3-1232	Wyee Creek	AGD	56	352800	6329300	Closed site	Valid	Artefact : -, Art (Pigment or Engraved) : -	Shelter with Art,Shelter with Deposit	294,101093
	Contact	Recorders				ASRSYS		Permits		
45-3-1233	Olney	AGD	56	350200	6328100	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	294,101093
	Contact	Recorders				ASRSYS		Permits		
45-3-3639	RPS MAND STH PS02	GDA	56	351342	6328621	Closed site	Valid	Aboriginal Resource and Gathering : -		
	Contact	Recorders				Miss.Philippa Sokol		Permits		
45-3-3640	RPS MAND STH PS03	GDA	56	351248	6328601	Closed site	Valid	Aboriginal Resource and Gathering : -		
	Contact	Recorders				Miss.Philippa Sokol		Permits		
45-3-3641	RPS MAND STH PS04	GDA	56	351239	6328605	Open site	Valid	Aboriginal Resource and Gathering : -		
	Contact	Recorders				Miss.Philippa Sokol		Permits		

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AHIMS Web Services (AWS)

Extensive search - Site list report

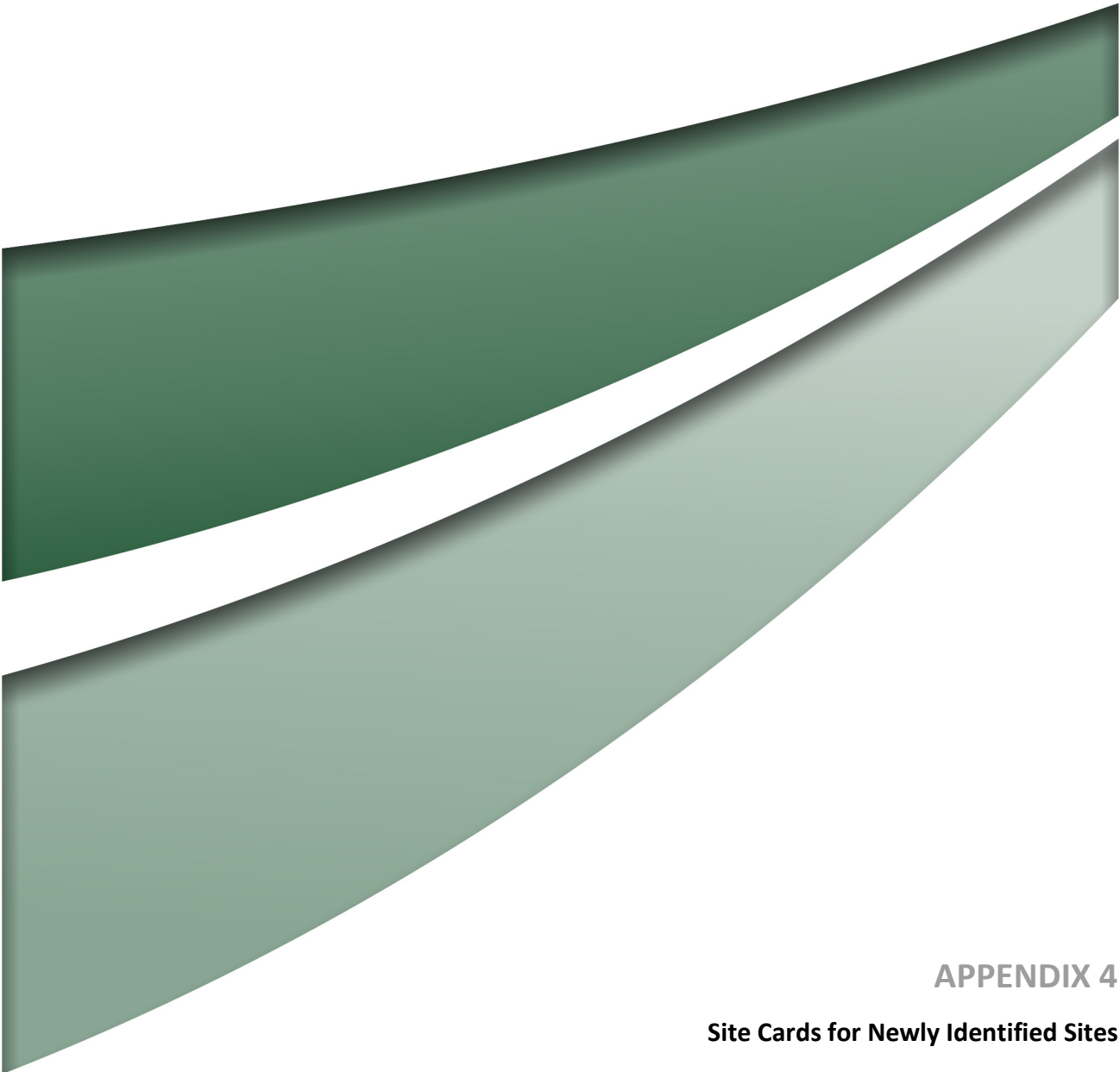
Your Ref/PO Number : Mandalong

Client Service ID : 558414

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-3-3642	RPS MAND STH PS05	GDA	56	351320	6328602	Closed site	Valid	Aboriginal Resource and Gathering : -		
	<u>Contact</u>	<u>Recorders</u>	Miss.Philippa Sokol							
45-3-3643	RPS MAND STH PS07	GDA	56	352001	6327447	Closed site	Valid	Aboriginal Resource and Gathering : -		
	<u>Contact</u>	<u>Recorders</u>	Miss.Philippa Sokol							
45-3-3644	RPS MAND STH PS24	GDA	56	351443	6327671	Closed site	Valid	Aboriginal Resource and Gathering : -		
	<u>Contact</u>	<u>Recorders</u>	Miss.Philippa Sokol							
45-3-3645	RPS MAND STH PS31	GDA	56	351468	6327445	Open site	Valid	Aboriginal Resource and Gathering : -		
	<u>Contact</u>	<u>Recorders</u>	Miss.Philippa Sokol							
45-3-3646	RPS MAND STH PS16	GDA	56	352002	6327447	Closed site	Valid	Aboriginal Resource and Gathering : -		
	<u>Contact</u>	<u>Recorders</u>	Miss.Philippa Sokol							

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APPENDIX 4

Site Cards for Newly Identified Sites

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW

AHIMS site ID: 45-3-4544

Date recorded: 14-02-2021

Site Location Information

Site name: MS9-RS-3

Easting: 351874 Northing: 6328077 Coordinates must be in GDA (MGA)

Horizontal Accuracy (m): 10

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. Fenwick Alison

Organisation:

Address: 75 York Street, Teralba

Phone: 0407654665 E-mail: afenwick@umwelt.com.au

Site Context Information

Land Form Pattern: Steep Hills Land Use: Mining

Land Form Unit: Slope Vegetation: Closed Forest

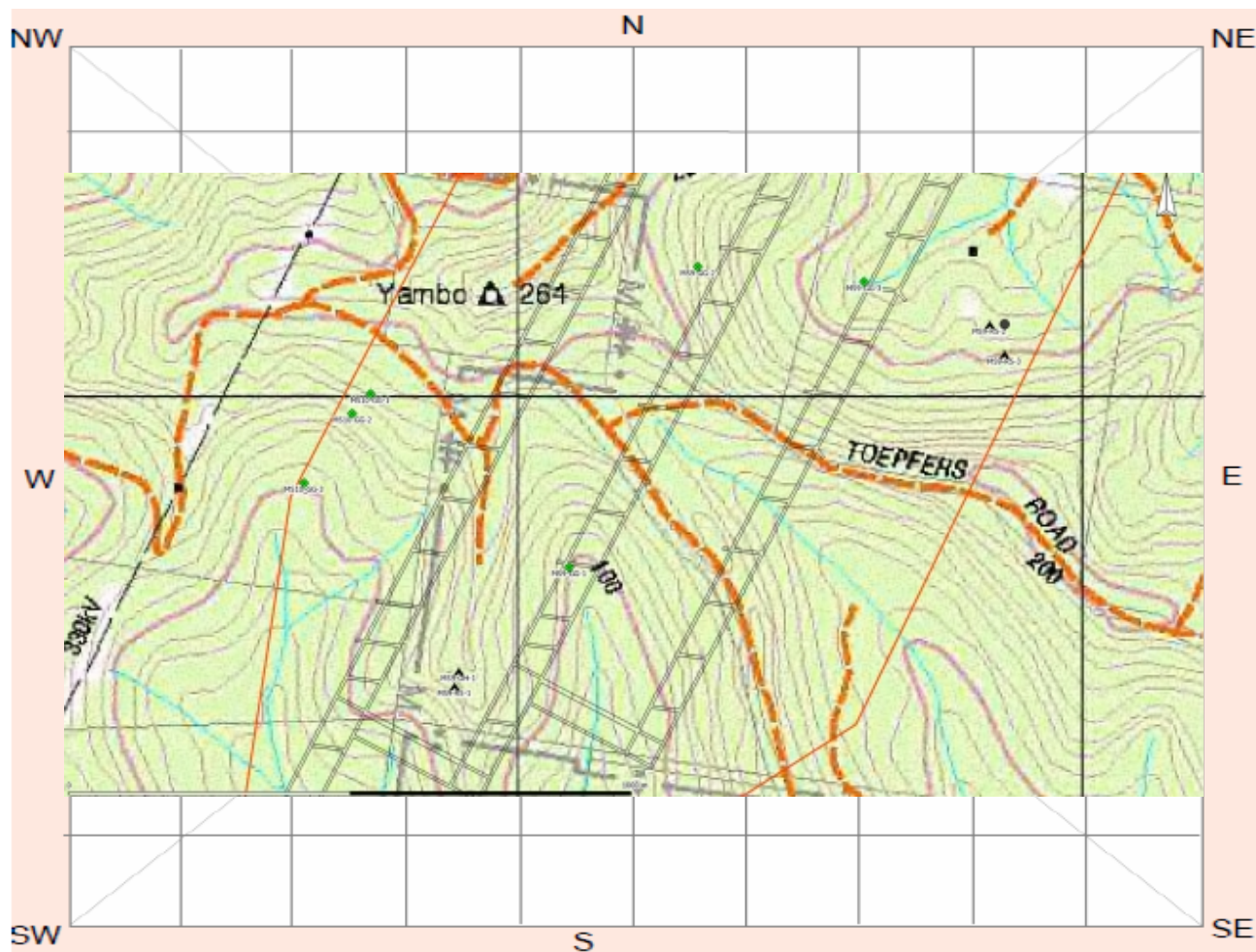
Distance to Water (m): 250 Primary Report:

How to get to the site: Located within the LW30-31 Environmental Protection Area - for access, contact Centennial Mandalong. Accessed via foot.

Other site information:

Shelter has a large angular shelf to the southern wall, with deeply incised angular grooving due to erosion. Within the shelter itself, a shallow area of potential deposit was observed. One broken chert flake had no retouch and evidence of pot-lidding, whilst the second broken flake had 50% cortex.

Site location map



Site contents information

open/closed site:

Site condition:

Features:

Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
1	5	0.35

Habitation Structure

Description:

Rock shelter located approx. 60 meters south of MS9-RS-2. Entrance is north facing with a small shallow opening with crawl space only. Two chert flakes were identified, potentially in situ.

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Features:

Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Features:

3.

Number of
featuresLength of
feature(s)
extent (m)Width of
feature (s)
extent (m)

Scarred Trees

Scar Depth
(cm)Regrowth
(cm)

Scar shape

Tree Species

Description:

Features:

4.

Number of
featuresLength of
feature(s)
extent (m)Width of
feature (s)
extent (m)

Scarred Trees

Scar Depth
(cm)Regrowth
(cm)

Scar shape

Tree Species

Description:

Features:

5.

Number of
featuresLength of
feature(s)
extent (m)Width of
feature (s)
extent (m)

Scarred Trees

Scar Depth
(cm)Regrowth
(cm)

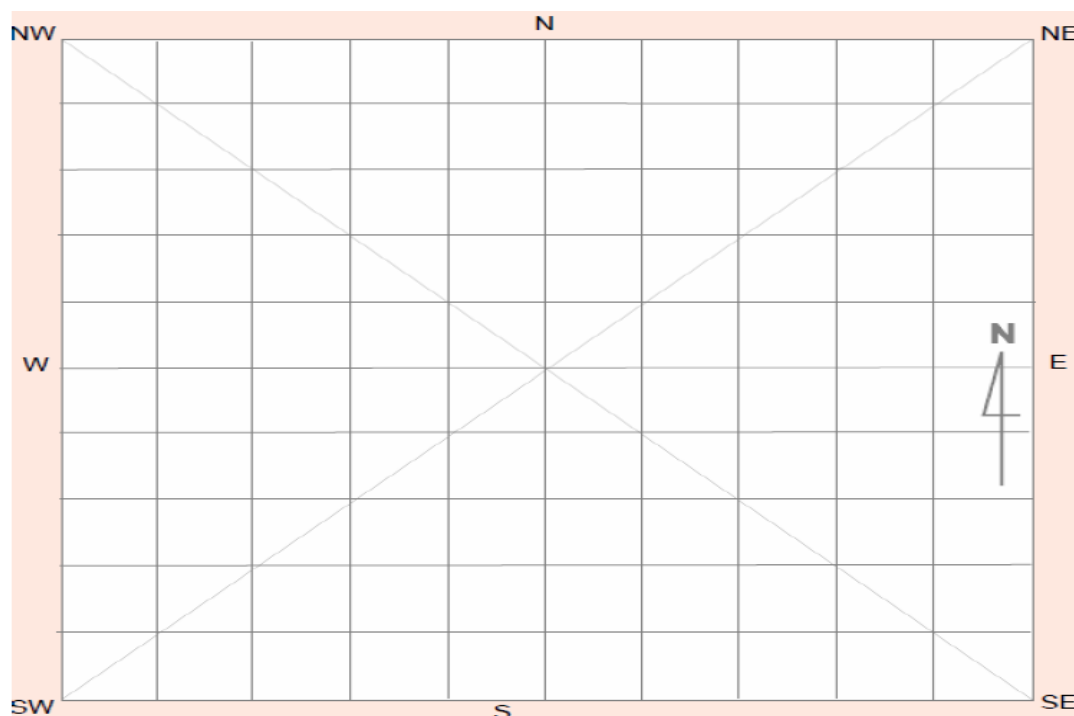
Scar shape

Tree Species

Description:

Other Site
Info:

Shelter has a large angular shelf to the southern wall, with deeply incised angular grooving due to erosion. Within the shelter itself, a shallow area of potential deposit was observed. One broken chert flake had no retouch and evidence of pot-lidding, whilst the second broken flake had 50% cortex.

Site plan

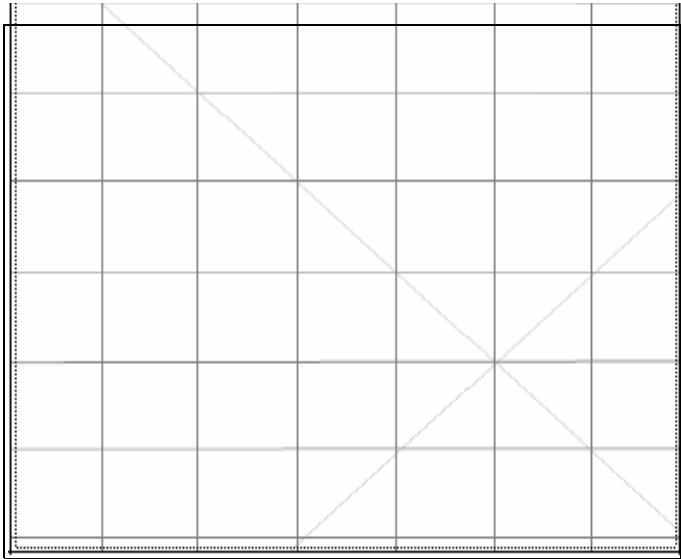
Site photographs



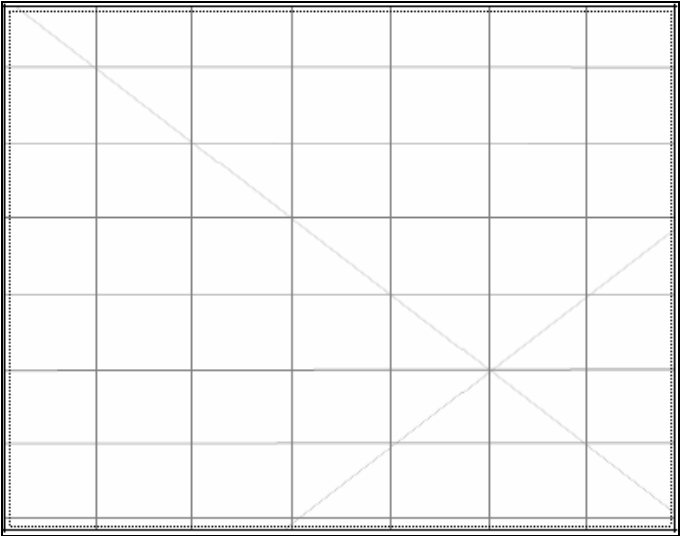
Description: MS9-RS-3 shelter, with artefact location denoted by scale on the left



Description: Broken chert flakes identified at the MS9-RS-3 site



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

Organisation:

Address:

Phone: E-mail:

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW

AHIMS site ID: 45-3-4545

Date recorded: 14-02-2021

Site Location Information

Site name: MS9-GG-3

Easting: 351622 Northing: 6328204 Coordinates must be in GDA (MGA)

Horizontal Accuracy (m): 10

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. Fenwick Alison

Organisation:

Address: 75 York Street, Teralba

Phone: 0407654665 E-mail: afenwick@umwelt.com.au

Site Context Information

Land Form Pattern: Steep Hills Land Use: Mining

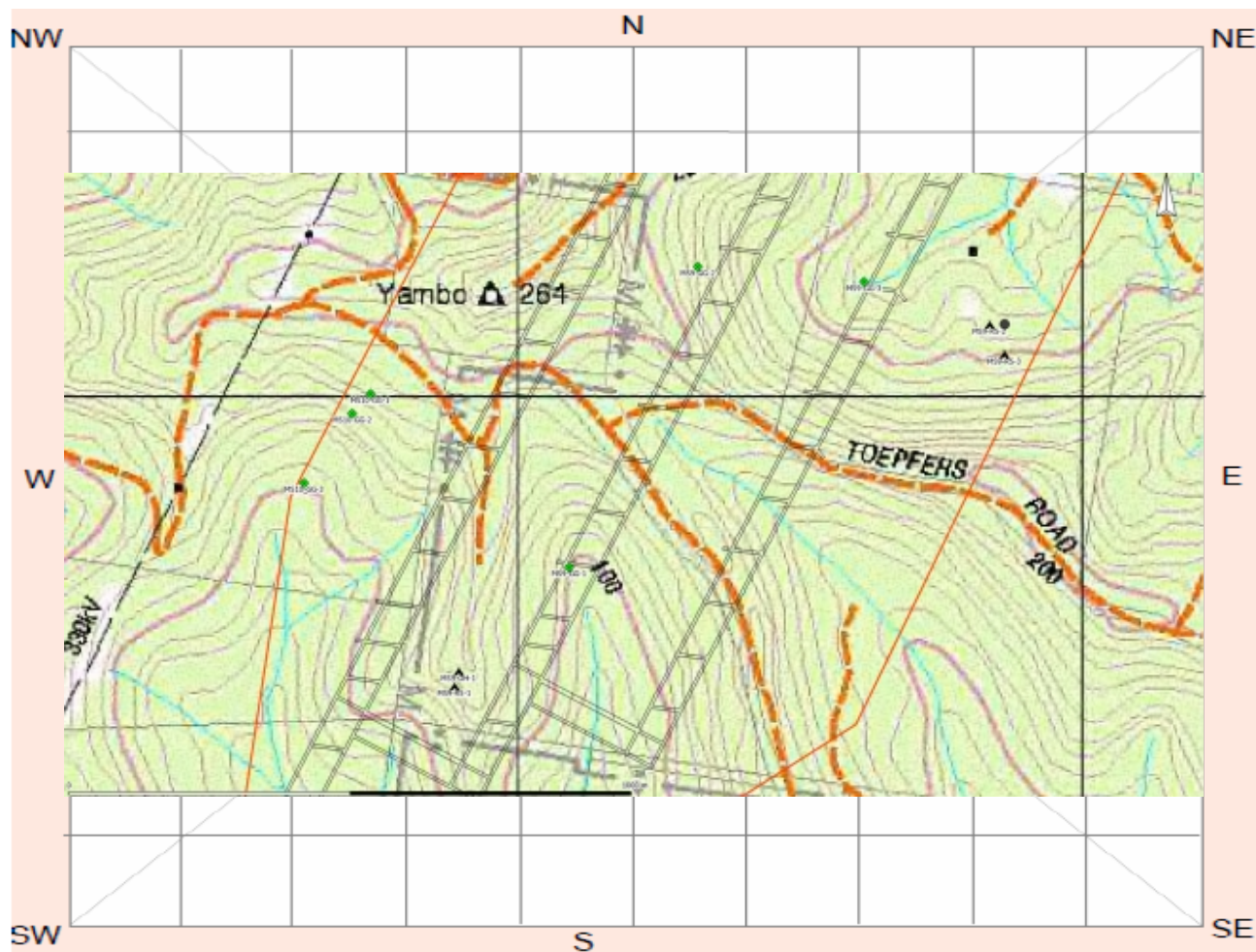
Land Form Unit: Stream Channel Vegetation: Closed Forest

Distance to Water (m): 0 Primary Report:

How to get to the site: Located within the LW30-31 Environmental Protection Area - for access, contact Centennial Mandalong. Must be accessed via foot.

Other site information: Dense vegetation is present in the surrounding area, however, visibility across the sandstone benches was good. The grooves were located across two sandstone benches.

Site location map



Site contents information

open/closed site:

Site condition:

Features:

1.

Grinding Groove

Number of
features

4

Length of
feature(s)
extent (m)

0.4

Width of
feature (s)
extent (m)

0.07

Scarred Trees

Scar Depth (cm)

Regrowth (cm)

Scar shape

Tree Species

Description:

Minimum of four grinding grooves located along an ephemeral creek, upon a sandstone platform.

Features:

2.

Number of
features

Length of
feature(s)
extent (m)

Width of
feature (s)
extent (m)

Scarred Trees

Scar Depth (cm)

Regrowth (cm)

Scar shape

Tree Species

Description:

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
3.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
4.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
5.	<input type="text"/>	<input type="text"/>	<input type="text"/>

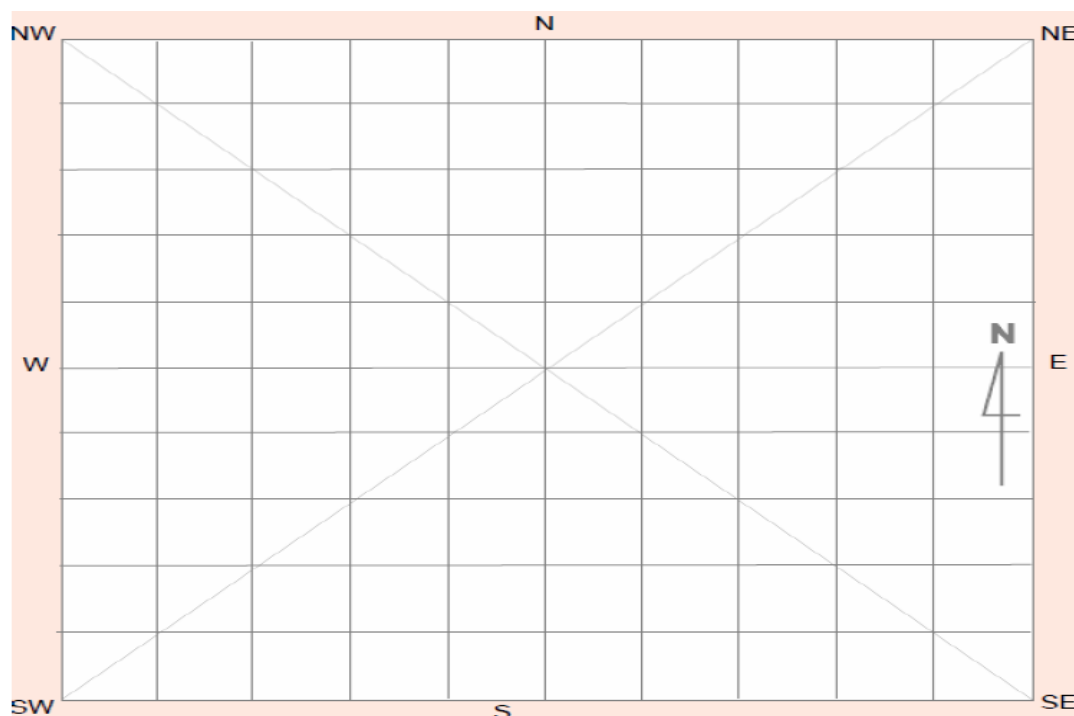
Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Other Site Info:

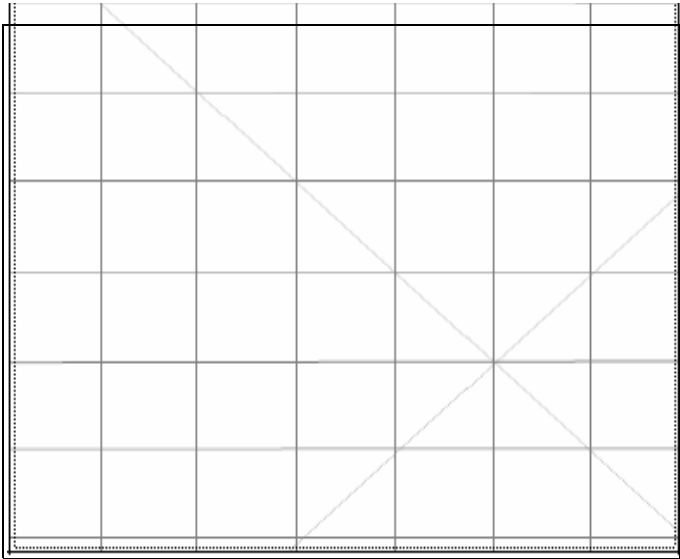
Dense vegetation is present in the surrounding area, however, visibility across the sandstone benches was good. The grooves were located across two sandstone benches.

Site plan

Site photographs



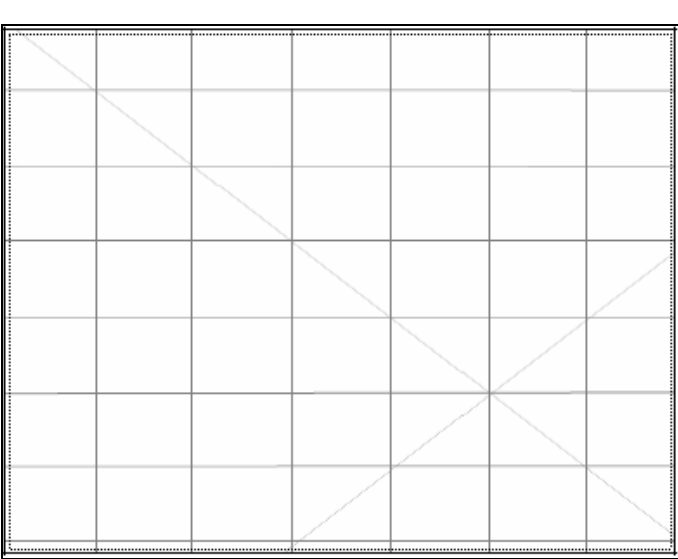
Description: View across the MS9-GG-3 site



Description:



Description: Close-up views of grooves located on one bench within MS9-GG-3



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

Organisation:

Address:

Phone:

E-mail:

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW

AHIMS site ID: 45-3-4546

Date recorded: 14-02-2021

Site Location Information

Site name: MS9-RS-2

Easting: 351846 Northing: 6328128 Coordinates must be in GDA (MGA)

Horizontal Accuracy (m): 10

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. Fenwick Alison

Organisation:

Address: 75 York Street, Teralba

Phone: 0407654665 E-mail: afenwick@umwelt.com.au

Site Context Information

Land Form Pattern: Steep Hills Land Use: Mining

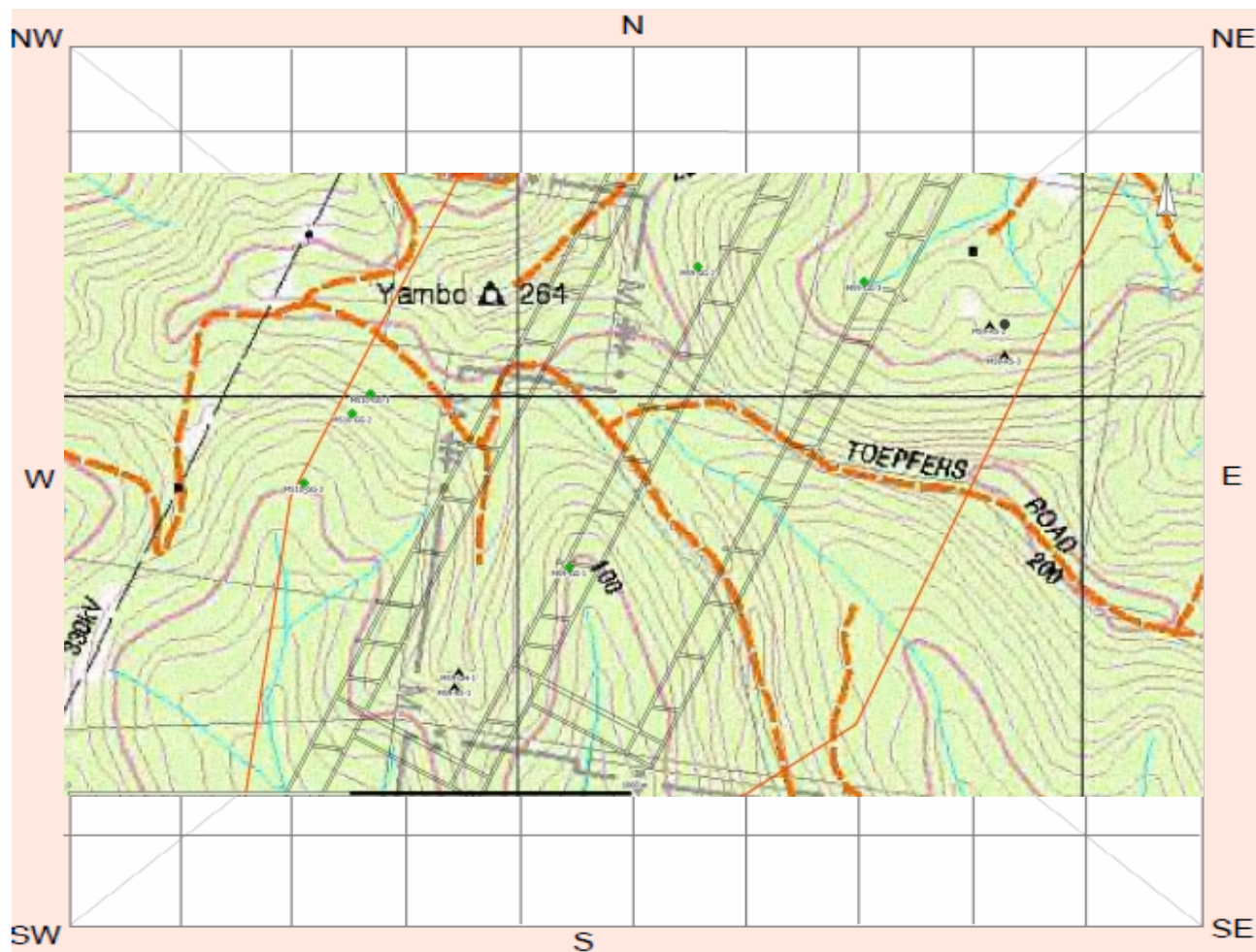
Land Form Unit: Slope Vegetation: Closed Forest

Distance to Water (m): 200 Primary Report:

How to get to the site: Located within the LW30-31 Environmental Protection Area - for access, contact Centennial Mandalong. Site access via foot.

Other site information: No artefactual or cultural material recovered, however a small area of deposit with the potential to contain evidence of Aboriginal occupation was identified. In proximity to both the previously recorded site 45-3-1228 and the newly identified MS9-RS-3. Total height approximately 7-8 meters.

Site location map



Site contents information

open/closed site:

Site condition:

Features:

Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)		
1.	<input type="text" value="Habitation Structure"/>	<input type="text" value="1"/>	<input type="text" value="6.75"/>	<input type="text" value="6.7"/>

Scarred Trees			
Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Large shelter mid-way up a steep slope, south of ephemeral creek. Well protected from the elements, and has formed through erosional processes impacting a large sandstone boulder that has broken away from up slope. Internal space is gently sloped, with pitting along the roof surface. Entrance west.

Features:

Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)		
2.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Scarred Trees			
Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
3.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
4.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
5.	<input type="text"/>	<input type="text"/>	<input type="text"/>

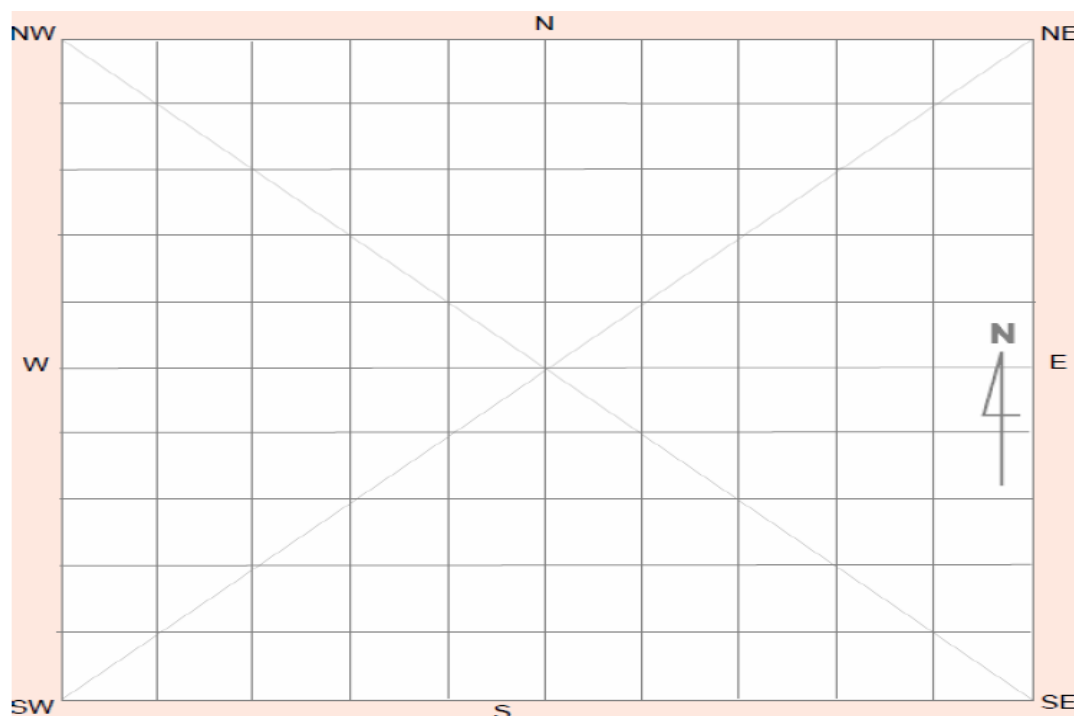
Description:

Scarred Trees

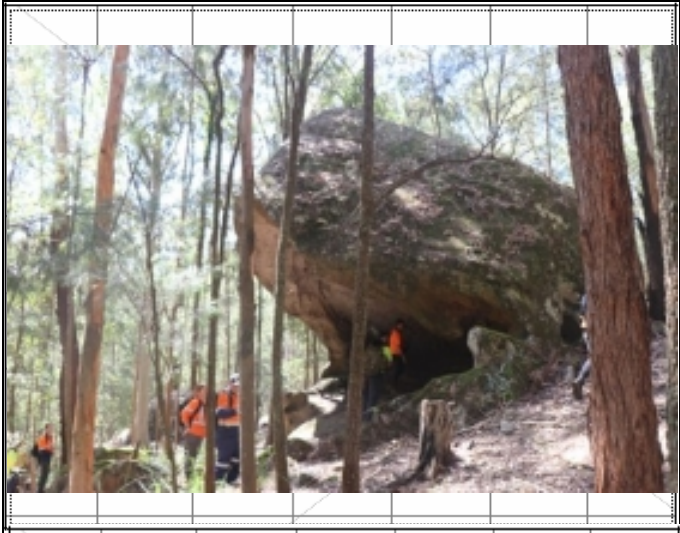
Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Other Site Info:

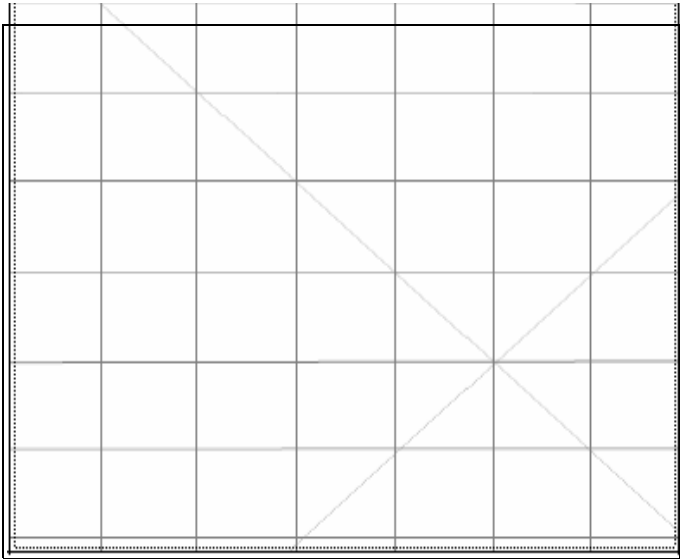
No artefactual or cultural material recovered, however a small area of deposit with the potential to contain evidence of Aboriginal occupation was identified. In proximity to both the previously recorded site 45-3-1228 and the newly identified MS9-RS-3. Total height approximately 7-8 meters.

Site plan

Site photographs



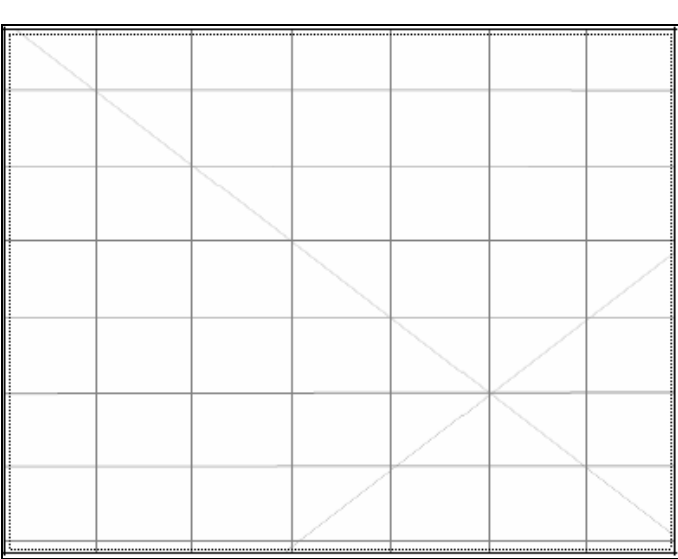
Description: View of the MS9-RS-2 site



Description:



Description: View of the MS9-RS-2 shelter



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

Organisation:

Address:

Phone: E-mail:

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW

AHIMS site ID: 45-3-4547

Date recorded: 14-02-2021

Site Location Information

Site name: MS9-RS-1

Easting: 350893 Northing: 6327486 Coordinates must be in GDA (MGA)

Horizontal Accuracy (m): 10

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. Fenwick Alison

Organisation:

Address: 75 York Street, Teralba

Phone: 0407654665 E-mail: afenwick@umwelt.com.au

Site Context Information

Land Form Pattern: Steep Hills Land Use: Mining

Land Form Unit: Ridge Vegetation: Closed Forest

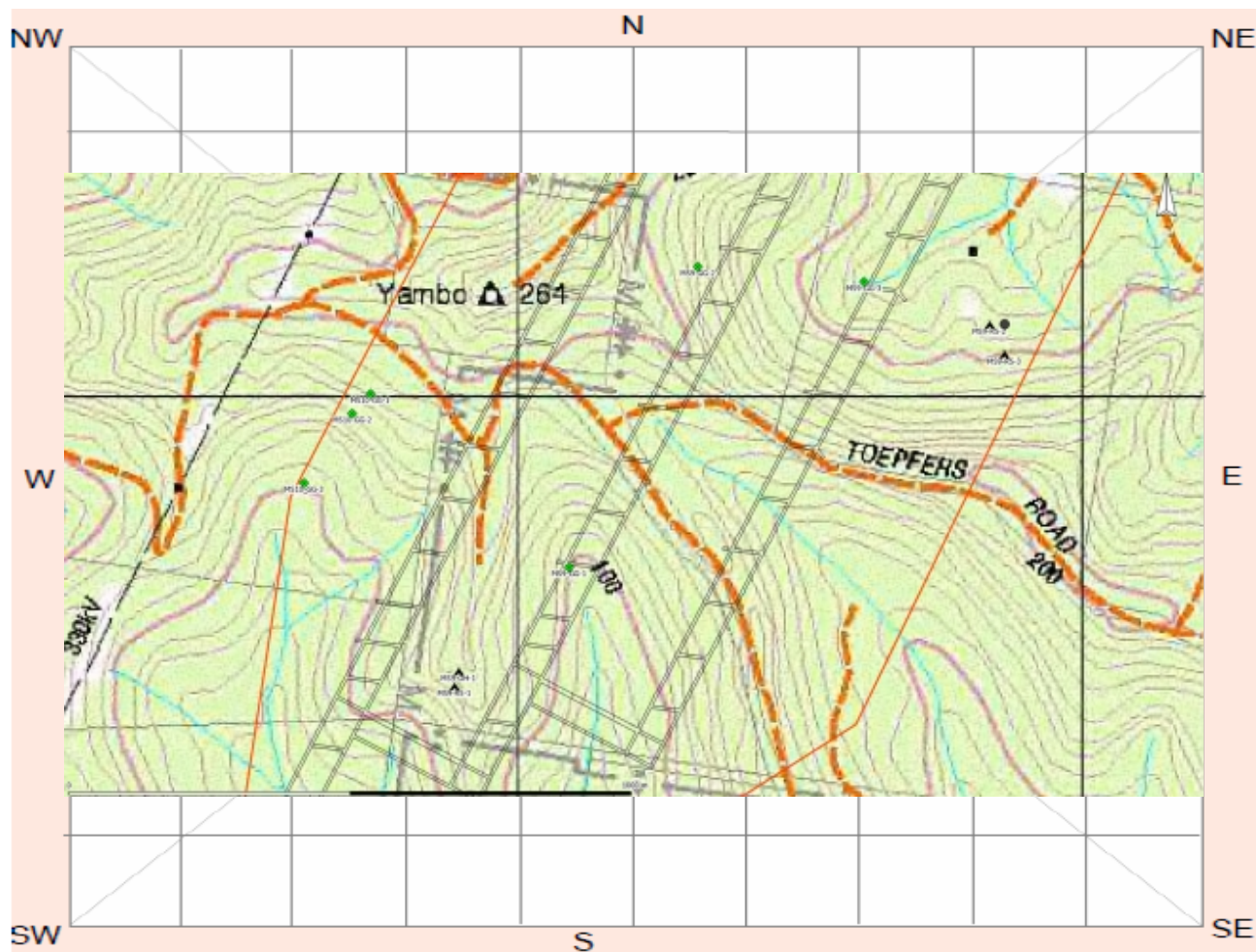
Distance to Water (m): 350 Primary Report:

How to get to the site: Located within the LW30-31 Environmental Protection Area - for access, contact Centennial Mandalong. Accessed via foot.

Other site information:

Ground soil is loose, potentially 20cm deep with potential for subsurface deposits. Vegetation growth is moderate, with poor ground visibility surrounding the site. Sandstone is prevalent in the area, with large rock formations evident.

Site location map



Site contents information

open/closed site:

Site condition:

Features:

1.

Habitation Structure

Number of
features

1

Length of
feature(s)
extent (m)

0.46

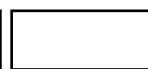
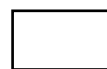
Width of
feature (s)
extent (m)

0.21

Scarred Trees

Scar Depth Regrowth
(cm) (cm)

Scar shape Tree Species

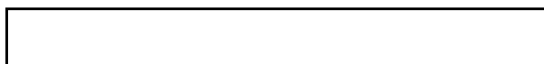


Description:

Site contained an area of potential deposit, with one fractured shell piece, multiple animal bone fragments and multiple charcoal fragments noted. Further measures include: max internal height 218cm, max depth 345cm and max height at dripline 168cm.

Features:

2.



Number of
features

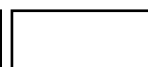
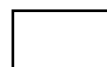
Length of
feature(s)
extent (m)

Width of
feature (s)
extent (m)

Scarred Trees

Scar Depth Regrowth
(cm) (cm)

Scar shape Tree Species



Description:

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
3.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
4.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
5.	<input type="text"/>	<input type="text"/>	<input type="text"/>

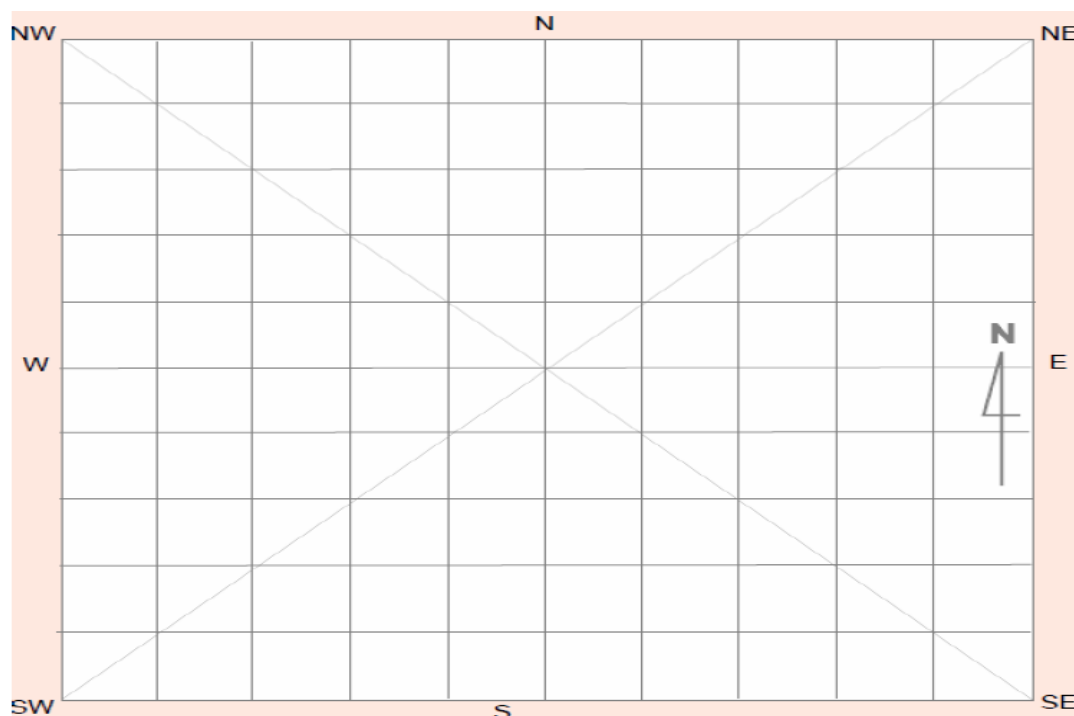
Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Other Site Info:

Ground soil is loose, potentially 20cm deep with potential for subsurface deposits. Vegetation growth is moderate, with poor ground visibility surrounding the site. Sandstone is prevalent in the area, with large rock formations evident.

Site plan

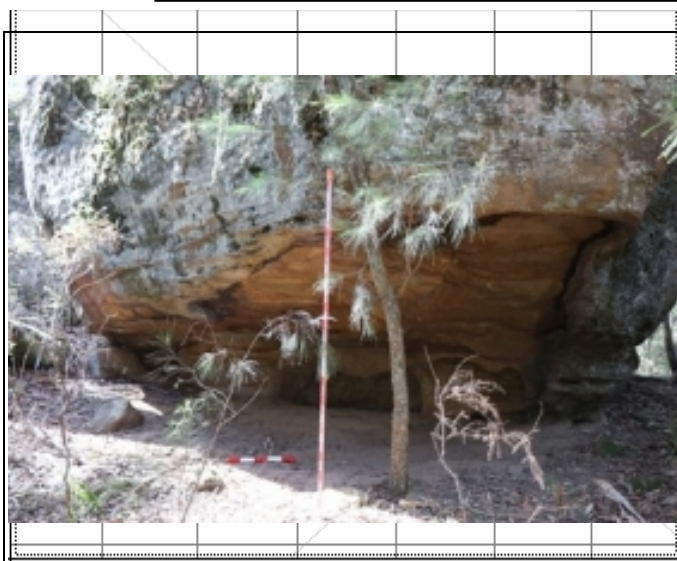
Site photographs



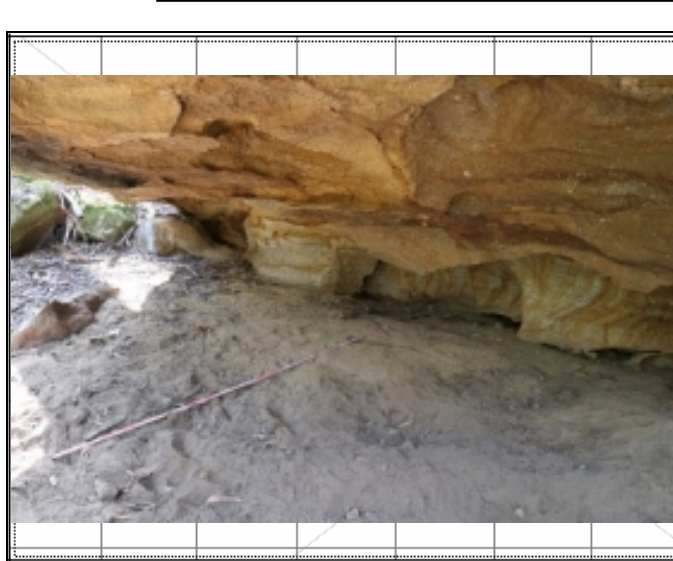
Description: Bone fragment recovered at the MS9-RS-1 site



Description: Shell fragment recovered at the MS9-RS-1 site



Description: View of the MS9-RS-1 shelter



Description: View of the internal space of the MS9-RS-1 shelter

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

Organisation:

Address:

Phone: E-mail:

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW

AHIMS site ID: 45-3-4548

Date recorded: 14-02-2021

Site Location Information

Site name: MS10-GG-1

Easting: 350743 Northing: 6328005 Coordinates must be in GDA (MGA)

Horizontal Accuracy (m): 10

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. Fenwick Alison

Organisation:

Address: 75 York Street, Teralba

Phone: 0407654665 E-mail: afenwick@umwelt.com.au

Site Context Information

Land Form Pattern: Steep Hills Land Use: Mining

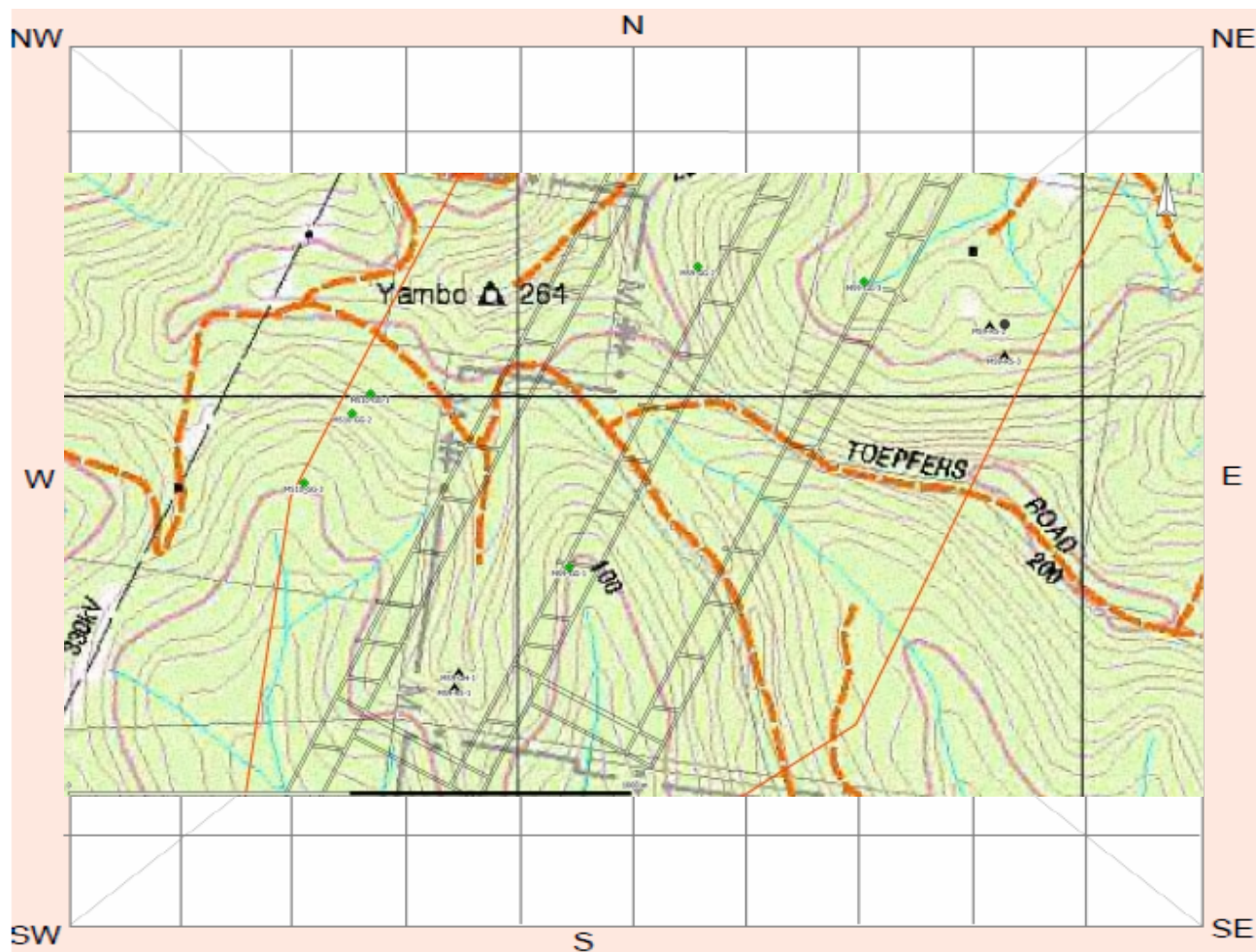
Land Form Unit: Stream Channel Vegetation: Closed Forest

Distance to Water (m): 0 Primary Report:

How to get to the site: Located within the LW30-31 Environmental Protection Area - for access, contact Centennial Mandalong

Other site information: Dense vegetation surrounds the site. Consists of two platforms in close proximity, with 10 and 3 grooves respectively.

Site location map



Site contents information

open/closed site:

Site condition:

Features:

Features:	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
1. <input type="text" value="Grinding Groove"/>	<input type="text" value="13"/>	<input type="text" value="0.35"/>	<input type="text" value="0.07"/>

Description:

Minimum of 13 grinding grooves identified along an extended bench on Buttondery Creek.

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Features:

Features:	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
2. <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
3.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
-----------------	---------------	------------	--------------

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
4.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
-----------------	---------------	------------	--------------

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
5.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

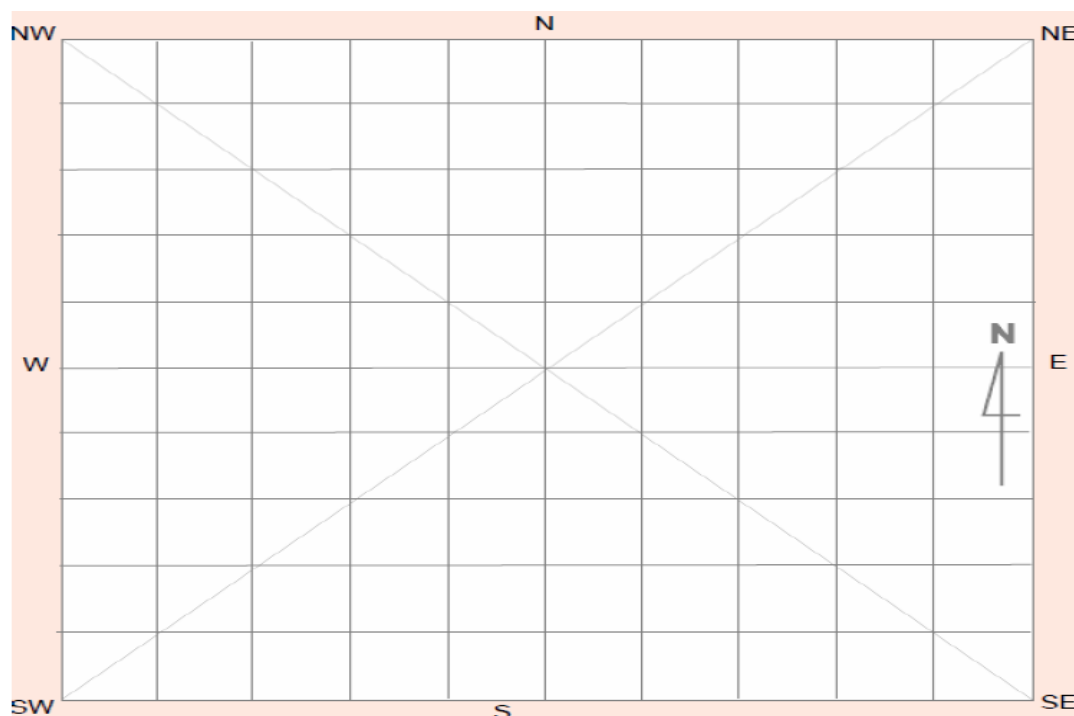
Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
-----------------	---------------	------------	--------------

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

Other Site Info:

Dense vegetation surrounds the site. Consists of two platforms in close proximity, with 10 and 3 grooves respectively.

Site plan

Site photographs



Description: MS10-GG-1 site



Description: Example of grooves identified at the MS10-GG-1 site



Description: Example of grooves identified at the MS10-GG-1 site



Description: Example of grooves identified at the MS10-GG-1 site

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

Organisation:

Address:

Phone: E-mail:

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW

AHIMS site ID: 45-3-4549

Date recorded: 14-02-2021

Site Location Information

Site name: MS10-GG-2

Easting: 350711

Northing: 6327970

Coordinates must be in GDA (MGA)

Horizontal Accuracy (m):

10

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.

Fenwick

Alison

Organisation:

Address:

75 York Street, Teralba

Phone:

0407654665

E-mail:

afenwick@umwelt.com.au

Site Context Information

Land Form
Pattern:

Steep Hills

Land Use:

Mining

Land Form
Unit:

Stream Channel

Vegetation:

Closed Forest

Distance to
Water (m):

0

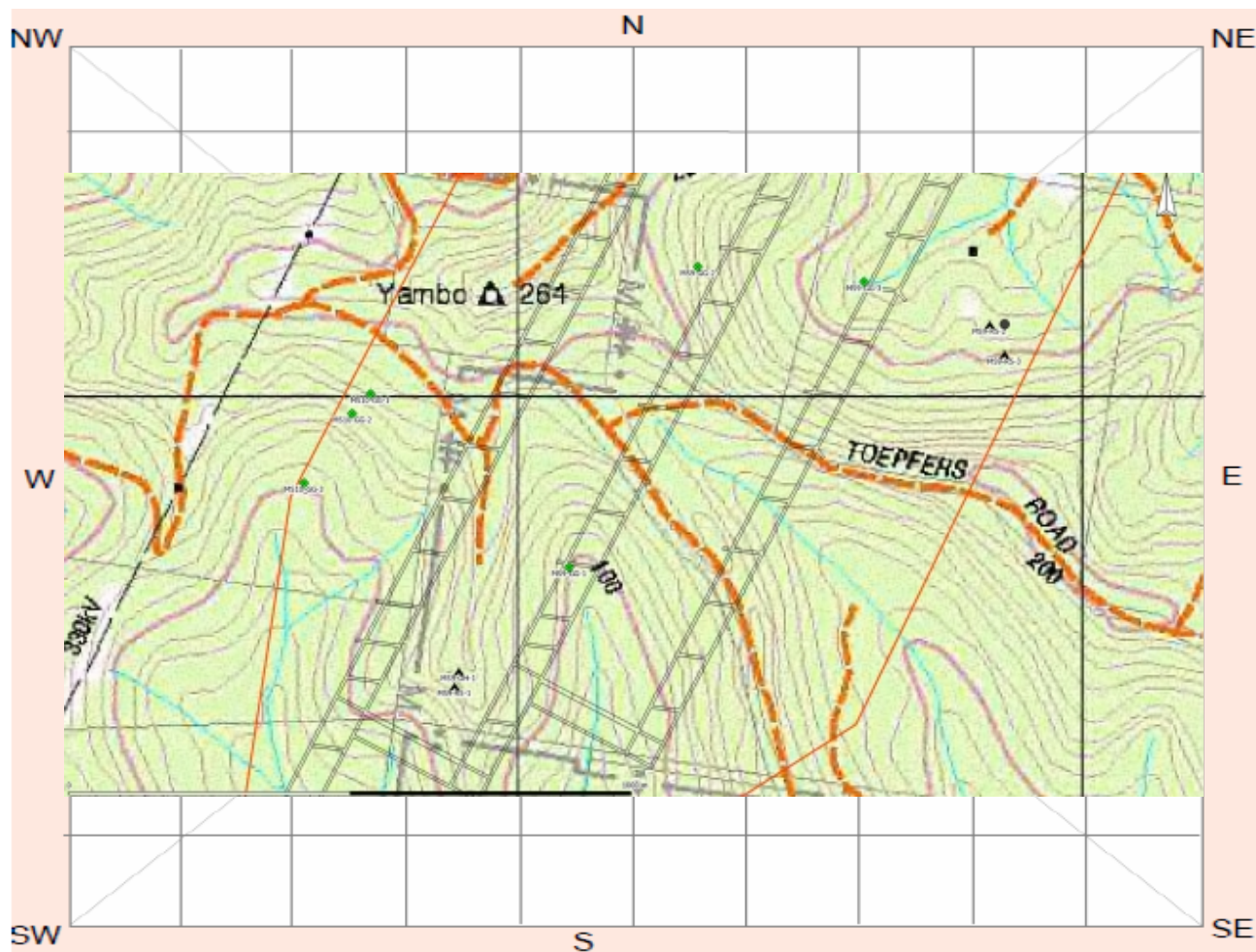
Primary
Report:

How to get
to the site:

Located within the LW30-31 Environmental Protection Area - for access,
contact Centennial Mandalong

Other site
information:

Site location map



Site contents information

open/closed site:

Site condition:

Features:

Features:	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
1. <input type="text" value="Grinding Groove"/>	<input type="text" value="1"/>	<input type="text" value="0.3"/>	<input type="text" value="0.03"/>

Scarred Trees			
Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

One grinding groove located approx. 200 meters down the creek line from MS10-GG-1. Located on Buttondery Creek with dense vegetation surrounding.

Features:

Features:	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
2. <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Scarred Trees			
Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
3.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
-----------------	---------------	------------	--------------

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
4.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
-----------------	---------------	------------	--------------

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
5.	<input type="text"/>	<input type="text"/>	<input type="text"/>

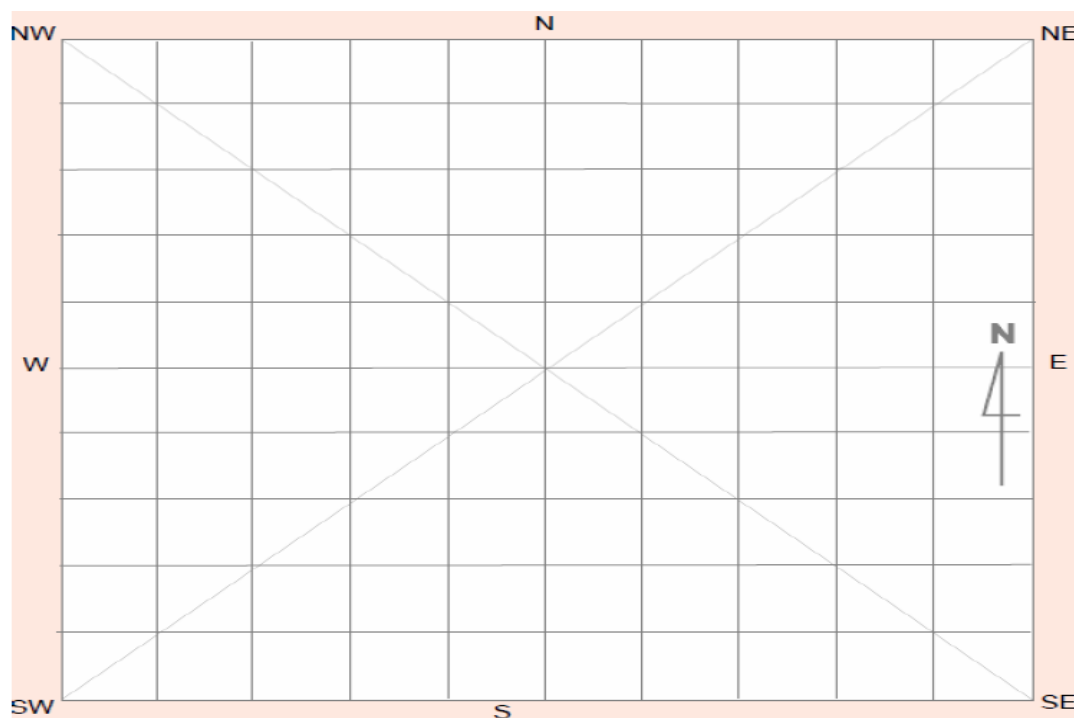
Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
-----------------	---------------	------------	--------------

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

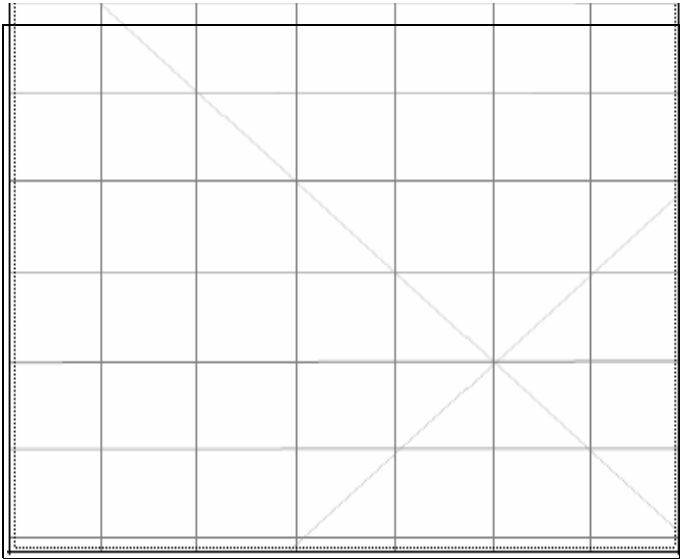
Other Site Info:

Site plan

Site photographs



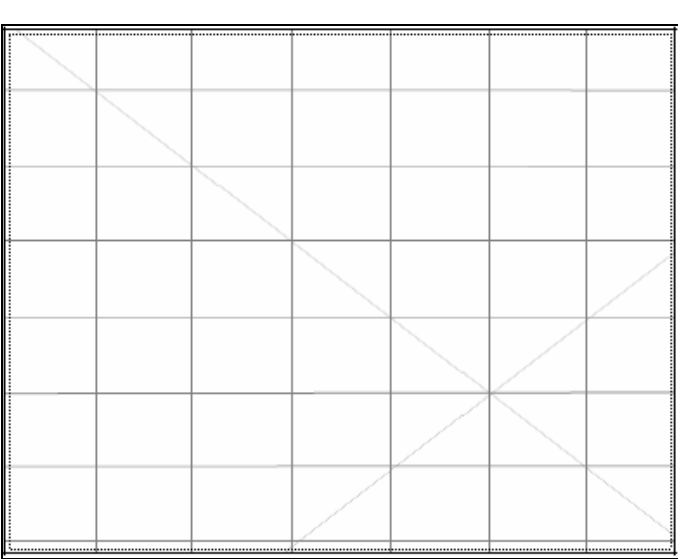
Description: Singular groove identified at the MS10-GG-2 site



Description:



Description: MS10-GG-2 site



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

Organisation:

Address:

Phone: E-mail:

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW

AHIMS site ID: 45-3-4550

Date recorded: 14-02-2021

Site Location Information

Site name: MS10-GG-3

Easting: 350626

Northing: 6327847

Coordinates must be in GDA (MGA)

Horizontal Accuracy (m):

10

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.

Fenwick

Alison

Organisation:

Address:

75 York Street, Teralba

Phone:

0407654665

E-mail:

afenwick@umwelt.com.au

Site Context Information

Land Form
Pattern:

Steep Hills

Land Use:

Mining

Land Form
Unit:

Stream Channel

Vegetation:

Closed Forest

Distance to
Water (m):

0

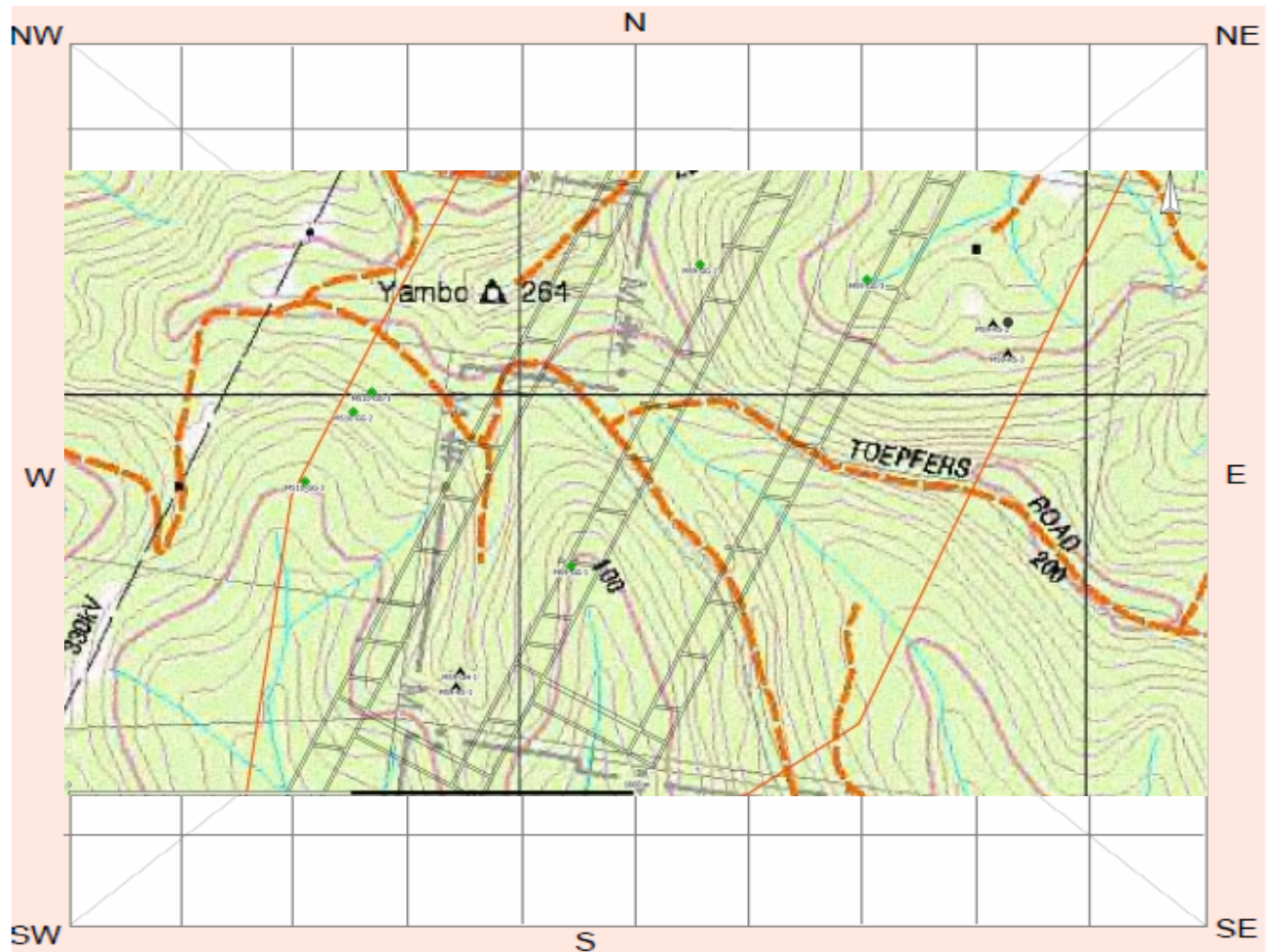
Primary
Report:

How to get
to the site:

Located within the LW30-31 Environmental Protection Area - for access,
contact Centennial Mandalong

Other site
information:

Site location map



Site contents information

open/closed site:

Site condition:

Features:

1.

Grinding Groove

Number of
features

1

Length of
feature(s)
extent (m)

0.25

Width of
feature (s)
extent (m)

0.05

Scarred Trees

Scar Depth (cm) Regrowth (cm) Scar shape Tree Species

Description:

One grinding groove located approx. 20 meters down from MS10-GG-2. Located on Buttondery Creek with dense vegetation surrounding.

Features:

2.

Number of
features

Length of
feature(s)
extent (m)

Width of
feature (s)
extent (m)

Scarred Trees

Scar Depth (cm) Regrowth (cm) Scar shape Tree Species

Description:

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
3.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
-----------------	---------------	------------	--------------

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
4.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
-----------------	---------------	------------	--------------

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
5.	<input type="text"/>	<input type="text"/>	<input type="text"/>

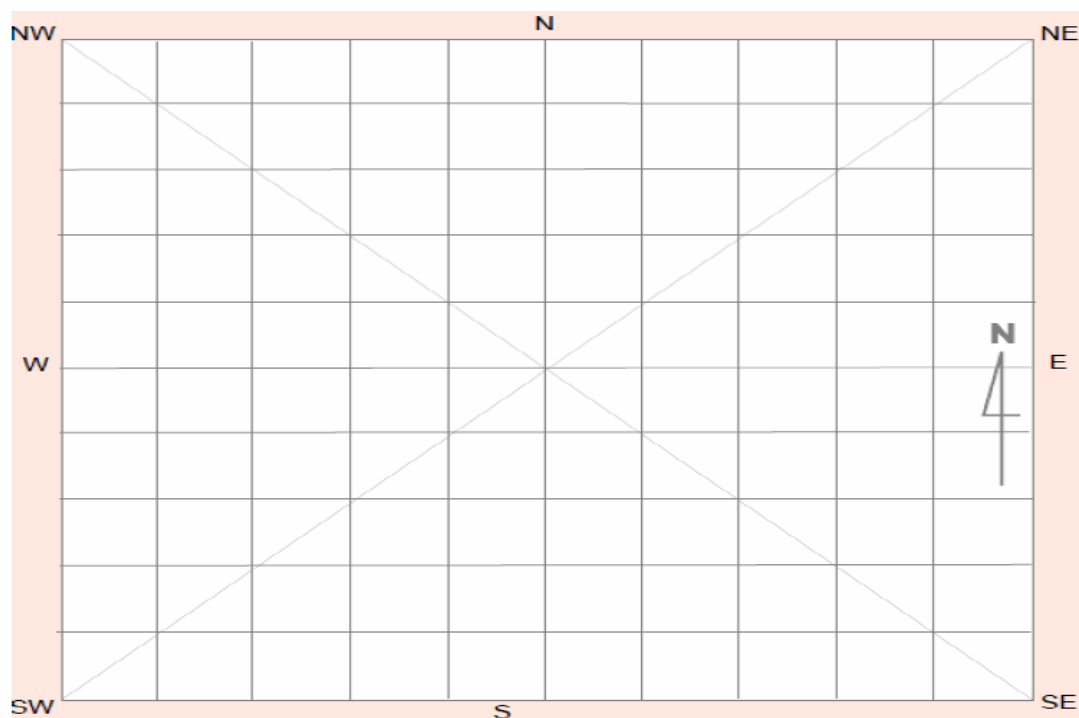
Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
-----------------	---------------	------------	--------------

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

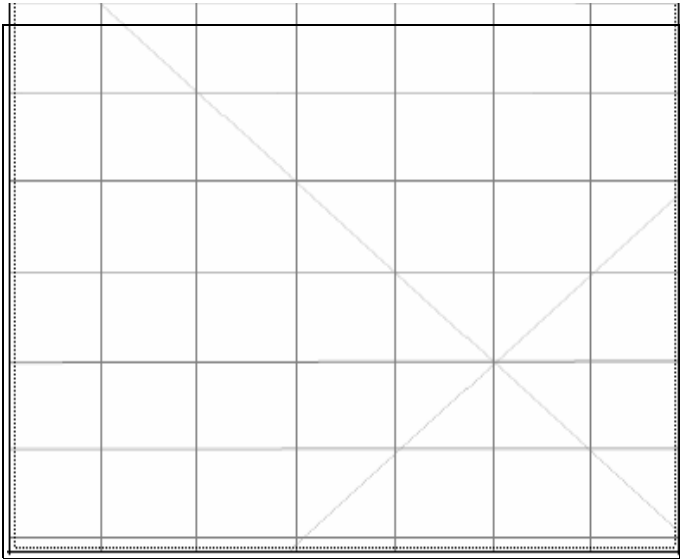
Other Site Info:

Site plan

Site photographs



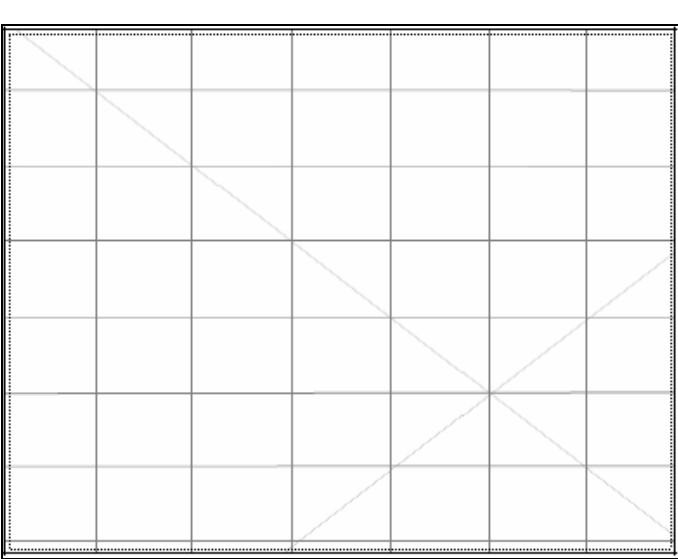
Description: Singular groove identified at the MS10-GG-3 site



Description:



Description: MS10-GG-3 site



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

Organisation:

Address:

Phone: E-mail:

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW

AHIMS site ID:

Date recorded:

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

Organisation:

Address:

Phone: E-mail:

Site Context Information

Land Form Pattern: Land Use:

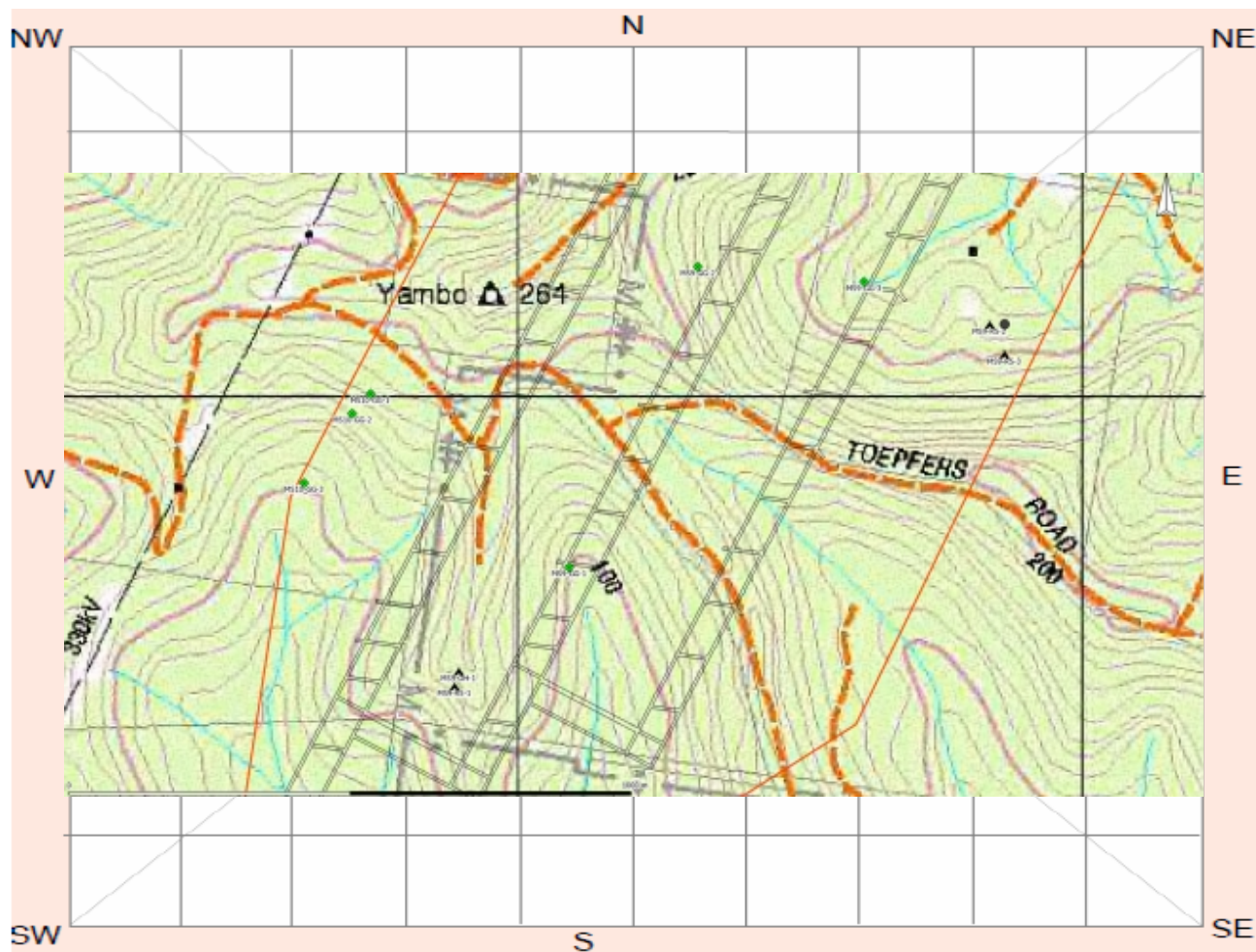
Land Form Unit: Vegetation:

Distance to Water (m): Primary Report:

How to get to the site:

Other site information:

Site location map



Site contents information

open/closed site:

Site condition:

Features:

Features:	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
1. <input type="text" value="Grinding Groove"/>	<input type="text" value="3"/>	<input type="text" value="0.3"/>	<input type="text" value="0.07"/>

Scarred Trees			
Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Minimum of three grinding grooves located at the midpoint of a steep incline of a tributary of Buttonderry Creek. There may be additional grooves present, however visibility is limited due to leaf litter and moss growth.

Features:

Features:	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
2. <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Scarred Trees			
Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
3.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
-----------------	---------------	------------	--------------

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
4.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
-----------------	---------------	------------	--------------

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
5.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

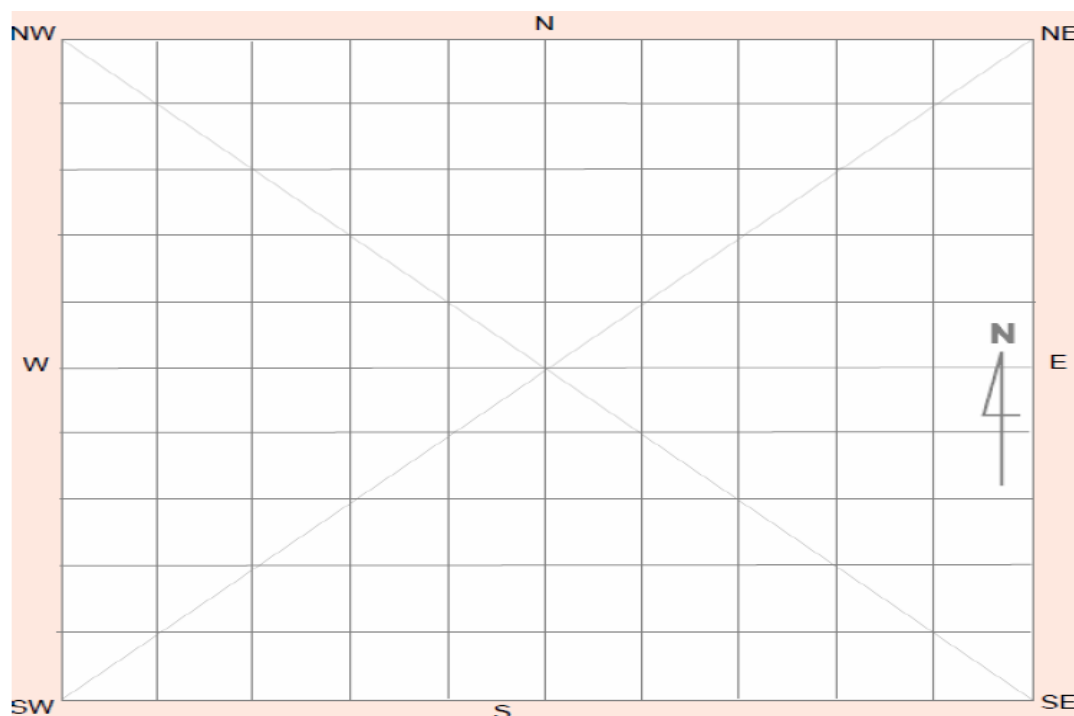
Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
-----------------	---------------	------------	--------------

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

Other Site Info:

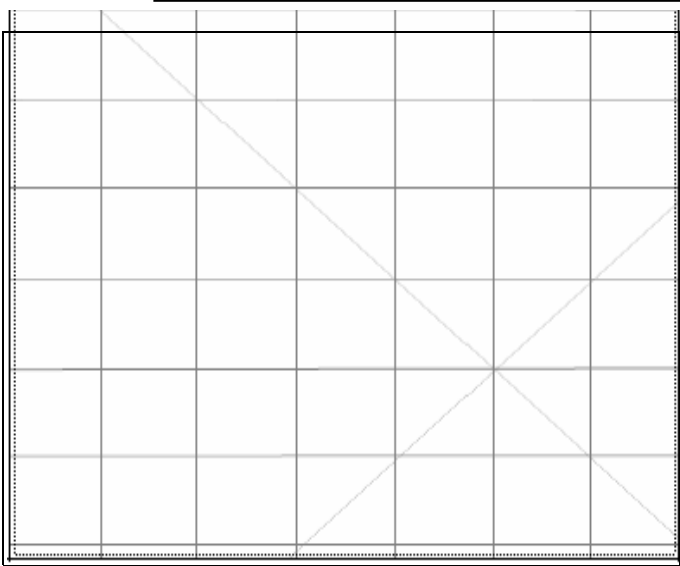
One smaller sandstone block had evidence of three further grooves. These grooves were relatively indistinct and have not been recorded as cultural.

Site plan

Site photographs



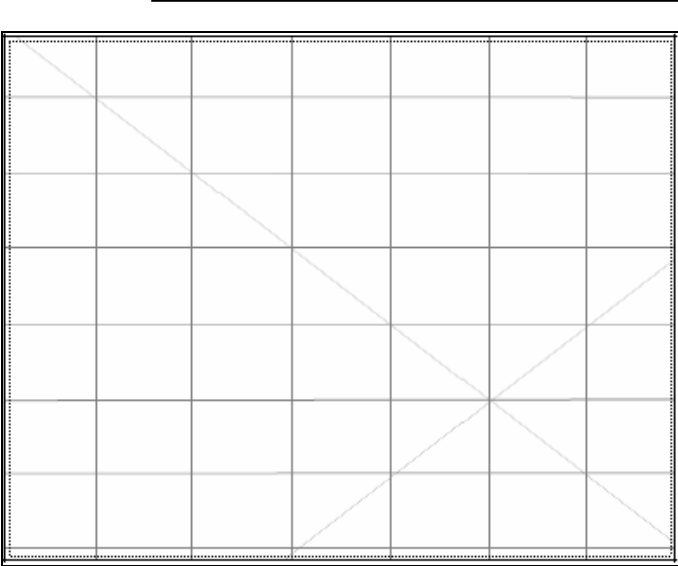
Description: View of the three grooves at MS9-GG-1



Description:



Description: Three potential grooves utilized for smaller tools at MS9-GG-1



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

Organisation:

Address:

Phone: E-mail:

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW

AHIMS site ID: 45-3-4552

Date recorded: 14-02-2021

Site Location Information

Site name: MS9-GG-2

Easting: 351327 Northing: 6328231 Coordinates must be in GDA (MGA)

Horizontal Accuracy (m): 10

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. Fenwick Alison

Organisation:

Address: 75 York Street, Teralba

Phone: 0407654665 E-mail: afenwick@umwelt.com.au

Site Context Information

Land Form Pattern: Steep Hills Land Use: Mining

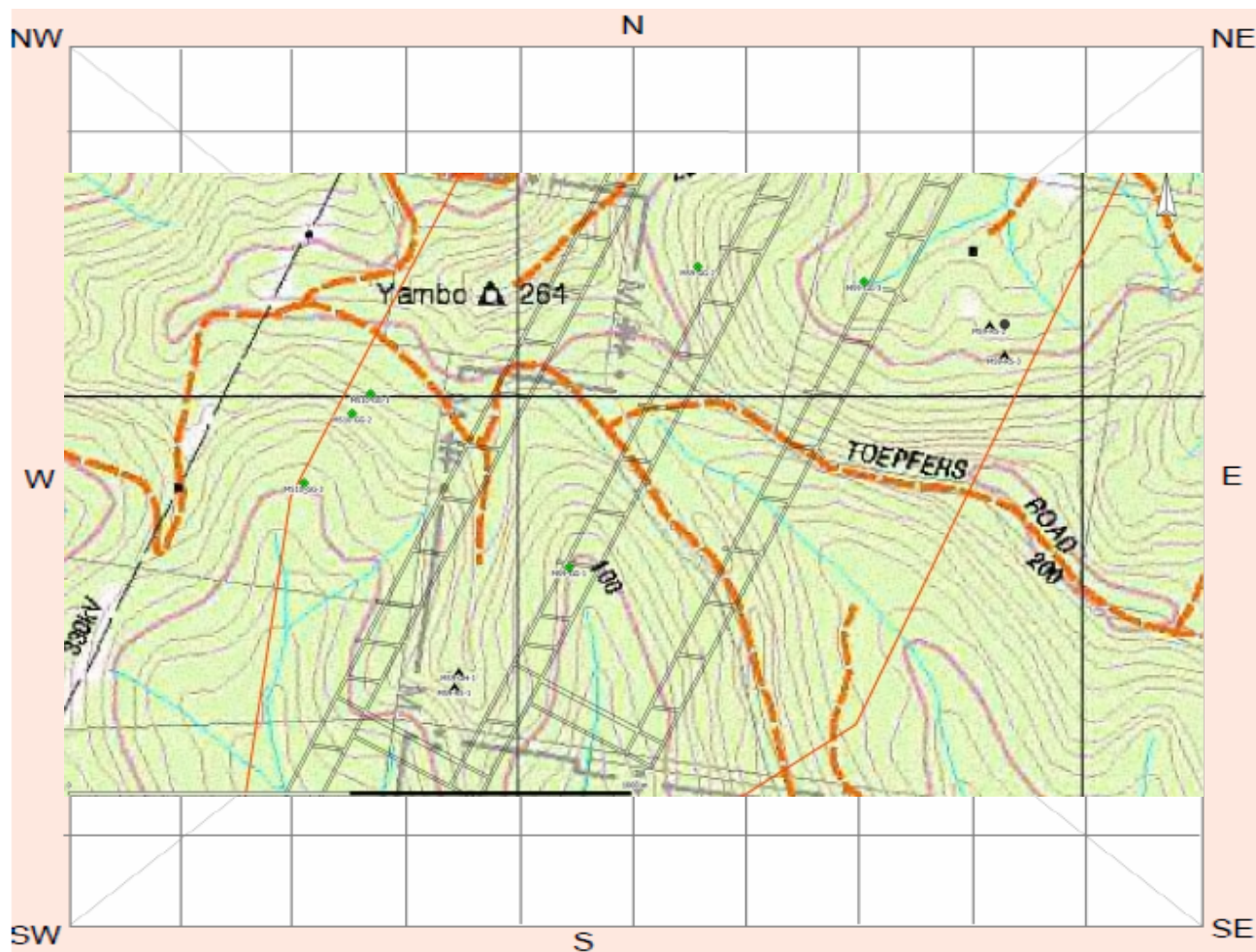
Land Form Unit: Stream Channel Vegetation: Closed Forest

Distance to Water (m): 0 Primary Report:

How to get to the site: Located within the LW30-31 Environmental Protection Area - for access, contact Centennial Mandalong

Other site information: There may be additional grooves present across the benches in proximity, however visibility was extremely limited due to lead litter and moss growth. Sandstone outcrop is located to the south and overhanging the grooves.

Site location map



Site contents information

open/closed site:

Site condition:

Features:

Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
1. <input type="text" value="Grinding Groove"/>	<input type="text" value="4"/>	<input type="text" value="0.3"/>

Scarred Trees			
Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Minimum of four grinding grooves, located that the midpoint of a steep slope of a tributary of Moran's Creek.

Features:

Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)
2. <input type="text"/>	<input type="text"/>	<input type="text"/>

Scarred Trees			
Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Description:

Features:

3.

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Features:

4.

Description:

Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Features:

5.

Description:

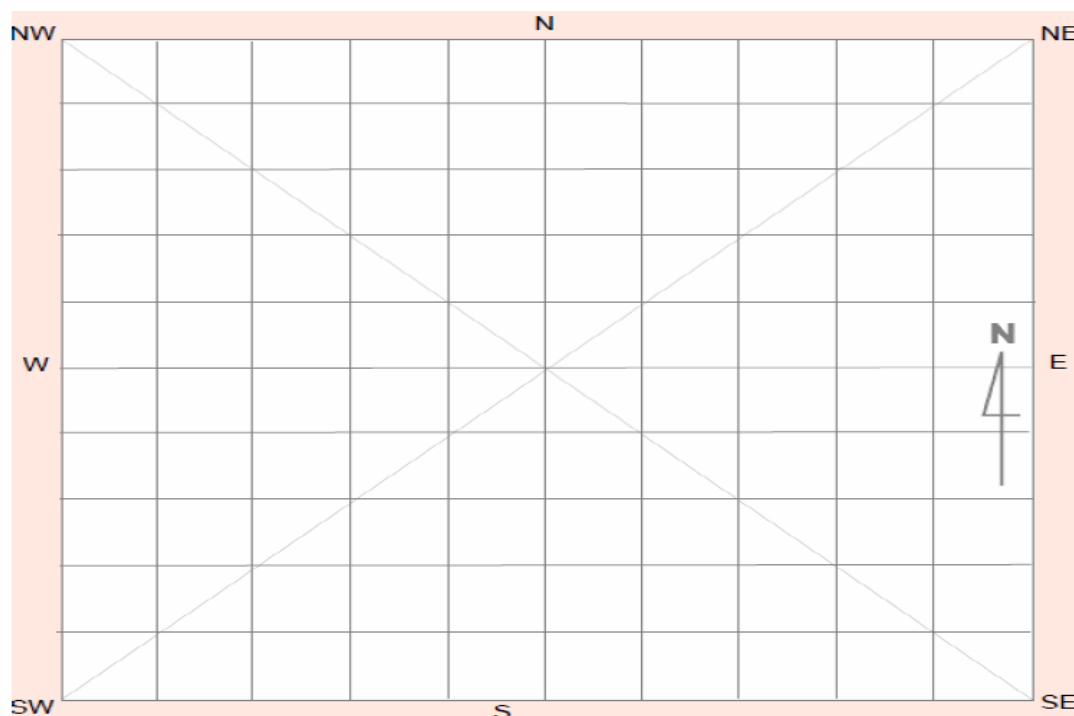
Scarred Trees

Scar Depth (cm)	Regrowth (cm)	Scar shape	Tree Species
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Other Site Info:

There may be additional grooves present across the benches in proximity, however visibility was extremely limited due to lead litter and moss growth. Sandstone outcrop is located to the south and overhanging the grooves.

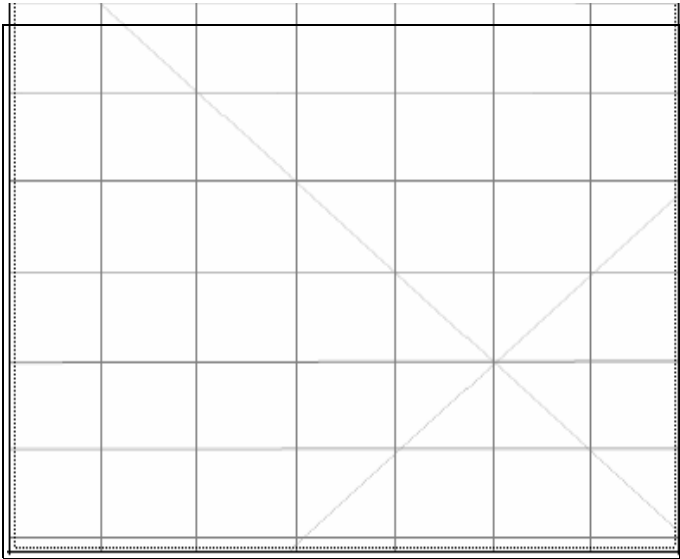
Site plan



Site photographs



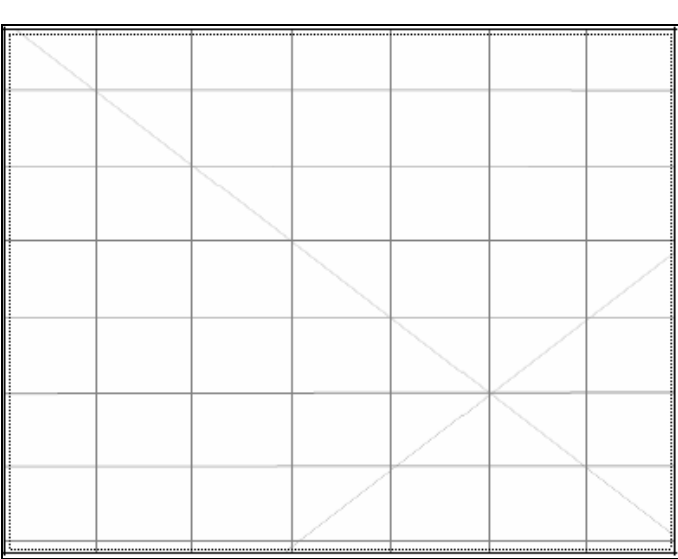
Description: View of the location of MS9-GG-2



Description:



Description: Close up view of MS9-GG-2



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

Organisation:

Address:

Phone: E-mail:

