



APPIN MINE AREAS 7 AND 9 LONGWALLS 709 TO 711 AND 905 HERITAGE MANAGEMENT PLAN

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DOCUMENT REVISION LOG

Persons authorising this Plan

Name	Title	Date
Gary Brassington	Manager Approvals	October 2021

Document Revisions

Revision	Description of Changes	Date
ICH Document		
1.0	Original Document	July 2021
1.1	Updated to address Heritage NSW feedback	October 2021

Persons involved in the review of this Plan

Name	Title	Company	Exp (yrs)
Cody Brady	Principal Approvals	South32	5
Gary Brassington	Manager Approvals	South32	25

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1. INTRODUCTION

1.1 Project Background

South32 Illawarra Metallurgical Coal (IMC) operates the Bulli Seam Operations (BSO) extracting hard coking coal used for steel production.

On 22 December 2011 the Planning and Assessment Commission (PAC), under delegation of the Minister for Planning, approved BSO (MP 08_0150) under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to continue mining operations until 2041.

This Heritage Management Plan (HMP) supports the Longwalls 709 to 711 and 905 Extraction Plan for mining of coal in Appin Areas 7 (AA7) and AA9 mining domains. The relationship between this HMP and the other components of the Extraction Plan is shown in Figure 1 of the Extraction Plan.

This Appin Mine HMP is the overarching plan for managing heritage impacts associated with Appin Mine operations and informs the relevant Extraction Plan HMP, the Surface Facilities Management Plan, Coal Wash Emplacement Area Management Plan and Gas Drainage Management Plan. The Appin Mine Heritage Management Plan (South32 2020) is available on the South32 Website. The relationship and interactions between these plans are shown in Figure 1.

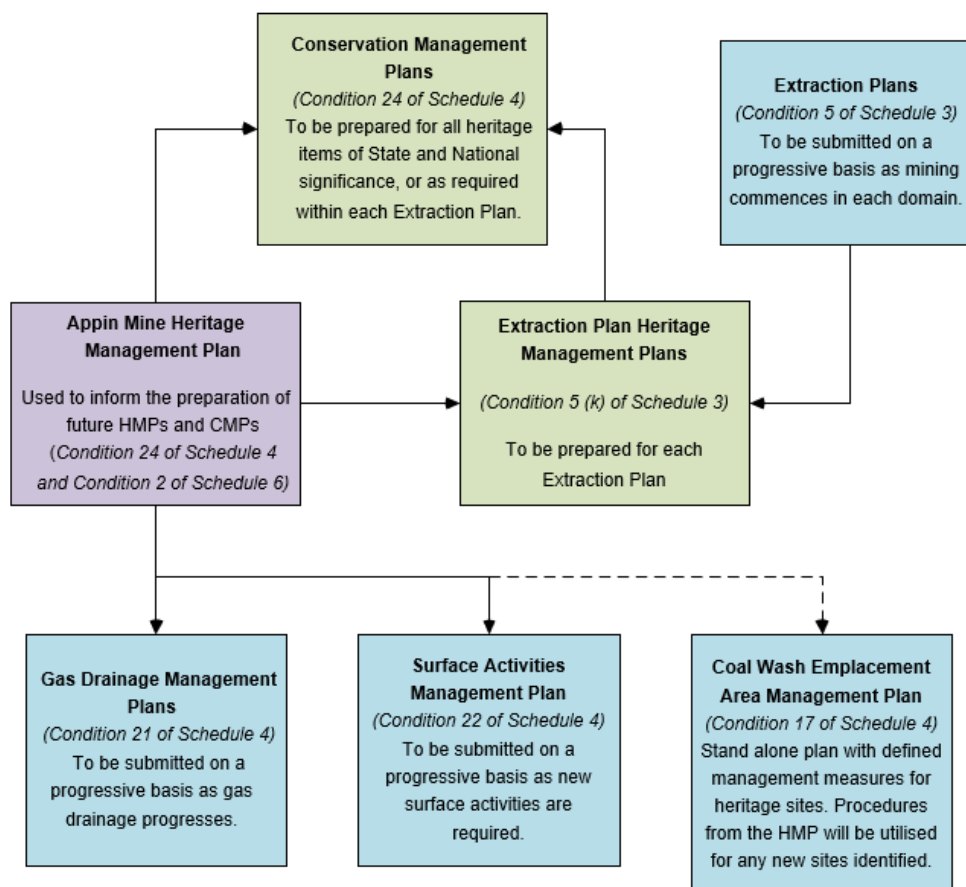


Figure 1 Management Plan Flow chart

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1.2 Scope

This HMP has been prepared in accordance with the BSO Approval (MP 08_0150) Condition 5(k), Schedule 3 as follows:

5. The Proponent shall prepare and implement an Extraction Plan for first and second workings within each longwall mining domain to the satisfaction of the Secretary. Each extraction plan must:

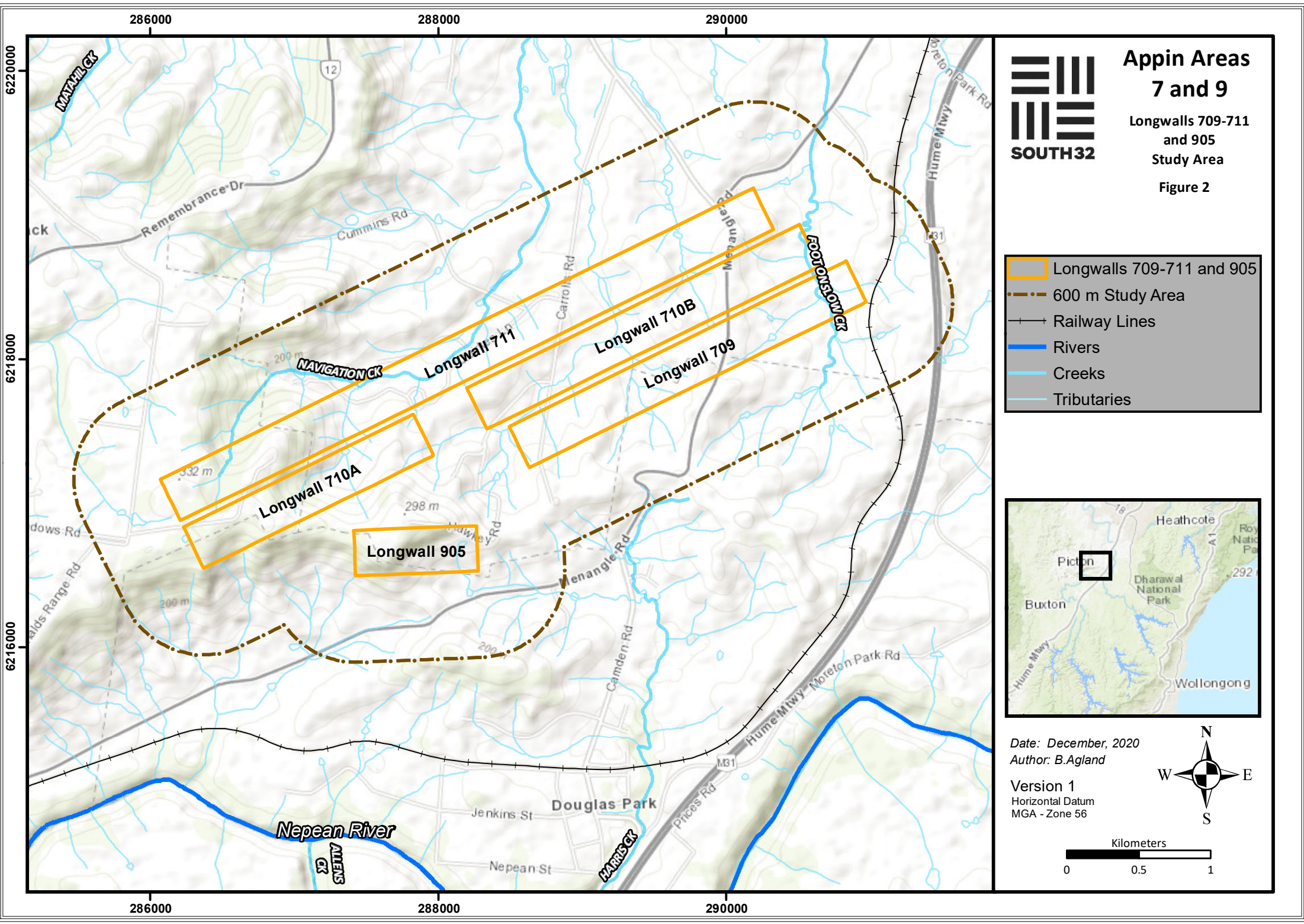
- k) include a Heritage Management Plan, which has been prepared in consultation with OEH and relevant stakeholders for both aboriginal and historic heritage, to manage the potential environmental consequences of the proposed second workings on both aboriginal and non- aboriginal heritage sites and which:
 - includes additional investigations (such as surveys and current register searches) for aboriginal heritage items (including previously known sites) and historic heritage items, sufficient to identify the significance (including ‘special significance’) of all sites which may be impacted by subsidence and to identify any actions required to ensure that the performance measures in Table 1 are met; and
 - is prepared in accordance with the relevant requirements for preparation of the heritage management plan required under condition 23 of Schedule 4.

The Study Area for the Extraction Plan is defined in accordance with MSEC (2021) as the surface area predicted to be affected by the proposed mining of Longwalls 709 to 711 and 905 and encompasses the areas bounded by the following limits:

- A 35° angle of draw line from the maximum depth of cover, which equates to a horizontal distance varying between 530 m and 750 m around the limits of the proposed extraction areas for Longwalls 709 to 711 and 905, and
- The predicted limit of vertical subsidence, taken as the 20 mm subsidence contour, resulting from the extraction of the proposed Longwalls 709 to 711 and 905.

Additionally, features potentially sensitive to far field movements, which includes horizontal, valley closure and upsidence movements that may be outside the 20 mm subsidence zone or 35° angle of draw line have been assessed.

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Appin Areas 7 and 9

Longwalls 709-711
and 905
Study Area

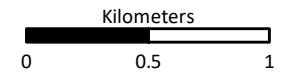
Figure 2

- Longwalls 709-711 and 905
- 600 m Study Area
- Railway Lines
- Rivers
- Creeks
- Tributaries



Date: December, 2020
Author: B.Agland

Version 1
Horizontal Datum
MGA - Zone 56





1.3 Objectives

The objectives of this HMP are to identify heritage items within the Longwalls 709 to 711 and 905 Study Area and to manage the potential impacts and/or environmental consequences of the proposed workings on Aboriginal and non-Aboriginal heritage sites and values.

Specific focus will be on Aboriginal heritage sites that may be determined to hold 'special significance', sites determined to hold high or moderate significance, other Aboriginal heritage sites, non-Aboriginal heritage features such as buildings or structures of State or National heritage significance and other buildings or structures of identified heritage significance.

This HMP is specific to heritage sites within the Longwalls 709 to 711 and 905 Study Area. The BSO HMP is the overarching document which covers other heritage sites for Appin Mine.

1.4 Consultation

Enquiries were made to the following services to identify new stakeholders for the Extraction Plan:

- The Registrar, *Aboriginal Land Rights Act 1983* for an updated list of Aboriginal owners relevant to the study area.
- National Native Title Tribunal for a list of registered native title claimants, native title holders and registered Indigenous Land Use Agreements.
- Native Title Services Corporation Limited.
- Heritage NSW
- Wollondilly Shire Council.

New organisations identified during this enquiry were contacted and given a 14-day period to register their interest in being consulted. This period closed on 3 July 2021.

This HMP was sent to RAPs and Heritage NSW for comment on 14 July 2021.

This HMP will be developed in consultation with Heritage NSW, and relevant stakeholders for both Aboriginal and non-Aboriginal heritage. The finalised HMP will be distributed to:

- Department of Planning, Infrastructure and Environment (DPIE);
- Heritage NSW; and
- All registered Aboriginal stakeholders.

The finalised HMP will be distributed to the above agencies and stakeholders. Additionally, IMC will make the HMP publicly available on the South32 website (Condition 11, Schedule 6 of the BSO Approval).

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2. STATUTORY REQUIREMENTS

Extraction of coal from Longwalls 709 to 711 and 905 will be in accordance with the conditions set out in the BSO Approval, applicable legislation as detailed in Section 2.2 and the requirements of relevant licences and permits (including conditions attached to mining leases).

2.1 BSO Approval

Condition 5 (k), Schedule 3 of the BSO Approval requires the preparation of an HMP to manage the potential environmental consequences of the proposed workings on both Aboriginal and non-Aboriginal heritage sites or values.

This HMP also addresses the requirements detailed in Condition 6, Schedule 3 and Condition 2, Schedule 6 of the BSO Approval as shown in Table 1.

Table 1 Management Plan Requirements

Project Approval Conditions	Relevant HMP Section
Condition 6 – Schedule 3 The Proponent shall ensure that the management plans required under condition 5(g)-(l) above include: <ul style="list-style-type: none"> a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this approval; and b) a detailed description of the measures that would be implemented to remediate predicted impacts. 	Section 4 Section 7
Condition 2 - Schedule 6 The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include: <ul style="list-style-type: none"> a) detailed baseline data; b) a description of: <ul style="list-style-type: none"> - the relevant statutory requirements (including any relevant approval, licence or lease conditions); - any relevant limits or performance measures/criteria; - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures; c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; 	Section 3 Section 2 Section 5 Section 5 to 8

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d) a program to monitor and report on the: <ul style="list-style-type: none"> - impacts and environmental performance of the project; - effectiveness of any management measures (see c above); 	Section 6
e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 8
f) a program to investigate and implement ways to improve the environmental performance of the project over time;	Section 10.4
g) a protocol for managing and reporting any: <ul style="list-style-type: none"> - incidents; - complaints; - non-compliances with statutory requirements; and - exceedances of the impact assessment criteria and/or performance criteria; and 	Section 9
h) a protocol for periodic review of the plan.	Section 10.4

Due consideration has been given to all the BSO Approval Conditions in the preparation of this HMP, including those relating to auditing, rehabilitation and environmental management.

2.2 Legislation and Guidelines

This HMP has been developed with due consideration of the requirements of relevant legislation and advisory documents and guidelines including:

- *Environmental Planning and Assessment Act 1979*;
- *National Parks and Wildlife Act 1974* (NPW Act).
- *National Parks and Wildlife Amendment Act 2010* (NSW).
- *Aboriginal Cultural Heritage Consultation requirements for proponents* (DECCW, April 2010).
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010).
- The Australia ICOMOS Burra Charter.
- *NSW Heritage Manual* (NSW Heritage, Department of Premier and Cabinet).

2.3 Relevant Leases and Licences

The following licences or permits may be applicable to IMC's operations in AA7 and 9:

- Mining Leases as per Table 2.

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- Environment Protection Licence (EPL) 2504 which applies to BSO operations. A copy of the licence can be accessed at the EPA website via the following link <http://www.epa.nsw.gov.au/prpoeo/index.htm>
- BSO Mining Operation Plan (MOP) 1/10/2020 to 30/09/2024 (V1.3).
- All relevant Occupational Health, Safety, Environment and Community approvals.
- Any additional leases, licences and approvals resulting from the BSO Approval.

Table 2 Appin Mine Leases, Licences and Other Reference Documents

Mining Lease - Document Number	Start	Finish
CCL 767	29 Oct 1991	08 Jul 2029
CL 388	22 Jan 1992	22 Jan 2034
ML 1382	20 Dec 1995	20 Dec 2037
ML 1433	24 Jul 1998	23 Jul 2019 ¹
ML 1678	27 Sep 2012	26 Sep 2033

The Project is located within the mining tenements listed in Table 2.

¹ Application for the renewal of Mining Lease 1433 which was lodged with the NSW Department of Planning and Environment – Division of Resources and Geoscience (Division) on 18 July 2018.

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3. BASELINE ASSESSMENT

A baseline Aboriginal Heritage Assessment (Biosis, 2009) and non-Aboriginal Heritage Assessment (Heritage Management Consultants [HMC], 2009) were undertaken in support of the BSO Environmental Assessment (EA). The Study Area for these assessments included the Longwalls 709 to 711 and 905 Study Area:

- Three Aboriginal heritage sites were identified in the Longwalls 709 to 711 and 905 Study Area during the assessments undertaken for the BSO EA (AHIMS 52-2-3191, AHIMS 52-2-3192 and AHIMS 52-2-3194).
- No non-Aboriginal heritage sites were detected in the Longwalls 709 to 711 and 905 Study Area during the assessments undertaken for the BSO EA.

Supplementary field surveys for Aboriginal heritage Objects and Places were undertaken by Biosis (2021) on a number of properties in the Longwalls 709 to 711 and 905 Study Area for the purposes of this Extraction Plan. The results of this assessment are included as Attachment B. During these surveys one previously unrecorded Aboriginal heritage site was identified. The site, named Hawkey Road ISO 1, is an isolated stone artefact. The Hawkey Road ISO 1 site has been assessed by Biosis (2021) to be of low scientific significance. No additional non-Aboriginal heritage items have been identified in the revised assessment (Biosis, 2021).

The locations of the recorded heritage features within the Longwalls 709 to 711 and 905 Study Area are shown in Figure 2.

3.1 Baseline Recording

3.1.1 Aboriginal Heritage

Known Aboriginal archaeological sites within or near the Longwalls 709 to 711 and 905 Study Area have been subject to recording at the level appropriate for registration on the Aboriginal Heritage Information Management System (AHIMS) at Heritage NSW.

Based on the risk assessment and the minimal predicted subsidence impacts, Hawkey Road ISO 1 will not be subject to detailed baseline recording or a regular program of monitoring.

Detailed baseline recording of any previously undetected Aboriginal heritage sites found prior to or during mining will be undertaken as required.

Details of the AHIMS Sites within the Longwalls 709 to 711 and 905 Study Area is provided in Table 3.

Table 3 AHIMS Sites within the Longwalls 709 to 711 and 905 Study Area

Site Number	Site Name	Site Type	Description
AHIMS 52-2-4630	Hawkey Road ISO 1	Artefact	Single isolated artefact and is an open site.
AHIMS 52-2-4226	DR-AS-01	Artefact	Two artefacts on an area of exposure on a flat landform pattern

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AHIMS 52-2-4227	DR-AS-02	Artefact	Two artefacts on an area of exposure on a flat landform pattern
AHIMS 52-2-3191	WG6, Wandinong	Artefact	Six artefacts on an access track located at the base of a hillslope and had been subject to vehicle use and water runoff and was highly disturbed
AHIMS 52-2-3192	WG5, Wandinong	Artefact	Site is a single isolated artefact
AHIMS 52-2-3194	Wandinong 5	Artefact	Three artefacts and is an open site
AHIMS 52-2-3687	Bulli Site 7	Artefact	The artefact is located on an exposure adjacent to a dam in a paddock, between Foot Onslow Creek and Menangle Road
AHIMS 52-2-3688	Bulli Site 8	Artefact	Site is a single isolated artefact
AHIMS 52-2-4508	WG8	Artefact	Site is a single isolated artefact

3.1.2 *Historic Heritage*

No non-Aboriginal heritage sites were detected in the Longwalls 709 to 711 and 905 Study Area during the assessments undertaken for the BSO EA. No non-Aboriginal heritage sites were located during the supplementary field investigation (Biosis 2021).

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4. PREDICTED IMPACTS

In accordance with the definition from the Independent Expert Panel for Mining in the Catchment (IEPMC, 2019), subsidence effects, subsidence impacts and subsidence consequences are described as:

- **Effect** - the nature of mining-induced deformation of the ground mass. This includes all mining-induced ground movements such as vertical and horizontal displacements and their expression as ground curvatures, strains and tilts.
- **Impact** - any physical change caused by subsidence effects to the fabric of the ground, the ground surface, or a structure. In the natural environment these impacts are principally tensile and shear cracking of the rock mass, localised buckling of the strata and changes in ground profile.
- **Consequence** - any change caused by a subsidence impact to the amenity, function or risk profile of a natural or constructed feature. Some consequences may give rise to secondary consequences. For example, the redirection of surface water to the subsurface through mining-induced fractures may be a primary consequence for water inflow to a reservoir and result in secondary consequences for surface ecology.

4.1 Aboriginal Heritage

4.1.1 Subsidence Effects

MSEC (2009) undertook an initial assessment of predicted subsidence in the Study Area to support the BSO EA. These predictions were revised by MSEC (2021) to account for the revised Mine Plan for Longwalls 709 to 711 and 905.

4.1.2 Subsidence Impacts

The Aboriginal heritage sites within the Study Area comprise open sites. Surface cracking could develop above the proposed longwalls. Fracturing of exposed bedrock could also occur along the streams at distances up to approximately 400 m outside the proposed mining area.

Aboriginal cultural heritage features located within the 600 m Study Area are detailed in Table 4.

Table 4 Predicted Subsidence Impacts to Aboriginal Heritage Features

Site Number	Site Name	Site Type	Significance	Risk of Impact
AHIMS 52-2-4630	Hawkey Road ISO 1	Artefact	Low	Negligible
AHIMS 52-2-4226	DR-AS-01	Artefact	Low	Negligible
AHIMS 52-2-4227	DR-AS-02	Artefact	Low	Negligible

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AHIMS 52-2-3191	WG6, Wandinong	Artefact	Low	Negligible
AHIMS 52-2-3192	WG5, Wandinong	Artefact	Low	Negligible
AHIMS 52-2-3194	Wandinong 5	Artefact	Low	Negligible
AHIMS 52-2-3687	Bulli Site 7	Artefact	Low	Negligible
AHIMS 52-2-3688	Bulli Site 8	Artefact	Low	Negligible
AHIMS 52-2-4508	WG8	Artefact	Low	Negligible

Further detail regarding the methodology used to predict the risk of impact can be found in Biosis (2021) and MSEC (2021).

4.1.3 Consequences

It is unlikely that the artefacts and deposits themselves would be impacted by surface cracking (MSEC 2021). The risk of impact from Longwalls 709 to 711 and 905 has been deemed as negligible (Biosis 2021).

4.2 Non-Aboriginal Heritage

No non-Aboriginal heritage sites were identified in the Longwalls 709 to 711 and 905 Study Area during the assessments undertaken for the BSO EA. No non-Aboriginal heritage sites were located during the supplementary field investigation (Biosis 2021).

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5. PERFORMANCE MEASURES AND INDICATORS

The BSO Approval provides Subsidence Impact Performance Measures (Schedule 3). Table 5 below details the conditions relevant to heritage items.

In relation to the performance measures for Aboriginal and non-Aboriginal heritage features the term “negligible” is defined within the Project Approval as “small and unimportant, such as not to be worth considering”.

Non-Aboriginal heritage sites are considered to be “affected by subsidence impacts” if they exhibit cracks in timber or the external facade, movement of wall claddings, loss of bearing to isolated walls, or re-levelling of the building as a result of the mining.

Table 5 Subsidence Impact Performance Measures

Aboriginal Heritage Features (Condition 1 Schedule 3)	
Sites determined to hold “special significance” as a result of studies required for Extraction Plans	Negligible impact or environmental consequence
Sites determined to hold high or moderate significance as a result of studies required for Extraction Plans	Less than 10% of such sites across the mining area are affected by subsidence impacts (other than negligible impacts or environmental consequence).
Other Aboriginal heritage sites	Less than 10% of such sites (or 1 such site, whichever is the greater) within any longwall mining domain are/is affected by subsidence impacts (other than minor impacts or environmental consequence).
Historic Heritage Features (Condition 1 Schedule 3)	
St James Church (Menangle) St Mary’s Tower (Douglas Park)	Negligible loss of heritage value. Negligible impact on structural integrity or external fabric.
Broughtons Pass Weir	Negligible loss of heritage value.
Other buildings or structures of State or National heritage significance	Negligible loss of heritage value. Negligible impact on structural integrity or external fabric, unless the owner of the feature agrees otherwise in writing
Other buildings or structures of identified heritage significance	No loss of heritage value greater than predicted under a Heritage Management Plan prepared under condition 6 below.
Built Features (Condition 3 Schedule 3)	

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...Other built features (including houses, industrial premises, swimming pools, farm dams and other built features or improvements).	<p>Always safe.</p> <p>Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated.</p> <p>Damage must be fully repaired or fully compensated, or else the damaged built feature or damaged infrastructure component must be replaced.</p>
--	---

Note: Not all of the above mentioned features are present in the Longwalls 709 to 711 and 905 Study Area as the subsidence impact performance measures in Schedule 3 relate to the entire BSO Area.

All identified Aboriginal heritage features located within the Longwalls 709 to 711 and 905 Study Area are isolated artefacts and considered to have a negligible risk of impact resulting from the extraction of the proposed longwalls.

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6. MONITORING AND REPORTING

6.1.1 *Aboriginal Heritage Sites*

Nine Aboriginal sites have been identified within the Study Area and it is considered there is negligible risk of impact resulting from the extraction of the proposed longwalls. No further assessment is recommended for these sites (Biosis 2021).

Monitoring of the nine identified sites is not proposed during extraction of Longwalls 709 to 711 and 905. This is due to the sites being isolated artefacts. If surface works are scheduled to take place within the general area of the Aboriginal sites, this management plan would be updated to include monitoring and management of potential impacts. This is due to the prediction that a higher density artefact scatters and sub-surface deposits may be found on crest landforms, and low flat rises within close proximity to fresh water sources (Biosis 2021).

While not all of the Study Area has been surveyed due to land access restrictions, rock shelter and other sandstone shelter sites susceptible to mine subsidence impacts are likely to be only present within landform where Hawkesbury Sandstone is present, which is not present within the Study Area (Biosis 2021).

6.1.2 *Historic Heritage Sites*

As no historic heritage sites were identified in the Study Area, no monitoring is proposed.

6.2 Reporting

Upon completion of any baseline recording of Aboriginal items, a report and archival material would be submitted to Heritage NSW.

Baseline Recording of non-Aboriginal items shall be in accordance with the requirements of the Heritage NSW.

No monitoring is proposed at this time; however, if monitoring is required as a result of surface activities; results from the monitoring program will be reported annually in the Annual Review. This report will:

- detail the outcomes of monitoring undertaken;
- provide results of visual inspections;
- determine whether performance indicators have been exceeded; and
- whether Corrective Management Actions (CMAs) are required.

If required, monitoring results would be reviewed monthly in the IMC Subsidence Management Committee. However, if the findings of monitoring are deemed to warrant an immediate response, the Principal Approvals will initiate the requirements of the Trigger Action Response Plan (TARP) (Biosis 2021) for applicable sites.

Monitoring results will be made publicly available in accordance with BSO Approval Condition 8 & 11, Schedule 6 and will also be included in the Annual Reporting Condition 4, Schedule 6.

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7. MANAGEMENT AND MITIGATION STRATEGIES

7.1 Aboriginal Heritage

The predicted impacts to Aboriginal objects are negligible and no mitigation measures are currently required or proposed.

IMC will review the need to implement management or mitigation strategies if additional Aboriginal sites and/or items are located within the Study Area.

If required, management strategies will be developed and implemented in accordance with current conservation practice and conservation principles contained within the Australia International Council of monuments and Sites, the Burra Charter, and the NSW Office of Environment and Heritage Guidelines for Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (2011). All management strategies will be developed in consultation with the identified Aboriginal stakeholders, the landowner, DPIE and Heritage NSW.

Possible measures include:

- Artificial drip line for where additional seepage has resulted as a result of mining.
- Silica or other fillers for cracking resulting from mining.
- Modification of monitoring methodology in response to any particular subsidence impacts.
- Archival recording.
- Continued monitoring and reporting.

7.2 Non-Aboriginal Heritage

As no historic heritage sites were identified in the Study Area, no mitigation measures are currently required or proposed.

IMC will review the need to implement management or mitigation strategies if historic heritage sites are located within the Study Area.

7.3 Trigger Action Response Plan

A TARP has been developed by Biosis (2021) in the event that an applicable heritage site is identified within the Longwalls 709 to 711 and 905 Study Area. This HMP will be updated to include the TARP in the event that an applicable heritage site was identified. A monitoring program to record the site would also be implemented.

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8. CONTINGENCY RESPONSE PLAN

In the event that the Performance Measures detailed in Section 5 of this HMP are considered to have been exceeded, or are likely to be exceeded, IMC will implement a Contingency Plan to manage any unpredicted impacts and their consequences.

This would involve:

- Capture photographic record.
- Notify relevant stakeholders soon as practicable.
- Notify relevant agencies and specialists soon as practicable.
- Offer site visits with stakeholders.
- Contract specialists to investigate and report on changes identified.
- Provide incident report to relevant agencies.
- Establish weekly monitoring frequency until stabilised.
- Updates from specialists on investigation process.
- Inform relevant agencies and stakeholders of results of investigation.
- Develop site CMA in consultation with key stakeholders if required, (pending stakeholder availability) and seek approvals.
- Implement CMA as agreed with stakeholders following approvals.
- Conduct initial follow up monitoring and reporting of CMA completion.
- Review Management Plan.
- Report in regular reporting and Annual Review.

IMC will consult with appropriate specialists and relevant agencies in order to devise an appropriate response in respect to any identified exceedance.

The development and implementation of contingency measures will be specifically designed to address the circumstances of the exceedance and assessment of environmental consequences.

If the contingency measures implemented by IMC fail to remediate the impact or the Secretary determines that it is not reasonable or feasible to remediate the impact, IMC will provide a suitable offset to compensate for the impact to the satisfaction of the Secretary in accordance with the BSO Approval Condition 2, Schedule 3.

8.1 Discovery of Unanticipated Aboriginal Objects

All Aboriginal Objects and Places are protected under the NPW Act. It is an offence to knowingly disturb an Aboriginal site without a consent or permit issued by the Heritage NSW.

Where Aboriginal cultural material becomes newly identified IMC will implement this Contingency Plan to ensure the protection of these items in accordance with the NPW Act.

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The following Contingency Plan describes the actions that must be taken in instances where Aboriginal cultural material is discovered or unearthed:

- Cessation of works in the vicinity of the find.
- Notify Heritage NSW as soon as practicable.
- Consultation with relevant stakeholders to undertake an impact assessment, and development of a management strategy.
- Develop a monitoring program in accordance with Heritage expert consultants' recommendations.
- Record the site in accordance with the NPW Act and Heritage NSW guidelines.

Newly recorded Aboriginal cultural heritage sites will be included on Figure 3 in accordance with the HMP review and update.

8.2 Discovery of Aboriginal Ancestral Remains

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils (Biosis 2021). If any suspected human remains are discovered during any activity IMC will:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and Heritage NSW Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by Heritage NSW.

8.3 Baseline recording for Aboriginal Shelter Sites

If unanticipated Aboriginal shelter sites are identified in the Study Area as part of the extraction of Longwalls 709 to 711 and 905, then appropriate management actions shall be undertaken in consultation with Heritage NSW and registered Aboriginal parties. This consultation will be informed by an archaeological study and if appropriate an impact assessment. Depending on the results of the impact assessment, management recommendations for Aboriginal shelter sites may include a monitoring program. Baseline recording of any new Aboriginal sites will be undertaken.

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9. COMPLAINTS AND COMPLIANCE MONITORING

9.1 Complaints and Dispute Resolution

IMC has a 24 hour, free call community hotline number (1800 102 210) and email address (illawarracomunity@south32.net) through which all complaints and general enquiries regarding environmental or community issues associated with IMC's operations can be reported.

All heritage related complaints received in relation to Appin Mine are managed in accordance with the Handling Community Complaints, Enquiries and Disputes Procedure.

Upon receipt of a community complaint, preliminary investigations will commence as soon as practicable to determine the likely cause of the complaint using information such as activities being undertaken on site at the time or area of the complaint.

An initial response will be provided to the complainant within 24 hours of the complaint being made, with a follow up response being provided as soon as practicable once a more detailed investigation is complete.

A summary of all complaints received during the reporting year will be provided as part of the Annual Review. A log of complaints is also maintained on the South32 website at:

<https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>.

9.2 Non-Compliance, Corrective Action and Preventative Action

Events, non-compliances, corrective actions and preventative actions are managed in accordance with the Reporting and Investigation Standard and Environmental Compliance/Conformance Assessment and Reporting Procedure. These procedures, which relate to all IMC operations, detail the processes to be utilised with respect to event and hazard reporting, investigation and corrective action identification. The key elements of the process include:

- identification of events, non-conformances and/or non-compliances;
- recording of the event, non-conformance and/or non-compliance in the event management system G360;
- investigation/evaluation of the event, non-conformance and/or non-compliance to determine specific corrective and preventative actions;
- assigning corrective and preventative actions to responsible persons in G360; and
- review of corrective actions to ensure the status and effectiveness of the actions.

Exceedances or non-compliances with heritage related criteria will be reported to all relevant agencies via the Annual Review or notified in accordance with Section 8.

For any incident, as defined by the BSO Approval, IMC will notify the Secretary and any other relevant agencies as soon as practicable after IMC identifies or is made aware of the incident. RAPs will be notified of any incidents involving Aboriginal heritage. IMC will provide a detailed report of any incident to the Secretary of DPIE, any relevant agencies and RAPs if the incident involves Aboriginal heritage.

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9.3 Monitoring Compliance with Appin Mine Approval Performance Conditions

Schedule 3 of the BSO Approval provides subsidence performance measures for Aboriginal and historical heritage features as shown in Table 5. In regard to the performance measures described in Table 5, "negligible" is defined as "small and unimportant, such as not to be worth considering" and "minor" is defined as "not very large, important or serious". Monitoring compliance with the BSO Approval performance conditions for heritage sites is discussed in Section 9.

Compliance with BSO Approval performance conditions for Aboriginal and non-Aboriginal heritage are monitored through subsidence monitoring and surface works programs by responsible site personnel or specialist contractors as appropriate. Monitoring results are published in End of Panel, Salvage and other reports as required. Monitoring Reports and results will be made available on the South32 website:

<https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents>.

9.4 Investigating Environmental Performance

Condition 2 (f) of Schedule 6 of the BSO Approval requires that a program be implemented to investigate and implement ways to improve the environmental performance of the Project over time.

IMC has committed to fund research to develop improved scientific understanding of subsidence impacts and environmental consequences as detailed in the Environmental Research Program. It is also anticipated that additional information in regard to improving environmental performance relative to Aboriginal and non-Aboriginal heritage will be gathered as part of End of Panel Reports, Impact Management Reports, Incident Reports, Audit Reports, annual reviews and heritage industry papers and reports.

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10. PLAN ADMINISTRATION

This HMP will be administered in accordance with the requirements of the Appin Mine Environmental Management Strategy (EMS) and the BSO Approval Conditions. A summary of the administrative requirements is provided below.

10.1 Roles and Responsibilities

Statutory obligations applicable to this Plan are identified and managed via an online compliance management system (TICKIT). The online system can be accessed from the link below:

<https://illawarracoal.tod.net.au/login>.

The overall responsibility for the implementation of this HMP resides with the Manager Approvals who shall be the HMP's authorising officer.

Parties responsible for environmental management in AA7 and 9 and the implementation of the HMP include:

Manager Approvals

- Ensure that the requisite personnel and equipment are provided to enable this HMP to be implemented effectively.
- Authorise the HMP and any amendments thereto.

Principal Approvals

- Document any changes to the HMP, recognising the potential for those changes to affect other aspects of the HMP.
- Provide regular updates to IMC on the results of the HMP.
- Arrange information forums for key stakeholders as required.
- Prepare any report in accordance with the HMP. Maintain records required by the HMP.
- Organise and participate in assessment meetings called to review mining impacts.
- Within 24 hours, respond to any queries or complaints made by members of the public in relation to aspects of this HMP.
- Organise audits and reviews of the HMP.
- Address any identified non-conformances, assess improvement ideas submitted and implement if considered appropriate.
- Arrange for the implementation of any agreed actions, responses or remedial measures.
- Ensure surveys required by this HMP are conducted and record details of instances where circumstances prevent these from taking place.

Environmental Field Team Coordinator

- Instruct suitable person(s) in the required standards for inspections, recording and reporting and be satisfied that these standards are maintained.

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- Investigate significant subsidence impacts.
- Identify and report any non-conformances with the HMP.
- Participate in any other assessment meetings called to review subsidence impacts in the area affected by mining.

Survey Coordinator

- Collate survey data and present in an acceptable form for review at assessment meetings.
- Bring to the attention of the Principal Approvals any findings indicating an immediate response may be warranted.
- Bring to the attention of the Principal Approvals any non-conformances identified with the Plan provisions or ideas aimed at improving the HMP.

Technical Experts

- Conduct the roles assigned to them in a competent and timely manner to the satisfaction of the Principal Approvals and formally provide expert opinion as requested.

Person(s) Performing Inspections

- Formally bring to the attention of the Environment Field Team Coordinator any nonconformances identified with the Plan, or ideas aimed at improving the Plan.
- Conduct inspections in a safe manner.

10.2 Resources Required

The Manager Approvals provides resources sufficient to support this HMP.

Equipment may be needed for this HMP. Where this equipment is of a specialised nature, it will be provided by the supplier of the relevant service. All equipment is to be appropriately maintained, calibrated and serviced as required in operation manuals.

It shall be the responsibility of the Manager Approvals to ensure that personnel and equipment are provided as required to allow the provisions of this Plan to be implemented.

10.3 Training

All staff and contractors working on IMC sites are required to complete the IMC training program which includes:

- An initial site induction (including relevant aspects of heritage, environment, safety and community).
- Safe Work Methods Statements and Job Safety Analyses, Toolbox Talks and Preshift communications.
- On-going job specific training and re-training (where required).

All training records are maintained by the IMC Training Department.

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It shall be the responsibility of the Manager Approvals to ensure that all persons and organisations having responsibilities under this Plan are trained and understand their responsibilities.

The person(s) performing regular inspections shall be under the supervision of the Environment Field Team Coordinator and be trained in observation and reporting. The Environment Field Team Coordinator shall be satisfied that the person(s) performing the inspections are capable of meeting and maintaining this standard.

10.4 Review and Update

In accordance with Condition 5 of Schedule 6 of the BSO Approval, the Extraction Plan will be reviewed, and if necessary revised, within three months, of:

- the submission of an Annual Review;
- the submission of an incident report;
- the submission of an Independent Environmental Audit (IEA) report; or
- any modification to the conditions of the BSO Approval (unless the conditions require otherwise).

If significant deficiencies in this HMP are identified in the interim period, the Plan will be modified as required. This process has been designed to ensure that documentation continues to meet current requirements, including changes in technology and operational practice, and expectations of stakeholders.

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11. REFERENCES

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12. APPENDICES

Appendix A: Aboriginal Stakeholder Consultation

A cultural heritage consultation program was undertaken for the BSO Part 3A Environmental Assessment. The details of which can be found in Section 2 of the BSO Part 3A Aboriginal Cultural Heritage Assessment (Biosis Research, 2009).

The following parties/groups registered their interest in the consultation process and will be involved in the ongoing consultation process:

- Campbelltown City Council.
- Coomaditchie United Aboriginal Corporation.
- Cubbitch Barta Native Title Claimants Aboriginal Corporation.
- Gary Caines.
- Illawarra Local Aboriginal Land Council.
- Korewal Elouera Jerrungarugh Tribal Elders Aboriginal Corporation.
- Kullila Welfare and Housing Aboriginal Corporation.
- Ngunawal Heritage Aboriginal Corporation.
- Peter Falk.
- Tharawal Local Aboriginal Land Council.
- Wadi Coomaditchie Aboriginal Corporation.
- Wargon and Burra Aboriginal Centre Inc.
- Wodi Elders Corporation.
- Wollondilly Shire Council.
- Woronora Plateau Gundungara.
- Wulungulu Elders Council.

Supplementary archaeological investigations of the study area were undertaken on 26 August 2020 by Samantha Keats, Consultant Archaeologist at Biosis, James Davis from Wodi Traditional Owners and Daniel Chalker from Cubbitch Barta Native Title Claimants Aboriginal Corporation (Biosis 2021).

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Appendix B: Appin Area 7 - 9 Longwalls 709 to 711 and 905 Heritage Impact Assessment (Biosis Research, 2021)

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Appin Longwalls 709, 710A, 710B, 711 and 905 Heritage Impact Assessment

FINAL REPORT

Prepared for Illawarra Metallurgical Coal

13 October 2021

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Biosis staff involved in this project were:

- Lauren Harley (mapping).
- Matthew Tetlaw (fieldwork).

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Glossary

ACHA	Aboriginal Cultural Heritage Assessment
ADDA	Aboriginal Due Diligence Assessment
AHIMS	Aboriginal Heritage Information Management System
Biosis	Biosis Pty Ltd
BSO	Bulli Seam Operations
DP	Deposited Plan
Due diligence code	<i>Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales</i>
EP	Extraction Plan
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
GSV	Ground Surface Visibility
HIA	Heritage Impact Assessment
Heritage Act	<i>Heritage Act 1977</i>
Heritage NSW	Heritage NSW, Department of Premier and Cabinet (DPC)
HMP	Heritage Management Plan
ICOMOS	International Council on Monuments and Sites
IMC	Illawarra Metallurgical Coal
LEP	Local Environment Plan
LGA	Local Government Area
MSB	Mine Subsidence Board
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NSW	New South Wales
PAD	Potential Archaeological Deposit
SHR	State Heritage Register
Study area	Part Lot 2 DP 734656; Lot 108 – 112, 113 DP 1144392; part Lot 2 and 3 DP 1004595; part 8A DP 4450; Lot 7 DP 245756; part Lot 801 and 802, Lot 803 - 806 DP 1103969; Lot 900 DP 1072947; part Lot 32 DP 61698; part Lot 1 - 3 DP 881528; part Lot 1511 and 1512 DP 117924; part Lot 152 DP 625389; part Lot 16 and 17 DP 251063; part Lot 91 DP 874485.
The Code	<i>The Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i>

Summary

Biosis Pty Ltd (Biosis) has been commissioned by Illawarra Metallurgical Coal (IMC) to undertake a Heritage Impact Assessment (HIA) for Aboriginal and non-Aboriginal heritage at Appin Longwalls 709, 710A, 710B, 711 and 905, Appin, New South Wales (NSW) (referred to as the study area herein). The Appin Colliery is comprised of a number of mining Areas; 5, 7, 8, and 9. These areas along with the West Cliff mining areas are collectively known as the Bulli Seam Operations (BSO). Biosis understands that there have been changes to the mine plan for Appin Areas 7 and 9 and IMC are seeking approval of an Extraction Plan (EP) and require Aboriginal and non-Aboriginal assessments to support the application.

The study area is located within the suburb of Menangle and Wollondilly Local Government Area (LGA), Parish of Camden, County of Camden. The study area for this HIA is defined as the surface area that could be potentially affected by subsidence and is inclusive of sensitive structures where additional subsidence effects may occur as a result of the extraction of coal from Longwalls 709, 710A, 710B, 711 and 905.

Supplementary archaeological investigations of the study area were undertaken on 26 August 2020 by Samantha Keats, Consultant Archaeologist at Biosis, James Davis from Wodi Wodi Traditional Owners and Daniel Chalker from Cubbitch Barta Native Title Claimants Aboriginal Corporation. Surveyed properties included those where access was granted by property owners. One new Aboriginal archaeological site was recorded during the supplementary field investigation, Hawkey Road ISO1 (AHIMS 52-2-4630). The site is located on a small crest adjacent to a drainage line in the southern part of Lot 81 DP880173. The artefact consists of a silcrete distal flake fragment with a plunge termination measuring 25.21 mm long by 20.45 mm wide and 4.04 mm thick.

No new non-Aboriginal heritage sites were identified during the field investigation.

1 Introduction

1.1 Project background

Biosis Pty Ltd (Biosis) has been commissioned by IMC to undertake a HIA for Aboriginal and non-Aboriginal heritage at Appin Longwalls 709, 710A, 710B, 711 and 905, Appin NSW (referred to as the study area herein). The Appin Colliery is comprised of a number of mining Areas; 5, 7, 8, and 9. These areas along with the West Cliff mining areas are collectively known as the BSO. Biosis understands that there have been changes to the mine plan for Appin Areas 7 and 9 and IMC are seeking approval of an EP and require Aboriginal and non-Aboriginal assessments to support the application.

Biosis previously completed an Aboriginal Cultural Heritage Assessment (ACHA) in 2009 that identified 32 new Aboriginal heritage sites within the Appin Colliery (Biosis Research 2009). A supplementary field investigation in 2012 identified an additional site (Biosis Research 2012). A non-Aboriginal heritage assessment (Statement of Heritage Impact) was completed by Michael Pearson Heritage Management Consultants Pty Ltd in 2009 that identified 49 heritage items of local and state significance (Michael Pearson Heritage Management Consultants Pty Ltd 2009).

The methodology for this HIA has been developed to meet the requirements of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010) (the Code) and NSW Heritage Manual 1996 (Heritage Office & DUAP 1996) and associated guidelines. This HIA should be read in conjunction with other specialist studies as part of the BSO.

1.2 Location of the study area

The study area is located within the Wollondilly LGA, Parish of Camden, County of Camden (refer to Figure 1 and Figure 2). The study area is located in the suburb of Menangle (refer to Figure 2). The study area for this HIA is defined as the surface area that could be potentially affected by subsidence and is inclusive of sensitive structures where additional subsidence effects may occur as a result of the extraction of coal from Longwalls 709, 710A, 710B, 711 and 905. This includes the 35 degree angle of draw from the proposed extents of the longwalls, the predicted limit of vertical subsidence and features sensitive to far-field movements and the 600 m boundary (MSEC 2021).

The supplementary field investigation study area comprises 125.1 hectares, and incorporates Burrells Road and Quirkies Lane in the north and Hawkey Road in the centre, and includes large residential subdivisions (Figure 3).

1.3 Planning approvals

The HIA complies with the statutory obligations outlined below:

- Conditions of Project Approval for the BSO.
- Relevant advisory documents and guidelines. These guidelines and documents include:
 - *National Parks and Wildlife Act 1974* (NSW) (NPW Act).
 - *National Parks and Wildlife Amendment Act 2010* (NSW).
 - *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010).

- *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010).
- The ethos of the Australia International Council on Monuments and Sites (ICOMOS) Burra Charter.
- *NSW Heritage Manual* (NSW Heritage, Department of Premier and Cabinet).

Condition 5 of Schedule 3 of the BSO Project Approval requires the preparation and implementation of an EP for first and second workings within each longwall mining domain. It also requires the preparation of a Heritage Management Plan (HMP) as a component of the EP for second workings to manage the potential environmental consequences of the proposed second workings on both Aboriginal and non-Aboriginal heritage sites or values. Table 1, Schedule 3 of the BSO Approval identifies the required performance measures that must be met for Aboriginal and non-Aboriginal heritage features.

1.4 Objectives of the assessment

The HIA will consist of the following components:

- Review of previous heritage assessments of the study area.
- Methodology and results of the supplementary field investigation.
- Present descriptions and significance assessment for the Aboriginal archaeological sites and historic heritage items within the study area.
- Identify the likelihood of subsidence impacts for Aboriginal and non-Aboriginal archaeological sites.
- Propose management options and mitigation measures for any cultural heritage sites that may be affected due to mining subsidence.
- Development of heritage contingency plans.

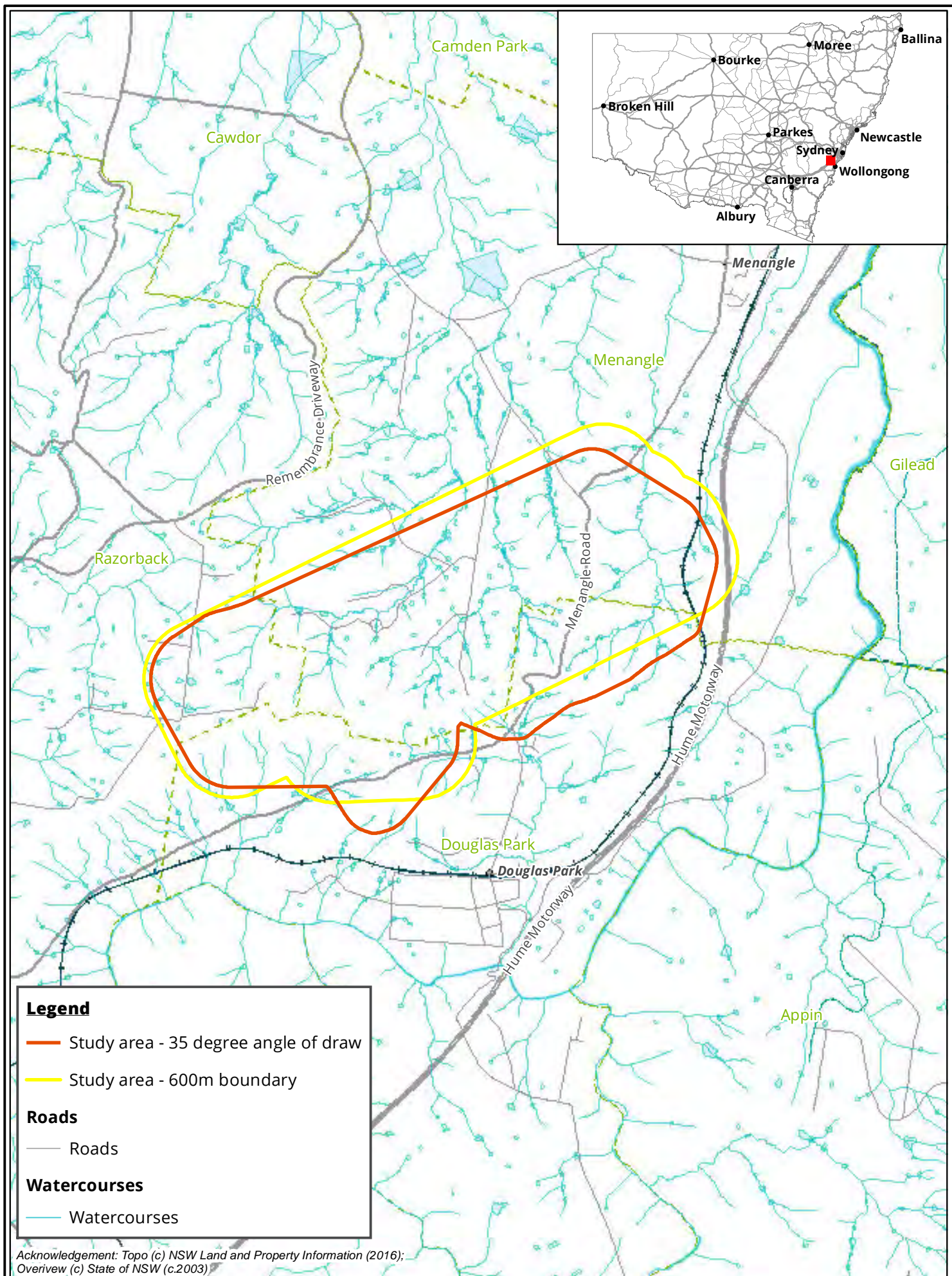
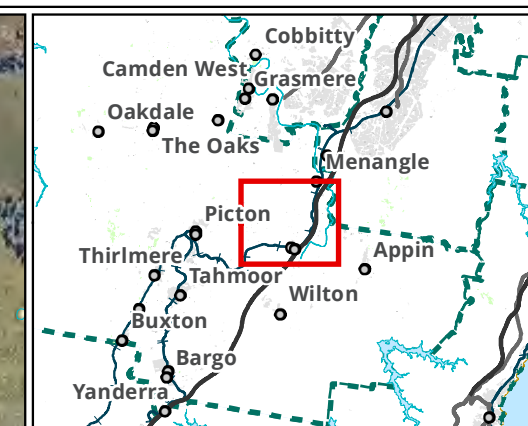
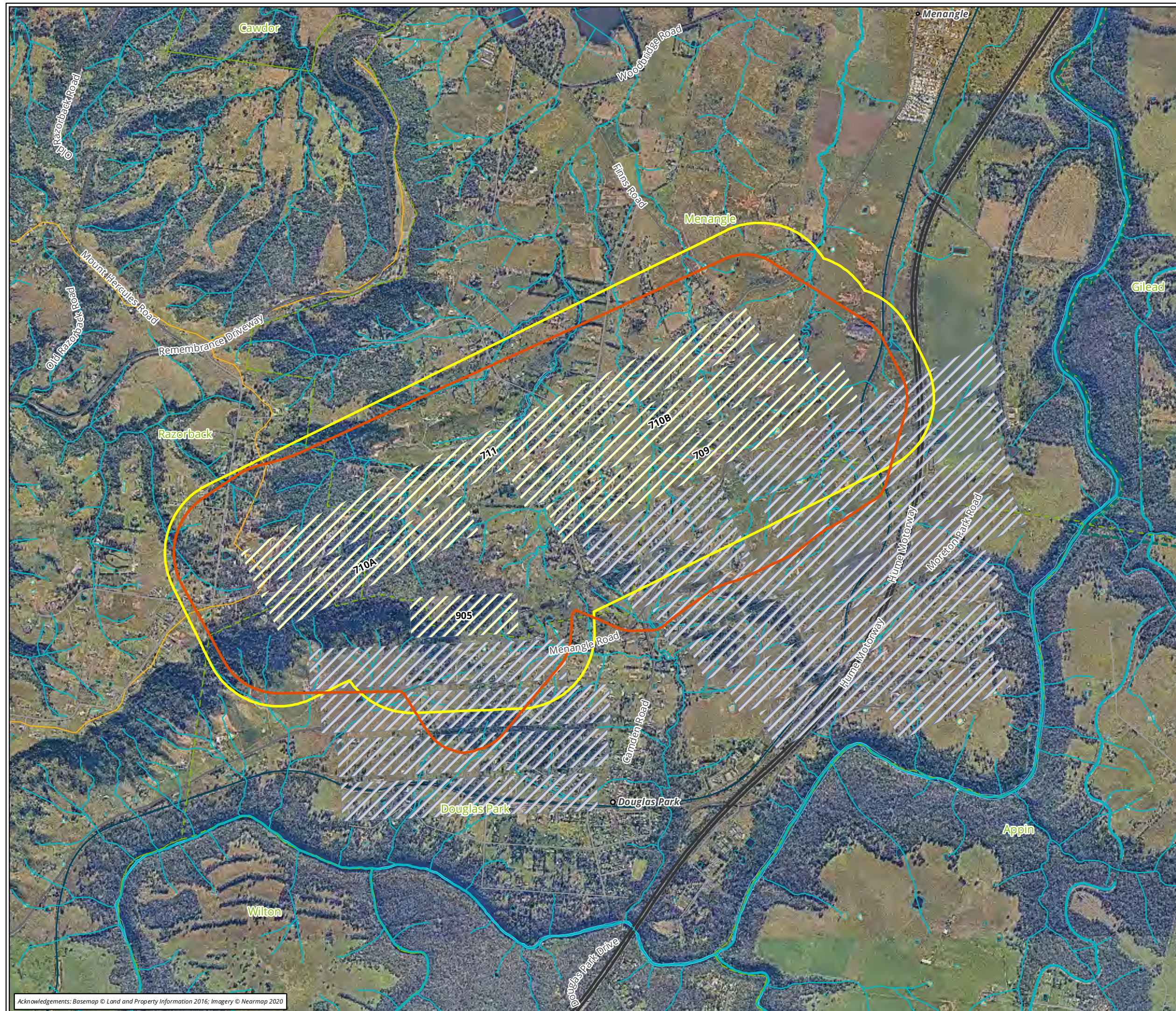


Figure 1 Location of the study area



Legend

- Study area - 35 degree angle of draw
- Study area - 600m boundary
- Watercourses

Longwall

- Proposed longwalls
- Existing

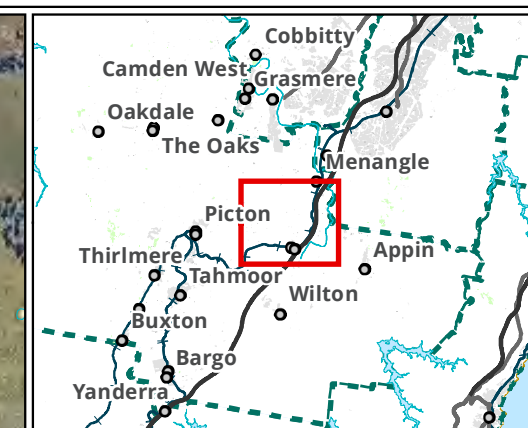
Figure 2 Study area detail

0 200 400 600 800 1,000
Metres

Scale: 1:28,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56



Matter: 33531,
Date: 12 October 2021,
Checked by: SJK, Drawn by: SSK, Last edited by: Iharley
Location: P:\33500s\33531\Mapping\33531_F2_StudyArea.mxd



Legend

- Study area - 35 degree angle of draw
- Study area - 600m boundary
- ▨ Supplementary field investigation area
- Lot
- Watercourses

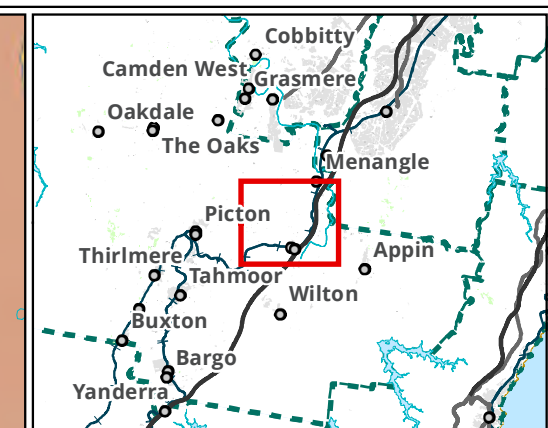
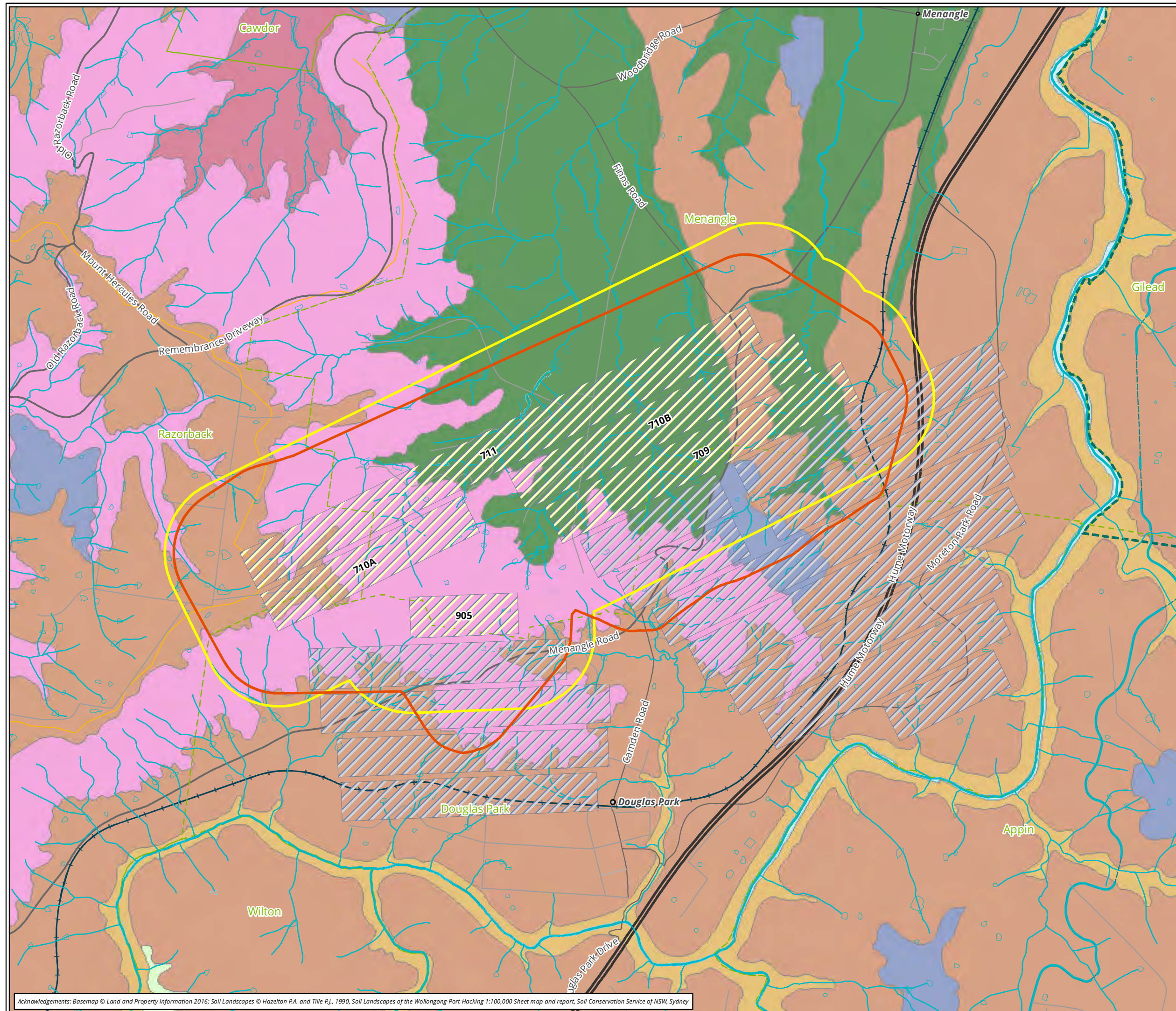
Figure 3 Supplementary field investigation area

0 200 400 600 800 1,000
Metres

Scale: 1:28,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56



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Checked by: SJK, Drawn by: SSK, Last edited by: Iharley
Location: P:\33500s\33531\Mapping\33531_F3_FieldInvArea.mxd



Legend

- Study area - 35 degree angle of draw
- Study area - 600m boundary
- Watercourses

Longwall

- Proposed longwalls
- Existing

Soil Landscape units

- bt - BLACKTOWN
- ha - HAWKESBURY
- lh - LUCAS HEIGHTS
- lu - LUDDENHAM
- mk - MONKEY CREEK
- pn - PICTON
- tp - THERESA PARK
- WATER - WATER

Figure 4 Soil landscapes in the vicinity of the study area

0 200 400 600 800 1,000
Metres

Scale: 1:28,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56



Matter: 33531,
Date: 12 October 2021,
Checked by: SJK, Drawn by: SSK, Last edited by: Iharley
Location: P:\33500s\33531\Mapping\33531_F4_SoilLandscapes.mxd

2 HIA updated background research

The aim of the updated background research for this HIA is to complete the following:

- Review and consolidation of previous heritage assessments of the study area.
- An updated search of the Aboriginal Heritage Information System (AHIMS), State Heritage Register (SHR) and *Wollondilly LEP 2011* to identify any recorded sites that may exist within the study area.
- Review of relevant reports identified through the register searches.

2.1 Updated database searches

2.1.1 Aboriginal heritage

Brayshaw McDonald (1990) undertook an archaeological survey at Menangle Park. The aims of the study were to identify areas of high Aboriginal/archaeological potential and significance; and to determine any threats that urban development might pose to archaeologically sensitive areas to make recommendations to the management of these areas. During the survey, two archaeological sites were located. Site 1 (MP1) is located on a ridgeline which runs parallel to the Nepean River and consists of two silcrete artefacts. The second site (MP2) is located adjacent to a creekline that also drains the western slopes of Menangle Sugarloaf and Mouth Gilead. MP2 consists of seven artefacts which were located over a total area of approximately 40 metres (m) by 10 m, and were made up of a range of raw material, pink and red silcrete as well as volcanic material.

Dibden (2002) was commissioned by McRoss Developments Pty Ltd to undertake an ACHA for land near Appin. Three sandstone shelters containing Aboriginal art and occupation deposit, and two shelters assessed to potentially contain archaeological deposit were recorded either directly within or immediately adjacent to the Dibden's study area. There had been one previously recorded site within the study area. Dibden suggested that it was highly probable that stone artefacts may be present in open contexts in the study area.

Mary Dallas Consulting Archaeologists (MDCA) (2014) undertook an Aboriginal Due Diligence Assessment (ADDA) at Station Street, Menangle. MDCA targeted the eastern side of the railway line and the western side of the railway line. The eastern side of the railway line was found to contain three artefact scatters, two areas of PAD and one rockshelter with PAD. The western side of the railway line was assessed with no archaeological sensitivity due to the substantial historical disturbance in the past. As part of this assessment, several Aboriginal groups were invited and attended the survey with MDCA. Comments were received from these groups in regards to the findings of the survey. Tharawal Local Aboriginal Land Council commented they were happy with the findings of the report. Cubitch Barta Native Title Claimants indicated that the west side of the railway had been heavily disturbed. They commented that they did not have any issues with the assessment of this area either due to this disturbance.

AHMS (2014) completed an ACHA for a planning proposal to re-zone land situated at Lot 7, DP 1072259 and Lot 4, Section 13, DP 939379, Cliffe Street, Picton, NSW, approximately 7 kilometres (km) west of the study area. The assessment included background research, Aboriginal community consultation, and a field investigation. The field investigation was hampered by low ground surface visibility (GSV), with no Aboriginal sites or objects identified. AHMS developed a series of predictive statements for the study area (2014, pp.19–20):

- Regional archaeological records indicate that terraces, lower slopes and areas of minor elevation in association with creeklines have high likelihood of containing extensive and archaeologically

significant cultural materials. Cultural materials have been demonstrated to occur >200 m from the edge of a watercourse, but more usually areas within 50-100 m contain the greatest density of materials. Stonequarry Creek, a fourth order creek, is situated adjacent to the western boundary of the subject area, therefore, land within 100 m of this feature is considered to have potential for Aboriginal cultural heritage.

- Where drainage lines have incised down through shale to underlying sandstone geology, associated site types such as rockshelters, grinding grooves and rock art may occur in the Cumberland sub-bioregion; however this only occurs near to the margins with surrounding sandstone country areas and is not applicable for the current subject area.
- Areas containing remnant native vegetation have potential to retain trees bearing cultural scars; and provide an indication of soil profile integrity. This is most likely to occur along the banks of Stonequarry Creek and associated drainage lines as aerial imagery indicates that these areas have not suffered from the same amount of clearance activities as other parts of the subject area.
- Aboriginal objects (primarily in the form of stone artefact deposits) are likely to be found at varying densities across most landforms within the subject area.
- Higher density artefact scatters and sub-surface deposits may be found on crest landforms, and low flat rises within close proximity to fresh water sources.
- Higher density artefact scatters and sub-surface deposits may be found adjacent to original drainage channels, particularly permanent and reliable water sources.
- The density and complexity of artefact scatters and sub-surface deposits is likely to decrease with distance from water sources and wetlands.
- A review of the underlying geology of the subject area has not identified the presence of suitable raw materials typically used in the manufacture of stone artefacts. As such, quarry sites are not expected to occur.
- Burial sites typically do not occur in the region outside of sandy or rockshelter contexts.
- Shell midden (or other faunal) deposits do not occur on the soil landscapes identified for the subject area and are therefore not expected.
- Stone arrangements have not been recorded in Sydney shale country and therefore are not expected to occur within the subject area.

Based on the above predictive statements AHMS developed the following archaeological potential predictions based on the environment and disturbance within the study area (2014, p.5):

- Land within 50 m of a waterway/drainage line: high archaeological potential.
- Land within 100 m of a waterway/drainage line: moderate archaeological potential.
- Land within 200 m of a waterway/drainage line: low archaeological potential.
- All other areas = very low sensitivity.
- Cut and fill disturbance = very low - nil sensitivity.

AHMS identified areas of high, moderate, and low archaeological potential, as well as areas of disturbance relating to the existing residential development within their study area. Following on from Aboriginal community consultation it was recommended that further assessment be undertaken.

AHMS (2015) undertook an Aboriginal and Historical Heritage Gap Analysis of the Greater Macarthur investigation area. The analysis identified that the current study area played host to several instances of early Aboriginal-European interaction. The area was formerly a well-used series of swamps and waterways, and was likely to have formed a focus of activity and occupation in the past. It has remained largely unmodified since European arrival. Riparian and swampy areas along the Nepean River in the vicinity of Menangle have been documented as used extensively by Aboriginal people in the past. Limited assessments have been undertaken in these areas, with little evidence of cultural material to date. However, it is considered that these areas have high risk of significant material being present and may form a constraint to future development.

Biosis (2018) was commissioned by Calibre to undertake an ADDA for the proposed subdivision along Station Street, Menangle. The assessment included background research and a field investigation. During the field investigation areas of previous disturbance were noted and recorded. Areas of ground surface exposure were targeted in order to identify any Aboriginal objects, however due to the extensive grass coverage no areas of exposure were identified. No previously unrecorded sites or objects were located during the field investigation.

2.1.2 AHIMS database search

An extensive search of the AHIMS database was conducted on 20/07/2020 (Client service ID: 521442). The search identified 61 Aboriginal archaeological sites within an 11 km search area, centred on the study area (Table 1). There are two AHIMS sites located within the study area (AHIMS 52-2-4226 and 52-2-4227) (Figure 4). The mapping coordinates recorded for these sites were checked for consistency with their descriptions and location on maps from Aboriginal heritage reports where available. These descriptions and maps were relied where notable discrepancies occurred.

AHIMS 52-2-4226 (DR-AS-01) is recorded as an artefact scatter consisting of a silcrete core and a silcrete flake. This site was recorded by Kayandel Arch Services in 2015. The site is located within a flat landform, and is approximately 213 m from Navigation Creek, a permanent water source.

AHIMS 52-2-4227 (DR-AS-02) is recorded as consisting of a silcrete flake and a silcrete flaked piece. This site was also recorded by Kayandel Arch Services in 2015. The site is located within a flat landform, and is approximately 333 m from Navigation Creek, a permanent water source.

It should be noted that the AHIMS database reflects Aboriginal sites that have been officially recorded and included on the list. Large areas of NSW have not been subject to systematic, archaeological survey; hence AHIMS listings may reflect previous survey patterns and should not be considered a complete list of Aboriginal sites within a given area. Some recorded sites consist of more than one element, for example artefacts and a modified tree, however for the purposes of this breakdown and the predictive modelling, all individual site types will be studied and compared. This explains why there are 71 results presented here, compared to the 61 sites identified in AHIMS.

Table 1 AHIMS site types

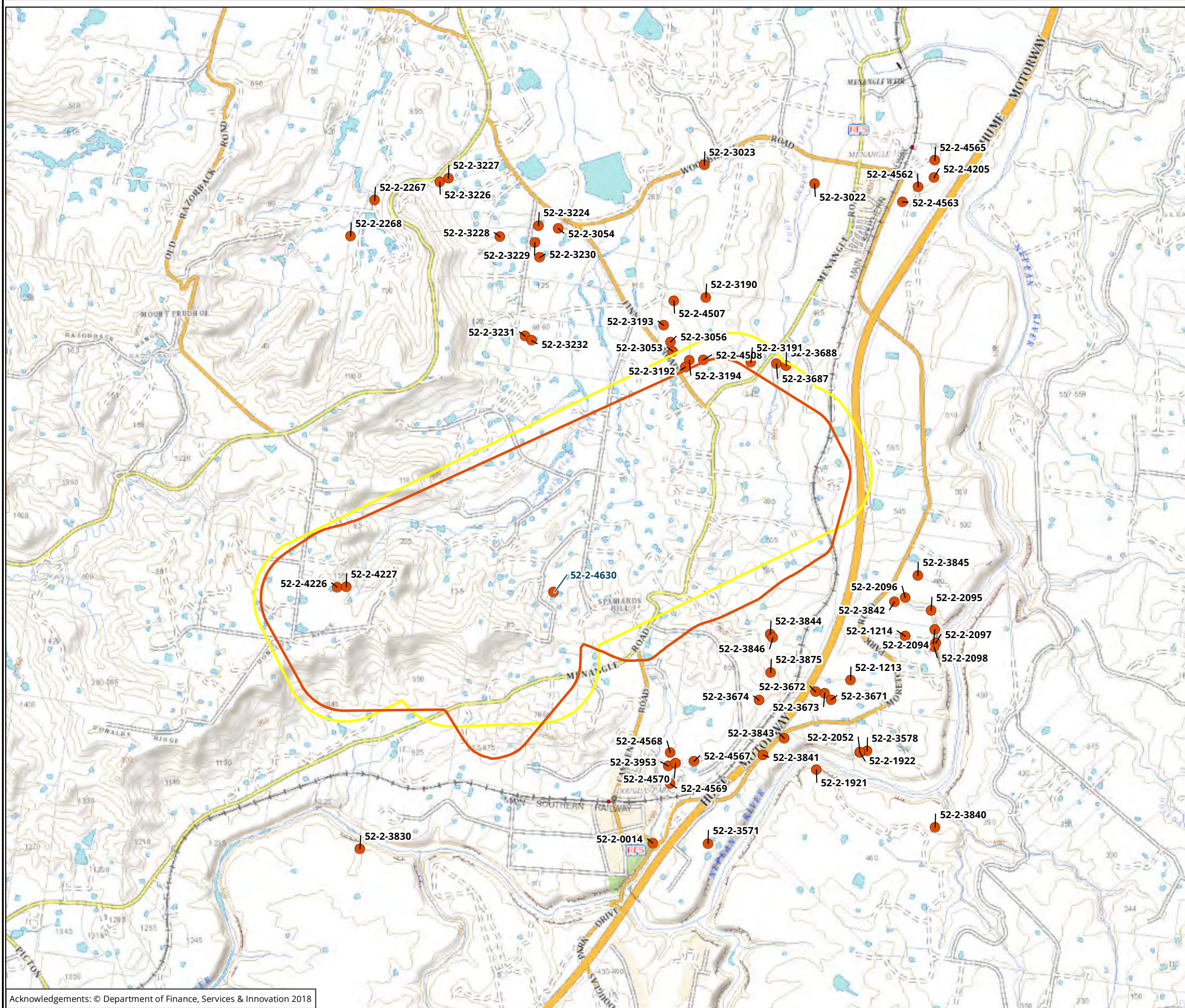
Site type	Occurrences	Frequency (%)
Artefact	46	64.79
Modified Tree (Carved or Scarred)	5	7.04
Art (Pigment or Engraved)	5	7.04
Potential Archaeological Deposit (PAD)	4	5.63
Shelter with Art	4	5.63

Site type	Occurrences	Frequency (%)
Shelter with Deposit	3	4.23
Grinding Groove	2	2.82
Shelter with Midden	1	1.41
Shell	1	1.41
Total	71	100.00%

A simple analysis of the Aboriginal cultural heritage sites registered within an 11 km search of the study area indicates that the dominant site type is artefacts, representing 64.79% (n=46), with modified tree (carved or scarred) and art (pigment or engraved) representing 7.04% each (n=5 each). PAD and shelter with art were represented by 5.63% each (n=4 each). Shelter with deposit was represented by 4.23% (n=3) and grinding grooves comprised of 2.82% (n=2). Shelter with midden and shell each had 1.41% (n=1).

2.1.3 Non-Aboriginal heritage

A search of the SHR and *Wollondilly LEP 2011* was completed in order to identify any non-Aboriginal heritage located within the study area. There were no records identified by these searches (Figure 5).



Legend

- Study area - 35 degree angle of draw
- Study area - 600m boundary
- AHIMS record

Figure 5 AHIMS records near the study area

NOT TO BE MADE PUBLIC

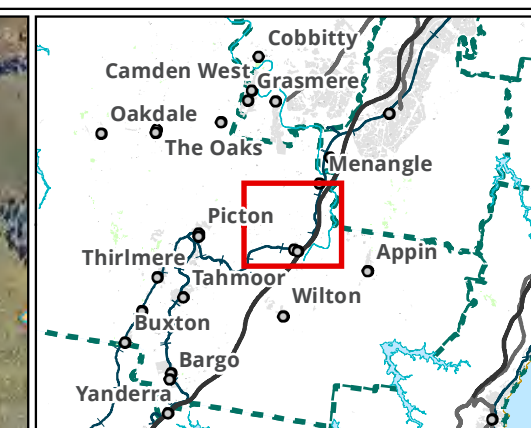
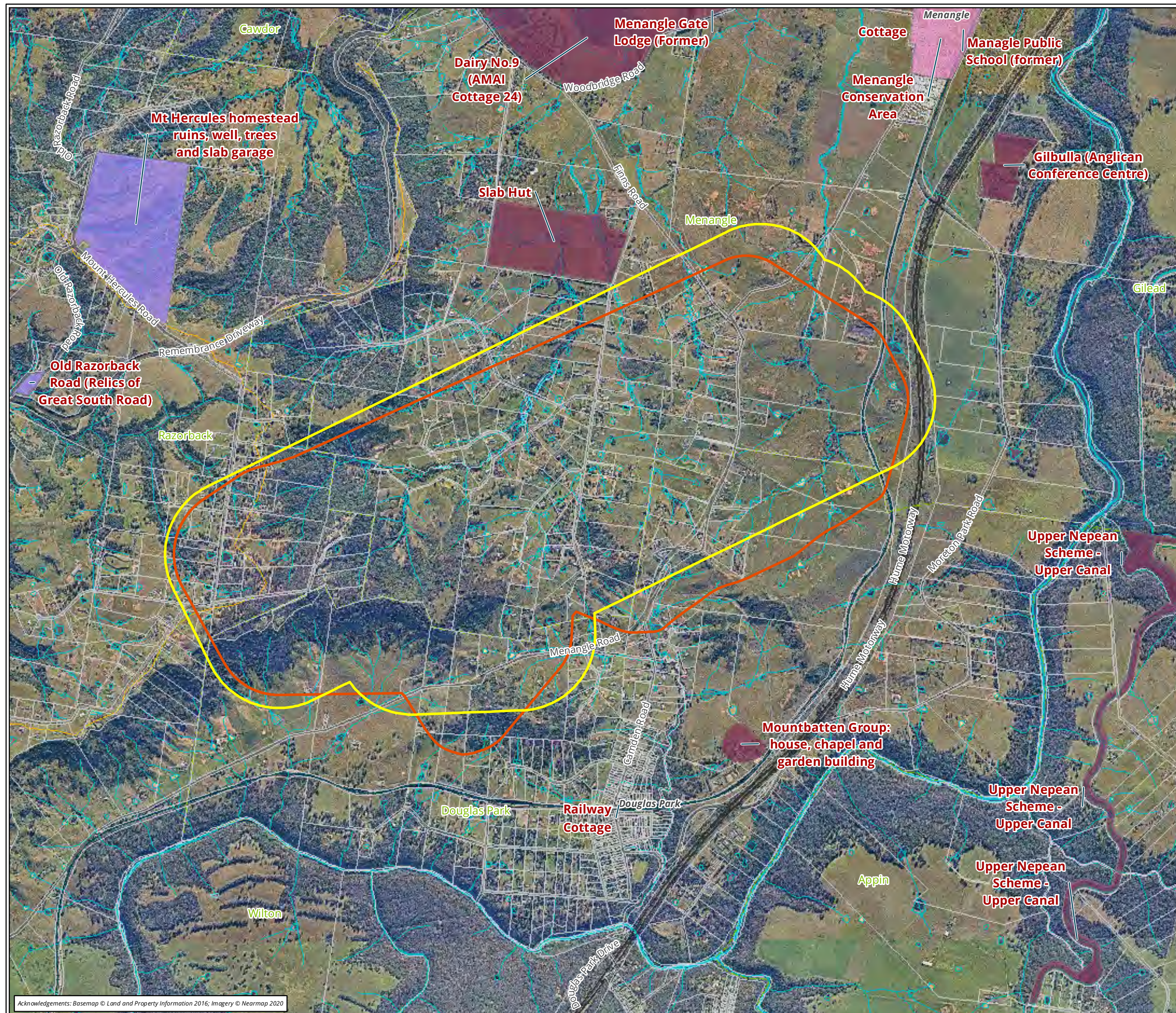
0 300 600 900 1,200 1,500
Metres

Scale: 1:35,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56



Ballarat, Brisbane, Canberra, Melbourne,
Sydney, Wangaratta & Wollongong

Matter: 33531
Date: 12 October 2021
Checked by: SJK, Generated by: Iharley
Location: P:\33500s\33531\Mapping\33531_F5_AHIMS.mxd



- Legend**
- Study area - 35 degree angle of draw
 - Study area - 600m boundary
 - Lot
 - Watercourses
- Heritage items**
- Conservation area - General
 - Item - Archaeological
 - Item - General

Figure 6 Historical items within the vicinity of the study area

0 200 400 600 800 1,000
Metres

Scale: 1:28,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56

biosis

Matter: [Matter],
Date: 12 October 2021,
Checked by: [Consultant], Drawn by: [GIS], Last edited by: [harley]
Location: P:\33500s\33531\Mapping\33531_F6_Heritage.mxd

3 Supplementary field investigation

Supplementary archaeological investigations of the study area were undertaken on 26 August 2020 by Samantha Keats, Consultant Archaeologist at Biosis, James Davis from Wodi Wodi Traditional Owners and Daniel Chalker from Cubbitch Barta Native Title Claimants Aboriginal Corporation. Surveyed properties included those where access was granted by property owners. The survey sampling strategy, methodology and a discussion of results are provided below.

3.1 Archaeological survey aims

The principle aims of the survey were to:

- Undertake a systematic survey of the study area targeting areas with the potential for Aboriginal heritage.
- Identify and record Aboriginal archaeological sites visible on the ground surface.
- Identify and record areas of Aboriginal archaeological and cultural sensitivity.
- Targeted location and inspection of known historical heritage features or sites.

3.2 Survey methods

The survey was conducted on foot. Recording during the survey followed the archaeological survey requirements of the Code and industry best practice methodology. Information recorded during the survey included:

- Aboriginal objects or sites present in the study area during the survey.
- Survey coverage.
- Any resources that may have potentially been exploited by Aboriginal people.
- Landform elements, distinguishable areas of land approximately 40m across or with a 20m radius (CSIRO 2009).
- Photographs of the site indicating landform.
- GSV and areas of exposure.
- Observable past or present disturbances to the landscape from human or animal activities.
- Aboriginal artefacts, culturally modified trees or any other Aboriginal sites.

Where possible, the identification of natural soil deposits within the study area was undertaken. Photographs and recording techniques were incorporated into the survey including representative photographs of survey units, landform, vegetation coverage, GSV and the recording of soil information for each survey unit where possible. Any potential Aboriginal objects observed during the survey were documented and photographed. The location of Aboriginal cultural heritage and points marking the boundary of the landform elements were recorded using a hand-held Global Positioning System and the Map Grid of Australia (94) coordinate system.

3.3 Constraints to the survey

There are several factors that influence the effectiveness (the likelihood of finding sites) of the archaeological survey. Factors that contributed most to the effectiveness of the survey within the study area were ground surface visibility and restricted access to some properties due to land access issues (Figure 3).

3.4 Visibility

In most archaeological reports and guidelines visibility refers to GSV, and is usually a percentage estimate of the ground surface that is visible and allowing for the detection of (usually stone) artefacts that may be present on the ground surface (DECCW 2010). GSV across the study area was typically low (20%) due to extensive grass coverage (Photo 1). Small areas of GSV were present along fence lines, along access tracks (Photo 2) and where erosion and disturbance had occurred.



Photo 1 South facing photo showing extensive grass coverage and low visibility



Photo 2 South facing photo showing visibility along access tracks

3.5 Exposure

Exposure refers to the geomorphic conditions of the local landform being surveyed, and attempts to describe the relationship between those conditions and the likelihood the prevailing conditions provide for the exposure of (buried) archaeological materials. Whilst also usually expressed as a percentage estimate, exposure is different to visibility in that it is in part a summation of geomorphic processes, rather than a simple observation of the ground surface (Burke & Smith 2004, p.79, DECCW 2010). Overall, the study area displayed areas of exposure of less than approximately 20% of the total area due to extensive grass coverage. Areas of exposure were located where erosions had occurred (Photo 3), along access tracks, at the base of mature trees (Photo 4), and around fence lines.



Photo 3 West facing photo showing exposure created by erosion



Photo 4 East facing photo showing exposure around the base of trees

3.6 Disturbances

Disturbance in the study area is associated with natural and human agents. Natural agents generally affect small areas and include the burrowing and scratching in soil by animals, such as wombats, foxes, rabbits and wallabies, and sometimes exposure from slumping or scouring. Disturbances associated with recent human action are prevalent in the study area and cover large sections of the land surface. The agents include residential development such as landscaping and construction of residential buildings (Photo 5); farming

practices, such as initial vegetation clearance for creation of paddocks, fencing and stock grazing (Photo 6); agricultural practices such as fruit orchards; and creation of artificial dams throughout the entire study area (Photo 7).



Photo 5 West facing photo showing disturbances from residential development



Photo 6 North facing photo showing disturbances from the construction of dams



Photo 7 East facing photo showing disturbances from dam construction

3.7 Results

One new Aboriginal archaeological site was recorded during the supplementary field investigation, Hawkey Road ISO1 (AHIMS 52-2-4630), which comprises an isolated stone artefact located within Lot 81 DP880173. No new non-Aboriginal heritage sites were identified during the field investigation (Figure 6).

3.7.1 Hawkey Road ISO1

The site is located on a small crest adjacent to a drainage line in the southern part of Lot 81 DP880173. The artefact consists of a silcrete distal flake fragment with a plunge termination measuring 25.21 millimetres (mm) long by 20.45 mm wide and 4.04 mm thick (Photo 8).



Photo 8 Hawkey Road ISO1

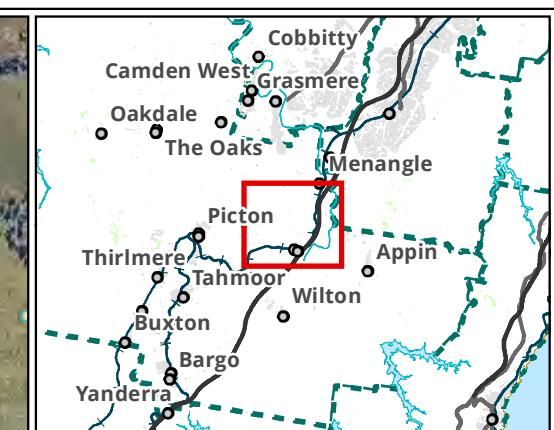
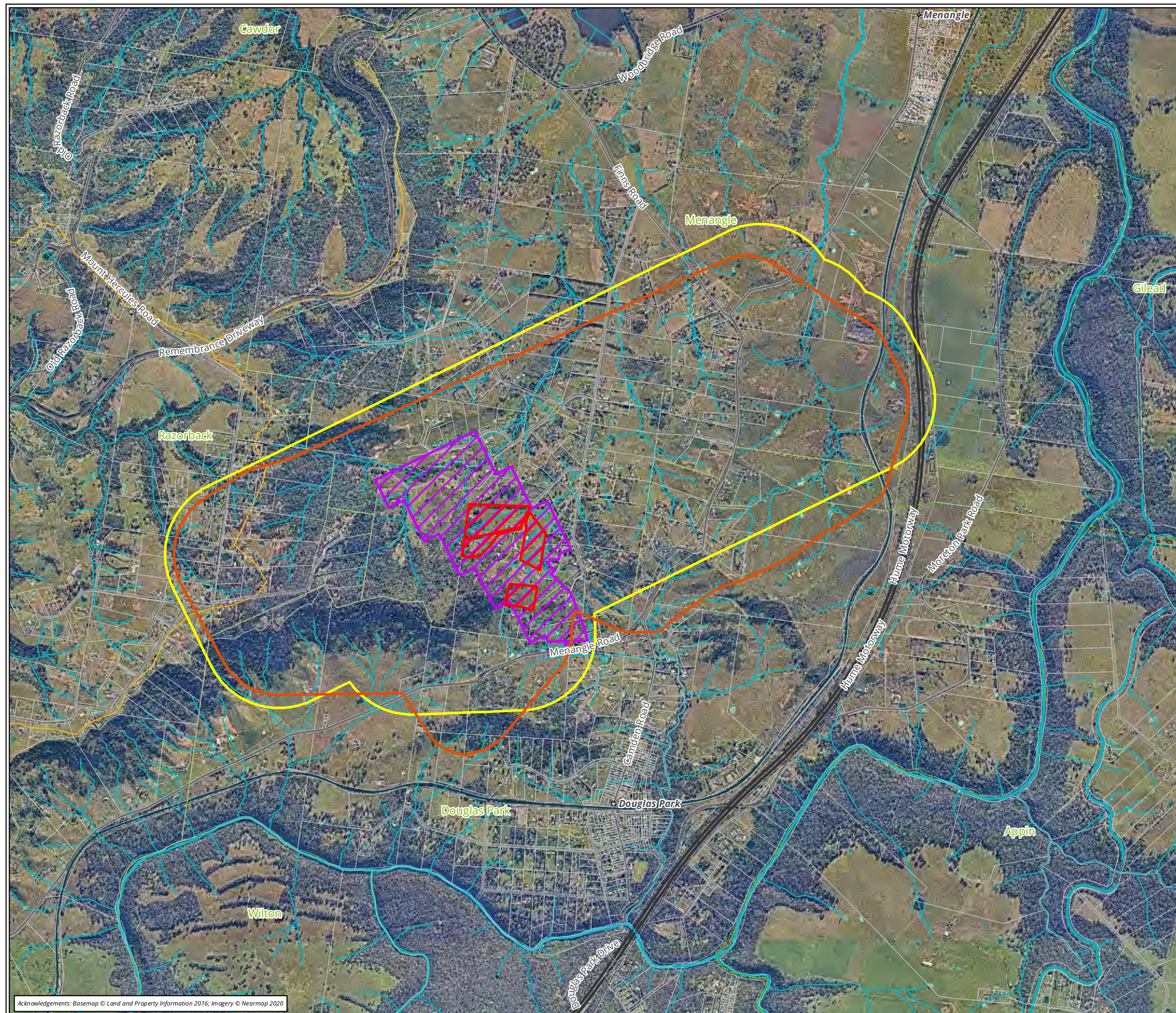
The following archaeological significance assessment is based on Requirement 11 of the Code. An assessment of significance was determined and a rating for each site was allocated. The results of the archaeological significance assessment are given in Table 3 below.

Table 2 Scientific significance assessment of archaeological sites within the study area

Site name	Site content	Site condition	Representativeness	Scientific significance
Hawkey Road ISO 1 AHIMS 52-2-4630	1	1	1	3 - Low

Table 3 Statements of scientific significance for archaeological sites within the study area

Site Name	Statement of Significance
Hawkey Road ISO 1 AHIMS 52-2-4630	Hawkey Road ISO1 was recorded as an isolated stone artefact located on a crest within Lot 81 DP880173. The artefact was a silcrete flake fragment, common in the region and was observed within an eroded part of the crest. This site type occurs frequently throughout the region and the scientific significance of this site has been assessed as low. The site has low historical and moderate aesthetic value.



Legend

- Study area - 35 degree angle of draw
- Study area - 600m boundary
- Supplementary field investigation area
- Properties assessed
- Lot
- Watercourses

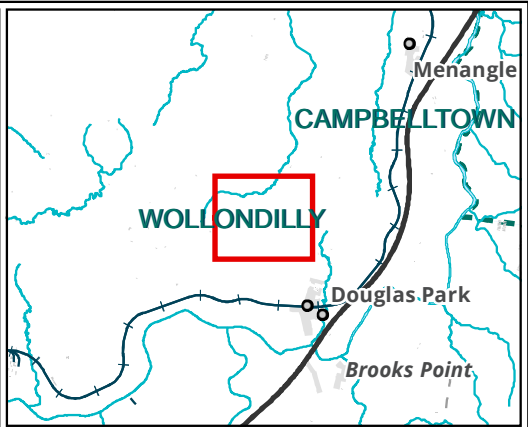
Figure 7 Properties accessed during supplementary survey

0 200 400 600 800 1,000
Metres

Scale: 1:28,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56



Matter: [Matter],
Date: 12 October 2021,
Checked by: [Consultant], Drawn by: [GIS], Last edited by: lharley
Location: P:\33500s\33531\Mapping\33531_F7_Assessed.mxd



- Legend**
- Supplementary field investigation area
 - AHIMS 52-2-4630 - Hawkey Road ISO1
 - Lot
 - Roads
 - Watercourses

Figure 8 Survey results

0 50 100 150 200 250
Metres

Scale: 1:7,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56

biosis

Matter: 33531,
Date: 12 October 2021,
Checked by: SJK, Drawn by: SSK, Last edited by: lharley
Location: P:\33500s\33531\Mapping\33531_F8_SurveyResults.mxd

4 Revised mine subsidence predictions

The BSO Aboriginal heritage and non-Aboriginal heritage assessments considered potential impacts to heritage sites using the 2009 Bulli Seam Operations Subsidence Assessment by Mine Subsidence Engineering Consultants (MSEC) (2009). An updated subsidence assessment for the study area has been prepared (MSEC 2021). The heritage items discussed in this impact assessment are Aboriginal archaeological site Hawkey Road ISO 1, identified during the supplementary survey. No non-Aboriginal heritage sites were located during the supplementary field investigation. Revised subsidence impact assessments for heritage items within or immediately adjacent to the study area can be found in the updated subsidence report by MSEC (2020).

4.1 Potential impacts from mine subsidence

During and following the extraction of coal via longwall mining methods, overlying rock strata are subject to varying degrees of subsidence, tilt and strain (MSEC 2009). At the surface, the ground subsides vertically and also moves horizontally towards the centre of the mined goaf area. These movements can cause slumping of soils or poorly consolidated landform elements such as talus slopes and cracking of rigid areas such as sandstone platforms, ledges and cliffs. These ground surface changes can potentially impact on cultural heritage sites.

Subsidence impact predictions on Aboriginal sites located within the study area are detailed in the Subsidence Assessment (MSEC 2021). There are three Aboriginal heritage sites that have been identified within the study area, being AHIMS 52-2-4226, 52-2-4227 and 52-2-4630. There are also six additional sites that are located within the 600 m boundary from the proposed mining area, being AHIMS 52-2-3191, 52-2-3192, 52-2-3194, 52-2-3687, 52-2-3688 and 52-2-4508. Table 4 below shows the revised subsidence modelling for Aboriginal sites, along with the potential impacts that may occur at the sites are also indicated.

Table 4 Maximum predicted cumulative systematic subsidence parameters and potential impacts at AHIMS sites within 600 m study area

Site	Site type	Maximum predicted cumulative systematic subsidence parameters				Type of potential impact
		Subsidence (mm)	Tilt (mm)	Tensile strain (mm/m)	Compressive strain (mm/m)	
Hawkey Road ISO 1 AHIMS 52-2-4630	Artefact	70	0.5	0.01	<0.01	Unlikely to occur, but potential impacts would likely consist of surface cracking.
DR-AS-01 AHIMS 52-2-4226	Artefact	275	3.0	0.05	0.01	Unlikely to occur, but potential impacts would likely consist of surface cracking.
DR-AS-02 AHIMS 52-2-4227	Artefact	475	5.5	0.06	0.01	Unlikely to occur, but potential impacts would likely consist of surface cracking.
WG6, Wandinong	Artefact	<20	<0.01	<0.01	<0.01	Unlikely to occur, but

Site	Site type	Maximum predicted cumulative systematic subsidence parameters				
		Subsidence (mm)	Tilt (mm)	Tensile strain (mm/m)	Compressive strain (mm/m)	Type of potential impact
AHIMS 52-2-3191						potential impacts would likely consist of surface cracking.
WG5, Wandinong AHIMS 52-2-3192	Artefact	<20	<0.01	<0.01	<0.01	Unlikely to occur, but potential impacts would likely consist of surface cracking.
Wandinong 5 AHIMS 52-2-3194	Artefact	<20	<0.01	<0.01	<0.01	Unlikely to occur, but potential impacts would likely consist of surface cracking.
Bulli Site 7 AHIMS 52-2-3687	Artefact	<20	<0.01	<0.01	<0.01	Unlikely to occur, but potential impacts would likely consist of surface cracking.
Bulli Site 8 AHIMS 52-2-3688	Artefact	<20	<0.01	<0.01	<0.01	Unlikely to occur, but potential impacts would likely consist of surface cracking.
WG8 AHIMS 52-2-4508	Artefact	<20	<0.01	<0.01	<0.01	Unlikely to occur, but potential impacts would likely consist of surface cracking.

4.2 Impact assessment for Aboriginal heritage sites

The impact assessment for Aboriginal heritage sites within the study area are presented below in Table 5 and were made using the subsidence predictions detailed in Table 4.

Table 5 Scientific significance assessment of archaeological sites within the study area

Site number	Site name	Site type	Significance	Risk of impact
AHIMS 52-2-4630	Hawkey Road ISO 1	Artefact	Low	Negligible
AHIMS 52-2-4226	DR-AS-01	Artefact	Low	Negligible
AHIMS 52-2-4227	DR-AS-02	Artefact	Low	Negligible
AHIMS 52-2-3191	WG6, Wandinong	Artefact	Low	Negligible
AHIMS 52-2-3192	WG5, Wandinong	Artefact	Low	Negligible
AHIMS 52-2-3194	Wandinong 5	Artefact	Low	Negligible
AHIMS 52-2-3687	Bulli Site 7	Artefact	Low	Negligible

Site number	Site name	Site type	Significance	Risk of impact
AHIMS 52-2-3688	Bulli Site 8	Artefact	Low	Negligible
AHIMS 52-2-4508	WG8	Artefact	Low	Negligible

Based on the information in Table 4 and Table 5, the following impact assessment has been described in terms of 'risk of impact' for Hawkey Road ISO 1, DR-AS-01, DR-AS-02 and WG6, Wandinong.

4.2.1 Hawkey Road ISO 1

This site has low predicted systematic tensile strains and an overall subsidence movement of less than 20 mm. The site is located on a small crest adjacent to a drainage line in the southern part of Lot 81 DP880173 and is an open site. Surface cracking could develop above the proposed longwalls and fracturing of exposed bedrock could also occur along streams. It is unlikely that surface artefacts will be impacted by surface cracking, which is in line with the impacts assessed in the BSO ACHA. Based on the risk assessment and minimal predicted subsidence impacts, Hawkey Road ISO 1 will not be subject to further archaeological assessment.

4.2.2 DR-AS-01

This site has low predicted systematic tensile strains and an overall subsidence movement of less than 20 mm. Two artefacts were discovered on an area of exposure on a flat landform pattern. Surface cracking could develop above the proposed longwalls and fracturing of exposed bedrock could also occur along streams. It is unlikely that surface artefacts will be impacted by surface cracking, which is in line with the impacts assessed in the BSO ACHA. Based on the risk assessment and minimal predicted subsidence impacts, DR-AS-01 will not be subject to further archaeological assessment.

4.2.3 DR-AS-02

This site has low predicted systematic tensile strains and an overall subsidence movement of less than 20 mm. Two artefacts were discovered on an area of exposure on a flat landform pattern. Surface cracking could develop above the proposed longwalls and fracturing of exposed bedrock could also occur along streams. It is unlikely that surface artefacts will be impacted by surface cracking, which is in line with the impacts assessed in the BSO ACHA. Based on the risk assessment and minimal predicted subsidence impacts, DR-AS-02 will not be subject to further archaeological assessment.

4.2.4 WG6, Wandinong

This site has low predicted systematic tensile strains and an overall subsidence movement of less than 20 mm. Six artefacts were discovered on an access track located at the base of a hillslope and had been subject to vehicle use and water runoff and was highly disturbed. The artefacts have likely been transported onto the track from further up slope due to water erosion and are not *in-situ*. Surface cracking could develop above the proposed longwalls and fracturing of exposed bedrock could also occur along streams. It is unlikely that surface artefacts will be impacted by surface cracking, which is in line with the impacts assessed in the BSO ACHA. Based on the risk assessment and minimal predicted subsidence impacts, WG6 Wandinong will not be subject to further archaeological assessment.

4.2.5 Wandinong 5

This site has low predicted systematic tensile strains and an overall subsidence movement of less than 20 mm. This site consists of an isolated find situated on a recently graded vehicle track on the "Wandinong" property. The isolated artefact consists of a flake fragment silicified tuff measuring 38 by 21 by 8 millimetres.

The artefact was located within an area of ground exposure measuring 100 by 5 metres approximately 80 metres west of a gas production well.

4.2.6 Bulli Site 7

This site has low predicted systematic tensile strains and an overall subsidence movement of less than 20 mm. This site consists of an isolated artefact. The artefact was located on an exposure adjacent to a dam in a paddock, between Foot Onslow Creek and Menangle Road. The area is highly disturbed, being located on the edge of a dam utilised by livestock in the paddock. It is unlikely that surface artefacts will be impacted by surface cracking, which is in line with the impacts assessed in the BSO ACHA. Based on the risk assessment and minimal predicted subsidence impacts, Wandinong 5 will not be subject to further archaeological assessment.

4.2.7 Bulli Site 8

This site has low predicted systematic tensile strains and an overall subsidence movement of less than 20 mm. This site consists of an isolated artefact. The artefact is located on an exposure north of Foot Onslow Road. The area is highly disturbed and is located in a paddock utilised by livestock. It is unlikely that surface artefacts will be impacted by surface cracking, which is in line with the impacts assessed in the BSO ACHA. Based on the risk assessment and minimal predicted subsidence impacts, Bulli Site 8 will not be subject to further archaeological assessment.

4.2.8 WG8

This site has low predicted systematic tensile strains and an overall subsidence movement of less than 20 mm. This site consists of an isolated artefact. The chert angular fragment is located on the surface of a heavily disturbed gas well pad. It is unlikely that surface artefacts will be impacted by surface cracking, which is in line with the impacts assessed in the BSO ACHA. Based on the risk assessment and minimal predicted subsidence impacts, WG8 will not be subject to further archaeological assessment.

4.3 Unidentified Aboriginal heritage

While not all of the study area has been surveyed due to land access restrictions, rock shelter and other sandstone shelter sites susceptible to mine subsidence impacts are likely to be only present within landforms where Hawkesbury Sandstone is present. MSEC (2020, p.87) subsidence predictions for Hawkesbury Sandstone cliffs and rock outcrop areas are extremely low and the risk of impact to unidentified Aboriginal heritage in these areas is considered to be negligible. However, if impacts occur to cliff lines along sections of the Picton soil landscape in the south-west part of the study area, additional requests to access the properties should be made and if granted, the areas surveyed for Aboriginal heritage.

5 Recommended management and mitigation measures

The following management options and mitigation measures for cultural heritage sites that may be impacted due to mining subsidence have been made to inform the Heritage Management Plan. The heritage performance measures and indicators, Trigger Action Response Plan (TARP), is presented as Table 6 for sites within the EP study area.

5.1 Aboriginal heritage

Nine Aboriginal sites have been identified within the 600 metre study area, and is considered to have a negligible risk of impact resulting from the extraction of the proposed longwalls. No further assessment is recommended for this site; however, stakeholders must be informed of one new heritage item (Hawkey Road ISO 1) in accordance with the Appin Mine Heritage Management Plan (South32 Illawarra Metallurgical Coal 2020). At the completion of the EP, stakeholders will be provided with an updated site card for Hawkey Road ISO1 for their records.

While not all of the study area has been surveyed due to land access restrictions, rock shelter and other sandstone shelter sites susceptible to mine subsidence impacts are likely to be only present within landform where Hawkesbury Sandstone is present, which is not present within the study area.

5.2 Historic heritage

No non-Aboriginal heritage sites were located during the supplementary field investigation; therefore, management options and mitigation measures are not applicable.

Table 6 Performance measures and indicators – Trigger Action Response Plan (TARP)

During and post mining	Trigger	Action	Response
Aboriginal heritage	<i>Subsidence impacts</i> <ul style="list-style-type: none"> Change in shelter and sandstone cliff line conditions not attributable to natural weathering or preservation – severe cracking of rock platforms or cliff lines, block falls of overhangs or overhang collapse. 	<ul style="list-style-type: none"> Continue monitoring program. Condition assessment and photographic record. Notify relevant specialists. Notify key stakeholders. 	<ul style="list-style-type: none"> Initiate monitoring program and management measures in line with the level of impacts observed.
	<i>Negligible</i> <ul style="list-style-type: none"> Change in shelter conditions not attributable to natural weathering or preservation that do not alter the heritage values of the place – mineral growth or micro-organism growth. Changes external to shelter that effect the sites context – ground cracking, boulder slumping, rock and/or tree falls. 	<ul style="list-style-type: none"> Continue with monitoring program if safe to do so. Condition assessment and photographic record. Notify relevant specialists. Notify registered Aboriginal parties. 	<ul style="list-style-type: none"> Continue with proposed monitoring program. Condition assessment recorded.
	<i>Major</i> <ul style="list-style-type: none"> Change in shelter conditions not attributable to natural weathering or preservation – change in drip line or seepage, cracking or exfoliation of overhang or shelter, movement or opening of existing planes and joints. 	<ul style="list-style-type: none"> Review monitoring program and modify if necessary. Report to key stakeholders as required. Condition assessment and photographic record. Consider development of site management plan to mitigate effects. Continue with monitoring program (as reviewed) if safe to do so. Notify relevant specialists. Notify registered Aboriginal parties. 	<ul style="list-style-type: none"> Continue with proposed monitoring program. Condition assessment recorded.
	<i>Severe</i>	<ul style="list-style-type: none"> Review monitoring program and modify if necessary. 	<ul style="list-style-type: none"> Continue with proposed monitoring program.

During and post mining	Trigger	Action	Response
	<ul style="list-style-type: none"> Change in shelter conditions not attributable to natural weathering or preservation – cracking or exfoliation of art panel, movement of existing planes and joints at panel, block fall within shelter or overhang, shelter or overhang collapse. 	<ul style="list-style-type: none"> Report to key stakeholders Site visit and discussions with Heritage NSW. Condition assessment and photographic record. Develop site management plan to mitigate effects. Continue with monitoring program (as reviewed) if safe to do so. Notify relevant specialists. Notify registered Aboriginal parties. 	<ul style="list-style-type: none"> Condition assessment recorded.
Non-Aboriginal heritage	<p>Negligible</p> <ul style="list-style-type: none"> Cracks or warping of external exterior cladding. Cracks or movement < 5 mm in width in any external or internal wall claddings, linings, or finish. Isolated cracked, loose, or drummy floor or wall tiles. 	<ul style="list-style-type: none"> Inform Mine Subsidence Board (MSB) of impacts. Notify relevant specialists. Monitor the minor affects to observe any further changes. Implement repairs by filling, patching or painting without the removal or replacement of any external weatherboards, claddings or linings. 	<ul style="list-style-type: none"> Continue monitoring in consultation with property owners.
	<p>Major</p> <ul style="list-style-type: none"> Continuous cracking or warping of exterior cladding. Slippage along the damp proof course of 5 to 15 mm anywhere in the total external façade. Loss of bearing to isolated walls, piers, columns, or other load-bearing elements. Loss of stability of isolated structural elements. 	<ul style="list-style-type: none"> Inform MSB of impacts. Notify relevant specialists. Monitor to observe any further changes. Implement repairs by removal or replacement of proportions of the building, for example weatherboards, or secure the stability of structural elements. 	<ul style="list-style-type: none"> Continue monitoring in consultation with property owners.

During and post mining	Trigger	Action	Response
	Severe <ul style="list-style-type: none"> Slippage along the damp proof course of 15 mm or greater anywhere in the total external façade. Loss of stability of several structural elements. 	<ul style="list-style-type: none"> Inform MSB of impacts. Notify relevant specialists. Monitor to observe any further changes. Implement repairs and replacement. 	<ul style="list-style-type: none"> Continue monitoring in consultation with property owners.

6 Aboriginal heritage contingency plans

To evaluate the potential for Aboriginal cultural heritage sites to be impacted by the proposed mining, predictive modelling, field survey of accessible areas and predicted impacts from the mining were modelled. However, even with extensive assessments the possibility exists that previously unknown Aboriginal sites may be identified in the study area during longwall mining. All Aboriginal places and objects are protected under the NSW NPW Act. This protection extends to Aboriginal objects and places that have not been identified.

In the event that new Aboriginal sites are identified, the following contingency plans have been provided to guide appropriate management actions. Aboriginal communities who have registered an interest in consultation during the BSO Aboriginal heritage assessment should be consulted regarding appropriate management methodologies.

Discovery of unanticipated Aboriginal objects

All Aboriginal objects and Places are protected under the NSW NPW Act. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the Heritage NSW. Should any Aboriginal objects be encountered during works associated with this project, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object the archaeologist will provide further recommendations. These may include notifying Heritage NSW and Aboriginal stakeholders.

Discovery of Aboriginal Ancestral Remains

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and Heritage NSW Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by Heritage NSW.

Baseline recording and monitoring methods for Aboriginal shelter sites

If unanticipated Aboriginal cultural material is identified in the study area as part of the extraction of longwalls 709, 710A, 710B, 711 and 905, then appropriate management actions should be undertaken in consultation with Heritage NSW and registered Aboriginal parties. This consultation should be informed by an archaeological study and if appropriate a subsidence impact assessment. Depending on the results of the subsidence impact assessment, management recommendations for Aboriginal shelter sites may include a subsidence monitoring program. Subsidence monitoring programs should include baseline recording of Aboriginal sites and an ongoing monitoring process.

Ongoing aboriginal stakeholder involvement

Recording of new sites

Should previously unknown Aboriginal archaeological cultural heritage sites be identified the registered Aboriginal parties (if not present at the site visit) will be notified. The notification will be made via letter or e-mail.

Baseline recording and monitoring

For baseline recording and scheduled monitoring visits (if required), the registered Aboriginal parties should be notified in writing – either by letter or e-mail – three weeks prior to the scheduled work commencing. Attendance and participation in site inspections will be subject to attendees satisfying standard requirements for contractors and meeting mutually agreeable terms of involvement and payment with IMC. These requirements will be advised to the registered Aboriginal parties in the written notification described above. As a condition of involvement in the field survey program, registered Aboriginal parties are required to provide copies of current insurances including public liability and workers compensation prior to commencement of field surveys. In addition, all field participants will be required to comply with all IMC standard occupational health and safety requirements including appropriate personal protection equipment and random drug and alcohol testing.

Individual Aboriginal stakeholder behaviour and the provision of cultural knowledge and values for the BSO Cultural Heritage Assessment will be considered in determining those individuals to be included in future field work. Due to logistical and occupational health and safety requirements, IMC must limit the number of representatives from each registered stakeholder group to one or two persons on any one day. Multiple representatives however can be rotated between different site visits over time.

Review of consultation

The registered Aboriginal parties list will be subject to review. If registered Aboriginal parties are consistently unable to be contacted, or if they have requested no further involvement in the project, they will cease to be notified unless IMC is notified by the group that they wish to recommence consultation.

Any Aboriginal groups not listed as registered stakeholders who wish to be included in ongoing consultation will be included in the notification and reporting process described above. Participation in monitoring visits by non-registered groups will be determined on a case by case basis.

References

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MSEC 2009, *Bulli Seam Operations Subsidence Assessment.*

MSEC 2021, *Appin – Longwalls 709, 710A, 710B, 711 and 905: Subsidence Predictions and Impact Assessments for the Natural and Built Features due to the Extraction of the Proposed Longwalls 709, 710A, 710B, 711 and 905 at Appin Colliery.*

South32 Illawarra Metallurgical Coal 2020, *Appin Mine Heritage Management Plan.*

Appendices

Appendix 1 AHIMS search results

This Appendix is not to be made public.

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 33531 AV

Client Service ID : 521442

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-2094	Nepean River 5	AGD	56	292093	6216664	Closed site	Valid	Artefact : -	Shelter with Deposit	97777
	<u>Contact</u>									
52-2-2095	Nepean River 6	AGD	56	292057	6216852	Closed site	Valid	Artefact : -	Shelter with Deposit	97777
	<u>Contact</u>									
52-2-2096	Nepean River 7	AGD	56	291800	6216980	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	97777
	<u>Contact</u>									
52-2-2097	Nepean river 4	AGD	56	292101	6216532	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	97777
	<u>Contact</u>									
52-2-2098	Nepean River 3	AGD	56	292084	6216493	Closed site	Valid	Artefact : -	Shelter with Deposit	97777
	<u>Contact</u>									
52-2-2052	Nepean River 2;Douglas Park; same as 52-2-1922	AGD	56	291350	6215450	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	<u>Contact</u>									
52-2-0014	Douglas Park; Art	GDA	56	289412	6214746	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	102463
	<u>Contact</u>									
52-2-1921	Brooks Point 8	AGD	56	290920	6215280	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	4213,97777
	<u>Contact</u>									
52-2-1922	Nepean River 2 (Douglas Park); same as 52-2-2052	AGD	56	291350	6215450	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	4213,97777
	<u>Contact</u>									
52-2-1213	Unit e rubbish Dummpp;Didicoolum;	AGD	56	291258	6216167	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	
	<u>Contact</u>									
52-2-1214	Unit D ground axe Paddock;Didicoolum;	AGD	56	291800	6216600	Open site	Valid	Artefact : -	Open Camp Site	
	<u>Contact</u>									
52-2-2267	KP1	AGD	56	286557	6220907	Open site	Valid	Artefact : -		103104
	<u>Contact</u>									
52-2-2268	KP2	AGD	56	286318	6220554	Open site	Valid	Artefact : 4		103104
	<u>Contact</u>									

Report generated by AHIMS Web Service on 20/07/2020 for Samantha Keats for the following area at Lat, Long From : -34.1883, 150.6488 - Lat, Long To : -34.1265, 150.7467 with a Buffer of 0 meters. Additional Info : Archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 61

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 33531 AV

Client Service ID : 521442

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-3022	PAD2 Mt Taurus	AGD	56	290905	6221068	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders						Permits	1915,1992	
52-2-3023	IF1 Mt Taurus	AGD	56	289814	6221256	Open site	Valid	Artefact : 1		
	Contact	Recorders		Doctor.Julie Dibden				Permits	1915	
52-2-3224	EMAI Site 1	GDA	56	288280	6220847	Open site	Valid	Artefact : 9		
	Contact Searle	Recorders		Mr.Paul Irish				Permits		
52-2-3226	Razorback RB1 IF1	AGD	56	287199	6221089	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders		Mr.Dominic Steele				Permits		
52-2-3227	Razorback RBA Site 1	AGD	56	287284	6221124	Open site	Valid	Artefact : 2		
	Contact Searle	Recorders		Mr.Dominic Steele				Permits		
52-2-3228	Razorback RB4 IF1	AGD	56	287795	6220545	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders		Mr.Dominic Steele				Permits		
52-2-3229	Razorback RB5 IF1	AGD	56	288140	6220490	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders		Mr.Dominic Steele				Permits		
52-2-3230	Razorback RB5 Site 1	AGD	56	288185	6220339	Open site	Valid	Artefact : 9		
	Contact Searle	Recorders		Mr.Dominic Steele				Permits		
52-2-3231	Razorback RB11 IF1	AGD	56	288043	6219563	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders		Mr.Dominic Steele				Permits		
52-2-3232	Razorback RB11 IF2	AGD	56	288108	6219523	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders		Mr.Dominic Steele				Permits		
52-2-3190	WG1	GDA	56	289934	6220137	Open site	Valid	Artefact : 1		
	Contact T Russell	Recorders		Doctor.Julie Dibden,Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats				Permits	4581	
52-2-3191	WG6, Wandinong	AGD	56	290275	6219303	Open site	Valid	Artefact : 1		
	Contact T Russell	Recorders		Doctor.Julie Dibden				Permits	4581	
52-2-3192	WG5, Wandinong	GDA	56	289732	6219450	Open site	Valid	Artefact : 3		
	Contact T Russell	Recorders		Doctor.Julie Dibden,Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats				Permits	4581	
52-2-3053	WG4 Wandinong (Unavailable)	AGD	56	289500	6219414	Open site	Valid	Artefact : -		
	Contact	Recorders		Doctor.Julie Dibden				Permits	2310,4581	
52-2-3194	Wandinong 5	GDA	56	289770	6219517	Open site	Valid	Artefact : 1		
	Contact T Russell	Recorders		Doctor.Julie Dibden,Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats				Permits	4581	
52-2-3054	RB5 PAD	AGD	56	288370	6220630	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact Searle	Recorders		Mr.Dominic Steele				Permits	2330	

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 33531 AV

Client Service ID : 521442

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-3056	WG4 AFT	GDA	56	289584	6219699	Open site	Valid	Artefact : 3		
	Contact Searle	Recorders				Doctor.Julie Dibden,Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats		Permits	4581	
52-2-3578	WA01, West Appin	GDA	56	291526	6215655	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders				Heritage Concepts		Permits		
52-2-3193	Wandinong 6	GDA	56	289517	6219860	Open site	Valid	Artefact : 2		
	Contact T Russell	Recorders				Doctor.Julie Dibden,Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats		Permits	4581	
52-2-3571	Prices Road, Douglas Park PAD	AGD	56	289850	6214550	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders				Ms.Jillian Comber		Permits	2772,2779	
52-2-3671	Moreton Park Road IA-1	GDA	56	291171	6216160	Open site	Valid	Artefact : -		
	Contact	Recorders				Ms.Renee Regal		Permits		
52-2-3672	Moreton Park Road IA-2	GDA	56	291018	6216241	Open site	Valid	Artefact : -		
	Contact	Recorders				Ms.Renee Regal		Permits		
52-2-3673	Moreton Park OCS-1	GDA	56	291108	6216228	Open site	Valid	Artefact : -		
	Contact	Recorders				Ms.Renee Regal		Permits		
52-2-3674	Mountbatten 1	AGD	56	290355	6215966	Open site	Valid	Artefact : 1		
	Contact	Recorders				Mr.Christopher Lewczak		Permits		
52-2-3687	Bulli Site 7	AGD	56	290526	6219289	Open site	Valid	Artefact : 1		
	Contact	Recorders				Ms.Renee Regal		Permits		
52-2-3688	Bulli Site 8	AGD	56	290621	6219273	Open site	Valid	Artefact : 1		
	Contact	Recorders				Ms.Renee Regal		Permits		
52-2-3842	Morton Park Rd 2	AGD	56	291693	6216939	Open site	Valid	Artefact : 3		
	Contact	Recorders				Biosis Pty Ltd - Sydney		Permits		
52-2-3843	Morton Park Rd 3	AGD	56	290603	6215591	Open site	Valid	Artefact : 22		
	Contact	Recorders				Biosis Pty Ltd - Sydney		Permits		
52-2-3844	Morton Park Rd 4	AGD	56	290466	6216620	Open site	Valid	Artefact : 1		
	Contact	Recorders				Biosis Pty Ltd - Sydney		Permits		
52-2-3845	Morton Park Rd 5	AGD	56	291924	6217200	Open site	Valid	Artefact : 20		
	Contact	Recorders				Biosis Pty Ltd - Sydney		Permits		
52-2-3846	Mountbatten 2	AGD	56	290492	6216583	Open site	Valid	Artefact : 1		
	Contact	Recorders				Biosis Pty Ltd - Sydney		Permits		
52-2-3875	Mountbatten OCS-1	GDA	56	290574	6216432	Open site	Valid	Artefact : -		
	Contact	Recorders				Niche Environment and Heritage,Ms.Renee Regal		Permits		

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 33531 AV

Client Service ID : 521442

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
52-2-3830	Bradcorp 1	GDA	56	286515	6214687	Open site	Valid	Art (Pigment or Engraved) : -, Potential Archaeological Deposit (PAD) : -		103104
	Contact	Recorders	Miss.Melanie (Duplicate of #6086) Thomson,Mrs.Caryll Sefton,Biosis Pty Ltd - Sydr							Permits
52-2-3840	Brooks Point Rd 1	AGD	56	292095	6214710	Open site	Valid	Artefact : 5		
	Contact	Recorders	Biosis Pty Ltd - Sydney,M Thompson							Permits
52-2-3841	Morton Park Rd 1	AGD	56	290396	6215426	Open site	Valid	Artefact : 8		
	Contact	Recorders	Biosis Pty Ltd - Sydney							Permits
52-2-3953	Harris Creek 3	GDA	56	289564	6215508	Open site	Valid	Artefact : 1		
	Contact	Recorders	Kelleher Nightingale Consulting Pty Ltd							Permits
52-2-4226	DR-AS-01	GDA	56	286289	6217273	Open site	Valid	Artefact : -		
	Contact	Recorders	Kayandel Archaeological Services							Permits
52-2-4227	DR-AS-02	GDA	56	286378	6217278	Open site	Valid	Artefact : -		
	Contact	Recorders	Kayandel Archaeological Services							Permits
52-2-4205	SSM1	GDA	56	292189	6221321	Open site	Valid	Artefact : -		
	Contact	Recorders	Ms.Tamika Goward							Permits
52-2-4507	WG7	GDA	56	289618	6220105	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats							Permits 4581
52-2-4508	WG8	GDA	56	289908	6219521	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats							Permits 4581
52-2-4562	SSM-GG-001	GDA	56	292031	6221226	Open site	Valid	Grinding Groove : 1		
	Contact	Recorders	Kayandel Archaeological Services,Miss.Meggan Walker							Permits
52-2-4563	SSM-ST-003	GDA	56	291877	6221080	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Kayandel Archaeological Services,Miss.Meggan Walker							Permits
52-2-4565	SSM-ST-002	GDA	56	292198	6221489	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Kayandel Archaeological Services,Miss.Meggan Walker							Permits
52-2-4567	Harris Creek Scar Tree	GDA	56	289815	6215554	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Sarah McGuinness							Permits

Report generated by AHIMS Web Service on 20/07/2020 for Samantha Keats for the following area at Lat, Long From : -34.1883, 150.6488 - Lat, Long To : -34.1265, 150.7467 with a Buffer of 0 meters. Additional Info : Archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 61

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 33531 AV

Client Service ID : 521442

<u>SiteID</u>	<u>SiteName</u>	<u>Datum</u>	<u>Zone</u>	<u>Easting</u>	<u>Northing</u>	<u>Context</u>	<u>Site Status</u>	<u>SiteFeatures</u>	<u>SiteTypes</u>	<u>Reports</u>
52-2-4568	Harris Creek Scar Tree 2	GDA	56	289582	6215643	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	<u>Contact</u>	<u>Recorders</u>	Niche Environment and Heritage,Ms.Sarah McGuinness					<u>Permits</u>		
52-2-4569	Harris Creek 2	GDA	56	289582	6215331	Open site	Valid	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>	Niche Environment and Heritage,Ms.Sarah McGuinness					<u>Permits</u>		
52-2-4570	Harris Creek 4	GDA	56	289635	6215531	Open site	Valid	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>	Niche Environment and Heritage,Ms.Sarah McGuinness					<u>Permits</u>		

Report generated by AHIMS Web Service on 20/07/2020 for Samantha Keats for the following area at Lat, Long From : -34.1883, 150.6488 - Lat, Long To : -34.1265, 150.7467 with a Buffer of 0 meters. Additional Info : Archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 61

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