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Illawarra Coal



Appin Area 9

Appin Area 9 Longwalls 901 to 904 Extraction Plan
Annex F – Heritage Management Plan, 31 October 2013

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ATTACHMENT A – ABORIGINAL STAKEHOLDER CONSULTATION
ATTACHMENT B – APPIN AREA 9 LONGWALLS 901 TO 904 HERITAGE IMPACT ASSESSMENT (BIOSIS, 2012)

Review History

Revision	Description of Changes	Date	Approved
A	New Document	31 May 2011	
B	Final Document - Revised with comments from BHPBIC	22 August 2011	
C	Final – Updated with PAC Approval Conditions	18 January 2012	
C	Final – Updated with new Mine Plan	1 May 2012	
C	Final – Updated with revised Heritage Assessment	1 June 2012	
D	Final - Updated with Agency Comments	31 October 2013	

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

BHP Billiton Illawarra Coal (BHPBIC) operates the Bulli Seam Operations (BSO) (Appin and West Cliff Collieries) 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 these mining operations until 2041.

This Heritage Management Plan (HMP) supports the Longwalls 901 to 904 Extraction Plan for mining of coal from Longwalls 901 to 904 in Appin Area 9 (AA9). The relationship between this HMP and the other components of the Extraction Plan is shown in **Error! Reference source not found.** of the Extraction Plan.

1.2 SCOPE

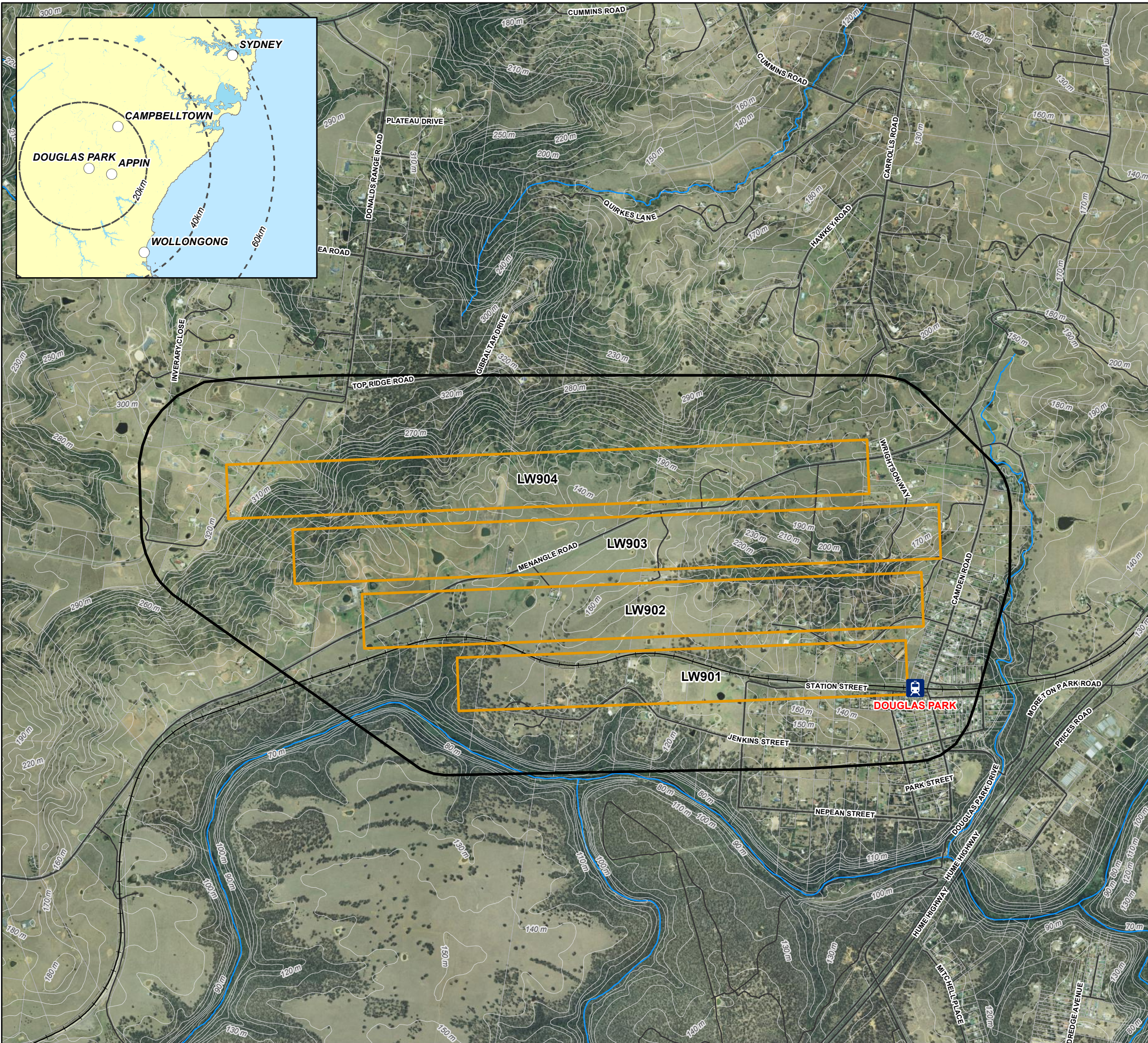
This HMP has been prepared by Cardno on behalf of BHPBIC in accordance with the BSO Approval *Condition 5 (k), Schedule 3* as follows:

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 Director-General. 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 items, 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 24 of Schedule 4.*

The Study Area for the Extraction Plan (**Figure 1**) is defined in accordance with MSEC (2012) as *the surface area predicted to be affected by the proposed mining of Longwalls 901 to 904 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 345 metres and 510 metres around the limits of the proposed extraction areas proposed for Longwalls 901 to 904, and*
- *The predicted limit of vertical subsidence, taken as the 20 mm subsidence contour, resulting from the extraction of the proposed Longwalls 901 to 904.*

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.



**Appin Area 9
(LW 901- 904)
Study Area**

- Legend**
- Railway Stations (LPI)
 - Local Roads (LPI)
 - Railway (LPI)
 - 10m Contours (LPI)
 - Watercourses (LPI)
 - Cadastre (LPI)
 - AA9 Longwall Layout
 - Longwalls 901-904 Study Area

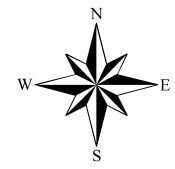
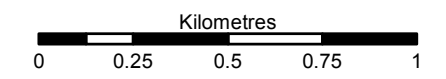


FIGURE 1

Scale 1:20,000 (at A3)



Map Produced by Cardno Wollongong
Date: 31/10/2013
Coordinate System: GDA 1994 MGA Zone 56
Project: 109012-03
Map: 1801_AppinArea9_LW_StudyArea.mxd 07
Aerial imagery supplied by BHPBIC (2009)

1.3 OBJECTIVES

The objectives of this HMP are to identify heritage items within the Longwall 901 to 904 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.

1.4 DISTRIBUTION

This HMP will be developed in consultation with the Heritage Branch of the Office of Environment and Heritage (OEH), and relevant stakeholders for both Aboriginal and European heritage. The finalised HMP will be distributed to:

- Department of Planning and Infrastructure (DP&I)
- NSW Trade and Investment - Division of Resources and Energy (DRE)
- OEH - Heritage Branch
- All registered Aboriginal stakeholders.

The finalised HMP will be distributed to the above agencies. Additionally, BHPBIC will make the HMP publicly available on the BHPBIC website (*Condition 11, Schedule 6* of the BSO approval).

2 STATUTORY REQUIREMENTS

Extraction of coal from Longwalls 901 to 904 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 (refer **Section 1.2**).

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 2.1**.

Table 2.1 – Management Plan Requirements

<i>Project Approval Condition</i>	<i>Relevant HMP Section</i>
<i>Condition 6 - Schedule 3</i>	
The Proponent shall ensure that the management plans required under <i>Condition 5(g)-(l)</i> above include:	
(a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this approval; and	Section 4
(b) a detailed description of the measures that would be implemented to remediate predicted impacts.	Section 7

Project Approval Condition	Relevant HMP Section
<p>Condition 2 - Schedule 6</p> <p>The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:</p> <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; (c) - 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; (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); (e) a contingency plan to manage any unpredicted impacts and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible; (f) a program to investigate and implement ways to improve the environmental performance of the project over time; (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 (h) a protocol for periodic review of the plan. 	<p>Section 3</p> <p>Section 2 Section 5</p> <p>Sections 5 to 8</p> <p>Section 6</p> <p>Section 8</p> <p>Section 10</p> <p>Section 9</p> <p>Section 10</p>

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:

- *National Parks and Wildlife (NPW) Act 1974: Part 6 Approvals - Aboriginal Cultural Heritage Consultation requirements for proponents (DECCW, April 2010).*
- Draft guidelines for Aboriginal Cultural Impact Assessment and Community Consultation (DECC, 2005), for assessing potential impacts on Aboriginal cultural heritage for development applications assessed under Part 3A of the EP&A Act.
- The Australia ICOMOS Burra Charter.
- Aboriginal Cultural Heritage Standards and Guidelines Kit (NPWS, 1997).
- NSW Heritage Manual (NSW Heritage Office and NSW Department of Urban Affairs and Planning [DUAP]).

2.3 RELEVANT LEASES AND LICENCES

The following leases and licences are applicable to BHPBIC operations in AA9.

- Mining Leases as per **Table 2.2**.
- Environmental Protection Licence (EPL) 2504, which applies to BSO, including Appin and West Cliff Mines. 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) 1/10/2012 to 30/09/2019 (v1).
- All relevant OH&S and HSEC approvals.
- Additional leases, licences and approvals resulting from the BSO Approval.

Table 2.2 – Appin Mine Leases, Licences and Other Reference Documents

Mining Lease - Document Number	Issue Date	Expiry Date/ Anniversary Date
CCL 767	29/10/1991	08/07/2029
CL 388	22/1/1992	21/01/2013
		Renewal Pending
ML 1382	20/12/1995	19/12/2016
ML 1433	24/7/1998	23/07/2019

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 901 to 904 Study Area:

- No Aboriginal heritage sites were detected in the Longwall 901 to 904 Study Area during the assessments undertaken for the BSO EA.
- One non-Aboriginal heritage site was detected in the Longwall 901 to 904 Study Area during the BSO EA investigations, being the Railway Cottage at 3 Camden Road, Douglas Park. The Railway Cottage is considered to be a historic site of local significance as it is the only surviving example of a residence associated with the construction of the southern rail line in Douglas Park.

Supplementary field surveys for Aboriginal heritage items were undertaken by Biosis (2012) on a number of properties along the Nepean River and on properties abutting Razorback Range 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 Bradcorp 1, consists of a rock shelter with art and is located ~475 m south of Longwall 901, on the southern side of the Nepean River. The Bradcorp 1 site has been assessed by Biosis (2012) to be of moderate scientific significance.

No additional non-Aboriginal heritage items have been identified in the revised assessment (Biosis, 2012).

The locations of the recorded heritage features within the Longwall 901 to 904 Study Area are shown in **Figure 2**.

Aboriginal and Non-Aboriginal Heritage Sites

APPIN AREA 9
LW 901-904

Legend

Aboriginal Sites (Biosis)

- PAD / Sandstone Shelter with PAD only
- Sandstone Shelter w Art/Grinding Groove/Engraving/Deposit
- Scarred Tree
- Shelter with Art
- Stone Artefact(s)

Non-Aboriginal Sites (Biosis)

- Mountbatten Group (Lot 1, DP 576136)
- Railway Cottage (Lot 1, DP 828396)
- Warragunyah (Lot 8, DP 246706)
- Railway Stations (LPI)

- Major Roads (LPI)
- Local Roads (LPI)
- Railway (LPI)
- Watercourses (LPI)
- AA9 Longwall Layout
- Longwalls 901-904 Study Area

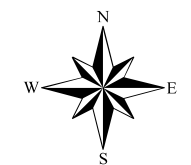
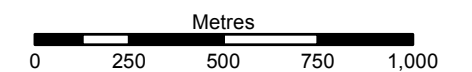


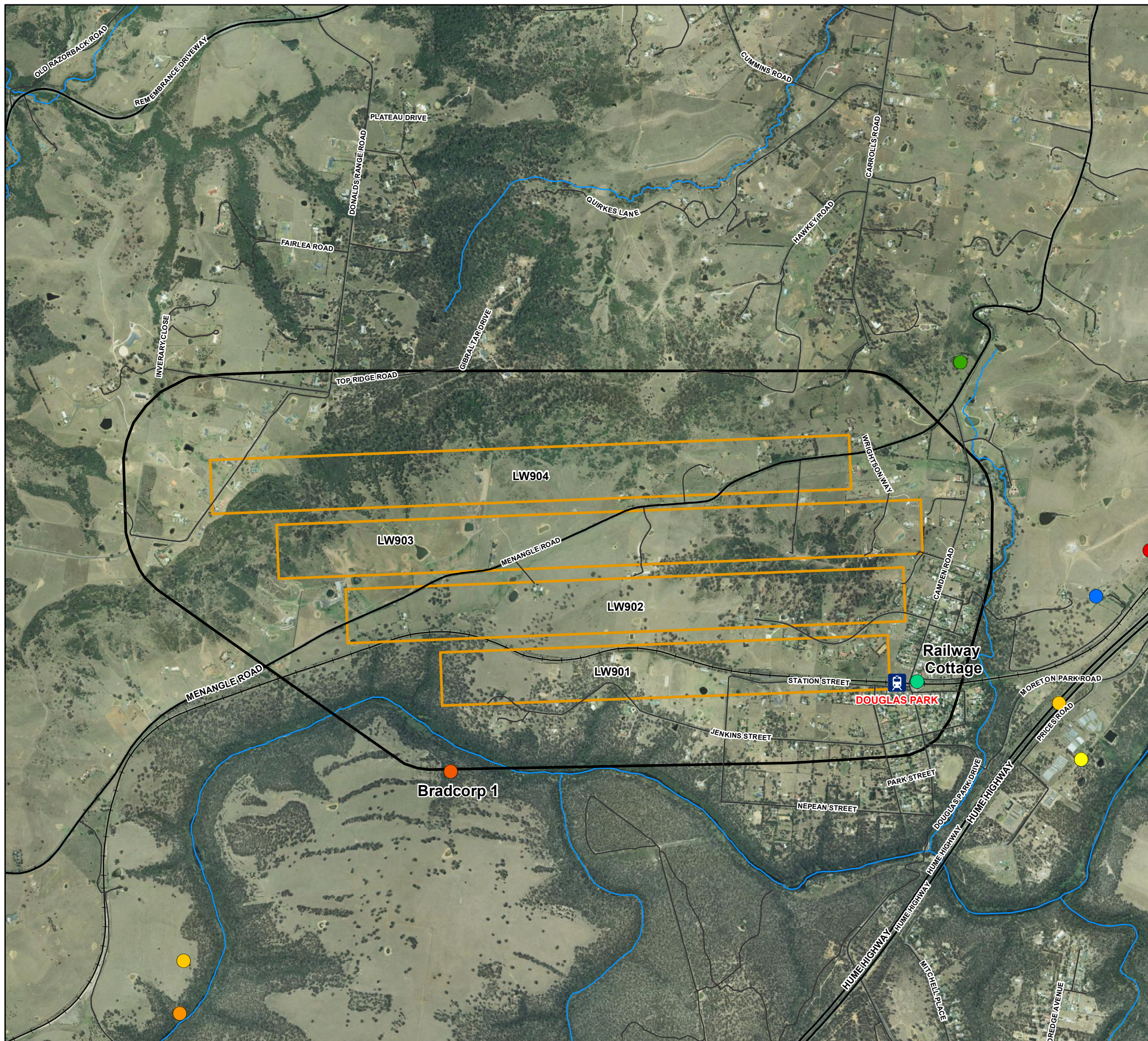
FIGURE 2

Scale 1:20,000 (at A3)



Map Produced by Cardno Wollongong
Date: 31/10/2013
Coordinate System: GDA 1994 MGA Zone 56
Project: 109012-03
Map: 1802_HeritageSites.mxd 05

Aerial imagery supplied by BHPBIC (2009)



3.1 BASELINE RECORDING

3.1.1 Aboriginal Heritage

Known Aboriginal archaeological sites within or near the Longwall 901 to 904 Study Area (i.e. Bradcorp 1) have been subject to recording at the level appropriate for registration on the *Aboriginal Heritage Information Management System (AHIMS)* at OEH (Biosis, 2012).

Based on the risk assessment and the minimal predicted subsidence impacts, Bradcorp 1 will not be subject to detailed baseline recording or a regular program of monitoring. Monitoring will be undertaken of the site based on the triggers set out in the TARP.

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

3.1.2 Historic Heritage

A detailed description of the Railway Cottage is provided in HMC (2009) and the following actions were recommended prior to mining.

- Further detailed subsidence assessment.
- Structural assessment.
- Develop Built Features Management Plan (BFMP) in consultation with the Mine Subsidence Board (MSB) and heritage specialist.
- Record, monitor and where necessary repair.

A revised assessment of the potential impacts to the Railway Cottage was undertaken by MSEC (2012) and Biosis (2012) (refer **Attachment B** for further details).

The structural assessment will be undertaken during the preparation of the Property Subsidence Management Plan (PSMP – referred to above as BFMP). This PSMP will be prepared in consultation with the property owner and the MSB prior to undermining.

It is noted that this item is of local heritage significance so the following recommendations within the BSO EA apply:

- A detailed subsidence assessment based on the final detailed design of longwall layouts. Refer (MSEC, 2012 and Biosis, 2012).
- Develop options to manage or mitigate potential impacts on the heritage values, including the implementation of engineering measures (e.g. bracing/ strengthening) on the advice of a suitably qualified Structural Engineer and Conservation Architect.
- Baseline recording of heritage items to the standard required by the Heritage Branch (according to their heritage significance), prior to undermining.
- BHPBIC will design and implement management or mitigation measures in consultation with the owner to maintain safety and serviceability of the Railway Cottage as it is an occupied item of local heritage significance.

4 PREDICTED IMPACTS

In accordance with the findings of the Southern Coalfield Inquiry:

- **Subsidence effects** are defined as the deformation of ground mass such as horizontal and vertical movement, curvature and strains.
- **Subsidence impacts** are the physical changes to the ground that are caused by subsidence effects, such as tensile and sheer cracking and buckling of strata.
- **Environmental consequences** are the environment identified, for example, as a loss of surface water flows and standing pools.

In applying these definitions to heritage items, subsidence impacts such as cracking will result in a heritage consequence if the subsidence impact damages the integrity or heritage value of the item.

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 (2012) to account for the revised Mine Plan for Longwalls 901 to 904.

Bradcorp 1 is located ~475 m south-west of the commencing (western) end of the proposed Longwall 901. The site is outside the area predicted to experience greater than 20 mm of subsidence as the result of the extraction of the proposed longwalls.

While it is possible that the site could experience subsidence slightly greater than 20 mm, it would not be expected to experience any significant conventional tilts, curvatures or strains (MSEC 2012).

4.1.2 Subsidence Impacts

Previous studies have identified the following risk factors as important determinates in the potential for sandstone shelter sites to be impacted by subsidence (Sefton 2000, Biosis 2007):

- Overhang size (particularly volume >50 m³).
- Presence of existing water seepage.
- Presence and location of joint and bedding planes.
- Topographic location in relation to valley bottom.
- Location above the goaf.
- Block-fall weathering the main shelter formation process.

The Bradcorp 1 site is situated on the western face of a moderate, continuous sandstone cliff line, on the upper valley slope in a small tributary of the Nepean River. The overhang has a volume of 232 m³ – placing it in the risk category for large sites.

Despite its large volume, the site situation, condition, distance from the longwalls and low subsidence predictions indicate that the risk of impact at this site is considered to be negligible (refer **Table 4.1**).

Table 4.1 – Predicted Subsidence Impacts to Aboriginal Heritage Features

Site Type	Significance	Risk of Impact	Subject to Baseline Recording	Subject to Monitoring
Bradcorp 1 (Shelter with Art)	Moderate	Negligible	No	If triggered*

* Monitoring of the site is triggered if impacts are observed within the Nepean River Cliff lines adjacent to the site.

Further detail regarding the methodology used to predict the risk of impact can be found in Biosis (2012) and MSEC (2012).

4.1.1 Consequences

Due to the distance from the longwalls, low subsidence predictions and the negligible risk of impacts to the site, it is predicted that there will be negligible consequences for the heritage value of the site from mining.

4.2 NON-ABORIGINAL HERITAGE

4.2.1 Subsidence Effects

The Railway Cottage is located in close proximity to Douglas Park Station and just beyond the end of Longwall 901.

The predicted subsidence effects and impacts to this feature were presented in the BSO EA (MSEC, 2009) and are presented in **Table 4.2** below.

Table 4.2 – Predicted Subsidence Effects Douglas Park Railway Cottage (MSEC, 2009)

Railway Cottage, 3 Camden Road, Douglas Park	
Structure Type	Weatherboard
Heritage Significance (HMC, 2009)	Local
Item directly over proposed longwalls or solid coal	Goaf
Location relative to longwalls	Over longwalls
Potential Maximum Predicted Subsidence (mm)	1600
Potential Maximum Predicted Tilt (mm/m)	8
Potential Maximum Predicted Radius of Hogging Curvature (km)	11
Potential Maximum Predicted Radius of Sagging Curvature (km)	7

The revised predicted subsidence at Douglas Park Station (MSEC, 2012) is presented in **Table 4.3**.

Table 4.3 – Maximum Predicted Total Conventional Subsidence Parameters after the Extraction of LW 901 to 904 (MSEC, 2012)

Site	Subsidence (mm)	Tilt (mm/m)	Tensile Strain (mm/m)	Compressive Strain (mm/m)
Douglas Park Railway Station	100	1.0	0.01	<0.01

4.2.2 Subsidence Impacts

MSEC (2009 & 2012) applied the probabilistic method of assessment to predict the potential impacts to heritage buildings.

The method takes into consideration the type of structure and amount of curvature predicted. Observations of impacts to buildings have found that weatherboard structures are less susceptible to subsidence impacts as timber buildings are able to absorb strain much better than rigid buildings (such as brick structures). It is also the case that where impacts occur, restoration of the heritage value of painted walls, particularly with flexible linings is less difficult than for masonry buildings.

Based on this assessment, sites were allocated repair categories which describe the potential subsidence impacts. These categories range from R0 to R5 (where R0 represents no repairs and R5 requires rebuilding of the structure due to extensive damage). These categories are based on relevant Australian Standards and international subsidence related building damage criteria. Refer MSEC (2012) for further detail on these definitions.

MSEC (2009) provided the probability of Railway Cottage to be classed within these categories (refer **Table 4.4**).

Table 4.4 – Predicted Subsidence Effects and Impacts at Douglas Park Railway Cottage (MSEC, 2009).

Railway Cottage, 3 Camden Road, Douglas Park	
Likelihood of No Repair or Repair Category R0	80~85%
Likelihood of Repair Category R1 or R2	10~15%
Likelihood of Repair Category R3 or R4	3~5%

MSEC (2012) undertook further assessment of this site based on the revised longwall layout, subsidence predictions and the site's fabric. MSEC (2012) determined that the potential damage to the structure at the cottage is expected to be low, with the most likely repair ranking to be *R2 (Minor Repair- where the damage affects a small proportion of external or internal claddings or linings, but does not affect the integrity of external brickwork or structural elements)*.

4.2.3 Consequences

No heritage consequences are predicted for non-Aboriginal heritage features. The PSMP for the site will manage safety and serviceability aspects for the property. Any repairs would be undertaken by the MSB with the heritage value of the site taken into account.

5 PERFORMANCE MEASURES AND INDICATORS

The BSO Approval provides Subsidence Impact Performance Measures (*Schedule 3*). **Table 5.1** 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*”.

For the purpose of measuring performance against the Aboriginal heritage subsidence impact performance criteria, sites are considered to be “affected by subsidence impacts” if they exhibit overhang collapse and/or rock fall that damages Aboriginal art that cannot be attributed to natural weathering or deterioration.

Non-Aboriginal heritage sites such as the Railway Cottage 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 5.1 – Subsidence Impact Performance Measures (BSO Approval)

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 consequences.
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 within any longwall mining area are 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 <i>Condition 6 Schedule 3</i> .
Built Features (Condition 3 Schedule 3)	
...Other built features (including houses, industrial premises, swimming pools, farm dams and other built features or improvements).	Always safe. Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repaired or fully compensated, or else the damaged built feature or damaged infrastructure component must be replaced.

Note: Not all of the above mentioned features are present in the Longwalls 901 to 904 Study Area as the subsidence impact performance measures in Schedule 3 relate to the entire BSO Area.

In order to mitigate the potential subsidence impacts and heritage consequences from the mining of Longwalls 901 to 904, monitoring and recording will be undertaken prior to mining, throughout the extraction and at the completion of subsidence (refer **Section 6**).

In the event that any subsidence impact is recorded, consideration would be given to implementing appropriate management, remediation and/or mitigation measures in consultation with OEH, landholders and other relevant stakeholders (refer **Section 7**).

If the subsidence impact performance measures are exceeded, BHPBIC will notify OEH and other stakeholders and implement the Contingency Plan (**Section 8**).

6 MONITORING AND REPORTING

6.1 MONITORING PROGRAM

6.1.1 Aboriginal Heritage Sites

A monitoring program will be implemented to monitor the impacts and consequences of subsidence effects from the extraction of Longwalls 901 to 904 on known Aboriginal heritage sites located within the Study Area.

Due to the minimal subsidence movements and negligible impacts predicted, Bradcorp 1 will not initially be subject to detailed baseline recording or a program of regular monitoring.

BHPBIC will undertake monitoring of the Nepean River sandstone cliff lines as described in the Subsidence Monitoring Program and Land Management Plan. If mining related impacts are observed on cliff lines north of Bradcorp 1 along sections of the southern banks of the Nepean River, then Bradcorp 1, with the approval of the landholder, would be accessed and assessed for impacts in accordance with the details in **Section 7**.

Any impacts will be assessed by comparing the results of the monitoring recording stages with the baseline data. Movement at and within the site will be monitored by comparing photographed monitoring points, and general observations of the surrounding landscape and whether it shows evidence of subsidence impact.

Monitoring will be implemented, as required for any additional heritage sites which are determined to be at risk of subsidence impacts detected prior to or during the extraction of Longwalls 901 to 904. The appropriate regime would be developed in consultation with a specialised heritage consultant and any relevant stakeholders. Details of recommended monitoring methods are provided in Biosis (2012).

6.1.2 Historic Heritage Sites

A monitoring program will be implemented to monitor the impacts and consequences of subsidence effects from the extraction of Longwalls 901 to 904 on known non-Aboriginal heritage sites located within the Study Area.

A subsidence monitoring program for the Railway Cottage will be developed in consultation with the owner on the basis of the pre-mining inspection and structural assessment.

With the consent of the owner, the subsidence monitoring program will include:

- Pre-mining inspection and assessment by MSB prior to mining (in consultation with the landowner).
- Observational monitoring to identify potential subsidence impacts to the fabric of the building and/or its interior.
- Assessment of heritage impacts by a suitably qualified heritage expert (if required). This assessment would be made available to the MSB and include recommendations developed in consultation with the landowner for management of heritage value during any repairs.

With the consent of the owner, baseline recording and monitoring would be undertaken at three stages during longwall extraction for Longwalls 901 and 902:

- *Baseline archival recording:*
Prior to commencement of mining.
- *Impact assessment recording:*
Following the identification of impacts
- *Final assessment recording:*
Following the completion of subsidence.

6.2 REPORTING

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

Baseline Recording of non-Aboriginal items shall be in accordance with the requirements of the OEH (Heritage Branch).

Results from the monitoring program will be reported annually in the Annual Environmental Management Report (AEMR). This report will: detail the outcomes of monitoring undertaken; provide results of visual inspections; determine whether performance indicators have been exceeded; and whether CMAs are required.

Monitoring results will be reviewed monthly by the BHPBIC Subsidence Management Committee. However, if the findings of monitoring are deemed to warrant an immediate response the Manager Approvals will initiate the requirements of the TARP (refer **Table 7.1**).

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*.

7 MANAGEMENT AND MITIGATION STRATEGIES

7.1 ABORIGINAL HERITAGE

The predicted impacts to the site are nil to negligible and no mitigation measures are currently proposed.

BHPBIC will review the need to implement management or mitigation strategies during routine monitoring (refer **Section 6**).

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, DP&I and OEH.

Possible measures include:

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

7.2 NON-ABORIGINAL HERITAGE

The Railway Cottage is located within an area that has been identified as potentially affected by subsidence. It is comprised of a standing structure that is currently being used as a residence.

The site will be subject to an assessment and monitoring regime, which will be negotiated with the property owner as part of the PSMP for the residence.

With the consent of the landowner, any impacts from the mining operations will be assessed by a structural engineer and a conservation architect heritage consultant. Any proposed conservation actions would be undertaken by the MSB and BHPBIC according to the requirements of the *Mine Subsidence Compensation Act 1961*.

Depending on the level of impact observed possible measures may include:

- Implement repairs by filling, patching or painting with or without the removal or replacement of any external or internal weatherboards, claddings or linings.
- Removal or replacement of external weatherboards, or structural elements.
- Total rebuild of built structures.

Based on the predicted subsidence impacts, it is anticipated that only the first level of repairs would be required for the Railway Cottage. However a range of options are presented in the TARP (refer **Table 7.1**).

Any proposed mitigation measures would be assessed for their potential to impact the heritage values of the property and the method used should be appropriate for the heritage value of the building. Where structural works are proposed as a mitigation measure, the advice of a conservation architect will be procured to manage any impacts to heritage values from such works.

7.3 TARPS

The AA9 Heritage Trigger Action Response Plan (TARP) is shown in **Table 7.1**.

Table 7.1 – AA9 Trigger Action Response Plan (TARP)

Monitoring	Trigger	Action
ABORIGINAL ARCHAEOLOGY		
<ul style="list-style-type: none"> Impacts to the cliff lines on the southern side of the Nepean River (directly north of the site) will trigger an inspection of Bradcorp 1 	<p>Level 1*</p> <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 e.g. mineral growth or micro-organism growth Changes external to shelter conditions that effect the sites context e.g. ground cracking, boulder slumping, rock and/or tree falls 	<ul style="list-style-type: none"> Continue with monitoring program Condition assessment and photographic record Notify relevant specialists and key stakeholders (e.g. Registered Aboriginal Parties) Summarise impacts and report in the End of Panel Report and AEMR
	<p>Level 2*</p> <ul style="list-style-type: none"> Change in shelter conditions not attributable to natural weathering or preservation e.g. 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"> <i>Actions stated for Level 1</i> Review monitoring program Review impacts against the Performance Measures Develop site management plan to mitigate effects in consultation with Registered Aboriginal Parties and the landowner
	<p>Level 3*</p> <ul style="list-style-type: none"> Change in shelter conditions not attributable to natural weathering or preservation e.g. 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"> <i>Actions stated for Level 2</i> Investigate reasons for impacts Update future predictions based on outcomes of the investigation
	<p>Exceeding Performance Measures</p> <ul style="list-style-type: none"> More than 10% of sites across the mining area are affected by subsidence impacts (other than negligible impacts or environmental consequence) 	<ul style="list-style-type: none"> <i>Actions stated for Level 3</i> Investigate reasons for the exceedance Update future predictions based on the outcomes of the investigation
EUROPEAN HERITAGE		
<ul style="list-style-type: none"> Douglas Park Railway Cottage – Item 30 from the BSO EA 	<p>Level 1*</p> <ul style="list-style-type: none"> Cracks or warping of external weatherboards, 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 No impact to heritage values of the site 	<ul style="list-style-type: none"> Continue monitoring program Condition assessment and photographic record Notify relevant specialists and key stakeholders Summarise impacts and report in the End of Panel Report and AEMR
	<p>Level 2*</p> <ul style="list-style-type: none"> Continuous cracking or warping of weatherboards, Slippage along the damp proof course of 5 to 15 mm Loss of bearing to isolated walls, piers, columns, or other load-bearing elements Loss of stability of isolated structural elements Loss of heritage value no greater than predicted in HMP 	<ul style="list-style-type: none"> <i>Actions stated for Level 1</i> Review monitoring program Review impacts against the Performance Measures Develop site management plan to mitigate effects in consultation with stakeholders, where appropriate
	<p>Level 3*</p> <ul style="list-style-type: none"> Continuous cracking or warping of weatherboards Slippage along the damp proof course of 15 mm or greater anywhere in the total external façade Re-levelling of building Loss of stability of several structural elements 	<ul style="list-style-type: none"> <i>Actions stated for Level 2</i> Investigate reason for impacts Notify DP&I and MSB as soon as practicable Seek advice on any CMA required. Consultation with stakeholders (undertake site inspection if required). Review the relevant TARP and Management Plan in consultation with key stakeholders

	<ul style="list-style-type: none"> Loss of heritage value greater than predicted in HMP 	
	<p>Exceeding Performance Measures</p> <ul style="list-style-type: none"> Loss of heritage value greater than predicted under the Heritage Management Plan 	<ul style="list-style-type: none"> Actions stated for Level 3 Investigate reasons for the exceedance Update future predictions based on the outcomes of the investigation

* These may be revised in consultation with DoPI and DPI and other key stakeholders following analysis of natural variability within the pre-mining baseline data.

8 CONTINGENCY RESPONSE PLAN

8.1 EXCEEDANCES OF PERFORMANCE MEASURES

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, BHPBIC 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 Corrective Management Action (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 AEMR.

BHPBIC 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 specific circumstances of the exceedance and assessment of environmental consequences.

If the contingency measures implemented by BHPBIC fail to remediate the impact or the Director-General determines that it is not reasonable or feasible to remediate the impact BHPBIC will provide a suitable offset to compensate for the impact to the satisfaction of the Director-General of DP&I in accordance with the BSO Approval *Condition 2, Schedule 3*.

All incidents will be reported internally through BHPBIC's Incident Procedure and related records will be maintained in accordance with the Records Management Procedure (refer **Section 10.4**).

8.2 UNEXPECTED FINDS

Where Aboriginal cultural material becomes newly identified BHPBIC will implement a contingency plan to ensure the protection of these items in accordance with the *NPW Act 1974*. 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.
- If suspected human remains are discovered notify the Coroner's Office and the NSW Police as soon as practicable.
- Notify OEH as soon as practicable.
- If human remains are discovered, notify the Aboriginal Lands Council as soon as practicable.
- Consultation with relevant stakeholders to undertake a subsidence 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 1974* and OEH guidelines.

9 INCIDENTS, COMPLAINTS, EXCEEDANCES AND NON-CONFORMANCES

9.1 INCIDENTS

BHPBIC will notify the DP&I and any other relevant agencies of any incident associated with the Appin Mine as soon as practicable after BHPBIC becomes aware of the incident. BHPBIC will provide the DP&I and any relevant agencies with a detailed report on the incident within seven days of the date of the occurrence.

9.2 COMPLAINTS HANDLING

BHPBIC will:

- Provide a readily accessible contact point through a 24 hour toll-free Community Call Line (1800 102 210). The number will be displayed prominently on BHPBIC sites in a position visible to the public as well as on publications provided to the local community.
- Respond to complaints in accordance with the BHPBIC Community Complaints and Enquiry Procedure.
- Maintain good relations and communication lines between community members and BHPBIC staff.
- Keep a register of any complaints, including the details of the complaint with information such as:
 - Time and date.
 - Person receiving the complaint.
 - Complainant's contact name and phone number.
 - Description of the complaint.
 - Work area where complaint relates to.
 - Details of any verbal response.
 - Details of any written response where appropriate.

9.3 NON-CONFORMANCE PROTOCOL

The requirement to comply with all approvals, plans and procedures is the responsibility of all personnel (staff and contractors) employed on or in association with the BSO. Regular inspections, internal audits and initiation of any remediation/rectification work will be undertaken by the Manager Approvals.

Non-conformities, corrective actions and preventative actions are managed in accordance with the BHPBIC *Non-Conformance, Preventative and Corrective Action Procedure (IHP0107)*. This procedure details the processes to be utilised with respect to the identification of non-conformances, the application of appropriate corrective action(s) to address non-conformances and the establishment of preventative actions to avoid non-conformances. The key elements of the process include:

- Identification of non-conformance and/or non-compliances.
- Recording of non-conformance and/or non-compliance.
- Evaluation of the non-conformance and/or non-compliance to determine specific corrective and preventative actions.
- Corrective and preventative actions to be assigned to the responsible person.
- Management review of corrective actions to ensure the status and effectiveness of the actions.

An Annual Review will be undertaken to assess BHPBIC's compliance with all conditions of the BSO Approval, mining leases and all other approvals and licences.

An independent environmental audit will also be undertaken (*Condition 9, Schedule 6*) to review the adequacy of strategies, plans or programs under these approvals and if appropriate, recommend actions to improve the environmental performance of the BSO. The independent environmental audit will be undertaken by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General of DP&I.

10 PLAN ADMINISTRATION

This HMP will be administered in accordance with the requirements of the AA9 Environmental Management System (EMS) and the BSO Approval Conditions. A summary of the administrative requirements is provided below.

10.1 ROLES AND RESPONSIBILITIES

All statutory obligations applicable to the AA9 operations 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 AA9 and the implementation of the HMP include:

Head of External Affairs

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

Manager Approvals

- Authorise the HMP and any amendments thereto.
- Delegate to an appropriately qualified person the responsibility to document any changes to the HMP, recognising the potential for those changes to affect other aspects of the HMP.
- Provide regular updates to BHPBIC 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.
- 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 Manager Approvals any findings indicating an immediate response may be warranted.
- Bring to the attention of the Manager 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 Manager Approvals and formally provide expert opinion as requested.

Person(s) Performing Inspections

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

10.2 RESOURCES REQUIRED

The Head of External Affairs provides resources sufficient to support this HMP.

Equipment will be needed for the TARP provisions of 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 BHPBIC sites are required to complete the BHPBIC training program which includes:

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

All training records are maintained by the BHPBIC Safety and Training Department (STAX database system), which can be accessed via the iPick system.

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 RECORD KEEPING AND CONTROL

Environmental Records are maintained in accordance with the BHPBIC procedure *Records Management (ICHP0108)*.

10.5 DOCUMENT CONTROL

The BHPBIC *Document Control procedure (ICHP0103)* outlines the method for control of defined 'business critical' documentation for all Illawarra Coal operations. The system has been designed in such a manner to ensure that:

- Documents are approved for adequacy by authorised personnel prior to use.
- Obsolete documents are promptly removed from circulation.

- Documents are reissued, or made available, to relevant persons in a timely fashion after changes have been made and the authorisation process is complete.

The HMP and other relevant documentation will be made available on the BHPBIC website (*Condition 11, Schedule 6*).

10.6 MANAGEMENT PLAN REVIEW

A comprehensive review of the objectives and targets associated with the BSO is undertaken on an annual basis via the BHPBIC Balanced Planning (1 year outlook) and Balanced Strategy (5 year outlook) processes. These reviews, which include involvement from the senior site management and other key site personnel, assess the performance of the mine over the previous year and develop goals and targets for the following period.

An annual review of the environmental performance of the BSO will also be undertaken in accordance with *Condition 4, Schedule 6*.

More specifically this HMP will be subject to review (and revision if necessary, to the satisfaction of the Director-General) within three months of:

- The submission of an annual review under *Condition 4, Schedule 6*.
- The submission of an incident report under *Condition 7, Schedule 6*.
- The submission of an audit report under *Condition 9, Schedule 6*.
- Any modification to the conditions of this approval.

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

11 REFERENCES

Biosis Research, 2009. *Bulli Seam Operations Aboriginal Cultural Heritage Assessment*. A report to BHPBIC.

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Sefton, C., 2000. *Overview of the Monitoring of Sandstone Overhangs for the Effects of Mining Subsidence Illawarra Coal Measures*. Report prepared for BHPBIC

Attachment 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 Wadi Coomaditchie Aboriginal Corporation.
- Wargon and Burra Aboriginal Centre Inc.
- Wodi Wodi Elders Corporation.
- Wollondilly Shire Council.
- Woronora Plateau Gundungara.
- Wulungulu Elders Council.

Aboriginal Stakeholder Involvement

Baseline Recording and Monitoring

For baseline recording and scheduled monitoring visits the Aboriginal Stakeholders will be notified in writing – either by letter, facsimile or e-mail - 3 weeks prior to the scheduled work commencing. Requirements for attendance and participation in site visits will be advised to the Aboriginal Stakeholders in the written notification.

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 BHPBIC. These requirements are described below:

Multiple Stakeholders

Prior on-site incidents have led to a precautionary approach when involving multiple stakeholders in the field on the same day. This will limit each group seeing all sites due to OH&S issues.

Stakeholder Behaviour

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 field work.

Insurance

Aboriginal stakeholders are required to provide copies of current insurances including public liability and workers compensation prior to commencement of field surveys.

OH&S

All field participants will be required to comply with all BHPBIC standard occupational health and safety requirements including appropriate personal protection equipment and random drug and alcohol testing.

Due to logistical and occupational health and safety requirements, BHPBIC 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 throughout the baseline recording program.

Recording of New Sites

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

Review of Consultation

At the conclusion of mining at each of the longwalls, the Aboriginal Stakeholder list will be subject to review. If Aboriginal Stakeholders are consistently unable to be contacted, or if they have requested no further involvement in the project, they will cease to be notified unless BHPBIC is informed 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, however this will not automatically translate into participation in monitoring visits.

**Attachment B – Appin Area 9 Longwalls 901 to 904 Heritage Impact Assessment
(Biosis, 2012)**

Appin Area 9 Longwalls 901 to 904 Heritage Impact Assessment

Final Report

January 2012



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DOCUMENT CONTROL SHEET

PROJECT	Heritage Impact Assessment for Appin Area 9, Longwalls 901 to 904. Supporting document for the Appin Area 9 Extraction Plan.
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BIOSIS PROJECT NO	11342
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REPORT FOR	BHP Billiton Illawarra Coal
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REPORT TITLE:	Appin Area 9 Longwalls 901 to 904, Heritage Impact Assessment
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AUTHOR(S):	Melanie Thomson & Asher Ford
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REVISION	PREPARED	INTERNAL REVIEW	EXTERNAL REVIEW	AMENDED
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Final Draft	Asher Ford	Nathan Garvey	Toni Stevens Gary Brassington	19 January 2012
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Final – 2	Asher Ford	Lyn O'Brien		

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- Peter Chudleigh and Toni Stevens (Cardno)
- Ashleigh Pritchard (GIS Operator Biosis Research)

ABBREVIATIONS

AHIMS	Aboriginal Heritage Information Management System
BHPBIC	BHP Billiton Illawarra Coal
DECCW	Department of Environment, Climate Change and Water NSW (formerly Department of Environment and Climate Change)
DECCW ICCR	Part 6 Approvals – Interim Community Consultation Requirements for Applicants
DoP	NSW Department of Planning
DPI	NSW Department of Primary Industries
EA	Environmental Assessment
EP& A Act NSW	Environmental Planning and Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1979
HMP	Heritage Management Plan

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1.0 INTRODUCTION

BHP Billiton Illawarra Coal (BHPBIC) commissioned Biosis Research to prepare a Heritage Impact Assessment (HIA) to inform the Heritage Management Plan (HMP) component of the Appin Area 9, Longwall 901 to 904, Extraction Plan. The purpose of this HIA is to review the heritage assessments undertaken of the Study Area to date and to outline the protocols for the baseline recording and ongoing management of Aboriginal and historical heritage items within the Longwall 901 to 904 Study Area.

1.1 Project Background

BHP Billiton Illawarra Coal (BHPBIC) owns and operates the Appin Colliery. Appin Colliery is located in the Southern Coalfield of NSW, approximately 25 kilometres west of Wollongong, in the Wollondilly Local Government Area (LGA) (Figure 1). The Appin Colliery extracts premium quality, hard coking coal used for steel production from the Bulli Seam using longwall mining techniques.

In 2009 BHPBIC sought approval under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to expand its underground coal mining operations at Appin Colliery, which comprises the extraction of coal in Areas 5, 7, 8, and 9. Collectively this area is known as the Bulli Seam Operations (BSO).

On 22nd December 2011 the Minister for Planning approved the BSO project. This approval will allow BHPBIC to continue mining operations for a further 30 years. BHPBIC is now seeking Extraction Approval for Longwalls 901 to 904 in Appin Area 9, which is located to the west of the currently active longwall mining operations in Appin Area 7.

Biosis Research (2009) completed the Aboriginal heritage assessment for the BSO Part 3A Environmental Assessment (EA). Due to the size of the project, the BSO Study Area was broken into four domains, comprising the North, East, West and South Domains. The Appin Area 9 Longwalls 901 to 904 are situated within the West Domain. During the BSO Part 3A EA no properties within the current Study Area were surveyed due to property access restrictions. The Non-Aboriginal heritage assessment for the BSO 3A EA was undertaken by Michael Pearson (2009). Known built heritage items within the Appin Area 9 precinct were assessed in detail as part of the Pearson (2009) assessment.

Subsequently, Biosis Research has been commissioned by BHPBIC to prepare a HIA to support the Extraction Plan for Appin Area 9. The Study Area for the HIA is defined as the surface area that could be potentially affected by vertical subsidence and is inclusive of sensitive structures where additional subsidence effects may occur as a result of the extraction of coal from Longwall 901 to 904 (Figure 2). This includes the 35 degree angle of draw line from the proposed extents of Longwalls 901 to 904, the predicted limit of vertical subsidence and features sensitive to far-field movements (MSEC 2012).

This HIA should be read in conjunction with these other specialist studies undertaken as part of the Longwalls 901 to 904 Extraction Plan.

1.2 Objectives

The objectives of the HIA are to:

- Review previous heritage assessments of the Study Area;
- 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 archaeological sites within the General Study Area using Sefton (2000) parameters, the Part 3A heritage assessments (Biosis Research 2010, Pearson 2010) and MSEC (2011) predictions;
- Compare predictions within this document to those contained within the BSO EA and determine the reason for any differences (if apparent);
- Detail how the performance criteria for Aboriginal and non-Aboriginal heritage features detailed in *Table 1, Schedule 3* of the BSO Approval Conditions are complied with;
- Establish the methodology for a monitoring program to detect and measure any changes at the sites due to mining subsidence; and,
- Propose management options and mitigation measures for any cultural heritage sites that may be affected due to mining subsidence.

1.3 Statutory Requirements

The HIA complies with the statutory obligations outlined below:

- The Conditions of Project Approval for the Bulli Seam Operations Project; and
- Relevant advisory documents and guidelines. These guidelines and documents include:
 - *National Parks and Wildlife Act 1974: Part 6 Approvals – Interim Community Consultation Requirements for Applicants* (DEC, 2004) [hereafter referred to as ‘DECC Part 6 Guidelines’].
 - *Draft guidelines for Aboriginal Cultural Impact Assessment and Community Consultation* (DECC, July 2005), for assessing potential impacts on Aboriginal cultural heritage for development applications assessed under Part 3A of the *Environmental Planning and Assessment Act 1979* [hereafter referred to as ‘DECC Part 3A Guidelines’].
 - The Australia ICOMOS Burra Charter [hereafter referred to as ‘the Burra Charter’].
 - *Aboriginal Cultural Heritage Standards and Guidelines Kit* (NPWS, 1997) [hereafter referred to as ‘DECC Standards and Guidelines Kit’].

- *NSW Heritage Manual* (NSW Heritage Office and NSW Department of Urban Affairs and Planning [DUAP]).

Condition 5(k) of Schedule 3 of the Project Approval requires the preparation of a HMP as a component of Extraction Plan 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 Project Approval identifies the required performance measures that must be met for Aboriginal and Non-Aboriginal heritage features.

2.0 SUPPLEMENTARY SURVEYS

Field surveys were not able to be undertaken in the Longwall 901 – 904 Study Area during the BSO Aboriginal Cultural Heritage Assessment (Biosis Research 2009) due to land access restrictions. Supplementary field surveys have subsequently been undertaken on a number of properties along the Nepean River and at properties abutting Razorback Range. Surveyed properties included those where access was granted by property owners. In general, the field surveys targeted sandstone cliff lines where Aboriginal archaeological rock art might be present. The methodology and results of the supplementary field survey is discussed below.

2.1 Supplementary Field Survey Methodology

The field survey methods have been designed to locate archaeological sites within the Study Area with reference to the following information:

- Areas of archaeological potential, known and unknown, based on the background research predictive model (regional site patterns, overlain on the physical environment of the Study Area); and,
- Previously recorded sites within the Study Area.

The survey methods involved the following approaches:

- Targeted location and inspection of known archaeological sites or heritage features; and,
- Representative survey of landforms considered to contain a greater potential for archaeological sites, such as sandstone cliff lines.

Based on previous archaeological assessment within the region, particular attention was paid to key sensitive landforms or features (creek banks and remnant vegetation) with a high likelihood for the presence of archaeological sites. This involved a survey team of two following the contours of the sandstone cliff lines. All identified areas of ground surface exposure, regardless of archaeological potential, were inspected. Old growth trees were closely examined for scarring or other culturally manufactured features or cultural markers relating to burials.

Information recorded during the survey included:

- Aboriginal sites;
- Landforms elements, distinguishable areas of land approximately 40 m across or with a 20 m radius (Speight 1998);
- Ground surface visibility (GSV) and areas of exposure;
- Observable past or present disturbances to the landscape from human or animal activities; and,
- Any resources that may have potentially have been exploited by Aboriginal people.

Distinguishing landform elements and their association with Aboriginal cultural heritage may help with the identification of site patterning, though with the awareness of the following limitations:

- The degree of GSV and amount of exposed areas can significantly bias the discovery of surface artefacts; and,
- Cultural material exposed on the surface is not necessarily representative of the potential extent of the site (either horizontally or vertically).

Information about GSV and areas of exposures help to provide a general indication of the effectiveness of the survey for identifying Aboriginal cultural heritage exposed to the surface. Observable disturbances are also considered when assessing the integrity of known or potential sites for an area.

Notable features, Landforms and Aboriginal archaeological sites within the Study Area were recorded using a GPS. A GPS ‘track’ was also recorded and stored showing all survey movements within the Study Area, effectively serving as continuous ‘survey transects’. Survey conditions and variables were recorded for the Study Area, whilst the extent of survey was determined after downloading the GPS data into a GIS. Topographic and aerial maps and a GPS were used to navigate across the Study Area and to areas of identified archaeological potential.

2.2 Supplementary Field Surveys Results

The results from the field surveys have been summarised in Table 1 below. Figure 3 shows Aboriginal sites recorded within the local region of the Study Area. Figure 5 indicates those properties accessed during supplementary field surveys within the Study Area.

Table 1: Survey Effort – divided by Landform Units

Landform - River and Creek Valleys	
Approximate area (m ²) assessed	62,540 m ²
Notable disturbances	Vegetation clearance on the margins of the landform, access by landowners to the Nepean River, native animal tracks
Disturbance level	Low – steep cliff lines and banks have restricted land use suitability
Visibility	Approximately <1% (low) overall due to vegetation cover – higher across sandstone overhang floors
Notable exposures	Around the bases of trees, floor of sandstone overhangs and cliff lines
Area of exposure	Approximately <5% overall
Effective survey coverage	8%
Aboriginal sites	BC1 (52-2-3830) - see section 5.2.1 below for further details
Archaeological Sensitivity	High – sandstone shelters with art or deposit

Photo(s)



Plate 1: Large sandstone overhangs and cliff lines along the Nepean River, facing south west



Plate 2: Top edge of the Nepean River – very steep, straight sandstone cliff lines

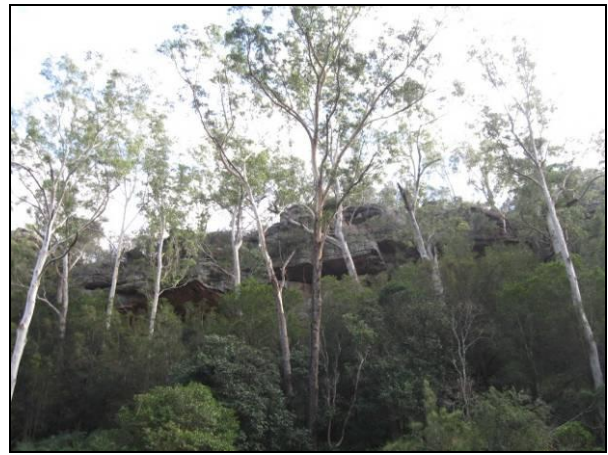


Plate 3: From bottom of river valley looking up at top cliff line, facing north



Plate 4: Moderate to steep slopes of Razorback Range, with sandstone outcrops, north west

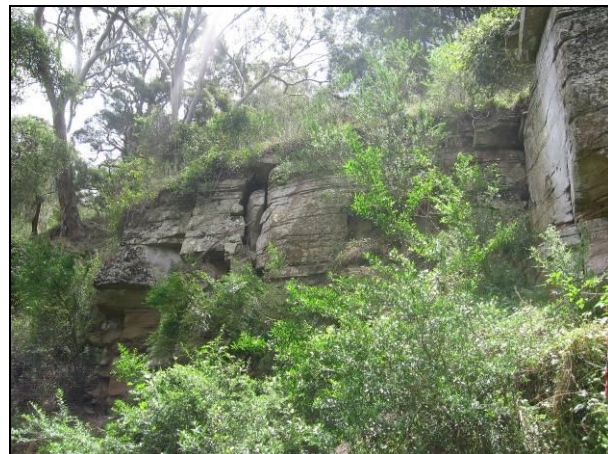


Plate 5: Soft, sharp sandstone outcrops at the top of Razorback Range that offer no overhangs due to the nature of the sandstone

Landform – Undulating plain

Approximate area (m ²) assessed	32,240 m ²
Notable disturbances	Vegetation clearance for grazing, construction of southern rail line, rural houses, Douglas Park township and main roads
Disturbance level	Moderate – clearing of vegetation for grazing and the development of rural residences
Visibility	Approximately <1% (low) overall due to vegetation cover and rural development
Notable exposures	Around farm dams and excavated spoil, on the edge of sandstone platform on the top of drainage features, fence lines, base of trees, farm vehicle tracks and other rural development disturbances
Area of exposure	Approximately <2% overall
Effective survey coverage	2%
Aboriginal sites	None
Archaeological Sensitivity	Low – open cleared farm land and rural properties

Photo(s)



Plate 6: Undulating plain between the Nepean River and Razorback Range – Spaniards Hill can be seen in the distance, facing north east



Plate 7: Ground surface visibility around the margins of farm dams, facing east



Plate 8: Exposed sandstone at the top edge of minor drainage features on the Nepean River, facing south



Plate 9: Open, cleared areas above the top of the Nepean River, facing west

2.2.1 Aboriginal Archaeological sites

One new Aboriginal archaeological site was recorded during the field surveys, Bradcorp 1 (52-2-3830), which comprises a sandstone shelter with art and is located in the bottom of a small side tributary of the Nepean River, on the southern side.

Table 2: Aboriginal Sites within close proximity to the Study Area.

Site number	Site name	Site type	Relationship to longwalls
52-2-3830	Bradcorp 1	Shelter with Art	475m south west of longwall 901, on the southern side of the Nepean River

2.2.2 Bradcorp 1 Site Description

Located outside of the Study Area, Bradcorp 1 is a previously unrecorded rock shelter with art site located 475 m from the south western end of Longwall 901 (Figure 3). The site is situated on the western side of a small drainage feature located on the southern side of the Nepean River. This is the only overhang located within this small drainage on the only prominent cliff line at the bottom of the drainage channel. The moderate sized sandstone overhang measures 23 m in length, 4.2 m in depth and 2.4 m in height (Plate 10 and 11; Plan 1)



Plate 10: Small shallow drainage feature in which shelter with art site Bradcorp 1 is situated



Plate 11: Moderate sandstone overhang Bradcorp 1 site, facing north

The site contains four art panels, three containing partial red ochre hand stencils (Plates 12-15) and one containing faded charcoal drawings (Plates 14-15). Aboriginal art was identified on four separate panels on the rear wall of the sandstone overhang. Each panel included the following art motifs:

- Panel 1: Indeterminate deteriorating red ochre (Plate 12)
- Panel 2: Partial red ochre hand stencil and other sections of deteriorated red ochre (Plate 13)
- Panel 3: Indeterminate charcoal motifs (Plate 14)
- Panel 4: Two indeterminate charcoal motifs (Plate 15)

No stone artefacts could be relocated within the drip line of the shelter. The usable floor space within the overhang provides a suitable living area that measures approximately 15 m x 3 m.

The shelter surface exhibits evidence of old and current wasps nests. Both bat and small mammal scats were identified on the floor of the shelter and the surface appeared to be slightly disturbed. Some minor exfoliation occurs in one section of the overhang. Lichen and other microflora growth are significant across the roof and back wall of the shelter, indicating that the shelter is damp. No seepage was observed within the overhang.

2.2.3 Bradcorp 1 Statement of Significance

This site comprises a low density of red ochre hand stencils and a limited number of indeterminate charcoal drawings. A small number of sites along the Nepean River and its tributaries contain red ochre hand stencils, giving the site a low-moderate regional representative value. While the overhang is quite large, the lip of the shelter is quite low, limiting the views along the tributary and the surrounding landscape. The site is therefore considered to have low aesthetic values. The overhang provides a large open living area with an archaeological deposit of moderate potential and research value.

Significance: **MODERATE**

2.3 Supplementary Field Survey Limitations

As shown in Figure 5, the supplementary field survey was not able to access all properties along the Nepean River, due to land access issues.



Plate 12: Faded and deteriorated red ochre at Panel 1

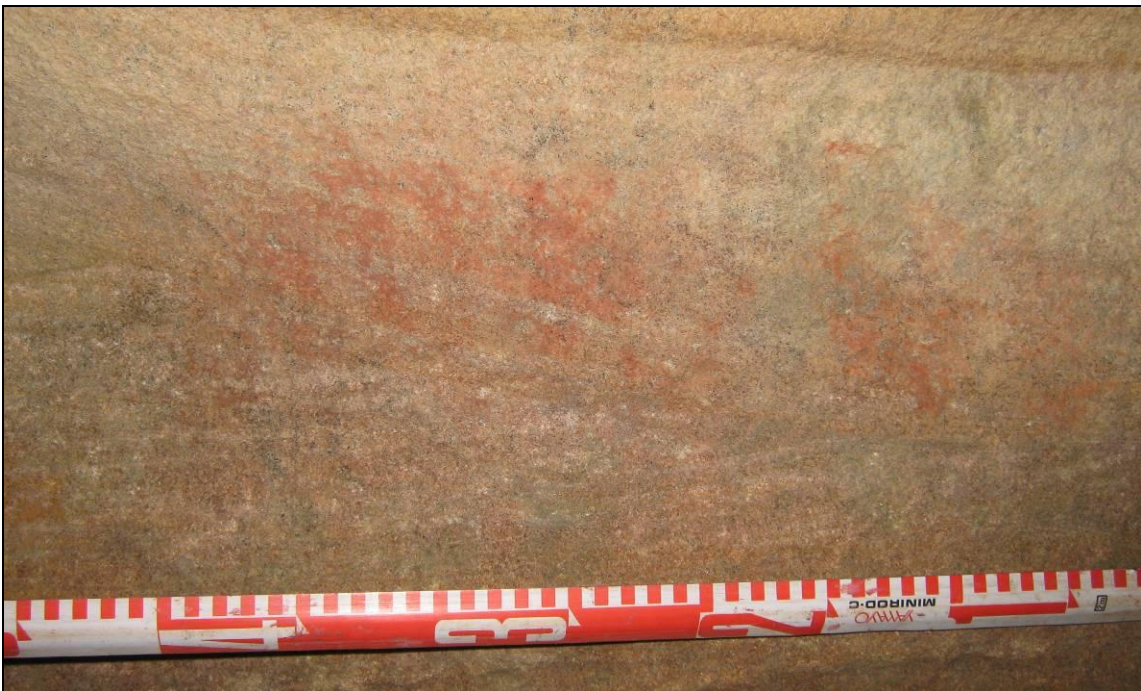


Plate 13: Faded and deteriorated red ochre hand stencils – fingers are evident on one stencil at Panel 2

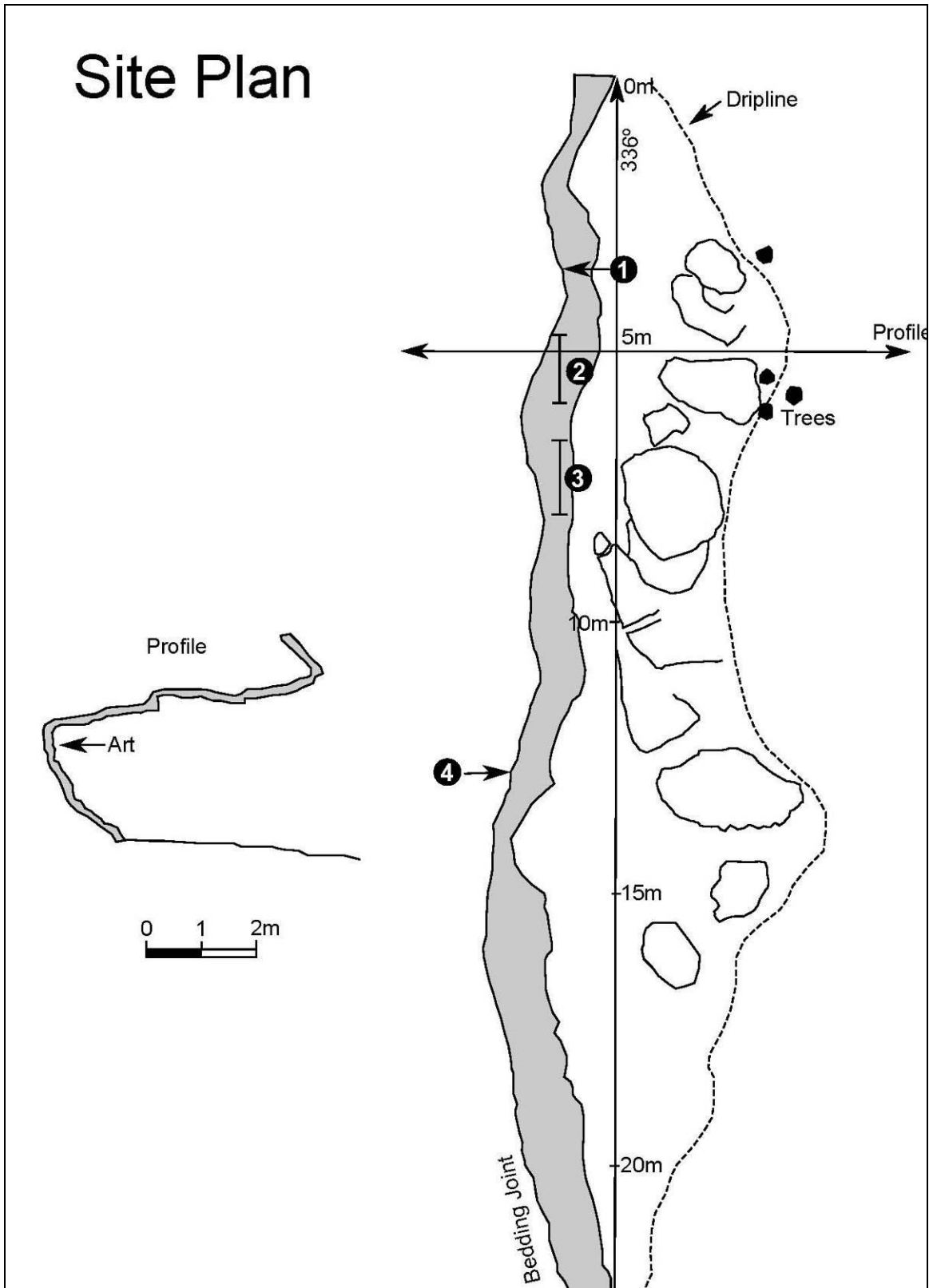


Plate 14: Poorly preserved charcoal drawings located adjacent to the red hand stencils on Panel 3



Plate 15: Two distinct indeterminate charcoal drawings located on Panel 4

Plan 1: Site Plan of Aboriginal site Bradcorp 1



3.0 REVISED MINE SUBSIDENCE PREDICTIONS FOR APPIN AREA 9 (LW 901 TO 904)

The BSO Aboriginal heritage and non-Aboriginal heritage assessments considered potential impacts to heritage sites using the 2009 *Bulli Seam Operations Subsidence Assessment* by MSEC (201). An updated subsidence assessment for the Study Area has been prepared (MSEC 2011 and 2012) and this Section provides a revised subsidence impact assessment for heritage items within or immediately adjacent to the Study Area. The heritage items discussed in this impact assessment are Aboriginal archaeological site Bradcorp 1, identified during the supplementary survey, and Railway Cottage –Item 30, identified in the 2009 BSO Non-Aboriginal heritage assessment (Pearson 2009).

3.1 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 2010). At the surface, the ground subsides vertically and also moves horizontally towards the centre of the mined goaf area (MSEC 2010). 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.

Predicted mining subsidence data were calculated for the study area by Mine Subsidence Engineering Consultants (MSEC 2009; 2010). Table 3 below shows the revised subsidence modelling for Aboriginal site Bradcorp 1 and historical site Railway Cottage – Item 30. The potential impacts that may occur at the site are also indicated.

Table 3 Maximum Predicted Cumulative Systematic Subsidence Parameters at archaeological site Bradcorp 1 and Railway Cottage – Item 30 (results provided by MSEC 2011: 152, MSEC 2012: 155); and potential impacts relating to each individual site.

Site Number	Site Name	Site Type	Maximum Predicted Cumulative Systematic Subsidence Parameters:				Type of Potential Impact
			Subsidence (mm)	Tilt (mm/m)	Tensile Strain (mm/m)	Compressive Strain (mm/m)	
52-2-3830	Bradcorp 1	Shelter with Art	<20	<0.01	<0.01	<0.01	Unlikely to occur, but potential impacts would most likely consist of isolated and minor cracking.
J69h01 SHI No: 2690714	Railway Cottage – Item 30	Weatherboard Cottage	80	1.0	0.01	<0.01	Unlikely to occur, but potential impacts would most likely consist of minor movements in the buildings fabric.

3.2 Bradcorp 1 Impact Assessment

The impact assessment for Bradcorp 1 is presented below in Table 4. This assessment was made using the parameters in Sefton's Principal Components (Table 5) and in conjunction with the subsidence predictions detailed in Table 3.

Table 4: Summary of the predicted risk of impact to Bradcorp 1

Site Number	Site Name	Site Type	Significance	Risk of Impact	Subject to Baseline Recording	Subject to Monitoring
52-2-3830	Bradcorp 1	Shelter with Art	Moderate	Negligible	No	No

Based on the information in Tables 3 and 4, the following impact assessment has been described in terms of 'risk of impact' for Bradcorp 1.

Bradcorp 1

52-2-3830

Shelter with Art

This site has low predicted systematic tensile strains, an overall subsidence movement of less than 20 mm, 475m south west of the end of Longwall 901. The site is situated on the western face of a moderate, continuous sandstone cliff line, on the upper valley slope in a small side tributary of the Nepean River. The site has a moderate volume – 232 m³ – placing it in the risk category for large sites. Despite the site having a large volume, the site situation, condition, distance from the longwalls and low subsidence predictions indicate that the risk of impact at this site is considered to be negligible. Based on the risk assessment and minimal predicted subsidence impacts, Bradcorp 1 will not be subject to a detailed baseline recording or a program of monitoring. However if impacts occur to cliff lines north of Bradcorp 1 along sections of the southern banks of the Nepean River, then Bradcorp 1 should be accessed and assessed for impacts.

Table 5 Assessment of risk of impact using Sefton's' (2000) 'Principal Components' and Biosis Research 2007 'Risk Categories' for all archaeological sites.

SITE NAME	SITE NUMBER	L (m)	W (m)	H (m)	Volume m ²	Aspect	BF / CW / SP	ART Y/N	Location	Wet / DRY	Location End LW	Location in LW	DIR	SUBS	Tensile Strain	Comp Strain	Tilt	Previously Undermined	Previously monitored
Bradcorp 1	52-2-3830	23	4.2	2.4	232m ²	E	CW	Y	UVS	D	N	O	E-W	<20	<0.01	<0.01	<0.01	No	No

Abbreviations:

- L overhang / sandstone platform length
- W overhang / sandstone platform width
- H overhang height
- Volume in m²
- Aspect direction shelter faces
- Faces aspect main apparent formation process either block fall (BF) or cavernous weather (CW) or sandstone platform (SP)
- Art Y = present
N = absent
- LOC RT = ridge top
UVS = upper valley slope
LVS = lower valley slope
VB = valley bottom (lowest cliff line)
- Wet / dry D = surfaces mainly not affected by water seepage
W = surface mainly affected by water seepage
- LOC END LW Y = located within 100m of the end of a longwall, wither inside or outside the longwall
N = not located within 100m of the end of a longwall, wither inside or outside the longwall
- LOC IN LW O = located outside the longwall and chain pillar
CP = located under the longwall and chain pillar
E = located closer to the edge of the longwall than the middle (centre)
M = located closer to the centre of the longwall than the end
- DIR LW Direction of the nearest longwall
- SUBS Maximum predicted subsidence
- Tensile Strain Maximum predicted tensile strain
- Comp. Strain Maximum compressive strain
- Tilt Maximum tilt

3.3 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 the River and Creek Valleys landform where Hawkesbury Sandstone is present (Biosis Research 2009: 32-34). MSEC subsidence predictions for Hawkesbury Sandstone cliffs and rock outcrops areas within the River and Creek Valleys landform are extremely low (MSEC 2010: 66 & 68) 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 southern banks of the Nepean River, then those sections of the River and Creek Valleys landform that have not been inspected should be accessed and surveyed for Aboriginal heritage.

3.4 Railway Cottage – Item 30 Impact Assessment

Railway Cottage - Item 30 is a typical but locally rare mid-19th century fettler's cottage located at 3 Camden Road, Douglas Park (Figure 5). Pearson (2009:92) describes the key features of the building as:

‘steeply pitched gabled roof; timber-framed balloon construction with weatherboard cladding; symmetrical fenestration; eaves overhang forming front verandah, supporting on squared timber posts; timber framed and sashed double-hung windows; single-storey; overwhelming modesty of scale and form; position in relation to railway line and road alignment.’

A summary of the impact predictions for the Railway Cottage – Item 30 is presented below and in the Tables 10 and 11 following. More detail is contained in the MSEC report (2011). Railway Cottage – Item 30 is listed on the Wollondilly LEP and State Heritage Inventory (SHI) (see Table 6).

Table 6: Historic Sites within the Study Area (taken from Pearson 2009).

Item number	Item name and address	Listing	Map Coordinates (MGA)	Summary of Heritage Significance
30	Railway Cottage 3 Camden Road, Douglas Park	<ul style="list-style-type: none"> • Wollondilly LEP 2009 • Wollondilly LEP 2011 • (SHI DB No. 2690716) 	289050 E 6215150 N	Local significance as the only surviving example of a residence associated with the construction of the southern rail line in Douglas Park.

The impact assessment for Railway Cottage - Item 30 is presented below in Table 7. This assessment was made using the subsidence impact assessment for Douglas Park Station (MSEC 2011: 93) and the subsidence predictions detailed in Table 3.

Table 7: Summary of the predicted risk of impact to Railway Cottage - Item 30

Site Number	Site Name	Site Type	Significance	Risk of Impact	Subject to Baseline Recording	Subject to Monitoring
SHI DB No. 2690716	Railway Cottage – Item 30	Weather board Cottage	Local	Low	Yes	Yes

Based on the information in Table 7, the following impact assessment has been described in terms of ‘risk of impact’ for Railway Cottage – Item 30.

Railway Cottage – Item 30, 3 Camden Road, Douglas Park (Lot 1 DP 828396)

This site will be subject to a maximum predicted overall subsidence movement of 80mm and is located 150m east of the end of Longwall 901. The site is a weatherboard cottage and therefore less susceptible to subsidence impacts as timber buildings are able to absorb strain to a greater extent than rigid buildings (such as brick structures). The sites fabric, distance from the longwalls and low subsidence predictions indicates that the risk of impact at this site is considered to be low. The site is considered overall to have low risk of impact from the proposed mining. It is recommended that the Railway Cottage – Item 30 be subject to baseline recording and a program of monitoring as part of the Property Subsidence Management Plans required for buildings in the Extraction Plan Area.

4.0 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 HMP. The heritage performance measures and indicators - Trigger Action Response Plan (TARP) is presented as Table 16.

4.1 Aboriginal Heritage

One Aboriginal site, Bradcorp 1, has been identified immediately adjacent to the Study Area, and is considered to have a negligible risk of impact resulting from the extraction of the proposed longwalls. If impacts are observed to cliff lines north of Bradcorp 1 along sections of the southern banks of the Nepean River, then Bradcorp 1 should be accessed and assessed for impacts. In the event that there are subsidence impacts noted at the Bradcorp 1 site, management strategies specific to the impact should be developed in line with the contingency plans detailed in Section 5.

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 the River and Creek Valleys landform where Hawkesbury Sandstone is present. If impacts occur to cliff lines along sections of the southern banks of the Nepean River, then those sections of the River and Creek Valleys landform that have not been inspected should be accessed and surveyed for Aboriginal heritage (Figure 5).

The proposed assessment, strategies, timing and nomination of all activities in regards to Bradcorp 1 are detailed in Table 8.

4.2 Historic Heritage

The historical heritage site Railway Cottage – Item 30 is located within an area that has been identified as potentially being affected by subsidence movements and is considered to have a low risk of impact. Monitoring of subsidence effects and impacts to Railway Cottage – Item 30 is recommended as an appropriate management measure to ensure compliance with the BSO Project Approval conditions. With appropriate approvals and consultation, any impacts from the mining operations should be assessed by a structural engineer and conservation architect / heritage consultant and the conservation actions implemented by BHPBIC. Any assessment and monitoring regime will be negotiated with the property owner as part of the Property Subsidence Management Plan for the building. The proposed assessment, strategies, timing and nomination of all activities are detailed in Sections 4.2.1 and 4.2.2; and Table 9 below.

4.2.1 Baseline Recording / Structural Report

Baseline recording the condition of Railway Cottage – Item 30 would involve recording and documentation as part of the Property Subsidence Management Plan (PSMP) undertaken by the Mine Subsidence Board (MSB), prior to undermining.

The preparations of a detailed baseline recording for heritage items have been taken from Pearson (2009) and are as follows:

- Site Identification of individual components or features of the heritage item that may be more robust and hence can tolerate greater subsidence effects (e.g. sturdy exterior walls), and conversely components or features that are at higher risk of damage due to their state of repair or construction (e.g. existing deteriorated render);
- The types of damage to the heritage fabric that can be repaired without loss of heritage values (e.g. cracks in internal painted masonry walls); and,
- Consideration of the risk of damage to individual components or features of the heritage item with the predicted subsidence effects, and whether stabilisation methods are available to readily reduce the risk of subsidence damage to that component or feature.

4.2.2 Monitoring

On the basis of the pre-mining inspection, a subsidence monitoring programme would be developed for the Railway Cottage – Item 30 in consultation with the owner. Observational monitoring should be undertaken to identify potential subsidence impacts to the fabric of the building and/or its interior as part of the PSMP.

Table 8: Management Activities, mitigation and timeframes for Aboriginal heritage.

Management Activity	To Be Completed by	In Consultation With	Timeframe	Impact = Mitigation	Outcomes	
Bradcorp 1						
Monitoring – During Extraction*	BHPBIC	Landowners	During the extraction of Longwalls 901, 902 and 903.	<p>Impact / Change Observed</p> <p>Impacts to sandstone cliff lines are observed along the southern banks of the Nepean River north of Bradcorp 1, then access to Bradcorp 1 and River and Creek Valley properties previously unsurveyed should occur (Figure 5).</p>	<p>Mitigation</p> <p>Contact qualified archaeological consultant with skills in Rock Art recording and arrange site visit of Bradcorp 1 and survey of River and Creek Valley properties previously unsurveyed .</p> <p>Inform registered Aboriginal parties and OEH in writing prior to site inspection of Bradcorp 1 and additional surveys.</p> <p>Site inspection to document and photograph any observed changes / impacts</p> <p>Discussion of potential remediation / mitigation. Consultation with OEH will be required if remediation or mitigation measures affect the archaeological values at individual sites</p> <p>Use appropriate specialists to undertake physical remediation activities</p>	<p>Where an inspection of Bradcorp 1 has been triggered, the following information relating to relevant Aboriginal archaeological sites will be recorded:</p> <ul style="list-style-type: none"> ▪ Impacts / no impacts ▪ Mitigation / Remediation undertaken ▪ Consultation ▪ Recommendations
* If triggered by impacts to the southern banks of the Nepean River, north of Bradcorp 1.						

Table 9: Management Activities, mitigation and timeframes of Baseline Recording and Monitoring Programs for Railway Cottage – Item 30.

Management Activity	To Be Completed by	In Consultation With	Timeframe	Impact = Mitigation		Outcomes
Railway Cottage – Item 30						
Baseline Recording	MSB (if agreed by the owner)	Landowner/s	Prior to the Commencement of Longwall Mining – July 2015			Completion of baseline condition recording.
Monitoring – During Extraction	Landholder (if agreed as part of the PSMP)	Landowner/s	During the extraction of Longwall 901 and 902	Impact / Change Observed If an impact or change is observed then an appropriate mitigation strategy should be developed in consultation with a built heritage specialist and the landowner.	Mitigation Implementation of the mitigation strategy in consultation with built heritage specialist. Use appropriate specialists to undertake physical remediation activities.	Where structural works are proposed as a mitigation measure, the advice of a Conservation Architect is required to manage any impacts to heritage values from such works.
Monitoring – Following Extraction	MSB (if impacts are identified)	BHP Billiton Illawarra Coal	Following the extraction of Longwall 901 and 902 as part of the End of Panel reports (3 months following mining activities)	No Impact / Change Observed	No further mitigation or management required	None
Monitoring – Long Term			Long-term site monitoring – undertaken 12 months following the extraction of Longwall 901 and 902 <u>only</u> .			

Table 10: Monitoring requirements for all Aboriginal and Heritage sites within the Study Area.

Site Number / Item Number	Site Name	Site Type	Subject to Baseline Recording	Subject to Monitoring	Monitoring to occur
52-2-3830	Bradcorp 1	Shelter with Art	No	Only if triggered	<ul style="list-style-type: none"> ▪ During extraction of Longwall 901 ▪ 3-6 months following extraction ▪ 12 month following extraction ▪ During the extraction of Longwall 902 ▪ 3-6 months following extraction ▪ 12 month following extraction
Item Number 30	Railway Cottage (Douglas Park)	Weatherboard residence	Yes – undertaken as part of the PSMP	Yes – PSMP	

Note: if changes to any sites are observed, additional monitoring at these sites will occur to measure, manage and mitigate further impact

Table 11 Performance Measures and Indicators - TRIGGER ACTION RESPONSE PLAN (TARP)

<i>During & post mining</i>	<i>Trigger</i>	<i>Action</i>	<i>Response</i>
Aboriginal Archaeology			
	<i>Subsidence impacts to Southern Nepean River Sandstone Cliff Lines</i>		
	- Change in 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"> - Gain property access to Bradcorp 1 and other River and Creek Valley properties previously unsurveyed (Figure 5) - Inspect Bradcorp 1 if safe to do so - 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>		
	- 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	<ul style="list-style-type: none"> - Continue with monitoring program if safe to do so - Condition assessment and photographic record - Notify relevant specialists 	<ul style="list-style-type: none"> - Continue with proposed monitoring program - Condition assessment recorded
	- Changes external to shelter that effect the sites context – ground cracking, boulder slumping, rock and/or tree falls	<ul style="list-style-type: none"> - Notify registered Aboriginal parties 	
	<i>Major</i>		
	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>During & post mining</i>	<i>Trigger</i>	<i>Action</i>	<i>Response</i>
	<i>Severe</i>		
	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"> - Review monitoring program and modify if necessary - Report to key stakeholders - Site visit and discussions with DPIM and resource managers - 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"> - Continue with proposed monitoring program - Condition assessment recorded

<i>During & post mining</i>	<i>Trigger</i>	<i>Action</i>	<i>Response</i>
European Heritage			
	<i>Negligible</i>		
	<ul style="list-style-type: none"> - Cracks or warping of external weatherboards, - 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 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 	Continue monitoring in consultation with property owners

<i>During & post mining</i>	<i>Trigger</i>	<i>Action</i>	<i>Response</i>
	<p><i>Major</i></p> <ul style="list-style-type: none"> - Continuous cracking or warping of weatherboards, - 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 e.g weatherboards, or secure the stability of structural elements 	<p>Continue monitoring in consultation with property owners</p>
	<p><i>Severe</i></p> <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 	<p>Continue monitoring in consultation with property owners</p>

5.0 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 National Parks and Wildlife Act 1974*. This protection extends to Aboriginal objects and places that have not been identified. As a result the NSW OEH requires an Unanticipated Discovery Plan to be developed for cultural heritage assessments.

In the event that new Aboriginal sites are identified then the following contingency plans have been provided to guide appropriate management actions. Management strategies should be implemented in accordance with current conservation practice and the conservation principles contained within the Australia International Council on Monuments and Sites (ICOMOS) *Burra Charter*, and the NSW Department of Environment and Conservation *Guidelines for Aboriginal Heritage Impact Assessment* (Draft). Aboriginal communities who have registered an interest in consultation during the BSO Aboriginal heritage assessment should be consulted regarding appropriate management methodologies.

5.1 Discovery of Unanticipated Aboriginal Cultural Material

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

- 1) Discovery: Should unanticipated Aboriginal cultural material be identified during any works, works must cease in the vicinity of the find.
- 2) Notification: OEH must be notified of the find.
- 3) Management: In consultation with OEH, registered Aboriginal parties and a qualified archaeologist, a subsidence impact assessment should be undertaken and management strategy developed to manage the identified Aboriginal cultural material. A subsidence monitoring program may be required for Aboriginal sites, using a methodology consistent with that outlined for Aboriginal shelter in Section 5.3.
- 4) Recording: The find will be recorded in accordance with the requirements of the *National Parks and Wildlife Act 1974* and OEH guidelines.

5.2 Discovery of Unanticipated Human Remains

The following contingency plan describes the actions that must be taken in instances where human remains or suspected human remains are discovered. Any such discovery at the activity area must follow these steps:

- 1) Discovery: If suspected human remains are discovered all activity in the vicinity of the human remains must stop (to ensure minimal damage is caused to the remains), and the remains must be left in place and protected from harm or damage.

- 2) Notification: Once suspected human skeletal remains have been found, the Coroners Office and the NSW Police must be notified immediately. Following this, the find must be reported to OEH and it is recommended that it is also reported to the Illawarra Local Aboriginal Land Council.
- 3) Management: If the human remains are of Aboriginal ancestral origin an appropriate management strategy will be developed in consultation with registered Aboriginal parties and OEH.
- 4) Recording: The find will be recorded in accordance with the requirements of the *National Parks and Wildlife Act 1974* and OEH guidelines.

5.3 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 Longwall 901 to 904, then appropriate management actions should be undertaken in consultation with OEH 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,

5.4 Ongoing Aboriginal Stakeholder Involvement

5.4.1 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, facsimile or e-mail.

5.4.2 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, facsimile 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 BHPBIC. 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 BHPBIC 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, BHPBIC must limit the number

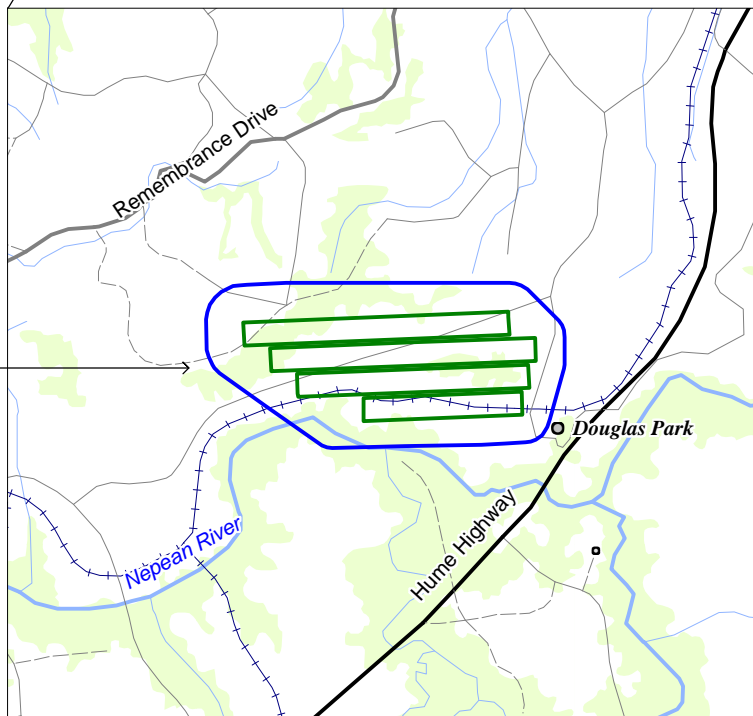
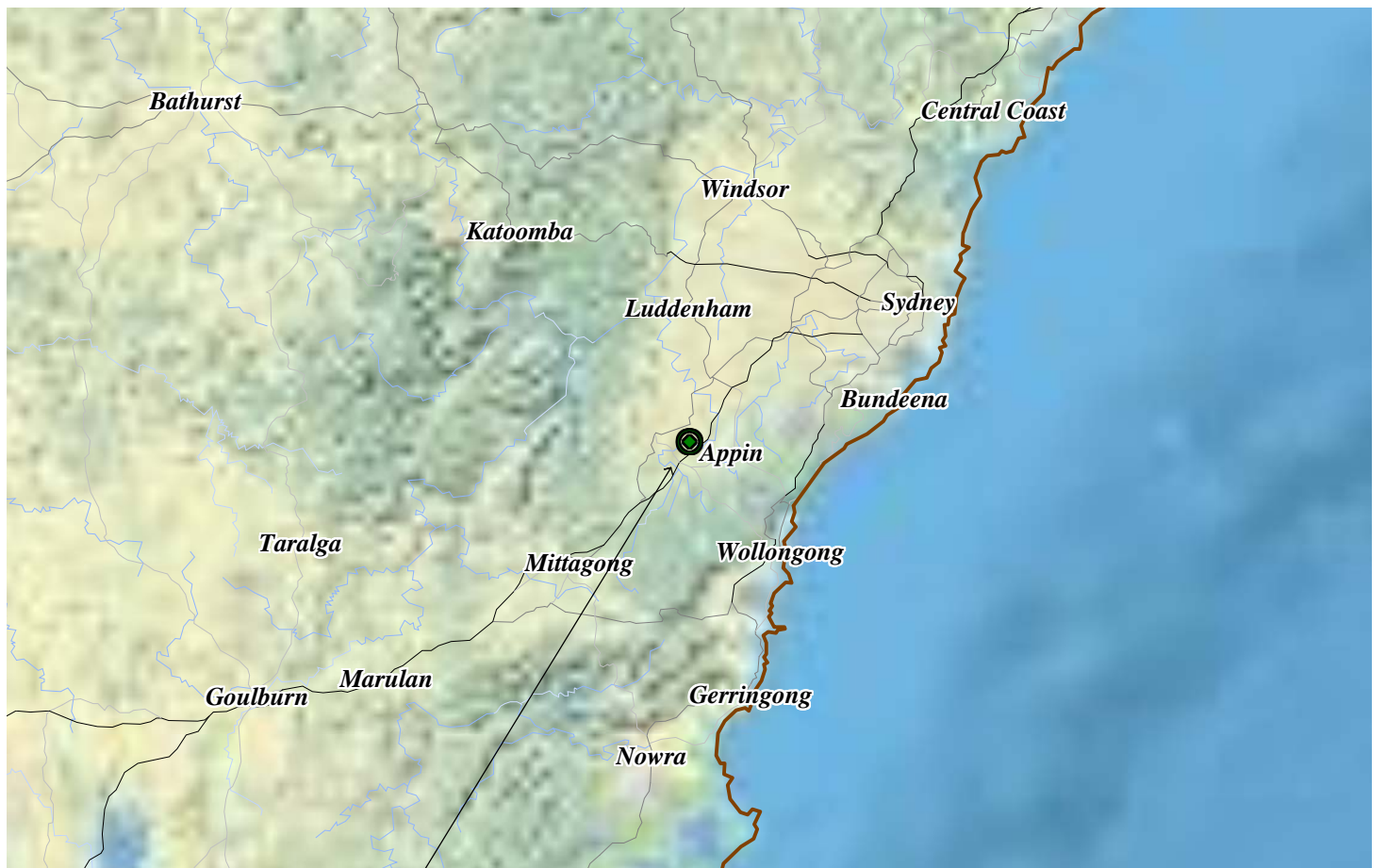
of representatives from each registered stakeholder group to one or two persons on any one day. Multiple representatives however can be rotated between different site visits over time.

5.4.3 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 BHPBIC 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.

FIGURES



General Study Area

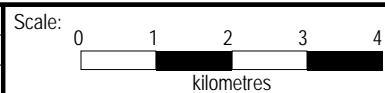
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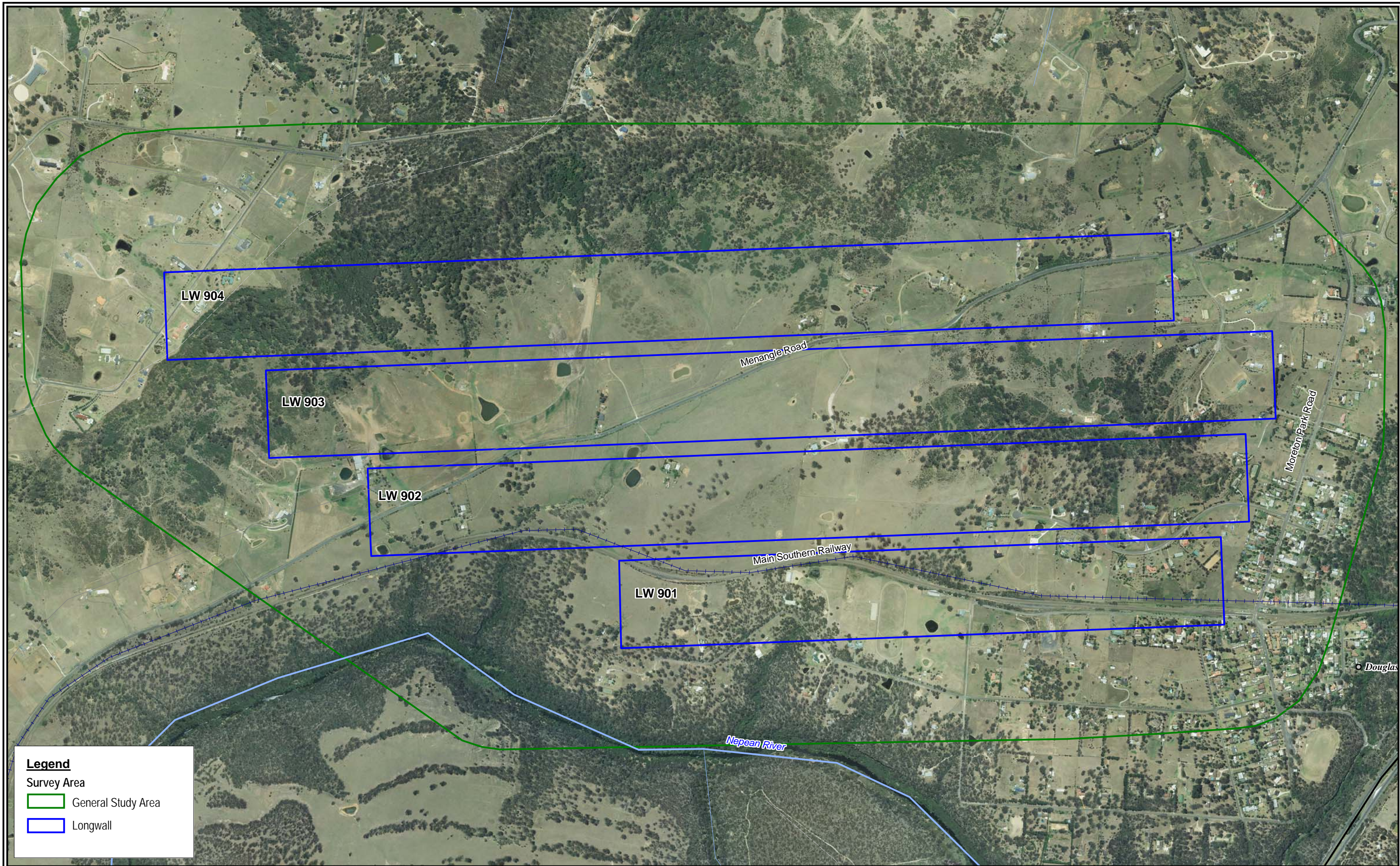


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Figure 1: Location of the General Study Area in a regional context

Date: 21 March 2011	Drawn by: ANP
File number: 11342	Checked by: MT
Location: P:\11300s\11342\Mapping\11342_F1_Locality.WOR	





Legend

Survey Area

General Study Area

Longwall



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Figure 2: Overview of the proposed Appin Area 9 layout for longwalls 901 to 904.

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File number: 11342	Checked by: MT
Location: ..P:\11300s\11342\Mapping\11342_F2 Overview.WOR	

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Scale: 1:12,000 at A3
 Map Projection: Transverse Mercator
 Horizontal Datum: Geocentric Datum of Australia 1994
 Grid: Map Grid of Australia, Zone 56




Figure 2

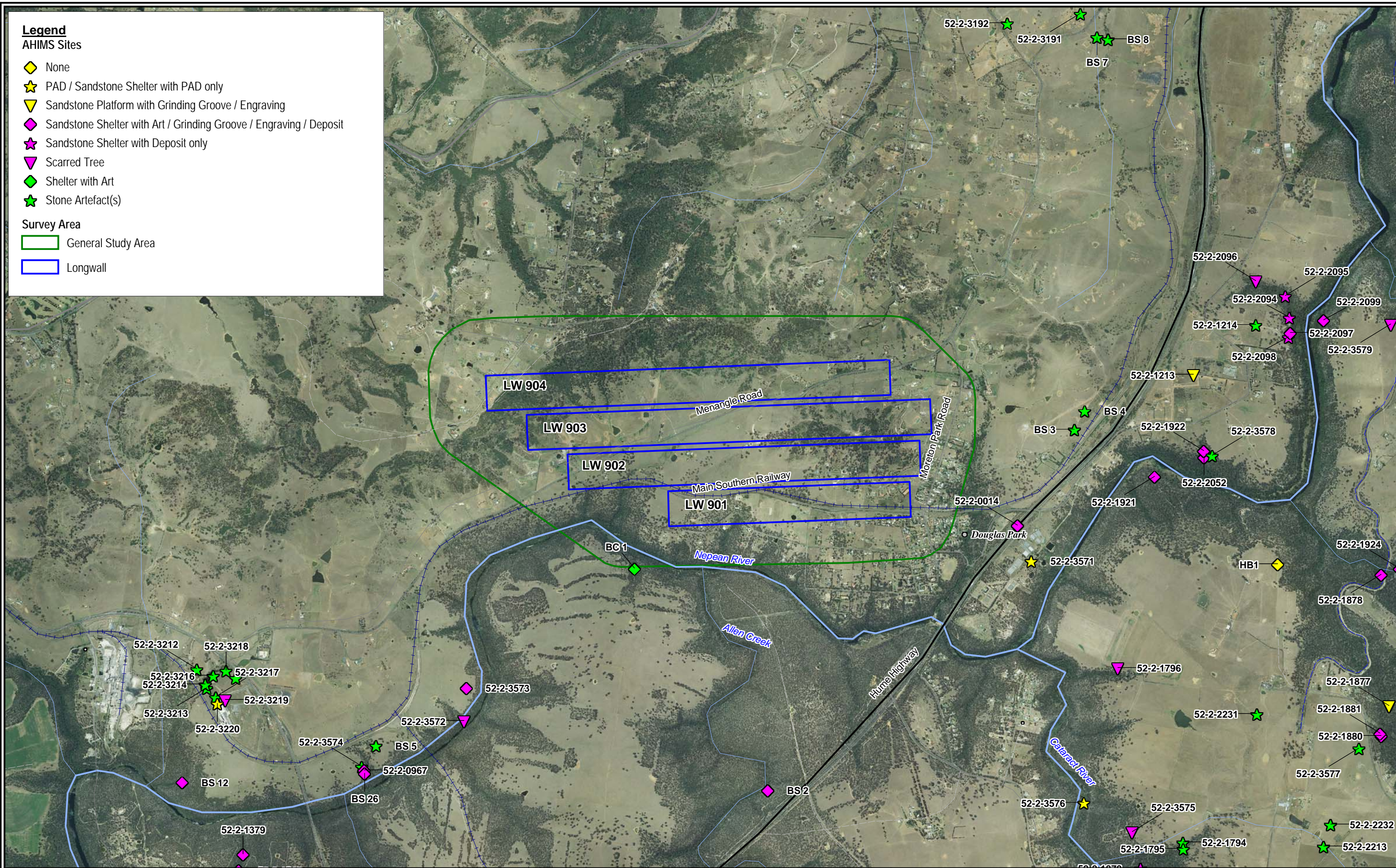
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AHIMS Sites

- ◆ None
- ★ PAD / Sandstone Shelter with PAD only
- ▼ Sandstone Platform with Grinding Groove / Engraving
- ◆ Sandstone Shelter with Art / Grinding Groove / Engraving / Deposit
- ★ Sandstone Shelter with Deposit only
- ▼ Scarred Tree
- ◆ Shelter with Art
- ★ Stone Artefact(s)

Survey Area

- General Study Area
- Longwall



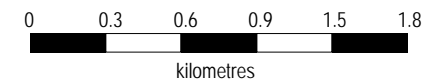
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Figure 3: Recorded Aboriginal archaeological sites registered on the DECCW AHIMS.

Date: 21 March 2011
File number: 11342
Location: ..P:\11300s\11342\Mapping\11342_F3 AHIMS.WOR

Drawn by: ANP
Checked by: MT

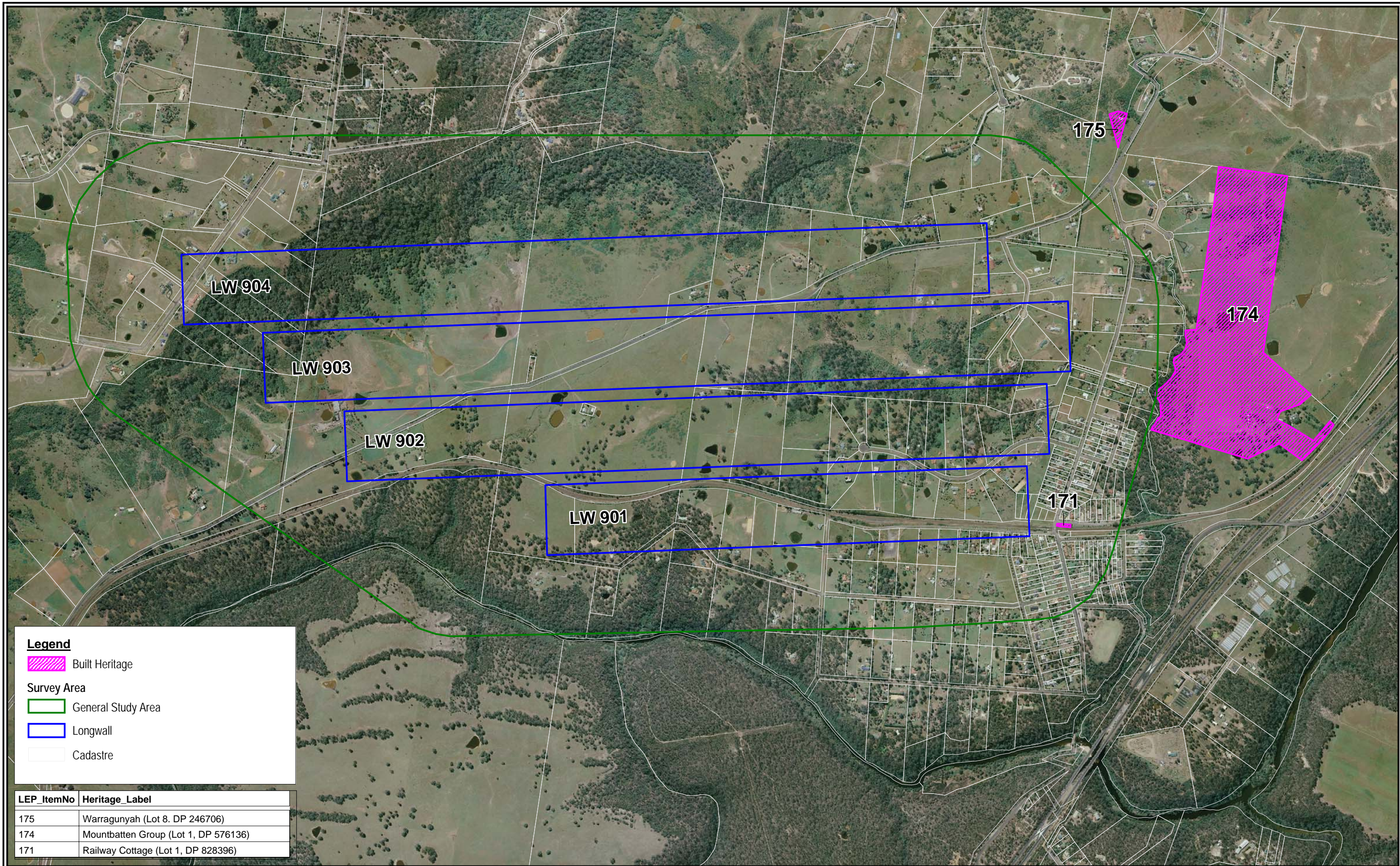
Acknowledgements:
Site data from DECCW and Biosis Research Pty Ltd
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Grid: Map Grid of Australia, Zone 56



Figure 3



Legend

- Built Heritage
- Survey Area**
- General Study Area
- Longwall
- Cadastre

LEP_ItemNo	Heritage_Label
175	Warragunyah (Lot 8, DP 246706)
174	Mountbatten Group (Lot 1, DP 576136)
171	Railway Cottage (Lot 1, DP 828396)



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Figure 4: Known historic heritage sites situated within or close to the General Study Area.

Date: 21 March 2011	Drawn by: ANP
File number: 11342	Checked by: MT
Location:..P:\11300s\11342\Mapping\11342_F4_Built Heritage.WOR	

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 kilometres

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 Grid: Map Grid of Australia, Zone 56


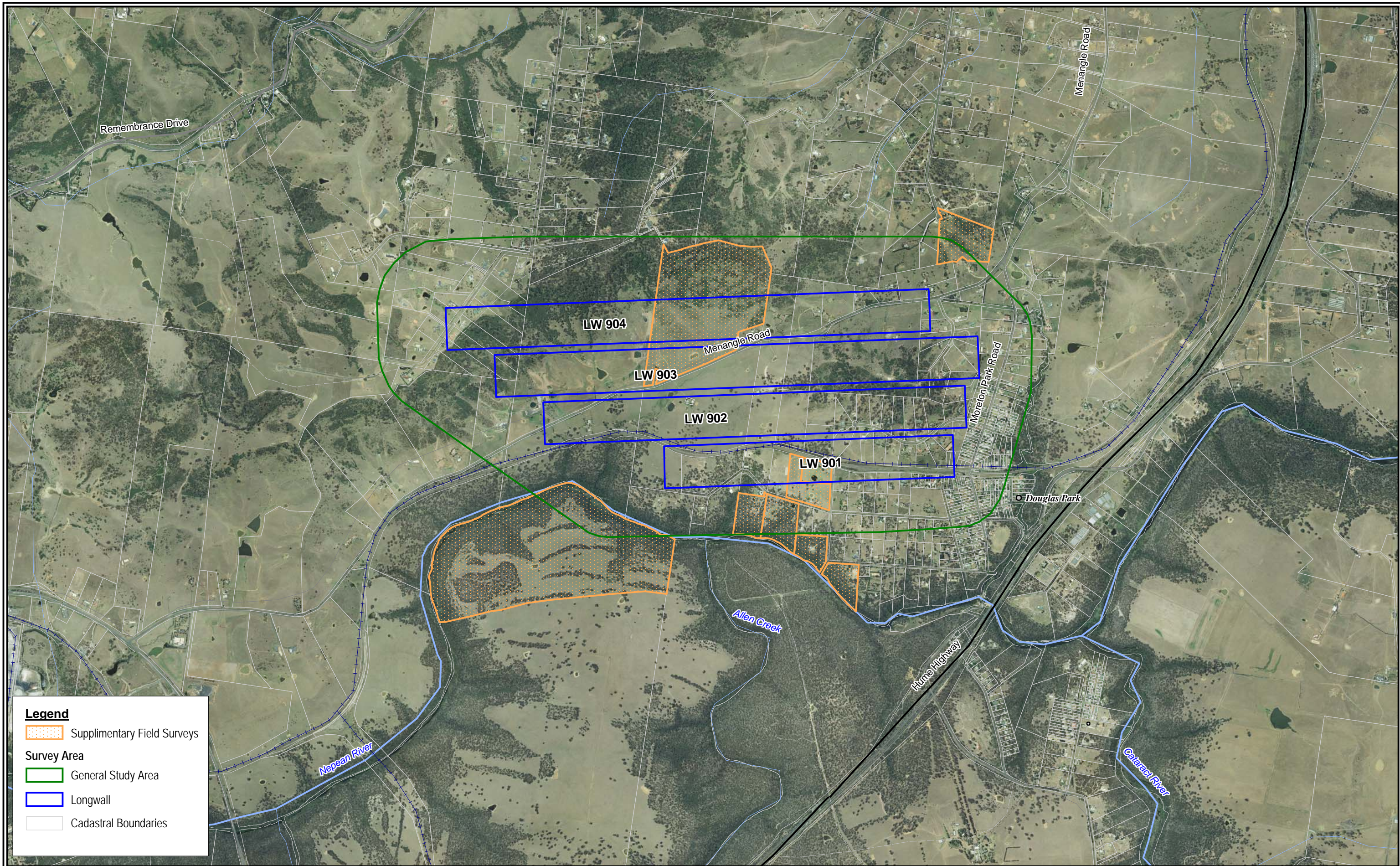






Figure 4



Legend

-  Supplementary Field Surveys
- Survey Area**
-  General Study Area
-  Longwall
-  Cadastral Boundaries



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Figure 5: Properties accessed and assessed during the supplementary surveys.

Date: 21 March 2011	Drawn by: ANP
File number: 11342	Checked by: MT
Location: ..P:\11300s\11342\Mapping\11342_F5 Survey Areas.WOR	

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 Metres

Scale: 1:25,000 at A3
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 Horizontal Datum: Geocentric Datum of Australia 1994
 Grid: Map Grid of Australia, Zone 56




Figure 5

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