BENGALLA Mining Company

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Aboriginal Archaeology and Cultural Heritage Impact Assessment

AECOM

Bengalla Continuation of Mining Project
Hansen Bailey Environmental Consultants
15-Jul-2013

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Aboriginal Archaeology and Cultural Heritage Impact Assessment

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Reviewed by Luke Kirkwood

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4	15 July 2013	Post-submission review	Geordie Oakes/ Archaeologist
5	16 July 2013	Hansen Bailey Review	Jason Martin/Environmental Scientist

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Glossary of Terms

Alluvium	"An unconsolidated accumulation of stream-deposited sediments, including sands, silts, clays or gravels" (www.geology.com, accessed 2011).
Archaeological potential	The likelihood of undetected surface and/or subsurface archaeological materials existing at a location.
Aboriginal archaeological site	The present spatial extent of visible Aboriginal archaeological material(s) at a given location.
Artefact	Any object which has been physically modified by humans.
Angular shatter	Small irregularly shaped fragments of knapped stone interpreted as an undiagnostic 'splinter' fragments.
Assemblage	A collection of artefacts.
Backing	Steep unidirectional or bidirectional retouch that is typically found on one lateral edge of an artefact.
Bedrock	Outcrop of *in situ* rock material.
Bipolar technique	Technique of resting a core on an anvil and striking it with a hammerstone.
Blocky fragment	Large angular fragment of stone that has detached fortuitously during the knapping process.
Bondi Point	A flake that has been 'backed' (i.e. retouched) along one lateral margin and comes to a point at its distal end. Bondi points are asymmetrical around their longitudinal axis.
Bulb of percussion	A bulge below the striking platform on the ventral surface of a flake.
Bulbar scar	A small flake scar on the bulb of percussion that results from a small flake being detached when the main flake is detached.
Bulbar fissures	Very fine lines present on the bulb or percussion that radiate out from the point of impact.
Broken flake	A flake that lacks a termination but retains one or more of the following: platform and/or intact point of impact, bulb of percussion, bulbar scar and lateral fissures.
Chert/tuff	In this report, the term 'chert/tuff' is used in place of 'chert' and 'tuff'. Despite differing geological origins, archaeologists working in northern and southeastern NSW have tended to use these terms interchangeably (see, for example, Corkill 1999). The use of the term 'chert/tuff' herein is intended to reduce confusion.
Compression waves	Prominent concentric rings on the ventral surface of the flake radiating out from the point of impact.
Conglomerate	"A poorly-sorted detrital sedimentary rock composed of rounded gravels, stones or cobbles in a matrix of much finer material" (Milford 1999).
Cortex	An altered, weathered outer surface or 'rind' on a piece of rock.

Complete flake	A complete flake is a flake that has a ventral surface that preserves a complete fracture plane, a platform (or impact point), lateral margins and a termination (Holdaway and Stern 2004: 111).
Core	"A mass of homogenous lithic material that has had flakes removed from its surface" (Andrefsky 2005: 14).
Crest	A landform element that "stands above all, or almost all, points in the adjacent terrain" (Speight 2009: 20).
Dorsal surface	The surface of a flake that was originally part of the outer surface of the core.
Effective coverage	A quantifiable estimate of the area in which archaeological materials are "*detectable*", i.e. exposed ground surface area.
Elouera	A backed, crescent-shaped implement that is symmetrical around its transverse axis but asymmetrical around its longitudinal axis.
Exposure	An area of land surface where the ground surface is visible, usually as the result of thinner vegetation cover, erosive forces or human-caused disturbance. In archaeological surveys, the percentage of ground surface that is visible is recorded. These percentages of exposure are then used to calculate effective coverage.
Flake	A sharp-edged sliver of stone that has been detached from a core. Flakes have a number of distinctive features or attributes that allow them to be distinguished from other lithic materials. These include a bulb of percussion, a striking platform, a dorsal surface, a ventral surface, a bulbar scar (also known as an eraillure scar), bulbar fissures, lateral fissures or hackles and compression waves.
Flake shatter	Any piece of flake debitage with no recognisable striking platform.
Flat	"Planar landform element that is neither a crest nor a depression and is level or very gently inclined" (Speight 2009: 22).
Floodplain	A large flat area, adjacent to a watercourse, characterised by frequent active erosion and aggradation by channelled and overbank stream flow.
Fluvial	Pertaining to rivers and streams. Deposits by flowing water.
Geometric microlith	A flake that has been 'backed' at one or other end, sometimes at both, and sometimes on one lateral margin as well. Geometric microliths are symmetrical around their transverse axis and have a maximum dimension of less than 80 mm.
Greywacke	A touch, well-indurated type of sandstone distinguished by detrital quartz crystals and rock fragments set in a finer-grained matrix (Milford 1999).
Grinding groove	A depression formed in rock from the sharpening of a stone hatchet head or use of a muller (topstone).
Ground Surface Visibility (GSV)	A term used to describe the area of the ground's surface that is visible during archaeological field surveys.
Hammerstone	A stone that has been used to strike a core to remove a flake, often causing pitting or other wear on the stone's surface.

Hearth	Fireplace often recognised archaeologically through the presence of charcoal or burnt ground. Historical hearths are usually associated with a brick or stone structure.
Holocene	The geological period covering the last 10,000 years.
In Situ	In the natural or original position. Applied to a rock, soil, or fossil when occurring in the situation in which it was originally formed or deposited.
Lateral fissures or hackles	Very fine lines present on the lateral margins of a flake.
Lithic	Of, or pertaining to, stone.
Lower slope	"Slope element not adjacent below a crest or flat but adjacent above a flat or depression" (Speight 2009: 21).
Metamorphic	"Rocks whose composition, texture and/or structure have been altered through tectonic pressure and/or heat" (Milford 1999).
Mudstone	A very fine-grained, hard, cohesive rock which generally has a dull, slightly porous appearance. Mudstone is composed of extremely fine-grained sediments such as rock flour, clay minerals and silt. Mudstone is macroscopically similar to chert but distinguished by its lack of lustre.
Pleistocene	The geological period equivalent to the last ice age and preceding the Holocene from about 2 million years to 10,000 years ago. The Late Pleistocene generally refers to the period of time from 40,000 – 10,000 years ago.
Potential Archaeological Deposit	PAD is the hypothesised presence of archaeological deposit where there is uncertainty due to a lack of visibly eroding artefacts, lack of test excavation either locally or in analogous landforms in the region.
Quartz	Quartz is one of the most common minerals on earth. A member of the silica family of minerals, quartz can occur in a variety of forms including free-standing crystals, as veins of milky quartz cutting through other rocks, and as tiny irregularly shapes grains that are components of many rocks.
Silcrete	"A very brittle, intensely indurated rock composed mainly of quartz clasts cemented by a matrix which may well be well-crystallised quartz, cryptocrystalline quartz or opaline silica. The texture of silcrete reflects the host rock and clasts may range in size from very fine grains to boulders" (Langford-Smith 1978: 3).
Stone artefact	Any piece of rock modified by human behaviour.
Striking platform	More-or-less planar surface struck to cause flake removal.
Survey Coverage	The area of a study area surveyed, usually expressed as a percentage. See also **Effective Coverage**.
Tuff	Rock-type consisting of consolidated volcanic ash ejected from a volcanic.
Ventral surface	The surface of a flake that has broken away from the core. Ventral surfaces are typically smooth and show no evidence of previous flake removals.

Executive Summary

AECOM Australia Pty Ltd (AECOM) has been commissioned by Hansen Bailey Environmental Consultants (Hansen Bailey) on behalf of Bengalla Mining Company Pty Limited (BMC) to undertake an Aboriginal archaeological and cultural heritage impact assessment for the Bengalla Continuation of Mining Project (the Project). The assessment is to form part of an Environmental Impact Statement (EIS) being prepared by Hansen Bailey to support an application for Development Consent under Part 4 Division 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to enable mining to continue directly west at a rate of up to 15 Million tonnes per annum (Mtpa) for a 24 year period.

The archaeological survey was undertaken within the Study Area (which consisted of the land between the Approved Bengalla Mine and the Project Boundary) over a total of 15 days between 14 May and 6 June 2012 by a combined field team of two AECOM archaeologists (Geordie Oakes and Andrew McLaren) and 28 rostered Registered Aboriginal Party (RAP) representatives.

A total of 289 archaeological sites have been identified within the Study Area. These include 196 AHIMS sites, 54 newly identified sites, alongside 39 sites identified within previous assessments that are not on the AHIMS register.

High significance was attributed to the southern section of B10 quarry (37-2-0579), which will not be impacted by the Project, due to its research potential. Moderate scientific significance was attributed to six sites due to moderate rarity and research potential and low significance was attributed to the remaining 282 sites. Consultation with RAPs to date indicates that all Aboriginal archaeological sites within the Study Area are culturally significant.

To manage potential impacts to Aboriginal sites from the Project, the existing Aboriginal Cultural Heritage Management Plan (ACHMP) will need to be updated. The updated ACHMP should be prepared in consultation with RAPs and the Office of Environment and Heritage (OEH), and to the satisfaction of the Department of Planning and Infrastructure (DP&I). The commitment for the development of this ACHMP is outlined in this report.

A total of 263 Aboriginal archaeological sites have been identified as being directly impacted by the Project through open cut mining activities and/or the construction/maintenance of mine-related infrastructure. Of these 259 are artefact scatters and isolated finds. Three AHIMS registered scarred trees will also be impacted by the Project (37-2-3095, 37-2-3107, and 37-2-3064) as well as the northern portion of quarry site (37-2-0579) where no Aboriginal heritage objects have been previously identified.

To mitigate Project impacts to Aboriginal sites, it is recommended that surface artefact collection be undertaken for all artefact scatters and isolated finds impacted by the Project (n=259). This should occur prior to Project disturbances. Details of the surface artefact collection should be addressed within the ACHMP.

It is recommended the three scarred trees impacted by the Project be subject to an aborist inspection, with the participation of RAP representatives, prior to Project impacts, in order to assess their status as Aboriginal scarred trees. Should it be determined the scars on these trees are of Aboriginal origin they should be removed under the supervision of a qualified Aborist, archaeologist and RAP representatives prior to impacts. Details for the scarred tree assessment, and possible removal, transport and long term storage should be incorporated into the revised ACHMP. Should it be determined they are not Aboriginal scarred trees they will not be managed as Aboriginal archaeological sites

The northern portion of the ridgeline originally mapped by Rich (1993) as B10 quarry (37-2-0579) will be impacted by the Project. This portion of B10 has been assessed as of low significance due to a lack of identified surface archaeology in the area, viewed in conjunction with past disturbances and results of previous archaeological excavations. Therefore, no mitigation is proposed for this area. In addition, no impacts are proposed to the larger southern portion of the B10 quarry site, where surface artefacts have previously been identified, and there have been fewer disturbances, making it of research value.

All Aboriginal sites not impacted by the Project but within the Project Boundary are to be protected from impacts. In addition, Aboriginal archaeological sites that will not impacted by the Project but occur within 200 m of proposed impacts (n = 17) are to be protected via permanent stock-proof fencing and appropriate associated signage**.** Site fencing is to be constructed under the direction of a qualified archaeologist and RAP representatives. Details for the care of protected sites should be incorporated into the ACHMP.

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) has been commissioned by Hansen Bailey Environmental Consultants (Hansen Bailey) on behalf of Bengalla Mining Company Pty Limited (BMC) to undertake an Aboriginal archaeological and cultural heritage impact assessment for the Bengalla Continuation of Mining Project (the Project). The assessment is to form part of an Environmental Impact Statement (EIS) being prepared by Hansen Bailey to support an application for Development Consent under Part 4 Division 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to enable mining to continue directly west at a rate of up to 15 Million tonnes per annum (Mtpa) for a 24 year period.

1.1 Project Description

BMC operates the Bengalla Mine (Bengalla) in the Upper Hunter Valley of NSW, approximately 130 km north-west of Newcastle and four km west of Muswellbrook (**Figure 1**), within the Muswellbrook Local Government Area (LGA). BMC is managed by Coal & Allied Bengalla Pty Limited. As part of BMC's ongoing commitment to future operations at Bengalla, and its commitment to long-term investment in the Upper Hunter Region, BMC has completed detailed scoping and feasibility studies to enable its continuation of mining west of its current operations.

The Project generally comprises:

- Open cut coal mining at up to 15 Mtpa ROM for 24 years continuing to utilise a dragline and truck and excavator fleet;
- Continue mining to the west of current operations;
- An additional Overburden Emplacement Area (OEA) to the west of Dry Creek which may be utilised for excess spoil material until it is intercepted by mining;
- Processing, handling and transportation of coal via the existing Coal Handling Preparation Plant (CHPP) (to be upgraded) and rail loop for export and domestic sale;
- An additional CHPP coal stockpile and Run of Mine (ROM) coal stockpile;
- Continued use, expansion and upgrades to existing site infrastructure;
- The construction of a radio tower;
- Relocation of the Explosives Magazine and Reload Facility;
- Relocation of a section of Bengalla Link Road near the existing mine access road to enable coal extraction;
- The re-diversion of Dry Creek via dams and pipe work with a later permanent realignment of Dry Creek through rehabilitation areas when emplacement areas are suitably advanced;
- Re-location of water storage infrastructure as mining progresses through existing dams (including the staged discharge dam);
- The construction of raw water dams and a clean water dam;
- A workforce of approximately 900 full time equivalent personnel (plus contractors) at peak production; and
- Supporting power reticulation infrastructure, other ancillary facilities and infrastructure including roads, temporary in pit coal, reject and earth handling facilities which enable construction activities.

1.2 Director General's Requirements

The Project has been granted State Significant Development (SSD) status under the EP&A Act (SSD-5170). DP&I issued the Director General's Requirements (DGRs) for the Project on 13 March 2012. In relation to Aboriginal heritage, they require:

> *"An Aboriginal cultural heritage assessment (including both cultural and archaeological significance) which must:*
>
> *Demonstrate effective consultation with Aboriginal communities in determining and assessing impacts, and selecting mitigation options and measures; and*

Outline any proposed mitigation and management measures (including an evaluation of the effectiveness and reliability of the measures)."

(Director General's Requirements for Continuation of Bengalla Mine Project, issued 13 March 2012)

This report fulfils the requirement for an Aboriginal cultural heritage assessment (including both cultural and archaeological significance). The proposed mitigation and management measures are contained in Section 14.0.

1.2.1 OEH Submission

In addition to the DGRs, OEH issued specific requirements for the Project in relation to Aboriginal heritage. These were:

- The EIS must address and document the information requirements set out in the draft *"Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DEC 2005)"*.
- The EIS must include surveys by suitably qualified archaeological consultants in consultation with all of the local Aboriginal knowledge holders.
- The EIS should identify the nature and extent of impacts on Aboriginal cultural heritage values across the project area and clearly articulate strategies proposed to avoid/minimise these impacts. If impacts are proposed as part of the final development, clear justification for such impacts should be provided.
- The EIS must assess and document the archaeological and Aboriginal significance of the sites Aboriginal cultural heritage values.
- The EIS must describe the actions that will be taken to avoid or mitigate impacts of the project on Aboriginal cultural heritage values. This must include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented. Any proposed methodology for investigation should reflect best practice standards set by OEH (2010) in the *Code of Practice for Archaeological Investigations of Objects in New South Wales*.
- The EIS must provide documentary evidence to demonstrate that effective community consultation with Aboriginal communities has been undertaken in assessing impacts, developing protection and mitigations options and making final recommendations. OEH supports broad-based Aboriginal community consultation and as a guide OEH's '*Aboriginal cultural heritage consultation requirements for proponents 2010*' provides a useful model to follow.
- If impacts on Aboriginal cultural heritage values are proposed as part of the final development, an assessment of the proposed impacts in the context of 'intergenerational equity' and cumulative impact must be undertaken. This assessment must examine both cultural and archaeological perspectives at both local and regional levels, with consideration given to site level and broader landscape level.

1.3 Study Area

The Project Boundary comprises a 2,338.7 ha parcel of land incorporating two key areas: one, the currently Approved Bengalla Mine (not assessed in this report); and two, the area containing the proposed mining continuation, which is the focus of this assessment. The Study Area comprises a 1,356 ha area, which includes the entire Disturbance Boundary of 964 ha, within the Project Boundary and is presented on **Figure 2**.

1.4 Assessment Methodology

This assessment has been undertaken in accordance with the *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (NSW Department of Environment & Conservation 2005) and with reference to the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010a), *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b), and *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (NSW OEH 2011).

The scope of work completed by AECOM for this report included:

- Searching the OEH's AHIMS register;
- Describing the existing environment within and surrounding the Study Area;
- Reviewing relevant archaeological and ethno historic information for the Study Area and surrounding area;

- Identifying, notifying and registering Aboriginal people who hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and/or places in the Study Area;
- Preparing a predictive model for Aboriginal archaeological sites within the Study Area;
- Undertaking an archaeological and cultural heritage survey of the Study Area and report on the findings;
- Providing RAPs with information about the Project;
- Facilitating a process whereby RAPs can:
  - Contribute culturally appropriate information to the assessment methodology;
  - Provide information that will enable the cultural significance of Aboriginal objects and/or places within the Study Area to be determined; and
  - Provide input into the development of any cultural heritage management options.
- Preparing and finalising an Aboriginal archaeological and cultural heritage impact assessment with input from RAPs.

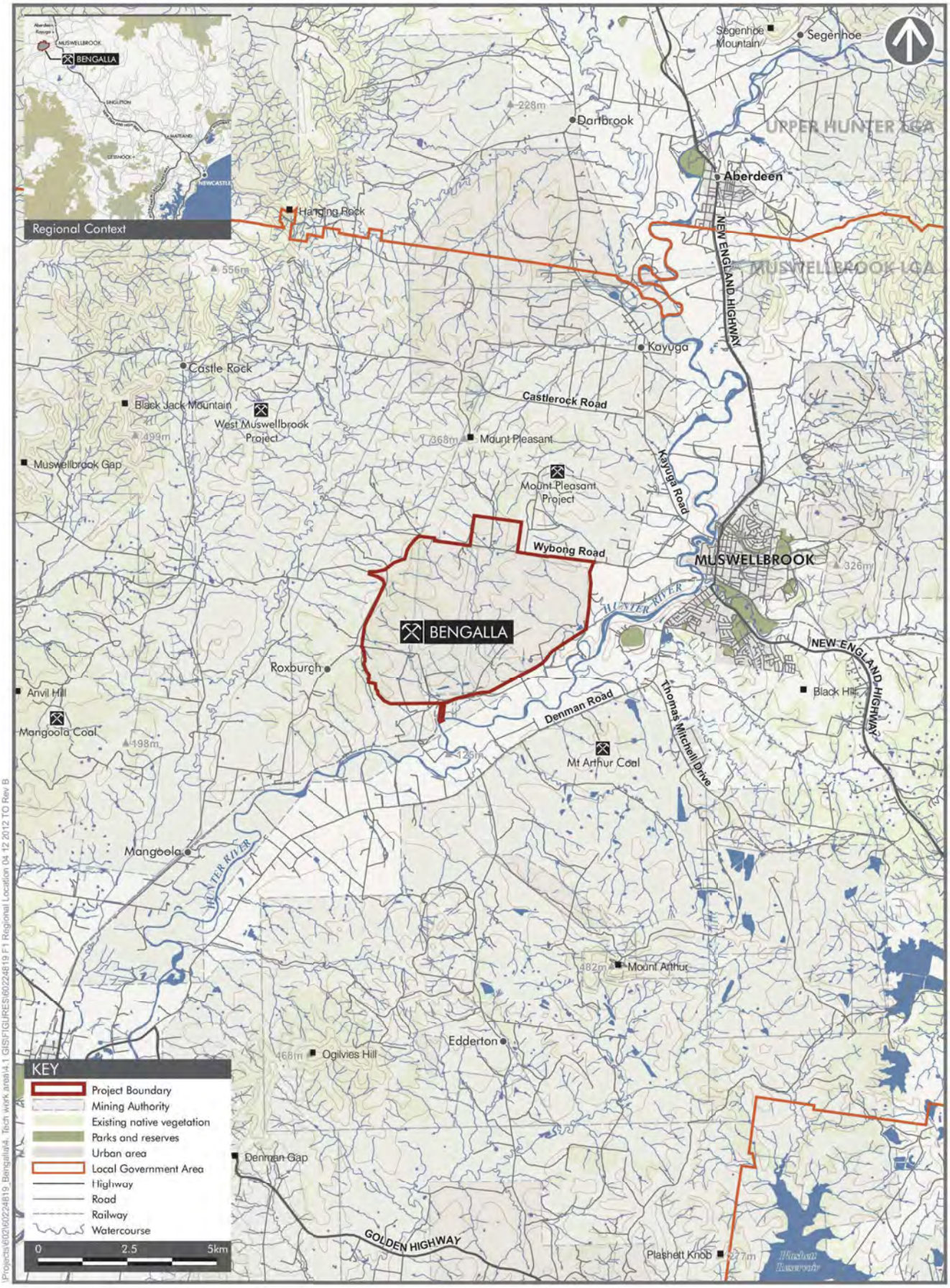
1.5 Project Team

The assessment was managed and report prepared by AECOM archaeologists Geordie Oakes and Andrew McLaren. Jason Martin (Hansen Bailey) and Andrew Wu (Hansen Bailey) undertook Aboriginal consultation and arranged participation of RAPs in the archaeological survey. Geordie Oakes and Andrew McLaren (AECOM) undertook fieldwork. Luke Kirkwood (Senior Archaeologist, AECOM) provided QA review of all assessment outputs. Unless otherwise specified, Tim Osborne (Designer, AECOM) created all figures within this report. Jodie Glennan (IAP Team Secretary, AECOM) provided administrative support throughout the assessment process.

1.6 Report Structure

The report is structured as follows:

- **Section 2.0** outlines the relevant statutory framework for the assessment;
- **Section 3.0** discusses the Aboriginal consultation processes adopted, the archaeological survey strategy and Aboriginal cultural values;
- **Section 4.0** describes the existing environment within and surrounding the Study Area (including land use) and outlines the key archaeological implications;
- **Section 5.0** summarises relevant ethnographic information for the Study Area and its surrounds;
- **Section 6.0** details the archaeological context of the Study Area and its surrounds on both a regional and local scale;
- **Section 7.0** presents a predictive model for Aboriginal archaeology within the Study Area, specifying probable site type occurrence, content, distribution and integrity;
- **Section 8.0** presents the archaeological survey methodology;
- **Section 9.0** describes the archaeological survey including objectives, field team members, survey strategy and methodology, Aboriginal archaeological sites recorded and an evaluation of the predictive model;
- **Section 10.0** discusses the finding of the assessment;
- **Section 11.0** outlines the scientific (i.e. archaeological) and cultural significance of identified Aboriginal archaeological sites within the Study Area;
- **Section 12.0** provides an assessment of the potential impacts of the Project on the sites identified;
- **Section 13.0** provides the cumulative impact assessment;
- **Section 14.0** details appropriate management options and/or recommendations for identified Aboriginal archaeological sites within the Study Area; and
- **Section 15.0** lists the references cited in-text.



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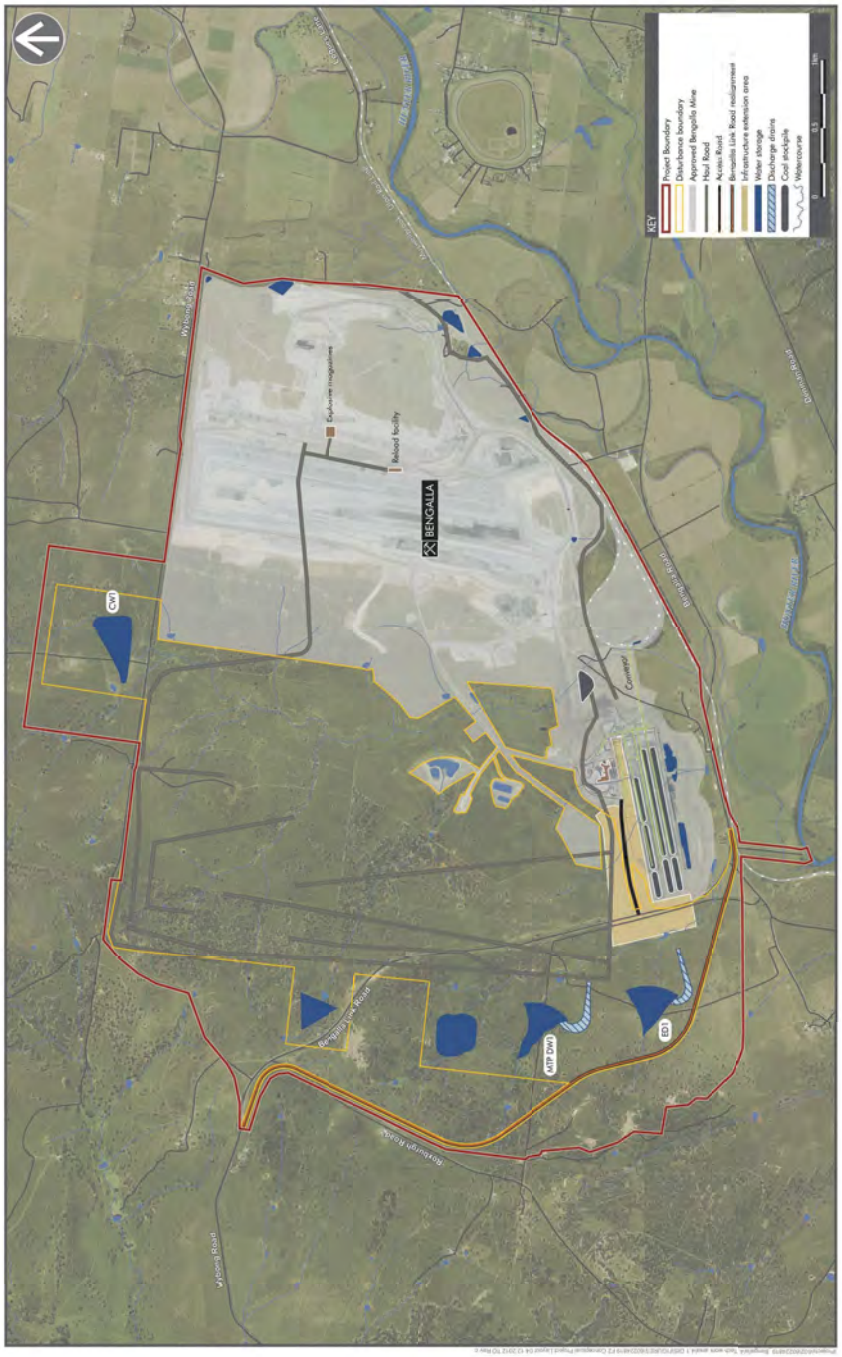
REGIONAL LOCATION
Continuation of Bengalla Mining Project
Aboriginal Archaeological and Cultural Heritage Impact Assessment

FIGURE 1



CONCEPTUAL PROJECT LAYOUT
Bengalla Continuation of Mining Project
Aboriginal Archaeological and Cultural Heritage Impact Assessment
FIGURE 2

2.0 Applicable Policy and Legislation

2.1 Commonwealth Legislation

2.1.1 Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (the ATSIHP Act) provides for the preservation and protection of places, areas and objects of particular significance to Indigenous Australians. The stated purpose of the ATSIHP Act is the 'preservation and protection from injury or desecration of areas and objects in Australia and in Australian waters, being areas and objects that are of particular significance to Aboriginals in accordance with Aboriginal tradition' (Part I, Section 4).

Under the Act, '*Aboriginal tradition*' is defined as "the body of traditions, observances, customs and beliefs of Aboriginals generally or of a particular community or group of Aboriginals, and includes any such traditions, observances, customs or beliefs relating to particular persons, areas, objects or relationships" (Part I, Section 3). A '*significant Aboriginal area*' is an area of land or water in Australia that is of 'particular significance to Aboriginals in accordance with Aboriginal tradition' (Part I, Section 3). A '*significant Aboriginal object*', on the other hand, refers to an object (including Aboriginal remains) of like significance.

For the purposes of the Act, an area or object is considered to be injured or desecrated if:

- In the case of an area:
    - it is used or treated in a manner inconsistent with Aboriginal tradition;
    - the use or significance of the area in accordance with Aboriginal tradition is adversely affected;
    - passage through, or over, or entry upon, the area by any person occurs in a manner inconsistent with Aboriginal tradition
- in the case of an object:
    - it is used or treated in a manner inconsistent with Aboriginal tradition.

The ATSIHP Act can override state and territory laws in situations where a state or territory has approved an activity, but the Commonwealth Minister prevents the activity from occurring by making a declaration to protect an area or object. However, the Minister can only make a decision after receiving a legally valid application under the ATSIHP Act and, in the case of long term protection, after considering a report on the matter. Before making a declaration to protect an area or object in a state or territory, the Commonwealth Minister must consult the appropriate minister of that state or territory (Part 2, Section 13). No areas or objects within the Study Area have been declared '*significant Aboriginal areas' or significant Aboriginal objects'* under the ATSIHP Act.

2.1.2 Environment Protection and Biodiversity Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) took effect on 16 July 2000. Under Part 9 of the EPBC Act, any action that is likely to have a significant impact on a matter of National Environmental Significance may only progress with approval of the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities (SEWPaC). An action is defined as a project, development, undertaking, activity, series of activities, or alteration. An action will also require approval if:

- It is undertaken on Commonwealth land and will have or is likely to have a significant impact;
- It is undertaken outside Commonwealth land and will have or is likely to have a significant impact on the environment on Commonwealth land; and
- It is undertaken by the Commonwealth and will have or is likely to have a significant impact.

The EPBC Act defines 'environment' as incorporating both natural and cultural environments and therefore includes Aboriginal and historic heritage items. Under the Act, protected heritage items are listed on the National Heritage List (items of significance to the nation) or the Commonwealth Heritage List (items belonging to the Commonwealth or its agencies). These two lists replaced the Register of the National Estate (RNE). Statutory references to the RNE in the EPBC Act were removed on 19 February 2012. However, the RNE remains an archive of over 13,000 heritage places throughout Australia.

The heritage registers mandated by the EPBC Act have been consulted and there are no Aboriginal heritage items located within the Project Boundary.

2.2 State Legislation

2.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act requires that consideration be given to environmental impacts as part of the land use planning process. In NSW, environmental impacts are interpreted as including impacts to cultural heritage.

Upon repeal of Part 3A of the EP&A Act on 1 October 2011, the *Environmental Planning and Assessment Amendment (Part 3A Repeal) Act 2011* inserted a new Division 4.1 into Part 4 of the EP&A Act.

Part 4, Division 4.1, provides for a new planning assessment and determination regime for State Significant Development (SSD). Section 89C of the EP&A Act stipulates that a development will be considered SSD if it declared to be such by the new *State Environmental Planning Policy (State and Regional Development) 2011* (SEPP SRD).

Under Clause 8(1) of SEPP SRD, a development is declared to be State Significant Development if:

a) the development on the land concerned is, by the operation of an environmental planning instrument, permissible with development consent under Part 4 of the EP&A Act, and

b) the development is specified in Schedule 1 or 2 of SEPP SRD.

The Project was declared SSD by the Minister for Planning and Infrastructure on 13 March 2012.

Projects declared SSD under Part 4, Division 4.1 of the EP&A Act are exempt from the provisions of Section 90 of the *National Parks and Wildlife Act 1974* (NPW Act), and therefore an Aboriginal Heritage Impact Permit (AHIP) is not required if impacts to Aboriginal objects and/or places cannot be avoided.

2.2.2 National Parks and Wildlife Act 1974

The NPW Act is administered by OEH and is the primary legislation for the protection of Aboriginal cultural heritage in NSW. The NPW Act gives the Director General of OEH responsibility for the proper care, preservation and protection of 'Aboriginal objects' and 'Aboriginal places', defined under the Act as follows:

- an *Aboriginal object* is any deposit, object or material evidence (that is not a handicraft made for sale) relating to Aboriginal habitation of NSW, before or during the occupation of that area by persons of non-Aboriginal extraction (and includes Aboriginal remains).
- an *Aboriginal place* is a place declared so by the Minister administering the NPW Act because the place is or was of special significance to Aboriginal culture. It may or may not contain Aboriginal objects.

Part 6 of the NPW Act provides specific protection for Aboriginal objects and places by making it an offence to harm them. Following amendments introduced in October 2010, the NPW Act includes a 'strict liability offence' for harm to Aboriginal objects and places. A 'strict liability offence' does not require someone to know that it is an Aboriginal object or place they are causing harm to in order to be prosecuted.

Defences against the 'strict liability offence' in the NPW Act include the carrying out of certain 'Low Impact Activities', prescribed in Clause 80B of the *National Parks and Wildlife Amendment Regulation 2010* (NPW Regulation), and the demonstration of due diligence.

An AHIP is required if impacts to Aboriginal objects and/or places cannot be avoided. An AHIP is a defence to a prosecution for harming Aboriginal objects and places if the harm was authorised by the AHIP and the conditions of that AHIP were not contravened. Applications for an AHIP must be accompanied by an assessment report conducted in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010a). Applications must also provide evidence of consultation with the Aboriginal communities. Consultation is required under Part 8A of the NPW Regulation and is to be conducted in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010b). AHIPs may be issued in relation to a specified Aboriginal object, Aboriginal place, land, activity or person or specified types or classes of Aboriginal objects, Aboriginal places, land, activities or persons.

Development Consents under Division 4.1 of the EP&A Act are exempt from the provisions of Section 90 of the NPW Act. Section 89A of the NPW Act, however, requires notification of the location of Aboriginal sites within a reasonable time, with penalties for non-notification. Section 89A is binding in all instances, including Part 4, Division 4.1 projects.

2.3 Local Government

2.3.1 Muswellbrook Local Environmental Plan 2009

The Muswellbrook Local Environmental Plan (LEP) is the comprehensive statutory planning document that applies to the Muswellbrook LGA. Clause 5.10 of the LEP provides specific provisions for the protection of heritage items and relics within Muswellbrook LGA. The objectives of the clause are:

- to conserve the environmental heritage of Muswellbrook;
- to conserve the heritage significance of items and heritage conservation areas including associated fabric, settings and views;
- to conserve archaeological sites; and
- to conserve places of Aboriginal heritage significance.

Clause 5.10 (2) requires development consent for the following:

- demolishing or moving a heritage item or a building, work, relic or tree within a heritage conservation area;
- altering a heritage item or a building, work, relic, tree or place within a heritage conservation area, including (in the case of a building) making changes to the detail, fabric, finish or appearance of its exterior;
- altering a heritage item that is a building by making structural changes to its interior;
- disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed,
- disturbing or excavating a heritage conservation area that is a place of Aboriginal heritage significance;
- erecting a building on land on which a heritage item is located or that is within a heritage conservation area; and
- subdividing land on which a heritage item is located or that is within a heritage conservation area.

Before granting consent, Council must consider the impact of the development on the heritage significance of the item. However, development consent is not required if Council considers the proposed development to not adversely affect the heritage significance of the item concerned.

Schedule 5 of the LEP provides a list of heritage items and relics within Muswellbrook LGA. There are no Aboriginal heritage items listed in the heritage schedule that occur within the boundaries of the Study Area.

3.0 Registered Aboriginal Party Consultation

Aboriginal community consultation for the Project was conducted by Hansen Bailey in accordance with the '*Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*' (DECCW 2010). Hansen Bailey has prepared the following section of the report.

3.1 Notification and Registration

3.1.1 Consultation with Regulatory Agencies

Section 4.1.2 of the Aboriginal Consultation Guidelines requires the proponent to consult with the following agencies for the purpose of identifying Aboriginal people who may hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects or places within the Study Area:

- Office of Environment and Heritage (OEH);
- NSW Department of Aboriginal Affairs – Office of the Registrar (DAA);
- Hunter-Central Rivers Catchment Management Authority (HCRCMA);
- Muswellbrook Shire Council (MSC);
- Native Title Services (NTS);
- National Native Title Tribunal (NNTT); and
- Wanaruah Local Aboriginal Land Council (WLALC).

On 27 February 2012, these agencies were consulted via a letter seeking assistance in identifying potentially interested Aboriginal stakeholders.

On 28 February 2012, DAA indicated that there are no Registered Aboriginal Owners (under Division 3 of the *Aboriginal Land Rights Act 1983*) of the land within the Project Boundary. OEH responded on 29 February 2012 by providing a list of 47 stakeholder groups. On 29 February 2012, NNTT responded by providing the results of a native title search, however no additional Aboriginal stakeholders were identified. On 6 March 2012, WLALC provided a list of 32 stakeholder groups. WLALC also expressed an interest in being consulted as part of this assessment. On 29 March 2012, MSC responded by providing a list of 35 stakeholders. HCRCMA advised in a letter dated 30 March 2012 that it would not be providing the details of any Aboriginal stakeholders. NTS responded by email on 10 April 2012, indicating that it could not release the details of any stakeholder groups due to privacy reasons.

3.1.2 Public Notification

Section 4.1.3 of the Aboriginal Consultation Guidelines requires that a Project must be advertised in the local newspaper. The notification must outline the Project and identify its location. In accordance with this requirement, the Project was advertised in the Muswellbrook Chronicle on 17 February 2012 and the Hunter Valley News on 22 February 2012 (**Appendix a**). The notice invited Aboriginal stakeholders to express an interest in being consulted as part of the Aboriginal cultural heritage impact assessment. In accordance with section 4.1.4 of the Aboriginal consultation guidelines the registration period extended for 14 days to the 7 March 2012.

Eight Aboriginal stakeholder groups responded to the public notice and were duly accepted as participants in the consultation program for this assessment.

Following the correspondence from the agencies and the newspaper notifications a total of 53 Aboriginal stakeholder groups were identified to be consulted for the Project.

3.1.3 Invitations for expressions of interest

In accordance with Section 4.1.3 of Aboriginal Consultation Guidelines on 19 March 2012, a letter inviting expressions of interest was sent to all Aboriginal stakeholders identified by the regulatory agencies. A total of 53 Aboriginal stakeholders were invited to register an interest in being consulted as part of the Aboriginal cultural heritage impact assessment. The closing date for expressions of interest was 2 April 2012, which provides the necessary 14 day period for expressions of interest.

The draft methodology for the archaeological survey component of this assessment was also attached to this letter and stakeholders were invited to comment on the methodology. Comment on the draft survey methodology was sought by the 16 April 2012. Additional details for the consultation conducted for the survey methodology is provided in **Section 3.3.1**.

This letter also advised all stakeholders that there would be a planning meeting held at Bengalla Mine on 4 April 2012 to discuss the Project, consultation process and the proposed survey methodology.

By the closing date for expressions of interest (2 April 2012), 12 stakeholder groups had expressed an interest in the Project. To enable sufficient time to respond to the personalised registration letter the period for expressions of interest was extended until after the onsite planning meeting held on 4 April 2012. An additional four groups registered an interest on 3 April 2012 and a further four groups registered an interest in person at the planning meeting.

From the public notice, personalised expression of interest letter and onsite planning meeting a total of 28 groups registered, and have since been consulted as part of the Aboriginal cultural heritage impact assessment. These stakeholders are listed in **Table 1**.

Table 1: Registered Aboriginal Groups

Ref	Group Name	Primary Contact
1	Aliera French Trading	Aliera French
2	Bawurra Consultants	Kevin Sampson
3	Breeza Plains Culture and Heritage Consultants	Terry Matthews
4	Bunda Consultants	Tammy Knox
5	Cacatua Cultural Consultants	Donna Sampson
6	D F T V Enterprises	Derrick Vale Sr
7	Deslee Talbott Consultants	Deslee Matthews
8	Gidawaa Walang Cultural Heritage Consultancy	Annie Hickey
9	Hunter Valley Aboriginal Corporation	Rhonda Griffiths
10	Hunter Valley Cultural Surveying	Luke Hickey
11	Indigenous Outcomes	Robert Smith
12	Kauwul (trading as Wonn1 Contracting)	Arthur Fletcher
13	Kawul Cultural Services	Vicky Slater
14	Myland Cultural & Heritage Group	Warren Schillings
15	Ngarramang-Kuri Aboriginal Culture & Heritage Group	Abie Wright
16	Roger Noel Matthews Consultancy	Roger Matthews
17	Ungooroo Aboriginal Corporation	Annette Dunstan
18	Upper Hunter Heritage Consultants	Melissa Matthews
19	Upper Hunter Wonnarua Council	Rhoda Perry
20	Waabi Gabinya Cultural Consultancy	Elizabeth Howard
21	Wallangan Cultural Services	Maree Waugh
22	Wanaruah Local Aboriginal Land Council	Noel Downs
23	Warragil Cultural Services	Aaron Slater
24	Warul Consultants	Scott Smith
25	Wattaka Wonnarua Culture Consultants	Des Hickey
26	Widescope Indigenous Group Pty Ltd	Steven Hickey
27	Wonnarua Culture Heritage	Gordon Griffiths
28	Yinarr Cultural Services	Kathleen Steward-Kinchela

Two further stakeholders expressed an interest in this assessment after the registration closure date on 11 April 2012 including Greg Griffiths and T&G Culture Consultants. Both Greg Griffiths and T&G Culture Consultants will continue to be consulted for the Project however would be ineligible for the archaeological survey component.

3.1.4 Notification of RAPs

In accordance with Section 4.1.5 of the Aboriginal Consultation Guidelines the expression of interest letter dated 19 March 2012, advised that contact details would be forwarded to OEH and WLALC unless they stipulated that they did not want their details distributed. In accordance with Section 4.1.6 of the Aboriginal Consultation Guidelines, the details of registered stakeholders were provided to OEH and WLALC on 30 April 2012 (see **Appendix a**.

- A copy of the public notice placed in the Muswellbrook Chronicle and Hunter Valley News;
- A copy of the letter inviting expressions of interest, sent to all Aboriginal stakeholders on 19 March 2012; and
- A record of RAPs whom have registered for consultation as part of the Aboriginal cultural heritage impact assessment.

3.2 Consultation Stage 2

3.2.1 Planning Meeting

In order to satisfy sections 4.2.1 and 4.2.2 of the Aboriginal Consultation Guidelines, a planning meeting was held on site at Bengalla on 4 April 2012. The purpose of the planning meeting was to:

- Present a detailed briefing about the Project;
- Discuss the draft survey methodology and the nature and scope of the assessment;
- Outline the environmental impact statement process;;
- Specify critical timelines and milestones for the completion of assessment activities and delivery of reports;
- Clearly define agreed roles, functions, and responsibilities in relation to Aboriginal consultation;
- Identify, raise and discuss the Aboriginal groups' cultural concerns, perspectives and assessment requirements (if any) and provide contact details should any individual discussions be required; and
- Provide a forum in which cultural knowledge of the land within the Project Boundary can be discussed.

A total of 24 RAPs attended the planning meeting.

3.3 Survey methodology

3.3.1 Methodology

In accordance with section 4.3.1 of the Aboriginal consultation guidelines, the proposed methodology for the archaeological survey was provided to RAPs accompanying the letter dated 19 March 2012.

The methodology letter provided a description of the Project, previous Aboriginal assessments and context, results from a desktop assessment along with the proposed archaeological survey methodology for the Project. All Aboriginal stakeholders were encouraged to provide comments and raise any concerns in relation to the draft methodology or cultural heritage issues either in writing, during the planning meeting or during any stage of the consultation process. **Section 8.0** describes the methodology adopted for the archaeological survey.

Five stakeholder groups provided a response to the draft methodology including:

- Breeza Plains Culture and Heritage Consultants;
- DFTV Enterprises;
- Gidawaa Walang Cultural Heritage Consultants;
- Ungooroo Aboriginal Corporation; and
- Cacatua Culture Consultants.

All of these groups agreed with the content in the draft methodology. These responses are provided in **Appendix a**.

3.3.2 Archaeological Survey

All Aboriginal stakeholders that had registered an interest prior to the planning meeting were offered the opportunity to participate in an archaeological survey of the land within the Project Boundary. All 28 registered stakeholder groups accepted the offer of archaeological survey.

As explained in the methodology, it was estimated that three weeks would be needed to survey the entire Study Area. Due to the large number of groups involved in the assessment, the 28 groups involved in the archaeological survey were divided equally into three working groups. Each working group would be allocated to one week of the archaeological survey. All stakeholder groups were asked to nominate an archaeological survey representative and to indicate the weeks that their representative would be available to undertake archaeological survey. Each of the 28 stakeholder groups was provided the opportunity to select one of the three working groups according to the availability of their archaeological survey representative. The final allocations for the 28 groups are shown in **Table 2**.

Each Aboriginal group was personally contacted by phone and / or email to confirm dates representatives were required in the field, request insurances and to provide other logistics. The archaeological survey was then scheduled for the three weeks from 14 May 2012 to 1 June 2012 and consisted of the following:

- Working Group 1 (14/05/12 – 18/05/12);
- Working Group 2 (21/05/12 – 25/05/12); and
- Working Group 3 (28/05/12 – 01/06/12).

The third week of archaeological survey was scheduled for the working week from 28 May 2012 to 1 June 2012. Due to inclement weather, the final three days of archaeological survey were postponed until the following week. That is, the archaeological survey originally scheduled for the three days from 30 May to 1 June 2012 was undertaken on 4 – 6 June 2012.

Table 2: Participants in the Archaeological Survey

Working Group	Survey Period	Stakeholder Group
1	15/05/12 – 18/05/12	Roger Noel Matthews
		Indigenous Outcomes
		Myland Cultural and Heritage Group
		Upper Hunter Heritage Consultants
		Wonnarua Culture Heritage
		Bawurra Consultants
		Bunda Consultants
		Yinarr Cultural Services
		Ngarramang-Kuri Aboriginal Culture and Heritage Group
2	21/05/12 – 25/05/12	Kawul Cultural Services
		Warragil Cultural Services
		Breeza Plains Culture and Heritage Consultants
		Gidawaa Walang Cultural Heritage Consultancy
		Cacatua Culture Consultants
		Wallangan Cultural Services
		Upper Hunter Wonnarua Council
		DFTV Enterprises
		Deslee Talbott Consultants
		Hunter Valley Cultural Surveying
3	30/05/12 – 01/06/12 & 04/06/12 – 06/06/12	Hunter Valley Aboriginal Corporation
		Widescope Indigenous Group
		Kauwul
		Wanaruah Local Aboriginal Land Council
		Aliera French Trading
		Waabi Gabinya Culture Consultants
		Cacatua Culture Consultants*
		Upper Hunter Wonnarua Council*
		Wallangan Cultural Services*
		Gidawaa Walang Cultural Heritage Consultancy*

** Stakeholder group was offered additional archaeological survey due to the absence of other stakeholders*

3.4 RAP Review of Draft Aboriginal Cultural Heritage Impact Assessment Report

The draft Aboriginal cultural heritage impact assessment report was issued to all RAPs on the 09 October 2012. Responses to the report were provided by 14 RAPs. A summary of the responses is provided below and the complete responses in **Appendix** b.

3.4.1 RAP Responses/Recommendations

A summary of the RAP responses/recommendations are outlined below:

Seven RAPs agreed with the content of the report and did not wish to make further comment.

When contacted, three RAPs stated they did not wish to make comment.

- The Wanaruah Local Aboriginal Land Council highlighted the importance of land within the Project Boundary to Aboriginal people. In addition, the Wanaruah Local Aboriginal Land Council made the following recommendations:
    - That the 'Management Recommendations' in the draft report be correctly titled "Consultant's Management Recommendations" to define the difference between those measures the consultant wished to see implemented and those of the Aboriginal Community.
    - That the recommendation here in are included in the report under Aboriginal community Recommendations and not as part of an annex to be ignored.
    - An Aboriginal cultural surface and subsurface investigation be conducted by the Aboriginal community and that the Aboriginal community be consulted over the scope of the cultural sub surface investigation.
    - The artefact analysis of salvaged objects include the participation from the Aboriginal community and it be expediated to be completed in such a way as to help inform the cultural investigation.
    - That any research and salvage works be rostered among the stakeholders so all get a fair go at being involved if they choose to be.
    - That the Aboriginal community be given employment opportunities in all areas of the mining process through Aboriginal specific traineeships and employment programs. The target numbers and time frames to be agreed mutually between the mining company and stakeholders before they start the destruction of cultural sites and areas.
    - That the proponent assist in building the capacity of Aboriginal companies to meet the compliance needs to become contractors to the proponent in areas other than culture and heritage.
    - That the proponent funds the building of a Keeping Place and learning centre for the Aboriginal Community.
    - That an area of land of not less than 50 Ha be set aside in perpetuity as a cultural offset for the Aboriginal community. The offset land is to be in an area freely accessible to the Aboriginal community and preferably with access directly to the Hunter River or other permanent water source. This will enable elders to conduct cultural activities in a culturally appropriate manner.
    - That the offset land is not part of any other offset (e.g. part of a biodiversity offset) without the unanimous support of Aboriginal stakeholders and the support of Wanaruah LALC.
    - That the proponent gives $500,000.00 per year for the life of the mine to a trust for Aboriginal employment and education programs un the Upper Hunter, and Wanaruah LALC be on the board of said trust/s with the power to veto projects they do not deem worthy.
    - That the proponent gives $200,000.00 per year for the life of the mine to a trust for delivery of Aboriginal Health Services in the Upper Hunter, and that Wanaruah LALC be on the said trust/s with the power to veto projects they deem not worthy.
- Kauwul requested Arthur Fletcher be consulted and to participate in the site salvage and the inspection and decision-making process with regard to the scarred trees.
- Hunter Valley Aboriginal Corporation stated that they did not wish to make specific comment however supported the views of the Wanaruah LALC.
- DFTU Enterprises commented that land surveyed during the second week of the survey was densely covered with pasture grass which lowered surface visibility and limited the potential to identify evidence of surface archaeological materials.

3.4.2 Responses to RAP Comments

Wanaruah Local Aboriginal Land Council

1. *That RAP recommendations are included in the report under Aboriginal community Recommendations and not as part of an annex to be ignored.*

   All RAP comments have been included in the main body of the AACHIA under Section 3.4.1 and have been considered in the development of management recommendations.

2. *An Aboriginal cultural surface and subsurface investigation be conducted by the Aboriginal community and that the Aboriginal community be consulted over the scope of the cultural sub surface investigation.*

   Details of proposed mitigation and management strategies of all sites will be included as part of the revised Aboriginal Cultural Heritage Management Plan (ACHMP) to be prepared following approval of the Project. The ACHMP will be developed in consultation with all RAPs and RAPs will be involved in the proposed surface collection.

3. *The artefact analysis of salvaged objects include the participation from the Aboriginal community and it be expediated to be completed in such a way as to help inform the cultural investigation.*

   Provisions will be made within the ACHMP for the participation of RAPs in the analysis of salvaged items. This may take the form of an artefact workshop held at BMC's offices during the analysis phase of the salvage works.

4. *That any research and salvage works be rostered among the stakeholders so all get a fair go at being involved if they choose to be*

   A roster will be developed so that each RAP group will have equal opportunity to be involved in all research and salvage works proposed for the Project as part of the ACHMP.

5. *That the Aboriginal community be given employment opportunities in all areas of the mining process through Aboriginal specific traineeships and employment programs. The target numbers and time frames to be agreed mutually between the mining company and stakeholders before they start the destruction of cultural sites and areas.*

   All members of the community are entitled to apply for vacant positions that arise at BMC and more broadly Coal & Allied. All applications will be assessed equally and fairly and employment will be provided to those applicants deemed most suitable for the role.

6. *That the proponent assist in building the capacity of Aboriginal companies to meet the compliance needs to become contractors to the proponent in areas other than culture and heritage.*

   See above response.

7. *That the proponent funds the building of a Keeping Place and learning centre for the Aboriginal Community.*

   It is proposed that the artefacts to be salvaged following the approval of the ACHMP for the Project will be stored in an appropriate storage facility (along with previously salvaged artefacts for DA 211/93) to preserve their long term integrity.

8. *That an area of land of not less than 50 Ha be set aside in perpetuity as a cultural offset for the Aboriginal community. The offset land is to be in an area freely accessible to the Aboriginal community and preferably with access directly to the Hunter River or other permanent water source. This will enable elders to conduct cultural activities in a culturally appropriate manner.*

9. *That the offset land is not part of any other offset (e.g. part of a biodiversity offset) without the unanimous support of Aboriginal stakeholders and the support of Wanaruah LALC.*

   No cultural heritage offset strategy is proposed for the Project.

10. *That the proponent gives $500,000.00 per year for the life of the mine to a trust for Aboriginal employment and education programs un the Upper Hunter, and Wanaruah LALC be on the board of said trust/s with the power to veto projects they do not deem worthy.*

    In partnership with the Upper Hunter Valley Aboriginal Community Coal & Allied launched the Aboriginal Development Consultative Community (now known as the Coal & Allied Aboriginal Community Development Fund (ACDF) in 2006, investing more than $1.7 Million in education, training, community and business development projects benefiting the Hunter Valley Aboriginal community since its inception. In 2011 the ACDF invested $644,958 in 28 projects, partnering with community groups and businesses, supporting projects which will help deliver long term sustainability in the Hunter Valley. The ACDF is a funding program accessible by any Aboriginal person or group in the Upper Hunter Valley region undertaking a project to benefit the wider Aboriginal community.

    The ACDF operates under a set of guidelines established and agreed to by the Upper Hunter Valley Aboriginal community and Coal & Allied. The projects funded are those most likely to deliver long term, sustainable outcomes for the Upper Hunter Valley Aboriginal community and applications may be made by members of the Upper Hunter Valley Aboriginal community, including the areas of Muswellbrook and Upper Hunter. Based on the established objectives, the ACDF looks to fund proposals of the following nature:

    - **Aboriginal business development;**
    - **Educational programs;**
    - **Heritage and culture;**
    - **Training and employment;**
    - **Community development;**
    - **Community health and wellbeing; and**
    - **Projects that have compelling and significant benefit for the whole Upper Hunter Aboriginal community.**

    More detail in relation to recent projects supported by the ACDF program is available on the Coal & Allied website www.riotintocoalaustralia.com.au/ouroperations/3453_bengalla_3599.asp.

11. *That the proponent gives $200,000.00 per year for the life of the mine to a trust for delivery of Aboriginal Health Services in the Upper Hunter, and that Wanaruah LALC be on the said trust/s with the power to veto projects they deem not worthy.*

    See above response.

Kauwul

1. *Kauwul requested Arthur Fletcher be consulted and to participate in the site salvage and the inspection and decision-making process with regard to the scarred trees.*

   RAP representatives will be included in all inspections and decision making for potential scarred trees throughout the consultation program developed for the ACHMP.

DFTU Enterprises

1. *DFTU Enterprises commented that land surveyed during the second week of the survey was densely covered with pasture grass which lowered surface visibility and limited the potential to identify evidence of surface archaeological materials.*

   The ACHMP developed for the Project will include a 'Unexpected Find' procedure for any Aboriginal artefacts not previously identified.

4.0 Existing Environment

The type and distribution of Aboriginal archaeological sites that occur within an area is intrinsically connected to the local environment. Environmental factors such as topography, geology, hydrology, flora and fauna will have played a pivotal role in influencing how Aboriginal people interacted with the landscape. Consequently, attempts to predict or interpret the character and distribution of sites in the landscape must include an analysis of environmental factors. The following section presents an overview of each of these factors which, when viewed in conjunction with the archaeological context, provides a broad background to the archaeological predictive model.

4.1 Climate

The climate in the vicinity of the Project can be described as having warm to hot and humid summers and cool to mild winters. Temperatures range from a maximum mean high of 31.7 ºC during January, to a minimum mean low of 3.8ºC in July, although daily temperatures can reach considerably higher or lower than these averages. The average annual rainfall for the area is 645.7 mm (Bureau of Meteorology 2012).

4.2 Topography

Bengalla is located in the Hunter Valley Region, defined by Hughes (1984a) as the catchment of the Hunter River and its tributaries. More specifically, Bengalla falls within the Central Lowlands subregion of the Hunter Valley, an area described by Galloway (in Story et al. 1963) as a belt of lowlands, occurring through the centre of the Hunter Valley, developed on relatively weak sedimentary rocks, that is undulating or gently hilly, with an abrupt transition to the steep country either side. Conforming to this description, the Study Area occurs on land that is gently undulating with low hills and generally slopes southward towards the Hunter River.

The majority of the Study Area consists of elevations between 150 to 250 m AHD (Australian Height Datum), with several hilltops reaching 270 m AHD. Along the eastern and southern margin of the Project Boundary are the Hunter River alluvial flats or floodplain, rising from 134 m AHD, of which only a narrow strip falls within the southern extent of the Study Area. Land within the Study Area is dominated by slopes of less than five degrees, with the gullies in the lower reaches of ephemeral streams draining into the Hunter River along with the ridge tops generally sloping at no more than two and a half degrees. The Hunter River alluvial floodplain generally slopes at no more than one degree (HLA-Envirosciences Pty Ltd 1993).

4.3 Hydrology

Bengalla is located on the northern side of the Hunter River, which is the most significant water body in the Hunter Valley Region, and flows in a general south-westerly direction through a channel approximately 50-100 m wide and approximately 3-6 m deep. The Hunter River cuts across a well-developed floodplain, which is approximately 3 km wide at its widest point.

Within the Study Area, natural surface water flows south along several minor tributaries and unnamed drainage lines, the majority of which feed into Dry Creek. The remainder flow south directly into the Hunter River. Dry Creek is the largest watercourse within the Study Area commencing north of Wybong Road and flowing south across the eastern portion of the Study Area through paddocks and farmland which have been largely modified by previous agricultural activities. For the vast majority of the year, Dry Creek remains dry and only occasionally holds small pools of water for a few days following significant rainfall events (Hansen Bailey 2012).

As demonstrated by a large number of archaeological assessments, both in the Hunter Valley and more broadly in NSW, the nature and distribution of potable water will have played a significant role in Aboriginal use of the landscape. Consequently, archaeological assessments within NSW have consistently shown Aboriginal archaeological sites associated with rivers, creek lines and, to a lesser degree, ephemeral drainage lines. Moreover, it has been shown that higher order creek lines i.e., 3rd and 4th, using Strahler's (1952) stream order model, are commonly associated with larger and more complex Aboriginal sites, in both surface and subsurface contexts (see Kuskie 2000a; White & McDonald 2010).

Watercourses within the Study Area are a combination of 1st, 2nd, 3rd and 4th ordered creek lines with a clear emphasis on lower order (1st and 2nd) creek lines, which account for over 75% of the total. A section of Dry Creek, roughly four km in length, comprises the only 4th order creek within the Project Boundary. Based on this understanding, it is anticipated that, should sites be identified, the larger and more complex sites will be associated with Dry Creek rather than its lower order counterparts. While archaeological sites with subsurface

potential may also be associated with low order creek lines within the Study Area, it is anticipated these will comprise fewer overall artefact numbers and diversity of material. In undertaking this general modelling, consideration must also be given to the effects of European landscape use practices which may have substantially modified creek line alignment and flow rates, and consequently disturbed or destroyed areas of potential archaeological deposit.

4.4 Geology

The Project is situated within the Hunter Coalfield, close to the north-eastern boundary of the Sydney Basin. The geology of the Hunter Valley is characterised by late Permian sediments, early Permian marine sediments, and Quaternary alluvium. Examination of available geological data indicates that Permian sediments including coal seams associated with the lower Jerry Plains and Vane Subgroups of the late Permian Wittingham Coal Measures occur within the Study Area. The Wittingham Coal measures, which outcrop in a number of places within the Project Boundary, form the lower part of the Singleton Supergroup, and are up to 800 m thick and consist of sandstone, siltstone, claystone, conglomerate and tuff within which intermittent coal seams lie (HLA-Envirosciences Pty Ltd 1993). One of the characteristics of the Wittingham Coal Measures is the occurrence of fine-grained siliceous raw materials such as silcrete and indurated mudstone/tuff (IMT), which are of particular importance, as these two raw materials dominate artefactual assemblages in the Hunter Valley.

Quaternary alluviums are also well represented within the Study Area and thinly overlay Permian sediments. Quaternary alluvial deposits consist of silts, sand clays and gravel along the creek valleys within the Project Boundary, and in the alluvial floodplain of the Hunter River to the south (Hansen Bailey 2012). In common with the Wittingham Coal Measures, both silcrete and IMT are known to occur in the alluvial gravels of the Hunter River and its associated terraces. In particular, a known source of silcrete outcrop has been previously identified at Bengalla - archaeological site B10 (37-2-0579), which was partially excavated in 1998 (see White 1998).

4.5 Soils

The Project is located in the Central Lowlands topographic zone within the Sydney Basin geological province. According to Kovac et al (1991) two soil landscape units underlie the Study Area. These comprise the Roxburgh Soil Landscape, which underlies the majority of the Study Area and the Bayswater Soil Landscape, of which a small section is found along its eastern boundary of the Study Area (Kovac et al. 1991). **Table 3** summarises the key characteristics of soils associated with these landscape and their archaeological implications.

Data provided in this table is a combination soil data from *Singleton Soil Landscapes* (Kovac et al. 1991) and the *Soil and Land Capability* assessment undertaken for the Project (GSS Environmental 2012).

Table 3: Soil Types within the Study Area

Landform Element	Dominant Soils	Dominant Geology	Erosion Potential	Archaeological Implications
Crest	**Lithosols** *A Horizon* – Dark reddish brown light sandy clay loam; single-grained; pH 7; becomes loam fine sandy at 10cm; pH 8.0; Bedrock at 35cm	Derived from sandstone shale, mudstone, conglomerate, and coal parent material from the Singleton Coal Measures.	High	1. Exposure of subsurface archaeological materials due to erosion; 2. Low potential for substantial intact soil units containing archaeological deposits; and 3. Alkaline soils tend to poorly preserve some organic materials i.e., wood and shell, but may preserve bone.
Upper Slope; gently inclines (3-10%) & moderately inclined (10-18%)	**Red Chromosol** *A Horizon* – Dark Brown moderate consistence silty clay loam. Moderate pedality rough faced peds (sub angular blocky 10-20 mm). Boundary clear and wavy. pH 6.8 (neutral). Depth 15 cm. *B Horizon* – Yellow Red and Dark brown clays. Moderate to strong pedality. pH 7.4 – 8.5 (alkaline). Depth 60 cm.	Derived from sandstone shale, mudstone, conglomerate, and coal parent material from the Singleton Coal Measures.	Moderate. Less susceptible to sheet and gully erosion when managed to their correct capacity, as compared to the less steep waning slope soils.	1. Exposure of subsurface archaeological materials due to erosion; 2. Low potential for substantial intact soil units containing archaeological deposits; 3. Alkaline soils tend to poorly preserve some organic materials i.e., wood and shell, but may preserve bone.
Mid-slope; very gently to gently inclined (3-10%)	**Brown Chromosol** *A Horizon* – Dark Brown silty clay loam. Sub angular blocky 5-25mm. Roots fine/medium and common. Boundary is clear and wavy. pH 6.6 (neutral). Depth 10 cm. *B Horizon* – Dark Brown and Orange strong and moderate clays. pH 5.9 – 8.0 (acidic to alkaline). Depth 90 cm. *C Horizon* – Conglomerate, sandstone and shale. Depth 140 cm.	Derived from sandstone shale, mudstone, conglomerate, and coal parent material from the Singleton Coal Measures.	Moderate. Less susceptible to sheet and gully erosion when managed to their correct capacity, as compared to the soil covering the steeper waxing slopes.	1. Potential exposure of subsurface archaeological materials due to sheet erosion; 2. Low potential for substantial intact soil units containing archaeological deposits; and 3. Acidic soils tend to preserve biological material i.e., wood and shell.. 4. Alkaline soils tend to poorly preserve some organic materials i.e., wood and shell, but may preserve bone.

Landform Element	Dominant Soils	Dominant Geology	Erosion Potential	Archaeological Implications
Mid-slope; very gently to gently inclined (3-10%)	**Red Sodosol** *A Horizon* – Very Dark Brown weak consistence clay loam. Moderate pedality (sub-angular blocky 10-50 mm), earthy faced peds. Many course roots. Boundary clear and even. pH 6.6 (neutral). Depth 20 cm. *B Horizon* – Dark Red, Yellow Red, and Yellow Brown heavy clays. Moderate to strong pedality. pH 8.2 – 8.9 (alkaline). Depth 120 cm.	Derived from sandstone shale, mudstone, conglomerate, and coal parent material from the Singleton Coal Measures.	High. These soils are susceptible to sheet and gully erosion due to the dispersive nature of their subsoils. Incorrect management practices can lead to the topsoil being detached and cause enhanced erosion rates when the subsoil is exposed.	1. Exposure of subsurface archaeological materials due to erosion; 2. Low potential for substantial intact soil units containing archaeological deposits; 3. Low preservation of organic remains (e.g. shell, wood) in alkaline soils.
Mid-slopes/lower slopes	**Brown Vertosol** *A Horizon* – Dark Brown strong consistence clays. Moderate pedality (angular blocky 20-50mm) earthy face peds. pH 7.2-8.2 (neutral to alkaline). Depth 30 cm *B Horizon* – Dark Reddish Brown and Yellowish Brown clays. Moderate to strong pedality. pH 9.2 (alkaline). Depth 110 cm.	Derived from sandstone shale, mudstone, conglomerate, and coal parent material from the Singleton Coal Measures.	Moderate. Soils are generally not susceptible to sheet or gully erosion when managed to their correct capacity, as compared to duplex soils with sodic characteristics.	1. Exposure of subsurface archaeological materials due to erosion; 2. Moderate potential for substantial intact soil units containing archaeological deposits; 3. Alkaline soils tend to poorly preserve some organic materials i.e., wood and shell, but may preserve bone.
Lower slope (within drainage line); level to very gently inclined (0 – 3%)	**Brown Kurosol** *A Horizon* – Brown and bleached weak consistence sandy and clay loam. pH 5.5-5.9 (acidic). Depth 60 cm. *B Horizon* – Strong Brown moderate consistence sandy clay. Sandy fabric (sub angular blocky 100-200mm. pH 4.9 (strongly acidic). Depth 100 cm.	Derived from sandstone shale, mudstone, conglomerate, and coal parent material from the Singleton Coal Measures.	High. Soils are susceptible to sheet and gully erosion due to the high erodibility and dispersive nature of their subsoils. Incorrect management practices can lead to the topsoil being detached and cause enhanced erosion rates when the subsoil is exposed	1. Exposure of subsurface archaeological materials due to erosion; 2. Low potential for substantial intact soil units containing archaeological deposits; 3. Low preservation of organic remains (e.g. shell, wood) in alkaline soils. 4. Acidic soils tend to preserve biological material i.e., wood and shell.

Landform Element	Dominant Soils	Dominant Geology	Erosion Potential	Archaeological Implications
Flat/Gullies (creekline); level to very gently inclined (0-3%)	**Brown Sodosol** *A Horizon* – Dark Brown strong consistence clay loam. Moderate pedality. Earthy peds. Boundary is diffuse, even. pH 7.2-8.1 (neutral to alkaline). Depth 60 cm. *B Horizon* – Brown moderate consistence light clay. Moderate pedality (sub angular blocky 100-200mm) earthy peds. pH 9.1 (strongly alkaline). Depth 100 cm.	Derived from sandstone shale, mudstone, conglomerate, and coal parent material from the Singleton Coal Measures.	Moderate. Sheet erosion and gully erosion is likely if protective vegetative cover is removed.	1. Exposure of subsurface archaeological materials due to erosion; 2. Moderate potential for substantial intact soil units containing archaeological deposits; 3. Low preservation of organic remains (e.g. shell, wood) in alkaline soils.

4.6 Geomorphology

Examination of historic aerials and observations made during the field survey, indicate the vast majority of land within the Study Area has been continuously grazed since the late 19th century, an activity initiated by large-scale land clearing. Vegetation clearance is a process that often results in the soil degradation, erosion and structural damage to existing soils. Turvey, in his original geomorphological assessment for Bengalla (in White 1998 pp 144-165), notes that this was such a significant problem in the Study Area in the 1950s that a remediation program was implemented incorporating large-scale contour banking and damming across the Study Area. In addition, according to historical investigations (see Rich 1993; White 1998) rabbit infestations at Bengalla during the 1940s and 1950s completely stripped paddocks bare of vegetation leading to further soil erosion as exposed soils were washed away, typically into watercourses.

As shown in **Table 3**, and also noted by Turvey (in White 1998 pp 144-165), soils within the Study Area are susceptible to moderate and high degrees of erosion due to their dispersive nature. This susceptibility to erosion is accelerated by poor land management and vegetation clearance. Observations made during the field assessment noted the majority of the Study Area, with the exception of Dry Creek and its tributaries, retained relatively little topsoil, and often exhibited exposed underlying clay units. Sheet, rill and gully erosion, largely a result of vegetation clearance, being the likely cause. This was most evident adjacent to lower order creeklines and drainage lines in the western portion of the Study Area.

Archaeologically, areas of erosion and exposure are of particular importance as they provide the greatest visibility, and subsequently the greatest chance of identifying surface artefacts. However, in these environments the potential for stratified subsurface archaeological deposit is reduced dramatically as erosional forces, particularly in high-energy flood environments, may expose and subsequently transport artefactual material downstream. Artefact scatters identified on deflated surfaces i.e. where topsoils have been carried away, are best conceived as time-averaged palimpsests (see Shiner 2008), or more simply as artefact assemblages where single knapping events or activities that have occurred at different times, even thousands of years apart, are merged.

Areas of sediment deposition within the Study Area afford the greatest likelihood for the preservation of subsurface archaeological materials. A review of geomorphological data, including soil assessments, in conjunction with observation made during the field survey, indicates Dry Creek and its tributaries likely offer the only depositional environment in the Study Area. GSS Environmental (2012) noted the upper profile material along Dry Creek is likely derived from erosional processes upslope. As a result, soils associated with Dry Creek and its tributaries have the greatest potential for subsurface materials, albeit in varying condition as a result of the geomorphic processes described above. Observations made during the field survey are consistent with this assessment, identifying artefactual material actively eroding from an A horizon soil profile, between 30-40 cm in depth.

4.7 Flora and Fauna

Historically, land within the Project Boundary has been impacted by processes related to agriculture, in particular land clearing for grazing. Nonetheless, small patches of remnant woodland vegetation occur in the western portion of the Project Boundary that provides habitat for the majority of local flora and fauna. Archaeologically, areas of remnant vegetation are of particular importance as they have the potential to contain mature native trees with Aboriginal scars or carvings.

Broadly, two main structural types of vegetation occur within the Study Area: Woodland and Grassland. Woodland is a broad category of vegetation that is dominated by a canopy of relatively widely spaced trees, where the crowns of the trees do not usually touch. Grasslands, as the name suggests, are dominated by grasses, and canopy trees and shrubs are either absent or very rare. Boxgum woodlands are well represented in Study Area, with White Boxgum Grassy Woodland the most extensive wooded vegetation community (Cumberland Ecology 2012).

Fauna surveys undertaken for the Project by Cumberland Ecology (2012) found the Study Area did not support a great diversity of fauna species due to the simplified and highly modified habitat present. The survey identified 50 species of bird, 19 mammals, three amphibians and two reptiles.

While the flora and fauna present within the Study Area today is unlikely to directly correlate with that available in the past, it offers a general guide that, combined with ethnographic records, provides some, albeit limited, information on the resources available to Aboriginal people in the past.

Ethnographic records for the Wonnarua indicate that a number of plant species were exploited for food. Most commonly mentioned in ethnographic records are various types of bush fruits, roots and a particular species of water lily (see Fawcett 1898; Miller 1887). Archer *et al* (2004) provide a detailed and exhaustive list of plant species eaten by the Wonnarua which include fruits such as bush cherries (*Syzygium australe*), apple berry (*Billardiera scandens)*, and black plum (*Diospyrus australis*) that would have been picked and eaten directly from the bush. Flower species exploited include bluebells (*Wahlenbergia spp.*) its flowers being edible, bottlebrush (*Casllistermon salignus*) and other types of sweet nectars which could be used to sweeten water or sucked directly from the flower, and the native violet (*Viola hederacea*) its flowers also being edible. In addition to these, a variety of nuts, roots, and seeds were likely consumed including the pepperberry tree (*Crytocarya obovata*), the native parsnip (*Trachymene incise*) and pigweed (*Portulucia oleracia*) to name a few. The consumption of particular plant species within the Study Area would have been dependent upon their local availability.

Fauna species identified in ethnographic records include those often mentioned by early observers i.e. kangaroo, emu, reptiles and various species of birds and amphibians (Fawcett 1898; Miller 1887). However, as Brayshaw (1984) notes, ethnographic literature generally does not identify which species of macropod, aside from kangaroos and wallabies, were hunted by the Wonnarua. Brayshaw provides a summary of animal species exploited by the Wonnarua as described in ethnographic records that includes echidna, possums, flying foxes, bird species such as ducks, geese, swans and pigeons, goannas and snakes.

4.8 Land Use and Disturbance

The Upper Hunter region has a long history of rural land use for a variety of agricultural and industrial activities, predominantly grazing and coal mining. The current dominant land uses within and adjacent to the Study Area include open cut coal mining and agriculture, with a focus on cattle grazing. As a result of these land uses, land within the Study Area has sustained disturbances from a range of activities, including:

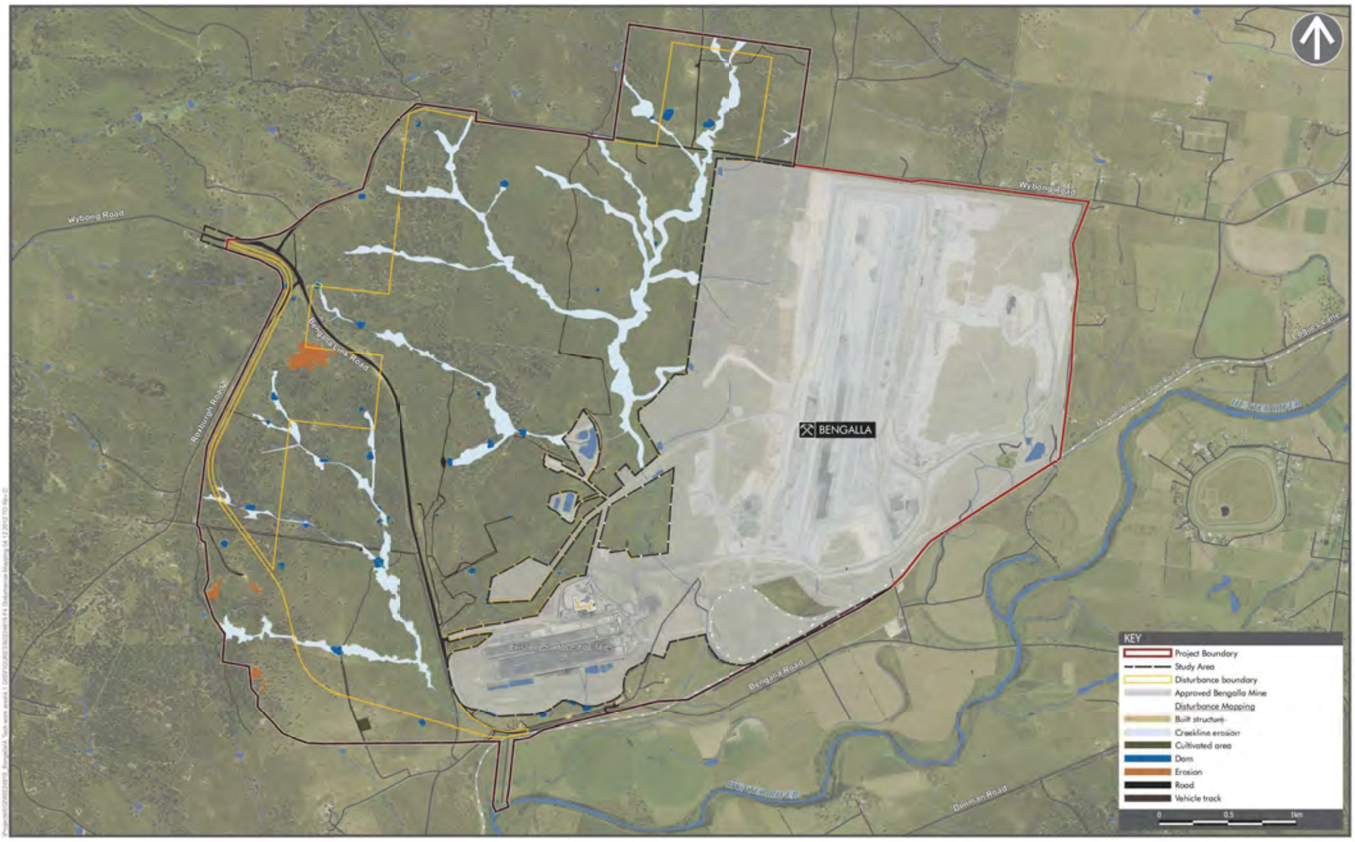
- Native vegetation clearance;
- Trampling from cattle grazing;
- Fencing works;
- Earthworks and excavation for damming;
- Topsoil disturbances from ploughing;
- Contour banking;
- Sheet, gully and rill erosion, particularly along creeklines;
- Landscape disturbances from construction of vehicle tracks;
- Landscape disturbances from the construction of farmhouses and associated buildings; and
- Landscape disturbances from coal mining activities including minor excavation for exploratory drilling activities.

Figure 3 provides disturbance mapping for the Study Area.

4.9 Implications for Aboriginal Archaeology and Cultural Heritage

Key observations drawn from a review of the existing environment of the Study Area are as follows:

- Environmental conditions discussed above, such as climate, access to fresh water, flora and fauna provide a basis to argue that land within the Study Area was sufficient to support repeated occupation by Aboriginal people;
- Evidence of occupation is likely to be found concentrated along/adjacent to creek lines where there is easy access to potable water and marine food resources. More intense evidence of Aboriginal occupation, in the form of higher artefact densities, is anticipated adjacent to Dry Creek, being the most significant creek line within the Study area, with lower densities along ephemeral feeder creeks and drainage lines.
- In topographic terms, the majority of the Study Area can be characterised as being suitable for occupation by Aboriginal people. This said, landforms most suited to repeated or intensive occupation activity include level to gently undulating/inclined flood/drainage plains, gently inclined foot slopes and flats (i.e. low gradient land surfaces).
- Stone suitable for the production of chipped and ground implements is available from both within the Study Area (quarry site B10 (37-2-0579)) and locally from the Hunter River gravels in the form of widely distributed surface deposits of pebble/cobble conglomerate.
- Native vegetation within the Study Area has been extensively modified as a result of European land use practices. Nonetheless, areas of remnant woodland have the potential to contain trees with cultural scarring. Scattered mature paddock trees may likewise exhibit scars.
- Prior to European occupation, the floral and faunal resources of the Study Area would have been sufficient to facilitate intensive and/or repeated occupation by Aboriginal people; and
- Erosion is common and widespread throughout the Study Area, likely being caused by extensive vegetation clearance from previous farming activities and rabbit infestations in the 1940s and 1950s. As a result, those areas where erosion is evident will generally offer poor potential for stratified archaeological deposit. Dry Creek and its tributaries likely offer the only depositional environment in the Study Area and therefore have the greatest potential for subsurface deposit.



AECOM

DISTURBANCE MAPPING
Bengalla Continuation of Mining Project
Aboriginal Archaeological and Cultural Heritage Impact Assessment

FIGURE 3

5.0 Ethnographic Context

Information regarding the ways in which Aboriginal people used the pre-contact landscape is available to archaeologists through two primary sources: archaeological data and ethnohistoric records. **Section 6.0** has summarised the archaeological context of the Study Area on both a regional and local scale. This section builds on this foundation by summarising relevant ethnohistoric information for the Study Area and its environs. As in other parts of Australia, Europeans living in the Hunter regions began to document Aboriginal culture from first contact, with explorers, missionaries, settlers and the like recording their encounters with, and observations of Aboriginal people and their material culture in letters, journals and official reports. Most of these accounts are overtly Eurocentric in tone and content and the veracity of some is, at best, questionable. Nonetheless, taken together, they form an important source of information on Aboriginal lifeways at the time of British colonisation and can, in conjunction with available archaeological data, be used to generate working predictive models of Aboriginal land use practices.

5.1 The Wonnarua

Prior to European settlement, the Muswellbrook district is thought to have been inhabited by people of the Wonnarua language group (many spelling variations include Wanaruwa, Wanarua, Wanaruah, Wannarawa, Wannerawa, Wonarua, Wonnah Kuah, Wonnuaruah). Key published sources for the Wonnarua language and peoples include primary ethnographic resources such as Threlkeld (in Gunson 1974), Howitt (cited in Brayshaw 1966), Mathews (1898; 1903), Enright (1901), Curr (1886), Fawcett (1898), and Miller (1887). A summary of some key features of the Wonnarua's way of life and material culture is provided below.

The Wonnarua language group covered a relatively small area of some 5,200 km^2 which, according to Tindale (1974), straddled the Upper Hunter Valley and extended from just west of Maitland and Kurri Kurri to the Dividing Range (just west of Widden Brook). The Wonnarua's lands border Darkinjung territory to the south near Wollombi, the Worimi and Awabakal of the Lower Hunter to the east near Maitland, and the Geawegal to the north near Muswellbrook.

While there is general acceptance of the boundaries of the Wonnarua, there is some evidence to suggest the Geawegal and Wonnarua were part of the Kamilaroi. Ethnographic accounts by Threlkeld (cited in Gunson 1974) and Mathews (1903) suggest Kamilaroi territory extended as far south as Jerrys Plains, into what is now referred to as Wonnarua territory. However, other early sources make a clear distinction between the two groups such as Howitt (cited in Brayshaw 1966) who states 'the Wonnarua, who were closely affiliated with the Kamilaroi, occupied the Valley from here to Merriwa in the Goulburn Valley'. Despite the conflicting evidence, it is almost certain that Aboriginal people living in the Muswellbrook or Jerrys Plains area were linked culturally, if not directly, to their Kamilaroi neighbours.

Population density for the Wonnarua is difficult to estimate, and certainly pre-European numbers have not been estimated with any accuracy. Various historical accounts of early European interactions with the Wonnarua, cited by Brayshaw (1987), suggest relatively low numbers for that language group. For example, five individuals were observed by John Howe near Jerrys Plains in 1819. In 1824, fifteen Aborigines visited Dangar's camp at Dart Brook, and soon after a group of 150 attacked his party just beyond the Liverpool Range. These figures tend to correlate with the low population numbers provided by early European accounts. However, Brayshaw (1987) suggests that actual numbers were likely higher citing an observation by a settler of 300 Aboriginal men at Patricks Plains in 1824, west of Cessnock and an official report indicating 200 participated in an attack on Merton at the junction of the Goulburn and Hunter Rivers in 1826 (Brayshaw 1987: 47). Curr (1886), on the other hand, stated that the Wonnarua numbered 500 individuals in 1841, a number supported by Fawcett (1898).

The social organisation of the Wonnarua prior to European settlement is also difficult to establish. As Brayshaw (1987) suggests it was not until the second half of the 19th century, after a significant breakdown of traditional Aboriginal life, that people such as A.W.Howitt, R.H.Mathews and W.J.Enright began to show interest and note details regarding Aboriginal social organisation. Despite this, utilising available information on the Wonnarua and drawing on broader knowledge of Aboriginal society it is possible to make general statements about the Wonnarua's social organisation.

The Wonnarua's social structure likely comprised of many self-governing units, with the smallest residential units known as hearth groups. These typically would have consisted of a man, his wife or wives and their dependent children. Several hearth groups camped together temporarily forming slightly larger residential units of perhaps 40 to 60 people (Lourandos 1977; O'Rourke 1997), who cooperated in hunting and gathering. The largest residential groupings consisted of either seasonal (summer) band aggregations or irregular ceremonial band aggregations forming local communities of at least 150 people. Residential units formed clans which were closely linked to the land they ranged. The tribe consisted of an agglomeration of clans, and the members of each tribe shared the same language, social customs and territory situated within specific but elastic geographical units (Vinnicombe 1980).

Wonnarua habitation patterns are equally difficult to interpret due to a paucity of evidence. However, Fawcett (1898), in a key statement discussing the Wonnarua, states that in choosing their campsites the Wonnarua considered 'proximity to fresh water was one essential, some food supply a second, while a vantage ground in case of attack from an enemy was a third'. Archaeological evidence available for the Hunter Valley, which indicates proximity to creeklines i.e. potable water sources, was the key determinant in the Aboriginal people's choice of campsite, is suggestive that Fawcett was correct in his assessment. Mathews (cited in Brayshaw 1966) also makes the observation of the Aboriginal people camping near Broke that they camped 'in a romantic spot on the bank of Wollombi Brook'.

As discussed in **Section 4.7**, the Wonnarua consumed a variety of animal and plant resources, in what was likely a seasonal dietary cycle. Fawcett (1898) notes a number of animals exploited by the Wonnarua including kangaroos, emus, wallabies, bandicoots, kangaroo rats, opossums, rats, emus, snakes, lizards, fish, caterpillars, grubs, lava of wasps and other insects, birds and reptiles. These they either roasted, or baked in heaps of cinders or stone, as a form of oven (Miller 1886). Various plant foods were also exploited for food and medicine including bush fruits, roots, and yams (see Archer et al. 2004; Brayshaw 1987; 1966; Fawcett 1898).

Available ethno-historic records attest to the manufacture and use of a diverse range of material culture utilised by the Wonnarua people. Brayshaw quotes a number of ethnographic sources including Threlkeld (in Gunson 1974), Caswell (1841) and Dawson (1830) (cited in Brayshaw 1966) who all describe the use of huts or 'gunyers', constructed from bark, as the most widely used habitation structure. These accounts describe how large sheets of bark were cut or stripped from tea, box or stringy bark trees, heated on a fire, and supported by three forked sticks to form a shelter. A similar process is said to have been used to obtain bark for canoes (Threlkeld in Gunson 1974). Enright (cited in Brayshaw 1966) notes that generally canoes were cut from large river gum trees (*Eucalyptus spp*) and also the kurrajong (*Brachychiton spp*).

Brayshaw (1966) cites a large list of items, largely from Enright's collection of implements, as utilised by the Wonnarua. These include a variety of spears for fishing, hunting and war, probably from the grass tree *Xanthorrhea arborea*; wommeras or spear throwers, usually about three feet in length; boomerangs, both returning and non-returning; yam-sticks; shields, of both wood and bark; waddys or clubs made of hard wood, probably mangrove (*Avicennia officinalis)* or white ironbark (*Eucalyptus paniculata*); axe heads (of basalt), both hafted non-hafted axes (see Fitzpatrick cited in Brayshaw 1966) used for cutting toe-holds to aid tree climbing, removing bark for huts and canoes, cutting possums out of trees, and removing bandicoots or kangaroo rats from hollow logs; stone implements, including gouges, knives and scrapers constructed from a variety of raw material; koola-man or wooden bowls for holding water, seeds, grubs etc; nets (turrila) and fishing line from the bark of various trees including the cabbage-tree (*Livistona australis*) and the kurrajong (*Brachychiton populneus*) for catching fish; fish hooks from oyster shells; a variety of bone implements including needles for sowing; and clothing made from opossum skins, including cloaks.

Spiritual authority was vested in a large number of supernatural beings. Throughout southeastern Australia, one of the most important was a belief in a sky deity *Baiami* ('The Great Shaper,' 'Thunder-God' or 'Great One'). Baiami formed the world by shaping the cosmos from a pre-existing primeval void (O'Rourke 1997). According to Berndt (1947), he had two wives, Biragnulu and Gunambali, and a son called Daramalan. Both Baiame and Daramalan were thought to return to earth during certain initiation rituals (Berndt 1947), and are often depicted in rock engravings or paintings (see Attenbrow 2010).

The Wonnarua are known to have utilised several methods to dispose of their dead, each involving varying degrees of ritual (Brayshaw 1966). The most common method recorded, as supported by archaeological evidence (see Dyall and Bentley 1973, 1975 cited in Brayshaw 1987; Donlon et al. 2003), was burial in the earth. Brayshaw (1966) notes the position of the body was varied and could be extended or flexed, face down, on its side or face up and the use of bark as a burial shroud was widespread. In some instances, articles belonging to the deceased have been were buried with them (see Donlon et al. 2003).

6.0 Archaeological Context

6.1 Regional Archaeology

Formal archaeological interest in the Aboriginal archaeological record of the Hunter River Valley can be traced to the early 1940s (McCarthy & Davidson 1943). However, concentrated investigation of this record did not begin until the mid-to-late 1970s, a period marked by a rapid growth in the Valley's coal mining industry as well as affiliated development (see Moore 1967, 1969, 1970 for important early survey and excavation work). Intensive development activities since this time have secured the Hunter Valley's place as one of the most intensively investigated archaeological regions in Australia, with hundreds of Aboriginal archaeological investigations involving survey and/or excavation having been undertaken. The vast majority of these being undertaken as part of larger Environmental Impact Assessments associated with coal mining projects in the Central Lowlands subregion (Story et al. 1963). Not surprisingly, these investigations have varied significantly in scale and scope, ranging from targeted small-scale surveys to complex, multi-phase survey and excavation projects over large areas. Nonetheless, together, they have revealed a rich and diverse record of past Aboriginal occupation, with thousands of Aboriginal archaeological sites now registered on OEH's Aboriginal Heritage Information Management System (AHIMS) database. Fortunately, several useful syntheses of previous Aboriginal archaeological work within the Hunter Valley are now available (e.g., ERM 2004; Hughes 1984; Koettig 1990; MacDonald & Davidson 1998). Together with Dean-Jones and Mitchell's (1993) pioneering environmental study, these syntheses provide a suitable interpretive framework for the current assessment. Key findings are detailed in brief below under three thematic sub-headings.

6.1.1 Open Artefact Sites: Distribution, Contents and Definition

Surface distributions of stone artefacts, variously referred to as artefact scatters, open sites, open camp sites, are by far and away the most common and widely distributed form of Aboriginal archaeological site in the Hunter Valley (ERM 2004; Hughes, 1984;Koettig, 1990; MacDonald & Davidson, 1998). Other site types, such as scarred trees, shell middens, quarries, grinding grooves, burials and rock shelters with deposit and/or art or PAD, have also been identified but are comparatively rare. Accordingly, open artefact sites remain the most intensively investigated component of the Aboriginal archaeological record of the Hunter Valley, with site distribution, contents and definition forming key research/discussion topics. Internal site structure has also generated some interest (e.g., Brayshaw & Haglund, 1984; Koettig, 1994;Rich, 1992) but remains to be investigated in detail.

As highlighted by Hughes (1984), and reiterated by numerous other researchers (e.g., ERM 2004;Koettig & Hughes, 1983, 1985; Koettig 1992,1994;Kuskie, 2000; Rich, 1992) consideration of the distribution of open artefact sites within the Hunter Valley indicates a strong trend for their presence along watercourses, specifically, on river/creek banks, terraces and adjacent 'flats' (i.e., flood/drainage plains). Although this patterning is, to a significant degree, a product of both geomorphic dynamics and archaeological sampling bias i.e. extensive fluvial erosion activity along watercourses resulting in generally higher levels of surface visibility and subsequently the focus of archaeological survey. Nevertheless, despite these factors, this pattern of site distribution is supported by the results of several large scale Aboriginal archaeological salvage projects incorporating surface collection and excavation (e.g. Haglund 1992; Koettig 1992, 1994; Kuskie 2000; MacDonald & Davidson, 1998; Rich 1992).

Moreover, these projects have indicated that assemblage size and complexity tend to vary significantly in relation to both the proximity and permanency of potable water sources as well as landform, with larger, more complex assemblages (i.e., those containing a wider variety of raw materials and technological types and/or higher mean artefact densities and features such as hearths and knapping floors) concentrated on landform elements adjacent to major watercourses. Artefact distributions associated with ephemeral watercourses and other non-adjacent landform elements (e.g., mid- and upper slopes, ridgelines), meanwhile, have typically taken the form of a low-density artefact scatters often referred to as 'background scatter'.

Flaked stone artefacts dominate archaeological assemblages from recorded open artefact sites within the Hunter Valley (Hiscock 1986). However, items such as complete and fragmentary grindstones, charcoal, animal bone, shell and ochre have also been recorded at some sites. With the notable exception of 'knapping floors', a relatively common component of the open artefact site record of the Hunter Valley, associated archaeological features (i.e. hearths and pits) are rare (e.g., Koettig, 1992). Defined in slightly different ways by different researchers, following White (1999: 152), knapping floors can be broadly defined as "activity areas in which primacy was given to the reduction of one or more blocks of stone".

Recorded knapping floors vary considerably in size and complexity, with some examples (e.g., Koettig, 1994; Rich, 1992) containing thousands of artefacts and attesting to the reduction of multiple blocks of differing raw materials. Backed artefacts (i.e. Bondi points and geometric microliths) are a common feature of knapping floors. At Narama, near Ravensworth, a detailed analysis of the contents of knapping floor and non-knapping floor assemblages revealed significant differences between the two, including variation in the frequency of backed artefacts, other retouched and/or utilised tools, cores and the application of different reduction strategies (Rich 1992). Together with differences in the spatial distribution of the two forms of assemblage, this evidence was used to suggest that backed artefact production within the Narama landscape was a highly structured activity, and that knapping floors assemblages were the product of a more restricted range of behaviours than more generalised scatters. Although limited to a single landscape, evidence from other parts of the Valley (e.g., Hiscock 1986; Koettig 1992, 1994) supports the suggestion that backed artefact manufacture was a highly structured activity.

Although relevant to a variety of site types, geomorphic processes such as soil erosion and deposition are of particular relevance to the identification and definition of open artefact sites. As in other archaeological contexts (e.g., Fanning & Holdaway 2004; Fanning *et al*. 2009; Holdaway *et al*. 2000), it is now widely accepted by archaeologists working in the Hunter Valley that the visibility and preservation of open artefact sites in this region are, to a significant extent, products of contemporary, historic and prehistoric geomorphic processes which have, and continue to act variously to expose, obscure and destroy them (Dean-Jones & Mitchell 1993). As demonstrated by numerous large scale salvage projects in the Valley (e.g., Haglund 1992; Koettig 1992, 1994; Kuskie 2000; MacDonald & Davidson, 1998; Rich 1992) surface artefacts invariably represent only a fraction of the total number of artefacts present within recorded open artefact 'sites', with the majority occurring in subsurface contexts. Artefact exposure, unsurprisingly, is highest on erosional surfaces and lowest on depositional ones (cf. Fanning & Holdaway 2004; Fanning *et al*. 2009). Furthermore, in many areas, surface artefacts have been shown to form part of more-or-less continuous subsurface distributions of artefacts, albeit with highly variable artefact densities linked to environmental variables such as distance to water, stream order and landform (e.g., Kuskie & Clarke 2004; Rich 1992).

6.1.2 Bondaian Stone Tool Technology

Chipped stone artefacts are a ubiquitous element of the Aboriginal archaeological record of the Hunter Valley. As in other parts of the state (e.g., Attenbrow 2010;Shiner 2008), this ubiquity has not only resulted in a long history of research but also guaranteed stone artefacts a prominent position in archaeological reconstructions of past Aboriginal land use in the region. To date, hundreds, if not thousands of surface-collected and excavated chipped stone assemblages from the Valley have been analysed, with individual assemblage sizes, research questions, aims, analytical methodologies and terminological schemes varying significantly between researchers and projects. Studies to date have ranged from basic descriptive accounts of assemblage composition in typological terms to detailed reconstructions of specialised knapping strategies through technological and metric attribute analyses, conjoining and, in some instances, experimental research. Particularly informative and/or influential analyses in the context of the Hunter Valley include those by Hiscock (1986a, 1986b,1993), Koettig (1992, 1994) and Moore (1997, 2000).

As highlighted by Koettig (1994) and others (e.g., Hiscock 1986a; Hughes 1984), available technological and typological data for surface collected and excavated chipped stone artefact assemblages from the Hunter Valley suggest that the vast majority of these assemblages belong to what is known as the 'Australian Small Tool Tradition'. This term was coined by Gould (1969) to signal the appearance, in mid-Holocene, of a new suite of chipped stone tool forms in the Aboriginal archaeological record of Australia, including Bondi points, geometric microliths, adzes and points, both unifacially and bifacially flaked. Complex hierarchically-organised reduction sequences associated with the production of these tools contrast markedly with the simple chaining of earlier periods (Moore 2011). Tools of the 'Australian small tool tradition', it has been suggested, formed part of a portable, standardised and multifunctional tool kit aimed specifically at risk reduction (Hiscock 1994; 2006). Stone artefact assemblages from late Pleistocene and early Holocene contexts, in contrast, are described by archaeologists as belonging to the 'Large Core and Scraper Tool Tradition', a term first used by Bowler *et al*. (1970) to describe the Pleistocene assemblages recovered from Lake Mungo in western New South Wales. Bowler *et al*. (1970) saw the main components of these assemblages - core tools, steep-edged scrapers and flat scrapers - as characteristic of early Australian Aboriginal assemblages and as being of a distinctly different character to those appearing in the mid-Holocene around 6,000 BP and persisting into the contact period (i.e., the last 200 years). In eastern Australia, including the Hunter Valley, these later assemblages (i.e., those belonging to Gould's (1969) 'Small Tool Tradition') are referred to as 'Bondaian' assemblages (after McCarthy 1967).

Mid-to-late Holocene Aboriginal knappers in the Hunter Valley utilised a diverse range of lithic raw materials for chipped stone artefact production (Hughes 1984). However, two rock types - silcrete and indurated mudstone - were clearly favoured for this task (Hiscock 1986a). Alongside other, less commonly exploited raw materials, including quartz, quartzite, petrified wood, chalcedony, chert, porcellanite and local volcanics, both are available in the gravels of the Hunter River and its tributaries, occurring in pebble, cobble and, in the case of silcrete, boulder form (Raggatt 1938; see also Hiscock 1986a:14-16). Notably, studies by Esteves (1998) and MacDonald and Davidson (1998) have indicated spatial variability in the availability of silcrete and mudstone gravels along the Hunter River, with neither rock type continuously distributed, but rather, available at localised points. This evidence notwithstanding, on the basis of available data, it would appear that gravels associated with the Hunter River and its major tributaries functioned as *the* primary source of lithic raw materials for Aboriginal chipped stone artefact manufacture during mid-to- late Holocene. Other exploited sources are known (e.g., AECOM 2011; Dean Jones 1990, 1992; Mills 2000). However, reduction evidence at these locations has tended to take the form of a low density background scatter of flaked cobbles and flakes, suggesting relatively non-intensive on-source reduction (e.g., AECOM 2011; Mills 2000).

In the Hunter Valley, asymmetrical and symmetrical backed artefacts dominate the retouched components of surface collected and excavated chipped stone assemblages. Accordingly, the technology of backed artefact manufacture has been a particular focus of research (e.g., Baker 1992; Hiscock 1993; Koettig 1992; 1994a). Studies by Hiscock (1986a, 1993), Moore (1997; 2000) and others (e.g., (Baker 1992; Koettig 1992; Witter 1995; 1999) have demonstrated that backed artefact manufacture in the Hunter Valley was a highly structured activity involving a complex system of raw material procurement, transportation, preparation and reduction. Differences in the technological character of recovered cores and conjoin sets across the Valley indicate a significant degree of variability in the strategies used by Aboriginal knappers to produce blanks for backed artefact manufacture (**Figure 4**). Heat treatment, significantly, appears to have been integral component of the backed artefact manufacturing process in the Hunter Valley, with evidence for the thermal alteration of stone packages prior to reduction both abundant and widespread. As Hiscock (1993:66) has observed, “the thermal alteration of Hunter Valley silcrete drastically improves flaking qualities and increases the lustre and smoothness of the fracture surface”. Compared with silcrete, evidence for the thermal alternation of indurated mudstone blanks is rare (e.g., Koettig 1992) and likely reflects the naturally higher flaking quality of this material.

Alongside the reconstruction of backed artefact manufacturing processes, the identification of diachronic change in Bondaian lithic technology in the Hunter Valley has received considerable analytical and interpretive attention (e.g., Baker 1992, Dean Jones 1992; Haglund 1989; Hiscock 1986a, 1986b; Koettig 1992; Rich 1991). Hiscock’s (1986b) pioneering attribute analysis of a sample of unretouched mudstone flakes recovered from Sandy Hollow 1 rockshelter (Moore 1970) is of particular significance in this regard and can be considered the foundation upon which all other studies have been undertaken. This analysis sought to test a tripartite division of the Sandy Hollow 1 (SH1) assemblage made on the basis on chronological changes in backed artefact frequency (Hiscock 1986b:42). Three phases were recognised: Pre-Bondaian, Phase I Bondaian and Phase II Bondaian. Attribute analysis of a sample of 742 complete mudstone flakes from Square AA revealed technological changes consistent with this division, including, but not limited to, changes in the relative frequency of platform preparation and overhang removal as well as flake shape and platform size. Having established the validity of the three phase Bondaian sequence at SH1, Hiscock (1986b) applied the same attribute analysis to a series (n = 15) of chipped stone assemblages recovered from open artefact sites on the Mount Arthur North and Mount Arthur South coal leases and found that individual assemblages could be assigned to one of the three Bondaian phases recognised at SH1. On the basis of this evidence, Hiscock (1986b) proposed that the attribute analysis employed at SH1 could serve as a relative dating system for open sites in the Hunter Valley. Given the number of such sites within the region, this argument was particularly groundbreaking and has prompted several archaeologists to apply Hiscock’s analysis to assemblages from other areas, albeit with mixed success (e.g., Baker 1992; Dean Jones 1992; Haglund 1989; Koettig 1992; Rich 1991). Difficulties in replicating Hiscock’s results, Holdaway (Holdaway 1993:29) notes, can be linked, at least in part, to spatial variability in the methods used by Aboriginal knappers to reduce stone, variability itself prompted variables such as raw material type and accessibility, site function and stylistic differences between Aboriginal groups. As Hiscock (1984) himself has observed, different stone artefact technologies are likely to have both temporal *and* spatial components.

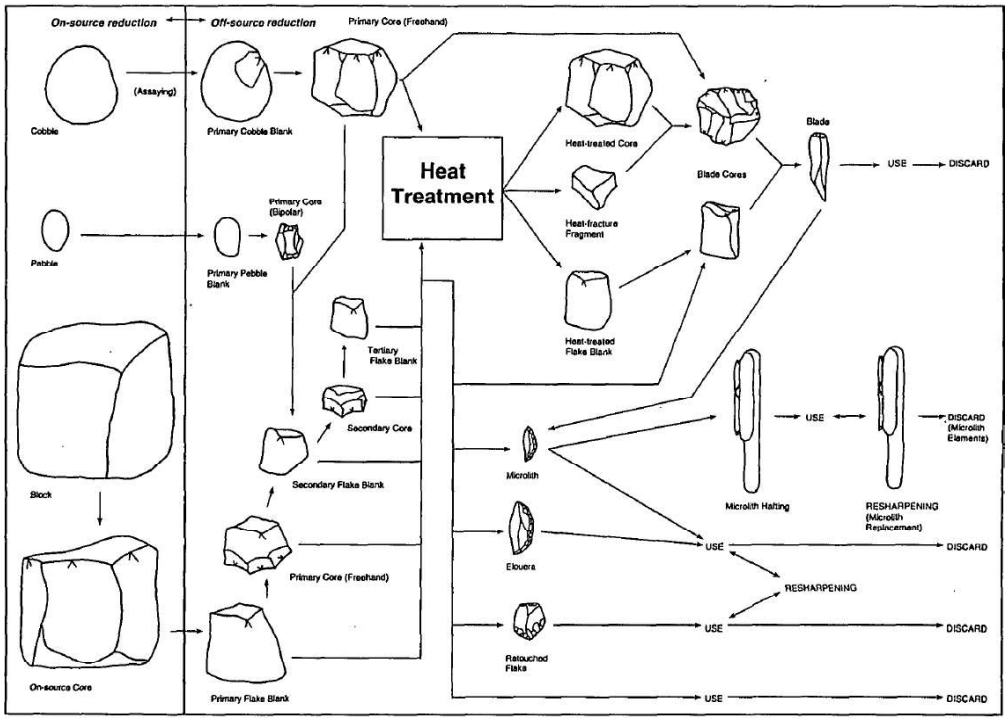


Figure 4: Moore's (2000) reduction model for the technology of Hunter Valley microlith assemblage (after Moore 2000: 29, Figure 5)

6.1.3 Chronology and Texture-contrast Soils

With some modification, McCarthy's (1967) *Eastern Regional Sequence* (ESR) of stone artefact assemblages remains the dominant chronological framework for Aboriginal prehistory in the Hunter Valley. The ERS hypothesises a three phase sequence of 'Capertian' (earliest), 'Bondaian' and 'Eloueran' assemblages and was developed on the basis of McCarthy's (1948; 1964) pioneering analyses of stratified chipped stone assemblages from Lapstone Creek rockshelter (McCarthy 1948), on the lower slopes of the Blue Mountains eastern escarpment, and Capertee 3 rockshelter (McCarthy 1964), in the Capertee Valley north of Lithgow. Hiscock's (1986b) three phase sequence notwithstanding, McCarthy's ESR is routinely characterised by archaeologists working within the Hunter Valley as a four-phase sequence, with the term Capertian retained and 'Bondaian' subdivided into three phases: Early Bondaian, Middle Bondaian and Late Bondaian[1] (**Figure 5**). The tripartite division of the Bondaian is based principally on the introduction and subsequent decline of backed artefact manufacture. However, other factors, such as changes in the abundance of bipolar and quartz artefacts, and the presence/absence of edge-ground axes are also relevant.

As in other parts of the state (e.g. Attenbrow 2010) evidence for Pleistocene and/or early Holocene Aboriginal occupation of the Hunter Valley is rare, with confirmed or potential terminal Pleistocene and/or early Holocene assemblages obtained from just five sites (Baker 1994; Hughes et al. 2000; Hiscock et al. 2000; Koettig 1986b; Kuskie 1999), one of which (i.e., Moffats Swamp Dune: Baker 1994) is located within the Valley's Coastal Plain. Significantly, studies by Koettig (1990), Baker (1994) and Kuskie (in prep), suggest that the chipped stone technology employed by Aboriginal knappers occupying the Hunter Valley during the terminal Pleistocene/early Holocene was part of the 'Large Core and Scraper tool Tradition'. This technology appears to have been focused on the opportunistic or non-specific reduction of early reduction cores (*sensu* Moore 2000) - some of which were very large. Core reduction appears simply to have geared towards the production of robust flakes for immediate use or retouch into simple scrapers, with no evidence for the complex hierarchically reduction sequences typical of the mid-to-late Holocene. Tool edges, Moore (2000:36) notes, were refurbished by unifacial retouching. A preference for volcanic materials over silcrete and mudstone has also been noted (Baker 1994; Koettig 1990, 1992:5). Heat treatment, meanwhile, is not reported for the early Hunter Valley assemblages.

[1] The Late Bondaian is equivalent to McCarthy's Eloueran phase.

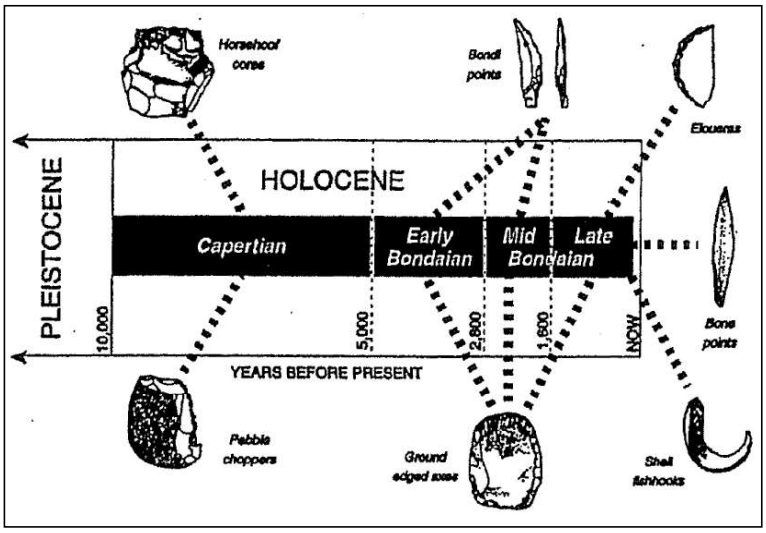


Figure 5: McCarthy's Eastern Regional Sequence (ERS) (from MacDonald and Davidson 1998: 105, Figure 5.1)

Critical to discussions concerning the chronology of Aboriginal occupation within the Hunter Valley is the genesis of the texture contrast or duplex soils that are associated with the vast majority of identified open artefact sites within the region (Dean Jones and Mitchell 1993). As Kuskie and Clarke (2004: 228) have pointed out, an understanding of the genesis of these soils, defined by Hughes (1984: 26) as those consisting of "an A horizon of massive, sandy to silty material which gives way abruptly down the profile to clayey material with a blocky structure", is critical for determining both the potential antiquity and integrity of any Aboriginal archaeological materials contained within them. Of particular relevance to archaeologists is the observation that whilst the 'A' and 'B' horizons of some texture contrast soils do, in fact, form a pedogenetical entity, having formed from *in-situ* weathering of parent materials, this is not always the case, with some 'A' horizons representing later colluvial deposits (Dean Jones and Mitchell 1993). In the Hunter Valley, available radiocarbon determinations and typological data for chipped stone assemblages recovered from excavated 'A' soil horizons provide overwhelming support for Hughes' (1984:28) widely cited suggestion that these soil horizons are sedimentary in origin and accumulated over the last 5,000 years. In contrast, Pleistocene dates for archaeological material in the Hunter Valley, confirmed through carbon dating of charcoal, have been associated with B unit soils (see Koettig 1986).

This said, as highlighted by Kuskie and Clarke (2004: 232), the paucity of information currently available on 'A' soil horizons between the last glacial maximum and late Holocene, precludes definitive comment on the maximum potential age of archaeological material within these horizons. As they quite rightly suggest, it is important that each locality be assessed independently given the complex interplay of pedogenetic and sedimentological processes that may have operated on the 'A' horizon within it. In contrast, Pleistocene dates for archaeological material in the Hunter Valley, confirmed through carbon dating of charcoal, have been associated with B unit soils (see Koettig 1986).

Drawing, in particular, on Mitchell's (1988) model for the genesis of duplex soils on hillslopes in the Sydney Basin, Dean Jones and Mitchell (1993) have suggested that rainwash (i.e., raindrop agitated surface flow) and bioturbation are crucial to the formation of texture contrast soils in these contexts. Following Mitchell (1988), they identify rainwash as the primary sediment transport mechanism operating on slopes but argue that, in isolation, slope transport will not result in a texture contrast profile. Duplex profiles, they suggest, will only form in situations where slope transport "combines with rapid rates of shallow bioturbation, especially soil mixing and mounding by organisms such as ants, termites and earthworms" (Dean Jones and Mitchell 1993: 43). Interestingly, Dean Jones and Mitchell (1993:43) attribute the development of stone layers between A and B horizons, a widespread geomorphological phenomenon in the Hunter Valley, to the down profile movement or 'sinking', over time, of stones through bioturbation. Stone layers, they suggest, will form at the level where bioturbation agents cease operating.

Bringing this and other observations to bear on the Aboriginal archaeological record the Hunter Valley, Dean Jones and Mitchell (1993:44) have suggested that the key archaeological implications of Mitchell's (1988) genesis model are as follows:

1. Duplex soils do not necessarily indicate great age;
2. Open sites located on texture contrast soils can never be truly stratified in a chronologically useful sense;
3. Stone artefacts on open sites will behave in the same way as natural stones on a hill slope and will be subject to surface dispersion, downslope movement, and differential burial or exposure, by bioturbation agents and will commonly form a stone layer; and
4. The only possible means of dating open sites in any meaningful way will be from artefact cultural sequences developed on the basis of stratified assemblages and/or intact hearths. All other dates, especially those based on detrital charcoal, will be spurious.

More broadly, Dean Jones and Mitchell (1993) and Hughes (2000) have highlighted a series of geomorphic contexts within the Hunter Valley that they believe represent favourable locations for the preservation of Pleistocene and/or early Holocene archaeological evidence. These include:

- Rock shelters and large middens;
- Source bordering dunes;
- The distal portions of low angle alluvial fans;
- Stream junctions where each tributary has a different rate of sediment supply; and
- Colluvial deposits at the base of steeply inclined surfaces.

6.1.4 Occupation Models

Existing models for Aboriginal site occupation in the Hunter Valley region are summarised in Table 4.

Table 4: Existing Models for Aboriginal Site Occupation in the Hunter Valley Region

Researcher(s)	Location	Summary of Model
Dyall 1980	Mt Arthur	Dyall proposed that creek confluences or junctions were most commonly used landforms for Aboriginal campsites.
Hughes 1984	Hunter Valley	Hughes proposed the often-quoted model of Aboriginal campsite location as commonly being found within 50 m of watercourses. Hughes argues that site sizes will diminish as the size of the watercourse decreases.
Koettig 1994	Central Lowlands	Utilising the results of salvage excavations at Camberwell and Bulga and ethnographic accounts from central Australia, Koettig proposes camps were ordered according to strict rules based on: the location of water sources, the size and composition of the group or groups camping, and the length of the stay. Koettig further proposes: • Where occupation is infrequent, archaeological features at a site may be widely distributed and relatively infrequent. • If, over time, occupation episodes are overprinted at the same site, then the evidence from different activity areas would be closer together and even superimposed. • The longer the stay of groups at a campsite the more types of activities should be reflected and the greater should be the disturbance of occupation debris on the ground.
Witter 1995	Hunter Valley	Witter proposed that most open artefact scatters as being, for the most part, peripheral to one or more base camps near the Hunter River or its major tributaries.
Dean-Jones, Pam & Mitchell 1993	Hunter Valley	Dean-Jones and Mitchell found that while the large majority of sites in the Hunter Valley have been distributed along drainage lines, there is potential for occupation to be associated with ridgelines as they provide linkage routes across the landscape. Elevated positions, particularly adjacent to fresh water supply are also noted as favourable occupation sites. Other landscapes such as terraces and mid slopes are also given preference, particularly during colder months when lower terrain may have been subject to frost hollow effects, and insects. Larger sites were noted to occur in valleys, as a result of greater resources.
Rich 1995	Mt Pleasant	Rich argued that Aboriginal people making use of the Mt Pleasant area used technological solutions in conjunction with other strategies for survival. Groups were mobile occupying residential bases for one or several days. At such locations, they may have carried out a range of activities including stone tool production and maintenance, use of stone tools to make and maintain items, food processing and cooking, and other social/domestic tasks. From these residential bases, they might have made trips to the surrounding areas to produce food and various materials.
Kuskie 2000a	Mt Arthur North	Kuskie's work indicated that the entire landscape was utilised by Aboriginal people to varying extents. Kuskie refines Hughes' (1984) model that relates Aboriginal occupation sites adjacent to watercourses, by proposing that level to gently inclined landforms were preferred. Kuskie also finds that occupation sites are more commonly associated with 3rd and 4th order creeks. Vantage points are noted as important features for Aboriginal occupation sites. Kuskie found that Aboriginal people used and occupied the entire Mt Arthur North area but at varying intensities and at different times.

6.2 Local Archaeology

This section summarises a selection of Aboriginal archaeological assessments that have been carried out in the environs of the Study Area.

6.2.1 Kuskie

Kuskie (2000a) *An Aboriginal Archaeological Assessment of the Proposed Mount Arthur North Coal Mine, Near Muswellbrook, Hunter Valley, New South Wales.*

Kuskie (2000a) conducted an assessment of the Mt Arthur North lease area prior to proposed mining activities. The assessment examined 244 ha (6.6%) of the total Mt Arthur North lease area (3,700 ha). Unlike previous surveys, Kuskie (2000a) based his survey on a system of Archaeological Terrain Units (ATUs) i.e. landscape divisions based on a combination of landform elements and slope class. Archaeological survey areas were segments of an ATU that were surrounded on all sides by a different ATU. Kuskie (2000a) recorded artefactual materials in terms of *sites* (defined as the presence of one or more artefacts in a survey area – when an artefact is found in a survey area the whole survey area is regarded as a site) and *site loci* (spatially separate locations of evidence within a site).

The assessment identified a total of 305 sites within the survey area, 112 of which were previously recorded. Of these sites, 304 were stone artefact scatters and one was a grinding groove site – the same site (#37-2-0111 – Fairford 1) recorded by Dyall (1980a). The sites were recorded in 1,188 separate site loci, which ranged in size from 0.3 m^2 to 60,000 m^2 and averaged334 m^2. Sites comprised of 1 to 21 site loci, but averaged two separate site loci. Total site size ranged from 540 m^2 to 1,444,487 m^2. Kuskie (2000a) calculated that the sites occupied 81% of the whole Mt Arthur North EIS area. This figure is derived from the practice of defining a whole survey area (Kuskie's definition of survey area) as a site if physical evidence is found anywhere within it.

A total of 17,330 stone artefacts were identified during this assessment, with 15,982 recorded in detail. Sites were found at an average density of one site per hectare, and the number of artefacts recorded within each site ranged from 1 to 2,602. Within individual loci, recorded artefacts ranged from 1 to 670. Site loci had artefact densities between 0.0004 and 850 artefacts/m^2 and a mean of 0.183 artefacts/m^2. This is 2.6 times higher than the average artefact density for all exposures, including those that did not contain artefacts. The majority of artefacts (86%) were recorded on surfaces exposed by sheet erosion. Artefacts were also noted in areas of stream bank erosion, gully erosion, rill erosion, dense vegetation, aggrading surface deposits and modified surfaces. Kuskie (2000a) recorded the following artefact distribution across the terrain units of Mt Arthur North. Overall, artefact densities were relatively low throughout the Study Area, despite artefacts being identified within a virtual continuum. All the landforms or variables sampled (geology, soils) contained archaeological materials.

Although sites were widely distributed throughout the Mt Arthur North landscape, Kuskie (2000a) noted several patterns in artefact distribution. Artefacts occurred at substantially higher densities within the valley flat landform element, on level to very gently inclined slopes, within 50 m of a watercourse (particularly if it was a higher order stream) and on level to very gentle valley flat ATU. Artefacts were widely distributed on ridge crests and spurs but in lower densities than expected. Artefact densities were higher than expected on simple slopes within all classes of slope (upper, mid, lower) and aggrading surfaces.

This distribution pattern led Kuskie (2000a) to argue that the most important landform units within the survey area were:

- The ridge crests/gentle sloping spurs;
- Moderate to steep simple slopes;
- Level/very gently sloping benches; and
- Level/very gently sloping valley flats.

Although Kuskie (2000a) identified the importance of valley flats and watercourses in this analysis, it is equally clear that occupation and use of higher terrain landform units is an important element in the assessment of this landscape.

The recorded assemblage contained 37 different types of artefacts, dominated by flakes (53.4%), microblades (16%) and flaked portions (15.1%). Evidence of utilised and/or retouched artefacts was not common (1.65%). The primary raw materials utilised were silcrete (51%) and IMT (34.6%), although 13 other stone materials were also identified.

Kuskie (2000a) concluded that the survey results indicated that a substantial body of Aboriginal heritage evidence existed at this site, of which only a small fraction was identified during the archaeological survey (due to the visibility constraints). The survey results also indicated that the major watercourses of the area were the focus of Aboriginal occupation, with level to gently inclined land typically preferred. Campsites tended to be positioned within 50 m of a watercourse, particularly on the third and fourth order streams. However, Kuskie (2000a) also noted the importance of vantage points within the landscape. The results indicated that the entire landscape was utilised to varying extents.

6.2.2 Kuskie & Clarke

Kuskie & Clarke (2004) *Salvage of Aboriginal Heritage Sites in the Mount Arthur North Coal. Mine Lease, Hunter Valley, New South Wales.*

As a result of the Mt Arthur North Aboriginal heritage assessment undertaken by Kuskie (2000a) and in view of the limited scope for avoiding impacts to sites identified, Kuskie and Clarke (2004) conducted a program of salvage excavation in 2004. The salvage excavations were conducted in four phases comprising of mechanical test scrapes, broad-area hand excavations, mechanical surface scrapes and localised hand excavations within the surface scrapes. Mechanical excavations covered a total of 15.5 ha, although additional mechanical surface scrapes (totalling 23 ha) were conducted along an extensive portion of the Whites Creek valley flats following the identification of a burial site. Therefore, a combined total of 38 ha of surface scrapes were completed, resulting in a total of 138.7m^3 of soil being excavated and sieved. In addition, a total of 779.75 m^2 was excavated by hand.

In all, the excavations retrieved a total of 32,866 stone artefacts with a total of 43 stone artefact types. Kuskie and Clarke (2004) identified a total of six activity categories including non-specific stone flaking, bipolar flaking, microblade production, backing retouch of microliths, loss or intentional discard of microliths and loss or intentional discard of non-microlith tools. The production of backed artefacts was the most common specific activity and the generally small size classes that characterised much of the assemblage was attributed to backed-blade production, However, these specific-activity attributes accounted for a small proportion of the overall assemblage with the remainder (97%) the result of non-specific knapping.

A total of 16 discrete stone materials were identified with silcrete being the most common (59.4%) followed by tuff or IMT (19.4%) and then, porcellanite (10%), quartz (4.3%) and petrified wood (3.5%). Other raw materials recorded (at much lower frequencies) included quartzite, chert, chalcedony, basalt, sandstone, volcanic glass, glass, ochre and two unidentified types of volcanic stone.

Stone artefacts occurred at varying densities throughout the landscape and within the soil profile. Artefact densities resulting from the main hand excavations ranged from 11 artefacts/m^3 at the ridge and Hunter River upper section to 271.7 artefacts/m^3 in the Whites Creek upper section, with a mean of 106.8 artefacts/m^3.

Kuskie and Clarke (2004) conclude from these results, that proximity to Whites Creek was more important to Aboriginal people than proximity to the Hunter River. The surface scrapes and excavations at Whites Creek contained much higher frequencies of ‘background discard’, higher frequencies of focussed activity areas, and a greater range and quantity of activities. Moreover, activity areas along Whites Creek represent substantially more intense activity and involve a greater range of stone materials than those along the ridge from Mt Arthur to the Hunter River.

In addition, Kuskie and Clarke (2004) suggested that the Whites Creek activity areas reflect a lifestyle involving several short-term temporary encampments used by small groups of people during the course of daily/seasonal hunting, in comparison to evidence along the ridge from Mt Arthur to the Hunter River, which indicates transitory movement. Radiocarbon dating, geomorphological and lithic evidence indicates that there is a high probability that occupation of the area was limited to the mid to late Holocene.

6.2.3 Umwelt Pty Ltd

Umwelt (2008) *Mt Arthur Underground Project.*

Umwelt (2008) conducted an assessment of Mt Arthur Underground to support an EA for the project. This assessment examined approximately 1,233 ha (32.7%) of the Mt Arthur Underground Project Boundary (3,800 ha). Like Umwelt's (2007) South Pit Extension survey, Umwelt (2008) used a modified version of the methodology used by Kuskie (2000a, 2000b), basing the survey on comparative ATUs and landform elements in an effort to obtain comparative data. However, the definition used to describe 'sites' differed slightly from Kuskie's (2000a, 2000b) and Umwelt's (2007) methodologies in that isolated artefacts were differentiated from artefact scatters and, more significantly, sites were defined on the basis of PADs connecting two or more loci or only loci if PADs were not defined. The assessment identified a total of 77 sites comprising of 509 site loci within the survey area. Of these sites, 76 were occupation sites (46 stone artefact scatters and 30 isolated artefacts) and one was a scarred tree site. The sizes of separate site loci were not recorded. Sites comprised 1 to 45 site loci, but averaged six separate site loci. A total of 9,603 stone tool artefacts were identified during this assessment. Sites were found at an average density of 0.02 sites per ha and loci were found at an average density of 0.1 loci per ha. The number of artefacts recorded within each site ranged from 1 to 2,768. Within individual loci, recorded artefacts ranged from 1 to 2000, though less than10 artefacts was the norm.

The recorded assemblage contained 11 different types of artefacts, dominated by flakes and broken flakes (percentages not calculated). Evidence of utilised and/or retouched artefacts and microblade manufacturing was not common within the assemblage. The primary raw materials utilised were IMT, followed by silcrete, with lower utilisation of porcellanite, quartz, chert, quartzite, hornfels, basalt, silicified sandstone, petrified wood, chalcedony, tuff and river pebbles (manuports) in site loci with larger assemblages.

The majority of recorded artefacts were identified on surfaces exposed by sheet erosion. Artefacts were also identified in areas of stream bank erosion, gully erosion, rill erosion, dense vegetation, aggrading surface deposits and modified surfaces.

Table 8 shows Umwelt's (2008) recordings of artefact distribution across the terrain units of Mt Arthur Underground.

Table 5: Artefact Distribution Recorded at Mt Arthur Underground by Umwelt (2008)

Landform	No. Artefacts	Effective Site Loci Area (m^2)	Artefact Density (No./m^2)
Simple slope (level – v. gentle)	199	1,734	0.1148
Simple slope (gentle)	391	15,691	0.0249
Simple slope (moderate – steep)	817	45,493	0.0699
Drainage depression (level – v. gentle)	1,912	224,808	0.0085
Drainage depression (gentle)	4,592	50,593	0.0908
Drainage depression (moderate – steep)	973	23,297	0.0418
Ridge crest Ridge Line	82	11,682	0.0070
Spur crest	447	2,472	0.1808
Modified terrain	190	3,199	0.0594
Totals	**9,603**	**378,969**	**0.0253**

Note: For the purposes of calculating total number of artefacts for an ATU, where a range of artefacts is given for a site (loci) the higher number is used for the calculation. Therefore, the number of artefacts shown is the upper limit and consequently the actual artefact densities may be lower.

Overall, artefact densities were relatively low throughout the Study Area, although densities were markedly higher on the spur crests and, to a lesser extent, on level to very gentle slopes.

Although sites were widely distributed throughout the Mt Arthur Underground landscape, Umwelt noted several patterns in artefact distribution. The majority of site loci occurred within gentle drainage depressions, on gently inclined slopes, and on creek banks or within 50 m of a watercourse (particularly if it was a higher order stream in proximity to confluences). Artefacts occurred in low frequencies on ridge crests and spurs, with Umwelt attributing the use of these landforms by Aboriginal people as a result of their views. Artefact densities were lower than expected on simple slopes within all classes of slope (upper, mid, lower), compared with Kuskie's (1999) findings. Artefact densities were much higher than expected in moderate to steep drainage depressions, which Umwelt postulates is due to these gullies being used as travel routes to the tops of ridges. This distribution pattern led Umwelt to argue that the most important landform units within the survey area were drainage depressions regardless of slope class.

Although Kuskie (2000a) identified the importance of valley flats and watercourses in his analysis, he also believed that occupation and use of higher terrain landform units including higher slopes, spurs and ridges, was also important. This view is not supported by Umwelt's (2008) findings; however, the survey results also indicated that the major watercourses of the area were the focus of Aboriginal occupation, with gently inclined land preferred for occupation. Campsites tended to be positioned within 50 m of a watercourse, particularly on the third and fourth order streams.

6.2.3.1 Rich

Rich, E. R. (1995b). *Mt Pleasant Coal Lease, Near Muswellbrook, NSW Archaeological Survey for Aboriginal Sites*

Rich undertook an archaeological survey of the Mt Pleasant coal lease, extending from Wybong road in the south to Dorset Road in the north. A total of 327 Aboriginal sites were recorded comprising 180 isolated artefacts and 93 artefact scatters (the remaining site types are not provided). In total 1,408 artefacts were recorded including backed blades and associated knapping debris, cores, a variety of retouched and/or used flakes and pieces, and larger pebble tools and axes of igneous materials. Silcrete was the predominant raw material utilised across the study area (58%) followed by mudstone 28%, igneous 5%, quartz 3%, and other 7%. Rich (1995) noted the composition of the assemblage was found to be similar to that identified at Bengalla.

Rich (1995) found artefact densities along gullies tended to be higher than on hill slopes and ridges. No artefacts were found on the slopes of Mt Pleasant above 300m and none was found on the Hunter Flats. Variation in artefact density across the lease was attributed to a variety of factors including the effects of land disturbance. It is noted, that artefact distribution does not appear to have been controlled by the availability of, or proximity to, the silcrete raw material source B10 (37-2-0579) identified at Bengalla given the almost identical percentage of silcrete artefacts. It is also noted that backed blades were found only near drainage lines and associated with larger-sized assemblages, a finding that is not uncommon in the Hunter Valley.

Rich (1995) provides a tentative occupation model for the landscape based on the site location, artefact counts and artefact typology. Groups were presumed to be mobile occupying residential bases for one or several days. At such locations, they may have carried out a range of activities including stone tool production and maintenance, use of stone tools to make and maintain items, food processing and cooking, and other social/domestic tasks. From these residential bases, they might have made trips to the surrounding areas to produce food and various materials.

6.2.4 MCAS

Myall Coast Archaeological Services (MCAS) (2007). *Aboriginal Cultural Survey Stage 3 Mount Pleasant.*

MCAS undertook archaeological survey for the Mt Pleasant Coal Project Stage 3. A total of 346 Aboriginal archaeological sites were recorded. The total number of individual artefacts recorded was 1802, consisting primarily of silcrete (n= 1202), IMT (n=479), chert (n=52), quartz (20) petrified (18), porcellanite (14) and basalt (17).

6.2.5 Scarp

Scarp (2009). *Cultural Heritage Investigations Stage 5, Mt Pleasant Mine, Hunter Valley*.

Scarp undertook archaeological survey for the Mt Pleasant Coal Project Stage 5. A total of 136 Aboriginal archaeological sites were recorded including 20 artefact scatters, 113 isolated artefacts and 3 possible scarred trees. The total number of artefacts recorded was 256, of which, 154 were flakes with 52 being retouched, and 48 were cores. Silcrete was the dominant raw material accounting for over 50% of the assemblage, with IMT accounting for 20%. Basalt, other volcanic material, quartz, quartzite, chalcedony, petrified wood and sandstone comprising the remainder of the assemblage. Scarp suggests lack of evidence for large or complex sites within the study area, combined with small assemblage numbers with high frequencies of retouched and worn artefacts, supports the proposition that use of the area was restricted to temporary or short term occupation.

6.3 Archaeological Work within the Project Boundary

The following Aboriginal heritage assessments have been carried out within the Project Boundary.

6.3.1 Rich

Rich, E. R. (1993). *Archaeological Survey for Aboriginal Sites, Proposed Bengalla Coal Mine*.

Rich undertook an archaeological survey within the disturbance area of the Project, extending from Wybong Road in the north, to the Muswellbrook-Merriwa Railway line in the south, and from Bengalla Road in the east in 1993 for the Bengalla EIS (Existing Project Boundary). A total of 56 Aboriginal sites were recorded, comprising 39 artefact scatters and 17 isolated artefacts. Artefacts were found to occur on all landforms, including Dry Creek, gullies, flats, rises, slopes and ridge tops. The most significant site recorded was a silcrete quarry B10 associated with tertiary ridge gravels.

Rich hypothesises that three stone industries were present in the area: a microblade (i.e. backed blade) industry, a small flake tool industry, and a large tool industry that included large retouched flakes, unifacial and bifacial pebble tools, axes, hammerstones and a grindstone. Interestingly, Rich found that the various stone industries tended to be found on different landform units. Microblade industries were concentrated along the main creek and around the confluence of minor gullies. Small flake tool assemblages tended to occur along minor gullies and on hill slopes and ridges while artefacts of the large tool industry were found on most land units, but most frequently on land units close the Hunter flats and on slopes and ridges away from the flats. Silcrete was the predominant raw material recorded, accounting for 60% of all artefacts. Much of this material was found naturally occurring at the quarry site B10 (37-2-0579) and likely procured there. IMT was the next most commonly recorded raw material (26%).

The majority of recorded artefacts comprised flake and non-flake debitage (82%) with cores and tools reasonably well represented at 8.5% and 8.2% respectively. Cores and tools were also reasonably well represented at 8.5% and 8.2% respectively.

Rich concluded that most of the Bengalla coal lease had been substantially disturbed by previous land uses such as clearing, ploughing, grazing, construction of dams, contour drains, fences, transmission lines, track and general erosion. Most recorded sites were extensively damaged.

Consent to Destroy Permit (CtD) SZ133 dated 12 March 1997 was granted under Section 90 of the National Parks and Wildlife Act 1974 (NPW Act) to salvage those sites which were to be directly impacted upon by the development of Bengalla

6.3.2 White

White, E. (1998). *Archaeological Salvage of Sites B10 & B33, Bengalla Mine, Hunter Valley, NSW*.

White undertook salvage excavation of the previously identified quarry site B10 (37-2-0579) and artefact scatter B33 (37-2-0602) at Bengalla in 1998. The works constituted the first large scale excavation of a quarry in the Hunter Valley. The quarry site was located on an elevated ridge roughly 600 m from the Hunter River and comprised of cobbles of silcrete, petrified wood, quartz, and other fine-grained siliceous and igneous materials. Two large pits, B10-1 and B10-2, measuring 5 x 10 m were excavated. B10-1 was excavated within the outcrop of silcrete cobbles and recovered 4,454 artefacts. Results found that the most commonly utilised material were the sub-angular silcrete boulders embedded in the stony deposit and showing above the ground. White observed that the tops of these boulders were battered to remove large flakes that were subsequently used as cores for flaking.

Heat treatment of some of these larger flakes/cores prior to flaking was noted. Artefact densities at the site were up to 1,200 artefacts per metre squared. Excavations at B10-2, located approximately 2 km upstream from B10 (37-2-0579), recovered 222 artefacts. White concludes from the low artefact density at excavations site B10-2 that use of the site was episodic and related to foraging and hunting activities.

Excavations at B33 (37-2-0602), located 2.8 km north of B10 (37-2-0579), included another 5 x 10 m trench. A total of 142 artefacts was recorded during excavation. In addition to the 5 x 10 m pit, the remains of a partly eroded knapping floor, referred to as B33-2 was also excavated employing a 3 x 5 m pit. A total of 523 heat shattered and flaked artefacts were recovered. No backed artefacts were identified, leading White to argue that the sites were used for stone processing, rather than tool production.

All excavated artefactual material was analysed and is currently housed within the Australian Museum.

6.3.3 ERM

ERM. (2007). *Bengalla Mine Section 90 #2621*.

ERM undertook a surface collection and excavation for Section 90 application #2621 for Aboriginal quarry site B10 (37-2-0579) at Bengalla in 2007. A total of 166 stone artefacts was collected during the surface collection and 39 during the excavation. Excavations consisted of grader scrapes across the site. Analysis of artefactual material recovered found the dominant raw material utilised was silcrete, accounting for 90% of all artefacts. Far fewer artefacts were recovered from the excavations than the surface collection. Artefacts recovered from subsurface contexts were found to be larger on average and comprising of a greater number of cores. From this result, it is concluded that core reduction, in the context of the subsurface deposit was being undertaken elsewhere.

All excavated artefactual material has been subject to analysis and attempts are currently being made to house the material within the Australian Museum.

6.3.4 ENSR AECOM

ENSR AECOM. (2008). *Bengalla Link Road Stage Two Archaeological Salvage Bengalla Mine*.

ENSR AECOM undertook a program of surface collection grader scrapes of Aboriginal sites identified along the route of the Bengalla Link Road Stage 2. Nine Aboriginal sites were salvaged, resulting in the recovery of 56 artefacts. All sites were considered low density artefact scatters, with the low numbers of artefacts attributed to the great distance of the sites from permanent water sources. Silcrete was the most commonly identified raw material, accounting for 66% of all artefacts. The remaining raw materials comprised IMT (20%), quartz (7%) porcellanite (2%) and other igneous (2%).

All excavated artefactual material has been subject to analysis and attempts are currently being made to house the material within the Australian Museum

6.3.5 CQCHM

Central Queensland Cultural Heritage Management (CQCHM). (2010). *Mount Pleasant Project Modification Aboriginal Cultural Heritage Assessment Report*.

CQCHM undertook archaeological survey associated with the transport corridor for the Mount Pleasant Project across both BMC and Coal & Allied owned land. Within the Project Boundary approximately 130 isolated artefacts, four artefact scatters, four scarred trees, and three potential scarred trees were identified. All sites were attributed low or moderate archaeological significance.

All artefacts recorded were left *in-situ* and were not subject to collection or salvage.

6.4 Known Archaeological Sites

6.4.1 AHIMS Sites Within the Study Area

A search of the AHIMS database was conducted on 29 September 2011. A total of 215 registered Aboriginal sites were identified within the Study Area. Of these, 19 were listed as destroyed, deleted, or were duplicates. The remaining 196 sites comprise 112 artefact scatters, 79 isolated artefacts, four scarred trees and one quarry. Further detail on these sites is provided in **Section 9.0** and **Appendix c**.

Table 6 provides a summary of Aboriginal site types located within the Study Area.

Table 6: Previously Recorded AHIMS Sites within the Study Area

Site Type	Number of Features	Percentage (%)
Artefact Scatters	112	57
Isolated Artefacts	79	40
Scarred Trees	4	2
Quarry	1	1
Total	**196**	**100**

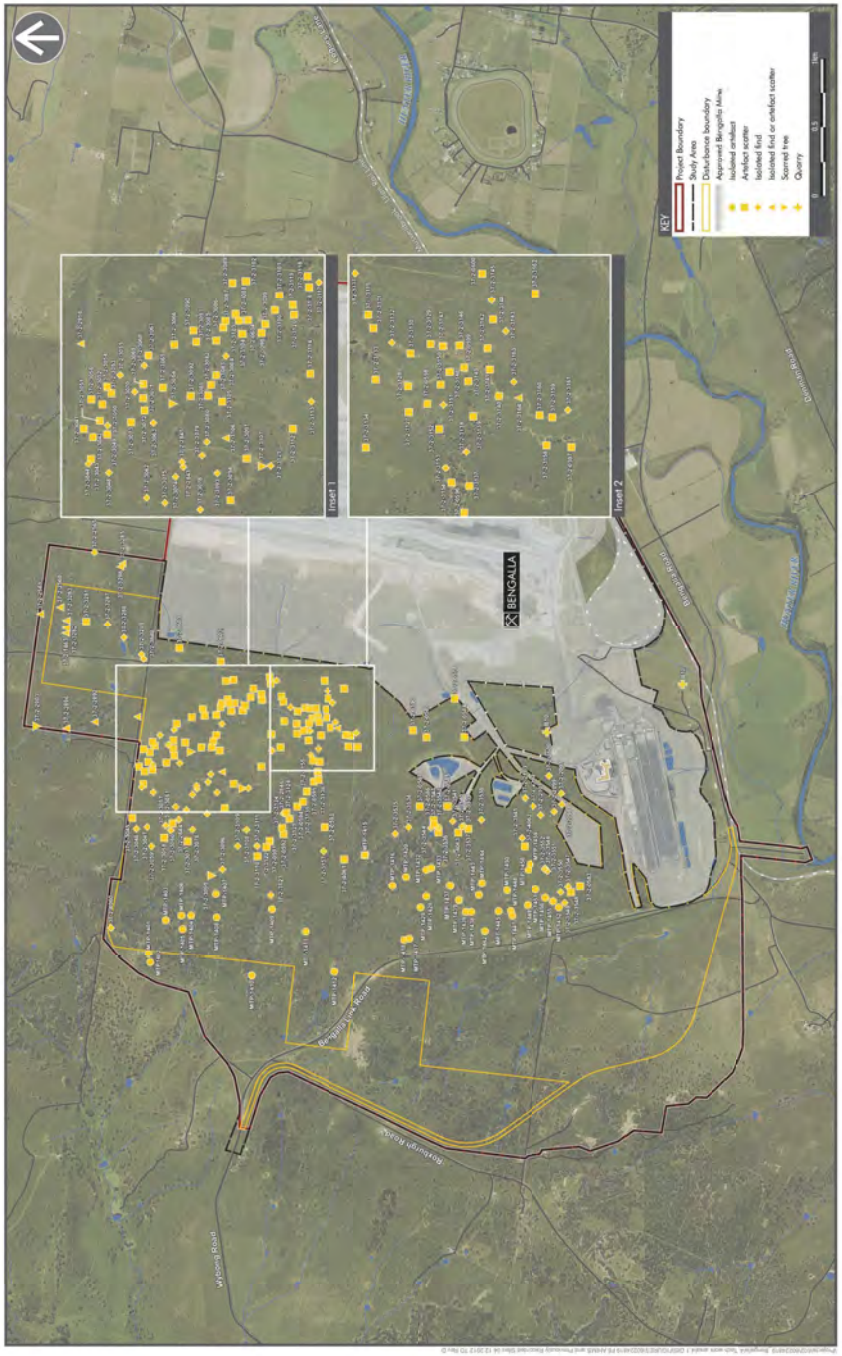
6.4.2 Sites in Previous Reports

A review of the Mount Pleasant Project Modification Aboriginal Cultural Heritage Assessment Report (CQCH 2010) has identified four artefact scatters and 35 isolated artefact sites as occurring within the Study Area that were not identified on the AHIMS register. Details for the sites are provided in **Table 7** including an approximation of their coordinates based on geo-referencing Figure 5 within the assessment.

Table 7: Sites Identified in Previous Reports

Site Name	Site Type	GDA94 Zone 56 E	GDA94 Zone 56 N
MTP-1401	Isolated Artefact	292739	6428967
MTP-1402	Isolated Artefact	292677	6428953
MTP-1403	Artefact Scatter	293358	6426904
MTP-1404	Isolated Artefact	293018	6428655
MTP-1405	Isolated Artefact	292918	6428717
MTP-1406	Isolated Artefact	293018	6428726
MTP-1407	Isolated Artefact	293174	6428475
MTP-1408	Isolated Artefact	293004	6428470
MTP-1409	Isolated Artefact	293063	6428072
MTP-1410	Isolated Artefact	292578	6428220
MTP-1411	Isolated Artefact	292899	6427827
MTP-1412	Artefact Scatter	292593	6427618
MTP-1415	Isolated Artefact	293453	6427387
MTP-1416	Isolated Artefact	293231	6427188
MTP-1417	Isolated Artefact	292847	6427065
MTP-1418	Isolated Artefact	292838	6427103
MTP-1420	Isolated Artefact	293292	6427089
MTP-1428	Isolated Artefact	293155	6426942
MTP-1429	Isolated Artefact	293075	6426985
MTP-1432	Isolated Artefact	293344	6426942
MTP-1433	Isolated Artefact	293358	6426904
MTP-1437	Isolated Artefact	293231	6426772
MTP-1438	Isolated Artefact	293041	6426620
MTP-1439	Isolated Artefact	293127	6426710
MTP-1440	Isolated Artefact	293125	6426706
MTP-1442	Isolated Artefact	292899	6426521
MTP-1443	Isolated Artefact	292985	6428840
MTP-1444	Isolated Artefact	293248	6426542
MTP-1445	Isolated Artefact	293046	6426422
MTP-1447	Isolated Artefact	293013	6426322
MTP-1448	Isolated Artefact	293046	6426332

Site Name	Site Type	GDA94 Zone 56 E	GDA94 Zone 56 N
MTP-1449	Isolated Artefact	293089	6426209
MTP-1450	Isolated Artefact	293198	6426360
MTP-1451	Isolated Artefact	293205	6426145
MTP-1452	Isolated Artefact	293070	6425972
MTP-1455	Artefact Scatter	293046	6426422
MTP-1456	Artefact Scatter	293143	6426073
MTP-1458	Isolated Artefact	293344	6426201
MTP-1459	Isolated Artefact	293384	6426187
MTP-1401	Isolated Artefact	292739	6428967



AHIMS AND PREVIOUSLY RECORDED SITES WITHIN THE STUDY AREA
Bengalla Continuation of Mining Project
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FIGURE 6

7.0 Predictive Model

Consideration of the environmental, archaeological and ethnohistoric context of the Study Area and its surrounds allows a series of predictions to be made concerning the nature and distribution of Aboriginal archaeological sites within it. This section provides a working predictive model for the Aboriginal archaeology within the Study Area based on the data summarised in **Sections 4.0, 5.0 & 6.0**. Predictions are made concerning the type of sites likely to occur within the Project Boundary, as well as their likely content, distribution and integrity.

Table 8: Key Predictions for Aboriginal Site Distribution, Content and Integrity

Site type	Distribution	Content	Integrity
Open artefact scatters	- The majority of scatters will occur in association with creek lines - Scatters are also likely to occur on hill slopes and ridge crests, often at a vantage point over the surrounding landscape.	- Stone artefacts will be the most common form of artefact present within identified scatters. - Silcrete followed by IMT will be the dominant raw material across the majority of sites. - Flake debitage will dominate recorded site assemblages whilst retouched will be rare.	- Open surface scatters along creek lines, slopes and ridge tops will exhibit varying degrees of archaeological integrity, depending on the effects of erosion.
Isolated artefacts	- The majority of isolated artefacts will occur within and in association with creek lines.	- The majority of isolated artefacts will comprise chipped stone artefacts.	- Isolated artefacts will exhibit varying degrees of integrity.
Archaeological deposit	- Archaeological deposits are likely to occur in alluvial soils along higher order creek lines.	- Archaeological deposit will likely comprise of stone artefacts. Hearths may also be present.	- Archaeological deposits will have varying degrees of integrity, particularly along creek lines, which experience significant erosion.
Scarred trees	- Scarred trees may occur where original remnant vegetation remains.	- Scarred trees will likely be eucalypts i.e. box.	- Scarred trees are likely to be extremely old, dying or dead.
Quarry sites	- Quarry sites may occur where exposed silcrete and mudstone outcrops occur.	- Stone artefacts will likely consist of large shattered cobbles.	- Quarry sites will exhibit varying degrees of integrity.

8.0 Archaeological Survey Methodology

8.1 Aim and Objectives

The aim of the archaeological survey was to identify, record and map Aboriginal heritage values within the Study Area. These values include both the tangible remains of past Aboriginal activity (i.e. archaeological evidence) as well as intangible cultural values. To achieve these aims, the following specific survey objectives were developed:

- To relocate and re-record all previously recorded Aboriginal archaeological sites within the Study Area.
- To comprehensively survey, by pedestrian transects, land within the Study Area.
- To inspect, where appropriate, areas of known or potential Aboriginal cultural value, including AHIMS sites, and areas identified by RAP representatives.
- To obtain sufficient data to facilitate the development of appropriate management and mitigation measures for identified Aboriginal sites and areas of archaeological sensitivity.

8.2 Archaeological Survey Team

A field team of two AECOM archaeologists (Geordie Oakes and Andrew McLaren) and 28 rostered RAP representatives. A list of representatives who participated in the archaeological survey is provided in **Section 3.3.2.**

8.3 Survey Methodology

The archaeological survey was undertaken over a total of 15 days between 14 May and 6 June 2012. Survey was confined to the Study Area, which encompasses all areas within the Project Boundary (and outside the Approved Bengalla Mine) with particular focus on areas contained within the Disturbance Boundary.

A comprehensive survey methodology was adopted whereby equally spaced pedestrian transects were undertaken over the entire Study Area south of Wybong Road and survey of the areas of proposed disturbance north of Wybong Road. All survey was undertaken on foot, with the archaeological survey team walking in line abreast at roughly 10 m intervals. Individual linear transect widths were dependent on the number of RAP representatives and archaeologists participating each day (range 70 to 130 m). Each transect was recorded using a handheld differential GPS (DGPS) (see **Figure 7** for transect data). During each transect notes were taken on landform, soils and surface exposure characteristics and photographs were taken.

All Aboriginal archaeological sites identified during survey were recorded to a standard comparable to that required by the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (NSW Department of Environment Climate Change & Water 2010b). For each site located or re-visited, individual artefact locations were captured by DGPS. Associated site data (e.g. location, type and content) was also documented. The following attributes were recorded for all stone artefacts: raw material, artefact type, length, width, thickness, cortex, flake type, platform type, core type, core blank, number of scars, length of longest scar, tool type, tool condition, tool blank, retouch direction, backing type, retouch location, and angle of retouch.

8.4 Landform Elements

While a sampling strategy was not adopted for the assessment, the Study Area was divided into discrete landform based areas for the purpose of site description and analysis. **Table 9** provides the landform elements identified within the Study Area and **Figure 7** provides a map of those elements.

Table 9: Landform Elements Identified in the Study Area

Landform Element	Description
Hilltop/Ridge/Crests	Landform that stands above all, or almost all, points in the adjacent terrain.
Upper slope	Slope element adjacent below a crest.
Mid slope	Slope element lying between the upper slope and lower slope.
Lower slope	A waning slope, below a mid slope and above a flat.
Flat	A planar landform that is neither a crest nor a depression and is level or very gently inclined (less than 3% tangent approximately).

8.5 Site Definition – Surface Features and Deposit

A discussion is provided below of the difficulties of defining a 'site' and a supporting argument for the methodology employed for this assessment.

The definition, in spatial terms, of Aboriginal archaeological sites is a topic of considerable importance to modern cultural heritage management and one that has generated significant discussion in Australian archaeology (e.g., Holdaway 1993; 2000; MacDonald & I. Davidson 1998b; Shiner 2008). Aboriginal archaeological sites can be broadly defined as places in the landscape that retain physical evidence of past Aboriginal activity. Such evidence can assume a range of forms, depending on the nature of the activity (or activities) that produced it, and can vary dramatically in quantity and extent. Some Aboriginal archaeological sites are, by their very nature, easy to define in spatial terms. Scarred trees and rock shelters, for example, can be readily delineated from their surrounding landscapes. Difficulties arise, however, for sites whose present-day physical extent is, more often than not, a product of natural geomorphological processes (e.g., soil accretion and erosion), as opposed to the actions of Aboriginal people in the past.

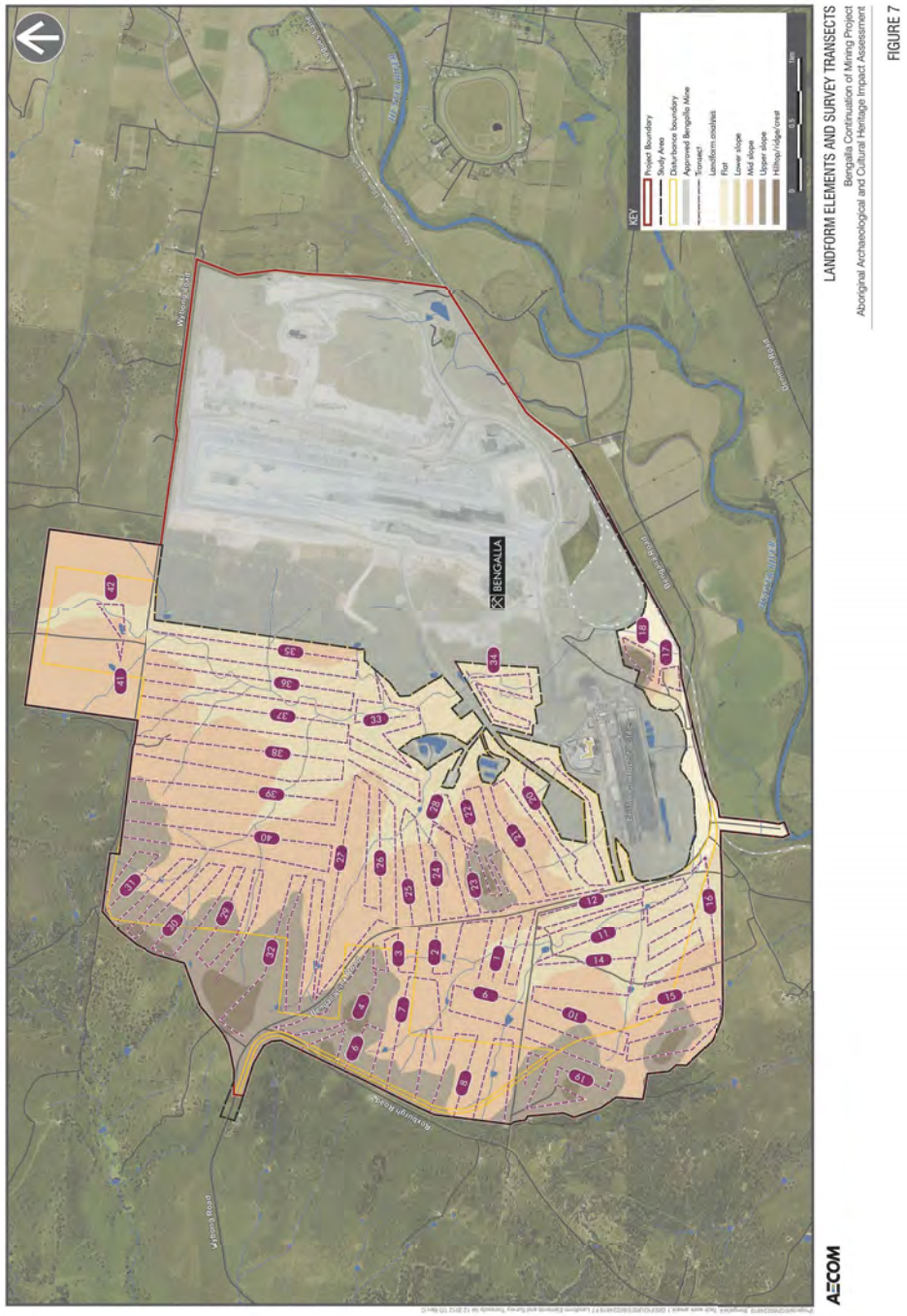
Although relevant to a variety of site types, the taphonomoic bias introduced by natural geomorphological processes is of particular relevance to identification and definition of surface scatters of stone artefacts, commonly referred to as 'artefact scatters' or 'campsites'. As demonstrated by countless large-scale excavations projects in southeastern Australia, surface artefacts almost invariably represent only a fraction of the total number of artefacts present within these sites, with the majority occurring in subsurface contexts. At the same time, in many areas, surface artefacts have been shown to form part of more-or-less continuous subsurface distributions of artefacts, albeit with highly variable artefact densities linked to environmental variables such as stream order, landform, slope and distance to water.

Such evidence poses a significant analytical and interpretive dilemma with respect to how to define a 'site'. To do so, on the basis of surface artefacts alone is clearly problematic, with modern site boundaries invariably reflecting the size and distribution of surface exposures as opposed to the actions of Aboriginal people in the past. Nonetheless, for pragmatic reasons, this is the most commonly used approach, with 'distance' and 'density-based' definitions dominating. In NSW, two of the most commonly employed distance-definitions are '*two artefacts within 50m of each other*' and '*two artefacts within 100 m of each other*'. Neither definition is derived from a particular theoretical approach or body of empirical research - they are simply pragmatic devices for site definition. Definitions based on artefact density also vary in their particulars. However, one of most commonly used definitions is that which isolates, within an arbitrarily defined 'background scatter' of one artefact per 100 m², higher density clusters that are subsequently defined as 'sites'.

Non-site archaeology offers an alternative approach to distance and density-based site definitions (Ebert 1992; Foley 1981), with individual artefacts, not sites, treated as the basic units of analysis (for published Australian examples see Holdaway et al. 2000; Mcniven 1992; Shiner 2008). Whilst recognising the major interpretive potential of non-site approaches for data analysis and discussion, their implementation in the context of cultural heritage management studies is difficult (but see MacDonald & I. Davidson 1998; Kuskie 2000 for examples).

Here, the identification of 'sites' is required for reasons of recording (i.e., their entry into site databases such as AHIMS) as well as ease of relocation, protection, and management. The identification of spatially-discrete 'sites', therefore, offers the most pragmatic approach to Aboriginal heritage management in impact assessment contexts.

Surface site definition in the current investigation has been based on the 100 m convention cited above. Subsurface archaeological potential, meanwhile, is addressed by the concept of 'archaeological sensitivity', with three levels of sensitivity recognised: nil, low and high (**Table 11**). Akin to the concept of Potential Archaeological Deposit (PAD), archaeologically sensitive areas can be broadly defined as areas that retain potential for subsurface archaeological deposit(s).



LANDFORM ELEMENTS AND SURVEY TRANSECTS
Bengalla Continuation of Mining Project
Aboriginal Archaeological and Cultural Heritage Impact Assessment
FIGURE 7

9.0 Archaeological Survey Results

9.1 Survey Coverage

The total Study Area comprised 1,356 ha and incorporated the entire Project Disturbance Boundary of 964 ha. A total of 42 transects were completed over a 15 day period, with transect lengths ranging from 300 m to 4,710 m. Combined, these result in a total survey coverage of approximately 1,113 ha, representing 82% of the Study Area. The remaining 18% largely comprises an area north of Wybong Road where no Project impacts are proposed.

Table 10 provides a breakdown of survey coverage by landform type and provides an assessment of effective survey coverage. An assessment of effective coverage, required by OEH, is not an estimate of the area that was surveyed rather an estimate of the area in which archaeological materials are 'detectable'. Some Aboriginal archaeological site types, such as rock shelters and scarred trees, are more readily observed as they are not typically obscured by vegetation cover. By comparison, detection of sites such as stone artefact scatters and isolates are often entirely dependent on prevailing ground surface conditions.

Table 10: Survey Coverage

Landform Type	Total Landform in Study Area (ha)	Total Landform Area Surveyed (ha)	% of Area Surveyed	Area Effectively Surveyed (ha)	% of Landform Effectively Surveyed
Hilltop/Ridge/Crest	34	33	96	2.31	6.79
Upper-slope	232	199	86	13.93	6.00
Mid-slope	654	508	84	35.56	5.44
Lower-slope	399	367	92	25.69	6.44
Flat	37	6	15	0.42	1.14
Total	**1356**	**1113**	**82**	**77.91**	**5.7**

Table 10 and **Appendix d** provide tabulated estimates of the effective survey coverage achieved for each transect completed during the archaeological survey. As shown, this was typically low, as it is with almost all 'greenfield' assessments, with an overall effective coverage of 5.7% of the Study Area. This suggests that limited surface visibility was a constraint, as it regularly is, in assessing the surface Aboriginal archaeological record of the Study Area.

Table 10 also indicates flats were the least surveyed landform within the Study Area. As shown on **Figure 7**, a relatively small area of flat was located at the southern portion of the Study Area adjacent to the Hunter River. Limited survey was conducted in this area due to significant grass cover, waterlogging and no planned Project impacts for that area.

9.2 Previously Recorded Sites

As discussed in **Section 6.4**, 235 previously recorded sites have been identified within the Study Area. These comprised 196 AHIMS sites and 39 sites identified within previous reports. Of these, approximately 121 sites, largely comprising of isolated artefacts, were not located during the survey due to significant grass cover and/or geomorphic processes which may have moved or transported artefact material from its recorded location.

9.3 Newly Recorded Sites

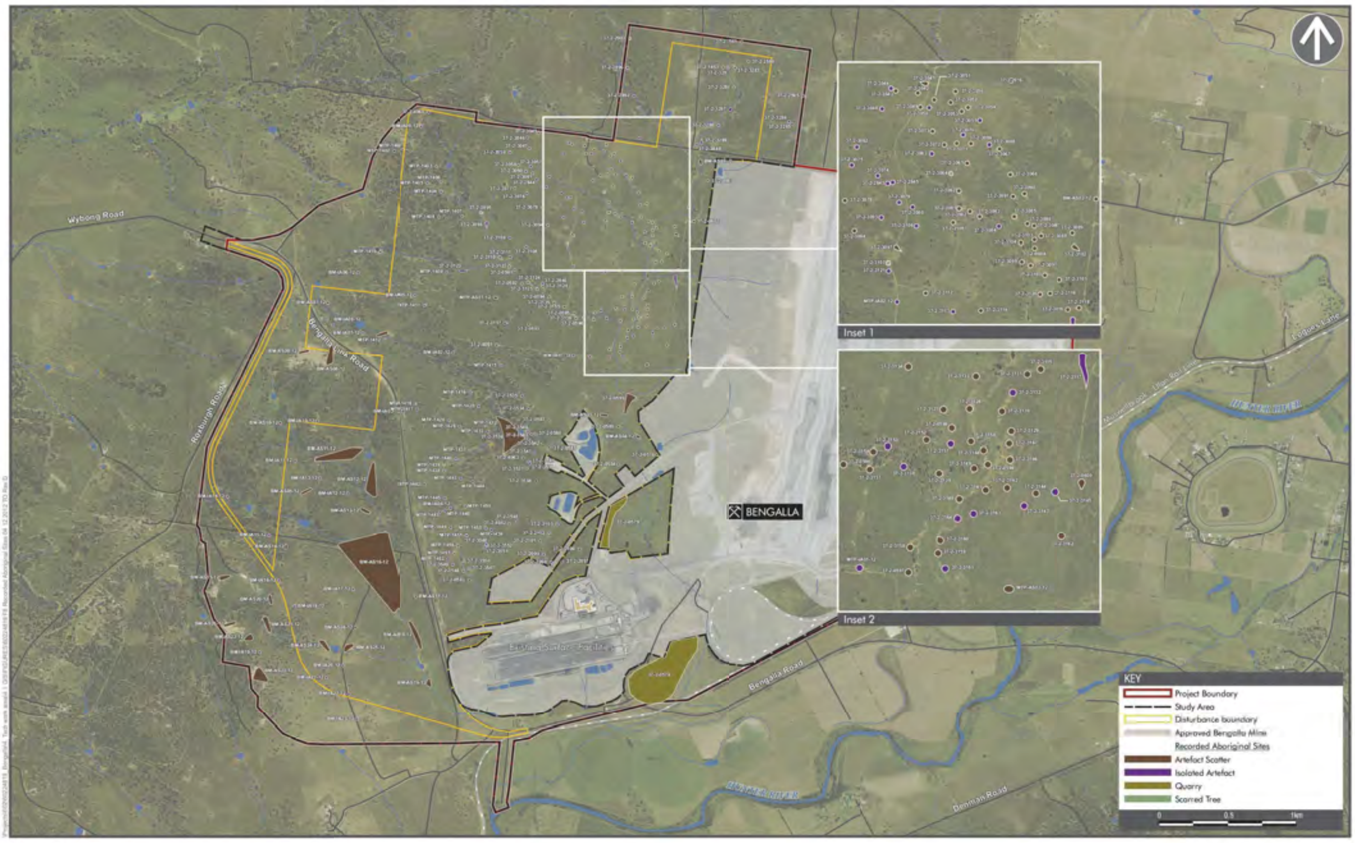
Approximately 1098 individual artefacts were recorded during the archaeological survey from a combination of existing AHIMS sites, sites identified in previous reports and newly recorded sites. Artefacts were identified across all landforms with varying densities (see **Figure 8**). As described in **Section 8.5**, the site definition employed in the current assessment was the 'visible extent of artefacts within 100 m of each other'. In instances where additional artefacts were found within 100 m of previously recorded AHIMS sites, that site has been expanded to include those artefacts, and were subsequently not recorded as new sites.

A total of 54 newly recorded archaeological sites were identified within the Study Area (**Figure 8**). These comprise, 29 artefact scatters and 25 isolated artefacts. **Table 11** lists details of the newly recorded sites, with coordinates reflecting centre points or centroids of each site.

Table 11: Newly Recorded Aboriginal Sites

Site name	Type	Artefacts	Landform	Dist. to water (m)	GDA94 Zone 56 E	GDA94 Zone 56 N
BM-AS01-12	Artefact	7	Lower slope	5	294901	6428871
BM-AS02-12	Artefact	3	Lower slope	39	294815	6428544
BM-AS03-12	Artefact	2	Lower slope	117	294202	6427023
BM-AS04-12	Artefact	2	Lower slope	1	294450	6426865
BM-AS05-12	Artefact	3	Mid slope	167	292029	6426475
BM-AS06-12	Artefact	2	Lower slope	170	292394	6425477
BM-AS07-12	Artefact	8	Upper slope	6	292197	6427848
BM-AS08-12	Artefact	5	Hilltop/Ridge/Slope	98	292208	6427466
BM-AS09-12	Artefact	2	Hilltop/Ridge/Slope	39	292022	6427494
BM-AS10-12	Artefact	2	Mid slope	7	291850	6426969
BM-AS11-12	Artefact	11	Mid slope	41	292276	6426741
BM-AS12-12	Artefact	21	Mid slope	13	292510	6426541
BM-AS13-12	Artefact	5	Mid slope	21	292471	6426325
BM-AS14-12	Artefact	2	Mid slope	141	291888	6426064
BM-AS15-12	Artefact	7	Hilltop/Ridge/Slope	325	291443	6425842
BM-AS16-12	Artefact	234	Lower slope	3	292579	6425918
BM-AS17-12	Artefact	6	Lower slope	59	292833	6425701
BM-AS18-12	Artefact	18	Lower slope	10	292839	6425432
BM-AS19-12	Artefact	20	Lower slope	10	292930	6425073
BM-AS20-12	Artefact	3	Upper slope	158	291779	6425680
BM-AS21-12	Artefact	6	Upper slope	1	291753	6425502
BM-AS22-12	Artefact	11	Upper slope	37	291623	6425398
BM-AS23-12	Artefact	23	Hilltop/Ridge/Slope	188	291704	6425127
BM-AS24-12	Artefact	12	Lower slope	15	292165	6425346
BM-AS25-12	Artefact	13	Lower slope	8	292349	6425330
BM-AS26-12	Artefact	2	Upper slope	13	291483	6425502
BM-IA01-12	Isolated	1	Lower slope	222	293979	6427459
BM-IA02-12	Isolated	1	Mid slope	62	293105	6427486
BM-IA03-12	Isolated	1	Mid slope	183	292741	6427051
BM-IA04-12	Isolated	1	Hilltop/Ridge/Slope	259	293086	6426348
BM-IA05-12	Isolated	1	Upper slope	204	292830	6427900
BM-IA06-12	Isolated	1	Upper slope	81	292414	6428066
BM-IA07-12	Isolated	1	Mid slope	21	292449	6427622

Site name	Type	Artefacts	Landform	Dist. to water (m)	GDA94 Zone 56 E	GDA94 Zone 56 N
BM-IA08-12	Isolated	1	Upper slope	23	292235	6427681
BM-IA09-12	Isolated	1	Upper slope	88	292874	6429137
BM-IA10-12	Isolated	1	Mid slope	103	292119	6426980
BM-IA11-12	Isolated	1	Mid slope	58	291959	6426694
BM-IA12-12	Isolated	1	Mid slope	83	292340	6426455
BM-IA13-12	Isolated	1	Mid slope	65	292140	6426567
BM-IA14-12	Isolated	1	Mid slope	7	291467	6426433
BM-IA15-12	Isolated	1	Mid slope	85	291770	6426148
BM-IA16-12	Isolated	1	Upper slope	328	291840	6425815
BM-IA17-12	Isolated	1	Mid slope	211	292380	6425752
BM-IA18-12	Isolated	1	Upper slope	202	291954	6425628
BM-IA19-12	Isolated	1	Mid slope	74	291700	6425294
BM-IA20-12	Isolated	1	Lower slope	28	292306	6425197
BM-IA21-12	Isolated	1	Mid slope	154	292185	6425108
BM-IA22-12	Isolated	1	Mid slope	215	292347	6424992
BM-IA23-12	Isolated	1	Mid slope	406	292406	6424802
MTP-AS01-12	Artefact	2	Mid slope	156	293414	6427885
MTP-AS02-12	Artefact	2	Lower slope	58	294513	6427391
MTP-AS03-12	Artefact	2	Lower slope	183	294152	6427949
MTP-IA01-12	Isolated	1	Lower slope	160	294099	6427451
MTP-IA02-12	Isolated	1	Mid slope	240	293974	6428112



AECOM

RECORDED ABORIGINAL SITES

Bengalla Continuation of Mining Project

Aboriginal Archaeological and Cultural Heritage Impact Assessment

FIGURE 8

10.0 Discussion of Findings

10.1 Total Number of Sites

A total of 289 archaeological sites have been identified within the Study Area. These comprise:

- 196 valid AHIMS sites;
- 39 sites identified within previous reports (not currently registered on AHIMS); and
- 54 newly recorded sites.

Site descriptions are provided in **Table 7** and **Table 11** with further site details in **Appendix e**.

10.2 Summary of Site Types

Table 12 provides a summary of the types of Aboriginal archaeological sites identified within the Study Area.

Table 12: Summary of Site Types within Study Area

Site Type	Count	% of Total
Artefact scatter	145	50
Isolated artefact	139	48
Scarred tree	4	1
Stone quarry	1	1
Total	**289**	**100**

10.2.1 Artefact Scatters & Isolated artefacts

A total of 145 artefact scatters and 139 isolated artefacts, totalling 1,098 surface artefacts, were recorded within the Study Area. Of these, the highest artefact count at a newly recorded site consisted of 234 individual artefacts recorded at site BM-AS16-12 located on a feeder creek of the Hunter River adjacent to Bengalla Road. The largest previously recorded site consisted of 239 artefacts recorded at AHIMS site 37-2-0599 (B30). Artefact counts at scatter sites range from two to 239, with a mean count of 12.9.

All surface artefact sites within the Study Area, with the exception of those located along Dry Creek and its tributaries, are considered to have low subsurface potential due to the effects of erosion. On the basis of Rich's (1998) excavations at B33-2 and a review of Dry Creek's geomorphology, sites located on Dry Creek, including AHIMS site 37-2-0599 (B30), are considered to have potential for subsurface deposit.

10.2.2 B10 Quarry Site (37-2-0579)

Aboriginal stone quarry site B10 (37-2-0579) was originally recorded by Rich (1993: 94) who described it as 'a silcrete source and extraction site occurring on a ridge within the coal lease'. Rich (1993: 94) identified cobbles of silcrete, petrified wood and other igneous materials eroding from the side of the cigar shaped ridge extending northward approximately 1.3 km from the Hunter River flats. Artefactual material, in varying densities, and consisting primarily of large (<5 cm) silcrete artefacts, was identified over the ridgeline. While the entire ridgeline was mapped as the B10 quarry site, Rich (1993: 94) noted the northern extent of the site/ridgeline showed declining artefact densities and 'patchy' occurrences of artefactual material.

Since its identification, two archaeological excavations have been undertaken at B10. Initially, White excavated the central section of the site in 1998 as part of a NPWS Consent to Destroy (CtD) permit SZ133. Two excavation areas, B10-1 and B10-2, were selected and approximately 4,676 artefacts were recovered. Subsequently, B10 was partially destroyed under CtD permit SZ133, leaving two smaller sections at the southern and northern extent, both remain extant today.

A second excavation, which included a program of surface collection, was undertaken at the site by ERM in 2007 as part of a second NPWS CtD Permit #2621. The focus of the archaeological works was on the middle/northern portion of the site, although it excluded a small section at the very northern extent. These excavation works consisted of grader scrapes and surface collection. A total of 170 artefacts were collected, the majority coming from the central section of the site, with a smaller portion (n=2) collected from around a dam in the north.

At the completion of both excavations and fulfilment of the CtD permits, two sections of the ridgeline originally mapped by Rich (1993) as B10 remained intact and are present today. These are at its very southern and very northern extents. The southern section comprises an approximate 18 ha area and the northern section a smaller approximate 5 ha area. During the current archaeological survey, two quartzite cores and one flake were identified on the remaining southern section of the ridgeline. However, during the current archaeological survey, and during past surveys, no artefacts, cobbles of silcrete or other raw materials were identified on the remaining northern portion of the ridgeline. This finding supports Rich's (1993) observation that artefact numbers will decline towards the northern extent of the ridgeline. Moreover archaeological excavations undertaken at B10 by White (1998) in the central/southern section of B10 recovered 4,454 artefacts, while ERM's (2007) excavation in the central/northern section only recovered 170 showing a marked decline towards the north.

Observations made during the current archaeological survey also noted that only a remnant of the original ridgeline identified by Rich (1993) remained undisturbed, having been cut into during construction of the Bengalla Mine haul road (see **Figure 9**). The section of ridgeline that remains is its eastern edge approximately 30 m in width and 300 m in length parallel to the haul road (shown in yellow below). Consequently, while the southern section of B10 is considered largely undisturbed and likely to have associated archaeological deposit, the northern portion is considered disturbed and unlikely to have associated archaeological deposit.

Figure 9: B10 Northern Section

10.2.3 Scarred Trees

Four previously recorded AHIMS scarred trees and four possible Aboriginal scarred trees noted by the Aboriginal community have been identified within the Study Area. An aborist and Aboriginal community members inspected the four potential scarred trees on 15 August 2012. The inspection by both the arborist and the Aboriginal community members present found the scarring on all four trees was the result of natural causes (see **Appendix f**). Accordingly, the trees will not be registered on AHIMS or managed as Aboriginal archaeological sites.

Table 13: Trees with Scarring

Tree ID	Easting (MGA)	Northing (MGA)	Aborist Finding
Tree 1	292756	6427129	Natural (branch tear/termites)
Tree 2	292698	6428743	Natural – branch tear
Tree 3	293161	6426412	Natural/branch or lower shoot tear
Tree 4	293257	6426726	Natural/branch or lower shoot tear

10.3 Spatial Distribution

Due to the arbitrary nature of site boundary definitions, as discussed in **Section 8.5**, the following discussion of the spatial distribution of artefacts within the Study Area is from a non-site approach, and as such uses individual artefact locations as the unit of analysis.

10.3.1 Distance to Water and Stream Order

Artefact distribution varies significantly with stream order within the Study Area. Spatial analysis of stone artefacts identified within the Study Area finds that the majority of artefacts (n = 720, 65%) were recorded within 50 m of a watercourse. **Table 14** is suggestive of a pattern of decreasing artefact numbers with distance from watercourse, with a marked decline in numbers from a distance of 100 m. The greatest proportion of artefacts (42%) were associated with 2nd order creek lines within the Study Area, though this percentage is likely exaggerated by the identification of 234 artefacts at site BM-AS16-12.

Artefact associations with Strahler ordered creek lines and adjusted according to the total creek line length within the Study Area, indicate that 4th order creek lines have the highest associated surface artefact numbers at 0.070 artefacts per metre of creek line. Calculations show the next highest artefact occurrences are associated with 3rd order creek lines at 0.066 artefacts per metre, followed by 2nd order at 0.051 and 1st order at 0.024 artefacts per metre. This trend corresponds to artefact spatial patterning according to creekline order identified during previous archaeological investigations throughout the Hunter Valley and NSW more broadly.

Limitations to this analysis, which would require subsurface testing to clarify, relate to surface visibility, which is generally greater along creek banks, making surface artefacts more easily detectable.

Table 14: Distribution of Aboriginal Artefacts Associated with Watercourses

Distance to Water Source (m)	Creekline Order				Total	% of Total
	1	2	3	4		
0 – 50	130	291	59	240	**720**	65
51 – 100	60	111	36	35	**242**	22
101 – 150	11	12	6	1	**30**	3
151 – 200	4	4	0	1	**9**	1
> 200	47	42	4	4	**97**	9
Total	253	462	108	285	**1098**	100
% of Total vs. Stream Order	**23**	**42**	**10**	**25**	**100**	**N/A**

Table 15: Creekline Totals

Creek Order	Total Length in Study Area (m)	% of Total Creekline	Artefacts/m
1st Order	10,585	42	0.024
2nd Order	9,067	36	0.051
3rd Order	1,628	6	0.066
4th Order	4,048	16	0.070
Total	**25,328**	**100**	**N/A**

10.3.2 Landform Analysis

Table 16 presents the number of individual artefacts identified within each landform type over the Study Area. Artefact distribution clearly varies across landforms. Results show that the majority of artefacts were found on lower slopes (n = 885, 81%), a landform generally associated with creeklines. Relatively few artefacts were located on upper slopes or hilltops, crests or ridges. The highest artefact density per hectare is within the lower slope class where 2.22 artefacts were identified per hectare. Conversely, the lowest artefact density per hectare was within the midslope class where 0.22 artefacts were identified per hectare.

Table 16: Correlation between Artefact Distribution and Landform Type

Landform Type	No. of Artefacts	%	Landform total (ha) in Study Area	Artefact density per ha
Hilltop/Crest/Ridge	11	1	34	0.32
Upper slope	59	5	232	0.25
Mid slope	143	13	654	0.22
Low slope	885	81	399	2.22
Flat	0	0	37	0
Total	**1098**	**100**	**1356**	**N/A**

10.4 Artefact Analysis

10.4.1 Assemblage Size and Composition

A total of 1,098 stone artefacts were identified and recorded during the current survey. **Table 17** provides a simplified typological breakdown of the survey assemblage, with first order type definitions based on those of Hiscock (1984) and Andrefsky (2005). As is typical of Hunter Valley assemblages, flake debitage (i.e., flakes and flake shatter fragments) dominates, accounting for 80.1% of the total. Non-flake debitage (i.e., angular shatter), in contrast, is comparatively poorly represented at 8.8%. Cores and retouched flakes, meanwhile, make up 10.7% of the assemblage, with 89 cores and 29 retouched flakes accounting for 8.1% and 2.6% of the total respectively. Two hatchet heads (0.2%) and a single hammerstone (0.1%) complete the assemblage.

Terminological differences notwithstanding, a comparison of the relative frequencies of stone artefact types represented in the current survey assemblage with those recorded by Rich (1993; 1995b) for the Bengalla Coal Mine (Rich 1993: 26, Table 3) and Mount Pleasant Project (Rich 1995: 31, Table 9) reveals a broadly similar typological profile for these assemblages (**Table 18**). Differences in the relative frequency of tools between assemblages, with both earlier assemblages exhibiting higher values, likely relate to Rich's in-field identification of non-retouched but potentially utilised flakes/pieces. No attempt was made to identify such items during the current survey. However, it is recognised that a proportion of the unretouched flakes and other items of debitage identified during survey may, in fact, have been used prior to discard.

Table 17: Simplified Typological Breakdown of Recorded Survey Assemblage

Type	Number	%
Flake	642	58.5
Flake shatter	238	21.7
Angular shatter	97	8.8
Core	89	8.1
Retouched flake	29	2.6
Hatchet head	2	0.2
Hammerstone	1	0.1
Total	**1098**	**100**

Table 18: Typological Breakdowns of Bengalla Coal Mine and Mt Pleasant Coal Lease Assemblages (after Rich 1993: 26, Table 3 and Rich 1995: 31, Table 9)

	Bengalla Coal Mine		Mount Pleasant Project	
Type	**Number**	**%**	**Number**	**%**
Waste	1443	82	1162	83.9
Cores	150	8.5	103	7.4
Axes and pebble tools	19	1.1	17	1.2
Other tools (RU flakes & pieces)	125	7.1	80	5.8
Backed artefacts	23	1.3	17	1.2
Bipolar	na	na	6	0.4
Total	**1760**	**100**	**1385**	**100**

10.4.2 Raw Materials

Table 19 presents a breakdown of the relative frequency of raw material types represented in the survey assemblage. As indicated, silcrete was the dominant raw material overall, accounting for the 67.1% (n = 737) of the total assemblage and 68.9% of identifiable materials (n = 1070). At 21.1%, IMT is the second most common raw material, followed by quartz (3.5%, n = 38), 'other' materials (2.6%, n = 28), chert (2.2%, n = 24), quartzite (1.5%, n = 17), porcellanite (0.7%, n = 8), volcanic rock (0.6%, n = 7), petrified wood (0.5%, n = 6) and chalcedony (0.1%, n = 1).

In keeping with the typological data described above, a comparison of relative frequencies of raw material types in the current survey assemblage with those reported by Rich (1993, 1995) for the adjoining Bengalla Coal Mine (Rich 1993: 25, Table 2) and Mt Pleasant Coal Lease (Rich 1995: 31, Table 9) indicates a common emphasis on the exploitation of silcrete for chipped stone tool manufacture (67.1%, 60% and 57.9% respectively), with IMT the second most commonly exploited raw material at 21.1%, 26% and 28% respectively (**Table 20**). Other raw materials (e.g., quartz, quartzite, chert and porcellanite) are comparatively poorly represented in all three assemblages, with available data suggestive of opportunistic, as opposed to targeted, procurement. Notably, the preference for silcrete evident in these 'local' assemblages is consistent with broader, intra-regional patterning in raw material use. As highlighted by White (1999:145), chipped stone assemblages recovered from the northwestern portion of the Hunter Valley tend to be silcrete-dominant, whilst those in southeast tend to be IMT-dominant. Taken at face value, this patterning is suggestive of intra-regional differences in the relative availability of these two raw materials. However, as White (1999:145) has highlighted, available data suggest that this is unlikely to be the case, with observed patterning more likely a product of real preferences that may, at least in part, relate to cultural boundaries and/or affiliations.

Table 19: Breakdown of Raw Material Types in the Survey Assemblage

Type	Number	%
Silcrete	737	67.1
IMT	232	21.1
Quartz	38	3.5
Other	28	2.6
Chert	24	2.2
Quartzite	17	1.5
Porcellanite	8	0.7
Volcanic	7	0.6
Petrified wood	6	0.5
Chalcedony	1	0.1
Total	**1098**	**100**

Table 20: Breakdown of Raw Material Types in the Bengalla Coal Mine and Mt Pleasant Coal Lease Assemblages (after Rich 1993: 25, Table 2 and Rich 1995: 31, Table 9)

	Bengalla Coal Mine		Mt Pleasant Coal Lease	
Type	**Number**	**%**	**Number**	**%**
Silcrete	1067	60	802	57.9
IMTC	452	26	388	28
Quartz	65	4	49	3.5
Other	102	6	68	4.9
Quartzite	0	0	7	0.5
Volcanic	74	4	71	5.1
Total	**1760**	**100**	**1385**	**100**

As to the source(s) of the raw materials represented in the survey assemblage, existing archaeological and geological data for the greater Bengalla area suggest that, with the possible exception of porcellanite (see Hughes 1984: 79 and Kuskie and Clarke 2004:412-13), all are available in gravel deposits associated with the nearby Hunter River. Along the river itself, locally occurring point and mid-channel gravel bars are known to contain a variety of materials suitable for chipped and ground stone tool manufacture, including silcrete, IMT, quartz, quartzite, chert, petrified wood and a variety of igneous rocks (A.McLaren & G.Oakes, pers. obs., May-June 2012). Locally occurring deposits of 'stranded' Tertiary ridge gravels are likewise known to contain a variety of suitable materials and were certainly exploited by Aboriginal people in the past, as evidenced by the presence of a large stone extraction or quarry site (Site B10 (37-2-0579)) in the southeastern portion of the Study Area.

Now largely destroyed, the B10 (37-2-0579) quarry site was first identified and recorded by Elizabeth White (nee Rich) in 1993 and subsequently subject to partial salvage as a condition of a 'Consent to Destroy Relics' issued to the BMC in 1998 (Rich 1993, 1998). In topographic terms, the site is located on the margins of a long low ridge overlooking the Hunter River floodplain, with elevations along the ridge ranging from 5 to 20 m. White (1998: 14) reports a total site area of approximately 0.26 km^2, calculated on the basis of observed surface evidence. Cobbles and boulders of silcrete, petrified wood and a variety of other rock types eroding from the ridgeline in question have been interpreted as part of a high-energy fluvial deposit associated with a palaeo-Hunter River (White 1998: 14). The total estimated thickness of the gravel deposit within the site was approximately 5 m.

Archaeological excavations within B10 (37-2-0579) indicate that a range of stone working activities were undertaken within the site, including the *in-situ* flaking of embedded sub-angular silcrete boulders for the purposes of removing flakes and blocks for subsequent on-site reduction and the heating of silcrete blanks to improve flaking quality (White 1998: 52). Interestingly, no evidence for backed artefact manufacture was identified in either of the areas excavated by White (1998). Notable differences in the composition of the chipped stone assemblages recovered from the two excavated portions of the B10 (37-2-0579) quarry have been interpreted as a product of spatial variability in stone working and associated settlement-subsistence activities (White 1998: 52). At the same time, they have been used to suggest that available excavated data from the B10 (37-2-0579) site cannot be considered representative (White 1998: i).

As alluded to by Rich (1993: 24) almost two decades ago, the presence of what appears to be a large quarry site within the Bengalla area raises the possibility that most, if not all, of the silcrete used for chipped stone tool manufacture within this area was procured from this source. This possibility notwithstanding, it should be noted that previous analyses of the relationship between proximity to the B10 (37-2-0579) quarry site and the size and character of silcrete assemblages recovered from the greater Bengalla area (i.e., Rich 1995: 34-8; White 1998: 91-103) provide little support for a standard distance decay or stone rationing model for this source (cf. McNiven 1993). Linear regression analyses and correlation statistics for the maximum linear dimensions of complete silcrete cores (n = 55) and flakes (n = 258) identified during the current survey are similarly suggestive, with both indicating extremely weak, statistically non-significant relationships (flakes: $r = 0.25$, $r^2 = .001$, $p>0.05$; cores: $r = 0.217$, $r^2 = .047$, $p>0.05$). Together with the results of White's (1995, 1998) previous analyses, available data suggest that proximity to the B10 (37-2-0579) quarry was not a key determinant of silcrete assemblage composition and density in the greater Bengalla area. Proximity to this source, it appears, was likely only one of many factors affecting the size and composition of these assemblages, with spatial variability in the organisation of settlement and subsistence activities, for example, likely exerting a strong influence on assemblage composition and site-based artefact densities (White 1998: 104). The possibility that other, previously undocumented sources of silcrete are present within the Bengalla landscape may also be relevant, as may the distances thus far tested (White 1998: 104).

10.4.3 The Core Assemblage

Eighty-seven complete cores and two core fragments were identified during the current survey, all of which displayed detachment scars consistent with direct freehand percussion using hand-held hammerstones. All but six of the complete cores identified during survey comprise non-specialised flake cores, with varying combinations of intermediate and expanding flake scars (after Holdaway et al. 2004: 184). Specialised core forms are limited to four tranchet or 'Redbank A' cores (after Hiscock 1993) and two microblade cores. Following Hiscock (1993) and Moore (2000), it is highly likely that all six of these specialised core forms were associated with backed artefact manufacture. No bipolar cores were recorded during survey. However, the identification of three potential bipolar flakes suggests that bipolar reduction may also have been employed by Aboriginal knappers in the Study Area, albeit infrequently. A breakdown of the proportions of different core types in the survey assemblage (**Table 21**) shows that both multidirectional (n = 42, 48.3%) and unidirectional (n = 31, 35.6%) cores are well represented in the Study Area, with bidirectional (n = 5, 5.7%) and bifacial (n = 9, 10.3%) cores also present but comparatively poorly represented. Descriptive statistics for the maximum linear dimensions of recorded core types are provided in **Table 22**. Together with the results of inter-type T-test comparisons (**Table 23)**, these data suggest that core type has little relationship to variation in the extent of reduction within the Study Area and support the hypothesis that *at least* four different methods of core reduction were employed by Aboriginal knappers camping within, or passing through, the Bengalla area.

Table 21: Breakdown of Core Types in the Survey Assemblage (core types after Holdaway and Stern 2004: 180)

Core type	Number	%
Unidirectional	31	35.6
Multidirectional	42	48.3
Bidirectional	5	5.7
Bifacial	9	10.3
Total	**87**	**100**

Table 22: Descriptive Statistics for the Maximum Linear Dimensions of Recorded Core Types

Statistic	Unidirectional	Multidirectional	Bidirectional	Bifacial
Mean	65.5	53.2	49.9	77.6
St. dev.	31.3	27.4	15.5	37
CV	47.8%	51.4%	30.9%	47.7%
Min	25.9	25.8	32.4	35.5
Max	165	180	65.7	155
Total (n)	31	42	5	9

Table 23: T-test Results for Comparisons of Mean Maximum Linear Dimensions of Recorded Core Types

Comparison	Significance value
Unidirectional vs. multidirectional	t = 1.786, df = 71, p = .078
Unidirectional vs. bidirectional	t = 1.082, df = 34, p = .278
Unidirectional vs. bifacial	t = -.982, df = 38, p = .332
Multidirectional vs. bidirectional	t = .261, df = 45, p = .795
Multidirectional vs. bifacial	t = -2.280, df = 49, p = .027
Bifacial vs. bidirectional	t = 1.574, df = 12, p = .141

Raw material data for complete cores (n = 87) (**Table 8**) are more-or-less consistent with that of the assemblage as a whole, with the majority (63.2%, n = 55) manufactured on silcrete blanks, followed by IMT (13.8%, n = 12) and a selection of other materials including quartzite (n = 4, 4.6%), quartz (n = 3, 3.4%), chert (n = 2, 2.3%), petrified wood (n = 2, 2.3%), porcellanite (n = 2, 2.3%) and 'other' materials (n = 7, 8%). Significantly, available cortical and body form data for identified cores suggest that a substantial proportion were manufactured on flakes imported into the Study Area from 'on-source' reduction areas outside of it. Although the extent of reduction frequently precludes positive identification, with 49.4% of cores (n = 43) made on blanks of indeterminate origin, 39.1% (n = 34) of the cores identified during survey were manufactured on flakes. Cores manufactured on complete and fragmentary cobbles, in contrast, account for 11.5% (n = 10) of the total. Metrical data for identified flake blank cores are consistent with the preferential on-source selection, for export, of large, partially decorticated flakes, with recorded examples exhibiting an average length of 63.7±25.8 mm (range: 27-155 mm), average width of 48.2±19.1 mm (range: 19.3-116 mm) and average thickness of 25.6±10.8 mm (range: 8.6-53 mm). As noted above, cortical data for identified flake blank cores (**Table 24**) are likewise consistent with the regular importation of blanks, with all but two (i.e., 94.1%) examples exhibiting less than 50% cortex at discard.

Table 24: Breakdown of Raw Materials in Complete Core Assemblage

Type	Number	%
Silcrete	55	63.2
IMT	12	13.8
Quartz	3	3.4
Other	7	8
Chert	2	2.3
Quartzite	4	4.6
Porcellanite	2	2.3
Petrified wood	2	2.3
Total	**87**	**100**

Table 25: Frequency of Complete Cores with Different Amounts of Cortex

Cortex %	Number	%
None	18	52.9
1-50%	14	41.2
51-99%	2	5.9
Total	**34**	**100**

10.4.4 The Flake Assemblage

Unretouched flakes are well represented in the survey assemblage, accounting for 58.5% (n = 642) of the total. A breakdown of relative proportions of flake types within the assemblage (**Table 26)** indicates that the majority (65.7%, n = 422) comprise complete flakes, as defined by Holdaway and Stern (2004: 111). Proximal flakes are also well represented, accounting for 28% (n = 180) of the total. Remaining flake types include 22 longitudinally split flakes (3.4%), seventeen redirecting flakes and a single hatchet reworking flake. Redirecting flakes retain former platform edges and are indicative of core rotation. Two hundred and thirty-eight flake shatter fragments were also recorded during survey. Complete unretouched flakes (n = 439, hatchet reworking flake excluded) in the survey assemblage are generally small in size, with an average length of 30.6±13.4 mm (range: 8-95.7 mm), average width of 25.5±11.3 mm (range: 7-76.3 mm) and average thickness of 9.1±5.3 mm (range: 1.1-54.7 mm). However, large flakes are also present, a legacy of their importation into the study area from on-source reduction areas. Elongation data (**Table 27** and **Figure 10**) indicate a population of predominantly short, broad flakes, with 74.5% (n = 327) exhibiting a length-breadth ratio between 0 and 1.5. True blades are present but rare.

Table 26: Relative Proportions of Flake Types in Survey Assemblage

Flake type	Number	%
Complete	422	65.7
Proximal	180	28
Split	22	3.4
Redirecting	17	2.6
Hatchet reworking	1	0.2
Total	**439**	**100**

Table 27: Flake Elongation Data for Complete Unretouched Flakes

Elongation	Number	%
0-0.5	7	1.6
0.6-1	144	32.8
1-1.5	176	40.1
1.6-2	70	15.9
2+	42	9.6
Total	**439**	**100**

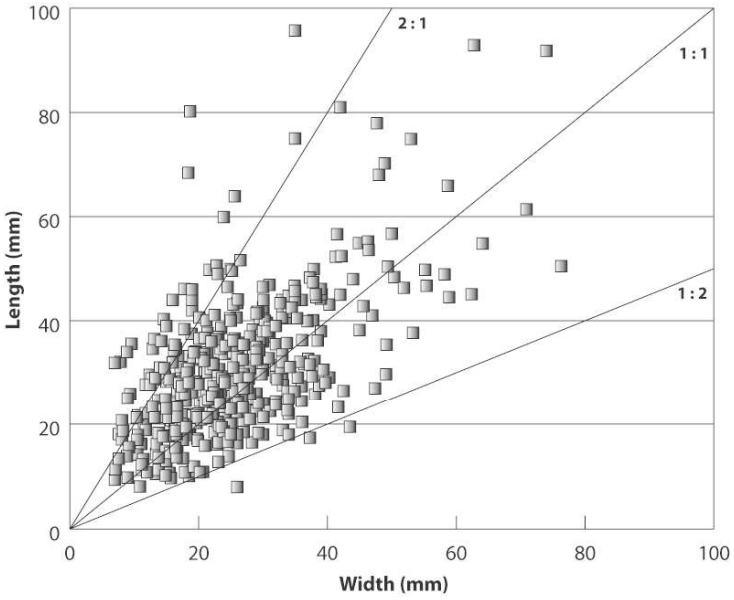


Figure 10: Length-width Scatterplot for Complete Unretouched Flakes in the Survey Assemblage (hatchet reworking flake excluded)

A comparison of the lengths of complete unretouched flakes and the longest cores scars in the survey assemblage (**Figure 11**) shows that the two share a similar distribution, supporting the inference that the former were struck from the cores discarded within the Study Area. Dorsal cortical data for complete unretouched flakes (**Table 28**), meanwhile, support the suggestion that the majority of blanks used as cores within the Study Area were fully or partially decorticated prior to reduction, an observation consistent with the regular importation, and subsequent reduction of, flakes and cobbles from on-source reduction areas (Moore 2000). As indicated in **Table 28**, 70.4% (n = 309) of the complete unretouched flakes identified during survey exhibited no dorsal cortex, with a further 23.5% (n =103) exhibiting between 1 and 50% dorsal cortex. Fully and predominantly corticated dorsal surfaces, in contrast, are conspicuously rare. Striking platform data for complete unretouched flakes (**Table 29**) provide further support for the reduction as cores of imported blanks and their products (e.g., cores made on flakes struck from imported flakes), with a cortical-to-non-cortical platform ratio of 9.5:1. More generally, the proportions of different platform types represented in the complete untouched flake assemblage are not inconsistent with the representation of core types in the survey assemblage. Taken at face value, the relative proportion of single and multiple facet platforms in the assemblage appears to be at odds with relative representation of unidirectional and multidirectional cores. However, it is highly likely that a significant proportion were struck from non-intensively reduced multidirectional cores. Single facet platforms may also have been produced during bidirectional and bifacial core reduction. Finally, although poorly represented, the presence of faceted platforms within the survey assemblage is indicative of systematic core reduction.

Table 28: Frequency and Percentage of Complete Unretouched Flakes with Different Amounts of Cortex

Dorsal Cortex %	Number	%
None	309	70.4
1-50%	103	23.5
51-99%	22	5
Complete	5	1.1
Total	**439**	**100**

Table 29: Relative Frequencies of Striking Platform Types in Complete Unretouched Flake Assemblage

Platform Type	Number	%
Single	305	69.5
Multiple	70	15.9
Cortical	42	9.6
Crushed	13	3
Faceted	9	2.1
Total	**439**	**100**

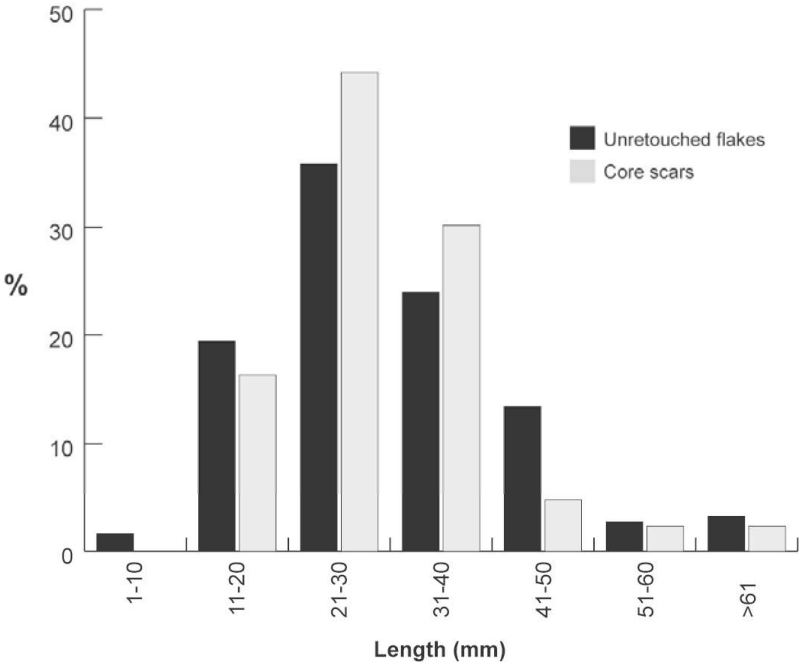


Figure 11: Comparison of Complete Unretouched Flake Lengths (n = 439) and Maximum Core Scar Lengths (n = 87)

10.4.5 The Tool Assemblage

Table 30 provides a breakdown of the tool sub-component of the survey assemblage (n = 32). As indicated, backed artefacts were the most common type of tool identified, with 12 examples accounting for 37.5% of the total tool sub-assemblage. Scrapers[2] were also well represented, with eleven examples recorded. Remaining tool types included six miscellaneous retouched flakes, two hatchet-heads and one hatchet reworking flake.

With only one exception, made on an IMT blank, recorded backed artefacts within the Study Area were manufactured on silcrete blanks. Symmetrical (n = 6) examples dominate, with three asymmetrical (i.e., Geometric microliths) and three indeterminate examples also recorded. Complete examples (n = 6) exhibit an average length of 21.9±7.3 mm (range: 16.4-36.4 mm), average width of 11±2.7 mm (range: 7.5-14.2 mm) and average thickness of 4.6±3 mm (range: 2.2-10.6 mm). Broken examples (n = 6) likely represent manufacturing failures. All but two of the backed artefacts identified during survey exhibit unidirectional backing.

Scrapers were manufactured on silcrete (n = 7), IMT (n = 2) and 'other' (n = 2) flake blanks. Complete examples (n = 11) have an average length of 41.2±13.2 mm (range: 19.3-58.2 mm), average width of 36.4±10.9 mm (range: 15.7-54.3 mm) and average thickness of 15.5±6.5 mm (range: 5.3-21.9 mm). Cross comparison of these data with that of the unretouched flake population suggest the preferential selection of larger blanks for scarper production.

[2] Note that a scraping function for these implements is inferred on the basis of retouch morphology, not demonstrated.

Retouch on all complete examples was initiated from the ventral surface and was applied to one (n = 5) or more (n = 6) margins. Recorded examples exhibit a mean retouched edge angle of 67.3º.

Identified hatchet-heads include a near complete edge-edge examples missing part of its cutting edge and broken, bifacially-flaked specimen with no remaining evidence of edge grinding. Both were manufactured on unidentified volcanic materials. A single hatchet reworking flake was also identified during survey and attests to the maintenance or reworking of hatchet-heads post-grinding. Reasons for discard for the two identified hatchet-heads are difficult to establish with certainty. However, one appears have been abandoned following an episode of reworking which has irreversibly altered the morphology of the hatchet's cutting edge. The other, meanwhile, appears to represent a manufacturing failure.

Table 30: The Tool Assemblage

Type	Number	%
Backed artefacts	12	37.50
Scrapers	11	34.38
Misc. retouched flakes	6	18.75
Hatchet-heads	2	6.25
Hatchet reworking flake	1	3.13
Total	**32**	**100**

10.5 Subsurface Archaeological Sensitivity of the Study Area

Subsurface archaeological potential is addressed in the context of this assessment by the concept of 'archaeological sensitivity'. **Figure 12** provides archaeological sensitivity mapping based on three key factors including the nature and extent of visible surface artefacts at the site, a review of the findings of previous archaeological excavations in analogous landforms in the surrounding area, and on-site observations of post-depositional processes affecting artefact exposure and burial. Using these variables, the level of archaeological sensitivity has been graded into three categories: nil, low and high. These ratings have then been applied to the Study Area to determine levels of potential subsurface deposit (**Table 31)**.

Table 31: Rating Scheme for Archaeological Sensitivity

Rating	Definition	Finding
Nil	Land with no potential for subsurface archaeological deposit(s) due to past ground disturbance(s).	Areas of damming, built structures and roads have been identified as having no potential for subsurface deposit
Low	Subsurface archaeological deposit(s) may be present. Relative to areas of high sensitivity, lower artefact counts, densities and assemblage richness values expected. Integrity of deposit(s) will be dependent on the nature of localised land disturbances.	The majority of the Study Area is considered to have low potential for subsurface deposit on the basis on landscape disturbances, particularly associated with sheet, gully and rill erosion.
High	Subsurface archaeological deposit(s) may be present. Relative to areas of low sensitivity, higher artefact counts, densities and assemblage richness values expected. Integrity of deposit(s) will be dependent on the nature of localised land disturbances.	Dry Creek and its tributaries have been identified, on the basis of its geomorphology and previous excavations (Rich 1998), as highly sensitive. Surface artefact densities identified during the archaeological survey indicate that the most sensitive area is approximately 100 m either side of Dry Creek. However, subsurface archaeological deposit in this area will be in varying condition as a result of disturbances and geomorphic processes.

10.6 Evaluation of Predictive Model

Table 32 provides an evaluation of the predictive model provided in **Section 7.0**.

Table 32: Evaluation of Predictive Model

Prediction	Survey Result
The majority of scatters will occur in association with creek lines	The results of the archaeological survey support this prediction. 87% (n=962) of artefacts identified were within 100 m of a creek line.
Scatters are also likely to occur on hillslopes and ridge crests, often at a vantage point over the surrounding landscape.	The results of the archaeological survey support this prediction, albeit with low artefact counts within those landforms.
Chipped stone artefacts will be the most common form of artefact present within identified scatters.	The results of the archaeological survey support this prediction. All but three artefacts comprising of two axes and one re-working flake, were chipped stone artefacts.
Silcrete followed by IMT will be the dominant raw material across the majority of sites.	The results of the archaeological survey support this prediction. Silcrete accounts for 67.1% of all artefactual material followed by mudstone 21.1%.
Flake debitage will dominate recorded site assemblages whilst retouched will be rare.	The results of the archaeological survey support this prediction. Flake debitage accounts for 80.1% of the assemblage.
Open surface scatters along creek lines, slopes and ridgetops will exhibit varying degrees of archaeological integrity, depending on the effects of erosion.	The results of the archaeological survey support this prediction, noting sheet, gully and rill erosion occur to varying degrees across the Study Area.
The majority of isolated artefacts will occur within in association with creek lines.	The results of the archaeological survey support this prediction. 87% (n=962) of artefacts identified were within 100 m of a creek line.
The majority of isolated artefacts will comprise chipped stone artefacts.	The results of the archaeological survey support this prediction, as all isolated artefacts consist of chipped stone artefacts.
Isolated artefacts will exhibit varying degrees of integrity.	The results of the archaeological survey support this prediction, noting sheet, gully and rill erosion occur to varying degrees across at varying sites across the Study Area.
Archaeological deposits are likely to occur in alluvial soils along higher order creek lines.	The results of the archaeological survey support this prediction, noting Dry Creek, a 4th order creek line, as having the highest potential for subsurface deposit.
Archaeological deposits will have varying degrees of integrity, particularly along creek lines, which experience significant erosion.	The results of the archaeological survey support this prediction, noting sheet, gully and rill erosion occur to varying degrees across the Study Area.
Scarred trees may occur where original remnant vegetation remains.	No scarred trees were identified during the archaeological survey. However, four previously recorded AHIMS scarred trees occur within the Study Area.
Quarry sites may occur where exposed silcrete and mudstone outcrops occur.	No new quarry sites were identified during the archaeological survey.

10.7 Reassessment of Occupation Models

Section 6.1.4 outlined models of Aboriginal occupation in the Hunter Valley proposed in past archaeological assessments. **Table 33** discusses these models with reference to the findings of the archaeological survey.

Table 33: Assessment of Occupation Models

Researcher(s)	Summary of Model	Archaeological Survey Results
Hughes (1984)	Hughes proposed the often-quoted model of Aboriginal campsite location as commonly being found within 50 m of watercourses. Hughes argues that site sizes will diminish as the size of the watercourse decreases.	The results of the archaeological survey support this assessment in part but extend the prediction area to the 50 m to 100 m zone. The greatest percentage of artefacts 87% (n=962) were recorded within 100 m of a creek line. Of those, 74.8% (n=720) were located within the 0-50 m range.
Koettig (1994)	Using ethnographic accounts, Koettig proposed camps were ordered according to strict rules based on: the location of water sources, the size and composition of the group or groups camping, and the length of the stay. Koettig further proposes: • Where occupation is infrequent, archaeological features at a site may be widely distributed and relatively infrequent. • If, over time, occupation episodes are overprinted at the same site, then the evidence from different activity areas would be closer together and even superimposed. • The longer the stay of groups at a campsite, the greater the types of activities that should be reflected and the greater the disturbance of occupation debris on the ground.	Interpreting the results of the survey using Koettig's hypothesis generates three key models of occupation. • A number of sites within the Study Area can be interpreted as sites of infrequent visitation and activity by Aboriginal people. • Given the high artefact densities at several sites and dispersed spatial distribution, it is likely more than one occupation episode has occurred at a number of sites. • Artefact analysis and test excavation at larger sites within the Study Area is likely to demonstrate a greater number of activities were occurring at these sites. This result could be interpreted as representing extended occupation of a site by Aboriginal people.
Dean-Jones and Mitchell (1993)	Dean-Jones and Mitchell (1993) correlate Aboriginal occupation with ridgelines due to their elevated position providing ease of movement across the landscape and greater visibility. Other landscapes such as terraces and mid slopes are also given preference, particularly during colder months when lower terrain may have been subject to frost hollow effects. Larger sites were noted to occur in valleys, as a result of greater resources. Water salinity was also raised as a potential influence on seasonality of occupation.	The results of the archaeological survey moderately support the notion that Aboriginal people used upper slopes and ridgelines as only a small number of artefacts (n = 70, 6%) were identified on hilltops, ridges and crests. Mid slopes do not appear to be given preference within the Study Area. However, lower slopes were clearly preferred accounting for 81% (n= 885) of all artefactual material identified. Seasonal use of areas cannot be easily assessed based on surface survey alone.
Rich (1995)	Rich argued that Aboriginal people utilised technological solutions in conjunction with other survival strategies. Aboriginal groups were mobile and moved according to the location of resources in an area.	The model is difficult to assess, given that resources present today may not be reflective of past resource availability.
Witter (1995)	Witter proposed that the majority of occupation sites are peripheral to one or more base camps in close association with the Hunter River. These base camps would contain archaeological evidence of more intensive use from larger groups of Aboriginal people.	This model cannot be assessed with the results of the archaeological survey alone.

Researcher(s)	Summary of Model	Archaeological Survey Results
Mills (2000)	Mills found evidence of Aboriginal activity associated with the full length of creek lines from their headwaters to the floodplain. Mills agreed with Dyall (1981b) that Aboriginal people used upper hill slopes for hunting and foraging after rain, when grasses and fruits were plentiful and adequate water was retained in pools to attract animals and sustain humans.	The archaeological survey supports Mills' model that Aboriginal activity was associated with the full length of creek lines within the Study Area, however, what activities occurred in these areas cannot be easily surmised from the survey alone.
Kuskie (2000)	Kuskie (2000) indicated that the entire landscape was utilised by Aboriginal people to varying extents. Kuskie refines Hughes' model (1984) relating Aboriginal occupation sites adjacent to watercourses by proposing that level to gently inclined landforms were preferred. Kuskie also finds that occupation sites are more commonly associated with third and fourth order creeks and vantage points. Kuskie found that Aboriginal people used and occupied the entire Mt Arthur North area but at varying intensities and at different time.	The survey supports Kuskie's findings that the entire landscape was utilised by Aboriginal people, though finds that greater levels of activity occurred in particular landscapes i.e. creek lines. The survey also supports the idea that level to gently inclined landforms was preferred. The idea that occupation sites are more commonly associated with 3rd and 4th order creek lines is supported by the survey results. Uses of landscape based on seasonality are difficult to assess from the archaeological survey alone.

AREAS OF ARCHAEOLOGICAL SENSITIVITY
Bengalla Continuation of Mining Project
Aboriginal Archaeological and Cultural Heritage Impact Assessment
FIGURE 12

11.0 Significance Assessment

Heritage sites and places hold value for different communities in a variety of different ways. As recently highlighted by Bourke and Smith (Burke et al. n.d.: 227), one of the primary responsibilities of cultural heritage practitioners is determine which heritage sites and places are worthy of preservation and management (and why) and, conversely, which are not (and why). This, by necessity, requires an assessment of relative cultural significance.

In Australia, the primary guide to the assessment of cultural significance is the *Australian ICOMOS Charter for the Conservation of Places of Cultural Significance* (1999), informally known as the *Burra Charter*, which defines it as the "*aesthetic, historic, scientific, social or spiritual value for past, present or future generations*" of a site or place. With respect to Aboriginal sites and places, it is possible to identify two major streams in the overall significance assessment process: the assessment of scientific significance by archaeologists and the assessment of cultural or social significance to Aboriginal people.

11.1 Scientific Significance

Scientific value refers to the contribution that the heritage resource (i.e. an Aboriginal site or place) can make to knowledge and understanding of the past. It is assessed according to the rarity, representativeness or research potential of a site. These factors are inter-related. The degree to which the heritage resource can contribute to knowledge is summed up in the notion of significance, which increases according to the degree of research potential and rarity of a site or area.

11.1.1 Levels of Scientific Significance

To adequately assess significance, evidence is required, which includes information about the presence of subsurface deposits, integrity of these deposits, nature of site contents and extent of the site. A review of information about previously recorded sites within the local area and region enables the rarity and representativeness of a site to be assessed.

- *High significance* is usually attributed to sites, which are so rare or unique that the loss of the site would affect our ability to understand aspects of past Aboriginal use/occupation for an area. In some cases, a site may be considered highly significant because its type is now rare due to destruction of the archaeological record through development.
- *Moderate significance* can be attributed to sites that provide information on an established research question or on the basis of moderate rareness.
- *Low significance* is attributed to sites that cannot contribute new information about past Aboriginal use/occupation of an area. This may be due to site disturbance or the nature of the site's contents.

11.1.2 Research Potential

Research potential or demonstrated research importance is considered according to the contribution that a heritage site can make to present understanding of human society and the human past. Heritage sites, objects or places of high scientific significance are those that provide an uncommon opportunity to inform us about the specific age of people in an area, provide a rare glimpse of artistic endeavour or provide a rare chronological record of changing life through deep archaeological stratigraphy.

The capacity of a site to address research questions is predicated on a definition of what the key research issues are for a region. In the Hunter Valley such questions will revolve around stone tool manufacture, settlement patterning; how regional resources were used; how uses changed throughout the Holocene; and how these changes manifested in the archaeological record.

Some archaeologists suggest that the value of a place/object can be judged by answering the following questions:

- Can the site contribute knowledge that no other resource can?
- Can it provide information not available on other sites?
- Can it answer pertinent research questions?

11.1.3 Rarity and Representativeness

Rarity and representativeness are related concepts. The comparative rarity of a site is a consideration in assessing scientific significance; a certain site type may be "one of a kind" in one region, but very common in another. Artefacts of a particular type may be common in one region, but outside the known distribution in another.

11.1.4 Integrity

The integrity of a site is also a consideration in determining scientific significance. While disturbance of a topsoil deposit with artefacts does not entirely diminish research value, it may limit the types of questions that may be addressed. A heavily cultivated paddock may be unsuited to addressing research questions of small-scale site structure, but it may still be suitable for answering more general questions about artefact distribution and raw material logistics.

11.1.5 Application of the Scientific Significance for the Project

An assessment of the scientific significance of newly and previously recorded Aboriginal archaeological sites within the Study Area is presented in **Table 34** and shown on **Figure 13**. Significance ratings are offered on the basis of the assessed research potential, rarity and representativeness of each site within an arbitrary 30 km² 'region' centred on the Study Area.

Table 34: Summary of Significance Assessment of Sites within the Study Area

Site Type	Significance			
	High	**Moderate**	**Low**	**Total**
Artefact Scatters	0	2	143	145
Isolated artefacts	0	0	139	139
Scarred Trees	0	4	0	4
Stone Quarry*	1 (southern section)	0	1 (northern section)	1
Total	**1**	**6**	**283**	**289**

**Note B10 quarry site (37-2-0579) has been split into two areas which have been subsequently assessed separately*

High Significance

The southern portion of B10 quarry site (37-2-0579) has been assessed as highly significant. A rating of highly significant has been attributed to this site due to its rarity and high research value given its ability to answer questions related to raw material use and procurement.

Moderate Significance

A total of six sites identified within the Study Area have been rated as moderately significant. Moderate significance has been attributed to two artefact scatter sites (BM-AS16-12 and 37-2-0599) as a result of their relatively large counts of artefacts. Furthermore, while artefact scatter site BM-AS16-12 is considered to have low potential for subsurface deposit, site 37-2-0599 has been assessed as having high potential for subsurface deposit and on that basis is considered of moderate significance. All four scarred trees (37-2-2903, 37-2-3064, 37-2-3095, and 37-2-3107) within the Study Area have been assessed as moderately significant, both in this assessment and as part of the CQCHM (2010) assessment, due to their relative rarity in the region[3].

Low Significance

A total of 282 i.e., the remaining sites, have been rated as of low significance. Low significance is attributed to sites that are common in the local and regional area, are highly disturbed, or have few artefact numbers.

[3] 45 Scarred trees are registered on AHIMS within a 30 x 30 km region centred on the Study Area as of 13 June 2012.

In addition, the northern mapped portion of B10 quarry site (37-2-0579) has been assessed as of low significance. This assessment is based on the following contributing factors:

- A lack of identified surface archaeology, including raw material suitable for knapping, both as part of the current assessment and Rich's (1993) assessment;
- Past excavations i.e. White (1998) and ERM (2007)) support Rich's observation that significantly fewer artefacts numbers will occur at the northern extent of the ridgeline mapped as B10. White's original excavation in the central portion of the ridgeline identified 4,454 artefacts, while ERM's exaction in the middle/northern portion of the ridgeline identified 170 artefacts; and
- Past disturbances, including the construction of the Bengalla haul road, has potentially impacted the integrity of the northern portion of the ridgeline.

Combined, these factors indicate the northern portion of B10 is of low research value.

11.2 Social (Cultural) Significance

Social or cultural values, within an Aboriginal Cultural Heritage Assessment refer to the spiritual, traditional, historical or contemporary associations and attachments a place or area has for Aboriginal people (NSW OEH 2011). As such, these values and their social significance can only be identified through consultation with Aboriginal people. Accordingly, throughout the assessment process, Hansen Bailey and AECOM have actively sought the opinions of RAPs on this matter, both verbally and in writing. Opportunities for the provision of cultural information have been provided at all stages of the assessment process.

Opportunities for RAPs to contribute knowledge of the social or cultural values of the Project Boundary have been provided at these times:

- A request during provision of the Project methodology for any initial comments regarding the Aboriginal cultural heritage values of the Project Boundary;
- During the planning meeting where RAPs were provided information about the scope of the Project, and the proposed cultural heritage assessment process;
- During the archaeological survey with either AECOM or Hansen Bailey;
- Opportunity were provided for personal meetings with knowledge holders who wish to share cultural heritage knowledge; and
- During the provision of the draft Aboriginal heritage impact assessment prior to its finalisation.

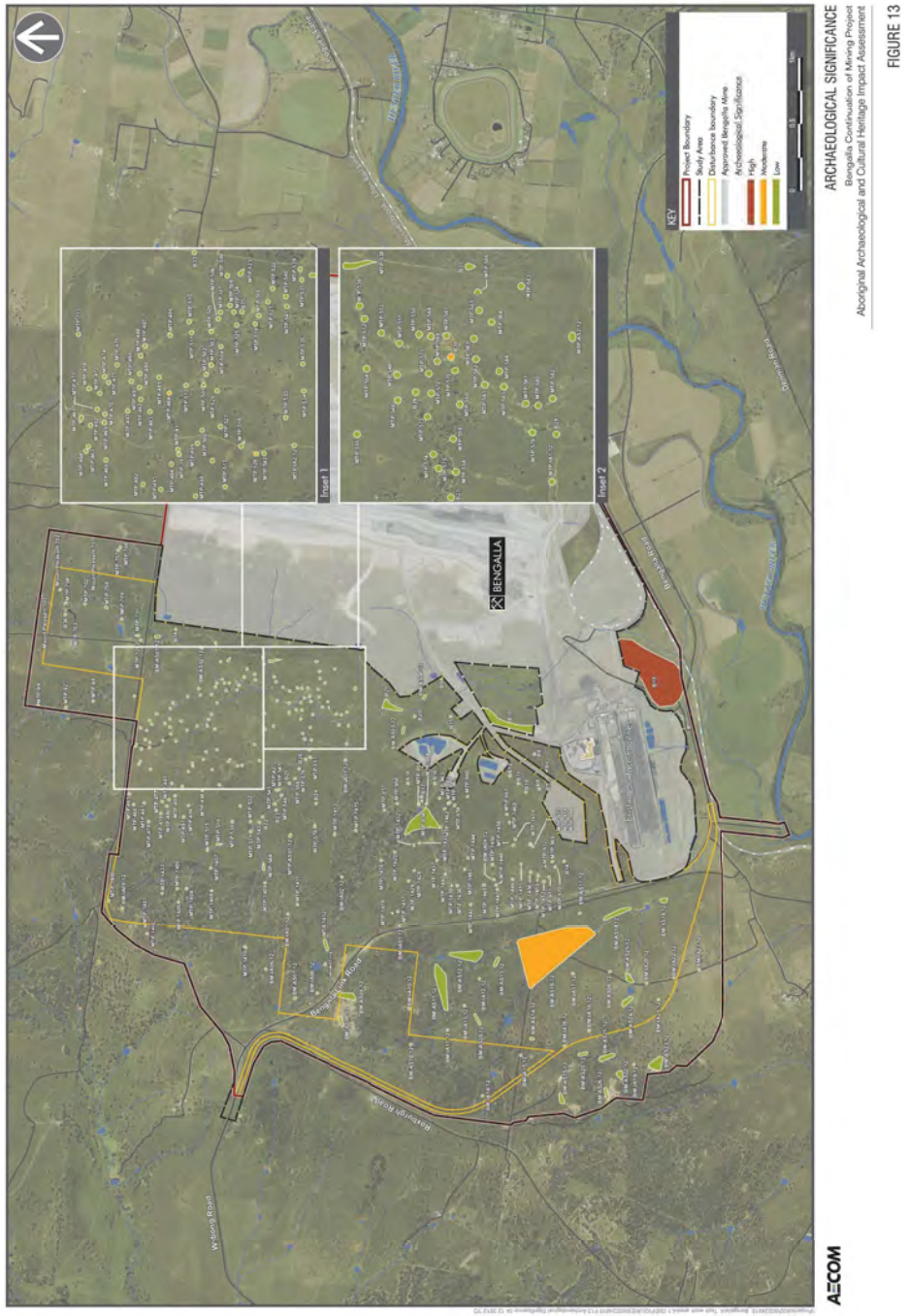
Social or cultural values are applicable to sites, items and landscapes. Aboriginal sites with archaeological evidence are all of value to the Aboriginal community because they represent a tangible connection with pre-European Aboriginal life.

11.2.1 Summary

The archaeological survey for the Project identified a rich landscape of past Aboriginal activity as evidenced from the numbers of stone artefacts recorded over the Study Area. Surface artefacts, which form Aboriginal archaeological and cultural sites, were recorded over the entire landscape but most intensely associated with creeklines and drainage lines, including Dry Creek. While having varying degrees of scientific significance, these stone artefacts are of cultural importance to Aboriginal people as they attest to the occupation and use of the Study Area by Aboriginal people in the past and provide an important tangible link to their heritage.

The identification of stone artefacts and archaeological sites notwithstanding, RAPs involved in the assessment process have not disclosed any specific knowledge related these artefacts or sites. However, during the archaeological survey, RAP representatives noted the importance of B10 quarry site for its rarity in the Hunter Region, being one of only a handful of these site types found locally. In addition, RAPs highlighted several key landscape features as important on the basis of their associated archaeological record. Dry Creek was highlighted by RAP representatives as a focal point for past Aboriginal activity due to higher artefact numbers identified in association with it. RAPs expressed interest at finding artefact scatter BM-AS26-12 on the crest of a hill on the western boundary of the Study Area. This highlighted the importance of vantage points in Aboriginal site selection.

Wanaruah LALC stated that the Study Area was important to Aboriginal people due to its proximity to an Aboriginal song line, which Mt Arthur was one of the guiding landmarks. In addition, Wanaruah LALC noted the Study Area is important as it is within walking distance to a number of known ceremonial areas (not identified).


KEY
Project Boundary
Study Area
Disturbance boundary
Approved Bengalla Mine
Archaeological Significance
High
Moderate
Low
Inset 1
Inset 2
BENGALLA
Bengalla Road
Wollombi Road
Wybong Road
Bengalla Link Road
ARCHAEOLOGICAL SIGNIFICANCE
Bengalla Continuation of Mining Project
Aboriginal Archaeological and Cultural Heritage Impact Assessment
FIGURE 13
AECOM

12.0 Impact Assessment

12.1 Project Construction Details and Impacts

As outlined in **Section 1.0**, BMC is seeking a new Development Consent under Part 4 Division 4.1 of the EP&A Act to enable mining to continue directly at a rate of up to 15 Mtpa for a 24 year period. A discussion is made below of each proposed activity and its potential impact on Aboriginal archaeological and cultural heritage values within the Study Area (**Figure 14**).

12.1.1 Open Cut Mining

Open cut mining is proposed to continue westward towards the western edge of the Project Boundary generally as shown on **Figure 14.** Open cut mining refers to a method of extracting rock or minerals from the earth through surface intrusion. This involves the sequential removal of soil, overburden and interburden above and between each coal seam, coal removal, progressive backfilling and rehabilitation of mined-out areas. This method of extraction will result in the disturbance or destruction of the ground surface.

The continuation of open cut mining will result in impacts to 231 Aboriginal sites.

12.1.2 Haul Roads

To facilitate open cut mining in the Project Boundary a series of haul roads will require construction. These will be located within the Disturbance Boundary within the boundary of proposed open cut areas as shown on **Figure 14**.

The construction of haul roads will result in impacts to two Aboriginal archaeological sites.

12.1.3 Coal Handling and Preparation Plant (CHPP) & Infrastructure

The Project will include the upgrading of the Bengalla CHPP to accommodate additional ROM coal productions levels up to 15 Mtpa.

No Aboriginal archaeological sites will be impacted as a result of upgrading the CHPP.

12.1.4 Rail Loop and Associated Coal Handling Infrastructure

The Project will involve the transport of product coal by rail to the Port of Newcastle for sale to the export market with lesser amounts supplied for use in local power stations. Product coal will continue to be conveyed from the product stockpiles to the existing Bengalla Rail Loop and associated train load out facility. The following upgrades will also be required as part of the Project:

- Installation of a reclaiming system, designed to operate at the Project rates required; and
- Upgrades to the existing train load out conveyors to a capacity of 5,000 tph.

No Aboriginal archaeological sites will be impacted as a result of upgrading the rail load out and associated coal handling infrastructure.

12.1.5 Mine Site Facilities

The existing administration office, bath house and workshops will continue to be utilised for the Project with at least the following extensions to the Bengalla infrastructure required:

- Additional parking for heavy and light vehicles;
- A vehicle maintenance workshop with supporting services; Administration, training, crib and amenities building;
- Light and heavy vehicle wash station incorporating a catch dam, sediment control dam and oil separator; Raw and fire water tanks; and Tyre laydown area; and
- The relocation of the existing helipad, the in-pit shut down and erection pads.

The construction of additional mine site facilities will result in impacts to three Aboriginal archaeological sites.

12.1.6 Site Access

All access to the Project will remain via the existing Bengalla Access Road off the Bengalla Link Road. To facilitate mining related activities in the south-western corner of the Project Boundary, a 6 km section of the Bengalla Link Road will need to be realigned.

The realignment of Bengalla Link Road will result in direct impacts to two Aboriginal archaeological sites.

12.1.7 Water Management

Mine Water Management System

Amendments to the Bengalla water management system required for the Project will be integrated with the existing water management system to enable optimal collection, use, recovery and recycling of water within the Project Boundary. The initial catchment areas above the mining area will require a system of catch dams, bunds, piped transfers and diversion drains to ensure that the water upstream does not inundate the mining area during large rainfall events.

Amendments to the Bengalla water management system through damming will result in impacts to eight Aboriginal archaeological sites.

Dry Creek Diversion

Dry Creek is an ephemeral creek that generally only flows following periods of intense rainfall due to its relatively small catchment area. As mining progresses to the west, it is anticipated that Dry Creek will be intercepted at approximately Year 5 of operations. As such, the construction of water storages and temporary diversion of Dry Creek will be required to divert clean water around mining operations through the use of a pipe network. Prior to the completion of mining in Year 24, a permanent re-alignment of Dry Creek will be constructed.

No Aboriginal archaeological sites will be impacted as a result of interim Dry Creek diversion.

12.1.8 General Run of Mine Activities

This impact category relates to activities that fall within the Disturbance Boundary for the Project but are not located within the footprint of proposed open cut mining areas and mine-related infrastructure. These activities include:

- Minor adjustments to mining infrastructure following detailed design;
- Bushfire management;
- Roads and access tracks;
- Minor buildings;
- General earthworks;
- Visual mitigation;
- Fencing;
- Water management; and
- Control structures.

Given the possible occurrence of these activities within the Disturbance Boundary over the 24-year life of the Project, there is the potential for 20 Aboriginal sites to be impacted. A precautionary approach dictates that the 20 sites should be considered as likely to be impacted by these activities and as such be appropriately managed and mitigated.

12.1.9 Sites Not Impacted

A total of 26 Aboriginal sites will not be impacted by the Project.

12.2 Summary of Impacts

Table 35 presents a summary of impacts to known Aboriginal sites within the Project Boundary. Note, a number of Aboriginal sites will be impacted by multiple activities and therefore are listed in the table multiple times.

Table 35: Summary of Impacts to Known Aboriginal Sites

Impact	Site ID/Name	Site Type	Significance
Open Cut *Significance Tally* High – 0 Moderate – 5 Low – 223	37-2-0578	Artefact Scatter	Low
	37-2-0579	Quarry (northern section)	Low
	37-2-0583	Artefact Scatter	Low
	37-2-0584	Artefact Scatter	Low
	37-2-0585	Artefact Scatter	Low
	37-2-0586	Artefact Scatter	Low
	37-2-0587	Artefact Scatter	Low
	37-2-0589	Artefact Scatter	Low
	37-2-0590	Artefact Scatter	Low
	37-2-0591	Artefact Scatter	Low
	37-2-0592	Artefact Scatter	Low
	37-2-0593	Artefact Scatter	Low
	37-2-0594	Artefact Scatter	Low
	37-2-0595	Artefact Scatter	Low
	37-2-0596	Artefact Scatter	Low
	37-2-0597	Artefact Scatter	Low
	37-2-0598	Artefact Scatter	Low
	37-2-0599	Artefact Scatter	Moderate
	37-2-0600	Artefact Scatter	Low
	37-2-0602	Artefact Scatter	Low
	37-2-0603	Artefact Scatter	Low
	37-2-0604	Artefact Scatter	Low
	37-2-2097	Isolated Artefact	Low
	37-2-2098	Isolated Artefact	Low
	37-2-2099	Isolated Artefact	Low
	37-2-2100	Isolated Artefact	Low
	37-2-2101	Isolated Artefact	Low
	37-2-2102	Isolated Artefact	Low
	37-2-2103	Isolated Artefact	Low
	37-2-2843	Isolated Artefact	Low
	37-2-2844	Isolated Artefact	Low
	37-2-2845	Isolated Artefact	Low
	37-2-2846	Isolated Artefact	Low
	37-2-3041	Artefact Scatter	Low
	37-2-3042	Artefact Scatter	Low
	37-2-3043	Artefact Scatter	Low
	37-2-3044	Isolated Artefact	Low
	37-2-3045	Artefact Scatter	Low
	37-2-3046	Isolated Artefact	Low

Impact	Site ID/Name	Site Type	Significance
	37-2-3047	Isolated Artefact	Low
	37-2-3048	Isolated Artefact	Low
	37-2-3049	Artefact Scatter	Low
	37-2-3050	Isolated Artefact	Low
	37-2-3051	Artefact Scatter	Low
	37-2-3052	Artefact Scatter	Low
	37-2-3053	Artefact Scatter	Low
	37-2-3054	Artefact Scatter	Low
	37-2-3055	Isolated Artefact	Low
	37-2-3056	Artefact Scatter	Low
	37-2-3057	Isolated Artefact	Low
	37-2-3058	Artefact Scatter	Low
	37-2-3059	Isolated Artefact	Low
	37-2-3060	Isolated Artefact	Low
	37-2-3061	Artefact Scatter	Low
	37-2-3062	Isolated Artefact	Low
	37-2-3063	Isolated Artefact	Low
	37-2-3064	Scarred Tree	Moderate
	37-2-3065	Artefact Scatter	Low
	37-2-3066	Artefact Scatter	Low
	37-2-3067	Artefact Scatter	Low
	37-2-3068	Isolated Artefact	Low
	37-2-3069	Artefact Scatter	Low
	37-2-3070	Isolated Artefact	Low
	37-2-3071	Artefact Scatter	Low
	37-2-3072	Artefact Scatter	Low
	37-2-3073	Artefact Scatter	Low
	37-2-3074	Isolated Artefact	Low
	37-2-3075	Isolated Artefact	Low
	37-2-3076	Isolated Artefact	Low
	37-2-3077	Artefact Scatter	Low
	37-2-3078	Isolated Artefact	Low
	37-2-3079	Isolated Artefact	Low
	37-2-3080	Isolated Artefact	Low
	37-2-3081	Artefact Scatter	Low
	37-2-3082	Artefact Scatter	Low
	37-2-3083	Artefact Scatter	Low
	37-2-3084	Isolated Artefact	Low
	37-2-3085	Artefact Scatter	Low
	37-2-3086	Artefact Scatter	Low
	37-2-3087	Artefact Scatter	Low
	37-2-3088	Artefact Scatter	Low
	37-2-3089	Artefact Scatter	Low
	37-2-3090	Artefact Scatter	Low
	37-2-3091	Artefact Scatter	Low

Impact	Site ID/Name	Site Type	Significance
	37-2-3092	Artefact Scatter	Low
	37-2-3093	Isolated Artefact	Low
	37-2-3094	Artefact Scatter	Low
	37-2-3095	Scarred Tree	Moderate
	37-2-3096	Isolated Artefact	Low
	37-2-3097	Artefact Scatter	Low
	37-2-3098	Artefact Scatter	Low
	37-2-3099	Artefact Scatter	Low
	37-2-3100	Artefact Scatter	Low
	37-2-3101	Artefact Scatter	Low
	37-2-3102	Artefact Scatter	Low
	37-2-3103	Artefact Scatter	Low
	37-2-3104	Artefact Scatter	Low
	37-2-3105	Artefact Scatter	Low
	37-2-3106	Isolated Artefact	Low
	37-2-3107	Scarred Tree	Moderate
	37-2-3108	Isolated Artefact	Low
	37-2-3109	Isolated Artefact	Low
	37-2-3110	Artefact Scatter	Low
	37-2-3111	Isolated Artefact	Low
	37-2-3112	Artefact Scatter	Low
	37-2-3113	Isolated Artefact	Low
	37-2-3114	Artefact Scatter	Low
	37-2-3115	Artefact Scatter	Low
	37-2-3116	Artefact Scatter	Low
	37-2-3117	Isolated Artefact	Low
	37-2-3118	Artefact Scatter	Low
	37-2-3119	Artefact Scatter	Low
	37-2-3120	Artefact Scatter	Low
	37-2-3121	Isolated Artefact	Low
	37-2-3122	Artefact Scatter	Low
	37-2-3123	Isolated Artefact	Low
	37-2-3124	Artefact Scatter	Low
	37-2-3125	Artefact Scatter	Low
	37-2-3126	Artefact Scatter	Low
	37-2-3127	Artefact Scatter	Low
	37-2-3128	Artefact Scatter	Low
	37-2-3129	Artefact Scatter	Low
	37-2-3130	Artefact Scatter	Low
	37-2-3131	Artefact Scatter	Low
	37-2-3132	Isolated Artefact	Low
	37-2-3133	Artefact Scatter	Low
	37-2-3134	Artefact Scatter	Low
	37-2-3135	Artefact Scatter	Low
	37-2-3136	Artefact Scatter	Low

Impact	Site ID/Name	Site Type	Significance
	37-2-3137	Artefact Scatter	Low
	37-2-3138	Isolated Artefact	Low
	37-2-3139	Artefact Scatter	Low
	37-2-3140	Artefact Scatter	Low
	37-2-3141	Artefact Scatter	Low
	37-2-3142	Artefact Scatter	Low
	37-2-3143	Isolated Artefact	Low
	37-2-3144	Artefact Scatter	Low
	37-2-3145	Isolated Artefact	Low
	37-2-3146	Artefact Scatter	Low
	37-2-3147	Artefact Scatter	Low
	37-2-3148	Artefact Scatter	Low
	37-2-3149	Artefact Scatter	Low
	37-2-3150	Artefact Scatter	Low
	37-2-3151	Isolated Artefact	Low
	37-2-3152	Artefact Scatter	Low
	37-2-3153	Isolated Artefact	Low
	37-2-3154	Artefact Scatter	Low
	37-2-3155	Artefact Scatter	Low
	37-2-3157	Isolated Artefact	Low
	37-2-3158	Artefact Scatter	Low
	37-2-3159	Artefact Scatter	Low
	37-2-3160	Artefact Scatter	Low
	37-2-3161	Isolated Artefact	Low
	37-2-3162	Artefact Scatter	Low
	37-2-3163	Isolated Artefact	Low
	37-2-3164	Isolated Artefact	Low
	37-2-3534	Isolated Artefact	Low
	37-2-3535	Isolated Artefact	Low
	37-2-3536	Artefact Scatter	Low
	37-2-3537	Artefact Scatter	Low
	37-2-3538	Isolated Artefact	Low
	37-2-3539	Isolated Artefact	Low
	37-2-3540	Isolated Artefact	Low
	37-2-3541	Isolated Artefact	Low
	37-2-3542	Isolated Artefact	Low
	37-2-3543	Artefact Scatter	Low
	37-2-3544	Isolated Artefact	Low
	37-2-3545	Isolated Artefact	Low
	37-2-3546	Isolated Artefact	Low
	37-2-3547	Isolated Artefact	Low
	37-2-3548	Artefact Scatter	Low
	37-2-3549	Isolated Artefact	Low
	37-2-3550	Isolated Artefact	Low
	37-2-3551	Isolated Artefact	Low

Impact	Site ID/Name	Site Type	Significance
	37-2-3552	Isolated Artefact	Low
	37-2-4060	Isolated Artefact	Low
	37-2-4061	Artefact Scatter	Low
	37-2-4062	Artefact Scatter	Low
	37-2-4063	Artefact Scatter	Low
	BM-AS01-12	Artefact Scatter	Low
	BM-AS02-12	Artefact Scatter	Low
	BM-AS03-12	Artefact Scatter	Low
	BM-AS04-12	Artefact Scatter	Low
	BM-AS16-12	Artefact Scatter	Moderate
	BM-AS17-12	Artefact Scatter	Low
	BM-IA01-12	Isolated Artefact	Low
	BM-IA02-12	Isolated Artefact	Low
	BM-IA03-12	Isolated Artefact	Low
	BM-IA04-12	Isolated Artefact	Low
	BM-IA05-12	Isolated Artefact	Low
	BM-IA09-12	Isolated Artefact	Low
	MTP-1403	Artefact Scatter	Low
	MTP-1404	Isolated Artefact	Low
	MTP-1405	Isolated Artefact	Low
	MTP-1406	Isolated Artefact	Low
	MTP-1407	Isolated Artefact	Low
	MTP-1408	Isolated Artefact	Low
	MTP-1409	Isolated Artefact	Low
	MTP-1411	Isolated Artefact	Low
	MTP-1415	Isolated Artefact	Low
	MTP-1416	Isolated Artefact	Low
	MTP-1417	Isolated Artefact	Low
	MTP-1418	Isolated Artefact	Low
	MTP-1420	Isolated Artefact	Low
	MTP-1428	Isolated Artefact	Low
	MTP-1429	Isolated Artefact	Low
	MTP-1432	Isolated Artefact	Low
	MTP-1433	Isolated Artefact	Low
	MTP-1437	Isolated Artefact	Low
	MTP-1438	Isolated Artefact	Low
	MTP-1439	Isolated Artefact	Low
	MTP-1440	Isolated Artefact	Low
	MTP-1442	Isolated Artefact	Low
	MTP-1443	Isolated Artefact	Low
	MTP-1444	Isolated Artefact	Low
	MTP-1445	Isolated Artefact	Low
	MTP-1447	Isolated Artefact	Low
	MTP-1448	Isolated Artefact	Low
	MTP-1449	Isolated Artefact	Low

Impact	Site ID/Name	Site Type	Significance
	MTP-1450	Isolated Artefact	Low
	MTP-1451	Isolated Artefact	Low
	MTP-1452	Isolated Artefact	Low
	MTP-1455	Artefact Scatter	Low
	MTP-1456	Artefact Scatter	Low
	MTP-1458	Isolated Artefact	Low
	MTP-1459	Isolated Artefact	Low
	MTP-AS01-12	Artefact Scatter	Low
	MTP-AS02-12	Artefact Scatter	Low
	MTP-AS03-12	Artefact Scatter	Low
	MTP-IA01-12	Isolated Artefact	Low
	MTP-IA02-12	Isolated Artefact	Low
Haul Roads *Significance Tally* High – 0 Moderate – 0 Low – 2	37-2-4060	Isolated Artefact	Low
	BM-IA09-12	Isolated Artefact	Low
Mine Site Facilities *Significance Tally* High – 0 Moderate – 1 Low – 2	BM-AS16-12	Artefact Scatter	Low
	BM-AS18-12	Artefact Scatter	Moderate
	BM-AS19-12	Artefact Scatter	Low
Site Access *Significance Tally* High – 0 Moderate – 0 Low – 2	BM-IA16-12	Isolated Artefact	Low
	BM-IA22-12	Isolated Artefact	Low
Water Management System (damming) *Significance Tally* High – 0 Moderate – 0 Low – 8	37-2-3287	Isolated Artefact	Low
	37-2-3288	Isolated Artefact	Low
	BM-AS11-12	Artefact Scatter	Low
	BM-AS24-12	Artefact Scatter	Low
	BM-AS25-12	Artefact Scatter	Low
	BM-IA13-12	Isolated Artefact	Low
	BM-IA17-12	Isolated Artefact	Low
	BM-IA20-12	Isolated Artefact	Low
Run of Mine Activities *Significance Tally* High – 0 Moderate – 0 Low – 20	37-2-1463	Artefact Scatter	Low
	37-2-2560	Artefact Scatter	Low
	37-2-3281	Artefact Scatter	Low
	37-2-3282	Isolated Artefact	Low
	37-2-3283	Isolated Artefact	Low
	37-2-3289	Isolated Artefact	Low
	37-2-3840	Isolated Artefact	Low
	BM-AS05-12	Artefact Scatter	Low

Impact	Site ID/Name	Site Type	Significance
	BM-AS06-12	Artefact Scatter	Low
	BM-AS07-12	Artefact Scatter	Low
	BM-AS12-12	Artefact Scatter	Low
	BM-AS13-12	Artefact Scatter	Low
	BM-AS14-12	Artefact Scatter	Low
	BM-IA07-12	Isolated Artefact	Low
	BM-IA08-12	Isolated Artefact	Low
	BM-IA11-12	Isolated Artefact	Low
	BM-IA12-12	Isolated Artefact	Low
	BM-IA18-12	Isolated Artefact	Low
	BM-IA21-12	Isolated Artefact	Low
	MTP-1412	Artefact Scatter	Low
Not Impacted *Significance Tally* High – 0 Moderate – 1 Low – 25	37-2-2561	Artefact Scatter	Low
	37-2-2565	Isolated Artefact	Low
	37-2-2892	Isolated Artefact	Low
	37-2-2896	Isolated Artefact	Low
	37-2-2903	Scarred Tree	Moderate
	37-2-2916	Isolated Artefact	Low
	37-2-3285	Isolated Artefact	Low
	37-2-3286	Isolated Artefact	Low
	BM-AS08-12	Artefact Scatter	Low
	BM-AS09-12	Artefact Scatter	Low
	BM-AS10-12	Artefact Scatter	Low
	BM-AS15-12	Artefact Scatter	Low
	BM-AS20-12	Artefact Scatter	Low
	BM-AS21-12	Artefact Scatter	Low
	BM-AS22-12	Artefact Scatter	Low
	BM-AS23-12	Artefact Scatter	Low
	BM-AS26-12	Artefact Scatter	Low
	BM-IA06-12	Isolated Artefact	Low
	BM-IA10-12	Isolated Artefact	Low
	BM-IA14-12	Isolated Artefact	Low
	BM-IA15-12	Isolated Artefact	Low
	BM-IA19-12	Isolated Artefact	Low
	BM-IA23-12	Isolated Artefact	Low
	MTP-1401	Isolated Artefact	Low
	MTP-1402	Isolated Artefact	Low
	MTP-1410	Isolated Artefact	Low

**Note: several sites may be impacted by multiple activities.*

13.0 Cumulative Impact Assessment

13.1 Assessment of Ecologically Sustainable Development (ESD)

In NSW, the NPW Act provides the legislative framework for the protection of Aboriginal objects and places. Section 2A(2) of the NPW Act stipulates that such protection is to be achieved by applying the principles of Ecologically Sustainable Development (ESD). ESD requires the integration of *economic* and *environmental* considerations (including cultural heritage) in decision-making processes and, in the context of Aboriginal cultural heritage in NSW, can be achieved through the implementation of two key principles: intergenerational equity and the precautionary principle.

Intergenerational equity is the principle whereby the present generation should ensure the health, diversity and productivity of the environment for the benefit of future generations. With regards to Aboriginal heritage, intergenerational equity can be assessed in terms of cumulative impacts to Aboriginal objects and places in a region. Central to any assessment of intergenerational equity is the proposition that regions with fewer Aboriginal objects and places necessarily retain fewer opportunities for future generations of Aboriginal people to enjoy their cultural heritage. Accordingly, information regarding the known and potential Aboriginal heritage resource within a given region lies at heart of any assessment of intergenerational equity.

The precautionary principle holds that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation. In NSW, the precautionary principle is relevant to OEH's consideration of potential impacts to Aboriginal cultural heritage in situations where:

- The proposed development involves a risk of serious or irreversible damage to Aboriginal objects or places or to the value of those objects or places; and
- There is uncertainty about the Aboriginal cultural heritage values or scientific or archaeological values, including in relation to the integrity, rarity or representativeness of the Aboriginal objects or places proposed to be impacted.

In these instances, OEH has indicated that a precautionary approach should be taken and all cost-effective measures implemented to prevent or reduce damage to Aboriginal objects and/or places.

13.1.1 Intergenerational Equity - Cumulative Impacts of the Project on Aboriginal Heritage

In the context of the current assessment, three avenues for assessing the cumulative impact of the Project on Aboriginal heritage can be pursued:

- A comparison, using archaeological survey undertaken for the current project in conjunction with an AHIMS search, of sites impacted within the Study Area against those not impacted within the Study Area;
- A comparison, using the results of an AHIMS search, of the impacted Aboriginal heritage resource in the Study Area with that of the surrounding region; and
- The use of aerial photographs, topographic maps and GIS data to identify the *potential* Aboriginal heritage resource of the surrounding region.

Identified Resource - Study Area

A total of 289 Aboriginal archaeological sites have been identified within the Study Area as a result of the archaeological survey and an AHIMS search. From this total, 263 sites will be impacted or partially impacted by the Project, and a further 26 will not be impacted, as identified in **Table 36**.

Table 36: Cumulative Impact Identified Resource

Site Type	Total Sites in the Study Area	Sites Impacted	Sites Not Impacted
Artefact scatters	145	134	11
Isolated artefacts	139	125	14
Scarred trees	4	3	1
Stone quarries*	1	1 (B10 northern section)	0
Total	**289**	**263**	**26**

Note: B10 quarry site (37-2-0579) has been split into two areas which have subsequently been assessed separately. The northern portion of low significance will be impacted but the remainder of the site will not.

As indicated above, 263 sites have been identified as being impacted or partially impacted by the Project, of which 259 are isolated finds and artefact scatters. Based on these figures, stone artefacts sites that will be impacted by the Project account for 91.2% of all known stone artefact sites within the Study Area. These results suggest that the loss of the 259 isolated finds and artefact scatter sites in question would constitute a significant impact to the identified Aboriginal heritage resource within the Study Area.

Impacts to three of four scarred trees registered on AHIMS that occur within the Study Area accounts for 75% of the total identified within the Study Area. These results suggest that the loss of the three scarred trees in question would constitute a significant impact to the identified Aboriginal heritage scatted tree resource within the Study Area.

Impacts to the northern section of B10 quarry site (37-2-0579) are not considered to represent a significant impact to the identified quarry resource in the Study Area or region (discussed below). This is due to a lack of identified artefacts in the originally mapped B10 boundary, viewed in conjunction with past mine related disturbances to this area, and previous archaeological excavations undertaken at B10, all of which indicate the northern area is of low research value. In addition, no impacts are proposed to the larger southern portion of the B10 quarry resource where surface artefacts have previously been identified, and there have been fewer past disturbances.

Identified Resource – AHIMS 30 x 30 km Region

A search of the AHIMS database for a 30 x 30 km region (study region) centred on the Study Area provides another method of assessing the cumulative impact of the Project on the existing Aboriginal heritage resource of the study region. A search of the database was undertaken on 14 June 2012 and returned 2,838 records of currently valid sites. A breakdown of site types is provided in **Table 37**.

Table 37: Identified Resource 30 x 30 KM

Site Type	Number of Features AHIMS
Artefact scatters and isolated finds	2838
Scarred trees	45
Stone quarries	6
Total	**2889**

Alongside those identified within the Project Boundary, existing Aboriginal sites in the study region offer opportunities for future research, conservation and education. As indicated above, a total of 259 isolated finds and artefact scatters will be impacted by the Project. On current evidence, these sites represent 9.1% of all known artefact scatters and isolated sites within the study region. Due to significant differences in the quantity and quality of information available on AHIMS site cards for stone artefact sites in the region, a direct comparison of the significance and character of stone artefact sites within and outside the Study Area is not possible. Nonetheless, it should be noted that of the sites impacted, none have been rated as having high scientific significance and only seven of moderate significance. Together with the figures above, this suggests that the loss of the 259 sites in question would constitute a moderate impact to the identified Aboriginal heritage resource of the region.

In addition, three scarred trees will be impacted as a result of the Project. On current evidence, these trees represent 6.6% of all known scarred tree sites in the study region. Destruction of these trees therefore constitutes a moderate impact to known scarred tree sites within the region.

Potential Resource

AHIMS results only represent a fraction of the likely archaeological resource present within a region, as these results are only representative of land that has been subject to archaeological investigations. Accordingly, an assessment of the *potential* Aboriginal heritage resource of the study region is also required. For the present analysis, aerial photographs, topographic maps and GIS data have been used to prepare a preliminary assessment of this resource.

As shown in **Table 38** analysis of available aerial photography and GIS data for study region indicates that, when combined with the total amount of land proposed to be impacted by open cut mining operations within the Project Area, grossly modified or disturbed terrain (i.e. urban areas, roads, coal mines, power stations, etc) accounts for 8.86% of the total study region. Within these areas, there is considered to be a low potential for archaeological sites. The vast majority of land within the area is low-intensity rural land use (68.78%). Undisturbed 'natural' terrain makes up the remaining 22.36%.

Viewed from an archaeological perspective, the results of the land use analysis presented in **Table 38** suggest that a significant portion of the study region represents a potential Aboriginal heritage resource. As noted above, Aboriginal heritage is unlikely to survive in areas of disturbed terrain (8.86%). However, numerous studies have shown that rural areas can, and frequently do, retain evidence of past Aboriginal occupation and/or activity, albeit typically of lower integrity to that identified in otherwise undisturbed areas. Therefore, combining low-intensity rural land use (68.78%) and undisturbed terrain (22.36%), it can be argued that 91.14% of the study region has the potential to retain evidence of past Aboriginal occupation and/or activity.

With regards to the existence, outside of the Project Boundary of environmental contexts that have the potential to contain sites comparable to that identified within it, an examination of available topographic mapping for the study region indicates that many such contexts exist. Particular attention, for example, is drawn to the northern undisturbed portion of Dry Creek, Sandy Creek and Coal Creek, to the north-west of the Project Boundary. As indicated by the results of the current assessment and previous archaeological investigations in the region, stone artefact sites are typically located in landform contexts within 100 or 200 m of watercourses, with larger, more complex sites associated with higher order streams. On the basis of this evidence alone, it can be concluded that the study region retains a significant, as yet unidentified, stone artefact resource.

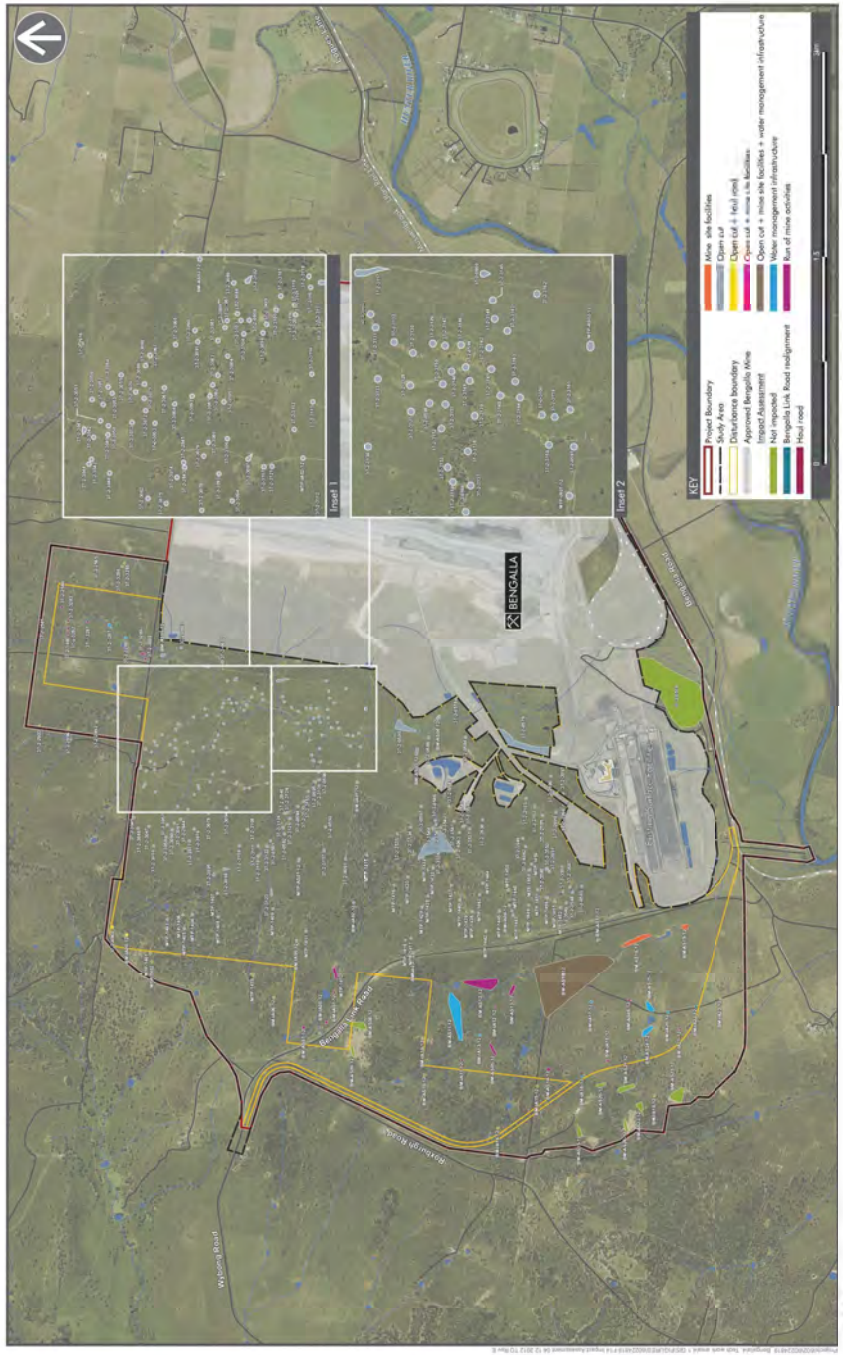
Table 38: Land Use Analysis

Disturbance category	Area (ha)	%
Grossly modified/disturbed	7,974	8.86
Low-intensity rural land use	61,906	68.78
Conservation areas	0	0
Undisturbed/minimally disturbed 'natural' terrain	20,120	22.36
Total	**90,000**	**100**

13.1.2 The precautionary principle

As indicated above, the precautionary principle holds that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

In the context of the current assessment, it can be stated that AECOM has adopted a precautionary approach in our assessment of the impacts of the Project on identified Aboriginal sites within the Study Area and that this approach is reflected in our proposed management strategy (**Section 14.0**).


KEY
Project Boundary
Mine Area
Disturbance boundary
Approved Bengalla Mine
Impact Assessment
Not impacted
Bengalla Link Road realignment
Haul road
Mine site facilities
Mine pit
Open cut + haul road
Open cut + mine site facilities
Open cut + mine site facilities + water management infrastructure
Water management infrastructure
Run of mine activities
Inset 1
Inset 2
BENGALLA
Bengalla Link Road
Wybong Road
Muswellbrook Road
IMPACT ASSESSMENT
Bengalla Continuation of Mining Project
Aboriginal Archaeological and Cultural Heritage Impact Assessment
FIGURE 14
AECOM

14.0 Management Recommendations

14.1 Statutory Requirements

As indicated in **Section 1.0**, this Aboriginal archaeology and cultural heritage impact assessment forms part of an EIS being prepared by Hansen Bailey to support Bengalla Mine's Project Approval under Part 4, Division 4.1 of the EP&A Act.

The *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005) detail the relevant statutory requirements for Aboriginal cultural heritage impact assessments conducted under Division 4.1 of Part 4 of the EP&A Act. Although not statutorily binding for Division 4.1 assessments, OEH's *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010a) and *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011) provide 'best practice' documents for Aboriginal Cultural Heritage Impact Assessments in NSW. Both documents have been used in the formulation of the management strategy detailed below.

14.2 Management Strategy

A total of 263 Aboriginal archaeological sites have been identified as being directly impacted by the Project through open cut mining activities and/or the construction/maintenance of mine-related infrastructure. A management strategy to address the impacts of the Project on the known Aboriginal archaeological resource of the Study Area is provided below.

It is recommended that this strategy be detailed in a revised ACHMP for the Project, which should be prepared in consultation with RAPs, OEH and DP&I. Subject to Development Consent under Part 4, Division 4.1 of EP&A Act, this ACHMP will guide the management of the known and potential Aboriginal archaeological resource of the Project Area as well identified cultural values.

The ACHMP should contain procedures for consultation and involvement of RAPs in the management of Aboriginal cultural heritage values within the Study Area. In addition, the ACHMP will include details of proposed mitigation and management strategies of all Aboriginal sites, procedures for the identification and management of previously unrecorded sites, details of an appropriate long term arrangement for any Aboriginal objects salvaged, details of an Aboriginal cultural heritage education program for all contractors and personnel associated with construction activities and compliance procedures.

14.2.1 AHIMS Site Cards

AHIMS sites cards will be completed and submitted to OEH for all newly recorded sites at the completion of the assessment.

14.2.2 Archaeological Salvage Program

An archaeological salvage program should be undertaken for those sites within the Study Area impacted by the Project prior to disturbances. The program, which is to be detailed in the ACHMP for the Project, will incorporate the following two components:

Surface Collection (Salvage) of Stone Artefacts

Two hundred and fifty nine isolated finds and artefact scatters, comprising two sites of moderate and 257 sites of low archaeological significance, will be directly impacted by the Project, resulting in their destruction. To mitigate these impacts, and in recognition that all sites are important to the Aboriginal community, surface artefact collection of all 259 artefact scatters and isolated finds will be undertaken prior to the commencement of mining activities. Surface collection is considered an appropriate and effective mitigation option for these sites given their content and level of archaeological significance. **Table 39** provides a list of sites to be surface collected.

Recovered artefacts should be subject to appropriate forms of analysis and managed in accordance with the ACHMP. RAPs should be involved in the collection of surface artefacts. Appropriate long-term management options for recovered artefacts should be developed in consultation with RAPs during the preparation of the ACHMP.

ASIR cards for all salvaged sites are required to be submitted to OEH at the completion of the salvage.

Scarred Tree Assessment & Removal

Three AHIMS registered scarred trees will be impacted by the Project (37-2-3095, 37-2-3107, and 37-2-3064). It is recommended that these trees be subject to an aborist inspection, with the participation of RAP representatives, prior to Project impacts, in order to assess their status as Aboriginal scarred trees. Should it be determined the scars on these trees are of Aboriginal origin they should be removed under the supervision of a qualified aborist, archaeologist and RAP representatives prior to impacts. Details for the scarred tree assessment, and possible removal, transport and long term storage should be incorporated into the revised ACHMP. Should it be determined they are not Aboriginal scarred trees they will not be managed as Aboriginal archaeological sites.

Subsurface Archaeological Excavation

Additional subsurface archaeological excavations have not been proposed for identified areas of archaeological sensitivity (i.e. Dry Creek and its tributaries for the following reasons):

- A comprehensive program of archaeological excavations, addressing questions pertaining to site location, site composition and specific research questions related to distance decay from B10 quarry site, has been undertaken on Dry Creek at site B33 (37-2-602) by Elizabeth White (1998);
- White (1998) excavated two locations on Dry Creek: B33-1 and B33-2. B33-1 comprised a 10 x 5 m area from which 142 artefacts were recorded, resulting in an artefact density of 2.84/m². B33-2 comprised a roughly 5 x 3 m area from which 523 artefacts were recorded, resulting in an artefact density of 34.8/m². These artefact densities are considered low/moderate within the context of the Hunter Valley (see Kuskie et al. 2004a; Hamm 2010);
- A review of geomorphological data, including soil assessments, in conjunction with observation made during the field survey, indicates that soils along Dry Creek and its tributaries are likely derived from erosional processes upslope. Consequently, artefacts identified within the area are likely to be in varying disturbed contexts. This was noted by White (1998: 62) who found the 'deposit appeared to be disturbed' at site B33-1. Turvey (in White 1998: 28) also notes it 'is unlikely that dateable archaeological material exists in this area due to the same erosional processes responsible for the material deposited in this channel system (from upslope)'. On this basis, archaeological excavations are not considered warranted; and
- As part of the proposed archaeological salvage program outlined above, a large assemblage of surface artefacts will be collected. The size of the assemblage is considered large enough to answer questions related to the location, duration, and complexity of past Aboriginal activities in the Bengalla landscape.

Subsurface archaeological excavations have not been proposed for the northern section of B10 quarry (37-2-0579) for the following reasons:

- A lack of identified surface archaeology directly within the area, including raw material suitable for knapping, both as part of the current assessment and Rich's (1993) assessment;
- Past excavations i.e. White (1998) and ERM (2007)) supports Rich's observation that significantly fewer artefacts numbers will occur at the northern extent of the B10 ridgeline. White's original excavation in the central portion of the ridgeline identified 4,454 artefacts, while ERM's exaction in the middle/northern portion of the ridgeline identified only 170 artefacts; and
- Past disturbances, including the construction of the Bengalla haul road has potentially impacted the integrity of the northern portion of the ridgeline on which B10 occurs.

14.2.3 Protection of Non-impacted Sites

All Aboriginal sites not impacted by the Project but within the Project Boundary are to be protected from impacts (n=26). In addition, Aboriginal archaeological sites that will not be impacted by the Project but occur within 200 m of proposed impacts i.e. mine activities (n = 17) are to be protected via permanent stock-proof fencing and appropriate associated signage (**Table 39).** Site fencing is to be erected after consultation with a qualified archaeologist and RAP representatives. All relevant staff and contractors are to be made aware of the nature and locations of all sites as well as BMC's legal obligations with respect to them. Protected sites will need to be identified on all relevant mine site plans. Details for the care of protected sites should be incorporated into the ACHMP.

14.2.4 Aboriginal Site Database

The existing Aboriginal Site Database for the Project Boundary will be updated upon commencement of the Project to incorporate the findings of this assessment report. BMC will be responsible for the maintenance of this database which will, at a minimum, contain the name, type, size (where applicable), MGA coordinates and status of all Aboriginal sites identified as part of this assessment and previous assessments within the Project Boundary. The database is to be regularly updated throughout the operational life of Project.

14.2.5 Aboriginal Heritage Induction & Cultural Awareness Training

As part of Project inductions, an Aboriginal cultural heritage component should be included. This will outline current protocols and responsibilities with respect to the management of Aboriginal cultural heritage for the Project. It will also provide an overview of the site types present and procedures for reporting the identification of Aboriginal archaeological sites.

In addition, Aboriginal cultural awareness training will be undertaken for all staff whose roles may reasonably bring them into contact with Aboriginal sites and/or involve consultation with local Aboriginal community members.

The commitment to the development of the Aboriginal cultural awareness training package will be included in the ACMP.

14.2.6 Management of Previously Unrecorded Aboriginal Objects

14.2.6.1 Open Artefact Sites

In the event that previously unidentified Aboriginal objects are identified throughout the construction and operational phases of the Project, the following procedure is to be adopted:

1. All works must cease immediately in the area to prevent any further impacts to the object(s).
2. Notify the BMC Environmental Specialist immediately;
3. A qualified archaeologist will be engaged to determine the nature, extent and scientific significance of the object(s);
4. RAPs are to be notified in writing regarding the nature of the find and if required proposed management actions. RAPs will be requested to provide comments within seven days;
5. Appropriate management recommendations are then to be developed by BMC in consultation with OEH, an archaeologist, and RAPs.

14.2.6.2 Human Skeletal Remains

In the event that human skeletal remains are identified, the following procedure is to be adopted:

1. When suspected human remains are identified, all work in the near vicinity is to cease immediately;
2. Notify the BMC Environmental Specialist immediately;
3. The BMC Environmental Specialist is to notify the Police immediately;
4. The BMC Environmental Specialist is to contact OEH's Environment line on 131 555 to identify that possible skeletal remains have been discovered and that the police have been notified. OEH will provide details on the current processes involved for managing archaeological skeletal remains (both Aboriginal & historic);
5. Under the instructions of the Police, an area 50 m in radius is to be cordoned off using temporary fencing around the exposed suspected human remains site. On agreement between the Police and the BMC Environmental Specialist, work can continue outside of this area as long as there is no risk of interference to the human remains or the assessment of human remains;
6. If the remains are determined to be Aboriginal remains, then under the advice of OEH, consult with the RAPs; and
7. Do not recommence work at the location until all legal requirements and the reasonable requirements of OEH and the RAPs have been adequately addressed.

14.3 Summary of Management Mitigation Measures

Table 39 presents a summary of management mitigation measures for Aboriginal sites within the Project Boundary.

Table 39: Summary of Management Mitigation Measures

Management Mitigation Measures	Site ID	Site Type
Surface Collection of Artefacts	37-2-0578	Artefact Scatter
	37-2-0583	Artefact Scatter
	37-2-0584	Artefact Scatter
	37-2-0585	Artefact Scatter
	37-2-0586	Artefact Scatter
	37-2-0587	Artefact Scatter
	37-2-0589	Artefact Scatter
	37-2-0590	Artefact Scatter
	37-2-0591	Artefact Scatter
	37-2-0592	Artefact Scatter
	37-2-0593	Artefact Scatter
	37-2-0594	Artefact Scatter
	37-2-0595	Artefact Scatter
	37-2-0596	Artefact Scatter
	37-2-0597	Artefact Scatter
	37-2-0598	Artefact Scatter
	37-2-0599	Artefact Scatter
	37-2-0600	Artefact Scatter
	37-2-0602	Artefact Scatter
	37-2-0603	Artefact Scatter
	37-2-0604	Artefact Scatter
	37-2-1463	Artefact Scatter
	37-2-2097	Isolated Artefact
	37-2-2098	Isolated Artefact
	37-2-2099	Isolated Artefact
	37-2-2100	Isolated Artefact
	37-2-2101	Isolated Artefact
	37-2-2102	Isolated Artefact
	37-2-2103	Isolated Artefact
	37-2-2560	Artefact Scatter
	37-2-2843	Isolated Artefact
	37-2-2844	Isolated Artefact
	37-2-2845	Isolated Artefact
	37-2-2846	Isolated Artefact
	37-2-3041	Artefact Scatter
	37-2-3042	Artefact Scatter
	37-2-3043	Artefact Scatter
	37-2-3044	Isolated Artefact
	37-2-3045	Artefact Scatter
	37-2-3046	Isolated Artefact
	37-2-3047	Isolated Artefact
	37-2-3048	Isolated Artefact
	37-2-3049	Artefact Scatter
	37-2-3050	Isolated Artefact
	37-2-3051	Artefact Scatter
	37-2-3052	Artefact Scatter
	37-2-3053	Artefact Scatter
	37-2-3054	Artefact Scatter
	37-2-3055	Isolated Artefact
	37-2-3056	Artefact Scatter
	37-2-3057	Isolated Artefact
	37-2-3058	Artefact Scatter

Management Mitigation Measures	Site ID	Site Type
	37-2-3059	Isolated Artefact
	37-2-3060	Isolated Artefact
	37-2-3061	Artefact Scatter
	37-2-3062	Isolated Artefact
	37-2-3063	Isolated Artefact
	37-2-3065	Artefact Scatter
	37-2-3066	Artefact Scatter
	37-2-3067	Artefact Scatter
	37-2-3068	Isolated Artefact
	37-2-3069	Artefact Scatter
	37-2-3070	Isolated Artefact
	37-2-3071	Artefact Scatter
	37-2-3072	Artefact Scatter
	37-2-3073	Artefact Scatter
	37-2-3074	Isolated Artefact
	37-2-3075	Isolated Artefact
	37-2-3076	Isolated Artefact
	37-2-3077	Artefact Scatter
	37-2-3078	Isolated Artefact
	37-2-3079	Isolated Artefact
	37-2-3080	Isolated Artefact
	37-2-3081	Artefact Scatter
	37-2-3082	Artefact Scatter
	37-2-3083	Artefact Scatter
	37-2-3084	Isolated Artefact
	37-2-3085	Artefact Scatter
	37-2-3086	Artefact Scatter
	37-2-3087	Artefact Scatter
	37-2-3088	Artefact Scatter
	37-2-3089	Artefact Scatter
	37-2-3090	Artefact Scatter
	37-2-3091	Artefact Scatter
	37-2-3092	Artefact Scatter
	37-2-3093	Isolated Artefact
	37-2-3094	Artefact Scatter
	37-2-3096	Isolated Artefact
	37-2-3097	Artefact Scatter
	37-2-3098	Artefact Scatter
	37-2-3099	Artefact Scatter
	37-2-3100	Artefact Scatter
	37-2-3101	Artefact Scatter
	37-2-3102	Artefact Scatter
	37-2-3103	Artefact Scatter
	37-2-3104	Artefact Scatter
	37-2-3105	Artefact Scatter
	37-2-3106	Isolated Artefact
	37-2-3108	Isolated Artefact
	37-2-3109	Isolated Artefact
	37-2-3110	Artefact Scatter
	37-2-3111	Isolated Artefact
	37-2-3112	Artefact Scatter
	37-2-3113	Isolated Artefact
	37-2-3114	Artefact Scatter
	37-2-3115	Artefact Scatter
	37-2-3116	Artefact Scatter
	37-2-3117	Isolated Artefact
	37-2-3118	Artefact Scatter
	37-2-3119	Artefact Scatter

Management Mitigation Measures	Site ID	Site Type
	37-2-3120	Artefact Scatter
	37-2-3121	Isolated Artefact
	37-2-3122	Artefact Scatter
	37-2-3123	Isolated Artefact
	37-2-3124	Artefact Scatter
	37-2-3125	Artefact Scatter
	37-2-3126	Artefact Scatter
	37-2-3127	Artefact Scatter
	37-2-3128	Artefact Scatter
	37-2-3129	Artefact Scatter
	37-2-3130	Artefact Scatter
	37-2-3131	Artefact Scatter
	37-2-3132	Isolated Artefact
	37-2-3133	Artefact Scatter
	37-2-3134	Artefact Scatter
	37-2-3135	Artefact Scatter
	37-2-3136	Artefact Scatter
	37-2-3137	Artefact Scatter
	37-2-3138	Isolated Artefact
	37-2-3139	Artefact Scatter
	37-2-3140	Artefact Scatter
	37-2-3141	Artefact Scatter
	37-2-3142	Artefact Scatter
	37-2-3143	Isolated Artefact
	37-2-3144	Artefact Scatter
	37-2-3145	Isolated Artefact
	37-2-3146	Artefact Scatter
	37-2-3147	Artefact Scatter
	37-2-3148	Artefact Scatter
	37-2-3149	Artefact Scatter
	37-2-3150	Artefact Scatter
	37-2-3151	Isolated Artefact
	37-2-3152	Artefact Scatter
	37-2-3153	Isolated Artefact
	37-2-3154	Artefact Scatter
	37-2-3155	Artefact Scatter
	37-2-3157	Isolated Artefact
	37-2-3158	Artefact Scatter
	37-2-3159	Artefact Scatter
	37-2-3160	Artefact Scatter
	37-2-3161	Isolated Artefact
	37-2-3162	Artefact Scatter
	37-2-3163	Isolated Artefact
	37-2-3164	Isolated Artefact
	37-2-3281	Artefact Scatter
	37-2-3282	Isolated Artefact
	37-2-3283	Isolated Artefact
	37-2-3287	Isolated Artefact
	37-2-3288	Isolated Artefact
	37-2-3289	Isolated Artefact
	37-2-3534	Isolated Artefact
	37-2-3535	Isolated Artefact
	37-2-3536	Artefact Scatter
	37-2-3537	Artefact Scatter
	37-2-3538	Isolated Artefact
	37-2-3539	Isolated Artefact
	37-2-3540	Isolated Artefact
	37-2-3541	Isolated Artefact

Management Mitigation Measures	Site ID	Site Type
	37-2-3542	Isolated Artefact
	37-2-3543	Artefact Scatter
	37-2-3544	Isolated Artefact
	37-2-3545	Isolated Artefact
	37-2-3546	Isolated Artefact
	37-2-3547	Isolated Artefact
	37-2-3548	Artefact Scatter
	37-2-3549	Isolated Artefact
	37-2-3550	Isolated Artefact
	37-2-3551	Isolated Artefact
	37-2-3552	Isolated Artefact
	37-2-3840	Isolated Artefact
	37-2-4060	Isolated Artefact
	37-2-4061	Artefact Scatter
	37-2-4062	Artefact Scatter
	37-2-4063	Artefact Scatter
	BM-AS01-12	Artefact Scatter
	BM-AS02-12	Artefact Scatter
	BM-AS03-12	Artefact Scatter
	BM-AS04-12	Artefact Scatter
	BM-AS05-12	Artefact Scatter
	BM-AS06-12	Artefact Scatter
	BM-AS07-12	Artefact Scatter
	BM-AS11-12	Artefact Scatter
	BM-AS12-12	Artefact Scatter
	BM-AS13-12	Artefact Scatter
	BM-AS14-12	Artefact Scatter
	BM-AS16-12	Artefact Scatter
	BM-AS17-12	Artefact Scatter
	BM-AS18-12	Artefact Scatter
	BM-AS19-12	Artefact Scatter
	BM-AS24-12	Artefact Scatter
	BM-AS25-12	Artefact Scatter
	BM-IA01-12	Isolated Artefact
	BM-IA02-12	Isolated Artefact
	BM-IA03-12	Isolated Artefact
	BM-IA04-12	Isolated Artefact
	BM-IA05-12	Isolated Artefact
	BM-IA07-12	Isolated Artefact
	BM-IA08-12	Isolated Artefact
	BM-IA09-12	Isolated Artefact
	BM-IA11-12	Isolated Artefact
	BM-IA12-12	Isolated Artefact
	BM-IA13-12	Isolated Artefact
	BM-IA16-12	Isolated Artefact
	BM-IA17-12	Isolated Artefact
	BM-IA18-12	Isolated Artefact
	BM-IA20-12	Isolated Artefact
	BM-IA21-12	Isolated Artefact
	BM-IA22-12	Isolated Artefact
	MTP-1403	Artefact Scatter
	MTP-1404	Isolated Artefact
	MTP-1405	Isolated Artefact
	MTP-1406	Isolated Artefact
	MTP-1407	Isolated Artefact
	MTP-1408	Isolated Artefact
	MTP-1409	Isolated Artefact
	MTP-1411	Isolated Artefact

Management Mitigation Measures	Site ID	Site Type
	MTP-1412	Artefact Scatter
	MTP-1415	Isolated Artefact
	MTP-1416	Isolated Artefact
	MTP-1417	Isolated Artefact
	MTP-1418	Isolated Artefact
	MTP-1420	Isolated Artefact
	MTP-1428	Isolated Artefact
	MTP-1429	Isolated Artefact
	MTP-1432	Isolated Artefact
	MTP-1433	Isolated Artefact
	MTP-1437	Isolated Artefact
	MTP-1438	Isolated Artefact
	MTP-1439	Isolated Artefact
	MTP-1440	Isolated Artefact
	MTP-1442	Isolated Artefact
	MTP-1443	Isolated Artefact
	MTP-1444	Isolated Artefact
	MTP-1445	Isolated Artefact
	MTP-1447	Isolated Artefact
	MTP-1448	Isolated Artefact
	MTP-1449	Isolated Artefact
	MTP-1450	Isolated Artefact
	MTP-1451	Isolated Artefact
	MTP-1452	Isolated Artefact
	MTP-1455	Artefact Scatter
	MTP-1456	Artefact Scatter
	MTP-1458	Isolated Artefact
	MTP-1459	Isolated Artefact
	MTP-AS01-12	Artefact Scatter
	MTP-AS02-12	Artefact Scatter
	MTP-AS03-12	Artefact Scatter
	MTP-IA01-12	Isolated Artefact
	MTP-IA02-12	Isolated Artefact
Scarred Tree Removal	37-2-3064	Scarred Tree
	37-2-3095	Scarred Tree
	37-2-3107	Scarred Tree
No Impact - Fencing	37-2-2561	Artefact Scatter
	37-2-2916	Isolated Artefact
	37-2-3285	Isolated Artefact
	37-2-3286	Isolated Artefact
	BM-AS08-12	Artefact Scatter
	BM-AS09-12	Artefact Scatter
	BM-AS10-12	Artefact Scatter
	BM-AS20-12	Artefact Scatter
	BM-AS21-12	Artefact Scatter
	BM-IA06-12	Isolated Artefact
	BM-IA10-12	Isolated Artefact
	BM-IA14-12	Isolated Artefact
	BM-IA15-12	Isolated Artefact
	BM-IA23-12	Isolated Artefact
	MTP-1401	Isolated Artefact
	MTP-1402	Isolated Artefact
	MTP-1410	Isolated Artefact
No Impact - Conservation	37-2-2896	Isolated Artefact
	37-2-2565	Isolated Artefact
	37-2-2892	Isolated Artefact
	37-2-2903	Scarred Tree
	BM-AS15-12	Artefact Scatter

Management Mitigation Measures	Site ID	Site Type
	BM-AS22-12	Artefact Scatter
	BM-AS23-12	Artefact Scatter
	BM-AS26-12	Artefact Scatter
	BM-IA19-12	Isolated Artefact
Impacted – No further mitigation measures (northern section)	37-2-0579	Quarry (northern)
No Impact – Conservation (southern section)	37-2-0579	Quarry (southern)

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Appendix A

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Bengalla Coal Mine – Continuation of Mining: Aboriginal Heritage Impact Assessment Draft Methodology

1.0 Introduction

AECOM has been commissioned by Hansen Bailey, on behalf of Bengalla Mining Company Pty Limited (BMC), to undertake an Aboriginal archaeological and cultural heritage impact assessment for the Bengalla Coal Mine Continuation of Mining Project (the Project). BMC is seeking a Development Consent under Part 4 Division 4.1 of the *Environmental Planning & Assessment Act 1979* (EP&A Act) to enable mining to continue to the west for a 24 year period at a rate of up to 15 Million tonnes per annum (Mtpa) of Run of Mine (ROM) coal. The Project is located approximately four kilometres west of Muswellbrook in the Upper Hunter Valley of NSW.

The objectives of the Aboriginal archaeological and cultural heritage impact assessment are to identify Aboriginal heritage values, both archaeological and cultural, of lands within the Project Boundary and to determine appropriate mitigation and/or management measures. The assessment will involve background research, Aboriginal community consultation and archaeological field survey.

This draft methodology provides some background information about the Project Area and describes the proposed assessment methodology.

Aboriginal stakeholders are invited to comment on this draft. Comments from Aboriginal stakeholders will be reviewed and addressed in the final methodology. Aboriginal stakeholders are also invited to provide comments regarding the Aboriginal heritage cultural values of the Project Area.

2.0 Project Overview

The Project consists of the following:

- Open cut coal mining at up to 15 Mtpa ROM for 24 years continuing to utilising a dragline and truck / excavator fleet;
- Continue mining to the west of current operations;
- An additional Overburden Emplacement Area (OEA) to the west of Dry Creek which may be utilised for excess spoil material until it is intercepted by mining;
- Processing, handling and transportation of coal via the existing CHPP (to be upgraded) and rail loop for export and domestic sale;
- An additional Coal Handling & Preparation Plant (CHPP) coal stockpile and ROM coal stockpile;
- Continued use, expansion and upgrades to existing site infrastructure;
- The construction of a radio tower;
- Relocation of the Explosives Magazine and Reload Facility;
- Relocation of a section of Bengalla Link Road near the existing mine access road to enable coal extraction;
- The diversion of Dry Creek via dams and pipe work with a later permanent alignment of Dry Creek through rehabilitation areas once stability is established;
- Re-location of water storage infrastructure as mining progresses through existing dams (including the staged discharge dam);
- The construction of raw water dams and a clean water dam;
- A workforce of approximately 900 full time equivalent personnel (plus contractors) at peak production; and
- Supporting power reticulation infrastructure.

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3.0 Background

3.1 AHIMS Search

A search of the Aboriginal Heritage Information Management System (AHIMS) database for previously recorded Aboriginal sites within the Project Boundary (as shown on **Figure 1**) was lodged with the Office of Environment & Heritage (OEH) on 28 September 2011. Results of the search found 211 AHIMS sites occur within the Project Boundary. **Table 1** provides a summary of these. All previously recorded AHIMS sites within the Project Boundary will be re-assessed during the assessment.

Table 1: Summary of Site Types

Site Type	Count	%
Isolated Find	3	1.4
Scarred Tree	3	1.4
Artefact Scatter	15	7.1
Isolated Find or Artefact Scatter (not specified)	190	90.1
Total	**211**	**100**

3.2 Archaeological Context

A number of Aboriginal archaeological assessments have been undertaken within the Project Boundary. A summary of these is provided below.

Rich, E. R. (1993). *Archaeological Survey for Aboriginal Sites, Proposed Bengalla Coal Mine*.

Rich undertook an archaeological survey within the disturbance area of the Project, extending from Wybong Road in the north, to the Muswellbrook-Merriwa Railway line in the south, and from Bengalla Road in the east in 1993 for the Bengalla EIS (Existing Project Area). A total of 56 Aboriginal sites were recorded, comprising 39 artefact scatters and 17 isolated finds. Artefacts were found to occur on all landforms, including Dry Creek, gullies, flats, rises, slopes and ridge tops. The most significant site recorded was a silcrete quarry (B10) associated with tertiary ridge gravels.

Rich hypothesises that three stone industries were present in the area: a microblade (i.e. backed blade) industry, a small flake tool industry, and a large tool industry that included large retouched flakes, unifacial and bifacial pebble tools, axes, hammerstones and a grindstone. Interestingly, Rich found that the various stone industries tended to be found on different landform units. Microblade industries were concentrated along the main creek and around the confluence of minor gullies. Small flake tool assemblages tended to occur along minor gullies and on hill slopes and ridges while artefacts of the large tool industry were found on most land units, but most frequently on land units close the Hunter flats and on slopes and ridges away from the flats. Silcrete was the predominant raw material recorded, accounting for 60% of all artefacts. Much of this material was found naturally occurring at the quarry site B10 and likely procured there. Indurated mudstone/tuff was the next most commonly recorded raw material (26%).

The majority of recorded artefacts comprised flake and non-flake debitage (82%) with cores and tools reasonably well represented at 8.5% and 8.2% respectively. Cores and tools were also reasonably well represented at 8.5% and 8.2% respectively.

Rich concluded that most of the Bengalla coal lease had been substantially disturbed by previous land uses such as clearing, ploughing, grazing, construction of dams, contour drains, fences, transmission lines, track and general erosion. Most recorded sites were extensively damaged.

All artefacts recorded were left *in-situ* and were not subject to collection or salvage.

White, E. (1998). *Archaeological Salvage of Sites B10 & B33, Bengalla Mine, Hunter Valley, NSW*.

White undertook salvage excavation of the previously identified quarry site B10 and artefact scatter B33 at Bengalla in 1998. The works constituted the first large scale excavation of a quarry in the Hunter Valley. The quarry site was located on an elevated ridge roughly 600 m from the Hunter River and comprised of cobbles of silcrete, petrified wood, quartz, and other fine-grained siliceous and igneous materials. Two large pits, B10-1 and B10-2, measuring 5 x 10 m were excavated. B10-1 was excavated within the outcrop of silcrete cobbles and

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recovered 4,454 artefacts. Results found that the most commonly utilised material were the sub-angular silcrete boulders embedded in the stony deposit and showing above the ground. White observed that the tops of these boulders were battered to remove large flakes that were subsequently used as cores for flaking. Heat treatment of some of these larger flakes/cores prior to flaking was noted. Artefact densities at the site were up to 1,200 artefacts per metre squared. Excavations at B10-2, located approximately 2 km upstream from B10, recovered 222 artefacts. White concludes from the low artefact density at excavations site B10-2 that use of the site was episodic and related to foraging and hunting activities.

Excavations at B33, located 2.8 km north of B10, included another 5 x 10 m trench. A total of 142 artefacts was recorded during excavation. In addition to the 5 x 10 m pit, the remains of a partly eroded knapping floor, referred to as B33-2 was also excavated employing a 3 x 5 m pit. A total of 523 heat shattered and flaked artefacts were recovered. No backed artefacts were identified, leading White to argue that the sites were used for stone processing, rather than tool production.

All excavated artefactual material was analysed and is currently housed within the Australian Museum.

ERM. (2007). *Bengalla Mine Section 90 #2621*.

ERM undertook a surface collection and excavation for Section 90 application #2621 for Aboriginal quarry site B10 at Bengalla in 2007. A total of 166 stone artefacts was collected during the surface collection and 39 during the excavation. Excavations consisted of grader scrapes across the site. Analysis of artefactual material recovered found the dominant raw material utilised was silcrete, accounting for 90% of all artefacts. Far fewer artefacts were recovered from the excavations than the surface collection. Artefacts recovered from subsurface contexts were found to be larger on average and comprising of a greater number of cores. From this result, it is concluded that core reduction, in the context of the subsurface deposit was being undertaken elsewhere.

All excavated artefactual material has been subject to analysis and attempts are currently being made to house the material within the Australian Museum.

ENSR AECOM. (2008). *Bengalla Link Road Stage Two Archaeological Salvage Bengalla Mine*.

ENSR AECOM undertook a program of surface collection grader scrapes of Aboriginal sites identified along the route of the Bengalla Link Road Stage 2 in 2008. Nine Aboriginal sites were salvaged, resulting in the recovery of 56 artefacts. All sites were considered low density artefact scatters, with the low numbers of artefacts attributed to the great distance of the sites from permanent water sources. Silcrete was the most commonly identified raw material, accounting for 66% of all artefacts. The remaining raw materials comprised indurated mudstone/tuff (20%), quartz (7%) porcellanite (2%) and other igneous (2%).

All excavated artefactual material has been subject to analysis and attempts are currently being made to house the material within the Australian Museum

Central Queensland Cultural Heritage Management (CQCHM). (2010). *Mount Pleasant Project Modification Aboriginal Cultural Heritage Assessment Report*.

CQCHM undertook archaeological survey for the Mount Pleasant lease area and adjoining Coal & Allied lands including an area at Bengalla. Within the Bengalla area approximately 130 isolated finds, four artefact scatters, three scarred trees, and three potential scarred trees were identified. All sites were attributed low or moderate archaeological significance.

All artefacts recorded were left *in-situ* and were not subject to collection or salvage.

3.3 Environmental Context

Environmental factors such as topography, geology, hydrology, flora and fauna would have been key influences on past Aboriginal occupation and land use, as well as archaeological site patterning and distribution, site survival over time, and the likelihood of detecting any extant archaeological sites. Any attempt to predict or interpret the character and distribution of Aboriginal sites in a given landscape must consider these environmental factors, along with historic and current land use practices, to enable predictions to be made concerning the likely presence or absence of sites in a given area, and, where appropriate, their archaeological integrity.

3.3.1 Topography

The land on which Bengalla is located is generally undulating and generally slopes southward towards the Hunter River. Within the eastern and southern margins of the Project Boundary are the Hunter River alluvial flats. In the eastern part of the Project Boundary, the Overton Ridge is situated and reaches 188 m AHD. South of the

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Overton Ridge are lower hillslopes of the Hunter Valley which rise from 134 m AHD at the Hunter River to 250 m AHD (HLA-Envirosciences Pty Ltd 1993). Land within the Project Boundary is dominated by slopes of less than 5 degrees, with the gullies in the lower reaches of ephemeral streams draining into the Hunter River along with the ridge tops generally sloping at no more than 2.5 degrees. The Hunter River alluvial floodplain generally slopes at no more than 1 degree (HLA-Envirosciences Pty Ltd 1993).

3.3.2 Geology

The Project is situated within the Hunter Coalfield, close to the north-eastern boundary of the Sydney Basin. The geology of the Hunter Valley is characterised by late Permian sediments, early Permian marine sediments, and Quaternary alluvium.

Coal seams at Bengalla comprise those of the lower Jerrys Plains and Vane Subgroups of the Late Permian Wittingham Coal Measures. Seams from the Bowfield (uppermost) to the Ramrod Creek are represented. The sequence of interest at Bengalla comprises eight economically viable seams from the Warkworth to Edderton seams forming part of the Wittingham Coal Measures. The Wittingham Coal measures are up to 800 m thick and consist of sandstone, siltstone, claystone, conglomerate and tuff within which intermittent coal seams lie (HLA-Envirosciences Pty Ltd 1993).One of the characteristics of the Wittingham Coal Measures is the occurrence of fine grained siliceous raw materials such as silcrete and indurated mudstone is of particular importance, as these two raw materials dominate artefactual assemblages in the Hunter Valley. These raw materials are known to occur in the alluvial gravels of the Hunter River and its associated terraces.

3.3.3 Soils

The Project is located in the Central Lowlands topographic zone within the Sydney Basin geological province. Three soil landscape units underpin the area within the Project Area. These are the Hunter, Bayswater and Roxburgh (occurring west of Dry Creek) soil landscape units as delineated by the Soil Landscapes of the Singleton 1:250,000 Sheet (Kovac et al. 1991).

The Hunter unit describes soils formed from the deposition of Hunter River alluvium and its tributaries. The main soils formed from these alluvial deposits relate to their position in time and space relative to the fluvial channels. Soils developed on: (i) prior stream channels and on tributary flats are typically brown and black clays (Brown / Black Vertosols); (ii) levees and flats adjacent to the present river are typically alluvial soils (Rudosols), specifically uniform loams and uniform sands; and (iii) old terraced areas have typically developed red podzolic soils and lateritic podzolic soils (Red Chromosols) (Hansen Bailey 2012).

The Bayswater unit describes soils that have formed from the underlying Permian Singleton Coal Measures. These measures are composed of sandstone, shale, mudstone, conglomerate and coal parent and have been derived from ancient marine sediments. Due to the sediments origin, salt levels are usually high and soils are often dispersive and highly erodible with sheet and gully erosion common landscape features. Soils are primarily yellow solodic soils (Yellow Sodosols) on slopes, with red, yellow and brown podzolic soils (Chromosols) also common across the Project Boundary.

3.3.4 Hydrology

The Project Boundary is located within the Hunter-Central River catchment. Bengalla is located on the northern side of the Hunter River, and is situated adjacent to the Hunter River floodplain. The Hunter River flows in a south-westerly direction through a channel approximately 50-100 m wide and approximately 3-6 m deep. It cuts across a well-developed floodplain, which is approximately 3 km wide at its widest point. Within the Project Boundary, natural surface water flows south along several minor tributaries and unnamed drainage lines south towards the Hunter River. Dry Creek is the most significant gully line within the Project Boundary. Within the Project Boundary, Dry Creek commences north of Wybong Road and flows south through the central portion of the Project Boundary through paddocks and farmland which have been largely modified by previous agricultural activities (and now owned by BMC). For the vast majority of the year, Dry Creek remains dry and only occasionally hold small pools of water for a few days following significant rainfall events (Hansen Bailey 2012).

3.3.5 Flora and Fauna

Historically, the land within the Project Boundary has been impacted by agriculture associated with grazing and land clearing. As such, the land within the Project Boundary primarily contains grassland and grassy woodland communities. The south eastern portions of the Project Boundary, where the topography slopes towards the Hunter River floodplain consist of cleared land that has essentially lost the native vegetation cover and had the original grassy ground stratum largely replaced by exotic grasses and herbs (Hansen Bailey 2012).

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3.3.6 Land Use and Disturbance

The Upper Hunter region has a long history of rural land use for a variety of agricultural and industrial activities, predominantly grazing and coal mining. The current dominant land uses within and adjacent to the Project Boundary include open cut coal mining and industrial activities, agriculture and rural residential. In addition to these uses, land surrounding the Project Boundary has also sustained disturbances from a range of other activities, including the establishment of the Muswellbrook-Ulan Railway line (and other associated infrastructure) which runs on an east-west alignment adjacent to the northern boundary of the Project Boundary, and culverts and roads. The close proximity of the land to the Railway Line indicates that the area may well have sustained indirect impacts from its construction, including vehicular action and erosion. Farm roads, dams and fences have also been constructed and erected in the area (Hansen Bailey 2012).

4.0 Approach

This section provides information on the approach AECOM intends to use for undertaking this Aboriginal heritage impact assessment. The assessment process has been divided into three broad sets of tasks:

- Desktop study;
- Archaeological field survey of the area within the Project Boundary however outside the Approved Bengalla Mine (see **Figure 1**); and
- Consultation with Aboriginal stakeholder groups in order to define the cultural heritage values of the Project Boundary.

4.1 Desktop Study

The desktop survey methodology comprises:

- A search of OEH's AHIMS database prior to archaeological survey;
- A review of the landscape (i.e. environmental) context of the Project Boundary;
- A review of relevant archaeological and ethnohistoric information for the Project Boundary and surrounding environment; and
- Preparation of a predictive model for Aboriginal archaeological site type and distribution within the Project Boundary.

4.2 Planning Meeting

A Planning meeting will be held with all registered Aboriginal stakeholder groups prior to commencement of the archaeological survey. The aim of the meeting will be to provide registered Aboriginal parties with information about the scope of the Project and the proposed cultural heritage assessment process. In particular, the meeting will:

- Present the Project and outline details relevant to the nature, scope, methodology, environmental and other impacts;
- Outline the environmental impact assessment process including the input points into the investigation and assessment activities;
- Specify critical timelines and milestones for the completion of assessment activities and delivery of reports;
- Clearly define agreed roles, functions, and responsibilities;
- Identify, raise and discuss the Aboriginal group's cultural concerns, perspectives and assessment requirements (if any): and
- Provide an opportunity whereby cultural knowledge may wish to be shared.

4.3 Archaeological Survey

An archaeological field survey will be conducted to identify Aboriginal archaeological sites. Full survey coverage of the Survey Area (which is the Project Boundary excluding the Approved Bengalla Mine) will be undertaken. The entire survey is expected to take three weeks. The Survey Area will be walked by AECOM archaeologists and registered stakeholder representatives spaced appropriately to ensure adequate coverage.

A daily survey team consisting of two AECOM archaeologists and a maximum of six Aboriginal community representatives (as organised by Hansen Bailey) will be required to complete the survey. ***Given the hill slopes***

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in parts of the survey area survey participants will be expected to possess adequate fitness for such survey work and be able to provide for themselves all appropriate personal protective equipment (PPE).

Relevant safety inductions will be required prior to the commencement of survey and these will be coordinated by BMC personnel. Each day of survey will begin with a safety tool box meeting to discuss the proposed survey areas for the day and any potential safety and health hazards. Toolbox meeting minutes will be provided to BMC personnel at completion of survey work for documentation.

All previously registered and/or recorded sites located within the Project Boundary will be ground-truthed and their nature, extent and significance re-assessed. All Aboriginal archaeological sites identified during the survey will be recorded with reference to OEH's *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (2010). For each site located or re-recorded, individual artefact locations will be captured by differential GPS. Associated site data (e.g. type, content, and surrounding environment) will be documented using AECOM's standard open site recording form. Photographic records of each site will also be taken. AHIMS site cards will be produced for all newly identified sites.

4.4 Recording of Transects

For each survey transect walked, the following information will be recorded:

- Landform element(s);
- Ground Surface Visibility (GSV) estimated to the nearest 10%;
- Exposure estimated to the nearest 10%;
- Factors responsible for identified ground surface exposures;
- The character and depth of any exposed soil profiles; and
- Presence or absence of Aboriginal heritage material.

4.5 Stone Artefact Recording

Information recorded for identified stone artefacts will, as a minimum, include raw material type, technological type and maximum linear dimension (mm). Where more than 50 artefacts are identified within a site, recording will be limited to a sample of 50 artefacts.

4.6 Scarred Tree Recording

The following attributes will be recorded for all potential Aboriginal scarred tree identified during field survey:

- Tree location;
- Tree species;
- Tree condition;
- Girth of the tree (at 1.5m);
- Scar dimensions;
- Overgrowth
- Scar orientation;
- Origin of scar;
- Type of scar;
- Scar preservation;
- Toe holds (presence/absence);
- Tool marks (presence/absence);
- Type of tool marks; and
- Epicormic stem(s) (presence/absence).

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4.7 Deposit, Potential Archaeological Deposit (PAD), and Archaeological Sensitivity

As demonstrated by numerous Aboriginal archaeological excavations in the Upper Hunter Valley, surface artefacts at most open artefact scatter sites represent only a portion of the total number of artefacts present within and surrounding these sites, with the majority occurring in subsurface contexts. At the same time, many excavations have demonstrated a more-or-less continuous subsurface distribution of artefacts across assessed landscapes, albeit with highly variable densities that are linked to environmental factors such as proximity to water and stream order.

Together with the view that ground surface visibility, as a result of soil erosion, represent a major bias in Aboriginal archaeological site location in the Hunter Valley, such evidence requires an assessment of the potential of identified surface sites to contain subsurface archaeological deposit.

Subsurface archaeological potential is addressed in the context of this assessment by the concept of 'archaeological sensitivity'. For the purposes of this assessment, archaeologically sensitive areas are those that are deemed to have the potential for archaeological deposit. Archaeological assessments of subsurface archaeological potential are based on analysis of three key factors including the nature and extent of visible surface artefacts at the site, a review of the findings of previous archaeological excavations in analogous landforms in the surrounding area, and on-site observations of post-depositional processes affecting artefact exposure and burial. For the archaeological field survey, it is anticipated that the archaeological sensitivity of the Project Boundary, including all previously and newly recorded Aboriginal archaeological sites, will be assessed.

4.8 Other Site Types

If other site types are identified during survey then site recording will be conducted to a degree comparable to that required by the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010).

5.0 Social/Cultural Values Assessment

Aboriginal stakeholders are in the best position to provide information on the Aboriginal social/cultural heritage values of a given area. During the archaeological assessment process, Hansen Bailey will consult with Aboriginal stakeholders regarding the cultural heritage values of the Project Boundary. This will include as a minimum:

- A request (in this draft methodology) for any initial comments regarding the Aboriginal cultural heritage values of the Project Boundary;
- The provision of this draft assessment methodology to all registered stakeholders for comment prior to fieldwork;
- A planning meeting to provide registered Aboriginal parties with information about the scope of the Project, and the proposed cultural heritage assessment process as discussed in **Section 4.2.**
- Discussion of cultural heritage values during field survey with either AECOM or Hansen Bailey;
- Opportunity for further personal meetings with knowledge holders who wish to share cultural heritage knowledge; and
- The provision of a draft Aboriginal heritage impact assessment to all registered stakeholders for comment prior to finalisation.

Consultation in relating to the above will be undertaken in accordance with OEH's *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (OEH 2010)**.**

6.0 References

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TRADING POST .COM.AU

Contact Muswellbrook Chronicle to advertise
65 433 011
www.muswellbrookchronicle.com.au
fax 6543 4782

Deaths

DANIEL: Debbie Ann. Passed away at Muswellbrook on Tuesday the 14th February 2012. Late of Adams Street, Muswellbrook. Loving wife of Stephen. Devoted mother of Joshua & Nathan. Beloved daughter of Beryl & Tom. Aged 49 Years.
A funeral service for Debbie will be held on Monday, the 20th February 2012 at 2pm in St. James Catholic Church Muswellbrook followed by interment in the Muswellbrook lawn cemetery. In Lieu of flowers donations to aid the Breast Cancer Foundation would be gladly accepted.
Muswellbrook Funeral Services
Winston Foipp Director
www.muswellbrook funeralservices.com.au
02 6543 1174

In Memoriam

DOUGLAS: Janet Enid. 4/11/1936 to 13/2/2009
The one we love do not go away, they are beside you everyday.
John, Julie, Peter, Darryl, Stuart, Phillip & all the family.

Ian Parker *(Skinny)* 17-11-1943 to 17-2-2011
"I know that your in heaven, and there for me you'll wait, One day I'll meet you smiling at the gate, Until that day comes we still are not apart, because my sweet "IAN," you are always in my heart"
Love you lots,
your wife Joan xxx.

Ian Parker *(Skinny)* 17-11-1943 to 17-2-2011
God saw you getting tired, and a cure was not to be, so he put his arms around you and whispered "come with me". With tearful eyes we watched you, and saw you pass away. Although we loved you dearly, we could not make you stay. Your golden heart stopped beating, hard working hands at rest, God broke our hearts to prove to us, he only takes the best.
Loved and dearly missed
Bruce, Julie, Ellie,
Luke & Drew xxx

PARKER, Ian
17/11/1943 to 17/2/2011
No one knows the pain I felt when I lost you Dad. It was so hard to see you suffer & I felt so bad. I miss you, your smile & your laugh & I wish with all my heart, that you were still with us & we didn't have to part.
My memories of you keep me strong & I know you are often here watching me from heaven & you are always near.
Love Kim (Fatso)
Loved, remembered & missed
Chris, Jake, Emily, Billy

PARKER, Ian
POP
17/02/11
Its been a year since that day when you were taken away. Not a day goes by where we don't miss you laugh, smile & the happiness you brought into our lives.
We love you
Linda, Tori-Jean, Hayden, Maddison and Kayne
xoxo

Return Thanks

KERSHAW, Lawrence Charles known as Lorry.
Passed away 13/12/2011.
Allyson & the family of the late Lawrence Kershaw would like to thank Dr. Peter Brown, Bronwyn from palative care, staff at Muswellbrook hospital. Also, family, friends neighbours for their love, support, flowers & cards. We are truly greatful to each & everyone of you at this very hard time.

For Sale

"FENCING SALE"
HUGE stock of Colorbond, weldmesh, pool fencing & gates all in stock ready for pickup today or we deliver.
Open 6 days.
Ph. 6571 4099
OUR TOWN FENCING

SHED 6m x 12.5m steel/brick with roller doors up to 4m high, $13,900 or submit offer ph 0413 104 820

Steel boat hull, approx 20ft, needs welding, $300. Ph 0488 958 576.

TJM CANOPY & roof rack to suit '03 DiCab Hilux.

4 x 6 STUD alloy wheels with near new tyres.

STEEL BULLBAR to suit '99 Rodeo.

ALLOY BULLBAR to suit VR /VS Commodore.

CANOPY to suit VN-VS Ute.
Ph: 0427 808 242.

TRAILER HIRE, horse float, car, furniture, bike & box trailers, king hire available, great rates Ph 0265433339.

WATER TANKS 1000L $120. Phone 4932 4997, 0410 551492.

Motor Vehicles

A CAR or CARS
REMOVED FREE
ANY CONDITION
Ph. 6572 3111

MAZDA, 3, 2010, auto rego (BPH71G) 7/12, 31,500kms, $19,000 Ph 0438 415 509.

MITSUBISHI, Magna, 1995, 4cyl, 5spd manual, a/c, mechanically sound, rego (AP61CI) 4/12, $1,500ono Ph 02 6545 3079 8am to 6pm.

Boats Marine

BOATING LICENCE COURSE & JET SKI
In Muswellbrook Wednesday 29th February limited places available. Ph: 9524 5678

Boats Wanted
Late model good cond.
FREE Valuations
TRADE INs accepted
Ring Ian
0435 389 929

Caravans

Goldstream Storm, 2008, Wind up RV off road van. Double beds, shower, oven, stove, hot water system, awning, very good cond. $26,500ono. Ring after 5pm 6549 1199 or 0427 003 809

Trades & Services

Dave's TV & Satellite Service
Digital Antennas, Boosters, Extra outlets. Vast Satellite digital TV Assessments.
Call Dave 0417 690 845

Building Materials

CYPRESS flooring, 91mm from $1.50/lineal metre. 4932 4997, 0410 551492.

PAVERS 400 x 400, mixed colours. $3.00 each. Ph. 4932 4997, 0410 551492.

Garage Sales

MUSWELLBROOK, 37 Skellatar Stock Route. Sat. 18, 8am to 12, trampoline, swing set, elec. guitar, games, bikes, clothes, shoes & more.

Muswellbrook 38 Thompson St. Sat. 18/2, not before 8am. plants, books, crockery, single bed, handbags, linen.

Garage Sales

MONSTER SALE
RAIN HAIL OR SHINE
Where: 40 Collins Lane (3rd left on Kayuga Rd then House at the end of the lane).
18/2/2012
8:00 am to 2:00pm
Includes: Farm Gear, Massy tractor with slasher, grass catcher, ploughs, hay cutter and many more attachments, old engines, southern cross motor pump, welder, corn crusher, blacksmith forge, milk can, plate bender, valve grinder, lots of tools, cat D4 dozer, 2 seat buggy with 202 Holden engine, ride on mower, Bedroom suite, build in robe, bar, T.V, stereo, microwave, games, fridge, lots of collectables, pool table, numerous household items, bicycles, sewing machine, BBQ.
So many items all must go

MUSWELLBROOK, 72 Acacia Dr. 7am to 12 everything must go, complete house contents.

Muswellbrook, 8 Marlock Place. Not before 9am. Moving Sale. Furniture, toys, baby clothes & bric-a-brac.

Livestock

2 x 3 Angus X Galloway Heifers
with large vealer C.A.F. & mth old C.A.F.
Drenched, genysis, vacc. $1,650 ea. incl.
Ph. 0428 377 552.

ANGUS HEIFERS
18 joined to Booroomooka Stud. LBW, EBV's avail, drenched, genysis & vacc. $990 ea incl.
Ph: 0428 377 552.

CHAFF
New mill at Singleton
Lucerne - $18.70
Oats - $16.50
Ph. 0428 497 722
or 0428 497 729.

Scrumio, 14yr old bay gelding, nice type, plenty of stock work, some camp draft placings, quiet, could suit pony club. $2,800. Ph 6543 6218

SHEEP/PIGS
Dorper Meat masters, self shedding, no shearing, multiple births. Ewes from $160. Cheap lawnmowers! Weaner pigs fr. $70.
TREATED TIMBER POSTS
2.4 long $3. Ph 0407 307 800

Wanted

Cement mixer suitable for engine driven, 5 to 10 cf, pay cash. Ph 6547 3523 at night

Electric HWS, approx. 50L, 2nd hand. Ph 0488 958 576.

SEEKING, Cattle property of any size to manage/caretake in Hunter Valley area by experienced couple ref. & previous experience avail. Ph Andy Hill 0427 998 974.

SEEKING Land of any size, to lease for 12 horses & 5 cows in Hunter Valley area. Ph Andy Hill 0427 998 974.

Health & Beauty

CHINESE MASSAGE
Call now for RR remedial massage, Singleton, 7 days.
Phone 6571 2322

Remedial Massage
Melissa Givney
is now at
Scone Inspire Health
Ph 65 453565

Pets

HOW TO AVOID A $110 FINE
Did you know it is illegal to advertise the sale, purchase or transfer of ownership of any dog or cat which has not been microchipped according to the Companion Animals Act 1998.

ADOPT A Pet / Save A Life!
0411 681 064
Dogs, Puppies, Cats, Kittens
All Need a Forever Home
hunteranimalrescue.com.au
Can you become a foster carer?

Notices

LIVE ON THE GREEN
Saturday 18/2/12
4pm - 8pm
Free
JODIE CROSBY
back by popular demand
Bring the kids, bring a rug, bring a friend.
Aberdeen RSL Club
6543 7141

Notices

BOATING LICENCE COURSE & JET SKI
In Muswellbrook Wednesday 29th February. Limited places available. Ph. 9524 5678

TAI CHI CLASS
Muswellbrook CWA Hall
Market Street
Wed 8.30am & 6pm
Scone Primary School
Liverpool Street
Thursday 5pm
Ph 0418 119 903

NOTICE TO CLASSIFIED ADVERTISERS
All classified display and classified semi display advertising is sold in whole centimetre and column units. Classified line advertisements are charged on the total number of lines. A minimum number of lines may be required.
The full Terms and Conditions of Advertising of The Muswellbrook Chronicle are available from our office or by phoning (02) 65433011.

Notices

Scone Chemist
153 Kelly Street, Scone
6545 1007
OPEN
Saturday 9am to 12 noon &
Daily 6.30pm-7.30pm
Sunday Duty 6.30pm to 7.30pm

Chemistworks Muswellbrook
Marketplace Muswellbrook
6541 0999
OPEN
Saturday 8.30am to 4pm
Sunday 9am to 3pm

BENGALLA

Public Notice
Aboriginal Stakeholder Consultation
Continuation of Bengalla Mine

Bengalla Mining Company Pty Limited is seeking to identify Aboriginal stakeholders who wish to be consulted in relation to a proposed Aboriginal Heritage Impact Assessment over an area associated with the Continuation of Bengalla Mine located 4 km west of Muswellbrook, NSW.

The purpose of community consultation with Aboriginal stakeholders is to assist Bengalla Mining Company Pty Limited in undertaking an Aboriginal Heritage Impact Assessment. Interested stakeholders who hold knowledge relevant to determining the cultural significance of Aboriginal objects and / or places in the area of the proposed project are invited to register their interest in writing to:

Mr Jason Martin
Hansen Bailey
Environmental Consultants
PO Box 473
SINGLETON NSW 2330
Email: jmartin@hansenbailey.com.au
Tel: 02 6575 2000
Fax: 02 6575 2001

Expressions of interest should include current contact details. The closing date for registration is close of business on 7 March 2012. Once Expressions of Interest have been received, a planning meeting will be held to discuss the program further.

Notices

"In lodging an advertisement with us you agree that we may publish the advertisement on our website. We provide this service at no additional cost. The general terms and conditions that apply to publication of advertisements in our publications apply also to publication of material on our website."

Job Training Courses

First Aid
Muswellbrook Golf Club
OHS Induction
49 608 608
efirstaid.com.au
The First Aid Training Company

COAL & ALLIED
Managed by Rio Tinto Coal Australia

Public Notice
Invitation for Aboriginal parties in the Upper Hunter Valley to register their interest to participate in cultural heritage consultation with Coal & Allied

Aboriginal people who hold cultural knowledge relevant to determining the significance of Aboriginal object(s) and/or place(s) in the Local Government Areas of Singleton, Muswellbrook and Upper Hunter, or within the Wanaruah Local Aboriginal Land Council boundary, are invited to participate in consultation with Coal & Allied regarding the assessment and management of Aboriginal Cultural Heritage associated with its development activities that may require assessment and/or Aboriginal Heritage Impact Permit (AHIP) approvals under Part 6 of the National Parks and Wildlife Act 1974 (NPW Act).

If you wish to register your interest as an Aboriginal party your registration must be in writing (letter, fax or email), and include your name/organisation, current contact details (postal address, email, phone number/s) and be received by Joel Deacon (see contact details at end of this letter) by close of business on Wednesday 7th March 2012. Details of people registering as Aboriginal Parties will be forwarded to Office of Environment and Heritage (OEH), and also the Wanaruah Local Aboriginal Land Council unless you specify otherwise.

Aboriginal parties who register are invited to attend a **Coal & Allied Upper Hunter Valley Aboriginal Cultural Heritage Working Group (CHWG) meeting,** with the following details:

Date: **Thursday 8th March 2012**
Time: 9.00am to 2.00pm
Venue: **Wollombi Brook Conservation Area, 1916 Putty Road, Bulga** (Morning tea and lunch will be provided)

The following project subject to an AHIP approval under Part 6 of the NPW Act is to be discussed at the CHWG meeting:

- Mount Pleasant Coal Project (DA 92/97) Stage 1 Construction AHIP #1131247, Aboriginal Heritage Conservation Strategy & Aboriginal Cultural Heritage Management Plan sites management procedures

CHWG discussions pertaining to development activities requiring assessment and AHIP approvals under Part 6 of the NPW Act are held in accordance with the OEH *Aboriginal cultural heritage consultation requirements for proponents 2010*.

The CHWG meeting will also discuss other projects and development activities that are associated with major projects and infrastructure approvals assessed under Part 3A, s75B of the Environmental Planning and Assessment Act 1979 (EP&A Act), in particular:

- Warkworth Mine Extension Environmental Assessment;
- Hunter Valley Operations North Carrington West Wing Environmental Assessment; and
- Hunter Valley Operations South Aboriginal Cultural Heritage Management Plan.

CHWG discussions pertaining to approvals under Part 3A, s75B of the EP&A Act are held in accordance with the OEH *Draft Guidelines for Aboriginal cultural heritage impact assessment & community consultation guidelines (July 2005)*.

If you are unable to attend the meeting you may lodge comments, queries or feedback on these or other topics associated with Coal & Allied's cultural heritage management program via letter, fax, email or phone prior to the scheduled date of the CHWG meeting.

Joel Deacon
Specialist Cultural Heritage
Rio Tinto Coal Australia Pty Ltd
Hunter Valley Services
PO Box 315, Singleton NSW 2330
joel.deacon@riotinto.com
Fax: 07 3361 4255

Tuition

MUSIC: Voice (contemporary), Stagecraft, Musicianship and Aural listening by trained music teacher. Call Tori Saunders 0427 228 301 Scone.

TUTOR
Do you need a tutor for your child?
Mainly Numeracy & Literacy
English: Year 4 – 12
Maths: Year 4-9
Other areas of study may be considered
Contact Daneli Heiland on
0409 132 959.
I am based in Muswellbrook

Tenders

Specialist Subcontractors & Suppliers pricing:
Construction of
- Woodlands Olive Grove – Processing Facility
Construction of
- Serviced Apartments – Lome Street Muswellbrook

Please submit quotations to: C&W Constructions Pty Ltd
Email: admin@cwconst.com.au
Fax: (02) 49326267

Wanted To Rent

WANTED PROPERTIES FOR RENT IN SINGLETON, MUSWELLBROOK, ABERDEEN, SCONE, DENMAN & MERRIWA
Are you interested in guaranteed rent one month in advance, hassle free tenancy management and no management fee?
If so Compass Housing Services are looking to lease several properties across the Upper Hunter.
For more information please contact Sam Gorman Branch Manager of Compass Housing Services on (02) 65409999 between the hours of 9am – 5pm Monday to Friday.

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Professional Boardroom
Ideal for Client Meetings or Staff Training
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Notices

BENGALLA

Public Notice
Aboriginal Stakeholder Consultation Continuation of Bengalla Mine

Bengalla Mining Company Pty Limited is seeking to identify Aboriginal stakeholders who wish to be consulted in relation to a proposed Aboriginal Heritage Impact Assessment over an area associated with the Continuation of Bengalla Mine located 4 km west of Muswellbrook, NSW.

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SINGLETON NSW 2330
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Tel: 02 6575 2000
Fax: 02 6575 2001

Expressions of interest should include current contact details. The closing date for registration is close of business on 7 March 2012. Once Expressions of Interest have been received, a planning meeting will be held to discuss the program further.

AngloAmerican Drayton mine

Public Notice

Drayton Mine wishes to advise that Thomas Mitchell Drive will be subject to periods of closure on Monday through to Friday for the purpose of blasting.

The road will be closed between a location 3.3km west of the New England Highway along Thomas Mitchell Drive and a location 4.1km west of the New England Highway along Thomas Mitchell Drive, between 10:00am and 5:00pm for periods up to 15minutes depending on environmental conditions. Road signs will display the date and time of the closure. Should weather conditions preclude blasting on that day, the closure may be postponed to the next suitable day.

Drayton mine apologise for any inconvenience caused. For further information please contact the Drill and Blast Engineer on 0427699278.

xstrata coal

Public Notice
Temporary Road Closure of Wybong Road

Mangoola Coal Operations wish to advise that Wybong Road will be temporarily closed on Thursday 23.02.2012 for the purpose of transportation of mining equipment from the site as per local council requirements.

The road will be closed between the Mangoola Coal Mine site entry to the intersection of Wybong Road and Bengalla Link Road. The likely timeframe for the road to be closed will be 1 hour between 9:30am and 10:30am.

Traffic control will be in place during this period which may cause minor delays.

Mangoola Coal Operations greatly appreciates your patience and we apologise for any inconvenience this temporary closure causes.

For further information contact our Community Response Line 1800 014 339

Job Training Courses

RSA & RCG Training

ataec

RSA $135 SITHFAB009A
RCG $135 SITHGAM006A
5th & 6th March 2012
Muswellbrook RSL Club
Enrol in more than one course And receive a discount
Call: 1300 306 597 all enquiries

To Let

3 b/r home, Merriwa
Avail for long term rent, a/c, fans in all rooms, single garage & carport, slow combustion heater, clean & neat.
Good references required.
Ph 0457 785 359

Broke Cabin or Caravans from $200p/w, self contained. 65791185 or 0419 220 297

DENMAN, near new 3 bdr ensuite b/v house d/b garage r/c ducted a/c. 10 mins town. no pets. references essential $385 p/w. Ph 0407 977 210.

Elders

Rental properties available in Merriwa:

- 2 Bedroom unit, new carpet, carport and a/c $150.00 per week.
- 3 Bedroom house on big block, newish kitchen and carpet. $190.00 per week.

Contact Sarah Caban at Scone 6545 1588

Wanted To Rent

Professional couple with 3 children looking for 4 bdrm home to rent in Scone area. Good references. Call Sharyn: 0411 788 733.

WANTED PROPERTIES FOR RENT IN SINGLETON, MUSWELLBROOK, ABERDEEN, SCONE, DENMAN & MERRIWA
Are you interested in guaranteed rent one month in advance, hassle free tenancy management and no management fee?
If so Compass Housing Services are looking to lease several properties across the Upper Hunter.
For more information please contact Sam Gorman Branch Manager of Compass Housing Services on (02) 65409999 between the hours of 9am – 5pm Monday to Friday.

Trades & Services

Dave's TV & Satellite Service
Digital Antennas, Boosters, Extra outlets. Vast Satellite digital TV Assessments.
Call Dave 0417 690 845

TANK REPAIRS. concrete & heavy gauge galvanised. Cracks, roof, straps. Ph John Parker (02) 6887 1186.

For Hire

BOBCAT & TIPPER
Available for hire, with an experienced operator. Cheap rates for a limited time only.
Call 0406 532 790

For Hire

Dimmocks Quality Meats
Now hiring new large mobile cool rooms, also large stainless steel spit roasts at competitive rates.
Ph 02 6543 7101 or 0419 511 255

Rural Services

RURAL, fencing, & steel yard construction, welding services, machinery repairs & weed spraying cheap hourly rates Ph 0477454940 or 02 6548 8541

Positions Vacant

DELIVERERS & INSERTER WANTED

To deliver the Hunter Valley News
MUSWELLBROOK, MERRIWA & MERRIWA ROADSIDE
Must have phone & car
Ph: 0407 177 132 or 02 6541 4311

DELIVERERS NEEDED

To deliver the Hunter Valley News
in singleton, Singleton Heights, and surrounding areas
Car essential
Ph: 02 6571 4052
Ph 0448 064 082

Gardner / Yard hand
Wanted in Muswellbrook Earn extra $$ for weeding & garden maintenance no experience needed.
Ph 0431 657 827

LABOURER / WELDER
Part Time position
15 hours per week.
Work involves:
Concreting / Steelfixing.
Apply at Scone Concrete Hayes St, Scone
Ph 0428 495 179

Positions Vacant

TRUCK DRIVERS
Expanding Tilt Tray Business is seeking honest and reliable Permanent and Casual drivers to join our team.
Essential
- Over 23 years of age
- MR / HR or HC Licence
- Willing to obtain TTA licence.
- Clear criminal history
- Available for on call roster including some weekend work

Desirable but not essential
- Mine inductions
- Work cover tickets
- Current TTA Licence

Resume to:
The Manager
PO Box 937
Muswellbrook 2333

Positions Vacant

Geographical Account Manager

- **Australian Leader in the Hire Equipment industry**
- **Competitive remuneration**
- **Great Team, Great Career Move**
- **Muswellbrook location**

Coates Hire, Australia's largest equipment hire company and top 5 player globally, has an exciting opportunity for an experienced and self motivated Geographical Account Manager to join our Muswellbrook Team. We are a people company and with our Coates Hire Learning Academy, provide structured training to assist in our team's career development.

As a Geographical Account Manager you will need to have a full understanding of the needs of every customer and always be on the lookout for additional business opportunities.

Your ability to develop new customer relationships, understand new projects and businesses and have an intimate knowledge of our competitors will give you the advantage to succeed in this position.

The successful applicant will have:

- Experience in managing and growing a sales territory
- Demonstrated ability in working with a team to achieve the best results for your customers
- Exceptional focus on workplace health and safety
- Experience within the equipment hire, mining, construction or trade supply industries will be well regarded but not essential
- Competitor knowledge

In return you will have the opportunity to work in a well established organisation that values your contribution to the team and offers great incentives.

If this sounds like you, lodge your application with your CV by clicking on APPLY via the careers page at www.coateshire.com.au or alternatively contact Michelle Carolsi - Recruitment Specialist at the Coates National Recruitment Centre on 1800 774 507.

coateshire

Positions Vacant

Upper Hunter Shire Council
Positions Vacant

FIELD OFFICER
- Water & Sewer x 2
Scone Depot

This position will report to the Plumbing Supervisor and will be required to carry out allocated construction and maintenance labouring duties which may include (but not limited to) maintenance of Council assets, traffic control, general construction and maintenance works and manual excavation works.

The salary will be in range of $743.80 - $833.10 per week, in accordance with Council's salary system.

Other conditions are in accordance with the Local Government (State) Award 2010.

Job description's for the above positions are available by contacting Technical Services Department on 02 6540 1115 during business hours, or via the internet on www.upperhunter.nsw.gov.au

Applicants must describe how they meet the essential skills and competencies in the job description.

Please specify in your application which of the positions above you are applying for.

Applications close 4 pm on Friday 16 March 2012. Applications must be in writing and addressed to:

the General Manager and
may be sent by mail to
PO Box 208, Scone, NSW, 2337;
or fax to 02 6545 2671;
or email to council@upperhunter.nsw.gov.au.

Upper Hunter Shire Council is a smoke free workplace and an EEO employer. Drug and alcohol testing is a condition of employment.

Daryl Dutton
General Manager

As one of the largest underground coal producers in Australia and a subsidiary of Banpu, the largest pan-Asian coal group, we're planning our future through development projects and organic growth. This means we have rewarding opportunities for training and advancement whilst working for a company which values you as an individual.

Administration Trainee
Mannering Colliery

Centennial Coal, in partnership with Hunter-V-Tec (a division of Hunter Valley Training Company Pty Ltd), offers an opportunity to gain entry into the business world and start an exciting and rewarding future.

With the joint knowledge of Centennial Coal and Hunter-V-Tec, you will gain transferable skills and qualifications in a fulltime one year Traineeship Program. Right from the start you will enjoy hands-on training and invaluable experiences through mentoring and involvement in challenging business related tasks.

You will undertake training at Certificate III level in Business through the registered training organisation VIA which will provide you with the opportunity to achieve nationally accredited qualifications. Ideally, you will have experience in the Microsoft Office suite of applications, data-base entry and be a personable self-starter.

To apply for this opportunity, please visit www.huntervtec.com.au
Any enquiries, please contact Nicole Vale on (02) 4932 4184.

Applications close midnight Sunday, 26 February 2012

Centennial Coal

Hansen Bailey

30 April 2012

Aboriginal Heritage Planning Officer
Planning and Aboriginal Heritage Section – North East
Office of Environment and Heritage
Locked Bag 914
COFFS HARBOUR NSW 2450

Attention: Rosalie Neve

Dear Rosalie

Continuation of Bengalla Mine Project
Aboriginal Archaeology and Cultural Heritage Impact Assessment

On 27 February 2012, the Office of Environment and Heritage (OEH) was mailed a letter seeking assistance in identifying Aboriginal stakeholders that should be consulted as part of the Aboriginal Archaeology and Cultural Heritage Impact Assessment (AACHIA) for the Continuation of Bengalla Mine Project (the Project). Bengalla Mining Company Pty Ltd and Hansen Bailey would like to thank you for the list of stakeholders provided on 29 February 2012.

On 19 March 2012, all listed Aboriginal groups were mailed a letter inviting them to register an interest in the AACHIA for the Project. The closing date for Expressions of Interest was 2 April 2012. The Aboriginal groups were advised that they should notify Hansen Bailey if they did not wish for their details to be forwarded to OEH.

Clause 4.1.3 of the *Aboriginal cultural heritage consultation requirements for proponents 2010* states that within 28 days of the closing date for Expressions of Interest, OEH must be provided with details of the Aboriginal groups that have registered an interest, as well as the notifications inviting an expression of interest. In accordance with this clause, please find attached to this letter: a list of all registered Aboriginal stakeholders, an example of the letter seeking expressions of interest (dated 19 March 2012), and the public notices advertised in the local newspapers.

Hansen Bailey Pty Ltd (ABN 17 093 597 810)
BRISBANE
Phone: (07) 3226 0900 **Fax:** (07) 3226 0901
Address: Level 15 215 Adelaide Street Brisbane Qld 4000 **Postal:** GPO Box 3285 Brisbane Qld 4001
HUNTER VALLEY
Phone: (02) 6575 2000 **Fax:** (02) 6575 2001
Address: 6/127-129 John Street Singleton NSW 2330 **Postal:** PO Box 473 Singleton NSW

If you have any questions with regard to this letter, please do not hesitate to contact me on (02) 6575 2010 or jmartin@hansenbailey.com.au.

Yours faithfully
HANSEN BAILEY

Jason Martin
Environmental Scientist

Attached: List of registered Aboriginal stakeholders
Letter sent to all Aboriginal stakeholder groups on 19 March 2012
Advertisement placed in the "Muswellbrook Chronicle"
Advertisement placed in the "Hunter Valley News"

Hansen Bailey

30 April 2012

Chief Executive Officer
Wanaruah Local Aboriginal Land Council
PO Box 127
MUSWELLBROOK NSW 2333

Attention: Noel Downs

Dear Noel

Continuation of Bengalla Mine Project
Aboriginal Archaeology and Cultural Heritage Impact Assessment

On 27 February 2012, the Wanaruah Local Aboriginal Land Council (WLALC) was mailed a letter seeking assistance in identifying Aboriginal stakeholders that should be consulted as part of the Aboriginal Archaeology and Cultural Heritage Impact Assessment (AACHIA) for the Continuation of Bengalla Mine Project (the Project). Bengalla Mining Company Pty Ltd and Hansen Bailey would like to thank you for the list of stakeholders provided on 6 March 2012.

On 19 March 2012, all listed Aboriginal groups were mailed a letter inviting them to register an interest in the AACHIA for the Project. The closing date for Expressions of Interest was 2 April 2012. The Aboriginal groups were advised that they should notify Hansen Bailey if they did not wish for their details to be forwarded to the WLALC.

Clause 4.1.3 of the *Aboriginal cultural heritage consultation requirements for proponents 2010* states that within 28 days of the closing date for Expressions of Interest, the Local Aboriginal Land Council must be provided with details of the Aboriginal groups that have registered an interest, as well as the notifications inviting an expression of interest. In accordance with this clause, please find attached to this letter: a list of all registered Aboriginal stakeholders, an example of the letter seeking expressions of interest (dated 19 March 2012), and the public notices advertised in the local newspapers.

Hansen Bailey Pty Ltd (ABN 17 093 597 810)
BRISBANE
Phone: (07) 3226 0900 **Fax:** (07) 3226 0901
Address: Level 15, 215 Adelaide Street Brisbane Qld 4000 **Postal:** GPO Box 3285 Brisbane Qld 4001
HUNTER VALLEY
Phone: (02) 6575 2000 **Fax:** (02) 6575 2001
Address: 6/127-129 John Street Singleton NSW 2330 **Postal:** PO Box 473 Singleton NSW

If you have any questions with regard to this letter, please do not hesitate to contact me on (02) 6575 2010 or jmartin@hansenbailey.com.au.

Yours faithfully
HANSEN BAILEY

Jason Martin
Environmental Scientist

Attached: List of registered Aboriginal stakeholders
Letter sent to all Aboriginal stakeholder groups on 19 March 2012
Advertisement placed in the "Muswellbrook Chronicle"
Advertisement placed in the "Hunter Valley News"

Continuation of Bengalla Mine – Aboriginal Stakeholder Consultation Records

Date	Method of Consultation	Aboriginal Stakeholder Groups Contacted
17 February 2012	Public notice in the *Muswellbrook Chronicle* inviting Aboriginal stakeholders to register an interest in being consulted as part of the Aboriginal Archaeological and Cultural Heritage Impact Assessment for the Continuation of Bengalla Mine Project (the Project). Interested persons were invited to register an interest by 7 March 2012.	N/A
22 February 2012	Public notice in the *Hunter Valley News* inviting Aboriginal stakeholders to register an interest in being consulted as part of the Aboriginal Archaeological and Cultural Heritage Impact Assessment for the Project. Interested persons were invited to register an interest by 7 March 2012.	N/A
27 February 2012	Letter to regulatory stakeholders seeking assistance with identifying Aboriginal stakeholders to be consulted during the Aboriginal Archaeological and Cultural Heritage Impact Assessment. Regulators were asked to provide a list of relevant Aboriginal stakeholders by 12 March 2012.	Office of Environment and Heritage (OEH), NSW Department of Aboriginal Affairs (DAA), Native Title Services Corporation (NTSCorp), National Native Title Tribunal (NNTT), Muswellbrook Shire Council (MSC), Hunter-Central Rivers Catchment Management Authority (HCRCMA), Wanaruah Local Aboriginal Land Council (WLALC)
19 February 2012	Letter from Deslee Matthews of Deslee Talbott Consultants (DTC) registering an expression of interest in the Project.	DTC
19 February 2012	Letter from Terry Matthews of Breeza Plains Culture and Heritage Consultants (BPCHC) registering an expression of interest in the Project.	BPCHC
20 February 2012	Letter received from Roger Noel Matthews (RNM) registering an expression of interest in the Project (dated 13 February 2012).	RNM
24 February 2012	Letter from Ellaine Freihaut of Hunter Valley Aboriginal Corporation (HVAC) registering an expression of interest in the Project.	HVAC
29 February 2012	Letter from Kathleen Kinchela of Yinarr Cultural Services (YCS) registering an expression of interest in the Project.	YCS
29 February 2012	Letter from Donna Sampson of Cacatua Culture Consultants (CCC) registering an expression of interest in the Project.	CCC
29 February 2012	Letter from OEH providing a list of Aboriginal stakeholders that need to be consulted as part of the Aboriginal Heritage Impact Assessment.	OEH
5 March 2012 (Received)	Letter from the Office of the Registrar (Department of Aboriginal Affairs) advising that the land within the Project Boundary does not have any Registered Aboriginal Owners (letter dated 28 February 2012).	DAA
9 March 2012 (Received)	Letter from the WLALC providing a list of Aboriginal Stakeholders that should be consulted during the Aboriginal Archaeological and Cultural Heritage Impact Assessment (letter dated 6 March 2012). WLALC also registered an interest itself.	WLALC
12 March 2012 (Received)	Letter from Aliera French of Aliera French Trading (AFT) expressing an interest in the Project (letter dated 9 March 2012).	AFT
19 March 2012	Letter to all Aboriginal groups identified by regulators as potentially having an interest in the Project. Letter invited the groups to register an interest in the Project and provided a copy of *Bengalla Coal Mine – Continuation of Mining: Aboriginal Heritage Impact Assessment Draft Methodology* (AECOM, 2012). The letter included a return	Aboriginal Native Title Consultants, Aboriginal Native Title Elders Consultants, AFT, Awabakal Traditional Owners Aboriginal

Date	Method of Consultation	Aboriginal Stakeholder Groups Contacted
	fax form for the registered parties to provide comments on the draft methodology. The letter also invited the parties to attend a Planning Meeting at Bengalla on 4 April 2012.	Corporation, Bawurra, Black Creek Aboriginal Corporation, BPCHC, Bullen Bullen Consultants, Bunda, Carrawonga Consultants, CCC, Culturally Aware, DTC, DFTVE, GWCHC, Giwirr Consultants, Hunter Traditional Owners, HVAC, Hunter Valley Cultural Consultants, HVCS, Hunter Valley Natural and Cultural Resources Management, IO, Jarban + Mugreba, Jeff Matthews, Kauwul, KCS, Kayaway, Lower Hunter Wonnarua Council, Lower Wonnaruah Tribal Consultancy, Mingga Consultants, Mooki Plains Management, Muswellbrook Cultural Consultants, MCHG, NKACHG, RNM, St Clair Singleton Aboriginal Corporation, TGCC, UAC, Ungooroo Cultural and Community Services, UHHC, UHWC, Valley Culture, WGCC, WalCS, Wanaruah Aboriginal Custodians Corporation, Wanaruah Custodians, WLALC, Wonnarua Nation Aboriginal Corporation, Wonnaruah Elders Council, WarCS, WC, WWCC, WIG, WCH, Yarrawalk and YCS.
21 March 2012	Email from Robert Smith of Indigenous Outcomes (IO) registering an expression of interest in the Project.	IO
21 March 2012	Email from Abie Wright of Ngarramung-Kuri Aboriginal Culture and Heritage Group (NKACHG) registering an expression of interest in the Project.	NKACHG
22 March 2012	Letter from Aaron Slater of Warragil Cultural Services (WarCS) registering an expression of interest in the Project.	WarCS
22 March 2012	Telephone call from Gordon Griffiths of Wonnarua Culture Heritage (WCH) registering an expression of interest in the Project	WCH
22 March 2012	Letter from Jessica Garland of Ungooroo Aboriginal Corporation (UAC) registering an expression of interest in the Project	UAC
22 March 2012	Email from Warren Schillings of Myland Cultural and Heritage Group (MCHG) registering an expression of interest in the Project	MCHG
22 March 2012	Fax from Terry Matthews of BPCHC to express agreement with the proposed survey methodology.	BPCHC
23 March 2012	Email from Steven Hickey of Widescope Indigenous Group (WIG) registering an expression of interest in the Project	WIG
26 March 2012	Telephone call and email from Elizabeth Howard of Waabi Gabinya Cultural Consultancy (WGCC) to register an expression of interest in the Project	WGCC
27 March 2012	Phone conversion with Aliera French of AFT, confirming that she will be attending the Planning Meeting.	AFT

Date	Method of Consultation	Aboriginal Stakeholder Groups Contacted
27 March 2012	Phone conversation with Terry Matthews of BPCHC, confirming that he and Corey Matthews will be attending the Planning Meeting.	BPCHC
27 March 2012	Phone conversation with Donna Sampson of CCC, confirming that a representative of CCC will be attending the Planning Meeting.	CCC
27 March 2012	Phone conversation with Deslee Matthews of DTC, confirming that she will be attending the Planning Meeting.	DTC
27 March 2012	Phone conversation with Warren Schillings of MCHG, confirming that he will be attending the Planning Meeting.	MCHG
27 March 2012	Phone conversation with Roger Matthews, confirming that he will be attending the Planning Meeting.	RNM
27 March 2012	Phone conversation with Jessica Garland of UAC, confirming that a representative from UAC will be attending the Planning Meeting.	UAC
27 March 2012	Phone conversation with Aaron Slater of WarCS, confirming that he will be attending the Planning Meeting.	WarCS
27 March 2012	Phone conversation with Steven Hickey of WIG, confirming that he will be attending the Planning Meeting.	WIG
27 March 2012	Phone conversation with Abie Wright of NKACHG to ask whether he will be attending the Planning Meeting. Abie requested further details of the meeting, and will confirm attendance later. Follow up email containing details of the planning meeting was sent.	NKACHG
27 March 2012	Phone conversation with Noel Downs of WLALC to ask whether any representatives of WLALC will be attending the Planning Meeting. Noel stated that he had not received the letter advising of the Planning Meeting. A copy of the letter was provided to Noel by email. Noel was still undecided about attending the meeting.	WLALC
27 March 2012	Phone conversation with Gordon Griffiths of WCH to check if any representatives of WCH will be attending the Planning Meeting. Gordon stated that he had not received the letter advising of the Planning Meeting, and was undecided about attending.	WCH
27 March 2012	Email asking whether any of these groups will be attending the Planning Meeting. These groups did not respond to the attempts to contact them by phone.	WGCC, HVAC and YCS.
27 March 2012	Email from Kathie Kinchela of YCS confirming that she will be attending the Planning Meeting.	YCS
28 March 2012	Telephone call from Derrick Vale of DFTV Enterprises (DFTVE), registering an interest in the Project. Derrick advised that he and one other representative of his group will be attending the Planning Meeting.	DFTVE
28 March 2012	Fax from Derrick Vale of DFTV indicating that he agrees with the content in the proposed methodology.	DFTVE
29 March 2012	Letter from Ann Hickey of Gidawaa Walang Cultural Heritage Consultancy (GWCHC) registering an interest in the Project. Ann confirmed over the phone that she would be attending the Planning Meeting.	GWCHC
29 March 2012	Telephone conversation with Cara Coles, formerly of Hunter Traditional Owners Environmental Management (HTOEM). Cara noted that she had now sold the business to her sister, who is currently interstate and therefore unable to attend the Planning Meeting. Cara was not interesting in taking part in the Project personally.	HTOEM
29 March 2012	Telephone conversation with George Tonna of NTSCorp to check whether NTSCorp would be responding to the letter requesting assistance in identifying stakeholders (dated 27 February 2012). George advised that NTSCorp cannot provide details of groups but ordinarily supplies details of the Project to known stakeholder groups. NTSCorp will need to check whether this has been done. Sent email to NTSCorp to confirm this conversation.	NTSCorp

Date	Method of Consultation	Aboriginal Stakeholder Groups Contacted
29 March 2012	Telephone conservation with Darryl Fitzgerald to check whether MSC will provide a list of stakeholders that will be consulted. Darryl will try to track down this letter.	MSC
29 March 2012	Email from Ben Oliver of MSC providing a list of stakeholders that should be consulted. MSC did not identify any additional stakeholders that were not already being consulted.	MSC
29 March 2012	Telephone call from Rhonda Griffiths of HVAC, confirming that she will be attending the planning meeting.	HVAC
29 March 2012	Attempted to follow up with HCRCMA and NNTT regarding the letter seeking assistance in identifying stakeholders (dated 27 February 2012). Unable to contact both parties. Left an answering machine message for Joe Thompson of HCRCMA.	HCRCMA and NNTT
30 March 2012	Telephone call from Steve Eccles of HCRCMA, acknowledging receipt of the letter seeking assistance in identifying Aboriginal stakeholders. Steve will attempt to provide a list of Aboriginal groups by the end of the day.	HCRCMA
30 March 2012	Email to Gordon Griffiths of WCH providing a copy of the letter regarding the planning meeting and methodology. Requested that Gordon confirm whether any representatives of his group will be attending the meeting.	WCH
30 March 2012	Fax to Gordon Griffiths providing the letter regarding the planning meeting and methodology.	WCH
30 March 2012	Telephone conversation with Kimberley Wilson of NNTT. Kimberley indicated that NNTT had sent an email on 29 February 2012 which provided the results of a native title claims search. Kimberley re-sent this email, which was subsequently received.	NNTT
2 April 2012	Letter from Rhoda Perry of Upper Hunter Wonnarua Council (UHWC) expressing an interest in the Project. Rhoda advised that Georgina Berry will be attending the Planning Meeting on behalf of the group.	UHWC
2 April 2012	Telephone call from Maree Waugh of Wallangan Cultural Services (WalCS) to register an expression of interest in the Project. She advised that a representative of her group will be attending the Planning Meeting.	WalCS
2 April 2012	Email from Abie Wright of NKACHG advising that one representative of his group will be attending the Planning Meeting.	NKACHG
3 April 2012	Telephone call from Gordon Griffiths of WCH advising that he will be attending the Planning Meeting. Also indicated that he knew another stakeholder, Kevin Sampson, who was interested in attending the Planning Meeting.	WCH
3 April 2012	Attempted to contact Elizabeth Howard of WGCC to check attendance for the Planning Meeting, but did not receive an answer.	WGCC
3 April 2012	Telephone call from Arthur Fletcher registering an expression of interest in the Project. Arthur indicated that he would be attending the Planning Meeting. He advised that he has incorporated his group, formerly known as Wonn1 Contracting, and is now known as Kauwul Pty Ltd (Kauwul).	Kauwul
3 April 2012	Email from Susan Rowland of HCRCMA (on behalf of Steve Eccles) providing a response to the letter dated 27 February 2012, which sought assistance in identifying interested Aboriginal stakeholders. The HCRCMA did not identify any potentially interested Aboriginal stakeholders.	HCRCMA
3 April 2012	Telephone call from Scott Smith of Warul Consultants (WC) registering an interest in the Project. Rosylyn Smith will be attending the planning meeting on the group's behalf.	WC
3 April 2012	Telephone call from Donna Sampson of CCC, advising that Kevin Sampson would like to register an interest in the Project. Kevin will provide a written expression of interest	CCC

Date	Method of Consultation	Aboriginal Stakeholder Groups Contacted
	at the Planning Meeting.	
3 April 2012	Email from Kevin Sampson of Bawurra Consultants (Bawurra) registering an expression of interest in the Project.	Bawurra
3 April 2012	Email from Tammy Knox of Bunda Consultants (Bunda) registering an expression of interest in the Project.	Bunda
3 April 2012	Telephone call from Noel Downs of WLALC, indicating that he will be attending the Planning Meeting.	WLALC
4 April 2012	Email from Arthur Fletcher of Kauwul to confirm his interest in the Project.	Kauwul
4 April 2012	Melissa Matthews of Upper Hunter Heritage Consultants (UHHC) attended the Planning Meeting and registered an interest in person.	UHHC
4 April 2012	Des Hickey of Wattaka Wonnarua Culture Consultants (WWCC) attended the Planning Meeting and registered an interest in person.	WWCC
4 April 2012	Luke Hickey of Hunter Valley Cultural Surveying (HVCS) attended the Planning Meeting and registered an interest in person.	HVCS
4 April 2012	Rod Hickey of Kawul Cultural Services (KCS) attended the Planning Meeting and registered an interest in person.	KCS
4 April 2012	Fax from Ann Hickey of GWCHC indicating that she agreed with the proposed survey methodology.	GWCHC
4 April 2012	Planning Meeting held at Bengalla to discuss the upcoming field survey.	AFT, Bawurra, BPCHC, Bunda, CCC, DTC, DFTVE, GWCHC, HVAC, HVCS, Kauwul, KCS, MCHG, NKACHG, RNM, UAC, UHHC, WalCS, WLALC, WarCS, WC, WWCC and YCS.
5 April 2012	Email from Taasha Layer of UAC indicating agreement with the proposed survey methodology.	UAC
10 April 2012	Telephone conversation with Peter Schultz of NTSCorp to check whether NTSCorp will be responding to the letter dated 27 February 2012. Peter indicated that he may not have received this letter. This letter was provided to NTSCorp again via email.	NTSCorp
10 April 2012	Email from Peter Schultz of NTSCorp advising that NTSCorp will not be providing the contact details of stakeholders due to privacy reasons.	NTSCorp
10 April 2012	Email from Donna Sampson of CCC expressing agreement with the proposed survey methodology.	CCC
11 April 2012	Telephone call from Greg Griffiths to individually register an interest in the Project. Greg also advised that Tony Griffiths of T & G Culture Consultants (TGCC) wanted to register an interest. Greg was advised that registrations for field work had now closed, but that he could still be consulted regarding other aspects of the cultural heritage assessment.	Greg Griffiths
12 April 2012	Letter from Kerrie Brauer of Awabakal Traditional Owners Aboriginal Corporation (ATOAC) advising that her group was not interested in being involved with the Project.	ATOAC
26 April 2012	Letter sent to all Aboriginal groups that have registered for the field work, advising them that the field work will be conducted from 14 May 2012 to 1 June 2012. Stakeholders were asked to nominate a field work representative and to provide their certificates of currency by 8 May 2012.	AFT, Bawurra, BPCHC, Bunda, CCC, DTC, DFTVE, GWCHC, HVAC, HVCS, IO, Kauwul, KCS, MCHG, NKACHG, RNM, UAC, UHHC, UHWC, WGCC, WalCS, WLALC, WarCS, WC, WWCC, WIG, WCH and YCS.
27 April 2012	Email from Vicky Slater of KCS indicating her group's availability for the second week of the field work.	KCS

Date	Method of Consultation	Aboriginal Stakeholder Groups Contacted
27 April 2012	Email from Aaron Slater of WarCS indicating his group's availability for the second week of field work.	WarCS
29 April 2012	Fax from Derrick Vale of DFTV indicating his group's availability for all three weeks of field work.	DFTV
30 April 2012	Letter to OEH and WLALC providing a list of Aboriginal stakeholders that have registered an interest in the Project, as required by Clause 4.1.6 of the *Aboriginal cultural heritage consultation requirements for proponents 2010.*	OEH and WLALC
30 April 2012	Fax from Terry Matthews of BPCHC indicating that he will be available for the second and third week of field work.	BPCHC
1 May 2012	Email from Tammy Knox on behalf of Kevin Sampson of Bawurra, indicating that Kevin will be available for the second week of field work.	Bawurra
1 May 2012	Fax from Warren Schillings of MCHG indicating his group's availability for the first and second week of field work.	MCHG
2 May 2012	Email from Tammy Knox of Bunda indicating her group's availability for the second week of field work.	Bunda
2 May 2012	Email from Ann Hickey of GWCHC indicating her availability for the second week of field work.	GWCHC
2 May 2012	Fax and email from Jessica Garland of UAC indicating her group's availability for the first and third weeks of the field survey.	UAC
2 May 2012	Email from Darrel Matthews of UHHC indicating his group's availability for the first week of field work.	UHHC
2 May 2012	Telephone call from Donna Sampson asking whether CCC would be involved in the field survey. Confirmed that CCC was eligible for the field survey. Donna indicated that CCC would be available for all three weeks of the survey. Since Donna had indicated that she had not received the letter sent on 26 April 2012. Another copy was emailed to her.	CCC
2 May 2012	Email from Donna Sampson of CCC to indicate that her group will be available for all three weeks of the field survey.	CCC
2 May 2012	Fax from Roger Matthews of RNM indicating his availability for the second week of field work.	RNM
2 May 2012	Fax from Michael Stair of DTC indicating that he will available for the second week of field work.	DTC
3 May 2012	Fax from Maree Waugh of WalCS indicating her availability for the second week of field work.	WalCS
3 May 2012	Fax from Arthur Fletcher of Kauwul indicating that he will be available for all three weeks of the field work.	Kauwul
3 May 2012	Fax from Rhonda Griffiths of HVAC indicating her group's availability for the second week of field work.	HVAC
4 May 2012	Email from Shannon Griffiths of WCH indicating his availability for the second week of field work.	WCH
5 May 2012	Fax from Rhoda Perry of UHWC indicating her group's availability for the second week of field work.	UHWC
7 May 2012	Telephone call from Tammy Knox of Bunda advising that she wanted to change her field work availability from the second week to the first week. She advised that Kevin Sampson of Bawurra also wanted to change his availability to the first week.	Bunda and Bawurra
7 May 2012	Telephone call from Rhonda Griffiths of HVAC to change her group's availability for the field work. HVAC's field work representative, Michelle Saunders, will only be available to participate in the third week of field work.	HVAC
7 May 2012	Email from Jessica Garland of UAC to advise that Annette Dunstan will only be available to participate in the third week of field work. UAC had previously stated that their representative would be available in the first and third weeks.	UAC
7 May 2012	Telephone conversation with Deslee Matthews of DTC to confirm her group's availability for the field work. The fax previously received from DTC was ambiguous. Deslee	DTC

Date	Method of Consultation	Aboriginal Stakeholder Groups Contacted
	advised that DTC's representative would prefer to be involved in week 2, but that week 3 was also amenable.	
8 May 2012	Telephone conversation with Aliera French of AFT to check her availability for the field work. Aliera indicated that she would be available for the third week of field work. Aliera was provided with another copy of the field work letter by email.	AFT
8 May 2012	Telephone conversation with Luke Hickey of HVCS to check his group's availability for the field work. Luke indicated that he would be available for the second week of field work.	HVCS
8 May 2012	Telephone conversation with Robert Smith of IO to check his group's availability for the field work. Robert indicated that he would be available to participate in any of the three weeks of field work.	IO
8 May 2012	Telephone conversation with Abie Wright of NKACHG to check his group's availability for the field work. Abie indicated that he is available for the first week of field work.	NKACHG
8 May 2012	Telephone conversation with Noel Downs of WLALC to check his group's availability for the field work. Noel tentatively expressed his availability for the third week of field work. Noel promised to confirm his availability on Thursday. WLALC was emailed another copy of the field work letter.	WLALC
8 May 2012	Telephone conversation with Scott Smith of WC to check his group's availability for the field work. Scott tentatively indicated that he will be available for the third week of field work. Scott was emailed another copy of the field work letter.	WC
8 May 2012	Telephone conversation with Des Hickey of WWCC to check his group's availability for the field work. Des indicated that he would be available for the third week of field work.	WWCC
8 May 2012	Telephone conversation with Kathleen Kinchela of YCS to check her group's availability for the field work. Kathleen indicated that she will be available for all three weeks of the field work.	YCS
8 May 2012	Telephone conversation with Steven Hickey of WIG to check his group's availability for the field work. Steven had not had an opportunity to read the letter, and needed to confirm his availability at a later date. Steven was emailed another copy of the field work letter.	WIG
8 May 2012	Attempted to contact Elizabeth Howard of WGCC but was unable to reach her.	WGCC
8 May 2012	Email from Elizabeth Howard of WGCC, indicating her availability for week 3 of the field work.	WGCC
9 May 2012	Fax from Aliera French of AFT confirming that she is available for the third week of field work.	AFT
10 May 2012	Email from Steven Hickey of WIG confirming that he is available for the third week of field work.	WIG
10 May 2012	Fax from Abie Wright of NKACHG confirming that his representative, Lenny Wright, is available for the first week of field work.	NKACHG
10 May 2012	Called all groups allocated to Week 1 of the field work to advise them of their allocation. Since no contact details are available for Bawurra, Tammy Knox of Bunda has offered to inform Bawurra of its allocation.	DFTVE, IO, MCHG, Bunda, NKACHG and CCC
10 May 2012	Attempted to contact the following groups to advise them of their allocation but was unable to reach them. Left a message asking for them to return the call.	Kauwul and UHHC
10 May 2012	Telephone call from Tammy Knox of Bunda to confirm that she has notified Kevin Sampson (Bawurra) of his allocation for the field work. Tammy advised that Bawurra's representative with be Barega Knox.	Bunda (on behalf of Bawurra)

Date	Method of Consultation	Aboriginal Stakeholder Groups Contacted
10 May 2012	Telephone conversation with Arthur Fletcher of Kauwul to advise that he had been allocated to the first week of field work. Arthur indicated that he would not be able to attend all of week 1, and asked if he could be re-allocated to week 3. Advised that Kauwul's allocation could be changed if another group was willing to be re-allocated.	Kauwul
10 May 2012	Telephone conversation with Kathie Kinchela of YCS to ask if she was available to participate in the first week of field work. Kathie confirmed that her group will be available for that week. YCS was re-allocated to Week 1, and Kauwul was re-allocated to Week 3 to take YCS' original place. Kathie will confirm tomorrow who YCS's field work representative will be.	YCS
10 May 2012	Called all groups allocated to the second week of field work to notify them of their allocation. Gordon Griffiths of WCH and Roger Matthews of RNM asked if they could be re-allocated to the first week.	DTC, GWCHC, WCH, WalCS, UHWC, RNM and HVCS
10 May 2012	Attempted to contact the following groups to advise them of their field work allocation but was unable to make contact.	WarCS and KCS
10 May 2012	Telephone call from Robin Matthews, the wife of Terry Matthews (BPCHC), responding to the message left on their phone. Advised Robin that BPCHC has been allocated to the second week of field work. Robin promised to pass the message onto Terry and will ask Terry to call tomorrow to confirm.	BPCHC
10 May 2012	Email to Arthur Fletcher of Kauwul indicating that he has been re-allocated to the third week of field work.	Kauwul
10 May 2012	Email to Luke Hickey of HVCS to provide another copy of the field work letter, as requested by Luke.	HVCS
10 May 2012	Telephone conversation with Darrel Matthews of UHHC to advise that his group has been allocated to the first week of field work. Darrel changed his group's field work representative from Melissa Matthews to Michael Stair. Darrel advised that Michael will be absent from the field work on Wednesday, 16 May 2012.	UHHC
11 May 2012	Telephone call from Kathie Kinchela of YCS to nominate a field work representative for YCS. Kathie changed her group's representative from herself to Gordon McKenney.	YCS
11 May 2012	Telephone conversation with Robert Smith of IO to confirm a field work representative for IO. Robert nominated Timothy Smith as his group's representative.	IO
11 May 2012	Telephone conversation with Derrick Vale of DFTVE. Derrick advising that he has been unable to contact his nominated field work representative (Susan Cutmore). Derrick asked if he could be re-allocated to week 2 of field work. Confirmed that DFTVE would be re-allocated to the second week of field work.	DFTVE
11 May 2012	Telephone conversation with Warren Schillings of MCHG to confirm a field work representative for MCHG. Warren advised that David Ahoy was no longer available to attend the field work and would be replaced by Ted Maley. Confirmed Ted Maley as the field work representative for MCHG.	MCHG
11 May 2012	Telephone conversation with Gordon Griffiths of WCH to advise that his group has been re-allocated to the first week of field work, as per his request on 10 May 2012.	WCH
11 May 2012	Telephone conversation with Roger Matthews of RNM to advise that his group has been re-allocated to the first week of field work, as per his request on 10 May 2012.	RNM
11 May 2012	Telephone conversation with Vicky Slater of Kawul. Vicky was advised that Kawul had been allocated to the second week of field work. Vicky changed her field work representative to Rod Hickey. Vicky asked if WarCS has been notified of its allocation. Advised that WarCS has	KCS

Date	Method of Consultation	Aboriginal Stakeholder Groups Contacted
	also been allocated to week 2. Vicky promised to inform Aaron Slater (WarCS) of his allocation. Vicky advised that Robert Slater will be field work representative for WarCS.	
11 May 2012	Telephone call from Robin Matthews of BPCHC to advise that she has notified Terry Matthews of his allocation to week 2 of field work.	BPCHC
14 May 2012 – 18 May 2012	Archaeological field survey (week 1)	Bawurra, Bunda, IO, MCHG, NKACHG, RNM, UHHC, WCH and YCS
16 May 2012	Telephone call from Derrick Vale of DFTVE to confirm that he will be the field work representative for his group.	DFTVE
16 May 2012	Fax from Krystal Saunders of WLALC (on behalf of Noel Downs) nominating Taine Davison as WLALC's field work representative.	WLALC
16 May 2012	Telephone from Des Hickey of WWCC asking about his allocation for the field work. Advised that WWCC was allocated to the third week of field work. Des asked if he could be re-allocated to the second week. Informed Des that all groups allocated to the second week had already been advised of their allocation. Suggested to Des that he could be re-allocated to week 2 if he could come to an arrangement with one of the groups currently allocated to week 2.	WWCC
16 May 2012	Attempted to contact the following groups to notify them of their field work allocation but was unable to make contact: WarCS, HVCS.	HVCS and WarCS
17 May 2012	Attempted to contact the following groups to notify them of their field work allocation but was unable to make contact: WarCS, HVCS.	HVCS and WarCS
17 May 2012	Telephone conversation with Jessica Garland of UAC to advise that Annette Dunstan has been allocated to the third week of field work.	UAC
17 May 2012	Telephone conversation with Ellaine Freihaut to advise that Michelle Saunders has been allocated to the third week of field work.	HVAC
17 May 2012	Telephone conversation with Noel Downs of WLALC to confirm a representative for his group. Noel confirmed that Taine Davison will be undertaking the field work on behalf of WLALC. Advised that Taine has been allocated to the third week of field work.	WLALC
17 May 2012	Telephone conversation with Aliera French of AFT to advise that she has been allocated to the third week of field work.	AFT
17 May 2012	Telephone conversation with Steven Hickey of WIG to advised that he has been allocated to the third week of field work. Steven requested an email reminder of this allocation.	WIG
17 May 2012	Email to Steven Hickey of WIG to confirm that he has been allocated to the third week of field work.	WIG
17 May 2012	Attempted to contact Elizabeth Howard of WWCC to notify her of WWCC's allocation for the field work. Was unable to reach Elizabeth but left a message on her phone.	WWCC
17 May 2012	Telephone conversation with Arthur Fletcher of Kauwul to advise that he has been allocated to the third week of field work.	Kauwul
17 May 2012	Email to Aaron Slater of WarCS to notify him of his group's allocation to the second week of field work.	WarCS
17 May 2012	Email to Luke Hickey of HVCS to advise that his group is currently allocated to the second week of field work. Requested that insurance details be provided to Hansen Bailey before the end of the week (i.e. prior to the field work commencing the following Monday). Advised Luke that if insurance details were not provided by the end of the week, HVCS would need to be re-allocated to the third week of	HVCS

Date	Method of Consultation	Aboriginal Stakeholder Groups Contacted
	field work.	
17 May 2012	Email from Kathie Kinchela of YCS to confirm her availability for all three weeks of field work. Kathie had previously indicated her availability over the phone. Kathie was advised on 10 May 2012 that she was allocated to the first week of field work.	YCS
18 May 2012	Robert Smith of IO mailed a return fax form confirming his availability for week 1 of the field work. Robert had previously indicating his availability over the phone. On 10 May 2012, Robert was informed that his group was allocated to the first week of field work.	IO
18 May 2012	Attempted to contact Luke Hickey of HVCS to confirm his allocation for week 2 of the field work.	HVCS
18 May 2012	Telephone conversation with Des Hickey of WWCC. Advised Des that his brother, Luke Hickey, was currently allocated to week 2 of the field work. However, Luke has not been able to be contacted to confirm this allocation. Advised Des that he could replace Luke in week 3, if he and Luke come to an agreement.	WWCC
18 May 2012	Telephone call from Maree Waugh of WalCS to change her group's field work representative from herself to Anthony Waugh.	WalCS
18 May 2012	Email to Luke Hickey of HVCS to remind that his group is allocated to field work next week. Advised Luke that he must bring copies of his group's insurance to the field work. Explained that if the insurance details are not provided, his group will not be allowed to undertake field work next week, and will be automatically re-allocated to the third week of field work.	HVCS
20 May 2012	Email from Vicky Slater of KCS to change her field work representative from Rod Hickey to Richard Slater.	KCS
20 May 2012	Email from Aaron Slater of WarCS to acknowledge his allocation to the second week of field work. Aaron confirmed that Robert Slater will be his group's field work representative.	WarCS
21 May 2012 – 25 May 2012	Archaeological field survey (week 2)	BPCHC, CCC, DTC, DFTVE, GWCHC, HVCS, KCS, UHWC, WalCS and WarCS.
21 May 2012	Telephone conversation with Luke Hickey of HVCS to advise that his field work representative, Gordon McKenny, was not allowed to participate in the field work today. Advised that HVCS did not provide insurance details far enough in advance of the field work. Luke provided his group's insurance on Sunday, 20 May 2012. This email was not sighted until after the field work had commenced on Monday morning. Advised Luke that his group can participate in the field work from this point onwards, now that his insurance details have been sighted. Offered Luke the option of either working the remaining 4 days this week or being re-allocated to next week. Luke opted to remain allocated to week 2 of the field work.	HVCS
23 May 2012	Telephone conversation with Luke Hickey of HVCS to advise that his group can be allocated one day of field work in week 3. This is to compensate for the day in week 2 that HVCS was disallowed from participating in the survey (due to failure to provide insurance details).	HVCS
23 May 2012	Telephone conversation with Scott Smith of WC to remind him that his group is allocated to the third week of field work. Requested that Scott nominate a field work representative and provide his group's insurance details. Sent an email with the same reminder.	WC
23 May 2012	Telephone conversation with Elizabeth Howard of WGCC to advise that she is allocated to the third week of field	WGCC

Date	Method of Consultation	Aboriginal Stakeholder Groups Contacted
	work.	
23 May 2012	Attempted to contact Des Hickey of WWCC but was unsuccessful. Left a message for Des to return the call.	WWCC
23 May 2012	Telephone call from Donna Sampson of CCC to advise that Arthur Fletcher of Kauwul was no longer able to participate in the field work next week. Arthur has asked CCC to provide a replacement for him. Donna nominated George Sampson as the field work representative for Kauwul.	CCC
23 May 2012	Telephone conversation with Arthur Fletcher of Kauwul to confirm the arrangement whereby CCC will provide a representative for Kauwul in Arthur's absence. Arthur indicated that he gave permission for CCC to provide a replacement.	Kauwul
23 May 2012	Email to Des Hickey of WWCC asking for a field work representative to be nominated.	WWCC
24 May 2012	Telephone conversation with Des Hickey of WWCC to advise that his group is allocated to the third week of field work.	WWCC
25 May 2012	Fax from Des Hickey of WWCC confirming his availability for the third week of field work.	WWCC
28 May 2012 – 29 May 2012	Archaeological field survey (week 3). Field work was originally scheduled for 28 May 2012 to 01 June 2012. Due to poor weather, the field work was suspended after the field work on 29 May 2012. The remaining three days were postponed until the following week.	AFT, HVAC, HVCS, Kauwul, WGCC, WLALC and WIG
29 May 2012	Telephone conversation with Luke Hickey of HVCS to inform Luke that he has been nominated as the field work representative for WWCC by Des Hickey. Luke indicated that he was unaware of this arrangement. Advised Luke that the remainder of field work in week 3 has been postponed until the following week. Luke will contact Des to make arrangements for field work on the following week.	HVCS
29 May 2012	Advised the following stakeholders that the remaining three days in the third week of field work will be postponed to the following week (4 – 6 June 2012).	Kauwul, WIG, HVAC, WGCC, WWCC and WLALC
29 May 2012	Attempted to contact the following stakeholders but was unable to reach them. Left a message asking them to return the call.	AFT and WC
29 May 2012	Telephone conversation with Scott Smith of WC. Scott advised that he is still in the process of taking out insurance for his group. Informed Scott that the field work has been postponed until the beginning of next week. Advised Scott that he could participate in the field work next week provided that valid insurance details were supplied before the end of the week.	WC
29 May 2012	Email to Noel Downs of WLALC asking Noel to notify Taine Davison, WLALC's field work representative, that the Bengalla field work has been postponed. Attempted to contact Taine by telephone but did not receive a response.	WLALC
29 May 2012	Email to Aliera French of AFT to advise that the Bengalla field work for the remainder of week 3 has been postponed to the following week. Aliera was unable to contacted by phone earlier.	AFT
31 May 2012	Telephone call from Scott Smith's mother to advise that WC will not be able to obtain the necessary insurance before next week, and will consequently be unable to participate in the field work.	WC
1 June 2012	Telephone conversation with Donna Sampson of CCC to offer the opportunity to participate in an additional 3 days of field work. Donna accepted the offer and nominated Adam Sampson as CCC's representative. Donna also advised that George Sampson will be undertaking field work on behalf of Kauwul.	CCC
1 June 2012	Telephone conversation with Rhoda Perry of UHWC to	UHWC

Date	Method of Consultation	Aboriginal Stakeholder Groups Contacted
	offer the opportunity to participate in an additional 3 days of field work. Rhoda accepted the offer and indicated that Georgina Berry will be interested in undertaking the field work.	
1 June 2012	Contacted the following groups by telephone to advise that field work will be undertaken next week, regardless of wet weather. Was unable to contact Elizabeth Howard of WGCC and left a message on her voicemail. Unable to contact Taine Davison of WLALC and Aliera French of AFT and sent an email with this message.	WIG, UAC, CCC, UHWC, HVAC, WWCC, WGCC, WLALC and AFT
4 June 2012 – 6 June 2012	Archaeological field survey (remainder of week 3). Three days of field work were undertaken to compensate for the suspension of field work on the previous week.	AFT, CCC, HVAC, GWCHC, Kauwul, UHWC, WalCS, WGCC, WLALC and WIG
4 June 2012	Telephone conversation with Ann Hickey of GWCHC to offer the opportunity to participate in an additional 2 days of field work. Ann accepted the offer.	GWCHC
4 June 2012	Telephone conversation with Maree Waugh of WalCS to offer the opportunity to participate in an additional 2 days of field work. Maree accepted the offer.	WalCS
9 August 2012	Telephone conversation with Ann Hickey of GWCHC to offer the opportunity to participate in the scar tree assessment on 15 August 2012. Ann accepted the offer.	GWCHC
9 August 2012	Telephone conversation with Maree Waugh of WalCS to offer the opportunity to participate in the scar tree assessment on 15 August 2012. Maree accepted the offer.	WalCS
15 August 2012	Assessment of potential scar trees identified during the archaeological field survey. The assessment was conducted by an arborist (Mark Burns, Global Soil Systems), archaeologists from AECOM, and representatives of the Aboriginal community (Ann Hickey and Maree Waugh).	GWCHC and WalCS
5 October 2012	Letter to all registered Aboriginal parties inviting comments on the Draft Aboriginal Archaeology and Cultural Heritage Impact Assessment (AACHIA). A return fax form was provided for the recipients to make comments on the draft report. The accompanying letter also offered registered Aboriginal parties the opportunity to share their cultural knowledge of the area. Interested parties can share cultural knowledge by requisitioning a personal meeting with Hansen Bailey or AECOM. Registered parties were informed that that the due date for the comments was 6 November 2012.	AFT, Bawurra, BPCHC, Bunda, CCC, DTC, DFTVE, GWCHC, Greg Griffiths, HVAC, HVCS, IO, Kauwul, KCS, MCHG, NKACHG, RNM, TGCC, UAC, UHHC, UHWC, WGCC, WalCS, WLALC, WarCS, WC, WWCC, WIG, WCH and YCS.
16 October 2012	Fax received from Terry Matthews of BPCHC providing a response to the draft AACHIA. BPCHC agreed with the content in the report and had no further comments.	BPCHC
16 October 2012	Fax received from Vicky Slater of KCS providing a response to the draft AACHIA. KCS agreed with the content in the report and had no further comments.	KCS
24 October 2012	Telephone call received from Deslee Matthews of DTC providing a response to the draft AACHIA. DTC agreed with the content in the report and had no further comments.	DTC
29 October 2012	Letter received from Noel Downs of WLALC providing a response to the draft AACHIA. WLALC provided cultural knowledge of the area and made a number of recommendations.	WLALC
2 November 2012	Contacted registered Aboriginal stakeholders by telephone to provide a reminder about the due date for responses to the AACHIA. Stakeholders were advised that the closing date for comments was 6 November 2012. Scott Smith of WC and Tony Griffiths of TGCC advised that their respective groups would not be providing a response to the draft AACHIA.	AFT, CCC, DFTVE, GWCHC, IO, MCHG, NKACHG, RNM, TGCC, WC, WGCC, WCS, WWCC, WIG, WalCH and YCS.

Date	Method of Consultation	Aboriginal Stakeholder Groups Contacted
	The following groups were unable to be contacted: Bawurra, Bunda, HVAC, HVCS, Kauwul, UAC, UHHC, UHWC, WarCS and Greg Griffiths.	
2 November 2012	Emailed the registered Aboriginal stakeholders that could not be contacted by telephone. These stakeholders were advised that the closing date for responses to the draft AACHIA was 6 November 2012.	Bunda, HVAC, HVCS, Kauwul, UAC, UHHC, UHWC and WarCS.
6 November 2012	Email from Tammy Knox of Bunda providing a response to the draft AACHIA. Tammy also provided a response on behalf of Bawurra. Bunda and Bawurra agreed with the content in the report and had no additional comments.	Bunda
6 November 2012	Fax from Suzie Worth of Kauwul providing a response to the draft AACHIA. Kauwul agreed with the content in the report and expressed an interest in being involved in future salvage work and scarred tree inspections.	Kauwul
8 November 2012	Telephone call from Rhoda Perry of UHWC asking about the closing date for responses to the AACHIA. Advised Rhoda that although the closing date had passed, all responses received before the end of the week would be considered.	UHWC
9 November 2012	Contacted registered Aboriginal stakeholders by telephone to give a final reminder of the closing date for responses to the AACHIA. Stakeholders were advised that although the closing date for responses had passed, responses would be accepted until the end of the week. Donna Sampson advised that CCC agreed with the content in the report and had no further comments. Melissa Matthews advised that UHHC would not be providing a response. The following stakeholders were unable to be contacted by telephone: AFT, HVAC, HVCS, IO, UAC, WGCC, WalCS, WarCS, WWCC, WCH, YCS and Greg Griffiths.	DFTVE, GWCHC, MCHG, NKACHG, RNM and WIG.
9 November 2012	Emailed the registered Aboriginal stakeholders that could not be contacted by telephone. These stakeholders were advised that responses to the draft AACHIA would be accepted until the end of the week.	AFT, HVAC, HVCS, IO, UAC, WGCC, WalCS, WarCS, WWCC, WCH and YCS.
9 November 2012	Fax from Rhonda Griffiths of HVAC providing a response to the draft AACHIA. HVAC indicated that it would support the views of WLALC.	HVAC
12 November 2012	Email from Aaron Slater indicating that WarCS agreed with the content in the draft AACHIA.	WarCS
12 November 2012	Email from Derrick Vale of DFTVE providing a response to the draft report. DFTVE agreed with the content in the report and commented that dense grass cover limited the ability to identify surface archaeological materials.	DFTVE

Hansen Bailey

19 March 2012

Aboriginal Native Title Consultants
16A Mahogany Drive
MUSWELLBROOK NSW 2333

Attention: Mr & Mrs John & Margaret Matthews

Dear Sir / Madam

Continuation of Bengalla Mine
Aboriginal Archaeology and Cultural Heritage Impact Assessment

1. INTRODUCTION

Bengalla Mining Company Pty Ltd (BMC) placed an advertisement in both the *Muswellbrook Chronicle* on 17 February 2012 and the *Hunter Valley News* on 22 February 2012. The advertisement invited Aboriginal stakeholders to provide an Expression of Interest if they wished to be consulted in relation to the Aboriginal Archaeology and Cultural Heritage Impact Assessment (AACHIA) for the Continuation of Bengalla Mine Project (the Project).

2. REGISTRATION

BMC and Hansen Bailey would like to thank your group for registering an interest in the AACHIA. This letter provides information relating to the Project and the upcoming consultation process associated with the AACHIA.

If you have yet to register in the Project AACHIA your group has been identified as a stakeholder that may have an interest and wish to be consulted. As such, your group is invited to register an interest in the AACHIA. Only groups that have registered an interest will be consulted during the AACHIA process. If you are interested in participating in the AACHIA, and would like to register, we ask that you provide a written Expression of Interest by **2 April 2012**.

Please be aware that we have a responsibility to notify the Office of Environment and Heritage (OEH) and the Local Aboriginal Land Council of your registered interest and to forward on your contact details. If you would prefer not to have your contact details provided to these authorities, please notify Hansen Bailey.

Hansen Bailey Pty Ltd (ABN 17 093 597 810)
BRISBANE
Phone: (07) 3226 0900 **Fax:** (07) 3226 0901
Address: Level 15, 215 Adelaide Street Brisbane Qld 4000 **Postal:** GPO Box 3285 Brisbane Qld 4001
HUNTER VALLEY
Phone: (02) 6575 2000 **Fax:** (02) 6575 2001
Address: 6/127-129 John Street Singleton NSW 2330 **Postal:** PO Box 473 Singleton NSW

3. PROJECT INFORMATION

The Bengalla Coal Mine (Bengalla) is situated approximately 4 km west of Muswellbrook in the Upper Hunter Valley of NSW. Bengalla is currently approved to operate until 2017.

BMC is seeking a new Development Consent under Division 4.1 of Part 4 of the *Environmental Planning and Assessment Act 1979* to enable mining at Bengalla to continue for up to 24 years. The Project will involve open cut mining, extracting up to 15 million tonnes of Run of Mine coal per year. Mining will continue to progress to the west of current operations, moving further away from Muswellbrook. The Project will utilise the existing infrastructure (with some upgrades) and provide employment for 900 full time personnel. **Figure 1** shows the indicative layout of the Project.

BMC and Hansen Bailey have commenced preparing an Environmental Impact Statement (EIS) for the Project. The AACHIA will be included in the EIS.

4. METHODOLOGY

A copy of the proposed methodology for the AACHIA has been attached to this letter for your review and comment. If you wish to comment on the draft methodology, could you please provide comment by **Monday, 16 April 2012**. To assist in this process a return fax form has been included in this letter, should you wish to utilise it.

Prior to this date, a planning meeting will be held to discuss the methodology, provide a more detailed briefing about the Project, and to explain the logistics of the field work. All comments on the draft methodology will be considered, and where appropriate, the methodology will be amended to incorporate these recommendations.

5. PLANNING MEETING

A planning meeting must be conducted as part of the cultural heritage assessment, as required by Section 4.2 of the *Aboriginal cultural heritage consultation requirements for proponents 2010.*

As such, you are invited to attend the planning meeting for the Bengalla AACHIA. The details for the planning meeting include:

Date: **Wednesday, 4 April 2012**

Time: **10:00 am**

Venue: **Bengalla Mine, Bengalla Link Road, Muswellbrook**

The objectives of the planning meeting will be to:

- Present a detailed briefing about the Project and its potential impacts;
- Discuss the methodology and the nature and scope of the AACHIA;

- Outline the environmental impact assessment process, including the input points into the investigation and assessment activities;
- Specify critical timelines and milestones for the completion of assessment activities and delivery of reports;
- Clearly define agreed roles, functions, and responsibilities;
- Identify, raise and discuss the Aboriginal groups' cultural concerns, perspectives and assessment requirements (if any) and provide contact details should any individual discussions be required; and
- Provide a forum in which cultural knowledge of the land within the Project Boundary can be discussed.

The planning meeting will be attended by representatives from BMC, Hansen Bailey and AECOM. Upon arrival at Bengalla for the planning meeting all participants will be required to sign in as a visitor. The planning meeting will consist of a presentation followed by a light lunch.

If your group wishes to participate in the archaeological survey, a representative of your group must be present at the planning meeting.

6. ARCHAEOLOGICAL SURVEY

6.1. FIELD WORK

The AACHIA will include an archaeological survey of the Survey Area to identify Aboriginal archaeological sites. The Survey Area consists of the area within the Project Boundary excluding the area associated with the Approved Bengalla Mine. The area will be walked by representatives from registered Aboriginal groups and AECOM archaeologists. Persons will be spaced appropriately to ensure that full coverage of the Survey Area is achieved.

Prior to the field work, AECOM will conduct a search of the AHIMS database to ascertain details for registered Aboriginal sites located in the survey area. During the field work, the nature, extent and significance of these sites will be re-assessed. The survey will be conducted in accordance with OEH's *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010).

The archaeological survey is expected to take three weeks. The study team will consist of two archaeologists from AECOM and a maximum of six representatives from the registered Aboriginal groups. If more than six representatives are nominated by the community, Hansen Bailey will organise a roster to accommodate the needs of interested groups.

Due to some challenging areas of terrain within the Survey Area, representatives must possess a reasonable level of physical fitness and must supply their own personal protective equipment (PPE).

The rate of pay for the field work will be **$550 per person** per day, plus daily travel expenses (maximum reimbursement of $50). Invoices are to be provided in accordance with this to Jason Martin of Hansen Bailey at the completion of the field work.

6.2. FIEDLWORK PARTICIPANTS

All representatives taking part in the archaeological survey will be required to undertake the relevant Coal & Allied (C&A) Health and Safety Inductions. In order to complete the inductions, registered groups will be required to nominate a single representative to complete the archaeological survey.

At the beginning of each day of field work, a safety toolbox meeting will be conducted by BMC staff. The purpose of these meetings is to address the potential health and safety hazards present in the areas to be surveyed on that day.

All participants are required to supply their own PPE, which must include the following:

- Protective clothing (long sleeved shirt and long trousers);
- High visibility vest with reflective stripes;
- Steel capped boots (lace up);
- Sunglasses;
- Gloves; and
- Hard hat.

Due to the rugged environment in which the field survey will be conducted, it is essential that the following guidelines are adhered to:

- Participants must possess a reasonable level of fitness – must be able to negotiate steep terrain and must not have any pre-existing medical conditions that will inhibit their participation; and
- Participants must be able to stay overnight in one of the towns within the Muswellbrook or Singleton Shires, in order to eliminate the need to drive long distances after a day of field work.

Aboriginal groups must provide their current public liability insurance and work cover details at least 1 week before a representative will be allowed to participate in field work.

7. SUMMARY

A summary of the key dates discussed in this letter regarding the AACHIA are provided below:

- Register an Interest in the Project – **Monday, 2 April 2012**;
- Onsite Planning Meeting – **Wednesday, 4 April 2012**; and
- Comments due on draft methodology – **Monday, 16 April 2012**.

Thank you again for registering an interest in this Project. We look forward to working with you in the near future.

If you have any questions with regard to this letter, please do not hesitate to contact me on (02) 6575 2010 or jmartin@hansenbailey.com.au.

Yours faithfully
HANSEN BAILEY

Jason Martin
Environmental Scientist

22/03/2012 12:36 67462350 QUIRINDI LIBRARY PAGE 01/04

Return Fax: (02) 6575 2001

Attention: Jason Martin

RE: CONTINUATION OF BENGALLA MINE – ABORIGINAL ARCHAEOLOGY CULTURAL HERITAGE IMPACT ASSESSMENT METHODOLOGY

Aboriginal Stakeholder Group: Breeza Plains Culture and Heritage consultants

I have read and have understood the Continuation of Bengalla Mine – Aboriginal archaeology and cultural heritage impact assessment methodology, which has been prepared by AECOM. I agree that this survey methodology is adequate and consistent with the views and wishes of the local Aboriginal community. With regard to the survey methodology, I would like to confirm that our group:

☒ Agrees with the content ☐ Disagrees with the content

We would like to make the following comments on the survey methodology:

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Further, in regard to the field work to be undertaken in **April 2012**, a representative from our group:

☒ Would like to attend ☐ Does not wish to attend

Our nominated representative attending the field work for the Continuation of Bengalla Mine Aboriginal cultural heritage impact assessment will be:

Tom Matthews
Cory Matthews

Additionally, we support Hansen Bailey's application to access data from the AHIMS database.

Signed in support: T. Matthews

On behalf of (Group): Breeza plains culture and heritage consults

Date: 22.3.2012

28/03/2012 21:02 0249320720 DFTU ENTERPRISES PAGE 01

Return Fax: (02) 6575 2001

Attention: Jason Martin

RE: CONTINUATION OF BENGALLA MINE – ABORIGINAL ARCHAEOLOGY CULTURAL HERITAGE IMPACT ASSESSMENT METHODOLOGY

Aboriginal Stakeholder Group: DFTV ENTERPRISES

I have read and have understood the Continuation of Bengalla Mine – Aboriginal archaeology and cultural heritage impact assessment methodology, which has been prepared by AECOM. I agree that this survey methodology is adequate and consistent with the views and wishes of the local Aboriginal community. With regard to the survey methodology, I would like to confirm that our group:

☑ Agrees with the content ☐ Disagrees with the content

We would like to make the following comments on the survey methodology:

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Further, in regard to the field work to be undertaken in **April 2012**, a representative from our group:

☑ Would like to attend ☐ Does not wish to attend

Our nominated representative attending the field work for the Continuation of Bengalla Mine Aboriginal cultural heritage impact assessment will be:

DERRICK VALE

.....

Additionally, we support Hansen Bailey's application to access data from the AHIMS database.

Signed in support: Derrick Vale

On behalf of (Group): DFTV ENTERPRISES

Date: .....

04-APR-2012 16:39 From:BARKUMA 49364449 To:65752001 P.1/1

Return Fax: (02) 6575 2001

Attention: Jason Martin

RE: **CONTINUATION OF BENGALLA MINE – ABORIGINAL ARCHAEOLOGY CULTURAL HERITAGE IMPACT ASSESSMENT METHODOLOGY**

Aboriginal Stakeholder Group GIDAWAA WALANG CULTURAL HERITAGE CONSULTANG

I have read and have understood the Continuation of Bengalla Mine – Aboriginal archaeology and cultural heritage impact assessment methodology, which has been prepared by AECOM. I agree that this survey methodology is adequate and consistent with the views and wishes of the local Aboriginal community. With regard to the survey methodology, I would like to confirm that our group:

☑ Agrees with the content ☐ Disagrees with the content

We would like to make the following comments on the survey methodology:

Further, in regard to the field work to be undertaken in **April 2012**, a representative from our group:

☑ Would like to attend ☐ Does not wish to attend

Our nominated representative attending the field work for the Continuation of Bengalla Mine Aboriginal cultural heritage impact assessment will be:

Additionally we support Hansen Bailey's application to access data from the AHIMS database

Signed in support A M

On behalf of (Group) GIDAWAA WALANG

Date 4.4.2012

Return Fax: (02) 6575 2001

Attention: Jason Martin

RE: CONTINUATION OF BENGALLA MINE – ABORIGINAL ARCHAEOLOGY CULTURAL HERITAGE IMPACT ASSESSMENT METHODOLOGY

Aboriginal Stakeholder Group: UNGOOROO ABORIGINAL CORPORATION

I have read and have understood the Continuation of Bengalla Mine – Aboriginal archaeology and cultural heritage impact assessment methodology, which has been prepared by AECOM. I agree that this survey methodology is adequate and consistent with the views and wishes of the local Aboriginal community. With regard to the survey methodology, I would like to confirm that our group:

☑ Agrees with the content ☐ Disagrees with the content

We would like to make the following comments on the survey methodology:

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Further, in regard to the field work to be undertaken in **April 2012**, a representative from our group:

☑ Would like to attend ☐ Does not wish to attend

Our nominated representative attending the field work for the Continuation of Bengalla Mine Aboriginal cultural heritage impact assessment will be:

MS ANNETTE DUNSTAN
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.....

Additionally, we support Hansen Bailey's application to access data from the AHIMS database.

Signed in support: .....

On behalf of (Group): UNGOOROO ABORIGINAL CORPORATION.

Date: 5/04/2012

Andrew Wu

From: Jason Martin
Sent: Tuesday, April 10, 2012 4:48 PM
To: Andrew Wu
Subject: FW: Bengalla Mine

Categories: Orange Category

-----Original Message-----
From: cacatua@resetdsl.net.au [mailto:cacatua@resetdsl.net.au]
Sent: Tuesday, 10 April 2012 4:46 PM
To: Jason Martin
Subject: Re: Bengalla Mine

Jason,

Cacatua has read and understood the Continuation of Bengalla Mine - Aboriginal archaeology and cultural heritage impact assessment methodology, which has been prepared by AECOM. we agree to this survey metholology is adequate and consistent with the views and wishes of the local Aboriginal community if the requests that were stated at the meeting on Thursday 5th April 2012 are added to the methodology.

Turther, in regards to the field work to be undeertaken in April 2012, a representative from our group would like to attend. Below are a list of workers that we may send out to represent Cacatua.
George Sampson
Adam Sampson
Tegan McCormack
Shane Willinson
Depending on our roster and the day of your work will depend on the representative that we send.

I do apologise if you have already recieved this by fax. the paperwork shows it was faxed on the 20th March 2012, however the fax log print out is not showing it as being sent.

Thank you
Donna Sampson
Reports manager

Appendix B

Aboriginal Stakeholder Responses to Draft Assessment Report

15/10/2012 11:50 67462350 QUIRINDI LIBRARY PAGE 01/01

Return Fax: (02) 6575 2001

Attention: Andrew Wu

RE: CONTINUATION OF BENGALLA MINE PROJECT – DRAFT ABORIGINAL ARCHAEOLOGY AND CULTURAL HERITAGE IMPACT ASSESSMENT REPORT

Aboriginal Stakeholder Group: Breeza plains Culture and heritage consults

I have read and have understood the Draft Continuation of Bengalla Mine Project – Aboriginal Archaeology and Cultural Heritage Impact Assessment Report which has been prepared by AECOM. With regard to the Report, I would like to confirm that our group:

☑ Agrees with the content ☐ Disagrees with the content

We would like to make the following comments on the Report:

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Signed in support: .....

On behalf of (Group): Breeza plains culture and heritage consults.

Date: 16:10:12

16/10/2012 11:14 0265731456 JAKILA PTY LTD PAGE 01/01

Return Fax: (02) 6575 2001

Attention: Andrew Wu

RE: CONTINUATION OF BENGALLA MINE PROJECT – DRAFT ABORIGINAL ARCHAEOLOGY AND CULTURAL HERITAGE IMPACT ASSESSMENT REPORT

Aboriginal Stakeholder Group: Kawul Cultural Services

I have read and have understood the Draft Continuation of Bengalla Mine Project – Aboriginal Archaeology and Cultural Heritage Impact Assessment Report which has been prepared by AECOM. With regard to the Report, I would like to confirm that our group:

☑ Agrees with the content ☐ Disagrees with the content

We would like to make the following comments on the Report:

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Signed in support: Vicky Lee

On behalf of (Group): K.C.S

Date: 16/10/12

Hansen Bailey
ENVIRONMENTAL CONSULTANTS

RECORD OF CONVERSATION

Name:	Deslee Matthews	Date/Time:	29/10/12 5pm
Company:	Deslee Talbott Consultants	Job No:	984
Phone No:	0431 205 336	Recorded by:	AW
Subject:	Response to report		

Details:

Deslee called to say that she agreed with the content in the report and had no further comments.

Action:

LOCAL ABORIGINAL LAND COUNCIL
WANARUA
P.O. BOX 127
19 MAITLAND STREET,
MUSWELLBROOK 2333
ABN 33 251 730 169
PH: (02) 6543 1288
(02) 6543 1962
FAX: (02) 6542 5377
EMAIL: wanarua@bigpond.net.au

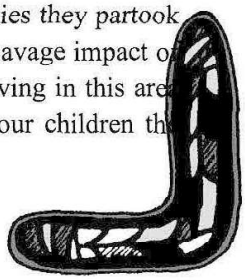
Andrew Wu
Environmental Engineer,
Hansen Bailey
P.O. Box 473
Singleton NSW 2330

Re: Continuation of Bengalla Mine Project, Draft Aboriginal ACHIA.

Thank you for this opportunity to comment on the Draft Aboriginal ACHIA for the continuation of Bengalla Mine Project. Like all areas in the Hunter Valley the land, vegetation and water ways hold cultural significance to the Aboriginal community. Both oral and European written history tells us that the area was resource rich, the land being very fertile, the flats open and grassy the hills well treed.

This area is in close proximity to the song line, Mount Arthur being one of the guiding markers, and a cross roads between the routes to the coast, the Sydney basin, Western Plains, the Northern Tablelands and possibly the Lithgow region. It is also in easy walking distance to a number of known ceremonial areas. Yes the area around here is very significant, perhaps even more so by this being near the area of the last stand of the local inhabitants against the invading whites' occupation, theft, kidnappings, rapes, murders and domination. In 1826 after fighting broke out there between Wonnarua and Kamilaroi people and settlers. The local tribes retreated into the swampy scrubland around Mount Arthur to conduct guerrilla warfare against the settlers in one of Australian's many frontier wars. When the white settles found they were unable to combat the resistance, the government of the day was contacted for aid and assistance. The settlers received arms ammunition and military support which led to the destruction of the Aboriginal resistance. Some of the elders tell of being taken by their parents and grandparents and having much of their early traditional teaching done here. There was at the time many of the traditional food sources and resources to be found within easy walking distance of the town of Muswellbrook, still very much as it was before European settlement.

We spend much of our time learning about our past, trying to reconnect with our culture. Yet as quickly as we begin to understand something about how our people lived, (the activities they partook in and the time lines showing when, "history" that was not passed on because of the savage impact of European settlement), it is lost because of development. Many of the people still living in this area cannot speak the language of their tribe, we cannot sing the songs, we cannot tell our children th



stories of all creation. This was lost because these things were considered "Evil" by the missionaries. What little is still known is closely guarded by those entrusted with it who pass it on as "need to know" on those occasions when something vital to the dreamtime is endangered. All that is left is to the majority is the few markers that remain of a once full and harmonious society and culture. These markers along with the snippets allowed to us by those entrusted, is all we have to link us to our mother the earth. Culturally, these places give us an insight to our forbearers. The level of occupation and the length of occupation give us insight to what the landscape was like and the activities the conducted. With no culture of writing, history has been passed by word of mouth. To aid the telling, many of the creation stories incorporated the land forms. This included how they came to be. No amount of written language can adequately describe or replace the value and meaning of being in touch with the living remnants of our dreamtime. On a social level these remnants and markers give hope to a displaced people. No longer is it "Shame" to be Aboriginal. We have for many years been told that our culture was "Bad, Heathen, Satanical, Backward, Uncivilised and generally unacceptable". Employment, education, and health issues can be directly linked to ones vision of ones self and community. We still suffer from stereotyping and bigotry. We need something that is ours to take pride in. All we have is tied to the land in the remnants and markers.

Loss and destruction of these areas by all forms of development means there are fewer and fewer teaching places remaining for Aboriginal people to pass on their knowledge and culture to the newer generations, as Koettig and Thorp (1990) identified, "There are no reserves or National Parks in the Central Lowlands within which some sites would be preserved, there is urgent need to address the problem of site destruction and preservation before more of the resource is eroded." At the time of writing in 1990, 77% of all known sites had already been destroyed in the Central Lowlands area.

When researching this current development proposal I was surprised the original development and mine approval that the proponent was not required to set aside any area or sites for protection for future generations nor were any mitigation measures imposed to offset social impacts created by the destruction of culture.

To that end, in line with the DGR's in section 1.2 of the report we make the following recommendations for mitigation and offsets for Cultural and Social impacts caused by destruction of Cultural Sites in the continuation of Bengalla Mine project:

1. That the "Management recommendations" in the draft report be correctly titled "Consultant's Management Recommendations" to define the difference between those measures the Consultant wishes to see implemented and those of the Aboriginal Community.

2. That the recommendations here in are included in the report under Aboriginal Community Recommendations and not as part of an annex to be ignored,

3. An Aboriginal Cultural surface and subsurface investigation be conducted by the Aboriginal community and that the Aboriginal community be consulted over the scope of the Cultural sub surface investigation,

4. The artefact analysis, of salvaged objects, include participation from the Aboriginal community, and it be expedited to be completed in such a way as to help inform the Cultural investigation.

5. That any research and salvage works be rostered among the stakeholders so all get a fair go at being involved if they choose to be.

6. That the Aboriginal Community be given employment opportunities in all areas of the mining process through Aboriginal specific traineeships and employment programs. The target numbers and time frames to be agreed mutually between mining company and stakeholders before they start the destruction of cultural sites and areas.

7. That proponent assist building capacity in Aboriginal Companies to meet the compliance needs to become contractors to the proponent in areas other than Culture and Heritage.

8. That the proponent funds the building of a Keeping Place and learning centre for the Aboriginal Community.

9. That an area of land of not less than 50 Ha be set aside in perpetuity as a Cultural offset for the Aboriginal Community. The offset land is to be in an area freely accessible to the Aboriginal community and preferably with access directly to the Hunter River or other permanent water source. This will enable Elders to conduct cultural activities in a culturally appropriate manner.

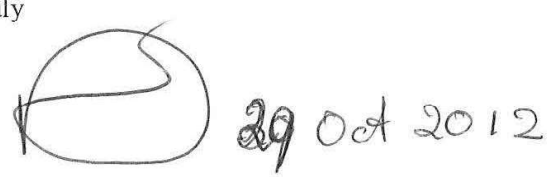
10. That the offset land is not part of any other offset (e.g. part of a biodiversity offset) without the unanimous support of the Aboriginal Stakeholders or the support of Wanaruah LALC.

11. That the proponent gives $500,000.00 per year for the life of the mine to a Trust for Aboriginal Employment and education programs in the Upper Hunter, and that Wanaruah LALC be on the board of said trust/s with the power to veto projects they deem not worthy.

12. That the proponent gives $200,000.00 per year for the life of the mine to a Trust for Delivery of Aboriginal Health Services in the Upper Hunter, and that Wanaruah LALC be on the board of said trust/s with the power to veto projects they deem not worthy.

Thank you for this opportunity to input

Yours Truly



Noel Downs
CEO

Hansen Bailey
ENVIRONMENTAL CONSULTANTS

RECORD OF CONVERSATION

Name:	Tony Griffiths	Date/Time:	2/11/12 3:30pm
Company:	T & G Consultants	Job No:	984
Phone No:	0428 147 417	Recorded by:	AW
Subject:	Response to draft report		

Details:

Called Tony to remind him of the due date for comments on the draft report.

Tony stated that he had no comments on the report.

Action:

Hansen Bailey
ENVIRONMENTAL CONSULTANTS

RECORD OF CONVERSATION

Name:	Scott Smith	Date/Time:	2/11/12 3:15 pm
Company:	Wanal ~~Cult~~ Consultants	Job No:	984
Phone No:	0401 167 950	Recorded by:	AW
Subject:	Response to draft report		

Details:

Called Scott to remind him of the due date for response to the draft Report.

Scott advised that he had no comments on the report.

Action:

Return Fax: (02) 6575 2001

Attention: Andrew Wu

RE: CONTINUATION OF BENGALLA MINE PROJECT – DRAFT ABORIGINAL ARCHAEOLOGY AND CULTURAL HERITAGE IMPACT ASSESSMENT REPORT

Aboriginal Stakeholder Group: Bawurra Consultants.

I have read and have understood the Draft Continuation of Bengalla Mine Project – Aboriginal Archaeology and Cultural Heritage Impact Assessment Report which has been prepared by AECOM. With regard to the Report, I would like to confirm that our group:

☑ Agrees with the content ☐ Disagrees with the content

We would like to make the following comments on the Report:

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Signed in support: .....

On behalf of (Group): .....

Date: 6-11-12

Return Fax: (02) 6575 2001

Attention: Andrew Wu

RE: **CONTINUATION OF BENGALLA MINE PROJECT – DRAFT ABORIGINAL ARCHAEOLOGY AND CULTURAL HERITAGE IMPACT ASSESSMENT REPORT**

Aboriginal Stakeholder Group: Bond Consultants

I have read and have understood the Draft Continuation of Bengalla Mine Project – Aboriginal Archaeology and Cultural Heritage Impact Assessment Report which has been prepared by AECOM. With regard to the Report, I would like to confirm that our group:

☑ Agrees with the content ☐ Disagrees with the content

We would like to make the following comments on the Report:

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Signed in support: .....

On behalf of (Group): .....

Date: 6-11-12.....

06.11.2012 04:29 PM Kauwul Pty Ltd T/A Wonn1 0249547751 PAGE. 1/ 1

Return Fax: (02) 6575 2001

Attention: Andrew Wu

RE: CONTINUATION OF BENGALLA MINE PROJECT – DRAFT ABORIGINAL ARCHAEOLOGY AND CULTURAL HERITAGE IMPACT ASSESSMENT REPORT

Aboriginal Stakeholder Group: KAUWUL T/A WONN1

I have read and have understood the Draft Continuation of Bengalla Mine Project – Aboriginal Archaeology and Cultural Heritage Impact Assessment Report which has been prepared by AECOM. With regard to the Report, I would like to confirm that our group:

☑ Agrees with the content ☐ Disagrees with the content

We would like to make the following comments on the Report:

ARTHUR FLETCHER WOULD LIKE TO BE CONSULTED AND TO PARTICIPATE IN THE SITES PROPOSED SALVAGE WORK; AND INSPECTION AND DECISION-MAKING PROCESS WITH REGARD TO THE SCARRED TREES.

Signed in support: .....

On behalf of (Group): KAUWUL T/A WONN1

Date: 6/11/12.

Hansen Bailey
ENVIRONMENTAL CONSULTANTS

RECORD OF CONVERSATION

Name:	Donna Sampson	Date/Time:	9/11/12 2:40 pm
Company:	Cacatua Culture Consultants	Job No:	954
Phone No:	0403 765 019	Recorded by:	AW
Subject:	Response to draft report		

Details:

Called Donna to remind about the closing date for comments on the draft report.

Donna indicated that Cacatua agreed with the content in the report.

Action:

Return Fax: (02) 6575 2001

Attention: Andrew Wu

RE: CONTINUATION OF BENGALLA MINE PROJECT – DRAFT ABORIGINAL ARCHAEOLOGY AND CULTURAL HERITAGE IMPACT ASSESSMENT REPORT

Aboriginal Stakeholder Group: Hunter Valley Aboriginal Corporation

I have read and have understood the Draft Continuation of Bengalla Mine Project – Aboriginal Archaeology and Cultural Heritage Impact Assessment Report which has been prepared by AECOM. With regard to the Report, I would like to confirm that our group:

☐ Agrees with the content ☐ Disagrees with the content

We would like to make the following comments on the Report:

The Board of Hunter Valley Aboriginal Corporation has indicated that in relation to providing comments on projects and reports, the Corporation supports the views and wishes of the local land Council, in this case the Wanaruah local Aboriginal land Council. If the land Council raise any issues with the report the corporation would prefer that you could consider their comments.

Signed in ~~support~~: Rhonda J. Griffiths

On behalf of (Group): Hunter Valley Aboriginal Corporation

Date: 9.11.13

Hansen Bailey
ENVIRONMENTAL CONSULTANTS

RECORD OF CONVERSATION

Name:	Melissa Matthews	Date/Time:	9/11/12 3:10pm
Company:	Upper Hunter Heritage Consultants	Job No:	984
Phone No:	0439 556 641	Recorded by:	AW
Subject:	Response to Aboriginal Archaeology assessment		

Details:

Called Melissa to remind her of the closing date for comments.

Melissa advised that Upper Hunter Heritage Consultants would not be providing a response.

Action:

Return Fax: (02) 6575 2001

Attention: Andrew Wu

RE: CONTINUATION OF BENGALLA MINE PROJECT – DRAFT ABORIGINAL ARCHAEOLOGY AND CULTURAL HERITAGE IMPACT ASSESSMENT REPORT

Aboriginal Stakeholder Group: DFTV Enterprises

I have read and have understood the Draft Continuation of Bengalla Mine Project – Aboriginal Archaeology and Cultural Heritage Impact Assessment Report which has been prepared by AECOM. With regard to the Report, I would like to confirm that our group:

☑ Agrees with the content ☐ Disagrees with the content

We would like to make the following comments on the Report:

Areas surveyed in the second week were densely covered with pasture grass which lowered surface visibility and limited the potential to identify evidence of surface archaeological materials.

Signed in support: Dominic Vale

On behalf of (Group): DFTV Enterprises

Date: 11/11/2012

Andrew Wu

From: Aaron Slater [warragil_c.s@hotmail.com]
Sent: Monday, November 12, 2012 10:16 AM
To: Andrew Wu
Subject: RE: Bengalla Aboriginal Cultural Heritage Assessment

Hi Andrew,

Sorry for the delay. will send fax back to you as we agree with the Content.

New Mobile Contact Details: [redacted]

And can you Address any Docoments to [redacted]

Regards

Aaron Slater -Manager

Subject: Bengalla Aboriginal Cultural Heritage Assessment
Date: Fri, 9 Nov 2012 16:07:45 +1100
From: awu@hansenbailey.com.au
To: warragil_c.s@hotmail.com

Hi Aaron,

Just a final reminder about comments for the Bengalla Aboriginal Cultural Heritage Assessment. Although the closing date for responses was Tuesday (6th November), I am prepared to accept all responses received before the end of the week.

I have attached a return fax form for your convenience.

Thank you again for your assistance in this assessment.

Andrew Wu
Environmental Engineer

HANSEN BAILEY
Tel: (02) 6575 2017
Fax: (02) 6575 2001
Email : awu@hansenbailey.com.au

Appendix C

AHIMS Search Results

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819
Client Service ID : 52287

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-0563	Denman Road	AGD	56	297000	6429250	Open site	Valid	Artefact : -	Isolated Find	2576
Contact	Recorders	Sue Effenberger						Permits		
37-2-1463	B36;	AGD	56	294960	6429380	Open site	Valid	Artefact : -	Open Camp Site	
Contact	Recorders	P Saunders,R Stocks						Permits		
37-2-1465	C5;	AGD	56	296650	6429420	Open site	Valid	Artefact : -	Open Camp Site	4105
Contact	Recorders	Elizabeth Rich,Ms.Jill Ruig						Permits		
37-2-2560	Mount Pleasant 702	AGD	56	295150	6429420	Open site	Valid	Artefact : 2		
Contact Searle	Recorders	Mr.Leonard (Lennie) Anderson						Permits		
37-2-3175	MTP-596	GDA	56	292864	6429476	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3176	MTP-597	GDA	56	292805	6429527	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3177	MTP-598	GDA	56	292786	6429443	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3178	MTP-599	GDA	56	292759	6429451	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3179	MTP-600	GDA	56	292696	6429465	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3180	MTP-601	GDA	56	292651	6429452	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3181	MTP-602	GDA	56	292585	6429519	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3182	MTP-603	GDA	56	292508	6429508	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3183	MTP-604	GDA	56	292438	6429489	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3184	MTP-605	GDA	56	292130	6429523	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3185	MTP-606	GDA	56	292141	6429579	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3187	MTP-608	GDA	56	292065	6429549	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6429400 - 6429611 with a Buffer of 0 meters.Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 59

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819

Client Service ID : 52287

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-3188	MTP-609	GDA	56	291958	6429609	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3189	MTP-610	GDA	56	291923	6429589	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3191	MTP-612	GDA	56	291786	6429580	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3194	MTP-615	GDA	56	292020	6429503	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-2871	MTP-67	GDA	56	296159	6429599	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-2872	MTP-68	GDA	56	296345	6429580	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-2873	MTP-69	GDA	56	296357	6429597	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-2874	MTP-70	GDA	56	296441	6429423	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-2876	MTP-72	GDA	56	296453	6429568	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-2877	MTP-73	GDA	56	296419	6429493	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-2878	MTP-74	GDA	56	296650	6429482	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-2883	MTP-79	GDA	56	296812	6429575	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-2884	MTP-80	GDA	56	296961	6429504	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-2886	MTP-82	GDA	56	297087	6429413	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-2893	MTP-89	GDA	56	293460	6429476	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-2894	MTP-90	GDA	56	293859	6429582	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6429400 - 6429611 with a Buffer of 0 meters,Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 59

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819
Client Service ID : 52287

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-2896	MTP-92	GDA	56	294373	6429566	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-2897	MTP-93	GDA	56	294290	6429546	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3281	MTP-702	GDA	56	295150	6429421	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3283	MTP-704	GDA	56	295157	6429564	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3482	MTP-904	GDA	56	297222	6429424	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-2813	MTP-6	GDA	56	296612	6429498	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-2814	MTP-7	GDA	56	296468	6429479	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-2815	MTP-8	GDA	56	296449	6429474	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-2816	MTP-9	GDA	56	296386	6429470	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-2857	MTP-53	GDA	56	297780	6429607	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3195	MTP-616	GDA	56	292053	6429470	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3196	MTP-617	GDA	56	292175	6429473	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3197	MTP-618	GDA	56	292369	6429477	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3199	MTP-620	GDA	56	292433	6429450	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3200	MTP-621	GDA	56	292519	6429434	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3201	MTP-622	GDA	56	292571	6429421	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6429400 - 6429611 with a Buffer of 0 meters.Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 59

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819

Client Service ID : 52287

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-3202	MTP-623	GDA	56	292727	6429410	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3204	MTP-625	GDA	56	292909	6429552	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3205	MTP-626	GDA	56	292940	6429553	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3206	MTP-627	GDA	56	292962	6429511	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3207	MTP-628	GDA	56	292983	6429552	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3208	MTP-629	GDA	56	293229	6429483	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3209	MTP-630	GDA	56	293294	6429611	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3226	MTP-647	GDA	56	292565	6429604	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3186	MTP-607	GDA	56	292095	6429548	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3193	MTP-614	GDA	56	291683	6429592	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3282	MTP-703	GDA	56	295102	6429565	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6429400 - 6429611 with a Buffer of 0 meters,Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 59

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819
Client Service ID : 52286

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-0603	B34;	AGD	56	294850	6428550	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	**Recorders**	Ms.Laila Haglund					**Permits**	851	
37-2-1464	C1;	AGD	56	297040	6429190	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	P Saunders,R Stocks					**Permits**		
37-2-1466	C20;	AGD	56	296480	6428930	Open site	Valid	Artefact : -	Open Camp Site	4105
	Contact	**Recorders**	Barry French,Ms.Jill Ruig					**Permits**		
37-2-1467	A1-A4;	AGD	56	293500	6429110	Open site	Valid	Artefact : -	Open Camp Site	4105
	Contact	**Recorders**	Elizabeth Rich,Barry French					**Permits**		
37-2-1468	A7-A8;	AGD	56	293850	6428970	Open site	Valid	Artefact : -	Open Camp Site	4105
	Contact	**Recorders**	Elizabeth Rich,Barry French					**Permits**		
37-2-1469	A33-A34;	AGD	56	294040	6429070	Open site	Valid	Artefact : -	Open Camp Site	4105
	Contact	**Recorders**	Elizabeth Rich,Barry French					**Permits**		
37-2-2564	Mount Pleasant 706	AGD	56	295571	6429155	Open site	Valid	Artefact : 1		
	Contact Searle	**Recorders**	Mr.Leonard (Lennie) Anderson					**Permits**		
37-2-2565	Mount Pleasant 707	AGD	56	295549	6429171	Open site	Valid	Artefact : 1		
	Contact Searle	**Recorders**	Mr.Leonard (Lennie) Anderson					**Permits**		
37-2-3173	MTP-594	GDA	56	292951	6429358	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mr.Lennard Roberts					**Permits**		
37-2-3174	MTP-595	GDA	56	293298	6429308	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mr.Lennard Roberts					**Permits**		
37-2-2870	MTP-66	GDA	56	296169	6429242	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mr.Lennard Roberts					**Permits**		
37-2-2875	MTP-71	GDA	56	296511	6429398	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mr.Lennard Roberts					**Permits**		
37-2-2889	MTP-85	GDA	56	294214	6429182	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mr.Lennard Roberts					**Permits**		
37-2-2890	MTP-86	GDA	56	293713	6429340	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mr.Lennard Roberts					**Permits**		
37-2-2891	MTP-87	GDA	56	293983	6429150	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mr.Lennard Roberts					**Permits**		
37-2-2892	MTP-88	GDA	56	294420	6429359	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mr.Lennard Roberts					**Permits**		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6428732 - 6429400 with a Buffer of 0 meters.Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 97

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819

Client Service ID : 52286

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-3034	MTP-453	GDA	56	297686	6429275	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3037	MTP-456	GDA	56	297744	6429040	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3038	MTP-458	GDA	56	297797	6428926	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3039	MTP-459	GDA	56	297810	6428940	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3040	MTP-460	GDA	56	297725	6428964	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3041	MTP-461	GDA	56	294096	6429036	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3043	MTP-463	GDA	56	293969	6429005	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3044	MTP-464	GDA	56	293949	6429016	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3045	MTP-465	GDA	56	293726	6429086	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3046	MTP-466	GDA	56	293646	6429056	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3047	MTP-467	GDA	56	293659	6428976	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3048	MTP-468	GDA	56	293911	6428929	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3050	MTP-470	GDA	56	294110	6428934	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3466	MTP-888	GDA	56	296754	6429043	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3467	MTP-889	GDA	56	296710	6429072	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3468	MTP-890	GDA	56	296691	6429109	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6428732 - 6429400 with a Buffer of 0 meters,Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 97

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819
Client Service ID : 52286

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-3469	MTP-891	GDA	56	296663	6429106	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3470	MTP-892	GDA	56	296670	6429067	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3471	MTP-893	GDA	56	296637	6429073	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3472	MTP-894	GDA	56	296620	6429121	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3473	MTP-895	GDA	56	296596	6429115	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3474	MTP-896	GDA	56	296548	6429089	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3284	MTP-705	GDA	56	295733	6429159	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3285	MTP-706	GDA	56	295572	6429156	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3286	MTP-707	GDA	56	295549	6429172	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3475	MTP-897	GDA	56	296491	6429086	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3476	MTP-898	GDA	56	296469	6428986	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3477	MTP-899	GDA	56	296552	6428945	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3478	MTP-900	GDA	56	296615	6428982	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3479	MTP-901	GDA	56	296764	6428926	Open site	Valid	Modified Tree (Carved or Scarred) : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3480	MTP-902	GDA	56	296709	6429128	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3481	MTP-903	GDA	56	296890	6429268	Open site	Valid	Artefact : -		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6428732 - 6429400 with a Buffer of 0 meters.Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 97

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819

Client Service ID : 52286

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3483	MTP-905	GDA	56	297311	6429363	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3484	MTP-906	GDA	56	297447	6429247	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3485	MTP-907	GDA	56	297573	6429096	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3486	MTP-908	GDA	56	297471	6429115	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3487	MTP-909	GDA	56	297430	6429014	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3488	MTP-910	GDA	56	297432	6429028	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3489	MTP-911	GDA	56	297488	6429030	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3490	MTP-912	GDA	56	297351	6428946	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3287	MTP-708	GDA	56	295126	6429265	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3288	MTP-709	GDA	56	295032	6429145	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3051	MTP-471	GDA	56	294131	6428967	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3052	MTP-472	GDA	56	294200	6428956	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3053	MTP-473	GDA	56	294247	6428918	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3054	MTP-474	GDA	56	294274	6428935	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3055	MTP-475	GDA	56	294324	6428880	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3056	MTP-476	GDA	56	294221	6429003	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6428732 - 6429400 with a Buffer of 0 meters,Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 97

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819

Client Service ID : 52286

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-3057	MTP-477	GDA	56	293670	6428840	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3058	MTP-478	GDA	56	293581	6428851	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3059	MTP-479	GDA	56	293519	6428942	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3060	MTP-480	GDA	56	293635	6428804	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3061	MTP-481	GDA	56	293684	6428790	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3062	MTP-482	GDA	56	293805	6428767	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3063	MTP-483	GDA	56	294121	6428737	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3067	MTP-487	GDA	56	294407	6428759	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3068	MTP-488	GDA	56	294364	6428777	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3069	MTP-489	GDA	56	294286	6428782	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3070	MTP-490	GDA	56	294253	6428819	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3071	MTP-491	GDA	56	294226	6428783	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3072	MTP-492	GDA	56	294174	6428777	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3073	MTP-493	GDA	56	294124	6428834	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3491	MTP-913	GDA	56	297394	6428808	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3493	MTP-915	GDA	56	297742	6428751	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6428732 - 6429400 with a Buffer of 0 meters.Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 97

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819

Client Service ID : 52286

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-3494	MTP-916	GDA	56	297728	6428825	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-2916	MTP-113	GDA	56	294457	6429049	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-2844	MTP-40	GDA	56	293712	6428744	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-2850	MTP-46	GDA	56	297418	6429033	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-2851	MTP-47	GDA	56	297428	6429018	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-2852	MTP-48	GDA	56	297292	6429202	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-2854	MTP-50	GDA	56	297273	6429212	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-2855	MTP-51	GDA	56	296942	6428777	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3370	MTP-791	GDA	56	296691	6428750	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3840	MTP-1262	GDA	56	294875	6429001	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3198	MTP-619	GDA	56	292333	6429391	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3203	MTP-624	GDA	56	292844	6429373	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-2853	MTP-49	GDA	56	297236	6429249	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3042	MTP-462	GDA	56	294062	6428996	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3049	MTP-469	GDA	56	294073	6428936	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3289	MTP-710	GDA	56	294908	6429017	Open site	Valid	Artefact : -		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6428732 - 6429400 with a Buffer of 0 meters,Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 97

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819

Client Service ID : 52286

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-4060	MTP-1400	GDA	56	292930	6429241	Open site	Valid	Artefact : -		
	Contact	Recorders	Ms.Helen Selimiotis					Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6428732 - 6429400 with a Buffer of 0 meters.Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 97

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819

Client Service ID : 52284

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-0570	B1;	AGD	56	296300	6428000	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
Contact	Recorders	Bobbie Oakley,Ms.Laila Haglund						Permits	851	
37-2-0591	B22;	AGD	56	293450	6427900	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
Contact	Recorders	Ms.Jill Ruig						Permits		
37-2-0601	B32;	AGD	56	295500	6428400	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
Contact	Recorders	Bobbie Oakley						Permits	851	
37-2-0602	B33;	AGD	56	294750	6428250	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
Contact	Recorders	Ms.Laila Haglund						Permits	851	
37-2-0603	B34;	AGD	56	294850	6428550	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
Contact	Recorders	Ms.Laila Haglund						Permits	851	
37-2-0604	B35;	AGD	56	294450	6428150	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
Contact	Recorders	Elizabeth Rich						Permits		
37-2-2629	BMRA8	GDA	56	291860	6428319	Open site	Destroyed	Artefact : 1		101517
Contact	Recorders	Environmental Resources Management Australia						Permits		
37-2-2630	BMRA9	GDA	56	291793	6428304	Open site	Destroyed	Artefact : 1		101517
Contact	Recorders	Environmental Resources Management Australia						Permits		
37-2-3061	MTP-481	GDA	56	293684	6428790	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3062	MTP-482	GDA	56	293805	6428767	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3063	MTP-483	GDA	56	294121	6428737	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3064	MTP-484	GDA	56	294202	6428653	Open site	Valid	Modified Tree (Carved or Scarred) : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3065	MTP-485	GDA	56	294270	6428697	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		
37-2-3066	MTP-486	GDA	56	294452	6428649	Open site	Valid	Artefact : -		
Contact	Recorders	Mr.Lennard Roberts						Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6428128 - 6428732 with a Buffer of 50 meters.Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 74

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

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819
Client Service ID : 52284

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-3067	MTP-487	GDA	56	294407	6428759	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3068	MTP-488	GDA	56	294364	6428777	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3069	MTP-489	GDA	56	294286	6428782	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3071	MTP-491	GDA	56	294226	6428783	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3072	MTP-492	GDA	56	294174	6428777	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3074	MTP-494	GDA	56	293893	6428644	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3075	MTP-495	GDA	56	293783	6428689	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3076	MTP-496	GDA	56	293640	6428644	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3077	MTP-497	GDA	56	293554	6428680	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3078	MTP-498	GDA	56	293754	6428539	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3079	MTP-499	GDA	56	293983	6428531	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3080	MTP-500	GDA	56	294040	6428511	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3081	MTP-501	GDA	56	294236	6428505	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3082	MTP-502	GDA	56	294282	6428493	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3083	MTP-503	GDA	56	294323	6428471	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3084	MTP-504	GDA	56	294404	6428430	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6428128 - 6428732 with a Buffer of 50 meters.Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 74

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819

Client Service ID : 52284

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-3085	MTP-505	GDA	56	294469	6428471	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3086	MTP-506	GDA	56	294524	6428441	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3087	MTP-507	GDA	56	294553	6428432	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3088	MTP-508	GDA	56	294582	6428389	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3089	MTP-509	GDA	56	294715	6428402	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3091	MTP-511	GDA	56	294464	6428556	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3092	MTP-512	GDA	56	294235	6428580	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3093	MTP-513	GDA	56	293908	6428467	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3094	MTP-514	GDA	56	293794	6428411	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3095	MTP-515	GDA	56	293306	6428503	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3096	MTP-516	GDA	56	293351	6428427	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3098	MTP-519	GDA	56	294501	6428281	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3492	MTP-914	GDA	56	297358	6428682	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3493	MTP-915	GDA	56	297742	6428751	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3099	MTP-520	GDA	56	294538	6428266	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3100	MTP-521	GDA	56	294598	6428225	Open site	Valid	Artefact : -		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6428128 - 6428732 with a Buffer of 50 meters.Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 74

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819
Client Service ID : 52284

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3101	MTP-522	GDA	56	294659	6428206	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3102	MTP-523	GDA	56	294722	6428346	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3103	MTP-524	GDA	56	294554	6428374	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3104	MTP-525	GDA	56	294497	6428362	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3105	MTP-526	GDA	56	294211	6428446	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3106	MTP-527	GDA	56	294056	6428431	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3107	MTP-528	GDA	56	293937	6428277	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3108	MTP-529	GDA	56	293637	6428257	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3109	MTP-530	GDA	56	293519	6428316	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3110	MTP-531	GDA	56	293446	6428179	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3111	MTP-532	GDA	56	293520	6428181	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3112	MTP-533	GDA	56	294095	6428149	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3113	MTP-534	GDA	56	294211	6428071	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3114	MTP-535	GDA	56	294328	6428075	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3116	MTP-537	GDA	56	294696	6428080	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6428128 - 6428732 with a Buffer of 50 meters.Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 74

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819

Client Service ID : 52284

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-3118	MTP-539	GDA	56	294743	6428087	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3119	MTP-540	GDA	56	294620	6428148	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3120	MTP-541	GDA	56	294578	6428144	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3121	MTP-542	GDA	56	293939	6428243	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3122	MTP-543	GDA	56	293513	6428113	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3123	MTP-544	GDA	56	293163	6428082	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-2843	MTP-39	GDA	56	293935	6428611	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-2844	MTP-40	GDA	56	293712	6428744	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-2845	MTP-41	GDA	56	293956	6428616	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-2855	MTP-51	GDA	56	296942	6428777	Open site	Valid	Modified Tree (Carved or Scarred) : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3370	MTP-791	GDA	56	296691	6428750	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3090	MTP-510	GDA	56	294512	6428568	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3097	MTP-518	GDA	56	293970	6428344	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6428128 - 6428732 with a Buffer of 50 meters.Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 74

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819
Client Service ID : 52278

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-0571	B2;	AGD	56	297000	6427500	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Bobbie Oakley,K Calley					Permits	851	
37-2-0572	B3;	AGD	56	296500	6427600	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Bobbie Oakley,K Calley					Permits	851	
37-2-0573	B4;	AGD	56	295900	6427650	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Bobbie Oakley,K Calley					Permits	851	
37-2-0591	B22;	AGD	56	293450	6427900	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Ms.Jill Ruig					Permits		
37-2-0592	B23;	AGD	56	293500	6427800	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Ms.Jill Ruig					Permits		
37-2-0593	B24;	AGD	56	293550	6427500	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Ms.Jill Ruig					Permits		
37-2-0594	B25;	AGD	56	293700	6427700	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Ms.Jill Ruig					Permits		
37-2-0595	B26;	AGD	56	293880	6427580	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Elizabeth Rich,Ms.Jill Ruig					Permits		
37-2-0596	B27;	AGD	56	293950	6427550	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Elizabeth Rich,Ms.Jill Ruig					Permits		
37-2-0597	B28;	AGD	56	294130	6427250	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Elizabeth Rich,Ms.Laila Haglund					Permits		
37-2-0598	B29;	AGD	56	294250	6427650	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Elizabeth Rich,Ms.Laila Haglund					Permits		
37-2-0599	B30;	AGD	56	294350	6427550	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Bobbie Oakley,Elizabeth Rich					Permits		
37-2-0600	B31;	AGD	56	294610	6427500	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6427341 - 6428128 with a Buffer of 50 meters.Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 72

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819

Client Service ID : 52278

SiteID	SiteName		Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact		Recorders	Bobbie Oakley,Elizabeth Rich					Permits	851	
37-2-2091	BMRA5		AGD	56	292094	6427550	Open site	Destroyed	Artefact : 1		100765,101517
	Contact	Searle	Recorders	Miss.Nicola Roche					Permits		
37-2-2092	BMRA6		AGD	56	291883	6427699	Open site	Destroyed	Artefact : 1		100765,101517
	Contact	Searle	Recorders	Miss.Nicola Roche					Permits		
37-2-2628	BMRA7		GDA	56	291494	6427760	Open site	Destroyed	Artefact : 1		101517
	Contact		Recorders	Environmental Resources Management Australia					Permits		
37-2-3147	MTP-568		GDA	56	294514	6427796	Open site	Valid	Artefact : -		
	Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3148	MTP-569		GDA	56	294443	6427778	Open site	Valid	Artefact : -		
	Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3149	MTP-570		GDA	56	294417	6427728	Open site	Valid	Artefact : -		
	Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3150	MTP-571		GDA	56	294408	6427802	Open site	Valid	Artefact : -		
	Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3151	MTP-572		GDA	56	294352	6427795	Open site	Valid	Artefact : -		
	Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3152	MTP-573		GDA	56	294285	6427806	Open site	Valid	Artefact : -		
	Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3153	MTP-574		GDA	56	294178	6427789	Open site	Valid	Artefact : -		
	Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3154	MTP-575		GDA	56	294138	6427774	Open site	Valid	Artefact : -		
	Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3155	MTP-576		GDA	56	293914	6427817	Open site	Valid	Artefact : -		
	Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3156	MTP-577		GDA	56	293494	6427685	Open site	Not a Site	Modified Tree (Carved or Scarred) : -		
	Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3157	MTP-578		GDA	56	293481	6427698	Open site	Valid	Artefact : -		
	Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3158	MTP-579		GDA	56	294240	6427508	Open site	Valid	Artefact : -		
	Contact		Recorders	Mr.Lennard Roberts					Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6427341 - 6428128 with a Buffer of 50 meters.Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 72

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819
Client Service ID : 52278

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-3159	MTP-580	GDA	56	294317	6427492	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3160	MTP-581	GDA	56	294323	6427527	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3161	MTP-582	GDA	56	294337	6427449	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3162	MTP-583	GDA	56	294659	6427540	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3163	MTP-584	GDA	56	294415	6427602	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3164	MTP-585	GDA	56	294371	6427589	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3110	MTP-531	GDA	56	293446	6428179	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3111	MTP-532	GDA	56	293520	6428181	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3112	MTP-533	GDA	56	294095	6428149	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3113	MTP-534	GDA	56	294211	6428071	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3114	MTP-535	GDA	56	294328	6428075	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3115	MTP-536	GDA	56	294601	6428002	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3116	MTP-537	GDA	56	294696	6428080	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3117	MTP-538	GDA	56	294717	6428038	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3118	MTP-539	GDA	56	294743	6428087	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3119	MTP-540	GDA	56	294620	6428148	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6427341 - 6428128 with a Buffer of 50 meters.Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 72

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819

Client Service ID : 52278

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-3120	MTP-541	GDA	56	294578	6428144	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3122	MTP-543	GDA	56	293513	6428113	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3123	MTP-544	GDA	56	293163	6428082	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3124	MTP-545	GDA	56	293650	6427997	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3125	MTP-546	GDA	56	293717	6427946	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3126	MTP-547	GDA	56	293760	6427968	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3127	MTP-548	GDA	56	294332	6427890	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3128	MTP-549	GDA	56	294404	6427892	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3129	MTP-550	GDA	56	294520	6427830	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3130	MTP-551	GDA	56	294494	6427885	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3131	MTP-552	GDA	56	294564	6427988	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3132	MTP-553	GDA	56	294524	6427937	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3133	MTP-554	GDA	56	294422	6427982	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3134	MTP-555	GDA	56	294235	6428009	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3135	MTP-556	GDA	56	293841	6427847	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3136	MTP-557	GDA	56	293999	6427733	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6427341 - 6428128 with a Buffer of 50 meters.Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 72

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819
Client Service ID : 52278

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-3137	MTP-558	GDA	56	294128	6427725	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3139	MTP-560	GDA	56	294320	6427714	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3140	MTP-561	GDA	56	294376	6427643	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3141	MTP-562	GDA	56	294449	6427668	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3142	MTP-563	GDA	56	294508	6427674	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3143	MTP-564	GDA	56	294555	6427624	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3144	MTP-565	GDA	56	294588	6427659	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3146	MTP-567	GDA	56	294516	6427752	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-2846	MTP-42	GDA	56	293755	6427988	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3138	MTP-559	GDA	56	294222	6427733	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3145	MTP-566	GDA	56	294641	6427663	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-4061	MTP-1413	GDA	56	293422	6427540	Open site	Valid	Artefact : -		
	Contact	Recorders	Ms.Helen Selimiotis					Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291225 - 297873, Northings : 6427341 - 6428128 with a Buffer of 50 meters.Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 72

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819

Client Service ID : 52276

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders						Permits		

There are no sites found for given search criteria.

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291204 - 292879, Northings : 6424190 - 6425683 with a Buffer of 0 meters,Additional Info : Archaeological Assessment. Number of Aboriginal sites and Aboriginal objects found is 0

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819
Client Service ID : 52275

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-0574	B5;	AGD	56	295850	6426950	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Elizabeth Rich					Permits	851	
37-2-0575	B6;	AGD	56	296140	6426700	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Elizabeth Rich					Permits	851	
37-2-0576	B7;	AGD	56	296740	6426520	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Elizabeth Rich					Permits	851	
37-2-0577	B8;	AGD	56	294880	6425880	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Ms.Laila Haglund					Permits	851	
37-2-0578	B9;	AGD	56	294480	6426550	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Ms.Laila Haglund					Permits	851	
37-2-0582	B13; - Bengalla Mine	AGD	56	293500	6425700	Open site	Destroyed	Artefact : -	Open Camp Site	2687,100681,100765,100995
	Contact	Recorders	Elizabeth Rich,Barry French					Permits	851,2621	
37-2-0583	B14;	AGD	56	293120	6425630	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Elizabeth Rich					Permits		
37-2-0584	B15;	AGD	56	294200	6426480	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Bobbie Oakley,Ms.Laila Haglund					Permits		
37-2-0585	B16;	AGD	56	293700	6426600	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Elizabeth Rich,Barry French					Permits		
37-2-0586	B17;	AGD	56	293600	6426700	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Bobbie Oakley,Ms.Jill Ruig					Permits		
37-2-0587	B18;	AGD	56	293700	6426800	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Bobbie Oakley,Ms.Jill Ruig					Permits		
37-2-0588	B19;	AGD	56	294000	6426620	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Elizabeth Rich,Ms.Laila Haglund					Permits		
37-2-0589	B20;	AGD	56	294200	6426750	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291173 - 297900, Northings : 6425683 - 6427341 with a Buffer of 0 meters.Additional Info : Archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 74

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819

Client Service ID : 52275

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Elizabeth Rich,Ms.Laila Haglund					Permits		
37-2-0590	B21;	AGD	56	294250	6426850	Open site	Valid	Artefact : -	Open Camp Site	2687,100681,100765
	Contact	Recorders	Elizabeth Rich					Permits		
37-2-2086	BEF1	AGD	56	293682	6426532	Open site	Valid	Artefact : 1		
	Contact	Recorders	Miss.Nicola Roche					Permits		
37-2-2087	BMRA1	AGD	56	292790	6425589	Open site	Destroyed	Artefact : 1		100765,101517
	Contact Searle	Recorders	Miss.Nicola Roche					Permits		
37-2-2088	BMRA2	AGD	56	292802	6426004	Open site	Destroyed	Artefact : 1		100765,101517
	Contact Searle	Recorders	Miss.Nicola Roche					Permits		
37-2-2089	BMRA3	AGD	56	292761	6426498	Open site	Destroyed	Artefact : 1		100765,101517
	Contact	Recorders	Miss.Nicola Roche					Permits		
37-2-2090	BMRA4	AGD	56	292583	6426881	Open site	Destroyed	Artefact : 1		100765,101517
	Contact Searle	Recorders	Miss.Nicola Roche					Permits		
37-2-2108	BEF1 - Bengalla Mining Company	AGD	56	293785	6426722	Open site	Destroyed	Artefact : 1		100765
	Contact Searle	Recorders	ERM-Thornton					Permits	2621	
37-2-2093	B 2	AGD	56	293453	6425665	Open site	Valid	Artefact : 6		
	Contact Searle	Recorders	Miss.Cheryl Kitchener					Permits		
37-2-2094	B 3	AGD	56	293558	6425608	Open site	Valid	Artefact : 7		
	Contact Searle	Recorders	Miss.Cheryl Kitchener					Permits		
37-2-2095	B4	AGD	56	293615	6425597	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders	Miss.Cheryl Kitchener					Permits		
37-2-2096	B5	AGD	56	293739	6425715	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders	Miss.Cheryl Kitchener					Permits		
37-2-2097	B6	AGD	56	293791	6425766	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders	Miss.Cheryl Kitchener					Permits		
37-2-2098	B7_	AGD	56	293713	6425763	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders	Miss.Cheryl Kitchener					Permits		
37-2-2099	B8	AGD	56	293659	6425819	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders	Miss.Cheryl Kitchener					Permits		
37-2-2100	B9_	AGD	56	293919	6425856	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders	Miss.Cheryl Kitchener					Permits		
37-2-2101	B10_	AGD	56	293634	6425917	Open site	Valid	Artefact : 1		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291173 - 297900, Northings : 6425683 - 6427341 with a Buffer of 0 meters,Additional Info : Archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 74

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819
Client Service ID : 52275

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact Searle	Recorders	Miss.Cheryl Kitchener					Permits		
37-2-2102	B11_	AGD	56	293699	6425974	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders	Miss.Cheryl Kitchener					Permits		
37-2-2103	B12_	AGD	56	293758	6426039	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders	Miss.Cheryl Kitchener					Permits		
37-2-2104	B13_	AGD	56	294688	6425891	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders	Miss.Cheryl Kitchener					Permits		
37-2-2105	B14_	AGD	56	294367	6425715	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders	Miss.Cheryl Kitchener					Permits		
37-2-2106	B15_	AGD	56	294627	6425597	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders	Miss.Cheryl Kitchener					Permits		
37-2-2107	B16_	AGD	56	294685	6425654	Open site	Valid	Artefact : 1		
	Contact Searle	Recorders	Miss.Cheryl Kitchener					Permits		
37-2-2109	BEF2 - Bengalla Mining Company	AGD	56	294028	6426561	Open site	Destroyed	Artefact : 1		100765
	Contact Searle	Recorders	ERM-Thornton					Permits	2621	
37-2-2110	BEF3 - Bengalla Mining Company	AGD	56	294021	6426577	Open site	Destroyed	Artefact : 1		100765
	Contact Searle	Recorders	ERM-Thornton					Permits	2621	
37-2-2111	BEF4 - Bengalla Mining Company	AGD	56	294012	6426572	Open site	Destroyed	Artefact : 1		100765
	Contact Searle	Recorders	ERM-Thornton					Permits	2621	
37-2-2113	Area 2 B2, 3,4,5,6,7	AGD	56	293453	6425665	Open site	Destroyed	Artefact : 1		100765
	Contact Searle	Recorders	Indigenous Outcomes - Cheryl Kitchener					Permits	2621	
37-2-2114	Area 2 B 8	AGD	56	293558	6425608	Open site	Destroyed	Artefact : 1		100765
	Contact Searle	Recorders	Indigenous Outcomes - Cheryl Kitchener					Permits	2621	
37-2-2115	Area 2 B 9	AGD	56	293615	6425597	Open site	Destroyed	Artefact : 1		100765
	Contact Searle	Recorders	Indigenous Outcomes - Cheryl Kitchener					Permits	2621	
37-2-2116	Area 2 B 10	AGD	56	293739	6425715	Open site	Destroyed	Artefact : 1		100765
	Contact Searle	Recorders	Indigenous Outcomes - Cheryl Kitchener					Permits	2621	
37-2-2117	Area 2 B 11	AGD	56	293791	6425766	Open site	Destroyed	Artefact : 1		100765
	Contact Searle	Recorders	Indigenous Outcomes - Cheryl Kitchener					Permits	2621	
37-2-2118	Area 2 B 12	AGD	56	293713	6425763	Open site	Destroyed	Artefact : 1		100765
	Contact Searle	Recorders	Indigenous Outcomes - Cheryl Kitchener					Permits	2621	
37-2-2119	Area 2 B 13	AGD	56	293659	6425819	Open site	Destroyed	Artefact : 1		100765
	Contact Searle	Recorders	Indigenous Outcomes - Cheryl Kitchener					Permits	2621	

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291173 - 297900, Northings : 6425683 - 6427341 with a Buffer of 0 meters.Additional Info : Archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 74

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819

Client Service ID : 52275

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-2120	Area 2 B 14	AGD	56	293919	6425856	Open site	Destroyed	Artefact : 1		100765
Contact	Searle	Recorders	Indigenous Outcomes - Cheryl Kitchener					Permits	2621	
37-2-2121	Area 2 B 15	AGD	56	293634	6425917	Open site	Destroyed	Artefact : 1		100765
Contact	Searle	Recorders	Indigenous Outcomes - Cheryl Kitchener					Permits	2621	
37-2-2122	Area 2 B 16	AGD	56	293699	6425974	Open site	Destroyed	Artefact : 1		100765
Contact	Searle	Recorders	Indigenous Outcomes - Cheryl Kitchener					Permits	2621	
37-2-2123	Area 2 B 17	AGD	56	293758	6426039	Open site	Destroyed	Artefact : 1		100765
Contact	Searle	Recorders	Indigenous Outcomes - Cheryl Kitchener					Permits	2621	
37-2-2124	Area 1 B 18	AGD	56	294688	6425891	Open site	Destroyed	Artefact : 1		100765
Contact	Searle	Recorders	Indigenous Outcomes - Cheryl Kitchener					Permits	2621	
37-2-2125	Area 1 B 19	AGD	56	294367	6425715	Open site	Destroyed	Artefact : 1		100765
Contact	Searle	Recorders	Indigenous Outcomes - Cheryl Kitchener					Permits	2621	
37-2-2126	Area 1 B 20	AGD	56	294627	6425597	Open site	Destroyed	Artefact : 1		100765
Contact	Searle	Recorders	Indigenous Outcomes - Cheryl Kitchener					Permits	2621	
37-2-2127	Area 1 B 21	AGD	56	294685	6425654	Open site	Destroyed	Artefact : 1		100765
Contact	Searle	Recorders	Indigenous Outcomes - Cheryl Kitchener					Permits	2621	
37-2-3534	MTP-956	GDA	56	293655	6427070	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3535	MTP-957	GDA	56	293606	6427166	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3536	MTP-958	GDA	56	293616	6426854	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3538	MTP-960	GDA	56	293707	6426546	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3539	MTP-961	GDA	56	293663	6426676	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3540	MTP-962	GDA	56	293657	6426687	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3541	MTP-963	GDA	56	293696	6426754	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		
37-2-3542	MTP-964	GDA	56	293653	6426850	Open site	Valid	Artefact : -		
Contact		Recorders	Mr.Lennard Roberts					Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291173 - 297900, Northings : 6425683 - 6427341 with a Buffer of 0 meters,Additional Info : Archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 74

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 60224819
Client Service ID : 52275

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
37-2-3543	MTP-965	GDA	56	293674	6426885	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3544	MTP-966	GDA	56	293650	6426907	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3545	MTP-967	GDA	56	293574	6426250	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3546	MTP-968	GDA	56	293355	6426073	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3547	MTP-969	GDA	56	293221	6425907	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3548	MTP-970	GDA	56	293182	6425886	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3549	MTP-971	GDA	56	293105	6425932	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3550	MTP-972	GDA	56	293183	6425961	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3551	MTP-973	GDA	56	293334	6426058	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3552	MTP-974	GDA	56	293349	6426079	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-3537	MTP-959	GDA	56	293641	6426641	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.Lennard Roberts					Permits		
37-2-4062	MTP-1460	GDA	56	293513	6426231	Open site	Valid	Artefact : -		
	Contact	Recorders	Ms.Helen Selimiotis					Permits		
37-2-4063	MTP-1462	GDA	56	293615	6426715	Open site	Valid	Artefact : -		
	Contact	Recorders	Ms.Helen Selimiotis					Permits		

Report generated by AHIMS Web Service on 28/09/2011 for Geordie Oakes for the following area at Datum :GDA, Zone : 56, Eastings : 291173 - 297900, Northings : 6425683 - 6427341 with a Buffer of 0 meters.Additional Info : Archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 74

Appendix D

Survey Coverage

Appendix D Survey Coverage

Transect #	Surveyors	Width	Exposure	Visibility	Length	Total Area Surveyed(m)	Total Area Surveyed (ha)	Effective Coverage Area (ha)
1	13	130	20%	40%	1805.418	234704.2976	23.47042976	1.877634381
2	13	130	10%	50%	1552.216	201788.0227	20.17880227	1.008940113
3	13	130	10%	30%	1487.467	193370.7299	19.33707299	0.58011219
4	13	130	30%	60%	2032.319	264201.5	26.42015	4.755627001
6	12	120	20%	40%	1619.889	194386.6844	19.43866844	1.555093475
7	12	120	20%	30%	2100.729	252087.4889	25.20874889	1.512524934
8	12	120	30%	20%	2959.442	355133.0224	35.51330224	2.130798135
9	11	110	10%	40%	1323.276	145560.4055	14.55604055	0.582241622
10	11	110	10%	60%	3529.158	388207.4027	38.82074027	2.329244416
11	11	110	40%	80%	1846.463	203110.904	20.3110904	6.499548927
12	11	110	10%	50%	1725.869	189845.5374	18.98455374	0.949227687
13	11	110	10%	40%	1752.383	192762.1106	19.27621106	0.771048442
14	11	110	20%	40%	2468.418	271525.9496	27.15259496	2.172207597
15	11	110	30%	60%	2511.372	276250.9706	27.62509706	4.972517471
16	11	110	20%	30%	968.2571	106508.2808	10.65082808	0.639049685
17	12	120	10%	20%	617.3227	74078.72447	7.407872447	0.148157449
18	12	120	10%	20%	856.981	102837.7239	10.28377239	0.205675448
19	12	120	30%	40%	2859.807	343176.8305	34.31768305	4.118121966
20	12	120	20%	20%	2474.824	296978.9317	29.69789317	1.187915727
21	12	120	30%	30%	2233.263	267991.5856	26.79915856	2.41192427
22	12	120	30%	40%	856.6524	102798.2889	10.27982889	1.233579467
23	12	120	40%	60%	2315.777	277893.2861	27.78932861	6.669438867
24	12	120	20%	40%	1819.684	218362.1106	21.83621106	1.746896885
25	12	120	40%	50%	1772.792	212735.0977	21.27350977	4.254701953
26	12	120	40%	60%	1973.572	236828.6727	23.68286727	5.683888146
27	12	120	20%	40%	3682.819	441938.291	44.1938291	3.535506328
28	12	120	30%	60%	2042.389	245086.6228	24.50866228	4.41155921
29	13	130	20%	40%	3581.083	465540.7752	46.55407752	3.724326202
30	13	130	20%	30%	3545.949	460973.3536	46.09733536	2.765840122
31	13	130	20%	30%	1163.409	151243.1582	15.12431582	0.907458949

32	12	120	20%	40%	4710.363	565243.5972	56.52435972	4.521948777
33	11	110	20%	20%	4177.355	459509.0076	45.95090076	1.83803603
34	3	30	30%	20%	1157.896	34736.87947	3.473687947	0.208421277
35	13	130	20%	40%	3253.006	422890.8404	42.28908404	3.383126723
36	13	130	10%	10%	3285.112	427064.6092	42.70646092	0.427064609
37	13	130	10%	10%	3281.419	426584.421	42.6584421	0.426584421
38	13	130	10%	10%	3313.981	430817.4828	43.08174828	0.430817483
39	13	130	10%	10%	3317.467	431270.665	43.1270665	0.431270665
40	13	130	10%	10%	3348.425	435295.1871	43.52951871	0.435295187
41	13	130	10%	10%	304.3735	39568.55127	3.956855127	0.039568551
42	13	130	20%	20%	730.5453	94970.88528	9.497088528	0.379883541
TOTAL							**1113.585889**	**87.86282433**

Appendix E

Aboriginal Archaeological Site Data

Unique Id.	Site Name	Raw Materials	Type	Flake Type	Core Type	Platform Count	Length	Width	Thickness	Cortex	Platform Type	Core Blank	Number of removals	Length of longest scar	Tool Type	Tool Condition	Tool Blank	Retouch Direction	Retouch Lo	Angle of Retouch	XCOORD	YCOORD	Dist.B10	Dist.Water	Stream O	Landform
1	37-2-0396	Silcrete	Flake	Complete		0	24.5	32	6.1	None	Single		0	0							294081.2026	6427734.326	1692.941966	47.34558124	2nd	Lower slope
2	37-2-0396	IM/Tuff	Angular Shatter			0	20.7	0	0				0	0							294060.8465	6427739.238	1701.015256	31.02882796	2nd	Lower slope
3	37-2-0535	Silcrete	Flake	Broken FI (Proximal)		0	19.1	0	0				0	0							293682.9724	6426882.377	1051.477022	28.72876493	2nd	Lower slope
4	37-2-0535	Silcrete	Flake	Complete		0	26.5	42.5	15.1	1-50%	Single		0	0							293693.1962	6426879.131	1042.573216	38.03366972	2nd	Lower slope
5	37-2-0535	IM/Tuff	Flake	Complete		0	35.8	26.2	5.7	1-50%	Cortical		0	0							293687.7601	6426889.093	1053.761197	35.63912626	2nd	Lower slope
6	37-2-0585	Silcrete	Flake	Broken FI (Proximal)		0	31.3	0	0				0	0							293843.6753	6426786.681	878.8288944	32.72307595	2nd	Lower slope
7	37-2-0585	Silcrete	Angular Shatter			0	19.2	0	0				0	0							293843.083	6426787.442	879.7914013	33.07305529	2nd	Lower slope
8	37-2-0585	Silcrete	Flake	Complete		0	52.3	41.3	14	None	Multiple		0	0							293842.9904	6426786.472	879.0432358	33.4391352	2nd	Lower slope
9	37-2-0585	Silcrete	Flake	Broken FI (Proximal)		0	28.3	0	0		Single		0	0							293773.7939	6426794.142	925.9780386	73.9087315	2nd	Lower slope
10	37-2-0585	IM/Tuff	Retouched Flake			0	38	31	18.2	1-50%			0	0	Scraper	Complete	Flake	V-D	Ilm;dm	59;65;90	293774.3819	6426795.264	926.5074269	73.25010313	2nd	Lower slope
11	37-2-0585	Silcrete	Core		Unidirectional	1	67	32	22	None		Flake	4	20.3							293773.3486	6426793.81	925.9875915	73.96994144	2nd	Lower slope
12	37-2-0589	Quartz	Flake	Complete		0	31.7	36.4	8.8	None	Single		0	0							294335.3029	6426958.341	897.110628	36.61796751	4th	Lower slope
13	37-2-0589	IM/Tuff	Flake Shatter			0	27.6	0	0				0	0							294335.4221	6426957.984	896.7530508	36.46402053	4th	Lower slope
14	37-2-0589	IM/Tuff	Flake Shatter			0	30.4	0	0				0	0							294337.1932	6426956.61	895.3722827	34.59211109	4th	Lower slope
15	37-2-0589	Quartz	Core		Multidirectional	2	29.9	29	19.8			Indeterminate	5	15.1							294337.6302	6426956.146	894.9071489	34.13100207	4th	Lower slope
16	37-2-0589	IM/Tuff	Angular Shatter			0	22	0	0				0	0							294334.7669	6426957.792	896.564446	37.09906064	4th	Lower slope
17	37-2-0589	IM/Tuff	Flake	Broken FI (Proximal)		21	0	0	0		Faceted		0	0							294331.5972	6426959.594	898.3895469	40.44276444	4th	Lower slope
18	37-2-0589	Volcanic	Flake	Complete		0	41.6	33	12.5		Crushed		0	0							294339.1319	6426957.836	896.5948727	32.75741863	4th	Lower slope
19	37-2-0589	Silcrete	Flake	Complete		0	30.6	20.9	8.2	None	Single		0	0							294350.25	6426969.943	908.7624765	26.42326908	4th	Lower slope
20	37-2-0589	Silcrete	Angular Shatter			0	35.2	0	0				0	0							294347.1317	6426990.268	929.0560949	37.61558707	4th	Lower slope
21	37-2-0590	Silcrete	Flake Shatter			0	0	0	0				0	0							294397.4547	6427074.951	1015.351461	30.25467901	4th	Lower slope
22	37-2-0590	Silcrete	Flake Shatter			0	23.3	0	0				0	0							294395.835	6427070.725	1011.04116	26.31250966	4th	Lower slope
23	37-2-0590	Silcrete	Flake Shatter			0	14.3	0	0				0	0							294395.9072	6427070.708	1011.028195	26.28238675	4th	Lower slope
24	37-2-0590	Silcrete	Flake	Broken FI (Proximal)		0	23.7	0	0		Crushed		0	0							294389.5878	6427067.086	1007.079227	24.85996105	4th	Lower slope
25	37-2-0590	Silcrete	Flake	Complete		0	26.7	16.7	9.9	None	Single		0	0							294388.8007	6427063.547	1003.505789	22.17101017	4th	Lower slope
26	37-2-0590	Volcanic	Flake	Complete		0	35.4	49.2	20.1	None	Single		0	0							294324.5145	6427014.614	953.4941943	63.79398582	4th	Lower slope
27	37-2-0590	Silcrete	Flake	Broken FI (Proximal)		0	10.5	0	0		Single		0	0							294327.3467	6427013.965	952.8042376	60.90885862	4th	Lower slope
28	37-2-0590	Silcrete	Angular Shatter			0	31.6	0	0				0	0							294338.1307	6427027.705	966.4650037	57.86636404	4th	Lower slope
29	37-2-0590	Silcrete	Flake	Broken FI (Proximal)		0	10.5	0	0		Faceted		0	0							294340.9234	6427033.62	972.3793917	59.49023124	4th	Lower slope
30	37-2-0590	Silcrete	Flake	Broken FI (Proximal)		0	29.6	0	0		Faceted		0	0							294345.0445	6427052.767	991.5398717	56.2701184	4th	Lower slope
31	37-2-0590	Petrified Wood	Core		Bidirectional	2	32.1	32.4	26.6			Indeterminate	5	25.1							294418.5546	6427122.424	1064.105644	21.82552374	4th	Lower slope
32	37-2-0590	Silcrete	Core		Unidirectional	0	72.4	36.4	23.2	1-50%	Single	Flake	3	15.1							294422.1733	6427127.91	1069.849401	24.62132309	1st	Lower slope
33	37-2-0590	Silcrete	Flake Shatter			0	17	0	0				0	0							294434.7658	6427136.898	1079.846138	11.31239705	1st	Lower slope
34	37-2-0590	Silcrete	Flake Shatter			0	21.9	0	0				0	0							294436.2485	6427135.974	1079.057329	12.13912816	1st	Lower slope
35	37-2-0590	Silcrete	Retouched Flake			0	21.1	9.7	3.8	None			0	0	Geo Microlith	Complete	Flake				294441.4035	6427156.753	1100.218992	10.06212489	1st	Lower slope
36	37-2-0590	Silcrete	Flake	Broken FI (Proximal)		0	13.4	0	0				0	0							294433.4144	6427154.962	1097.725056	7.411171811	1st	Lower slope
37	37-2-0590	Silcrete	Flake	Complete		0	26	29	6.8	None	Single		0	0							294432.6094	6427154.821	1097.516158	7.630268576	1st	Lower slope
38	37-2-0590	Silcrete	Retouched Flake			0	17.4	9.4	3.7	None			0	0	Geo Microlith	Complete	Flake	V-D			294429.9906	6427154.373	1096.851176	8.849691773	1st	Lower slope
39	37-2-0590	IM/Tuff	Flake Shatter			0	10.5	0	0				0	0							294429.0647	6427153.861	1096.265079	9.198384125	1st	Lower slope
40	37-2-0590	IM/Tuff	Flake	Broken FI (Proximal)		0	36.9	0	0		Cortical		0	0							294427.5195	6427153.745	1096.024625	10.38610629	1st	Lower slope
41	37-2-0590	IM/Tuff	Flake	Broken FI (Proximal)		0	15.6	0	0		Cortical		0	0							294428.0227	6427161.576	1103.870777	15.77570678	1st	Lower slope
42	37-2-0590	Quartz	Flake	Broken FI (Proximal)		0	16.8	0	0		Cortical		0	0							294430.6336	6427163.078	1105.579567	15.98272012	1st	Lower slope
43	37-2-0590	Quartz	Flake Shatter			0	14.9	0	0				0	0							294430.2834	6427162.691	1105.165131	15.75017214	1st	Lower slope
44	37-2-0590	IM/Tuff	Flake	Complete		0	32.1	7.9	5.9	None	Faceted		0	0							294431.1809	6427164.332	1106.874407	16.99140585	1st	Lower slope
45	37-2-0590	Silcrete	Flake	Broken FI (Proximal)		0	22.8	0	0		Single		0	0							294425.1684	6427167.995	1110.046014	22.75969815	1st	Lower slope
46	37-2-0590	Silcrete	Flake	Broken FI (Proximal)		0	14.5	0	0		Multiple		0	0							294425.8431	6427169.06	1111.159939	23.38789151	1st	Lower slope
47	37-2-0590	IM/Tuff	Flake	Complete		0	22.7	14.2	5.6	None	Faceted		0	0							294425.396	6427170.134	1112.196189	24.5487896	1st	Lower slope
48	37-2-0590	Silcrete	Flake	Complete		0	24.2	16.4	7.4	None	Single		0	0							294425.4745	6427170.236	1112.303934	24.60586175	1st	Lower slope
49	37-2-0590	Silcrete	Flake	Broken FI (Proximal)		0	14.1	0	0		Single		0	0							294423.3614	6427169.205	1111.114971	24.7160288	1st	Lower slope

50	37-2-0590	IM/Tuff	Flake	Complete		0	43.1	40.3	8.4	None	Single		0	0							294440.4242	6427157.316	1100.68957	10.10690509	1st	Lower slope
51	37-2-0590	Silcrete	Angular Shatter			0	22.3	0	0				0	0							294454.0964	6427154.69	1099.412567	19.02338363	1st	Lower slope
52	37-2-0590	Silcrete	Flake	Broken FI (Proximal)		0	19.3	0	0		Single		0	0							294454.2253	6427155.811	1100.540894	19.55785112	1st	Lower slope
53	37-2-0590	Silcrete	Flake Shatter			0	11.9	0	0				0	0							294454.8265	6427155.678	1100.471328	20.06138702	1st	Lower slope
54	37-2-0590	Silcrete	Angular Shatter			0	19.4	0	0				0	0							294457.3316	6427154.902	1099.964579	22.15147588	1st	Lower slope
55	37-2-0590	Silcrete	Flake	Complete		0	92.9	62.8	23.9	None	Single		0	0							294463.2423	6427156.938	1102.635331	28.40201036	1st	Lower slope
56	37-2-0590	Silcrete	Flake	Broken FI (Proximal)		0	14.8	0	0		Single		0	0							294469.6908	6427154.609	1101.063472	34.06971623	1st	Lower slope
57	37-2-0590	IM/Tuff	Flake	Complete		0	9.8	9	3	None	Crushed		0	0							294490.7663	6427162.734	1111.798478	22.01177239	1st	Lower slope
58	37-2-0590	IM/Tuff	Flake	Broken FI (Proximal)		0	13.6	0	0		Cortical		0	0							294490.6545	6427162.887	1111.93488	22.19700946	1st	Lower slope
59	37-2-0590	Silcrete	Flake	Complete		0	38.6	23.5	10.4	None	Single		0	0							294490.2364	6427161.389	1110.394015	21.5572772	1st	Lower slope
60	37-2-0590	IM/Tuff	Flake	Broken FI (Proximal)		0	11.3	0	0		Crushed		0	0							294492.9484	6427160.952	1110.332019	19.19729153	1st	Lower slope
61	37-2-0590	IM/Tuff	Flake	Broken FI (Proximal)		0	16.7	0	0		Cortical		0	0							294350.1117	6427225.752	1164.556879	25.67063015	4th	Lower slope
62	37-2-0590	Silcrete	Flake	Complete		0	19.8	26.6	7.4	None	Single		0	0							294347.5356	6427225.316	1164.100789	24.38014889	4th	Lower slope
63	37-2-0594	Silcrete	Flake Shatter			0	31.3	0	0				0	0							293772.4326	6427865.935	1891.759463	40.32370809	2nd	Lower slope
64	37-2-0594	Silcrete	Flake	Complete		0	28.7	15.9	12.7	None	Single		0	0							293768.4086	6427865.862	1892.900485	40.5204916	2nd	Lower slope
65	37-2-0594	Silcrete	Angular Shatter			0	37.9	0	0				0	0							293768.5685	6427866.247	1893.219287	40.12409125	2nd	Lower slope
66	37-2-0594	Silcrete	Angular Shatter			0	35	0	0				0	0							293767.3044	6427867.237	1894.544744	39.25737296	2nd	Lower slope
67	37-2-0594	Silcrete	Flake	Complete		0	95.7	35	18	1-50%	Cortical		0	0							293767.3221	6427867.591	1894.876854	38.90360375	2nd	Lower slope
68	37-2-0597	Silcrete	Flake Shatter			0	31	0	0				0	0							294254.6639	6427447.645	1389.011381	58.99170481	4th	Lower slope
69	37-2-0597	IM/Tuff	Flake Shatter			0	22	0	0				0	0							294244.0585	6427449.618	1391.669575	69.61065178	4th	Lower slope
70	37-2-0597	IM/Tuff	Flake Shatter			0	18	0	0				0	0							294244.337	6427449.85	1391.88191	69.33754051	4th	Lower slope
71	37-2-0597	Silcrete	Flake Shatter			0	15.6	0	0				0	0							294257.7918	6427403.924	1345.180959	71.24458036	4th	Lower slope
72	37-2-0597	Silcrete	Core		Unidirectional	1	80.6	60	43.2	1-50%		Flake	13	34.5							294254.7312	6427400.31	1341.764114	75.8931433	4th	Lower slope
73	37-2-0598	Silcrete	Flake	Broken FI (Proximal)		0	16.9	0	0		Single		0	0							294378.4552	6427829.517	1768.699498	41.45833959	4th	Lower slope
74	37-2-0600	Silcrete	Flake Shatter			0	24.3	0	0				0	0							294693.1978	6427633.045	1611.055894	227.0135714	4th	Mid slope
75	37-2-0602	Silcrete	Angular Shatter			0	28.3	0	0				0	0							294802.7915	6428436.761	2420.229923	28.57438025	4th	Lower slope
76	37-2-0602	IM/Tuff	Flake	Complete		0	24.5	36	16.8	51-99%	Multiple		0	0							294799.3283	6428431.341	2414.248604	31.92156979	4th	Lower slope
77	37-2-0602	Silcrete	Flake Shatter			0	22	0	0				0	0							294799.8898	6428423.479	2406.638136	39.52946477	4th	Lower slope
78	37-2-2098	Silcrete	Flake	Complete		0	39.6	30.6	9.7	None	Cortical		0	0							293857.9976	6425877.261	515.6761642	919.3604203	2nd	Lower slope
79	37-2-3041	Silcrete	Flake	Broken FI (Proximal)		0	11.1	0	0		Single		0	0							294035.0973	6429071.182	3025.317894	141.4459352	1st	Mid slope
80	37-2-3055	Silcrete	Core		Multidirectional	2	63	32	20.5	1-50%		Indeterminate	6	17							294294.6969	6428861.938	2801.058812	76.62390151	1st	Mid slope
81	37-2-3066	Quartz	Flake Shatter			0	13.6	0	0				0	0							294422.1727	6428684.88	2624.933419	16.73698251	1st	Mid slope
82	37-2-3066	Silcrete	Flake	Redirecting Flake		0	30.9	14.7	7.7	None	Single		0	0							294453.224	6428658.026	2599.263327	54.60571171	1st	Lower slope
83	37-2-3066	IM/Tuff	Flake	Complete		0	13.9	24.7	6.3	None	Single		0	0							294453.1834	6428652.605	2593.845731	49.697331	1st	Lower slope
84	37-2-3066	IM/Tuff	Flake Shatter			0	13.7	0	0				0	0							294453.5001	6428651.665	2592.920507	48.71377075	1st	Lower slope
85	37-2-3066	Chert	Flake	Complete		0	18.1	7.6	2.6	1-50%	Single		0	0							294454.5081	6428651.109	2592.409473	47.77514008	1st	Lower slope
86	37-2-3066	Silcrete	Flake	Complete		0	29.6	12.4	7.6	None	Single		0	0							294453.8496	6428650.613	2591.884884	47.61561893	1st	Lower slope
87	37-2-3066	Silcrete	Flake Shatter			0	25.3	0	0				0	0							294453.8166	6428650.109	2591.37992	47.17916556	1st	Lower slope
88	37-2-3066	Silcrete	Flake Shatter			0	30	0	0				0	0							294453.5905	6428650.155	2591.415932	47.32196067	1st	Lower slope
89	37-2-3066	Silcrete	Flake	Complete		0	20.7	8.1	5.8	None	Single		0	0							294452.993	6428648.901	2590.136948	46.48590797	1st	Lower slope
90	37-2-3066	IM/Tuff	Flake	Complete		0	28	25	6	None	Multiple		0	0							294451.8796	6428644.45	2585.641684	43.19959359	1st	Lower slope
91	37-2-3066	Quartzite	Flake	Broken FI (Proximal)		0	20.1	0	0		Single		0	0							294456.2643	6428643.583	2584.969445	40.25498563	1st	Lower slope
92	37-2-3066	Quartz	Flake	Broken FI (Proximal)		0	32.8	0	0		Cortical		0	0							294454.3873	6428642.737	2584.040345	40.4297425	1st	Lower slope
93	37-2-3066	Silcrete	Core		Multidirectional	2	27	19.3	11.6	None		Flake	4	15.1							294458.6483	6428645.331	2586.824161	40.80070909	1st	Lower slope
94	37-2-3067	Silcrete	Flake Shatter			0	30	0	0				0	0							294402.9237	6428762.276	2701.77364	63.17029807	1st	Mid slope
95	37-2-3067	Quartzite	Flake	Complete		0	30	21	8		Single		0	0							294402.583	6428763.053	2702.542483	64.01079735	1st	Mid slope
96	37-2-3067	Silcrete	Flake Shatter			0	41	0	0				0	0							294403.2222	6428762.833	2702.337483	63.62655062	1st	Mid slope
97	37-2-3067	IM/Tuff	Flake Shatter			0	9	0	0				0	0							294404.0356	6428763.051	2702.574653	63.62633586	1st	Mid slope
98	37-2-3067	IM/Tuff	Flake Shatter			0	33	0	0				0	0							294404.4982	6428763.342	2702.876615	63.7931082	1st	Mid slope
99	37-2-3067	Silcrete	Flake Shatter			0	29	0	0				0	0							294400.6206	6428765.6	2705.043915	67.00845798	1st	Mid slope
100	37-2-3079	IM/Tuff	Flake Shatter			0	36.4	0	0				0	0							294004.083	6428577.555	2538.601641	64.83100978	1st	Mid slope
101	37-2-3081	Silcrete	Flake	Complete		0	32.5	29.9	13.1	1-50%	Single		0	0							294234.1728	6428506.846	2447.881954	34.38226583	1st	Mid slope
102	37-2-3081	Silcrete	Flake	Broken FI (Proximal)		0	36	0	0		Crushed		0	0							294232.1419	6428505.858	2446.983332	36.36447039	1st	Mid slope
103	37-2-3081	Silcrete	Angular Shatter			0	26.2	0	0				0	0							294232.6399	6428504.628	2445.732664	35.84798942	1st	Mid slope

104	37-2-3081	IM/Tuff	Flake	Complete		0	18.1	25.6	6.3	1-50%	Single		0	0							294232.3257	6428504.175	2445.29388	36.16588697	1st	Mid slope
105	37-2-3081	Chert	Flake	Broken FI (Proximal)		0	13.8	0	0		Single		0	0							294232.3074	6428503.481	2444.601354	36.20084316	1st	Mid slope
106	37-2-3081	Silcrete	Flake Shatter			0	18.1	0	0				0	0							294232.8865	6428503.164	2444.259277	35.63430225	1st	Mid slope
107	37-2-3081	Silcrete	Flake	Complete		0	22.2	14.2	7.5	None	Single		0	0							294233.0495	6428502.717	2443.805583	35.49357834	1st	Mid slope
108	37-2-3081	Silcrete	Flake	Complete		0	54.9	44.9	9.2	None	Single		0	0							294234.4135	6428502.11	2443.13998	34.1723674	1st	Mid slope
109	37-2-3081	Chert	Flake	Broken FI (Proximal)		0	13.7	0	0		Single		0	0							294235.5561	6428501.915	2442.896166	33.0490005	1st	Mid slope
110	37-2-3081	Silcrete	Flake	Complete		0	44	33	15	None	Cortical		0	0							294229.0092	6428501.623	2442.892425	39.59810007	1st	Mid slope
111	37-2-3081	Silcrete	Flake	Complete		0	18	30	8.8	None	Single		0	0							294231.2539	6428501.286	2442.455042	37.38981328	1st	Mid slope
112	37-2-3081	IM/Tuff	Flake	Complete		0	8	26	6	None	Single		0	0							294232.5222	6428500.893	2442.006417	36.16620569	1st	Mid slope
113	37-2-3081	Silcrete	Angular Shatter			0	44.2	0	0				0	0							294232.5912	6428502.058	2443.167267	35.99347822	1st	Mid slope
114	37-2-3081	Silcrete	Core		Unidirectional	1	53.3	34.6	19.9	1-50%		Flake	3	29							294240.6963	6428506.615	2447.378495	27.85764782	1st	Lower slope
115	37-2-3082	IM/Tuff	Flake	Complete		0	16.4	26	2.9	None	Single		0	0							294288.5867	6428491.297	2430.593947	24.15610866	1st	Lower slope
116	37-2-3082	IM/Tuff	Flake	Complete		0	11.3	11.2	5.8	None	Single		0	0							294288.5251	6428491.301	2430.599243	24.1026558	1st	Lower slope
117	37-2-3082	Silcrete	Flake	Complete		0	24.4	29	9.6	51-99%	Single		0	0							294285.5445	6428488.226	2427.589636	23.71107636	1st	Lower slope
118	37-2-3082	IM/Tuff	Core		Unidirectional	1	57.5	36	18.7	1-50%		Indeterminate	5	20.3							294284.9812	6428487.89	2427.266362	23.54777321	1st	Lower slope
119	37-2-3083	IM/Tuff	Angular Shatter			0	26.7	0	0				0	0							294341.7713	6428485.053	2423.812522	28.84064043	1st	Lower slope
120	37-2-3083	IM/Tuff	Flake Shatter			0	12.2	0	0				0	0							294343.7755	6428481.758	2420.520037	25.81591128	1st	Lower slope
121	37-2-3085	IM/Tuff	Flake	Complete		0	30.7	23.2	4.7	1-50%	Faceted		0	0							294513.2054	6428488.516	2433.465326	15.7283076	1st	Lower slope
122	37-2-3085	IM/Tuff	Flake	Complete		0	21.6	23	6.5	51-99%	Single		0	0							294512.5222	6428488.402	2433.303008	15.12185121	1st	Lower slope
123	37-2-3085	Silcrete	Flake	Complete		0	22.5	15.3	4.4	None	Single		0	0							294469.5579	6428470.052	2412.306411	32.43719417	1st	Lower slope
124	37-2-3085	IM/Tuff	Flake	Complete		0	29.2	32	14.2	1-50%	Single		0	0							294470.1666	6428464.871	2407.16584	33.65925264	1st	Lower slope
125	37-2-3085	Silcrete	Flake	Complete		0	21.9	18.9	5.5	None	Single		0	0							294469.9911	6428464.793	2407.078452	33.85129319	1st	Lower slope
126	37-2-3085	Silcrete	Core		Unidirectional	1	46.3	38	18.9	None	Single	Flake	4	21.4							294470.3533	6428465.016	2407.32075	33.42917233	1st	Lower slope
127	37-2-3085	Quartzite	Flake	Complete		0	18.9	33.1	13	None	Single		0	0							294470.4143	6428462.678	2404.989511	34.41123735	1st	Lower slope
128	37-2-3086	Silcrete	Flake Shatter			0	50.9	0	0				0	0							294523.5526	6428437.644	2383.501144	39.69821525	1st	Lower slope
129	37-2-3086	IM/Tuff	Flake	Complete		0	21.4	22	5	1-50%	Cortical		0	0							294523.5888	6428437.415	2383.275619	39.50458965	1st	Lower slope
130	37-2-3086	Porcellanite	Flake	Broken FI (Proximal)		0	11.9	0	0		Multiple		0	0							294524.0689	6428437.813	2383.709511	40.06666453	1st	Lower slope
131	37-2-3087	Silcrete	Flake Shatter			0	15.4	0	0				0	0							294582.4943	6428436.898	2388.027547	48.80380095	4th	Lower slope
132	37-2-3088	Silcrete	Flake	Complete		0	18.9	18.7	3.6	None	Multiple		0	0							294589.0259	6428390.761	2342.820242	45.24122146	4th	Lower slope
133	37-2-3088	Silcrete	Flake	Redirecting Flake		0	21.3	21.4	7	None	Single		0	0							294581.8706	6428390.739	2342.047805	51.34784277	4th	Lower slope
134	37-2-3088	Silcrete	Flake Shatter			0	24.1	0	0				0	0							294579.586	6428396.426	2347.469879	50.90587551	4th	Lower slope
135	37-2-3088	Silcrete	Flake	Broken FI (Proximal)		0	13.9	0	0		Single		0	0							294555.9497	6428402.485	2351.206013	48.73973216	1st	Lower slope
136	37-2-3088	Silcrete	Flake	Complete		0	19.8	15.6	7.1	None	Single		0	0							294557.1724	6428393.433	2342.305701	50.5926509	1st	Lower slope
137	37-2-3088	IM/Tuff	Flake	Complete		0	33.6	24	7.4	None	Single		0	0							294554.123	6428377.251	2325.911006	52.78201684	1st	Lower slope
138	37-2-3088	Volcanic	Flake	Complete		0	31.9	22	9.1	51-99%	Single		0	0							294556.0614	6428384.364	2333.172742	51.74663716	1st	Lower slope
139	37-2-3088	Quartz	Flake Shatter			0	28.5	0	0				0	0							294556.8954	6428384.653	2333.537962	52.44118399	1st	Lower slope
140	37-2-3088	Silcrete	Flake	Complete		0	21.6	27	4.6	None	Single		0	0							294554.8991	6428371.927	2320.68155	56.08455316	1st	Lower slope
141	37-2-3088	IM/Tuff	Angular Shatter			0	25.4	0	0				0	0							294551.8742	6428376.374	2324.831464	51.21800467	1st	Lower slope
142	37-2-3088	Silcrete	Flake	Complete		0	22.7	16	3.7	None	Single		0	0							294553.4122	6428369.859	2318.484958	55.96722952	1st	Lower slope
143	37-2-3090	Silcrete	Core		Multidirectional	3	44.8	39	32	None		Indeterminate	8	31.7							294511.8278	6428594.727	2539.323684	39.16193361	1st	Lower slope
144	37-2-3090	Silcrete	Flake	Complete		0	26.1	26	6.9	51-99%	Single		0	0							294516.807	6428592.559	2537.503264	44.58203815	1st	Lower slope
145	37-2-3090	Silcrete	Angular Shatter			0	25.6	0	0				0	0							294517.0217	6428591.673	2536.634421	45.09545995	1st	Lower slope
146	37-2-3090	Silcrete	Flake	Complete		0	41	47	14	None	Single		0	0							294516.1864	6428554.439	2499.433715	67.53679252	1st	Lower slope
147	37-2-3090	IM/Tuff	Flake	Complete		0	40.5	33.8	9.9	1-50%	Cortical		0	0							294514.4976	6428556.281	2501.152556	65.04725291	1st	Lower slope
148	37-2-3090	Silcrete	Angular Shatter			0	32	0	0				0	0							294516.7458	6428533.155	2478.243166	56.57037303	1st	Lower slope
149	37-2-3091	Silcrete	Flake	Complete		0	49.8	21.7	8.4	None	Single		0	0							294467.1498	6428554.254	2496.266434	54.24372578	1st	Lower slope
150	37-2-3091	Silcrete	Flake Shatter			0	24.1	0	0				0	0							294464.5564	6428553.794	2495.675983	55.1290385	1st	Lower slope
151	37-2-3091	Silcrete	Flake Shatter			0	29.1	0	0				0	0							294462.9908	6428552.972	2494.777174	56.24869567	1st	Lower slope
152	37-2-3091	IM/Tuff	Flake Shatter			0	22.7	0	0				0	0							294462.5354	6428552.762	2494.544971	56.55220431	1st	Lower slope
153	37-2-3091	Silcrete	Angular Shatter			0	24	0	0				0	0							294463.6542	6428551.696	2493.535613	57.36168875	1st	Lower slope
154	37-2-3091	Silcrete	Flake	Broken FI (Proximal)		0	19.5	0	0		Multiple		0	0							294463.975	6428550.566	2492.42298	58.40876924	1st	Lower slope
155	37-2-3091	IM/Tuff	Flake	Broken FI (Proximal)		0	18.2	0	0		Single		0	0							294463.6702	6428551.005	2492.846262	58.03618058	1st	Lower slope
156	37-2-3092	Silcrete	Flake Shatter			0	43.2	0	0				0	0							294233.9314	6428566.203	2507.195216	59.75597023	1st	Lower slope
157	37-2-3092	Silcrete	Angular Shatter			0	29.3	0	0				0	0							294233.846	6428566.773	2507.768313	59.58386392	1st	Lower slope
158	37-2-3092	IM/Tuff	Flake	Complete		0	26.5	23.5	7.1	1-50%	Cortical		0	0							294237.111	6428569.785	2510.642048	62.45866383	1st	Lower slope

159	37-2-3095	Silcrete	Flake	Complete		0	42	19	9	None	Single		0	0							293374.776	6428507.274	2629.491612	12.21783984	1st	Mid slope
160	37-2-3096	Silcrete	Flake	Broken FI (Proximal)		0	20.5	0	0		Single		0	0							293349.0885	6428342.561	2487.127758	32.30870928	2nd	Mid slope
161	37-2-3096	Silcrete	Flake	Broken FI (Proximal)		0	16.9	0	0		Crushed		0	0							293349.9094	6428341.374	2485.712024	31.6044629	2nd	Mid slope
162	37-2-3096	Silcrete	Flake Shatter			0	21.5	0	0				0	0							293350.2591	6428341.161	2485.377399	31.28255301	2nd	Mid slope
163	37-2-3097	Quartz	Flake	Complete		0	27.4	27	4.5	None	Cortical		0	0							294039.1738	6428301.654	2260.483874	305.8028111	1st	Mid slope
164	37-2-3098	Silcrete	Flake	Split Flake (Siret)		0	40.1	0	0				0	0							294523.3494	6428310.599	2256.839232	35.97991165	1st	Lower slope
165	37-2-3098	Silcrete	Flake	Complete		0	41.4	30.1	13.6	None	Multiple		0	0							294526.9937	6428306.197	2252.751853	31.88119618	1st	Lower slope
166	37-2-3098	Silcrete	Flake	Redirecting Flake		0	32.5	29	12.5	None	Single		0	0							294531.8625	6428302.977	2249.953532	27.02968351	1st	Lower slope
167	37-2-3099	Silcrete	Flake	Complete		0	16.2	11.1	2.8	None	Single		0	0							294543.4407	6428285.351	2233.418655	24.71035493	1st	Lower slope
168	37-2-3099	Quartzite	Flake	Complete		0	29.3	23.8	8.6	None	Single		0	0							294544.0799	6428284.918	2233.045862	24.662715	1st	Lower slope
169	37-2-3099	Silcrete	Flake	Complete		0	20.1	18.7	6.2	None	Single		0	0							294543.3119	6428281.072	2229.145758	28.25400487	1st	Lower slope
170	37-2-3099	FGS Other	Flake	Complete		0	14.2	10.5	3.6	None	Single		0	0							294542.9848	6428279.681	2227.730708	29.59996834	1st	Lower slope
171	37-2-3099	IMI/Tuff	Flake	Complete		0	25.9	9.4	2.9	None	Faceted		0	0							294543.1625	6428277.963	2226.03611	30.97408508	1st	Lower slope
172	37-2-3099	IMI/Tuff	Flake Shatter			0	12.6	0	0				0	0							294543.4848	6428276.727	2224.834778	31.8897843	1st	Lower slope
173	37-2-3099	Silcrete	Angular Shatter			0	18.1	0	0				0	0							294544.471	6428276.375	2224.574803	31.74031955	1st	Lower slope
174	37-2-3099	Silcrete	Angular Shatter			0	14	0	0				0	0							294545.1064	6428276.079	2224.338635	31.72437175	1st	Lower slope
175	37-2-3099	Chert	Flake	Complete		0	20.4	11.5	3.1	None	Single		0	0							294545.006	6428277.388	2225.632785	30.59487691	1st	Lower slope
176	37-2-3099	Silcrete	Flake Shatter			0	14.6	0	0				0	0							294546.5978	6428278.673	2227.059601	28.74126804	1st	Lower slope
177	37-2-3099	Silcrete	Flake	Complete		0	33.2	17	5	None	Single		0	0							294546.4464	6428280.045	2228.411624	27.57383927	1st	Lower slope
178	37-2-3099	Silcrete	Flake Shatter			0	36	0	0				0	0							294547.4235	6428281.746	2230.196076	25.61540195	1st	Lower slope
179	37-2-3099	Silcrete	Flake	Complete		0	37	31	10	None	Single		0	0							294548.7325	6428282.236	2230.806201	24.61188498	1st	Lower slope
180	37-2-3102	Volcanic	Axe			0	91.4	67.3	33.2	51-99%			0	0							294782.6659	6428293.566	2275.842518	120.9648732	4th	Lower slope
181	37-2-3106	Silcrete	Flake	Complete		0	44.2	39	11	None	Single		0	0							294057.356	6428432.602	2388.114449	185.1825331	1st	Mid slope
182	37-2-3110	IMI/Tuff	Retouched Flake			0	35.5	28.2	21.6	None	Cortical		0	0	Scraper	Complete	Flake	V-D	Ilm;dm	76;66;73	293484.819	6428172.005	2277.324872	36.04001599	2nd	Lower slope
183	37-2-3110	FGS Other	Flake	Complete		0	44.8	34	11.6	Complete	Single		0	0							293478.879	6428160.63	2269.03279	30.62187087	2nd	Lower slope
184	37-2-3110	Volcanic	Flake	Complete		0	50.5	76.3	11.2	1-50%	Cortical		0	0							293461.171	6428159.833	2275.074887	14.37556277	2nd	Mid slope
185	37-2-3115	IMI/Tuff	Flake	Complete		0	26.4	18.2	8.1	None	Single		0	0							294595.8308	6428006.512	1962.055517	27.31493692	2nd	Lower slope
186	37-2-3115	Quartzite	Flake Shatter			0	16.6	0	0				0	0							294596.6418	6428003.649	1959.323217	28.24582782	2nd	Lower slope
187	37-2-3115	Silcrete	Flake	Complete		0	24.1	30.1	7.9	None	Single		0	0							294597.1311	6428002.496	1958.244431	28.86073658	2nd	Lower slope
188	37-2-3115	Silcrete	Core		Multidirectional	2	54.2	34.1	13.6	None		Flake	3	35.6							294597.711	6428002.061	1957.88953	29.49457425	2nd	Lower slope
189	37-2-3116	Silcrete	Flake	Complete		0	50.6	22.8	10.3	None	Single		0	0							294695.6936	6428078.476	2048.399519	61.98128114	2nd	Lower slope
190	37-2-3116	IMI/Tuff	Core		Multidirectional	0	27.8	27	8.6	None		Flake	3	22.2							294696.8276	6428078.995	2049.107939	62.16089894	2nd	Lower slope
191	37-2-3117	IMI/Tuff	Flake	Complete		0	40.6	25.9	8.2	51-99%	Multiple		0	0							294761.6074	6427980.59	1965.165053	39.19298989	2nd	Lower slope
192	37-2-3117	Quartz	Flake	Complete		0	32.4	26.7	13.6	1-50%	Single		0	0							294729.7315	6427923.591	1902.745847	96.91109076	2nd	Lower slope
193	37-2-3117	Silcrete	Flake	Complete		0	34.6	12.9	9.3	None	Single		0	0							294717.8775	6427852.414	1830.652762	166.8041282	2nd	Lower slope
194	37-2-3117	Silcrete	Flake	Complete		0	36.9	23.1	8.9	None	Single		0	0							294692.0306	6428010.625	1980.961194	23.28469577	2nd	Lower slope
195	37-2-3117	IMI/Tuff	Angular Shatter			0	21.7	0	0				0	0							294689.3964	6428011.609	1981.462976	25.44404786	2nd	Lower slope
196	37-2-3118	Chert	Flake	Complete		0	30.1	21.4	10.7	None	Multiple		0	0							294770.1006	6428074.537	2058.779253	54.03619856	2nd	Lower slope
197	37-2-3118	Porcellanite	Flake	Broken FI (Proximal)		0	25.8	0	0		Single		0	0							294742.1778	6428085.322	2063.700779	71.21408972	2nd	Lower slope
198	37-2-3118	Silcrete	Flake	Broken FI (Proximal)		0	17.9	0	0		Single		0	0							294742.168	6428083.897	2062.301243	69.89598157	2nd	Lower slope
199	37-2-3118	Silcrete	Flake Shatter			0	17.5	0	0				0	0							294743.0475	6428083.087	2061.67869	68.8159202	2nd	Lower slope
200	37-2-3118	Porcellanite	Angular Shatter			0	15.4	0	0				0	0							294743.4892	6428082.979	2061.659233	68.55299889	2nd	Lower slope
201	37-2-3118	Silcrete	Flake Shatter			0	13.2	0	0				0	0							294743.8774	6428083.608	2062.352093	68.9992087	2nd	Lower slope
202	37-2-3118	Silcrete	Flake	Complete		0	10.7	15.5	1.4	None	Single		0	0							294743.9632	6428083.877	2062.632692	69.22000254	2nd	Lower slope
203	37-2-3118	Silcrete	Flake	Redirecting Flake		0	59.9	23.9	11.6	None	Single		0	0							294744.4876	6428085.755	2064.57705	70.79896982	2nd	Lower slope
204	37-2-3118	Silcrete	Flake	Complete		0	17.1	8.1	2.8	None	Single		0	0							294743.0007	6428083.974	2062.539409	69.65774997	2nd	Lower slope
205	37-2-3118	Silcrete	Flake Shatter			0	13.4	0	0				0	0							294742.6051	6428084.398	2062.877932	70.19757702	2nd	Lower slope
206	37-2-3118	Silcrete	Flake Shatter			0	13.5	0	0				0	0							294743.032	6428084.253	2062.819144	69.90597606	2nd	Lower slope
207	37-2-3118	Silcrete	Flake	Broken FI (Proximal)		0	34.4	0	0		Single		0	0							294743.5805	6428084.051	2062.728358	69.51915875	2nd	Lower slope
208	37-2-3118	Silcrete	Flake	Broken FI (Proximal)		0	18.5	0	0		Crushed		0	0							294743.9254	6428083.901	2062.648819	69.25586359	2nd	Lower slope
209	37-2-3118	Silcrete	Flake	Complete		0	37.5	18.9	6.7	None	Single		0	0							294743.3446	6428084.499	2063.121528	70.02200595	2nd	Lower slope
210	37-2-3118	Silcrete	Flake	Broken FI (Proximal)		0	9.3	0	0		Single		0	0							294743.9031	6428085.311	2064.027134	70.58338805	2nd	Lower slope
211	37-2-3118	Silcrete	Flake Shatter			0	9	0	0				0	0							294744.0806	6428085.457	2064.20507	70.65859533	2nd	Lower slope
212	37-2-3118	Silcrete	Angular Shatter			0	13.6	0	0				0	0							294744.2879	6428085.944	2064.723245	71.04467352	2nd	Lower slope
213	37-2-3118	Silcrete	Flake	Complete		0	10.5	13.4	2.7	None	Single		0	0							294744.8864	6428086.351	2065.239685	71.22641043	2nd	Lower slope

214	37-2-3118	Silcrete	Flake Shatter			0	28.6	0	0				0	0							294745.039	6428086.744	2065.654986	71.54697049	2nd	Lower slope
215	37-2-3118	Silcrete	Flake	Complete		0	18.9	11.8	2.6	None	Crushed		0	0							294745.2094	6428086.432	2065.382498	71.1963378	2nd	Lower slope
216	37-2-3118	Silcrete	Flake	Broken FI (Proximal)		0	17.7	0	0		Single		0	0							294745.1229	6428085.803	2064.748757	70.63098552	2nd	Lower slope
217	37-2-3118	Silcrete	Flake	Complete		0	40.3	14.6	7.4	None	Single		0	0							294745.3819	6428084.843	2063.85834	69.63944854	2nd	Lower slope
218	37-2-3118	Silcrete	Flake	Complete		0	49.8	55.2	9.7	1-50%	Crushed		0	0							294745.0077	6428085.591	2064.518266	70.46938746	2nd	Lower slope
219	37-2-3118	Silcrete	Flake Shatter			0	15.7	0	0				0	0							294743.8365	6428086.667	2065.343869	71.87854534	2nd	Lower slope
220	37-2-3118	Silcrete	Flake Shatter			0	33.5	0	0				0	0							294742.9349	6428086.664	2065.164711	72.1905268	2nd	Lower slope
221	37-2-3118	Silcrete	Flake	Broken FI (Proximal)		0	21.5	0	0		Single		0	0							294743.6984	6428086.72	2065.368829	71.97586012	2nd	Lower slope
222	37-2-3118	IM/Tuff	Flake	Complete		0	20.9	17.2	4.2	None	Multiple		0	0							294744.9801	6428086.346	2065.253166	71.19063471	2nd	Lower slope
223	37-2-3118	Silcrete	Flake	Broken FI (Proximal)		0	36.9	0	0		Multiple		0	0							294745.1622	6428085.963	2064.913359	70.76896859	2nd	Lower slope
224	37-2-3118	Silcrete	Flake	Complete		0	10.1	18.5	4.2	None	Multiple		0	0							294744.8504	6428085.267	2064.169694	70.21696942	2nd	Lower slope
225	37-2-3118	Silcrete	Flake	Complete		0	16.5	28.3	8.2	None	Multiple		0	0							294745.07	6428084.975	2063.926489	69.86809108	2nd	Lower slope
226	37-2-3118	Silcrete	Flake Shatter			0	11.5	0	0				0	0							294745.5012	6428084.945	2063.981801	69.69613284	2nd	Lower slope
227	37-2-3118	Silcrete	Flake Shatter			0	19.2	0	0				0	0							294745.4788	6428084.801	2063.836208	69.56766267	2nd	Lower slope
228	37-2-3118	Silcrete	Flake Shatter			0	39.3	0	0				0	0							294745.6015	6428084.712	2063.773071	69.44307895	2nd	Lower slope
229	37-2-3118	Silcrete	Angular Shatter			0	40.7	0	0				0	0							294745.6266	6428084.845	2063.90841	69.56035893	2nd	Lower slope
230	37-2-3118	Silcrete	Flake	Complete		0	17.1	8.1	2.9	None	Single		0	0							294745.3102	6428085.177	2064.171738	69.97829911	2nd	Lower slope
231	37-2-3118	Silcrete	Flake	Broken FI (Proximal)		0	16.6	0	0				0	0							294745.295	6428085.395	2064.382502	70.18901013	2nd	Lower slope
232	37-2-3118	Silcrete	Flake Shatter			0	10	0	0				0	0							294745.3658	6428085.339	2064.341504	70.11274212	2nd	Lower slope
233	37-2-3118	Silcrete	Flake	Complete		0	39.4	30.1	12	None	Single		0	0							294745.3663	6428085.285	2064.288655	70.06161308	2nd	Lower slope
234	37-2-3118	Silcrete	Flake Shatter			0	19.4	0	0				0	0							294745.4273	6428085.219	2064.23593	69.9791625	2nd	Lower slope
235	37-2-3118	Silcrete	Angular Shatter			0	14.4	0	0				0	0							294745.4547	6428085.286	2064.307008	70.03337201	2nd	Lower slope
236	37-2-3118	Silcrete	Flake	Broken FI (Proximal)		0	27.7	0	0				0	0							294745.2878	6428085.333	2064.320296	70.13289722	2nd	Lower slope
237	37-2-3118	Silcrete	Flake Shatter			0	10.9	0	0				0	0							294745.1198	6428085.713	2064.6599	70.54710952	2nd	Lower slope
238	37-2-3118	Silcrete	Flake Shatter			0	21.8	0	0				0	0							294744.9409	6428086.02	2064.925812	70.89611762	2nd	Lower slope
239	37-2-3118	Silcrete	Flake Shatter			0	6.8	0	0				0	0							294744.9255	6428086.279	2065.176755	71.14551374	2nd	Lower slope
240	37-2-3118	Silcrete	Flake	Broken FI (Proximal)		0	15.8	0	0		Single		0	0							294744.9658	6428086.521	2065.421959	71.36052232	2nd	Lower slope
241	37-2-3118	Silcrete	Flake Shatter			0	25.9	0	0				0	0							294745.035	6428086.477	2065.392392	71.29615288	2nd	Lower slope
242	37-2-3118	Silcrete	Flake	Complete		0	31.9	7	3.2	None	Single		0	0							294745.224	6428086.52	2065.471652	71.27470944	2nd	Lower slope
243	37-2-3118	Silcrete	Flake	Complete		0	16.1	22.9	3.1	None	Single		0	0							294745.179	6428086.662	2065.602055	71.42361768	2nd	Lower slope
244	37-2-3118	Silcrete	Flake Shatter			0	10.3	0	0				0	0							294745.1335	6428085.512	2064.465503	70.35297851	2nd	Lower slope
245	37-2-3118	Silcrete	Core		Multidirectional	3	36.2	31	16.7	None		Indeterminate	9	30.7							294745.6672	6428085.37	2064.431143	70.04301447	2nd	Lower slope
246	37-2-3118	Silcrete	Flake Shatter			0	12	0	0				0	0							294745.3728	6428084.808	2063.822234	69.60946844	2nd	Lower slope
247	37-2-3118	Silcrete	Flake Shatter			0	15.6	0	0				0	0							294745.3416	6428084.573	2063.585686	69.39832699	2nd	Lower slope
248	37-2-3118	Silcrete	Angular Shatter			0	13.1	0	0				0	0							294745.5637	6428084.484	2063.54209	69.24044599	2nd	Lower slope
249	37-2-3118	Silcrete	Flake Shatter			0	28.9	0	0				0	0							294746.3923	6428086.21	2065.397393	70.6067531	2nd	Lower slope
250	37-2-3118	Silcrete	Retouched Flake			0	13.1	8.7	4.8	None			0	0	Geo Microlith	Broken	Flake				294746.2812	6428087.413	2066.555	71.7844156	2nd	Lower slope
251	37-2-3118	Silcrete	Flake Shatter			0	21.4	0	0				0	0							294745.2435	6428086.948	2065.895152	71.67296515	2nd	Lower slope
252	37-2-3118	Silcrete	Flake	Complete		0	18.4	18.5	4.8	None	Multiple		0	0							294745.1337	6428086.721	2065.651017	71.49419176	2nd	Lower slope
253	37-2-3118	Silcrete	Flake Shatter			0	35	0	0				0	0							294742.802	6428087.655	2066.110719	73.16459932	2nd	Lower slope
254	37-2-3118	Silcrete	Flake	Broken FI (Proximal)		0	15.3	0	0		Multiple		0	0							294742.6104	6428088.475	2066.877615	73.99967392	2nd	Lower slope
255	37-2-3118	Silcrete	Angular Shatter			0	43.2	0	0				0	0							294742.6387	6428088.811	2067.212687	74.30460232	2nd	Lower slope
256	37-2-3118	Silcrete	Flake	Broken FI (Proximal)		0	23	0	0		Single		0	0							294735.9674	6428078.442	2055.747267	63.3234842	2nd	Lower slope
257	37-2-3118	Silcrete	Angular Shatter			0	15.2	0	0				0	0							294736.8568	6428077.471	2054.966172	62.73838943	2nd	Lower slope
258	37-2-3118	Silcrete	Flake	Split Flake (Siret)		0	24.3	0	0				0	0							294735.7785	6428076.334	2053.642396	61.28636301	2nd	Lower slope
259	37-2-3118	Silcrete	Flake	Complete		0	10.8	12	2.5	None	Single		0	0							294735.4438	6428076.268	2053.513113	61.10486094	2nd	Lower slope
260	37-2-3118	Silcrete	Flake	Complete		0	27.4	36	14.4	1-50%	Single		0	0							294735.309	6428077.051	2054.255482	61.78991382	2nd	Lower slope
261	37-2-3119	IM/Tuff	Flake	Complete		0	10.9	20.7	4.2	None	Single		0	0							294626.2312	6428165.854	2124.02289	36.02298918	4th	Lower slope
262	37-2-3122	Chert	Flake	Complete		0	41.7	34	11.1	1-50%	Single		0	0							293521.6519	6428102.443	2199.037967	10.72307419	2nd	Lower slope
263	37-2-3123	Silcrete	Flake	Complete		0	22	20	8	None	Single		0	0							293243.5652	6428091.944	2307.671253	22.26609576	1st	Mid slope
264	37-2-3124	IM/Tuff	Core		Bidirectional	2	35.7	22.9	14.2	None		Indeterminate	6	31.2							293675.8428	6427982.159	2032.407588	22.59266804	2nd	Lower slope
265	37-2-3126	Silcrete	Flake	Broken FI (Proximal)		0	16.9	0	0		Single		0	0							293787.2803	6427932.726	1951.323553	30.73650193	2nd	Lower slope
266	37-2-3126	Silcrete	Flake	Complete		0	39.3	29.5	15.2	51-99%	Single		0	0							293763.0974	6427962.495	1986.776055	43.07277689	2nd	Lower slope
267	37-2-3126	Silcrete	Flake	Broken FI (Proximal)		0	30.2	0	0		Single		0	0							293764.2901	6427963.774	1987.654407	44.32374167	2nd	Lower slope

268	37-2-3126	Silcrete	Flake	Broken FI (Proximal)		0	19.7	0	0		Single		0	0							293764.4231	6427965.101	1988.886138	44.55614576	2nd	Lower slope
269	37-2-3126	IM/Tuff	Flake	Broken FI (Proximal)		0	17.9	0	0		Single		0	0							293760.7931	6427969.494	1994.142582	41.60228825	2nd	Lower slope
270	37-2-3126	Silcrete	Flake	Complete		0	31.4	32	7.5	1-50%	Single		0	0							293759.7282	6427968.644	1993.638759	40.39243873	2nd	Lower slope
271	37-2-3126	Silcrete	Flake Shatter			0	26.6	0	0				0	0							293760.1061	6427968.726	1993.607307	40.77900654	2nd	Lower slope
272	37-2-3126	Silcrete	Flake Shatter			0	20.2	0	0				0	0							293760.1201	6427968.59	1993.473112	40.76753858	2nd	Lower slope
273	37-2-3126	Porcellanite	Flake	Broken FI (Proximal)		0	22.7	0	0		Single		0	0							293760.0205	6427968.709	1993.615931	40.69173745	2nd	Lower slope
274	37-2-3126	Silcrete	Retouched Flake			0	50.6	27.5	16.6	None			0	0	Scraper	Broken	Flake	V-D	ilm;dm	55;59;60	293760.3728	6427969.345	1994.122072	41.16060751	2nd	Lower slope
275	37-2-3126	IM/Tuff	Flake	Complete		0	30.2	17.2	6.6	None	Single		0	0							293760.1275	6427968.935	1993.801058	40.83963286	2nd	Lower slope
276	37-2-3126	IM/Tuff	Flake	Complete		0	46.9	31	11	None	Multiple		0	0							293760.408	6427968.18	1992.997122	40.97769564	2nd	Lower slope
277	37-2-3126	IM/Tuff	Flake Shatter			0	34.8	0	0				0	0							293760.5146	6427967.685	1992.49251	41.00023309	2nd	Lower slope
278	37-2-3126	Silcrete	Retouched Flake			0	51.6	56	20.8	1-50%	Single		0	0	Misc Retouched Flake	Complete	Flake	V-D	r/m-d/v;dm/vd	60;58	293760.7053	6427966.4	1991.207577	41.00250933	2nd	Lower slope
279	37-2-3126	IM/Tuff	Flake	Complete		0	22.7	27.6	10.3	1-50%	Single		0	0							293761.1658	6427966.037	1990.726381	41.41430255	2nd	Lower slope
280	37-2-3126	Silcrete	Core		Multidirectional	2	50.6	48.4	28.9	None		Indeterminate	4	33							293756.1923	6427964.872	1991.063659	36.34169122	2nd	Lower slope
281	37-2-3126	Quartzite	Hammerstone			0	91.2	78	59				0	0							293758.2455	6427964.236	1989.854625	38.32701963	2nd	Lower slope
282	37-2-3126	IM/Tuff	Flake	Broken FI (Proximal)		0	28.5	0	0		Single		0	0							293740.3561	6427973.158	2003.667432	23.62095891	2nd	Lower slope
283	37-2-3127	IM/Tuff	Flake	Broken FI (Proximal)		0	17.5	0	0		Multiple		0	0							294329.265	6427877.551	1816.339858	88.35469755	4th	Lower slope
284	37-2-3127	Silcrete	Flake	Complete		0	28.3	15	4.6	None	Multiple		0	0							294328.1673	6427880.758	1819.553454	90.39366995	4th	Lower slope
285	37-2-3127	IM/Tuff	Flake Shatter			0	12	0	0				0	0							294328.5691	6427881.814	1820.606923	90.36357761	4th	Lower slope
286	37-2-3127	Chert	Flake Shatter			0	16.1	0	0				0	0							294328.5159	6427883.095	1821.888226	90.8524946	4th	Lower slope
287	37-2-3127	IM/Tuff	Flake Shatter			0	12	0	0				0	0							294328.2802	6427883.695	1822.489681	91.28392493	4th	Lower slope
288	37-2-3127	IM/Tuff	Flake	Complete		0	45.1	39.1	14.2	None	Multiple		0	0							294328.3004	6427890.442	1829.236422	93.8643558	4th	Lower slope
289	37-2-3127	Silcrete	Core		Unidirectional	1	72.5	56	29	None		Indeterminate	3	29.9							294330.6132	6427890.619	1829.400422	91.84150248	4th	Lower slope
290	37-2-3127	FGS Other	Core		Multidirectional	2	107	90	51	51-99%		Cobble	5	42.6							294331.5271	6427890.215	1828.992096	90.84260092	4th	Lower slope
291	37-2-3127	Silcrete	Flake	Complete		0	29.2	14.8	6.4	None	Single		0	0							294359.4863	6427907.223	1846.087306	69.22717681	4th	Lower slope
292	37-2-3127	Quartzite	Core		Unidirectional	1	93.9	83	48.6	None		Flake	12	51.6							294368.0386	6427910.741	1849.716191	62.05522016	4th	Lower slope
293	37-2-3128	Silcrete	Flake	Complete		0	24.5	17.5	4.5	None	Single		0	0							294414.7241	6427933.499	1873.758735	44.96597732	4th	Lower slope
294	37-2-3128	Quartz	Flake	Broken FI (Proximal)		0	11.5	0	0		Single		0	0							294411.4028	6427933.694	1873.823614	46.13673268	4th	Lower slope
295	37-2-3128	IM/Tuff	Flake	Complete		0	34.7	16.5	6.9	None	Single		0	0							294410.8266	6427930.096	1870.206261	42.96276362	4th	Lower slope
296	37-2-3128	Silcrete	Flake Shatter			0	26.5	0	0				0	0							294412.4701	6427928.99	1869.164291	41.34679182	4th	Lower slope
297	37-2-3128	Silcrete	Flake	Broken FI (Proximal)		0	18.9	0	0		Multiple		0	0							294410.6424	6427928.228	1868.332613	41.30101831	4th	Lower slope
298	37-2-3128	Silcrete	Flake Shatter			0	31	0	0				0	0							294408.7679	6427925.26	1865.296443	39.39031106	4th	Lower slope
299	37-2-3128	IM/Tuff	Flake	Complete		0	32.5	33	13.4	1-50%	Single		0	0							294404.3684	6427917.263	1857.146632	35.06434875	4th	Lower slope
300	37-2-3128	Quartzite	Core		Multidirectional	2	85.7	84	46.4	51-99%		Cobble	9	38.9							294401.569	6427899.105	1838.903484	26.56410679	4th	Lower slope
301	37-2-3128	Silcrete	Flake	Complete		0	38.3	28.4	14.3	None	Single		0	0							294402.206	6427897.071	1836.892188	25.33374471	4th	Lower slope
302	37-2-3128	Silcrete	Flake	Complete		0	81	42	33	None	Single		0	0							294404.1306	6427892.931	1832.821196	22.61242049	4th	Lower slope
303	37-2-3128	IM/Tuff	Flake	Complete		0	49.9	25	8.7	51-99%	Cortical		0	0							294403.706	6427887.747	1827.625495	22.98462976	4th	Lower slope
304	37-2-3128	Silcrete	Core		Multidirectional	2	29.7	29	12.5	None		Indeterminate	3	27.7							294402.9457	6427887.748	1827.600041	23.74089397	4th	Lower slope
305	37-2-3128	Silcrete	Flake	Broken FI (Proximal)		0	27.5	0	0		Single		0	0							294402.8314	6427888.174	1828.021838	23.81602299	4th	Lower slope
306	37-2-3128	Silcrete	Flake Shatter			0	13.7	0	0				0	0							294402.6416	6427888.194	1828.035285	24.00357911	4th	Lower slope
307	37-2-3128	Silcrete	Flake	Complete		0	20.7	15.7	4.4	None	Faceted		0	0							294402.4027	6427888.606	1828.438838	24.21245216	4th	Lower slope
308	37-2-3128	Silcrete	Angular Shatter			0	16.3	0	0				0	0							294402.2549	6427888.934	1828.761586	24.34176938	4th	Lower slope
309	37-2-3128	Silcrete	Flake Shatter			0	15.9	0	0				0	0							294402.3106	6427889.162	1828.991358	24.27606211	4th	Lower slope
310	37-2-3128	Silcrete	Flake Shatter			0	15.4	0	0				0	0							294402.3685	6427889.33	1829.161241	24.21213817	4th	Lower slope
311	37-2-3128	IM/Tuff	Flake	Broken FI (Proximal)		0	18.6	0	0		Single		0	0							294402.5136	6427889.413	1829.249166	24.06453179	4th	Lower slope
312	37-2-3128	Silcrete	Flake	Complete		0	23.1	15.7	5.3	None	Single		0	0							294402.7102	6427889.494	1829.336876	23.86575284	4th	Lower slope
313	37-2-3128	Silcrete	Flake	Complete		0	37.2	29.7	13.2	None	Single		0	0							294402.5416	6427889.6	1829.437017	24.03176426	4th	Lower slope
314	37-2-3128	IM/Tuff	Flake	Broken FI (Proximal)		0	30.6	0	0				0	0							294402.4825	6427889.97	1829.804771	24.08569239	4th	Lower slope
315	37-2-3128	Silcrete	Flake	Broken FI (Proximal)		0	20.7	0	0		Single		0	0							294402.917	6427890.473	1830.322422	23.65334248	4th	Lower slope
316	37-2-3128	Silcrete	Angular Shatter			0	30.1	0	0				0	0							294403.1624	6427890.728	1830.585757	23.41319505	4th	Lower slope
317	37-2-3128	Silcrete	Flake Shatter			0	29.9	0	0				0	0							294403.1516	6427890.58	1830.437471	23.42062229	4th	Lower slope
318	37-2-3128	Silcrete	Flake	Broken FI (Proximal)		0	19.1	0	0		Single		0	0							294403.0749	6427890.588	1830.442811	23.49746529	4th	Lower slope
319	37-2-3128	Silcrete	Flake Shatter			0	14.9	0	0				0	0							294403.2278	6427890.692	1830.552045	23.34690861	4th	Lower slope

320	37-2-3128	Silcrete	Flake	Complete		0	44	16	7.9	None	Single		0	0						294402.6131	6427890.505	1830.343939	23.95770101	4th	Lower slope
321	37-2-3128	Silcrete	Flake	Broken FI (Proximal)		0	32.6	0	0		Single		0	0						294401.3493	6427890.822	1830.617781	25.2281667	4th	Lower slope
322	37-2-3128	Silcrete	Angular Shatter			0	26.6	0	0				0	0						294400.9504	6427890.779	1830.561423	25.62577449	4th	Lower slope
323	37-2-3128	Silcrete	Flake Shatter			0	20.7	0	0				0	0						294400.3181	6427891.225	1830.986144	26.27283407	4th	Lower slope
324	37-2-3128	Silcrete	Flake	Complete		0	33.2	18.6	7	None	Single		0	0						294401.238	6427892.003	1831.794372	25.39955484	4th	Lower slope
325	37-2-3128	Silcrete	Flake Shatter			0	33.7	0	0				0	0						294401.1435	6427891.987	1831.775211	25.4926197	4th	Lower slope
326	37-2-3128	IM/Tuff	Flake	Complete		0	35.5	32	8.7	None	Single		0	0						294400.9006	6427892.807	1832.586627	25.80729945	4th	Lower slope
327	37-2-3128	Silcrete	Flake	Broken FI (Proximal)		0	14.3	0	0		Single		0	0						294401.1922	6427893.195	1832.984164	25.56105831	4th	Lower slope
328	37-2-3128	IM/Tuff	Angular Shatter			0	15	0	0				0	0						294401.3789	6427893.077	1832.8725	25.36169856	4th	Lower slope
329	37-2-3128	IM/Tuff	Flake Shatter			0	26.2	0	0				0	0						294403.0931	6427882.795	1822.65513	24.59116143	4th	Lower slope
330	37-2-3128	Silcrete	Flake Shatter			0	31.5	0	0				0	0						294402.4499	6427859.297	1799.148981	13.71077566	4th	Lower slope
331	37-2-3128	Silcrete	Flake	Broken FI (Proximal)		0	24.3	0	0		Faceted		0	0						294404.8454	6427853.602	1793.542815	9.086843372	4th	Lower slope
332	37-2-3128	Silcrete	Flake	Complete		0	29	33	12.4	None	Single		0	0						294404.8282	6427853.767	1793.707082	9.144714744	4th	Lower slope
333	37-2-3131	Silcrete	Flake	Broken FI (Proximal)		0	35.5	0	0		Single		0	0						294534.1229	6427999.117	1947.60054	20.82187603	2nd	Lower slope
334	37-2-3131	Silcrete	Angular Shatter			0	19.7	0	0				0	0						294534.9518	6427998.881	1947.448634	21.68050948	2nd	Lower slope
335	37-2-3132	Silcrete	Retouched Flake			0	18.4	10.4	1.9	None			0	0	Bondi Point	Broken	Flake			294515.4626	6427927.498	1874.511491	40.95253666	4th	Lower slope
336	37-2-3132	Petrified Wood	Flake Shatter			0	38.1	0	0				0	0						294516.1833	6427927.769	1874.848987	41.03138987	4th	Lower slope
337	37-2-3132	Chert	Flake	Broken FI (Proximal)		0	17.2	0	0		Multiple		0	0						294515.3378	6427927.041	1874.044806	41.31002951	4th	Lower slope
338	37-2-3132	Petrified Wood	Flake Shatter			0	24.9	0	0				0	0						294515.5809	6427928.214	1875.235429	40.36267434	4th	Lower slope
339	37-2-3132	Petrified Wood	Flake Shatter			0	21.9	0	0				0	0						294515.6817	6427928.363	1875.393227	40.27473591	4th	Lower slope
340	37-2-3132	Petrified Wood	Core		Bidirectional	2	52.1	26.5	21.2	1-50%		Indeterminate	4	44.4						294514.9812	6427929.308	1876.268504	39.11602191	4th	Lower slope
341	37-2-3136	Quartzite	Flake	Complete		0	33.9	25.4	6	1-50%	Crushed		0	0						294008.4515	6427737.684	1708.862284	27.3495036	2nd	Lower slope
342	37-2-3136	Silcrete	Angular Shatter			0	27.8	0	0				0	0						294001.2918	6427736.528	1709.131587	33.52427276	2nd	Lower slope
343	37-2-3136	IM/Tuff	Flake	Complete		0	32.5	19.2	5.3	None	Single		0	0						294000.8258	6427735.062	1707.787059	33.52168591	2nd	Lower slope
344	37-2-3136	IM/Tuff	Flake	Complete		0	29.1	35.4	5.8	51-99%	Single		0	0						294001.4975	6427736.905	1709.460411	33.45553181	2nd	Lower slope
345	37-2-3136	Silcrete	Flake	Complete		0	23.5	14	4.1	None	Single		0	0						293999.644	6427738.027	1710.927711	35.58188139	2nd	Lower slope
346	37-2-3136	Silcrete	Flake	Complete		0	32.7	37	7.6	51-99%	Single		0	0						293999.5804	6427737.928	1710.843331	35.60704721	2nd	Lower slope
347	37-2-3136	Silcrete	Flake	Complete		0	27.6	33.1	13	None	Single		0	0						294000.9056	6427739.512	1712.132986	34.96702692	2nd	Lower slope
348	37-2-3136	IM/Tuff	Core		Unidirectional	1	77.4	53.9	24.8	1-50%	Multiple	Flake	5	19						293999.8651	6427740.836	1713.636883	36.45746233	2nd	Lower slope
349	37-2-3136	Silcrete	Flake	Complete		0	21.8	15.2	5.6	None	Single		0	0						294000.0092	6427739.603	1712.3998	35.82657783	2nd	Lower slope
350	37-2-3137	Silcrete	Flake	Complete		0	24.5	20.2	9.7	None	Single		0	0						294127.479	6427725.687	1677.925198	13.65407026	2nd	Lower slope
351	37-2-3140	IM/Tuff	Flake	Complete		0	44.5	38.3	12.6	1-50%	Single		0	0						294406.2295	6427658.433	1598.575127	18.56294465	4th	Lower slope
352	37-2-3140	IM/Tuff	Flake	Complete		0	28.9	12.7	5	None	Single		0	0						294405.137	6427654.885	1594.985035	18.35485041	4th	Lower slope
353	37-2-3140	Silcrete	Flake	Complete		0	38.2	45	12.8	None	Single		0	0						294404.2345	6427656.008	1596.070366	17.14344596	4th	Lower slope
354	37-2-3140	IM/Tuff	Flake Shatter			0	34.7	0	0				0	0						294402.7983	6427656.392	1596.396675	15.6579873	4th	Lower slope
355	37-2-3140	IM/Tuff	Flake	Broken FI (Proximal)		0	14.1	0	0		Multiple		0	0						294366.3977	6427647.15	1586.132744	20.95795386	2nd	Lower slope
356	37-2-3141	Silcrete	Retouched Flake			0	17.5	14.4	3.8	None			0	0	Backed Artefact Ind.	Broken	Flake			294420.175	6427661.247	1602.02633	20.29073012	4th	Lower slope
357	37-2-3141	Silcrete	Flake	Complete		0	19	17.6	4.2	None	Single		0	0						294419.8498	6427660.522	1601.285942	20.83241913	4th	Lower slope
358	37-2-3141	Silcrete	Flake Shatter			0	31.3	0	0				0	0						294422.6355	6427661.42	1602.324524	17.90715637	4th	Lower slope
359	37-2-3141	Silcrete	Flake	Broken FI (Proximal)		0	20.1	0	0		Multiple		0	0						294424.3504	6427661.56	1602.553967	16.2533883	4th	Lower slope
360	37-2-3141	Silcrete	Flake	Broken FI (Proximal)		0	22.4	0	0		Multiple		0	0						294426.3846	6427660.218	1601.322622	14.98608177	4th	Lower slope
361	37-2-3146	IM/Tuff	Flake	Complete		0	24.5	18	3.1	None	Cortical		0	0						294486.8748	6427711.817	1657.12084	13.159278	4th	Lower slope
362	37-2-3146	Silcrete	Flake	Complete		0	40.5	24.9	7.4	None	Single		0	0						294488.5353	6427713.192	1658.638554	15.25594992	4th	Lower slope
363	37-2-3146	Silcrete	Flake	Complete		0	22	34	10.9	None	Single		0	0						294489.5037	6427713.965	1659.495555	16.47219291	4th	Lower slope
364	37-2-3146	Chert	Flake	Complete		0	40	30.3	11.2	51-99%	Single		0	0						294488.3391	6427715.906	1661.324068	16.51061286	4th	Lower slope
365	37-2-3146	Silcrete	Retouched Flake			0	20.3	13.9	4.2	None			0	0	Geo Microlith	Complete	Flake			294488.8866	6427713.636	1659.112308	15.77286984	4th	Lower slope
366	37-2-3146	Silcrete	Flake			0	17.9	10.6	2.3	None	Single		0	0						294489.02	6427713.028	1658.518773	15.61676332	4th	Lower slope
367	37-2-3146	Silcrete	Flake	Complete		0	22.5	31.1	5.3	None	Single		0	0						294489.8736	6427713.467	1659.033021	16.5763575	4th	Lower slope
368	37-2-3146	Silcrete	Flake	Broken FI (Proximal)		0	14.9	0	0		Single		0	0						294490.808	6427713.717	1659.366804	17.52712701	4th	Lower slope
369	37-2-3146	Silcrete	Core		Unidirectional	1	34.4	25.9	24	1-50%		Indeterminate	4	32.4						294491.5168	6427714.259	1659.971213	18.40046029	4th	Lower slope
370	37-2-3146	Chert	Flake	Complete		0	20.4	36.1	18.7	1-50%	Single		0	0						294487.745	6427714.284	1659.655489	15.10972979	4th	Lower slope
371	37-2-3146	Quartz	Flake	Complete		0	22.1	12.6	3	None	Single		0	0						294490.4741	6427714.927	1660.541439	17.78499338	4th	Lower slope

372	37-2-3146	Silcrete	Retouched Flake			0	18.2	14	3.6	None			0	0	Geo Microlith	Broken	Flake				294490.5652	6427715.112	1660.733947	17.95529	4th	Lower slope
373	37-2-3146	Silcrete	Flake	Complete		0	37.7	21.4	10.6	1-50%	Single		0	0							294486.4587	6427714.96	1660.214625	14.43641031	4th	Lower slope
374	37-2-3146	IMiTuff	Flake	Redirecting Flake		0	15.9	21	5.8	None	Single		0	0							294482.8568	6427714.104	1659.047374	11.15061342	4th	Lower slope
375	37-2-3146	Silcrete	Retouched Flake			0	9.9	6.1	2.6	None			0	0	Backed Artefact Ind.	Broken	Flake				294480.7272	6427713.756	1658.518278	9.480372243	4th	Lower slope
376	37-2-3146	Quartz	Flake	Complete		0	22.1	14	5.6	1-50%	Cortical		0	0							294480.5061	6427711.988	1656.737884	7.993537818	4th	Lower slope
377	37-2-3146	Silcrete	Flake Shatter			0	14.9	0	0				0	0							294475.939	6427714.237	1658.597474	8.064754064	4th	Lower slope
378	37-2-3146	Chert	Flake Shatter			0	31.6	0	0				0	0							294472.3091	6427711.167	1655.243182	5.601741789	4th	Lower slope
379	37-2-3146	Chert	Flake	Complete		0	18.9	16.3	5.1	None	Single		0	0							294471.7834	6427710.852	1654.887165	5.60648462	4th	Lower slope
380	37-2-3146	Chert	Flake Shatter			0	13.2	0	0				0	0							294470.7386	6427709.904	1653.859103	5.594657287	4th	Lower slope
381	37-2-3146	Quartzite	Flake Shatter			0	22	0	0				0	0							294468.1187	6427709.71	1653.46023	7.674226329	4th	Lower slope
382	37-2-3146	Chert	Flake	Complete		0	22.7	33.8	6.9	None	Single		0	0							294469.8553	6427709.182	1653.069611	5.895416349	4th	Lower slope
383	37-2-3146	Chert	Flake	Complete		0	26.9	18.4	5.3	None	Single		0	0							294474.6445	6427710.615	1654.881702	4.394360269	4th	Lower slope
384	37-2-3146	Silcrete	Flake	Complete		0	35.6	9.6	5.2	None	Single		0	0							294477.1602	6427708.342	1652.823543	3.048818852	4th	Lower slope
385	37-2-3146	IMiTuff	Flake	Complete		0	19.6	25	4.2	1-50%	Multiple		0	0							294472.1999	6427704.356	1648.445374	3.336870657	4th	Lower slope
386	37-2-3146	IMiTuff	Flake	Broken FI (Proximal)		0	25.3	0	0		Single		0	0							294472.7969	6427695.481	1639.647569	10.96630252	4th	Lower slope
387	37-2-3146	IMiTuff	Flake Shatter			0	36.2	0	0				0	0							294472.2798	6427696.28	1640.402073	10.30641352	4th	Lower slope
388	37-2-3146	IMiTuff	Flake	Redirecting Flake		0	80.2	18.7	14.9	1-50%	Single		0	0							294473.2703	6427696.601	1640.802336	9.777965307	4th	Lower slope
389	37-2-3146	Quartz	Flake			0	21.7	10.6	6.8	1-50%	Crushed		0	0							294477.0296	6427705.798	1650.277495	2.115069368	4th	Lower slope
390	37-2-3146	Silcrete	Flake	Complete		0	18.3	29.3	6.8	None	Single		0	0							294478.6451	6427705.723	1650.337945	3.720549274	4th	Lower slope
391	37-2-3146	IMiTuff	Flake	Redirecting Flake		0	27	27	19	None	Single		0	0							294492.7414	6427725.058	1670.836964	23.60685617	4th	Lower slope
392	37-2-3146	IMiTuff	Flake	Complete		0	68.4	18.4	6.7	None	Single		0	0							294491.8545	6427725	1670.698221	23.85939517	4th	Lower slope
393	37-2-3146	Silcrete	Flake	Complete		0	31.1	17.2	7.9	None	Multiple		0	0							294490.4931	6427724.23	1669.807959	23.77439559	4th	Lower slope
394	37-2-3146	Silcrete	Flake	Complete		0	22.1	11.8	4.9	None	Single		0	0							294490.5808	6427724.245	1669.830818	23.84311918	4th	Lower slope
395	37-2-3146	Silcrete	Flake	Redirecting Flake		0	30.6	39.4	11.3	None	Single		0	0							294486.6712	6427736.324	1681.514649	16.07935918	4th	Lower slope
396	37-2-3146	Silcrete	Flake			0	42.6	30	7.8	None	Single		0	0							294489.0734	6427736.947	1682.3468	14.06104724	4th	Lower slope
397	37-2-3146	Silcrete	Flake Shatter			0	23.5	0	0				0	0							294489.4548	6427736.887	1682.320937	13.88340478	4th	Lower slope
398	37-2-3146	Silcrete	Flake	Broken FI (Proximal)		0	25.2	0	0		Single		0	0							294489.7989	6427736.34	1681.806776	14.14022392	4th	Lower slope
399	37-2-3146	Silcrete	Flake Shatter			0	14	0	0				0	0							294490.1714	6427735.963	1681.464565	14.26109719	4th	Lower slope
400	37-2-3146	Silcrete	Flake Shatter			0	34.9	0	0				0	0							294490.2759	6427736.212	1681.721918	13.99397885	4th	Lower slope
401	37-2-3146	IMiTuff	Flake	Complete		0	30.9	28	8.7	None	Multiple		0	0							294485.3188	6427724.152	1669.271057	20.69886235	4th	Lower slope
402	37-2-3146	Silcrete	Flake Shatter			0	20.2	0	0				0	0							294483.8727	6427723.311	1668.307704	19.26496208	4th	Lower slope
403	37-2-3146	Silcrete	Flake	Complete		0	28.3	15.8	6.5	1-50%	Single		0	0							294482.5987	6427725.968	1670.845372	21.16291124	4th	Lower slope
404	37-2-3146	IMiTuff	Flake Shatter			0	22.3	0	0				0	0							294480.7283	6427726.1	1670.818017	20.68860377	4th	Lower slope
405	37-2-3146	Silcrete	Flake	Complete		0	30.8	21.9	5.3	None	Single		0	0							294481.2875	6427727.115	1671.876651	21.82075165	4th	Lower slope
406	37-2-3146	Silcrete	Flake	Broken FI (Proximal)		0	18.1	0	0				0	0							294481.4813	6427726.894	1671.672866	21.66688753	4th	Lower slope
407	37-2-3146	Silcrete	Flake Shatter			0	34.5	0	0				0	0							294493.0911	6427739.288	1685.039468	9.93632441	4th	Lower slope
408	37-2-3146	Silcrete	Flake	Broken FI (Proximal)		0	17.1	0	0		Single		0	0							294493.3604	6427739	1684.777197	10.0799533	4th	Lower slope
409	37-2-3146	Silcrete	Flake	Broken FI (Proximal)		0	22.2	0	0		Faceted		0	0							294493.3479	6427738.818	1684.594816	10.25093741	4th	Lower slope
410	37-2-3146	IMiTuff	Flake	Complete		0	24.7	13.7	7.9	None	Cortical		0	0							294501.7974	6427734.122	1680.712112	14.67971544	4th	Lower slope
411	37-2-3146	IMiTuff	Flake	Complete		0	11	19	5.5	None	Single		0	0							294499.9326	6427723.005	1669.467287	25.27976387	4th	Lower slope
412	37-2-3146	Silcrete	Flake	Complete		0	46.1	17.8	7.1	None	Multiple		0	0							294496.4199	6427719.718	1665.861427	25.34603185	4th	Lower slope
413	37-2-3146	Silcrete	Flake	Broken FI (Proximal)		0	34.1	0	0		Multiple		0	0							294503.3078	6427729.19	1675.9499	19.83779098	4th	Lower slope
414	37-2-3146	IMiTuff	Flake	Complete		0	29.3	23	3.5	None	Faceted		0	0							294503.7119	6427730.142	1676.936823	19.05587516	4th	Lower slope
415	37-2-3146	Quartz	Flake	Complete		0	21.1	20.5	4.8	None	Single		0	0							294504.1686	6427729.959	1676.799424	19.38046681	4th	Lower slope
416	37-2-3146	Silcrete	Angular Shatter			0	23	0	0				0	0							294506.4855	6427730.901	1677.965544	19.44865417	4th	Lower slope
417	37-2-3146	IMiTuff	Flake	Complete		0	30.6	18.3	5.9	1-50%	Single		0	0							294506.5991	6427731.969	1679.039547	18.56194352	4th	Lower slope
418	37-2-3146	Silcrete	Flake	Complete		0	22.5	29	9	None	Single		0	0							294507.587	6427732.096	1679.264375	18.95565025	4th	Lower slope
419	37-2-3146	Silcrete	Flake	Complete		0	20.5	26	3.7	None	Single		0	0							294508.2141	6427731.859	1679.091369	19.49317495	4th	Lower slope
420	37-2-3146	Silcrete	Flake	Complete		0	36	30	9	1-50%	Cortical		0	0							294507.5042	6427730.466	1677.634264	20.31559021	4th	Lower slope
421	37-2-3146	Silcrete	Flake	Complete		0	20.2	27	5.8	None	Single		0	0							294509.695	6427731.771	1679.153058	20.41233003	4th	Lower slope
422	37-2-3146	IMiTuff	Flake	Complete		0	36.1	29	8	1-50%	Single		0	0							294518.0288	6427745.436	1693.605485	20.66825893	4th	Lower slope
423	37-2-3146	Silcrete	Angular Shatter			0	18.3	0	0				0	0							294512.0208	6427765.568	1713.012258	22.63322446	4th	Lower slope
424	37-2-3147	Silcrete	Flake Shatter			0	18.7	0	0				0	0							294513.7664	6427793.172	1740.652167	26.00966682	4th	Lower slope
425	37-2-3147	Silcrete	Angular Shatter			0	25.1	0	0				0	0							294513.1155	6427793.044	1740.459847	25.38033872	4th	Lower slope
426	37-2-3147	Silcrete	Flake	Broken FI (Proximal)		0	16.5	0	0		Multiple		0	0							294513.0533	6427793.149	1740.55813	25.37882781	4th	Lower slope
427	37-2-3147	Silcrete	Flake Shatter			0	23.4	0	0				0	0							294512.9563	6427793.338	1740.736536	25.39046931	4th	Lower slope

428	37-2-3147	Silcrete	Flake	Complete		0	28.3	17.5	8.1	None	Single		0	0						294513.0527	6427793.539	1740.946133	25.57595255	4th	Lower slope
429	37-2-3147	Silcrete	Flake Shatter			0	20.3	0	0				0	0						294513.1802	6427793.571	1740.990671	25.70186545	4th	Lower slope
430	37-2-3147	Silcrete	Flake Shatter			0	17	0	0				0	0						294513.3446	6427793.574	1741.010042	25.84482481	4th	Lower slope
431	37-2-3147	Silcrete	Angular Shatter			0	9	0	0				0	0						294513.4964	6427793.582	1741.033146	25.97969968	4th	Lower slope
432	37-2-3147	Silcrete	Flake Shatter			0	11	0	0				0	0						294513.6632	6427793.543	1741.010996	26.10408449	4th	Lower slope
433	37-2-3147	Silcrete	Angular Shatter			0	30.8	0	0				0	0						294513.8721	6427793.548	1741.036852	26.28743091	4th	Lower slope
434	37-2-3147	Petrified Wood	Flake	Broken FI (Proximal)		0	15.4	0	0		Multiple		0	0						294514.3425	6427794.042	1741.575474	26.9422627	4th	Lower slope
435	37-2-3147	Silcrete	Flake Shatter			0	30.3	0	0				0	0						294514.3289	6427794.68	1742.208897	27.25849836	4th	Lower slope
436	37-2-3147	Silcrete	Flake	Complete		0	33.4	27.8	8.7	None	Single		0	0						294514.9624	6427795.657	1743.244545	28.31367702	4th	Lower slope
437	37-2-3147	Silcrete	Flake Shatter			0	29.1	0	0				0	0						294515.377	6427796.056	1743.683238	28.87800668	4th	Lower slope
438	37-2-3147	Silcrete	Flake	Broken FI (Proximal)		0	15.9	0	0		Single		0	0						294515.9543	6427796.87	1744.551319	29.80623214	4th	Lower slope
439	37-2-3147	Silcrete	Flake Shatter			0	12.2	0	0				0	0						294516.3094	6427796.751	1744.468834	30.03827879	4th	Lower slope
440	37-2-3147	Silcrete	Flake	Broken FI (Proximal)		0	4	0	0		Single		0	0						294516.3635	6427796.742	1744.465357	30.07883304	4th	Lower slope
441	37-2-3147	Silcrete	Flake Shatter			0	10.4	0	0				0	0						294516.4362	6427796.729	1744.459786	30.13291155	4th	Lower slope
442	37-2-3147	Silcrete	Angular Shatter			0	15.9	0	0				0	0						294516.4813	6427796.696	1744.431525	30.15304532	4th	Lower slope
443	37-2-3147	IM/Tuff	Flake Shatter			0	16.1	0	0				0	0						294516.4377	6427796.656	1744.387314	30.09475818	4th	Lower slope
444	37-2-3147	Silcrete	Flake	Complete		0	10.8	17.9	5.5	None	Single		0	0						294516.378	6427796.577	1744.302673	30.0019082	4th	Lower slope
445	37-2-3147	Silcrete	Angular Shatter			0	28.6	0	0				0	0						294516.4607	6427796.371	1744.10611	29.96155769	4th	Lower slope
446	37-2-3147	Silcrete	Angular Shatter			0	18.8	0	0				0	0						294516.4341	6427796.125	1743.858681	29.80880426	4th	Lower slope
447	37-2-3147	Silcrete	Angular Shatter			0	16.6	0	0				0	0						294516.4142	6427796.003	1743.735293	29.72780657	4th	Lower slope
448	37-2-3147	Silcrete	Retouched Flake			0	12.2	6.9	3.1	None			0	0	Backed Artefact Ind.	Broken	Flake			294515.8686	6427795.566	1743.245332	29.03427411	4th	Lower slope
449	37-2-3147	Silcrete	Flake Shatter			0	15.2	0	0				0	0						294515.5435	6427795.866	1743.510986	28.91632362	4th	Lower slope
450	37-2-3147	Silcrete	Angular Shatter			0	36	0	0				0	0						294516.0771	6427795.426	1743.127129	29.14013467	4th	Lower slope
451	37-2-3147	Silcrete	Flake	Broken FI (Proximal)		0	21.9	0	0		Single		0	0						294516.1386	6427794.579	1742.290702	28.76705426	4th	Lower slope
452	37-2-3147	Silcrete	Flake Shatter			0	17.3	0	0				0	0						294515.8512	6427795.239	1742.918248	28.85024861	4th	Lower slope
453	37-2-3147	Silcrete	Flake	Complete		0	18.5	22.5	6.8	None	Single		0	0						294513.7509	6427795.194	1742.662499	27.04452257	4th	Lower slope
454	37-2-3147	Silcrete	Flake	Broken FI (Proximal)		0	22.4	0	0		Multiple		0	0						294512.8896	6427795.158	1742.540883	26.30686364	4th	Lower slope
455	37-2-3147	Silcrete	Flake	Complete		0	17	10.5	4.7	None	Single		0	0						294512.7732	6427795.386	1742.756194	26.33925627	4th	Lower slope
456	37-2-3147	Silcrete	Angular Shatter			0	28.9	0	0				0	0						294512.596	6427795.109	1742.462975	26.03643501	4th	Lower slope
457	37-2-3147	IM/Tuff	Flake	Complete		0	30.9	32.8	8.5	None	Single		0	0						294512.4847	6427795.619	1742.959425	26.23644489	4th	Lower slope
458	37-2-3147	Silcrete	Flake	Complete		0	14.3	13.4	2.3	None	Single		0	0						294512.562	6427796.278	1743.622842	26.68547213	4th	Lower slope
459	37-2-3147	Silcrete	Flake	Broken FI (Proximal)		0	20.6	0	0		Single		0	0						294512.617	6427796.603	1743.951693	26.92367759	4th	Lower slope
460	37-2-3147	Silcrete	Flake	Complete		0	23.3	12.9	4.8	None	Single		0	0						294512.4559	6427796.85	1744.181516	26.94482399	4th	Lower slope
461	37-2-3147	Silcrete	Flake	Broken FI (Proximal)		0	22.8	0	0		Multiple		0	0						294512.4271	6427796.918	1744.246331	26.96351378	4th	Lower slope
462	37-2-3147	Silcrete	Flake	Broken FI (Proximal)		0	12.2	0	0		Single		0	0						294512.4506	6427796.952	1744.28249	27.00290023	4th	Lower slope
463	37-2-3147	IM/Tuff	Flake	Broken FI (Proximal)		0	18.2	0	0				0	0						294512.4672	6427796.981	1744.312992	27.03377561	4th	Lower slope
464	37-2-3147	Silcrete	Flake Shatter			0	18.1	0	0				0	0						294512.6288	6427797.281	1744.627524	27.34555138	4th	Lower slope
465	37-2-3147	Silcrete	Flake Shatter			0	13.5	0	0				0	0						294512.7272	6427797.169	1744.52583	27.35445487	4th	Lower slope
466	37-2-3147	Silcrete	Angular Shatter			0	33.2	0	0				0	0						294512.8172	6427797.053	1744.41933	27.35506557	4th	Lower slope
467	37-2-3147	Silcrete	Angular Shatter			0	25	0	0				0	0						294512.8955	6427796.971	1744.345505	27.36766705	4th	Lower slope
468	37-2-3147	Silcrete	Flake	Complete		0	19.4	17.6	4.8	None	Single		0	0						294512.956	6427796.928	1744.308725	27.38997748	4th	Lower slope
469	37-2-3147	Silcrete	Flake Shatter			0	11.4	0	0				0	0						294512.9932	6427796.848	1744.232815	27.37163177	4th	Lower slope
470	37-2-3147	Silcrete	Flake Shatter			0	8.4	0	0				0	0						294512.9044	6427796.763	1744.139416	27.24960095	4th	Lower slope
471	37-2-3147	Silcrete	Flake	Broken FI (Proximal)		0	16.1	0	0				0	0						294512.8771	6427796.58	1743.95461	27.11838937	4th	Lower slope
472	37-2-3147	Silcrete	Flake Shatter			0	23.6	0	0				0	0						294512.8334	6427796.411	1743.782107	26.9828751	4th	Lower slope
473	37-2-3147	Silcrete	Angular Shatter			0	11.2	0	0				0	0						294512.8627	6427796.341	1743.715361	26.96513495	4th	Lower slope
474	37-2-3147	Silcrete	Angular Shatter			0	53	0	0				0	0						294512.8742	6427796.303	1743.678691	26.95202809	4th	Lower slope
475	37-2-3147	Silcrete	Flake	Complete		0	36.5	13.1	6.1	None	Multiple		0	0						294512.8885	6427796.28	1743.657225	26.95005646	4th	Lower slope
476	37-2-3147	Silcrete	Flake	Broken FI (Proximal)		0	19.3	0	0		Faceted		0	0						294513.0378	6427796.325	1743.716834	27.0973266	4th	Lower slope
477	37-2-3147	Silcrete	Flake Shatter			0	27.6	0	0				0	0						294513.1621	6427796.448	1743.849592	27.268981	4th	Lower slope
478	37-2-3147	Silcrete	Flake Shatter			0	21.7	0	0				0	0						294513.2225	6427796.436	1743.84565	27.31203218	4th	Lower slope
479	37-2-3147	Silcrete	Flake	Complete		0	25.6	20.8	4.2	None	Single		0	0						294513.243	6427796.339	1743.75117	27.2719585	4th	Lower slope

480	37-2-3147	Silcrete	Flake	Broken FI (Proximal)		0	15.4	0	0		Crushed		0	0							294513.1713	6427796.329	1743.734087	27.20790536	4th	Lower slope
481	37-2-3147	Silcrete	Flake	Complete		0	16.2	13.5	2.4	None	Single		0	0							294513.066	6427796.291	1743.685805	27.1002626	4th	Lower slope
482	37-2-3147	Silcrete	Flake Shatter			0	20.2	0	0				0	0							294512.9068	6427796.422	1743.80034	27.04855804	4th	Lower slope
483	37-2-3147	Silcrete	Flake	Complete		0	17.2	19.8	9.2	None	Single		0	0							294512.8665	6427796.369	1743.7436	26.98472969	4th	Lower slope
484	37-2-3147	Silcrete	Flake	Complete		0	22.1	22.6	8.9	None	Multiple		0	0							294513.0381	6427796.348	1743.73975	27.11106511	4th	Lower slope
485	37-2-3147	Silcrete	Angular Shatter			0	40.9	0	0				0	0							294513.2034	6427796.338	1743.746236	27.23921749	4th	Lower slope
486	37-2-3147	Silcrete	Flake Shatter			0	16	0	0				0	0							294513.2637	6427796.309	1743.723379	27.27129995	4th	Lower slope
487	37-2-3147	Silcrete	Flake Shatter			0	8.9	0	0				0	0							294513.3854	6427796.324	1743.75042	27.37904624	4th	Lower slope
488	37-2-3147	Silcrete	Flake	Complete		0	9.4	7	3.8	None	Multiple		0	0							294513.5239	6427796.298	1743.738347	27.47692623	4th	Lower slope
489	37-2-3147	IM/Tuff	Core		Multidirectional	4	25.8	22	16.3	1-50%		Indeterminate	10	19.6							294513.3964	6427796.227	1743.654997	27.33183656	4th	Lower slope
490	37-2-3147	Silcrete	Flake	Broken FI (Proximal)		0	17.8	0	0		Single		0	0							294514.3978	6427796.696	1744.221659	28.42080394	4th	Lower slope
491	37-2-3147	IM/Tuff	Flake Shatter			0	27.5	0	0				0	0							294537.067	6427786.77	1736.775228	46.41157233	4th	Lower slope
492	37-2-3147	Silcrete	Flake	Complete		0	26.9	25.8	5.7	None	Single		0	0							294543.0478	6427786.318	1737.016024	52.28992615	4th	Lower slope
493	37-2-3147	IM/Tuff	Flake	Complete		0	11.3	13.8	1.6	None	Single		0	0							294543.6907	6427787.309	1738.07554	53.04812523	4th	Lower slope
494	37-2-3148	IM/Tuff	Flake	Complete		0	15.6	9.2	3.2	None	Single		0	0							294445.1694	6427771.54	1713.54529	31.72633442	4th	Lower slope
495	37-2-3148	Silcrete	Flake	Complete		0	13.3	11.4	2.4	None	Single		0	0							294443.5882	6427768.065	1709.980129	35.39041195	4th	Lower slope
496	37-2-3149	Silcrete	Flake	Broken FI (Proximal)		0	33.3	0	0		Single		0	0							294405.9246	6427722.253	1662.329847	63.79932272	4th	Lower slope
497	37-2-3150	Silcrete	Flake	Broken FI (Proximal)		0	25.2	0	0		Single		0	0							294407.1033	6427836.31	1776.346519	16.46095732	4th	Lower slope
498	37-2-3150	Silcrete	Flake	Complete		0	29.8	27	6.7	None	Single		0	0							294406.9111	6427836.11	1776.139383	16.72126317	4th	Lower slope
499	37-2-3150	IM/Tuff	Flake	Broken FI (Proximal)		0	7.2	0	0				0	0							294425.4678	6427801.686	1742.554837	23.72005408	4th	Lower slope
500	37-2-3150	Silcrete	Flake	Broken FI (Proximal)		0	18.2	0	0		Single		0	0							294427.9721	6427800.496	1741.491367	21.32780914	4th	Lower slope
501	37-2-3154	Silcrete	Flake	Complete		0	28.1	25.5	9.2	None	Single		0	0							294130.7094	6427761.18	1712.741703	49.05669556	2nd	Lower slope
502	37-2-3154	Quartz	Flake	Broken FI (Proximal)		0	19.8	0	0		Single		0	0							294115.2012	6427763.687	1717.188899	51.6437669	2nd	Lower slope
503	37-2-3157	Silcrete	Flake	Complete		0	70.2	48.9	25.3	1-50%	Single		0	0							293533.8486	6427709.97	1835.146541	284.8010902	2nd	Mid slope
504	37-2-3157	IM/Tuff	Flake	Complete		0	30.8	18.5	7.2	1-50%	Cortical		0	0							293508.7573	6427708.45	1844.945573	298.2391655	2nd	Mid slope
505	37-2-3158	IM/Tuff	Flake	Complete		0	13	15	5	None	Multiple		0	0							294243.4625	6427504.458	1446.424277	61.02924145	4th	Lower slope
506	37-2-3158	Silcrete	Flake	Split Flake (Siret)		0	33	13	4	None	?		0	0							294244.7413	6427522.552	1464.395135	64.69604738	4th	Lower slope
507	37-2-3158	IM/Tuff	Flake	Complete		0	48	44	10	1-50%	Single		0	0							294245.5189	6427526.328	1468.113093	65.61103491	4th	Lower slope
508	37-2-3160	Silcrete	Flake Shatter			0	0	0	0				0	0							294276.0684	6427565.058	1505.163879	37.79751493	4th	Lower slope
509	37-2-3160	Silcrete	Flake Shatter			0	0	0	0				0	0							294277.9028	6427566.152	1506.180476	36.11200579	4th	Lower slope
510	37-2-3160	IM/Tuff	Flake	Broken FI (Proximal)		0	19.9	0	0		Single		0	0							294321.7894	6427545.776	1484.643159	17.31148052	4th	Lower slope
511	37-2-3164	Silcrete	Flake	Broken FI (Proximal)		0	21.8	0	0		Multiple		0	0							294367.2365	6427597.985	1536.98969	41.43280639	2nd	Lower slope
512	37-2-3164	Silcrete	Flake	Complete		0	18.5	23.8	5.3	51-99%	Single		0	0							294366.7722	6427597.085	1536.081593	42.04746747	2nd	Lower slope
513	37-2-3164	Silcrete	Flake	Complete		0	18	34	11.9	None	Multiple		0	0							294367.2509	6427592.839	1531.844775	46.12251752	2nd	Lower slope
514	37-2-3164	Silcrete	Core		Unidirectional	1	50.4	38.8	20.8	None		Flake	2	22							294362.9119	6427591.4	1530.33415	45.9685214	2nd	Lower slope
515	37-2-3164	Silcrete	Flake	Complete		0	33.5	33	11.2	None	Multiple		0	0							294362.7445	6427589.73	1528.661814	47.51625729	2nd	Lower slope
516	37-2-3164	IM/Tuff	Flake	Complete		0	26	23	7.8	None	Single		0	0							294362.6998	6427588.557	1527.488274	48.62883413	2nd	Lower slope
517	37-2-3164	Quartz	Flake	Complete		0	32.3	38	19.6	None	Crushed		0	0							294363.2282	6427587.382	1526.321448	49.90489114	2nd	Lower slope
518	37-2-3164	Silcrete	Flake	Complete		0	15.9	16.7	4.8	None	Single		0	0							294365.3464	6427586.008	1524.981711	51.84702357	2nd	Lower slope
519	37-2-3164	IM/Tuff	Flake	Complete		0	22.3	26	4.7	None	Multiple		0	0							294365.2407	6427585.172	1524.144056	52.60934225	2nd	Lower slope
520	37-2-3164	IM/Tuff	Flake	Broken FI (Proximal)		0	20.2	0	0		Single		0	0							294364.2184	6427583.301	1522.256535	54.09981542	2nd	Lower slope
521	37-2-3164	Silcrete	Flake Shatter			0	32	0	0				0	0							294364.7734	6427582.35	1521.31469	55.16846413	2nd	Lower slope
522	37-2-3164	IM/Tuff	Angular Shatter			0	27	0	0				0	0							294364.0989	6427578.338	1517.292255	53.32341601	4th	Lower slope
523	37-2-3164	Quartz	Flake	Complete		0	27.7	11.8	9.1	None	Crushed		0	0							294360.6909	6427568.431	1507.335314	47.61196271	4th	Lower slope
524	37-2-3164	Silcrete	Flake	Broken FI (Proximal)		0	22.6	0	0		Single		0	0							294359.8361	6427566.962	1505.854805	46.55863317	4th	Lower slope
525	37-2-3164	Silcrete	Flake	Broken FI (Proximal)		0	20.2	0	0		Single		0	0							294360.6358	6427564.788	1503.6919	47.13024057	4th	Lower slope
526	37-2-3164	Silcrete	Flake	Complete		0	22.5	24	4	None	Single		0	0							294359.9286	6427564.057	1502.951304	46.37226443	4th	Lower slope
527	37-2-3164	IM/Tuff	Angular Shatter			0	12	0	0				0	0							294359.182	6427563.031	1501.915545	45.57128555	4th	Lower slope
528	37-2-3164	Silcrete	Flake	Broken FI (Proximal)		0	16	0	0		Crushed		0	0							294358.4421	6427562.803	1501.678166	44.82262914	4th	Lower slope
529	37-2-3164	Silcrete	Flake	Complete		0	34.1	19.5	10.4	None	Single		0	0							294355.3267	6427562.798	1501.637592	41.70956251	4th	Lower slope
530	37-2-3164	IM/Tuff	Flake	Broken FI (Proximal)		0	24.3	0	0		Multiple		0	0							294352.8129	6427560.079	1498.894702	39.1715906	4th	Lower slope
531	37-2-3164	Quartz	Core		Multidirectional	3	49.4	47	31	None		Cobble	8	33.5							294354.4952	6427558.477	1497.308399	40.92307106	4th	Lower slope
532	37-2-3164	Silcrete	Flake Shatter			0	12.4	0	0				0	0							294346.2523	6427554.883	1493.655877	33.17821111	4th	Lower slope

533	37-2-3164	Silcrete	Flake	Broken FI (Proximal)		0	11.4	0	0		Single		0	0							294345.8884	6427553.533	1492.304345	33.10123485	4th	Lower slope
534	37-2-3287	Silcrete	Flake	Complete		0	40.6	33	12.3	None	Cortical		0	0							295049.2086	6429219.87	3237.326765	32.26689958	4th	Lower slope
535	37-2-3287	Chert	Flake	Complete		0	18.5	27	10.4	None	Cortical		0	0							295126.591	6429266.29	3300.223584	26.38107259	4th	Lower slope
536	37-2-3287	IMI/Tuff	Retouched Flake			0	64.1	61	27	1-50%	Cortical		0	0	Misc Retouched Flake	Complete	Flake	V-D	Ilm	65;75	295157.6771	6429271.379	3312.704236	20.1048969	4th	Lower slope
537	37-2-3289	FGS Other	Flake Shatter			0	33.8	0	0				0	0							294899.4841	6429098.528	3088.434357	48.04353911	4th	Mid slope
538	37-2-3289	Silcrete	Angular Shatter			0	54	0	0				0	0							294900.2369	6429097.788	3087.843174	46.99129096	4th	Mid slope
539	37-2-3289	Silcrete	Flake Shatter			0	14	0	0				0	0							294899.7721	6429096.776	3086.763628	46.71136081	4th	Mid slope
540	37-2-3536	IMI/Tuff	Flake	Complete		0	44	36	13.3	51-99%	Cortical		0	0							293527.0048	6426825.545	1115.65865	37.27848223	2nd	Lower slope
541	37-2-3536	Silcrete	Angular Shatter			0	26	0	0				0	0							293532.5984	6426838.18	1120.315539	41.71363483	2nd	Lower slope
542	37-2-3536	FGS Other	Core		Multidirectional	0	80	62	44	51-99%		Cobble	5	39.4							293537.3501	6426843.352	1120.500926	47.07215361	2nd	Lower slope
543	37-2-3536	IMI/Tuff	Flake	Complete		0	24.1	29.3	6.7	1-50%	Single		0	0							293555.6431	6426861.299	1120.221405	35.33627612	2nd	Lower slope
544	37-2-3536	IMI/Tuff	Flake	Split Flake (Siret)		0	20.2	0	0				0	0							293555.2038	6426864.079	1122.515542	32.52759282	2nd	Lower slope
545	37-2-3536	Silcrete	Flake	Complete		0	43.4	26	10.6	None	Multiple		0	0							293558.2572	6426864.528	1120.705415	32.50040473	2nd	Lower slope
546	37-2-3536	Silcrete	Angular Shatter			0	19.4	0	0				0	0							293556.1049	6426858.981	1118.243411	37.68840557	2nd	Lower slope
547	37-2-3536	Silcrete	Core		Bifacial	1	67.3	63.4	22.7	None		Flake	9	24.6							293561.1275	6426868.267	1121.393623	29.56095839	2nd	Lower slope
548	37-2-3536	Quartz	Flake Shatter			0	30.4	0	0				0	0							293562.512	6426869.55	1121.357249	28.80109483	2nd	Lower slope
549	37-2-3536	Silcrete	Flake	Complete		0	46.1	39	10.7	None	Cortical		0	0							293576.999	6426867.873	1110.146103	21.77809086	2nd	Lower slope
550	37-2-3536	Silcrete	Core		Multidirectional	3	65	45	25	None		Flake	5	34							293585.9544	6426867.075	1103.429458	19.80636521	2nd	Lower slope
551	37-2-3536	Silcrete	Flake Shatter			0	0	0	0				0	0							293382.6658	6427016.61	1352.299952	85.30412297	2nd	Lower slope
552	37-2-3536	Silcrete	Flake	Complete		0	48.4	50.4	20.4	51-99%	Single		0	0							293448.3208	6426704.695	1099.388926	73.59234869	2nd	Mid slope
553	37-2-3536	IMI/Tuff	Flake	Complete		0	14.9	14.9	1.5	None	Multiple		0	0							293444.7887	6426883.344	1215.230762	66.74312191	2nd	Lower slope
554	37-2-3536	Silcrete	Core		Unidirectional	1	39.7	30.6	15.5	1-50%		Flake	5	21.2							293453.0633	6426880.054	1206.915481	58.75690134	2nd	Lower slope
555	37-2-3536	IMI/Tuff	Flake Shatter			0	21.8	0	0				0	0							293453.2907	6426879.044	1206.063344	57.84071523	2nd	Lower slope
556	37-2-3536	Silcrete	Flake	Complete		0	25.7	22.8	8.4	None	Single		0	0							293465.0772	6426885.572	1201.8949	56.66593388	2nd	Lower slope
557	37-2-3536	IMI/Tuff	Flake	Complete		0	25.6	21.2	5.6	None	Single		0	0							293484.8006	6426885.336	1187.454754	50.53733867	2nd	Lower slope
558	37-2-3536	Silcrete	Flake Shatter			0	36.2	0	0				0	0							293495.9275	6426878.958	1175.021505	44.05578301	2nd	Lower slope
559	37-2-3536	FGS Other	Core		Multidirectional	3	57.8	45.8	29.1	1-50%		Cobble	5	34.1							293514.574	6426903.221	1178.908072	38.31354804	2nd	Lower slope
560	37-2-3536	IMI/Tuff	Flake	Complete		0	46.7	34.9	15.9	1-50%	Cortical		0	0							293521.7851	6426901.646	1172.742861	30.93907144	2nd	Lower slope
561	37-2-3536	Silcrete	Flake	Redirecting Flake		0	39.9	36.9	12.1	None	Multiple		0	0							293526.7796	6426900.502	1168.442853	25.825294	2nd	Lower slope
562	37-2-3536	Silcrete	Flake	Complete		0	36.2	29.6	11.1	1-50%	Single		0	0							293526.5497	6426907.282	1173.481527	27.91580913	2nd	Lower slope
563	37-2-3536	IMI/Tuff	Flake	Split Flake (Siret)		0	16.7	0	0				0	0							293529.3534	6426904.844	1169.780978	24.41463698	2nd	Lower slope
564	37-2-3536	IMI/Tuff	Angular Shatter			0	55.8	0	0				0	0							293525.467	6426909.069	1175.520262	29.63132956	2nd	Lower slope
565	37-2-3536	Other	Flake	Complete		0	55.2	46.3	14.5	1-50%	Cortical		0	0							293532.3435	6426911.582	1172.588593	25.02051883	2nd	Lower slope
566	37-2-3536	Silcrete	Flake	Complete		0	37.7	53.3	7.5		Single		0	0							293532.3642	6426911.686	1172.649762	25.06698946	2nd	Lower slope
567	37-2-3536	IMI/Tuff	Flake	Complete		0	19.5	43.5	8.4	1-50%	Cortical		0	0							293536.4	6426905.48	1165.371081	18.26308998	2nd	Lower slope
568	37-2-3536	IMI/Tuff	Flake	Complete		0	33.9	21.4	5.3	None	Single		0	0							293536.8247	6426901.753	1162.380539	16.3400552	2nd	Lower slope
569	37-2-3536	Silcrete	Flake	Broken FI (Proximal)		0	30.6	0	0		Single		0	0							293536.9008	6426904.904	1164.608583	17.54524423	2nd	Lower slope
570	37-2-3536	Silcrete	Flake	Complete		0	25.9	28	8.2	None	Single		0	0							293543.9617	6426910.196	1163.607684	16.04964892	2nd	Lower slope
571	37-2-3536	Silcrete	Flake	Redirecting Flake		0	39	32	17	None	Single		0	0							293542.4619	6426911.933	1165.900676	18.31668292	2nd	Lower slope
572	37-2-3536	Silcrete	Flake	Broken FI (Proximal)		0	16	0	0		Multiple		0	0							293539.9755	6426912.835	1168.259698	20.4756026	2nd	Lower slope
573	37-2-3536	Silcrete	Angular Shatter			0	37.2	0	0				0	0							293542.4951	6426911.043	1165.228737	17.55356457	2nd	Lower slope
574	37-2-3536	Silcrete	Flake Shatter			0	24.6	0	0				0	0							293541.725	6426909.516	1164.643101	16.78239369	2nd	Lower slope
575	37-2-3536	Silcrete	Angular Shatter			0	30.8	0	0				0	0							293542.016	6426908.427	1163.650651	15.75973813	2nd	Lower slope
576	37-2-3536	Silcrete	Flake	Broken FI (Proximal)		0	24.2	0	0		Single		0	0							293541.6329	6426910.45	1165.386633	17.57369306	2nd	Lower slope
577	37-2-3536	Silcrete	Flake	Broken FI (Proximal)		0	17.4	0	0		Single		0	0							293542.9264	6426911.081	1164.961408	17.34859914	2nd	Lower slope
578	37-2-3536	Silcrete	Core		Multidirectional	3	51.3	47.5	25.7	1-50%		Indeterminate	9	26.7							293548.3201	6426910.825	1161.091557	14.88805721	2nd	Lower slope
579	37-2-3536	Silcrete	Flake	Broken FI (Proximal)		0	24.8	0	0		Single		0	0							293548.8857	6426909.317	1159.602777	13.28461925	2nd	Lower slope
580	37-2-3536	Silcrete	Flake	Redirecting Flake		0	40.5	35.3	15.4	1-50%	Single		0	0							293548.537	6426908.6	1159.316452	12.69157053	2nd	Lower slope
581	37-2-3536	Silcrete	Angular Shatter			0	25.4	0	0				0	0							293548.2611	6426907.647	1158.8085	11.87526293	2nd	Lower slope
582	37-2-3536	Silcrete	Core		Multidirectional	4	60.7	51.8	42.8	None		Indeterminate	10	53.9							293548.3367	6426910.871	1161.113901	14.92799383	2nd	Lower slope

583	37-2-3536	Silcrete	Flake	Redirecting Flake		0	28.1	18.5	7.5	None	Single		0	0							293540.8715	6426909.203	1165.000243	17.09809644	2nd	Lower slope
584	37-2-3536	FGS Other	Core		Unidirectional	1	124.4	75.1	58.5	51-99%		Cobble	3	26							293531.4229	6426935.135	1190.404268	42.22575381	2nd	Lower slope
585	37-2-3536	Silcrete	Core		Multidirectional	2	52.3	35.4	26.4	None		Indeterminate	6	30.5							293436.1325	6426960.839	1275.059845	78.62895472	2nd	Lower slope
586	37-2-3536	Silcrete	Flake Shatter			0	14.7	0	0				0	0							293434.475	6426964.125	1278.553386	79.19232728	2nd	Lower slope
587	37-2-3536	Silcrete	Flake	Broken FI (Proximal)		0	21.5	0	0		Single		0	0							293447.4084	6427016.381	1307.112337	45.35549942	2nd	Lower slope
588	37-2-3536	Silcrete	Core		Bidirectional	2	65.7	56.9	20.4	None		Flake	5	30.5							293432.8345	6427042.79	1336.379619	29.0837636	2nd	Lower slope
589	37-2-3536	Silcrete	Flake	Complete		0	44	35	20	None	Single		0	0							293432.8275	6427043.634	1337.004394	28.56822194	2nd	Lower slope
590	37-2-3536	Silcrete	Core		Multidirectional	3	48	38	27.6	1-50%		Indeterminate	7	33.2							293536.8139	6427004.198	1238.488302	31.66709834	2nd	Lower slope
591	37-2-3536	Silcrete	Flake Shatter			0	33.2	0	0				0	0							293476.6206	6426760.419	1110.774441	55.04828527	2nd	Mid slope
592	37-2-3536	Silcrete	Flake	Broken FI (Proximal)		0	27.7	0	0		Single		0	0							293485.6354	6426793.758	1125.198087	41.76648101	2nd	Lower slope
593	37-2-3544	Silcrete	Flake	Complete		0	38	39	11.4	None	Single		0	0							293638.771	6426921.787	1109.906577	50.7399256	2nd	Lower slope
594	37-2-3544	Silcrete	Core			0	0	0	0				0	0							293637.1178	6426884.01	1081.953073	21.00426767	2nd	Lower slope
595	37-2-3548	Silcrete	Flake Shatter			0	30.4	0	0				0	0							293230.5534	6425861.394	1127.043873	525.681325	3rd	Lower slope
596	37-2-3552	Silcrete	Core		Bifacial	1	92.8	61.7	36.4	1-50%	Single	Flake	7	37.7							293355.9608	6426076.993	983.9026008	619.1798433	2nd	Mid slope
597	37-2-4061	IM/Tuff	Flake	Broken FI (Proximal)		0	19.4	0	0		Cortical		0	0							293481.4021	6427531.992	1702.893671	316.103338	2nd	Mid slope
598	37-2-4062	Silcrete	Flake	Complete		0	34.7	28	9.9	1-50%	Single		0	0							293512.4738	6426233.433	844.9940108	525.3569027	2nd	Mid slope
599	B10	Quartzite	Core		Multidirectional	3	180	160	107.8	51-99%			3	96							294739.9472	6425375.833	793.6954963	1280.515228	4th	Hilltop/Ridge/Crest
600	B10	Quartzite	Core		Bifacial	1	155	116	53	51-99%		Flake	3	61.8							294689.1078	6425193.548	935.3884008	1325.341229	3rd	Hilltop/Ridge/Crest
601	B10	Quartzite	Flake	Complete		0	91.8	74	25.2	1-50%	Single		0	0							294693.0637	6425192.204	938.1180229	1328.395974	3rd	Hilltop/Ridge/Crest
602	BM-AS01-12	Silcrete	Flake	Broken FI (Proximal)		0	17.4	0	0		Multiple		0	0							294901.153	6428883.631	2877.685011	55.49891059	2nd	Lower slope
603	BM-AS01-12	Silcrete	Flake Shatter			0	14.5	0	0				0	0							294900.0572	6428881.294	2875.179201	55.35351731	2nd	Lower slope
604	BM-AS01-12	Silcrete	Flake Shatter			0	19.2	0	0				0	0							294900.5927	6428880.452	2874.457786	55.62833263	4th	Lower slope
605	BM-AS01-12	Silcrete	Flake	Broken FI (Proximal)		0	22.1	0	0		Single		0	0							294898.9403	6428875.784	2869.557182	54.48517041	4th	Lower slope
606	BM-AS01-12	Silcrete	Flake Shatter			0	12.1	0	0				0	0							294898.7517	6428872.646	2866.442621	53.13786733	4th	Lower slope
607	BM-AS01-12	Silcrete	Flake	Complete		0	28.8	13.3	10	None	Single		0	0							294903.9656	6428861.302	2856.342647	42.20030671	4th	Lower slope
608	BM-AS01-12	Chert	Core		Bifacial	1	35.5	28.6	13.1	1-50%		Flake	3	27.5							294904.1059	6428863.827	2858.84563	44.27998632	4th	Lower slope
609	BM-AS02-12	Silcrete	Angular Shatter			0	29.7	0	0				0	0							294815.3039	6428544.472	2528.358783	87.72049188	4th	Lower slope
610	BM-AS02-12	Silcrete	Angular Shatter			0	22.3	0	0				0	0							294815.2006	6428545.359	2529.210536	88.53159193	4th	Lower slope
611	BM-AS02-12	Silcrete	Angular Shatter			0	20.4	0	0				0	0							294815.8845	6428545.691	2529.665256	88.0482334	4th	Lower slope
612	BM-AS03-12	IM/Tuff	Core		Multidirectional	2	41.7	40.3	37.2	None		Indeterminate	4	25.9							294219.9852	6427021.505	967.7018546	165.855614	4th	Lower slope
613	BM-AS03-12	Silcrete	Flake Shatter			0	32.9	0	0				0	0							294184.3357	6427027.357	978.5341811	201.0365841	4th	Lower slope
614	BM-AS04-12	Silcrete	Angular Shatter			0	62.3	0	0				0	0							294457.7311	6426861.623	809.0323544	25.38671987	4th	Lower slope
615	BM-AS04-12	Silcrete	Flake Shatter			0	22.3	0	0				0	0							294440.2552	6426869.798	814.7807883	7.609582277	4th	Lower slope
616	MTP-1403	Silcrete	Core		Unidirectional	1	43.3	38.7	15.6	None		Flake	4	19							293190.04	6426559.982	1253.214327	113.9368985	2nd	Upper slope
617	MTP-1403	IM/Tuff	Flake	Complete		0	16.5	23.1	6	None	Cortical		0	0							293163.2708	6426569.875	1281.710438	92.3073008	2nd	Upper slope
618	MTP-1403	Silcrete	Retouched Flake			0	48.1	34.1	11.1	None	Single		0	0	Misc Retouched Flake	Complete	Flake	V-D	ilm;rlm		293164.5777	6426570.806	1280.881044	91.98844926	2nd	Upper slope
619	MTP-1412	Silcrete	Flake	Complete		0	46.5	30	12.3	None	Single		0	0							292558.8793	6427606.217	2357.626996	33.4233042	2nd	Mid slope
620	MTP-1412	Silcrete	Retouched Flake			0	68	35	14	1-50%	Single		0	0	Misc Retouched Flake	Complete	Flake	V-D	rlm - dtov; dm - vtod	62.55	292622.7615	6427622.318	2320.553012	48.84075501	2nd	Mid slope
621	MTP-1412	Silcrete	Flake	Complete		0	28	23	11	None	Single		0	0							292623.4325	6427625.373	2322.113275	51.78282976	2nd	Mid slope
622	MTP-1412	Silcrete	Flake	Complete		0	39	15	5.3	None	Single		0	0							292613.0637	6427623.644	2328.627029	52.36856932	2nd	Mid slope
623	MTP-1412	IM/Tuff	Flake	Complete		0	21	28	7	None	Multiple		0	0							292612.9733	6427621.954	2327.560518	50.79759806	2nd	Mid slope
624	MTP-1412	IM/Tuff	Flake	Complete		0	44	19	7.25	None	Cortical		0	0							292608.9811	6427621.538	2330.245209	51.86019663	2nd	Mid slope
625	MTP-1456	Silcrete	Flake	Redirecting Flake		0	44	30.1	11.6	None	Multiple		0	0							293140.7696	6426064.95	1198.973441	504.730167	2nd	Mid slope
626	MTP-1456	Silcrete	Flake	Complete		0	28.2	24.5	4.8	None	Cortical		0	0							293140.0857	6426070.481	1199.687187	504.014778	2nd	Mid slope
627	MTP-1456	Silcrete	Flake	Broken FI (Proximal)		0	22.7	0	0		Single		0	0							293141.2902	6426071.338	1198.489636	505.2198218	2nd	Mid slope
628	MTP-1456	Silcrete	Flake Shatter			0	39.6	0	0				0	0							293148.8148	6426085.165	1191.162775	512.9510057	2nd	Mid slope
629	MTP-1456	IM/Tuff	Flake	Complete		0	27.1	17.8	7.6	None	Multiple		0	0							293137.4032	6426030.644	1202.723367	500.6481055	2nd	Mid slope
630	MTP-1456	IM/Tuff	Flake	Complete		0	8.1	10.9	1.1	1-50%	Multiple		0	0							293139.3638	6426030.83	1200.758678	502.6174705	2nd	Mid slope
631	MTP-1456	FGS Other	Retouched Flake			0	21.1	44.5	19.1	1-50%	Cortical		0	0	Scraper	Complete	Flake	V-D	dm	70	293137.7474	6426030.35	1202.386796	500.9610758	2nd	Mid slope
632	MTP-1455	Chert	Flake	Split Flake (Siret)		0	30.9	0	0				0	0							293131.6498	6426026.212	1208.595249	494.4927063	2nd	Mid slope

633	MTP-1455	Quartzite	Flake	Complete		0	27.7	25.1	7.3	1-50%	Single		0	0							293131.1054	6426025.686	1209.154773	493.9020064	2nd	Mid slope
634	MTP-1455	Silcrete	Flake	Broken FI (Proximal)		0	41.2	0	0		Multiple		0	0							293131.0099	6426021.81	1209.370403	493.4654272	2nd	Mid slope
635	MTP-1455	Silcrete	Flake	Split Flake (Siret)		0	54.3	0	0				0	0							293135.2322	6426019.042	1205.244097	497.4493959	2nd	Mid slope
636	MTP-1455	Silcrete	Flake	Complete		0	34.6	23.4	17.9	1-50%	Single		0	0							293135.4096	6426019.169	1205.062365	497.6361704	2nd	Mid slope
637	MTP-1455	Silcrete	Flake Shatter			0	55.6	0	0				0	0							293137.0253	6426019.383	1203.440189	499.2636644	2nd	Mid slope
638	MTP-1455	Silcrete	Angular Shatter			0	35.1	0	0				0	0							293134.89	6426017.62	1205.636699	496.9993156	2nd	Mid slope
639	MTP-1455	IM/Tuff	Flake	Complete		0	27.4	22.3	7.6	None	Single		0	0							293144.3635	6426011.463	1196.409803	506.0295388	2nd	Mid slope
640	MTP-1455	FGS Other	Flake	Complete		0	45.1	62.4	14.8	Complete	Cortical		0	0							293143.7052	6426008.454	1197.196433	505.1956223	2nd	Mid slope
641	MTP-1455	IM/Tuff	Flake	Broken FI (Proximal)		0	23.3	0	0		Cortical		0	0							293118.7578	6426016.219	1221.809299	480.8074789	2nd	Mid slope
642	MTP-1455	Silcrete	Flake Shatter			0	52.5	0	0				0	0							293117.3966	6426016.087	1223.174441	479.4402198	2nd	Mid slope
643	MTP-1455	Silcrete	Flake Shatter			0	56.3	0	0				0	0							293116.8	6426017.282	1223.727125	478.9361881	2nd	Mid slope
644	MTP-1455	Silcrete	Flake	Complete		0	24.8	26.8	6.4	None	Single		0	0							293116.6939	6426017.609	1223.821454	478.8558012	2nd	Mid slope
645	MTP-1455	Silcrete	Flake	Complete		0	23.8	32	10.7	None	Single		0	0							293116.7545	6426017.106	1223.77893	478.8772493	2nd	Mid slope
646	MTP-1455	FGS Other	Flake	Complete		0	36.6	20.1	12.4	1-50%	Crushed		0	0							293116.229	6426017.215	1224.300164	478.3617179	2nd	Mid slope
647	MTP-1455	Silcrete	Flake	Complete		0	25.8	38.1	16	None	Single		0	0							293116.4135	6426016.958	1224.125054	478.5258875	2nd	Mid slope
648	MTP-1455	Silcrete	Flake	Broken FI (Proximal)		0	15	0	0		Single		0	0							293116.814	6426015.953	1223.761596	478.8492433	2nd	Mid slope
649	MTP-1455	Silcrete	Flake	Broken FI (Proximal)		0	32.5	0	0				0	0							293118.8578	6426013.217	1221.823679	480.692036	2nd	Mid slope
650	MTP-1455	FGS Other	Flake Shatter			0	27	0	0				0	0							293114.4572	6426010.923	1226.312877	476.1486462	2nd	Mid slope
651	MTP-1455	Chert	Flake	Complete		0	40.6	20.1	11.6	1-50%	Cortical		0	0							293115.1257	6426012.402	1225.585111	476.9131631	2nd	Mid slope
652	BM-AS07-12	Silcrete	Flake Shatter			0	32.6	0	0				0	0							292194.6723	6427848.674	2792.171095	41.47468772	1st	Upper slope
653	BM-AS07-12	Silcrete	Retouched Flake			0	16.4	7.5	2.2	None			0	0	Geo Microlith	Complete	Flake	V-D			292196.3527	6427846.667	2789.59538	43.93644106	1st	Upper slope
654	BM-AS07-12	Silcrete	Flake			0	34	8.9	8.4	None	Faceted		0	0							292196.7308	6427846.297	2789.068056	44.45079985	1st	Upper slope
655	BM-AS07-12	Silcrete	Flake Shatter			0	29.2	0	0				0	0							292196.0052	6427847.656	2790.495423	43.13701156	1st	Upper slope
656	BM-AS07-12	Silcrete	Flake Shatter			0	18.6	0	0				0	0							292196.0074	6427849.393	2791.606043	42.30023393	1st	Upper slope
657	BM-AS07-12	Silcrete	Flake	Complete		0	31	14	9	None	Single		0	0							292196.3702	6427848.875	2790.995643	42.86394922	1st	Upper slope
658	BM-AS07-12	Silcrete	Flake			0	29	18	9	None	Single		0	0							292198.4028	6427847.849	2788.777586	45.14012927	1st	Upper slope
659	BM-AS07-12	IM/Tuff	Flake Shatter			0	20.6	0	0				0	0							292197.4069	6427845.059	2787.756273	45.67278691	1st	Upper slope
660	BM-AS08-12	Silcrete	Flake	Complete		0	74.9	53	20.6	1-50%	Single		0	0							292225.1499	6427413.301	2509.889488	221.8018746	1st	Upper slope
661	BM-AS08-12	Silcrete	Flake	Broken FI (Proximal)		0	41	24	13		Cortical		0	0							292209.3545	6427447.302	2541.593019	185.9564342	1st	Upper slope
662	BM-AS08-12	Silcrete	Core		Bifacial	1	76.2	56.9	45.6	1-50%		Indeterminate	3	23.4							292206.7246	6427452.92	2546.86331	180.0842298	1st	Upper slope
663	BM-AS08-12	FGS Other	Flake	Complete		0	28.7	25.5	12.8	None	Cortical		0	0							292223.4001	6427540.433	2582.03237	148.179157	1st	Upper slope
664	BM-AS08-12	Silcrete	Retouched Flake			0	58.2	47.7	21.1	None	Single		0	0	Scraper	Complete	Flake	V-D	rlm;llm;dm	52;83;65	292191.3617	6427400.169	2531.451173	212.6322607	1st	Hilltop/Ridge/Crest
665	BM-AS09-12	Silcrete	Core		Multidirectional	5	63.2	58.8	50.1	1-50%		Indeterminate	7	41.5							291993.2155	6427485.923	2745.156178	130.2815779	1st	Upper slope
666	BM-AS09-12	Silcrete	Core		Unidirectional	1	90	67.5	31.01	None	Single	Flake	3	22.4							292052.7893	6427499.527	2701.628554	87.24716785	1st	Upper slope
667	BM-AS10-12	IM/Tuff	Flake Shatter			0	20.7	9.6	4.2				0	0							291849.859	6426968.293	2649.950321	57.68005865	1st	Mid slope
668	BM-AS10-12	IM/Tuff	Flake	Split Flake (Siret)		0	29.4	17.4	16				0	0							291852.2432	6426965.604	2646.790275	55.80347573	1st	Mid slope
669	BM-AS11-12	Silcrete	Core		Multidirectional	2	46.6	36.4	38.7	1-50%		Indeterminate	6	28.4							292114.9098	6426706.393	2316.479679	12.49430743	2nd	Mid slope
670	BM-AS11-12	IM/Tuff	Flake	Complete		0	11.9	19.3	4	None	Single		0	0							292114.0477	6426703.99	2316.639823	14.90134595	2nd	Mid slope
671	BM-AS11-12	Silcrete	Flake	Redirecting Flake		0	46.7	55.4	15.5	None	Single		0	0							292114.5379	6426703.605	2316.062062	14.92146166	2nd	Mid slope
672	BM-AS11-12	Quartz	Core		Unidirectional	1	20.9	26.1	16.4	51-99%			2	21.5							292112.5363	6426699.507	2316.852905	19.43846372	2nd	Mid slope
673	BM-AS11-12	IM/Tuff	Flake	Complete		0	22.8	14.6	3.7	None	Single		0	0							292120.252	6426702.756	2310.336792	13.3678021	2nd	Mid slope
674	BM-AS11-12	IM/Tuff	Flake Shatter			0	23.7	18.5	6.7				0	0							292114.0109	6426706.173	2317.281789	13.26142086	2nd	Mid slope
675	BM-AS11-12	IM/Tuff	Flake	Complete		0	13.5	17.6	3.6	1-50%	Single		0	0							292114.3679	6426706.45	2317.016016	12.81509161	2nd	Mid slope
676	BM-AS11-12	IM/Tuff	Flake	Complete		0	27.5	17.4	6.3	1-50%	Single		0	0							292114.4694	6426707.782	2317.289815	11.80219598	2nd	Mid slope
677	BM-AS11-12	Silcrete	Flake	Complete		0	28.8	15.5	5.7	None	Single		0	0							292371.6826	6426716.96	2074.417098	86.57144543	2nd	Mid slope
678	BM-AS11-12	Other	Flake Shatter			0	35.5	38.9	11.5				0	0							292372.7625	6426781.131	2094.571799	145.9932613	2nd	Mid slope
679	BM-AS11-12	Silcrete	Flake	Complete		0	32.1	35.8	8.8	1-50%	Single		0	0							292441.5102	6426778.665	2029.276439	124.3344285	1st	Mid slope
680	BM-AS12-12	Other	Flake	Complete		0	36.3	36.1	9.1	51-99%	Multiple		0	0							292479.5622	6426481.526	1907.083351	18.6784459	2nd	Mid slope
681	BM-AS12-12	Silcrete	Flake Shatter			0	35.3	25.1	6.4				0	0							292491.0905	6426507.081	1901.648764	25.14215251	2nd	Mid slope
682	BM-AS12-12	Silcrete	Angular Shatter			0	22.9	16.8	10.2				0	0							292480.0128	6426488.777	1908.235306	13.9844822	2nd	Mid slope
683	BM-AS12-12	Silcrete	Flake	Broken FI (Proximal)		0	20.2	15.7	5.6		Single		0	0							292519.4033	6426481.148	1868.137442	17.73954893	1st	Mid slope
684	BM-AS12-12	IM/Tuff	Flake	Broken FI (Proximal)		0	16.9	14.6	3.7		Faceted		0	0							292520.3979	6426477.773	1866.412201	19.08154766	1st	Mid slope
685	BM-AS12-12	IM/Tuff	Flake	Broken FI (Proximal)		0	27.6	19.9	7.2		Single		0	0							292520.328	6426475.294	1865.928679	20.92092833	1st	Mid slope
686	BM-AS12-12	Silcrete	Flake	Complete		0	21.1	19.1	12.4	None	Single		0	0							292519.9901	6426475.836	1866.37848	20.74694418	1st	Mid slope

687	BM-AS12-12	FGS Other	Flake	Complete		0	54.8	64.1	13.3	Complete	Cortical		0	0							292519.8957	6426474.391	1866.150079	21.88582563	1st	Mid slope
688	BM-AS12-12	Silcrete	Flake	Broken FI (Proximal)		0	36.4	30.5	10.5		Single		0	0							292522.2209	6426474.199	1863.840101	20.60203751	1st	Mid slope
689	BM-AS12-12	IM/Tuff	Angular Shatter			0	17.1	14.1	6.8				0	0							292523.5565	6426473.204	1862.317362	20.70543456	1st	Mid slope
690	BM-AS12-12	IM/Tuff	Flake Shatter			0	26	18.2	3.7				0	0							292525.187	6426470.273	1860.080567	22.57431526	1st	Mid slope
691	BM-AS12-12	IM/Tuff	Flake Shatter			0	22.4	15.2	2.9				0	0							292526.6387	6426470.872	1858.796341	21.47520644	1st	Mid slope
692	BM-AS12-12	Silcrete	Flake Shatter			0	49.9	19.4	14.1				0	0							292520.245	6426479.138	1866.866325	18.27932388	1st	Mid slope
693	BM-AS12-12	IM/Tuff	Flake	Complete		0	28	17	7.1	Complete	Single		0	0							292525.4882	6426477.456	1861.379721	16.07263742	1st	Mid slope
694	BM-AS12-12	IM/Tuff	Flake Shatter			0	35	16.1	9.3				0	0							292525.9651	6426465.536	1858.285175	26.73754938	1st	Mid slope
695	BM-AS12-12	Silcrete	Flake	Complete		0	27.7	12.5	6.5	None	Single		0	0							292522.5262	6426442.987	1856.875321	14.56767376	2nd	Lower slope
696	BM-AS12-12	Silcrete	Flake	Complete		0	27.5	38.7	15.9	1-50%	Single		0	0							292533.5431	6426442.303	1845.953819	24.36729499	2nd	Mid slope
697	BM-AS12-12	Silcrete	Flake Shatter			0	33.1	10.2	9.2				0	0							292543.0961	6426442.688	1836.687557	33.69990151	2nd	Mid slope
698	BM-AS12-12	Silcrete	Flake	Broken FI (Proximal)		0	20.7	25.1	5.7		Single		0	0							292526.7244	6426673.866	1913.720141	155.3588407	2nd	Mid slope
699	BM-AS12-12	Silcrete	Angular Shatter			0	50.4	25.5	27.1				0	0							292503.4659	6426597.495	1912.971686	92.94495865	2nd	Mid slope
700	BM-AS12-12	IM/Tuff	Flake	Broken FI (Proximal)		0	21.6	20.9	6.1		Multiple		0	0							292503.0649	6426597.531	1913.366701	92.58366632	2nd	Mid slope
701	BM-AS05-12	Silcrete	Flake	Broken FI (Proximal)		0	21	20.2	10.5		Single		0	0							292071.6671	6426487.332	2307.746891	216.9199561	2nd	Mid slope
702	BM-AS05-12	IM/Tuff	Angular Shatter			0	20.4	11.9	6				0	0							292070.7986	6426487.54	2308.638864	217.2101541	2nd	Mid slope
703	BM-AS05-12	Quartzite	Flake	Complete		0	21.1	24.1	12.8	None	Cortical		0	0							292005.0126	6426452.182	2367.229194	215.5103937	2nd	Mid slope
704	BM-AS13-12	Silcrete	Flake	Broken FI (Proximal)		0	16.9	18.9	14.3		Multiple		0	0							292494.4325	6426316.008	1862.8086	71.79020846	2nd	Lower slope
705	BM-AS13-12	Quartzite	Flake Shatter			0	46.7	29	7.9				0	0							292489.301	6426319.421	1868.360581	71.28034817	2nd	Lower slope
706	BM-AS13-12	IM/Tuff	Flake Shatter			0	29.8	34	11.6				0	0							292464.1199	6426326.429	1894.271668	82.3309189	2nd	Mid slope
707	BM-AS13-12	IM/Tuff	Flake	Split Flake (Siret)		0	36	13	5.6				0	0							292443.6626	6426338.266	1916.205092	92.78577672	2nd	Mid slope
708	BM-AS13-12	FGS Other	Core		Unidirectional	1	165	79	33	51-99%		Cobble	4	0							292439.4881	6426343.752	1921.134904	94.2666208	2nd	Mid slope
709	BM-AS14-12	Silcrete	Flake Shatter			0	29.6	0	0				0	0							291893.8746	6426070.333	2445.879603	190.392014	2nd	Mid slope
710	BM-AS14-12	IM/Tuff	Flake	Broken FI (Proximal)		0	16.8	0	0		Single		0	0							291892.1753	6426054.364	2447.571668	205.664424	2nd	Mid slope
711	BM-AS15-12	Silcrete	Flake	Broken FI (Proximal)		0	64.1	46.2	16.1	1-50%	Cortical		0	0							291433.8668	6425837.238	2914.491532	384.6976745	1st	Upper slope
712	BM-AS15-12	Silcrete	Angular Shatter			0	13.4	0	0				0	0							291422.6725	6425835.786	2925.764376	383.7276096	1st	Upper slope
713	BM-AS15-12	Silcrete	Flake	Broken FI (Proximal)		0	40.1	0	0				0	0							291420.4105	6425840.577	2927.654649	388.6459213	1st	Upper slope
714	BM-AS15-12	Silcrete	Angular Shatter			0	16.6	0	0				0	0							291420.9486	6425841.446	2927.052698	389.4799509	1st	Upper slope
715	BM-AS15-12	Silcrete	Flake	Split Flake (Siret)		0	28.9	0	0				0	0							291418.28	6425831.863	2930.448295	380.091911	1st	Upper slope
716	BM-AS15-12	Silcrete	Flake	Complete		0	40.1	37.8	12.4	None	Single		0	0							291420.2724	6425826.281	2928.904521	374.3880841	1st	Upper slope
717	BM-AS15-12	Silcrete	Flake	Complete		0	33.6	20.9	5.6	None	Single		0	0							291480.7426	6425848.03	2866.933867	396.9696353	1st	Upper slope
718	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	14.3	15.6	2.1		Single		0	0							292430.1376	6426042.925	1909.687546	27.45938959	2nd	Lower slope
719	BM-AS16-12	Silcrete	Flake	Complete		0	28.3	25.4	7.4	None	Single		0	0							292507.5399	6425972.342	1834.352862	42.3664408	2nd	Lower slope
720	BM-AS16-12	IM/Tuff	Flake	Complete		0	44.5	58.9	8.9	None	Single		0	0							292506.3743	6425973.335	1835.469268	41.20711334	2nd	Lower slope
721	BM-AS16-12	Silcrete	Flake Shatter			0	53	38	17				0	0							292499.9661	6425975.983	1841.745659	38.15367087	2nd	Lower slope
722	BM-AS16-12	Silcrete	Flake	Split Flake (Siret)		0	60	36.7	13.7				0	0							292480.5047	6425855.977	1870.529157	132.8678046	2nd	Lower slope
723	BM-AS16-12	Silcrete	Flake Shatter			0	26	21.6	11.5				0	0							292472.1941	6425849.603	1879.49685	143.2621837	2nd	Lower slope
724	BM-AS16-12	Silcrete	Flake	Complete		0	20.2	19.7	14.2	None	Single		0	0							292470.878	6425848.269	1880.955161	145.1357799	2nd	Lower slope
725	BM-AS16-12	Silcrete	Angular Shatter			0	26.1	23.5	15.6				0	0							292469.0672	6425848.094	1882.774131	146.5586759	2nd	Lower slope
726	BM-AS16-12	Silcrete	Angular Shatter			0	35	31	10.3				0	0							292465.0496	6425846.08	1886.994539	150.857308	2nd	Lower slope
727	BM-AS16-12	Silcrete	Flake Shatter			0	51.3	49.7	16.6				0	0							292476.4102	6425850.786	1875.174485	139.4332578	2nd	Lower slope
728	BM-AS16-12	FGS Other	Flake	Complete		0	21.8	17.7	4.5	None	Single		0	0							292545.1903	6425863.653	1805.391953	71.52541809	3rd	Lower slope
729	BM-AS16-12	Silcrete	Flake Shatter			0	33.2	18	8.1				0	0							292546.8049	6425861.776	1803.993633	69.94850402	3rd	Lower slope
730	BM-AS16-12	Silcrete	Retouched Flake			0	51.6	37.3	7.9	None			0	0	Scraper	Complete	Flake	V-D	dm	76;74;69	292548.5582	6425860.777	1802.361933	68.23781261	3rd	Lower slope
731	BM-AS16-12	Silcrete	Core		Unidirectional	0	68.7	53.7	32.9	None	Single		5	26.7							292549.0199	6425860.587	1801.924246	67.78629924	3rd	Lower slope
732	BM-AS16-12	Silcrete	Flake	Complete		0	34.1	29.2	8.8	None	Crushed		0	0							292549.4243	6425861.979	1801.367851	67.32387569	3rd	Lower slope
733	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	32	29	7		Multiple		0	0							292549.8626	6425862.983	1800.821431	66.86123279	3rd	Lower slope
734	BM-AS16-12	Silcrete	Flake	Complete		0	14.5	15.6	4.4	None	Single		0	0							292550.2385	6425863.366	1800.405683	66.47995619	3rd	Lower slope
735	BM-AS16-12	Silcrete	Flake	Complete		0	21.2	19.2	19.9	None	Single		0	0							292550.8668	6425862.617	1799.863692	65.86449959	3rd	Lower slope
736	BM-AS16-12	Silcrete	Flake Shatter			0	15.3	18.5	4.2				0	0							292551.4802	6425862.599	1799.256027	65.25167656	3rd	Lower slope
737	BM-AS16-12	Silcrete	Retouched Flake			0	19.6	11.3	3.1	None	Single		0	0	Bondi Point	Complete	Flake				292550.8521	6425858.272	1800.362971	66.12098377	3rd	Lower slope

738	BM-AS16-12	Silcrete	Flake Shatter			0	29.3	20.5	6				0	0							292551.1006	6425861.681	1799.734867	65.65882464	3rd	Lower slope
739	BM-AS16-12	Silcrete	Core		Multidirectional	0	48.9	35.8	24.5	1-50%			4	32.2							292553.4078	6425862.797	1797.318351	63.32017655	3rd	Lower slope
740	BM-AS16-12	IM/Tuff	Flake	Complete		0	28.4	26.8	8.2	1-50%	Single		0	0							292554.0744	6425860.342	1796.928645	62.75347305	3rd	Lower slope
741	BM-AS16-12	Silcrete	Flake	Complete		0	26.2	22.4	6.2	1-50%	Single		0	0							292553.9401	6425854.997	1797.667484	63.43317544	3rd	Lower slope
742	BM-AS16-12	Silcrete	Flake	Complete		0	21.4	30.1	11.8	None	Single		0	0							292553.1558	6425854.786	1798.470817	64.23973539	3rd	Lower slope
743	BM-AS16-12	Quartz	Flake	Complete		0	30.5	30	12.5	1-50%	Cortical		0	0							292554.3462	6425853.096	1797.483207	63.33432293	3rd	Lower slope
744	BM-AS16-12	Silcrete	Core		Multidirectional	2	32.2	26.1	22.7	1-50%		Flake	3	21							292553.4851	6425850.63	1798.625607	64.65157404	3rd	Lower slope
745	BM-AS16-12	IM/Tuff	Angular Shatter			0	19.8	12.4	9				0	0							292549.8787	6425858.089	1801.350798	67.10681937	3rd	Lower slope
746	BM-AS16-12	Silcrete	Core		Bifacial	0	58.3	41.6	18.7	None		Flake	6	21.2							292549.6165	6425858.787	1801.532752	67.30909512	3rd	Lower slope
747	BM-AS16-12	Silcrete	Flake	Complete		0	32.1	33	11.5	1-50%	Cortical		0	0							292548.1885	6425858.162	1803.022001	68.78399488	3rd	Lower slope
748	BM-AS16-12	IM/Tuff	Core		Unidirectional	1	45.3	53.4	18.2	1-50%	Single	Flake	2	33.8							292556.8419	6425847.531	1795.658134	62.12726331	3rd	Lower slope
749	BM-AS16-12	Silcrete	Flake	Complete		0	45.7	35	11.3	1-50%	Single		0	0							292556.6533	6425848.325	1795.751078	62.10239728	3rd	Lower slope
750	BM-AS16-12	Silcrete	Retouched Flake			0	42.7	30.1	12.2	None	Single		0	0	Misc Retouched Flake	Broken	Flake	V-D	ilm	75;74	292564.7228	6425854.079	1787.062597	52.95161012	3rd	Lower slope
751	BM-AS16-12	Quartzite	Flake Shatter			0	36	33.5	9.5				0	0							292564.3466	6425854.369	1787.402674	53.26720195	3rd	Lower slope
752	BM-AS16-12	IM/Tuff	Flake	Complete		0	32	16	4.3	1-50%	Single		0	0							292564.7325	6425855.368	1786.903995	52.71287726	3rd	Lower slope
753	BM-AS16-12	IM/Tuff	Flake Shatter			0	16.5	11.8	2.6				0	0							292564.9611	6425855.925	1786.612822	52.39749279	3rd	Lower slope
754	BM-AS16-12	Silcrete	Flake	Complete		0	17.9	18.2	8.2	None	Single		0	0							292578.4343	6426007.309	1762.128535	57.81551913	2nd	Lower slope
755	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	14.2	26.2	7.1		Single		0	0							292564.2245	6425982.493	1777.258288	34.53455147	2nd	Lower slope
756	BM-AS16-12	Silcrete	Flake	Complete		0	24.3	21	8.4	None	Single		0	0							292567.4654	6425985.992	1773.868701	37.10952718	2nd	Lower slope
757	BM-AS16-12	Silcrete	Core		Multidirectional	2	39.8	38.6	19.3				5	39.8							292570.8058	6425983.366	1770.644865	33.98909006	2nd	Lower slope
758	BM-AS16-12	Silcrete	Retouched Flake			0	19.3	15.7	5.3	None	Multiple		0	0	Scraper	Complete	Flake	V-D	rlm;ilm;dm	70;74;70	292570.86	6425983.867	1770.568753	34.48051694	2nd	Lower slope
759	BM-AS16-12	Silcrete	Flake	Redirecting Flake		0	24.1	23.3	6.5	None	Single		0	0							292573.3108	6425983.341	1768.143394	33.76332537	2nd	Lower slope
760	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	32.9	30	9		Single		0	0							292587.2901	6425997.566	1753.603649	49.56278689	2nd	Lower slope
761	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	22	25	6		Single		0	0							292588.1136	6425999.414	1752.71453	51.55990264	2nd	Lower slope
762	BM-AS16-12	Silcrete	Flake	Complete		0	41.7	29.1	10.8	None	Single		0	0							292584.174	6426002.974	1756.529989	54.18603067	2nd	Lower slope
763	BM-AS16-12	Other	Axe			0	118.4	62.2	35.5				0	0	Axe	Broken					292579.0838	6426011.992	1761.342177	62.53122995	2nd	Lower slope
764	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	16	21	9		Single		0	0							292585.4996	6425968.321	1756.696933	21.56728379	2nd	Lower slope
765	BM-AS16-12	Silcrete	Angular Shatter			0	14	8	9				0	0							292596.7312	6425968.691	1745.4615	29.08946195	2nd	Lower slope
766	BM-AS16-12	Silcrete	Flake Shatter			0	26.5	22	12.3				0	0							292598.2949	6425974.238	1743.614416	34.05538287	2nd	Lower slope
767	BM-AS16-12	Silcrete	Flake	Complete		0	18	26	4	None	Multiple		0	0							292592.4412	6425964.432	1749.975922	23.06113355	2nd	Lower slope
768	BM-AS16-12	Silcrete	Flake	Complete		0	24	23	5.5	None	Single		0	0							292589.8133	6425963.272	1752.664262	20.31814686	2nd	Lower slope
769	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	16.6	12.6	3.9		Single		0	0							292589.5427	6425963.969	1752.895623	20.5983698	2nd	Lower slope
770	BM-AS16-12	IM/Tuff	Core		Bifacial	1	52.7	39	24.6	None		Indeterminate	4	22.4							292593.908	6425962.374	1748.626522	23.0004265	2nd	Lower slope
771	BM-AS16-12	IM/Tuff	Flake	Complete		0	33.4	28.5	9.6	1-50%	Single		0	0							292592.5976	6425952.131	1750.543406	18.00044442	2nd	Lower slope
772	BM-AS16-12	Silcrete	Flake Shatter			0	38.3	32.7	10.9				0	0							292593.063	6425950.786	1750.163281	18.32616118	2nd	Lower slope
773	BM-AS16-12	Quartz	Flake	Complete		0	36.4	22.8	18.2	51-99%	Single		0	0							292593.3765	6425949.746	1749.916361	18.60235423	2nd	Lower slope
774	BM-AS16-12	Silcrete	Flake	Complete		0	33	26	6	None	Single		0	0							292612.7432	6425882.416	1736.227848	7.218507297	2nd	Lower slope
775	BM-AS16-12	Silcrete	Flake	Complete		0	25	9	8.5	None	Multiple		0	0							292613.1785	6425883.294	1735.70463	6.764226066	3rd	Lower slope
776	BM-AS16-12	Silcrete	Flake	Complete		0	20	25	5.5	51-99%	Multiple		0	0							292615.2733	6425883.307	1733.619547	4.670017205	3rd	Lower slope
777	BM-AS16-12	Silcrete	Flake Shatter			0	12.7	12.1	2.9				0	0							292616.9172	6425885.221	1731.78875	3.491631259	3rd	Lower slope
778	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	10.8	7.7	2.3		Single		0	0							292616.451	6425886.638	1732.109123	4.710266556	3rd	Lower slope
779	BM-AS16-12	Silcrete	Flake	Complete		0	37	28	7.7	1-50%	Single		0	0							292614.1105	6425887.238	1734.377419	6.939377959	3rd	Lower slope
780	BM-AS16-12	IM/Tuff	Flake	Complete		0	20.4	23	5	1-50%	Single		0	0							292614.3839	6425887.726	1734.0565	6.996700142	3rd	Lower slope
781	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	39.4	0	0		Single		0	0							292617.3423	6425888.564	1731.029178	5.714745584	3rd	Lower slope
782	BM-AS16-12	Silcrete	Flake Shatter			0	24.3	0	0				0	0							292617.4869	6425888.434	1730.898274	5.533657381	3rd	Lower slope
783	BM-AS16-12	Silcrete	Flake	Complete		28	19.1	5.2	0	None	Faceted		0	0							292617.7566	6425889.211	1730.552509	5.964162828	2nd	Lower slope
784	BM-AS16-12	Silcrete	Flake Shatter			0	20.3	0	0				0	0							292618.0561	6425889.582	1730.217645	5.866956908	2nd	Lower slope
785	BM-AS16-12	Silcrete	Core		Unidirectional	1	80.1	47.2	30.6	51-99%	Single	Flake	3	22.6							292615.7547	6425891.119	1732.356093	8.629076233	2nd	Lower slope
786	BM-AS16-12	Silcrete	Flake	Complete		0	63.9	25.6	10.4	1-50%	Cortical		0	0							292616.2321	6425891.038	1731.888959	8.179414512	2nd	Lower slope
787	BM-AS16-12	Silcrete	Flake Shatter			0	21.4	0	0				0	0							292616.1633	6425892.269	1731.836887	8.947460592	2nd	Lower slope
788	BM-AS16-12	Chert	Flake	Broken FI (Proximal)		0	24.8	0	0	None	Multiple		0	0							292616.2985	6425892.237	1731.705454	8.821921027	2nd	Lower slope
789	BM-AS16-12	Silcrete	Flake	Complete		0	32.5	26.9	13.1	None	Single		0	0							292615.9862	6425892.36	1732.004266	9.142798098	2nd	Lower slope
790	BM-AS16-12	IM/Tuff	Flake	Complete		0	29.3	37.7	10.6	None	Single		0	0							292615.8984	6425892.346	1732.093013	9.203316593	2nd	Lower slope
791	BM-AS16-12	Silcrete	Flake	Complete		0	28.9	23.7	11.6	None	Crushed		0	0							292615.9491	6425892.782	1732.000094	9.438218461	2nd	Lower slope

792	BM-AS16-12	Silcrete	Flake	Complete		0	17.8	15.4	4.2		Single		0	0							292616.39	6425893.563	1731.485477	9.644688956	2nd	Lower slope
793	BM-AS16-12	IM/Tuff	Flake	Split Flake (Siret)		0	31.1	0	0				0	0							292616.4896	6425893.584	1731.384312	9.590034397	2nd	Lower slope
794	BM-AS16-12	Silcrete	Flake	Complete		0	24.9	14.9	2.1	None	Multiple		0	0							292616.3603	6425893.596	1731.511842	9.689038671	2nd	Lower slope
795	BM-AS16-12	Silcrete	Flake	Complete		0	18.6	23.9	4.7	None	Multiple		0	0							292616.281	6425893.515	1731.598614	9.687757014	2nd	Lower slope
796	BM-AS16-12	Silcrete	Flake	Complete		0	49.6	25.2	16.7	1-50%	Single		0	0							292616.3471	6425893.091	1731.573947	9.345986795	2nd	Lower slope
797	BM-AS16-12	IM/Tuff	Flake	Broken FI (Proximal)		0	27.3	0	0		Single		0	0							292616.0492	6425893.15	1731.864712	9.605040011	2nd	Lower slope
798	BM-AS16-12	Silcrete	Flake Shatter			0	15.5	0	0				0	0							292616.1259	6425892.882	1731.814407	9.369394588	2nd	Lower slope
799	BM-AS16-12	IM/Tuff	Flake	Complete		0	16.6	24.6	7				0	0							292618.4045	6425892.103	1729.622619	7.201928383	2nd	Lower slope
800	BM-AS16-12	Silcrete	Flake	Split Flake (Siret)		0	22.7	0	0				0	0							292618.6634	6425892.952	1729.282131	7.70480552	2nd	Lower slope
801	BM-AS16-12	Silcrete	Flake Shatter			0	29.9	0	0				0	0							292618.8073	6425893.322	1729.102943	7.927930397	2nd	Lower slope
802	BM-AS16-12	Silcrete	Flake Shatter			0	21.1	0	0				0	0							292617.8265	6425896.953	1729.730464	11.56017008	2nd	Lower slope
803	BM-AS16-12	Silcrete	Angular Shatter			0	14.7	0	0				0	0							292617.7815	6425896.588	1729.809985	11.25916286	2nd	Lower slope
804	BM-AS16-12	Silcrete	Flake Shatter			0	11.7	0	0				0	0							292617.8348	6425896.322	1729.782248	11.00036042	2nd	Lower slope
805	BM-AS16-12	Silcrete	Flake	Complete		0	24.5	26.1	7.2	None	Crushed		0	0							292621.9167	6425871.409	1728.27774	8.957440343	3rd	Lower slope
806	BM-AS16-12	IM/Tuff	Flake	Broken FI (Proximal)		0	23.9	0	0		Multiple		0	0							292622.7383	6425874.907	1727.080215	7.49568499	2nd	Lower slope
807	BM-AS16-12	IM/Tuff	Flake Shatter			0	23.8	0	0				0	0							292617.8166	6425896.015	1729.829661	10.7419142	2nd	Lower slope
808	BM-AS16-12	IM/Tuff	Flake Shatter			0	25.5	0	0				0	0							292617.7245	6425898.387	1729.6964	12.89182018	2nd	Lower slope
809	BM-AS16-12	Silcrete	Flake	Complete		0	34.3	16.2	8.4	None	Single		0	0							292613.3986	6425893.78	1734.441877	12.06384081	2nd	Lower slope
810	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	24.5	0	0		Multiple		0	0							292612.9188	6425894.146	1734.884146	12.66712888	2nd	Lower slope
811	BM-AS16-12	Silcrete	Flake Shatter			0	24.9	0	0				0	0							292612.3006	6425895.699	1735.350638	14.10841488	2nd	Lower slope
812	BM-AS16-12	Silcrete	Flake Shatter			0	32.1	0	0				0	0							292624.702	6425895.831	1722.993522	9.259139989	2nd	Lower slope
813	BM-AS16-12	FGS Other	Flake	Complete		0	21.6	19.1	5.5	None	Single		0	0							292625.9355	6425896.865	1721.666695	10.53533569	2nd	Lower slope
814	BM-AS16-12	Silcrete	Flake	Complete		0	36.7	21	17.6				0	0							292626.4495	6425897.226	1721.120604	11.02603605	2nd	Lower slope
815	BM-AS16-12	Silcrete	Flake	Complete		0	43.1	25.4	10.7	1-50%	Multiple		0	0							292626.2433	6425895.998	1721.443309	9.793792737	2nd	Lower slope
816	BM-AS16-12	Silcrete	Flake	Complete		0	25.6	17.3	4.2	None	Single		0	0							292626.8854	6425896.157	1720.788914	10.16188847	2nd	Lower slope
817	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	31.6	0	0		Single		0	0							292628.0733	6425896.879	1719.537334	11.29989564	2nd	Lower slope
818	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	12.9	0	0		Single		0	0							292630.711	6425897.406	1716.86136	13.09721353	2nd	Lower slope
819	BM-AS16-12	Silcrete	Flake	Complete		0	45.1	38.2	10.8		Single		0	0							292632.5208	6425898.346	1714.970287	14.93758213	2nd	Lower slope
820	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	16.7	0	0		Multiple		0	0							292632.8081	6425898.277	1714.690843	15.06607225	2nd	Lower slope
821	BM-AS16-12	Silcrete	Flake Shatter			0	10.8	0	0				0	0							292633.7058	6425897.67	1713.855034	15.21239878	2nd	Lower slope
822	BM-AS16-12	Silcrete	Flake	Complete		0	28.5	24	10.3	None	Single		0	0							292632.2951	6425899.054	1715.127872	15.36071742	2nd	Lower slope
823	BM-AS16-12	Silcrete	Angular Shatter			0	29.1	0	0				0	0							292632.3286	6425900.76	1714.934035	16.7817283	2nd	Lower slope
824	BM-AS16-12	Silcrete	Flake	Complete		0	12.3	11.2	2.9	None	Single		0	0							292629.2954	6425900.014	1718.023796	14.65689474	2nd	Lower slope
825	BM-AS16-12	IM/Tuff	Flake	Complete		0	31.6	37.3	9.9	1-50%	Single		0	0							292628.4913	6425900.276	1718.799793	14.58285659	2nd	Lower slope
826	BM-AS16-12	Silcrete	Flake	Split Flake (Siret)		0	28.4	0	0				0	0							292638.5212	6425906.914	1708.201734	14.97970568	2nd	Lower slope
827	BM-AS16-12	IM/Tuff	Flake	Complete		0	36.1	14.2	10.1	None	Multiple		0	0							292634.4566	6425910.726	1711.91038	9.551187244	2nd	Lower slope
828	BM-AS16-12	IM/Tuff	Flake	Complete		0	22.3	15.8	10.1	1-50%	Crushed		0	0							292636.1274	6425912.299	1710.108338	9.313927197	2nd	Lower slope
829	BM-AS16-12	Silcrete	Flake	Complete		0	21.4	14.6	6.2	None	Single		0	0							292635.0662	6425916.136	1710.8358	6.136573926	2nd	Lower slope
830	BM-AS16-12	Silcrete	Angular Shatter			0	24.8	0	0				0	0							292634.5923	6425915.75	1711.340766	5.920226808	2nd	Lower slope
831	BM-AS16-12	Chert	Flake	Complete		0	18.3	13.8	6.7	51-99%	Multiple		0	0							292634.9234	6425919.631	1710.685225	5.346816154	2nd	Lower slope
832	BM-AS16-12	IM/Tuff	Flake	Complete		0	21.7	19.7	2.9	None	Single		0	0							292635.5329	6425920.166	1710.033598	6.035660437	2nd	Lower slope
833	BM-AS16-12	IM/Tuff	Flake	Split Flake (Siret)		0	16.2	0	0				0	0							292635.6583	6425919.485	1709.964945	6.062271622	2nd	Lower slope
834	BM-AS16-12	Silcrete	Flake	Complete		0	18.7	8.3	7.2	None	Single		0	0							292635.9646	6425918.412	1709.749002	6.369634648	2nd	Lower slope
835	BM-AS16-12	Silcrete	Flake	Complete		0	29.1	26.3	17.1	None	Multiple		0	0							292636.4401	6425921.733	1709.000862	7.36301762	2nd	Lower slope
836	BM-AS16-12	Silcrete	Flake	Complete		0	20.6	16.4	3.7	None	Single		0	0							292636.6556	6425922.312	1708.738908	7.793932785	2nd	Lower slope
837	BM-AS16-12	Silcrete	Flake Shatter			0	16.7	0	0				0	0							292636.0438	6425921.747	1709.394697	7.003016424	2nd	Lower slope
838	BM-AS16-12	Silcrete	Core		Bidirectional	2	63.8	38.6	31.8	1-50%		Indeterminate	4	50.4							292631.803	6425916.354	1714.068823	3.401338747	2nd	Lower slope
839	BM-AS16-12	Chert	Flake	Broken FI (Proximal)		0	18.8	0	0		Single		0	0							292633.1612	6425911.834	1713.103778	7.959112591	2nd	Lower slope
840	BM-AS16-12	FGS Other	Flake	Redirecting Flake		0	47.4	37.8	11.7	1-50%	Multiple		0	0							292633.7622	6425912.789	1712.422014	7.434089622	2nd	Lower slope
841	BM-AS16-12	Silcrete	Core		Multidirectional	4	63.2	52.1	29.4	1-50%		Indeterminate	10	37.4							292635.4236	6425921.742	1710.013237	6.436563678	2nd	Lower slope
842	BM-AS16-12	Silcrete	Flake	Complete		0	46.5	24.5	10.9	None	Multiple		0	0							292632.8896	6425932.053	1711.729744	13.49414588	2nd	Lower slope
843	BM-AS16-12	IM/Tuff	Flake Shatter			0	25.8	0	0				0	0							292631.8262	6425933.965	1712.64696	15.16524676	2nd	Lower slope
844	BM-AS16-12	Silcrete	Angular Shatter			0	28.6	0	0				0	0							292633.8792	6425933.192	1710.657332	14.85480798	2nd	Lower slope
845	BM-AS16-12	Silcrete	Flake Shatter			0	23.4	0	0				0	0							292631.6885	6425935.748	1712.652708	16.91384281	2nd	Lower slope
846	BM-AS16-12	Quartz	Flake Shatter			0	22.4	0	0				0	0							292631.7392	6425935.759	1712.601338	16.9310353	2nd	Lower slope

847	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	19.6	0	0		Single		0	0							292629.8483	6425939.505	1714.217085	20.54500333	2nd	Lower slope
848	BM-AS16-12	IM/Tuff	Flake Shatter			0	11	0	0				0	0							292629.109	6425939.253	1714.972406	20.29812055	2nd	Lower slope
849	BM-AS16-12	IM/Tuff	Flake	Complete		0	32.9	20.4	8.4	None	Multiple		0	0							292629.1047	6425941.268	1714.834543	22.3126412	2nd	Lower slope
850	BM-AS16-12	Porcellanite	Core		Multidirectional	2	27.2	18.2	12.6	1-50%		Indeterminate	3	23.4							292631.4361	6425943.475	1712.355663	24.58099774	2nd	Lower slope
851	BM-AS16-12	Porcellanite	Core			0	29.1	26.2	14.1				0	0							292627.2585	6425941.65	1716.64957	22.81114941	2nd	Lower slope
852	BM-AS16-12	Silcrete	Flake	Complete		0	33	29.4	11.7	None	Multiple		0	0							292626.9489	6425942.209	1716.919572	23.40051904	2nd	Lower slope
853	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	17.7	0	0		Single		0	0							292626.7442	6425942.277	1717.119067	23.49224384	2nd	Lower slope
854	BM-AS16-12	Porcellanite	Core		Multidirectional	3	26.6	18.8	14.3	None		Indeterminate	5	22							292626.6493	6425943.426	1717.134522	24.64426569	2nd	Lower slope
855	BM-AS16-12	IM/Tuff	Flake	Complete		0	19.9	17.7	5.7	None	Single		0	0							292629.0012	6425947.089	1714.540398	28.13449741	2nd	Lower slope
856	BM-AS16-12	Silcrete	Flake Shatter			0	21.3	0	0				0	0							292629.2711	6425946.751	1714.293638	27.79189402	2nd	Lower slope
857	BM-AS16-12	Silcrete	Flake Shatter			0	17.8	0	0				0	0							292629.5067	6425946.502	1714.075214	27.54094797	2nd	Lower slope
858	BM-AS16-12	IM/Tuff	Flake	Complete		0	35	29	16.4	1-50%	Single		0	0							292630.8249	6425944.349	1712.905551	25.41635843	2nd	Lower slope
859	BM-AS16-12	IM/Tuff	Flake	Complete		0	26.4	25.6	8.6	None	Single		0	0							292630.7341	6425943.995	1713.020332	25.05855709	2nd	Lower slope
860	BM-AS16-12	Porcellanite	Flake	Complete		0	23.2	16.7	5.4	None	Single		0	0							292629.8811	6425947.131	1713.659655	28.17094243	2nd	Lower slope
861	BM-AS16-12	Silcrete	Flake	Complete		0	30	18.2	10.8	None	Single		0	0							292628.2279	6425949.075	1715.180962	30.14581982	2nd	Lower slope
862	BM-AS16-12	Silcrete	Flake	Complete		0	26.2	19	8.2	None	Multiple		0	0							292630.1857	6425948.922	1713.237381	29.96608509	2nd	Lower slope
863	BM-AS16-12	Silcrete	Flake Shatter			0	19.5	0	0				0	0							292628.6308	6425949.005	1714.783505	30.05995774	2nd	Lower slope
864	BM-AS16-12	Silcrete	Flake	Complete		0	52.4	42.2	18	1-50%	Single		0	0							292631.1957	6425954.89	1711.848423	26.62978306	2nd	Lower slope
865	BM-AS16-12	Silcrete	Flake Shatter			0	21.4	0	0				0	0							292633.0071	6425960.973	1709.67299	20.28442779	2nd	Lower slope
866	BM-AS16-12	Silcrete	Flake Shatter			0	25.6	0	0				0	0							292631.624	6425962.768	1710.949462	19.09870884	2nd	Lower slope
867	BM-AS16-12	Silcrete	Flake Shatter			0	54.7	0	0				0	0							292631.1261	6425962.271	1711.475205	19.7555321	2nd	Lower slope
868	BM-AS16-12	Silcrete	Flake	Complete		0	46	19	12.7	1-50%	Single		0	0							292634.1745	6425964.426	1708.30843	16.63968282	2nd	Lower slope
869	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	25	0	0		Single		0	0							292631.9618	6425971.304	1710.14207	11.57464021	2nd	Lower slope
870	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	32.2	0	0		Single		0	0							292632.6905	6425971.341	1709.412433	11.09737382	2nd	Lower slope
871	BM-AS16-12	IM/Tuff	Flake	Complete		0	20.9	20.4	6	1-50%	Multiple		0	0							292632.7458	6425977.728	1709.033199	7.022651364	2nd	Lower slope
872	BM-AS16-12	Quartz	Flake	Split Flake (Siret)		0	27.4	0	0				0	0							292633.2466	6425977.759	1708.531483	6.546054142	2nd	Lower slope
873	BM-AS16-12	Silcrete	Flake Shatter			0	37.5	0	0				0	0							292627.6012	6425999.272	1713.257203	22.32356811	2nd	Lower slope
874	BM-AS16-12	IM/Tuff	Flake	Complete		0	35.7	33.7	13.9	51-99%	Multiple		0	0							292624.2486	6426011.351	1716.214015	34.54356082	2nd	Lower slope
875	BM-AS16-12	Silcrete	Flake	Complete		0	13.7	16.6	8.7	None	Single		0	0							292658.1329	6425846.473	1695.263641	45.02029264	3rd	Lower slope
876	BM-AS16-12	Silcrete	Flake	Complete		0	35.2	24.2	10.3	1-50%	Single		0	0							292670.2318	6425843.479	1683.647548	44.67185816	3rd	Lower slope
877	BM-AS16-12	Other	Core		Unidirectional	1	117.3	72.7	42.6	51-99%		Cobble	3	24							292678.7804	6425842.829	1675.255738	46.42004651	3rd	Lower slope
878	BM-AS16-12	Silcrete	Flake	Complete		0	28.1	24.1	12	None	Multiple		0	0							292676.7766	6425822.461	1680.016177	27.29054117	3rd	Lower slope
879	BM-AS16-12	Chert	Core		Bifacial	1	49.9	28.4	13.6	None		Indeterminate	5	15							292676.7424	6425820.098	1680.387504	25.32339056	3rd	Lower slope
880	BM-AS16-12	IM/Tuff	Angular Shatter			0	14	0	0				0	0							292678.7071	6425814.192	1679.301854	22.27627073	3rd	Lower slope
881	BM-AS16-12	IM/Tuff	Flake	Complete		0	41.7	29.3	10.8	None	Single		0	0							292687.7072	6425806.618	1671.53717	26.76517466	3rd	Lower slope
882	BM-AS16-12	IM/Tuff	Flake	Complete		0	36.6	25.6	8	1-50%	Cortical		0	0							292710.9933	6425804.144	1648.910572	49.32363938	3rd	Lower slope
883	BM-AS16-12	Silcrete	Flake	Complete		0	35.4	16.3	11.1	None	Single		0	0							292712.604	6425805.496	1647.109125	51.06621723	3rd	Lower slope
884	BM-AS16-12	IM/Tuff	Core		Multidirectional	2	36.4	23.6	22.4	1-50%		Indeterminate	6	20.8							292713.149	6425805.098	1646.632601	51.56361034	3rd	Lower slope
885	BM-AS16-12	Silcrete	Flake Shatter			0	29.1	0	0				0	0							292713.2622	6425795.423	1648.053596	51.55138488	3rd	Lower slope
886	BM-AS16-12	Quartz	Flake	Complete		0	19.7	23.2	4.8	None	Single		0	0							292689.8413	6425777.17	1674.172438	35.84289301	3rd	Lower slope
887	BM-AS16-12	Silcrete	Core		Unidirectional	1	105.9	51.9	40.4	None		Flake	3	26.3							292692.8927	6425766.807	1672.958078	45.13131525	3rd	Lower slope
888	BM-AS16-12	IM/Tuff	Flake	Complete		0	56.6	41.5	14.4	51-99%	Cortical		0	0							292699.1136	6425709.228	1677.96291	27.48292564	3rd	Lower slope
889	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	42.5	0	0		Single		0	0							292699.6973	6425703.553	1678.592316	28.16060392	3rd	Lower slope
890	BM-AS16-12	Silcrete	Flake Shatter			0	28	0	0				0	0							292713.6707	6425660.171	1674.7985	53.84540221	3rd	Lower slope
891	BM-AS16-12	Silcrete	Angular Shatter			0	22.3	0	0				0	0							292714.8026	6425653.172	1675.390515	60.44111343	3rd	Lower slope
892	BM-AS16-12	Silcrete	Flake	Complete		0	42.8	45.6	12.1	1-50%	Single		0	0							292711.1206	6425650.855	1679.526515	63.50080059	3rd	Lower slope
893	BM-AS16-12	IM/Tuff	Flake	Complete		0	32.8	30.9	3.8	1-50%	Single		0	0							292714.3978	6425636.469	1679.928582	50.56591985	3rd	Lower slope
894	BM-AS16-12	Silcrete	Angular Shatter			0	25.9	0	0				0	0							292673.2983	6425592.911	1730.997475	50.26671075	3rd	Lower slope
895	BM-AS16-12	Silcrete	Flake	Complete		0	36	22	8	None	Single		0	0							292562.3201	6425815.82	1794.28079	72.74161245	3rd	Lower slope
896	BM-AS16-12	Silcrete	Flake Shatter			0	28.7	0	0				0	0							292560.8215	6425816.724	1795.641993	73.28106053	3rd	Lower slope
897	BM-AS16-12	Silcrete	Retouched Flake			0	53.8	37.2	19.9	None	Multiple		0	0	Scraper	Complete	Flake	V-D	rlm	58; 65	292623.1979	6426091.076	1716.79866	24.19576001	2nd	Lower slope
898	BM-AS16-12	Silcrete	Core		Multidirectional	2	70.4	58.2	32.9	None		Flake	4	27.3							292572.5302	6426041.254	1767.320132	69.98545037	2nd	Lower slope
899	BM-AS16-12	Silcrete	Flake	Complete		0	36.2	38.5	24.3	1-50%	Multiple		0	0							292572.7147	6426042.289	1767.12424	69.38947096	2nd	Lower slope
900	BM-AS16-12	Silcrete	Flake	Complete		0	28.3	19.5	6.3	51-99%	Faceted		0	0							292560.5356	6426039.288	1779.33714	65.02492478	2nd	Lower slope
901	BM-AS16-12	IM/Tuff	Flake	Complete		0	17.4	37.3	10.1	1-50%	Single		0	0							292513.268	6426134.215	1827.926498	94.77801709	2nd	Lower slope
902	BM-AS16-12	Silcrete	Flake Shatter			0	19.3	13.6	5.1				0	0							292506.8763	6426043.055	1832.951229	29.60186291	2nd	Lower slope

903	BM-AS16-12	Silcrete	Flake	Complete		0	38.7	31	28.4	None	Single		0	0							292501.2502	6426043.152	1838.576096	29.02805016	2nd	Lower slope
904	BM-AS16-12	Silcrete	Angular Shatter			0	48.4	32.6	20.4				0	0							292501.1163	6426042.249	1838.719095	28.12240189	2nd	Lower slope
905	BM-AS16-12	FGS Other	Flake	Complete		0	31.1	34.2	10.9	None	Single		0	0							292499.3972	6426043.058	1840.429933	28.95009335	2nd	Lower slope
906	BM-AS16-12	IM/Tuff	Flake	Complete		0	13.6	13.8	3.6	None	Multiple		0	0							292501.2765	6426044.738	1838.534877	30.61423424	2nd	Lower slope
907	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	0	0	0		Multiple		0	0							292498.0628	6426045.224	1841.744157	31.19340597	2nd	Lower slope
908	BM-AS16-12	Silcrete	Flake Shatter			0	11.9	7.8	2				0	0							292496.8969	6426045.324	1842.909146	31.40814652	2nd	Lower slope
909	BM-AS16-12	Silcrete	Flake Shatter			0	14.4	11.4	5.6				0	0							292496.1221	6426043.932	1843.696461	30.13085614	2nd	Lower slope
910	BM-AS16-12	IM/Tuff	Flake	Broken FI (Proximal)		0	17.6	19.4	5.6		Multiple		0	0							292496.2666	6426043.628	1843.554846	29.80900402	2nd	Lower slope
911	BM-AS16-12	Silcrete	Flake Shatter			0	15.3	7.4	4.2				0	0							292496.2632	6426044.066	1843.554114	30.24295804	2nd	Lower slope
912	BM-AS16-12	Silcrete	Flake	Complete		0	17	17.6	6.1	None	Single		0	0							292496.5694	6426042.327	1843.264951	28.47812293	2nd	Lower slope
913	BM-AS16-12	Silcrete	Angular Shatter			0	15.2	8.2	4.9				0	0							292496.8168	6426042.285	1843.017996	28.40275771	2nd	Lower slope
914	BM-AS16-12	Silcrete	Flake Shatter			0	19.4	13.1	3.4				0	0							292497.5006	6426041.138	1842.346391	27.18047613	2nd	Lower slope
915	BM-AS16-12	Silcrete	Flake	Complete		0	21.2	15.3	9.4	None	Multiple		0	0							292496.8766	6426041.55	1842.965905	27.66633224	2nd	Lower slope
916	BM-AS16-12	IM/Tuff	Core		Multidirectional	2	27.4	21.3	14	1-50%		Indeterminate	4	17.8							292496.2587	6426041.497	1843.584337	27.70330884	2nd	Lower slope
917	BM-AS16-12	Silcrete	Flake	Complete		0	34.3	29.4	16.1	None	Single		0	0							292495.4288	6426043.984	1844.389243	30.29230787	2nd	Lower slope
918	BM-AS16-12	Silcrete	Flake	Complete		0	16.8	19.9	5.2	None	Single		0	0							292494.7682	6426043.924	1845.050376	30.35258353	2nd	Lower slope
919	BM-AS16-12	Silcrete	Core		Unidirectional	1	36.3	20.5	22.5	None		Indeterminate	4	26.8							292494.4251	6426045.194	1845.38198	31.66490035	2nd	Lower slope
920	BM-AS16-12	Quartz	Flake	Complete		0	11.4	7.1	2.5	1-50%	Single		0	0							292495.562	6426043.358	1844.262013	29.65279022	2nd	Lower slope
921	BM-AS16-12	Silcrete	Flake	Complete		0	20	17.6	4.5	None	Single		0	0							292477.5336	6426049.612	1862.240017	27.13870006	2nd	Lower slope
922	BM-AS16-12	Quartz	Flake	Complete		0	18	16.6	10.7	51-99%	Multiple		0	0							292477.3253	6426048.762	1862.453815	27.26130698	2nd	Lower slope
923	BM-AS16-12	Silcrete	Flake	Complete		0	27.8	20	8.4	None	Single		0	0							292462.8218	6426074.169	1876.960026	18.28564591	2nd	Lower slope
924	BM-AS16-12	Silcrete	Flake Shatter			0	20.1	17.3	4.5				0	0							292479.0844	6426075.291	1860.705949	31.29739138	2nd	Lower slope
925	BM-AS16-12	Silcrete	Angular Shatter			0	13.2	10.2	3.3				0	0							292479.0008	6426076.32	1860.7976	31.76490299	2nd	Lower slope
926	BM-AS16-12	IM/Tuff	Flake Shatter			0	43.5	32.4	8.2				0	0							292461.5635	6426075.79	1878.230153	18.97401458	2nd	Lower slope
927	BM-AS16-12	IM/Tuff	Flake	Complete		0	10.8	20.2	2.2	None	Single		0	0							292459.5834	6426074.631	1880.201583	17.026315	2nd	Lower slope
928	BM-AS16-12	Quartz	Flake	Complete		0	9.7	15.7	5.1	Complete	Single		0	0							292456.6033	6426076.401	1883.195024	17.66568585	2nd	Lower slope
929	BM-AS16-12	Quartz	Flake	Complete		0	26.4	33.8	22.7	1-50%	Multiple		0	0							292456.3809	6426075.137	1883.407667	16.38656284	2nd	Lower slope
930	BM-AS16-12	Quartz	Flake Shatter			0	18.1	14	5.2				0	0							292455.5335	6426073.867	1884.246106	14.94998211	2nd	Lower slope
931	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	25.9	18.7	9.1		Multiple		0	0							292455.1524	6426073.895	1884.627385	14.89662448	2nd	Lower slope
932	BM-AS16-12	IM/Tuff	Flake	Complete		0	18.7	16.5	3.1	1-50%	Single		0	0							292458.3438	6426073.702	1881.434769	15.66703766	2nd	Lower slope
933	BM-AS16-12	IM/Tuff	Retouched Flake			0	36.4	14.2	10.6	1-50%			0	0	Bondi Point	Complete	Flake				292357.5181	6426056.279	1982.225417	28.24479328	2nd	Lower slope
934	BM-AS16-12	IM/Tuff	Flake Shatter			0	22.7	19.4	5.4				0	0							292332.9012	6426063.091	2006.836958	44.65389675	2nd	Lower slope
935	BM-AS16-12	Quartz	Flake	Complete		0	36.2	25.4	9.8	1-50%	Single		0	0							292322.7816	6426063.816	2016.957349	39.9019754	2nd	Lower slope
936	BM-AS16-12	Silcrete	Core		Unidirectional	1	69	52	30.9	1-50%		Flake	8	0							292280.307	6426075.094	2059.476895	21.48008061	2nd	Lower slope
937	BM-AS16-12	Silcrete	Flake	Redirecting Flake		0	51.6	26.5	15.1	None	Multiple		0	0							292616.3656	6426147.372	1725.522682	9.351937465	2nd	Lower slope
938	BM-AS16-12	Silcrete	Flake	Complete		0	61.4	70.9	54.7	1-50%	Multiple		0	0							292616.2793	6426162.597	1726.43577	17.2641844	2nd	Lower slope
939	BM-AS16-12	Silcrete	Flake	Complete		0	10.2	14.9	3.6	None	Single		0	0							292622.7373	6426157.435	1719.692484	18.31000818	2nd	Lower slope
940	BM-AS16-12	Silcrete	Flake Shatter			0	40	28.1	10.5				0	0							292622.814	6426154.689	1719.464482	17.13129546	2nd	Lower slope
941	BM-AS16-12	Silcrete	Flake	Complete		0	29.7	49.1	8.3	None	Single		0	0							292624.3705	6426153.442	1717.842903	18.16407066	2nd	Lower slope
942	BM-AS16-12	IM/Tuff	Flake	Complete		0	29	13.3	5.2	1-50%	Cortical		0	0							292626.146	6426153.253	1716.059821	19.81478816	2nd	Lower slope
943	BM-AS16-12	Silcrete	Flake	Complete		0	22	22.2	4.5	None	Multiple		0	0							292626.8487	6426153.292	1715.360225	20.50334221	2nd	Lower slope
944	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	32.7	22.1	5.3		Multiple		0	0							292626.9008	6426153.721	1715.331275	20.66797657	2nd	Lower slope
945	BM-AS16-12	Silcrete	Flake	Broken FI (Proximal)		0	46.7	17.8	14.9		Multiple		0	0							292625.1636	6426153.807	1717.070585	19.03031858	2nd	Lower slope
946	BM-AS16-12	IM/Tuff	Flake Shatter			0	11.7	10.1	2.6				0	0							292621.7334	6426151.481	1720.372232	15.1005102	2nd	Lower slope
947	BM-AS16-12	IM/Tuff	Flake	Broken FI (Proximal)		0	16.2	14.4	2.4		Single		0	0							292619.3595	6426149.503	1722.640391	12.41305886	2nd	Lower slope
948	BM-AS16-12	IM/Tuff	Flake	Complete		0	28.9	27.8	21.6	None	Single		0	0							292618.892	6426148.861	1723.074511	11.8862359	2nd	Lower slope
949	BM-AS16-12	IM/Tuff	Flake	Complete		0	50.4	49.4	16.2	None	Single		0	0							292614.6096	6426154.939	1727.670354	10.26119157	2nd	Lower slope
950	BM-AS16-12	Silcrete	Retouched Flake			0	44.9	37.2	8.6	None	Single		0	0	Scraper	Complete	Flake	V-D	distal margin	59;55;50	292619.8225	6426153.781	1722.402545	14.0262491	2nd	Lower slope
951	BM-AS16-12	Silcrete	Flake	Complete		0	12.8	23.1	4.5	None	Single		0	0							292618.3623	6426156.585	1724.013435	14.20278993	2nd	Lower slope
952	BM-AS17-12	Silcrete	Flake	Broken FI (Proximal)		0	24.4	0	0		Single		0	0							292835.4254	6425699.052	1547.299396	109.848096	3rd	Lower slope
953	BM-AS17-12	Chalcedony	Flake	Complete		0	24	24	7.1	None	Single		0	0							292834.4072	6425701.291	1547.767091	108.583912	3rd	Lower slope
954	BM-AS17-12	Silcrete	Core		Multidirectional	2	60	57.8	39.7	1-50%		Indeterminate	4	39.1							292835.6549	6425700.885	1546.648172	109.8671752	3rd	Lower slope
955	BM-AS17-12	Silcrete	Flake	Complete		0	19.4	23.6	12.1	None	Single		0	0							292835.4205	6425700.757	1546.905946	109.6477117	3rd	Lower slope
956	BM-AS17-12	IM/Tuff	Flake Shatter			0	18.5	0	0				0	0							292835.0636	6425701.051	1547.184551	109.2616975	3rd	Lower slope
957	BM-AS17-12	IM/Tuff	Flake	Complete		0	17.6	14.5	2.4	None	Single		0	0							292835.2859	6425701.405	1546.885974	109.4463594	3rd	Lower slope

958	BM-AS18-12	Silcrete	Flake	Complete		0	21.3	10.4	5.5	None	Single		0	0							292791.3201	6425513.487	1642.446544	32.93108235	3rd	Lower slope
959	BM-AS18-12	Silcrete	Core		Unidirectional	1	57.6	51.6	39.1	1-50%		Flake	4	33.1							292793.8797	6425511.97	1640.540988	35.32154285	3rd	Lower slope
960	BM-AS18-12	Silcrete	Flake	Broken FI (Proximal)		0	19.6	0	0		Single		0	0							292799.9654	6425500.771	1638.604441	42.16204572	3rd	Lower slope
961	BM-AS18-12	Silcrete	Flake Shatter			0	43.5	0	0				0	0							292828.1451	6425454.115	1628.960828	5.882025825	3rd	Lower slope
962	BM-AS18-12	Silcrete	Flake Shatter			0	27.1	0	0				0	0							292829.6531	6425453.257	1627.881831	5.422215944	3rd	Lower slope
963	BM-AS18-12	Silcrete	Flake Shatter			0	37.6	0	0				0	0							292829.4111	6425453.867	1627.878628	5.104412856	3rd	Lower slope
964	BM-AS18-12	Silcrete	Flake Shatter			0	59.2	0	0				0	0							292829.4612	6425453.941	1627.804536	5.016040867	3rd	Lower slope
965	BM-AS18-12	Silcrete	Flake Shatter			0	42	0	0				0	0							292828.7033	6425451.481	1629.426718	7.421294392	3rd	Lower slope
966	BM-AS18-12	Silcrete	Core		Multidirectional	3	50.3	39.7	38.4	None		Indeterminate	5	36.9							292825.1887	6425452.811	1632.19023	9.060869273	3rd	Lower slope
967	BM-AS18-12	Silcrete	Flake	Complete		0	21.4	16.7	4.7	None	Single		0	0							292828.9062	6425446.825	1630.986836	11.50345594	3rd	Lower slope
968	BM-AS18-12	Silcrete	Flake	Complete		0	65.9	58.7	29.8	None	Single		0	0							292831.8129	6425440.897	1630.540739	16.76207699	3rd	Lower slope
969	BM-AS18-12	IMI/Tuff	Flake	Complete		0	44.1	26.1	6.8	None	Multiple		0	0							292837.4859	6425438.4	1626.250476	19.7737517	3rd	Lower slope
970	BM-AS18-12	Silcrete	Flake	Complete		0	21.3	13.2	5.3	None	Single		0	0							292837.0196	6425438.872	1626.500565	19.20890252	3rd	Lower slope
971	BM-AS18-12	IMI/Tuff	Flake	Complete		0	18.1	25	5.2	None	Multiple		0	0							292860.6476	6425380.783	1628.106231	20.6167469	3rd	Lower slope
972	BM-AS18-12	Silcrete	Flake	Broken FI (Proximal)		0	41	0	0		Single		0	0							292860.8606	6425365.789	1634.236903	24.97256411	3rd	Lower slope
973	BM-AS18-12	IMI/Tuff	Flake	Complete		0	49	23	10.2	1-50%	Cortical		0	0							292861.4992	6425363.665	1634.564356	25.76263764	3rd	Lower slope
974	BM-AS18-12	IMI/Tuff	Flake	Complete		0	40	25	5	1-50%	Multiple		0	0							292864.737	6425373.899	1627.287738	17.67971401	3rd	Lower slope
975	BM-AS18-12	IMI/Tuff	Flake	Complete		0	49.9	37.9	9.4	None	Multiple		0	0							292871.7781	6425327.096	1641.302409	12.79062683	3rd	Lower slope
976	BM-AS18-12	IMI/Tuff	Flake	Complete		0	42.5	34.5	14.5	1-50%	Cortical		0	0							292940.4879	6425050.255	1726.265409	44.40046503	3rd	Lower slope
977	BM-AS19-12	Silcrete	Flake	Complete		0	23.3	41.7	8.9	None	Single		0	0							292932.991	6425055.504	1729.289666	42.21027793	3rd	Lower slope
978	BM-AS19-12	Silcrete	Angular Shatter			0	19.6	0	0				0	0							292931.4812	6425056.299	1730.056169	42.22532782	3rd	Lower slope
979	BM-AS19-12	Silcrete	Angular Shatter			0	18.4	0	0				0	0							292931.2889	6425056.256	1730.23768	42.35752703	3rd	Lower slope
980	BM-AS19-12	Silcrete	Flake	Broken FI (Proximal)		0	28.2	0	0		Multiple		0	0							292931.1595	6425057.109	1729.847731	41.68347249	3rd	Lower slope
981	BM-AS19-12	Silcrete	Flake	Broken FI (Proximal)		0	15.1	0	0				0	0							292931.0596	6425058.06	1729.377247	40.91735524	3rd	Lower slope
982	BM-AS19-12	Silcrete	Flake	Complete		0	24.7	21.5	6.6	None	Multiple		0	0							292930.916	6425058.895	1729.010017	40.2809382	3rd	Lower slope
983	BM-AS19-12	Silcrete	Flake	Broken FI (Proximal)		0	19.6	0	0		Single		0	0							292929.9066	6425059.405	1729.537121	40.39802071	3rd	Lower slope
984	BM-AS19-12	Silcrete	Core		Multidirectional	4	33.7	28.4	28.4	None		Indeterminate	7	29.9							292929.623	6425057.531	1730.854351	42.12419512	3rd	Lower slope
985	BM-AS19-12	Silcrete	Flake	Broken FI (Proximal)		0	15.2	0	0		Single		0	0							292929.4723	6425057.762	1730.843192	42.01091251	3rd	Lower slope
986	BM-AS19-12	Silcrete	Flake	Complete		0	19.4	18.1	6.5	None	Single		0	0							292930.5014	6425059.112	1729.22209	40.31889438	3rd	Lower slope
987	BM-AS19-12	Silcrete	Flake	Broken FI (Proximal)		0	19.1	22.5	7.4	None	Single		0	0							292927.5209	6425059.554	1731.396167	41.64369913	3rd	Lower slope
988	BM-AS19-12	Silcrete	Flake Shatter			0	14.1	0	0				0	0							292926.2852	6425057.652	1733.504659	43.90810839	3rd	Lower slope
989	BM-AS19-12	Silcrete	Flake	Broken FI (Proximal)		0	21.2	17.4	5.6		Single		0	0							292922.7014	6425062.553	1733.600052	42.46812305	3rd	Lower slope
990	BM-AS19-12	Chert	Flake	Complete		0	40.1	21.2	9.1	1-50%	Single		0	0							292924.0354	6425063.438	1731.999819	40.90595317	3rd	Lower slope
991	BM-AS19-12	IMI/Tuff	Flake	Complete		0	26.4	34.9	8.5	1-50%	Multiple		0	0							292921.8682	6425067.283	1731.561713	39.8382119	3rd	Lower slope
992	BM-AS19-12	Silcrete	Flake Shatter			0	25.1	0	0				0	0							292927.6132	6425067.002	1727.022391	35.85800457	3rd	Lower slope
993	BM-AS19-12	Silcrete	Flake	Broken FI (Proximal)		0	32.2	0	0		Single		0	0							292930.9282	6425071.897	1721.495078	30.0380263	3rd	Lower slope
994	BM-AS19-12	Silcrete	Flake	Complete		0	25.9	17.9	7.2	None	Single		0	0							292931.4638	6425091.352	1709.947245	20.83823774	3rd	Lower slope
995	BM-AS19-12	IMI/Tuff	Flake	Complete		0	46.3	51.9	14.3	1-50%	Cortical		0	0							292932.0132	6425090.994	1709.697939	20.32428962	3rd	Lower slope
996	BM-AS20-12	IMI/Tuff	Core		Unidirectional	1	34.5	29.4	14.9	1-50%	Single	Flake	5	14.4							291774.3237	6425705.676	2589.937002	262.7225409	1st	Upper slope
997	BM-AS20-12	IMI/Tuff	Flake	Complete		0	15.5	16.4	5.8	1-50%	Single		0	0							291773.7701	6425704.282	2590.677067	261.3491945	1st	Upper slope
998	BM-AS20-12	Silcrete	Flake	Complete		0	34	29	12.5	None	Single		0	0							291786.9897	6425651.599	2585.406579	208.51952	1st	Upper slope
999	BM-AS21-12	Silcrete	Flake	Complete		0	21.3	19.9	5.9	None	Multiple		0	0							291732.3884	6425544.171	2658.125287	113.2061212	1st	Mid slope
1000	BM-AS21-12	Silcrete	Flake	Broken FI (Proximal)		0	72	52	19		Single		0	0	Misc Retouched Flake	Broken	Flake	V-D	rlm	46;45	291747.0282	6425545.024	2643.599977	108.2101366	1st	Mid slope
1001	BM-AS21-12	Silcrete	Core		Unidirectional	0	54.3	35.5	21.5	None		Flake	5	20.7							291745.1238	6425523.109	2649.831249	88.68479145	1st	Mid slope
1002	BM-AS21-12	Silcrete	Core			0	53.8	26.6	24.9	1-50%	Single		0	0							291746.7879	6425520.343	2648.765302	85.47199963	1st	Mid slope
1003	BM-AS21-12	Silcrete	Flake	Complete		0	31.7	22.3	8.5	None	Single		0	0							291775.7786	6425446.538	2636.616095	8.358380993	1st	Mid slope
1004	BM-AS21-12	IMI/Tuff	Flake	Complete		0	25.4	22.1	7.4	None	Single		0	0							291769.645	6425452.201	2641.269502	16.48910235	1st	Mid slope
1005	BM-AS22-12	Silcrete	Flake	Broken FI (Proximal)		0	27.5	0	0				0	0							291647.1237	6425392.715	2774.363978	12.10814969	1st	Mid slope
1006	BM-AS22-12	Silcrete	Core		Multidirectional	2	34.3	24.8	19.5	1-50%			2	19.8							291644.6674	6425390.848	2777.198051	13.99178947	1st	Mid slope
1007	BM-AS22-12	Silcrete	Angular Shatter			0	25.5	0	0				0	0							291644.9342	6425391.566	2776.765894	13.25269263	1st	Mid slope
1008	BM-AS22-12	FGS Other	Flake	Complete		0	32.3	20.9	4.5	1-50%	Multiple		0	0							291635.6265	6425394.791	2785.026264	14.41671771	1st	Upper slope
1009	BM-AS22-12	IMI/Tuff	Flake	Split Flake (Siret)		0	22.7	0	0				0	0							291629.7798	6425392.352	2791.286911	20.4523398	1st	Upper slope
1010	BM-AS22-12	Quartz	Flake Shatter			0	24.3	0	0				0	0							291627.3802	6425390.605	2794.035461	23.41980911	1st	Upper slope

1011	BM-AS22-12	Silcrete	Flake	Complete		0	28.8	32.2	12.1	None	Single		0	0							291635.1729	6425415.975	2780.474287	15.59833801	1st	Upper slope
1012	BM-AS22-12	Other	Flake	Axe Reworking		0	26.4	22.3	8.7				0	0							291636.6448	6425416.503	2778.920044	15.0208816	1st	Upper slope
1013	BM-AS22-12	Silcrete	Core		Unidirectional	1	44.2	42	18.9	1-50%	Cortical	Flake	4	23.4							291633.5915	6425419.907	2781.103171	19.58803254	1st	Upper slope
1014	BM-AS22-12	IM/Tuff	Flake Shatter			0	48.4	0	0				0	0							291600.6694	6425389.049	2820.343157	48.00692615	1st	Upper slope
1015	BM-AS22-12	Silcrete	Angular Shatter			0	28.8	0	0				0	0							291597.2479	6425387.328	2824.076366	51.8058515	1st	Upper slope
1016	BM-AS23-12	Silcrete	Core		Unidirectional	1	39.5	31.5	19.2	1-50%		Indeterminate	5	16.5							291701.2192	6425137.603	2795.511681	272.811523	1st	Upper slope
1017	BM-AS23-12	IM/Tuff	Flake	Complete		0	27	47.4	12.1	1-50%	Cortical		0	0							291697.5971	6425146.291	2796.075638	263.5764747	1st	Upper slope
1018	BM-AS23-12	Silcrete	Flake	Broken FI (Proximal)		0	26.8	0	0				0	0							291696.1873	6425146.583	2797.31237	263.0176286	1st	Upper slope
1019	BM-AS23-12	IM/Tuff	Flake	Complete		0	35.4	27	9.2	None	Cortical		0	0							291693.1874	6425156.849	2796.811022	252.3698689	1st	Upper slope
1020	BM-AS23-12	Silcrete	Flake Shatter			0	28.3	0	0				0	0							291693.7755	6425163.365	2794.153858	246.0850908	1st	Upper slope
1021	BM-AS23-12	Silcrete	Flake	Complete		0	24.9	34	12	None	Single		0	0							291702.9622	6425170.76	2783.081019	240.8397918	1st	Upper slope
1022	BM-AS23-12	IM/Tuff	Flake	Complete		0	38.4	17.8	5.2	None	Single		0	0							291684.8419	6425167.127	2801.412153	240.7952718	1st	Upper slope
1023	BM-AS23-12	Silcrete	Flake	Complete		0	13.9	8.9	5.6	None	Single		0	0							291682.3964	6425159.088	2806.303854	248.3626589	1st	Upper slope
1024	BM-AS23-12	Quartz	Flake Shatter			0	11.4	0	0				0	0							291685.3632	6425153.014	2805.455182	254.8138304	1st	Upper slope
1025	BM-AS23-12	Silcrete	Flake	Complete		0	41.4	29	16.5	1-50%	Single		0	0							291688.719	6425152.179	2802.551048	256.1766715	1st	Upper slope
1026	BM-AS23-12	IM/Tuff	Core		Multidirectional	2	54.8	47.4	15.1	51-99%		Cobble	6	23.4							291680.9383	6425149.246	2810.862437	257.9011764	1st	Upper slope
1027	BM-AS23-12	Silcrete	Flake	Complete		0	53.6	46.4	15.9	None	Single		0	0							291679.4961	6425147.368	2812.836244	259.572128	1st	Upper slope
1028	BM-AS23-12	IM/Tuff	Flake Shatter			0	18.2	0	0				0	0							291676.8998	6425149.466	2814.611489	257.1672071	1st	Upper slope
1029	BM-AS23-12	Quartz	Flake Shatter			0	19.8	0	0				0	0							291699.9114	6425173.081	2785.230616	237.8756391	1st	Upper slope
1030	BM-AS23-12	IM/Tuff	Flake	Broken FI (Proximal)		0	8.7	0	0		Single		0	0							291727.4863	6425116.627	2777.796168	299.4392085	1st	Hilltop/Ridge/ Crest
1031	BM-AS23-12	Silcrete	Flake Shatter			0	28.4	0	0				0	0							291733.5226	6425112.346	2773.58206	305.208938	1st	Hilltop/Ridge/ Crest
1032	BM-AS23-12	Silcrete	Flake	Complete		0	23	15	4	None	Single		0	0							291663.6755	6425102.975	2842.460404	302.3139961	1st	Upper slope
1033	BM-AS23-12	Silcrete	Angular Shatter			0	12	0	0				0	0							291663.2414	6425104.44	2842.375612	300.826355	1st	Upper slope
1034	BM-AS23-12	Silcrete	Flake Shatter			0	29.4	0	0				0	0							291747.6565	6425097.55	2765.426529	320.3713613	1st	Hilltop/Ridge/ Crest
1035	BM-AS23-12	Silcrete	Flake	Split Flake (Siret)		0	18.8	0	0				0	0							291747.9625	6425096.393	2765.543156	321.5418073	1st	Hilltop/Ridge/ Crest
1036	BM-AS23-12	Silcrete	Flake	Complete		0	13.4	7.6	4.8	None	Single		0	0							291751.8658	6425095.255	2762.283208	322.8916283	1st	Hilltop/Ridge/ Crest
1037	BM-AS23-12	Silcrete	Angular Shatter			0	15.4	0	0				0	0							291753.1957	6425093.988	2761.48085	324.2393523	1st	Hilltop/Ridge/ Crest
1038	BM-AS23-12	Silcrete	Flake	Split Flake (Siret)		0	34.5	0	0				0	0							291751.2867	6425086.895	2765.759807	331.2029051	1st	Hilltop/Ridge/ Crest
1039	BM-AS24-12	Silcrete	Retouched Flake			0	40.4	54.3	21.9	None	Cortical		0	0	Scraper	Complete	Flake	V-D	llm;rlm;dm	61;71;65	292201.0508	6425310.228	2266.715905	36.28312407	1st	Lower slope
1040	BM-AS24-12	Silcrete	Flake Shatter			0	25.9	13.2	6.7				0	0							292165.435	6425343.18	2289.804051	30.0517884	1st	Lower slope
1041	BM-AS24-12	Silcrete	Flake	Broken FI (Proximal)		0	30	25.5	9.2		Single		0	0							292142.302	6425374.443	2302.262772	52.77476749	1st	Lower slope
1042	BM-AS24-12	Silcrete	Angular Shatter			0	31	21.7	11.5				0	0							292140.5725	6425373.519	2304.189195	51.95049091	1st	Lower slope
1043	BM-AS24-12	Silcrete	Flake	Broken FI (Proximal)		0	11.3	16.5	2				0	0							292142.7484	6425372.2	2302.50694	50.51700272	1st	Lower slope
1044	BM-AS24-12	Silcrete	Angular Shatter			0	17.7	12.1	9.6				0	0							292143.4748	6425372.144	2301.830603	50.44237602	1st	Lower slope
1045	BM-AS24-12	Silcrete	Angular Shatter			0	14.1	11.6	4.4				0	0							292141.7175	6425373.08	2303.227536	51.44013246	1st	Lower slope
1046	BM-AS24-12	Silcrete	Angular Shatter			0	15.7	10.2	5.6				0	0							292141.4898	6425375.422	2302.746241	53.79093743	1st	Lower slope
1047	BM-AS24-12	Silcrete	Flake Shatter			0	12.7	9.5	1.9				0	0							292142.3234	6425374.651	2302.180305	52.98175649	1st	Lower slope
1048	BM-AS24-12	Silcrete	Flake	Broken FI (Proximal)		0	13.6	24.5	2.3		Single		0	0							292142.7918	6425373.17	2302.17543	51.48510919	1st	Lower slope
1049	BM-AS24-12	Silcrete	Flake	Broken FI (Proximal)		0	11.3	16.3	1.8				0	0							292142.2515	6425372.72	2302.825545	51.05529296	1st	Lower slope
1050	BM-AS24-12	Quartz	Flake	Complete		0	31	25.4	11.6	1-50%	Single		0	0							292166.3942	6425368.981	2280.930648	52.13389714	1st	Lower slope
1051	BM-AS25-12	Quartz	Flake	Broken FI (Proximal)		0	22	14.9	6.3		Cortical		0	0							292321.2735	6425305.36	2155.354431	58.44297056	1st	Lower slope
1052	BM-AS25-12	Silcrete	Flake	Split Flake (Siret)		0	27.9	16.7	3.1				0	0							292321.894	6425304.376	2155.118729	57.28166287	1st	Lower slope
1053	BM-AS25-12	Silcrete	Flake Shatter			0	28.1	18.7	3.3				0	0							292319.4503	6425310.365	2155.313168	63.59091884	1st	Lower slope
1054	BM-AS25-12	IM/Tuff	Flake Shatter			0	23.8	19.4	8.1				0	0							292354.6858	6425329.666	2115.568941	71.8528413	1st	Lower slope
1055	BM-AS25-12	Silcrete	Flake	Split Flake (Siret)		0	51.1	31.6	12.2				0	0							292358.8526	6425331.385	2111.064774	73.65720051	1st	Lower slope
1056	BM-AS25-12	Silcrete	Flake	Complete		0	33.9	19.3	6.1	None	Single		0	0							292361.4329	6425335.818	2107.113507	78.24639964	1st	Lower slope
1057	BM-AS25-12	Silcrete	Flake Shatter			0	31.7	20.8	9.3				0	0							292367.8336	6425341.225	2099.244565	84.35189479	1st	Lower slope
1058	BM-AS25-12	Silcrete	Angular Shatter			0	14.3	13.5	9.4				0	0							292375.3255	6425346.689	2090.334609	91.11049644	1st	Lower slope
1059	BM-AS25-12	IM/Tuff	Flake Shatter			0	42	25	11.3				0	0							292358.6088	6425333.791	2110.463016	76.04930287	1st	Lower slope
1060	BM-AS25-12	FGS Other	Flake	Broken FI (Proximal)		0	23.8	17.2	4.8		Multiple		0	0							292340.8216	6425333.529	2127.25862	77.07797759	1st	Lower slope

1061	BM-AS25-12	Silcrete	Flake	Complete		0	23.2	26.9	9.6	None	Multiple		0	0						292333.1509	6425339.177	2132.549156	84.31205726	1st	Lower slope
1062	BM-AS25-12	Silcrete	Flake	Split Flake (Siret)		0	48.2	32.3	10.9				0	0						292333.3693	6425340.638	2131.84937	85.66671643	1st	Lower slope
1063	BM-AS25-12	IM/Tuff	Flake	Complete		0	29.1	40.3	10.2	None	Single		0	0						292345.2899	6425339.068	2121.168257	81.86197745	1st	Lower slope
1064	BM-AS26-12	Silcrete	Core		Multidirectional	3	50.6	41.7	24.8	1-50%			5	28.1						291448.8189	6425489.506	2946.912031	37.03458806	1st	Upper slope
1065	BM-AS26-12	Silcrete	Flake	Complete		0	41.1	22.5	13.2	1-50%	Single		0	0						291520.332	6425508.616	2873.054304	94.01285992	1st	Upper slope
1066	BM-AS06-12	IM/Tuff	Flake	Complete		0	27.1	27.6	8	None	Single		0	0						292394.0287	6425475.983	2031.824129	221.5853627	1st	Lower slope
1067	BM-AS06-12	Silcrete	Flake Shatter			0	15.4	14.5	2.8				0	0						292395.1357	6425473.397	2031.510857	219.2383558	1st	Lower slope
1068	BM-IA01-12	IM/Tuff	Flake	Complete		0	45	42	14.7	None	Single		0	0						293979.2547	6427459.606	1444.081526	271.3545638	2nd	Lower slope
1069	BM-IA02-12	Silcrete	Flake	Complete		0	43.4	32.7	11.9	1-50%	Single		0	0						293105.8539	6427486.783	1885.37458	112.1290063	2nd	Mid slope
1070	BM-IA03-12	Silcrete	Flake			0	0	0	0				0	0						292741.5184	6427051.001	1879.87443	233.1611277	1st	Mid slope
1071	BM-IA04-12	Other	Flake	Broken FI (Proximal)		0	26.5	0	0				0	0						293086.8943	6426348.331	1285.315554	308.7290919	2nd	Upper slope
1072	BM-IA05-12	Silcrete	Flake	Complete		0	23	25	8	None	Single		0	0						292830.1773	6427900.603	2379.500527	254.1792451	1st	Upper slope
1073	BM-IA06-12	Silcrete	Flake	Complete		0	38	30	9.5	None	Single		0	0						292414.7711	6428066.675	2779.794793	131.3327657	1st	Upper slope
1074	BM-IA07-12	Quartz	Flake	Complete		0	38	30.7	15.7	None	Single		0	0						292449.6859	6427622.627	2451.574906	28.86901936	2nd	Mid slope
1075	BM-IA08-12	IM/Tuff	Flake	Complete		0	29.7	29.8	8.4	1-50%	Cortical		0	0						292235.0164	6427681.769	2656.305708	26.63672356	1st	Upper slope
1076	BM-IA09-12	Silcrete	Flake	Broken FI (Proximal)		0	35.3	0	0		Single		0	0						292874.7298	6429137.074	3406.903814	137.9095023	1st	Upper slope
1077	BM-IA10-12	Silcrete	Flake	Complete		0	68	48	16	1-50%	Single		0	0						292119.1395	6426980.838	2403.479279	152.5619964	1st	Mid slope
1078	BM-IA11-12	IM/Tuff	Angular Shatter			0	29.7	28	20				0	0						291959.0422	6426694.261	2463.416953	107.3203727	2nd	Mid slope
1079	BM-IA12-12	FGS Other	Flake	Complete		0	77.9	47.7	17.5	1-50%	Multiple		0	0						292340.1632	6426455.166	2038.007176	133.2002112	2nd	Mid slope
1080	BM-IA13-12	Silcrete	Core		Multidirectional	4	41.1	28.8	15	None		Indeterminate	8	38.6						292140.1135	6426567.087	2257.038929	113.9452823	2nd	Mid slope
1081	BM-IA14-12	Silcrete	Core		Unidirectional	1	25.9	24.6	16.1	None		Indeterminate	4	23.9						291467.3161	6426433.216	2896.406176	27.17171783	1st	Mid slope
1082	BM-IA15-12	IM/Tuff	Flake	Broken FI (Proximal)		0	26.2	0	0		Multiple		0	0						291770.6565	6426148.145	2570.55022	135.2376091	2nd	Mid slope
1083	BM-IA16-12	Silcrete	Core		Multidirectional	2	79.7	73	29.5	1-50%		Flake	5	24.6						291840.5192	6425815.612	2511.259626	376.8552413	1st	Upper slope
1084	BM-IA17-12	Silcrete	Flake Shatter			0	14.3	9.8	1.8				0	0						292380.9937	6425752.653	1982.902739	260.7459204	3rd	Mid slope
1085	BM-IA18-12	FGS Other	Core		Bifacial	1	111	82.5	31.4	51-99%		Cobble	9	30.4						291954.7039	6425628.813	2423.918028	251.7795718	1st	Mid slope
1086	BM-IA19-12	Silcrete	Flake Shatter			0	41.9	0	0				0	0						291700.6968	6425294.329	2748.21566	123.23415	1st	Mid slope
1087	BM-IA20-12	Silcrete	Flake	Complete		0	28.1	39.7	7.1	None	Single		0	0						292306.135	6425197.639	2209.377135	77.68199789	1st	Lower slope
1088	BM-IA21-12	Silcrete	Flake	Complete		0	75	35	20	None	Single		0	0						292185.9954	6425108.485	2355.068751	203.7528924	1st	Mid slope
1089	BM-IA22-12	IM/Tuff	Flake	Complete		0	48.9	58.2	15.9	None	Multiple		0	0						292347.5468	6424992.501	2260.75848	265.4265562	1st	Mid slope
1090	BM-IA23-12	IM/Tuff	Flake	Complete		0	48.3	37.3	29.4	1-50%	Multiple		0	0						292406.5204	6424802.846	2306.704666	455.5503098	1st	Mid slope
1091	MTP-AS1-12	Silcrete	Flake Shatter			0	21	0	0				0	0						293409.6535	6427885.128	2047.344247	205.7791975	1st	Mid slope
1092	MTP-AS1-12	Silcrete	Core		Multidirectional	3	80.6	66.2	38	None		Flake	4	31.4						293421.1326	6427880.937	2038.412846	212.7615927	1st	Mid slope
1093	MTP-AS2-12	Quartz	Core		Unidirectional	1	12	7	5	None		Flake	1	12						294508.9654	6427392.762	1342.231514	113.7852392	1st	Lower slope
1094	MTP-AS2-12	Silcrete	Flake Shatter			0	12	0	0				0	0						294517.4528	6427392.733	1343.299244	107.036045	1st	Lower slope
1095	MTP-AS3-12	Silcrete	Flake	Complete		0	56.7	50	20.3	None	Single		0	0						294152.9898	6427942.799	1890.802446	220.7420919	2nd	Lower slope
1096	MTP-AS3-12	Silcrete	Flake	Complete		0	27.4	17.4	10.2	None	Single		0	0						294144.025	6427943.656	1892.561304	223.9347173	2nd	Lower slope
1097	MTP-IA1-12	Other	Retouched Flake	Complete		0	0	0	0				0	0	Scraper	Complete	Flake	V-D		294099.6185	6427451.157	1410.50438	209.3339981	4th	Lower slope
1098	MTP-IA2-12	Silcrete	Flake	Broken FI (Proximal)		0	21.4	0	0		Multiple		0	0						293974.1243	6428112.323	2083.412796	288.8860526	2nd	Mid slope

Appendix F

Arborist Scarred Tree Assessment

Scar Tree Assessment
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SCAR TREE ASSESSMENT

BENGALLA MINING COMPANY PTY LTD

Prepared for: *Bengalla Mining Company Pty Ltd*

Prepared by: Global Soil Systems

Date: *22 August 2012*

Scar Tree Assessment
Bengalla Mining Company

GLOBAL SOIL SYSTEMS
Land Rehabilitation and Revegetation - Contractors and Consultants

SCAR TREE ASSESSMENT BENGALLA MINING COMPANY PTY LTD

August 2012

Prepared for:
Bengalla Mining Company Pty Ltd

Prepared by:

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Scar Tree Assessment
Bengalla Mining Company

GLOBAL SOIL SYSTEMS
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1.0 BACKGROUND AND OBJECTIVES

Dr Mark Burns (Director Global Soil Systems) was engaged to prepare this report for the Bengalla Mining Company. Other members of the inspection team included Geordie Oakes (AECOM), Maree Waugh (Aboriginal representative – Wallagan Cultural Services), Annie Hickey (Aboriginal representative - Gidawaa Walang Cultural Heritage Consultancy) and Calvin Leech (Bengalla Mine Environmental Adviser).

The principal objective of the inspection and this report was to clarify whether observed tree scarring related to early Aboriginal activity or whether it was attributable to other causes. A total of four trees were examined.

The assessment methodology largely conforms to Long (2005). Conclusions drawn are based on this approach and also a local case study and extensive practical involvement by the author in forestry, nursery, farm extension advice and mine rehabilitation over a 37 year period in the Hunter Valley, NSW.

2.0 CAUSES OF TREE SCARRING

Scars can be attributed to a range of man-made and natural causes (Long 2005). The main causes of scarring include the following.

Natural Scarred Trees

Some of the most common causes of tree scarring can be attributed to natural causes including lightning strikes, wind damage, branch tears, larval activity, termite activity, bird damage, fire damage, abrasion and numerous other minor impacts which can create small or large scars on trees. The exact cause of natural scarring is often difficult to identify as several factors can often combine to produce a scar. The majority of scars that exist in the Australian landscape today are the result of natural and incidental causes (Long 2005). The cumulative effects of natural tree growth and decay, land clearance and forest management have removed most of the mature trees which held cultural scars in the pre-contact and even historical periods of Australia's past. These have largely been replaced with younger trees bearing the impacts associated with the agricultural and forestry use of the landscape which followed the earlier subsistence use of the landscape after c.1870 (Long 2005). Many scars are the result of several processes, the order of which is not always clear.

In reviewing comments in this report it is important to understand that remnant forest and woodland areas on the floor of the upper Hunter Valley have been extensively disturbed and modified over a long period following the arrival of Europeans. As mentioned by Long (2005) this has effectively resulted in most tree scars being the result of natural and incidental causes. This needs to be kept firmly in mind when assessing the probability of scars relating to Aboriginal activity.

European Scarred Trees

A range of scars can also be related to European activity and European bark removal. Scars are generally limited to rectangular panels, approximately 1 – 3 meters in length, which reflects their primary use for building cladding. European scars can also include survey and blaze marks and bark strip scars. Scars can also relate to past clearing activities and associated damage to tree trunks.

Aboriginal Scarred Trees

Aboriginal scars often have differing forms.

1. Curved (pre-form) bark removal scars. This category consists of circular, oval or elongated scars resulting from the removal of a pre-formed artifact, such as a canoe or container that took shape from a curved section of either the tree bole, a major limb or a large burl.
2. Bark slab (sheet) removal scars. Sheet and slab artifacts are produced from rectangular or square sheets of bark.
3. Toe holds. Toe holds are a series of small incisions into the bank designed to create a toe hold for climbing purposes.
4. Resource extraction holes such as smoke holes and access holes.
5. Other scar forms such as bark strip removal scars, grub procurement scars, marked and carved trees and wood removal scars.

3.0 LIFE SPANS AND A LOCAL EXAMPLE OF WOUND REGROWTH

Past experience by the author in forestry and scar tree assessment in the Upper Hunter Valley has been drawn upon to determine both the age of trees, and the likely age of wound regrowth in the study trees.

Estimating Maximum Life Span

There is no doubt that some Australian eucalypt species such as River Red Gum (*Eucalyptus camaldulensis*) can live up to 500 years and longer. Species in the colder south-eastern highlands of Australia such as *Eucalyptus regnans* can live for 200-400 years (Jacobs 1955). However, experience has shown that the maximum life span of most dominant eucalypt species such as Iron Bark (*Eucalyptus crebra)*, Grey and White Box (*Eucalyptus moluccana* and *albens* respectively), Spotted Gum (*Corymbia maculata*) and Red gum (*Eucalyptus tereticornis/blakelyi)* in open woodland environments in the upper Hunter Valley is approximately 100 to 140 years. The relatively warm climate compared to southern states and tableland areas also does not tend to result in trees living longer than this. Many trees of these species can have shorter life spans. Despite this there may be exceptions and occasional trees may be slightly older.

Life span is determined by the innate genetic potential of species, as well as the propensity for trees to suffer from lightning strike, wind damage and physical damage to trunks during past clearing. Accelerated crown dieback due to attack from leaf eating and sap sucking insect activity (dieback) can also lead to reduced life span (a common feature in the Upper Hunter Valley). Regular wildfires are also a contributing factor as are a multitude of causes relating to human activity such as clearing, logging etc. Secondary effects, including attack by termites and borers, can also follow primary damage to a tree and result in reduced life span.

Other factors can also be involved. As one example, three of the four trees in this assessment had obvious white ant and/or borer attack as well as natural fungal decay. The generally poor duplex clay soils on the floor of the Hunter Valley (away from the fertile alluvial flats), together with extended periods of drought, also tend to place ongoing stress on trees resulting in frequent crown dieback due to insect attack. This often leads to a consequent propensity for enhanced termite and borer attack and hence, shorter life spans.

Life span is relevant to this study in the context of tree age versus the cessation of Aboriginal scarring of trees (estimated at approximately 150 years ago in the Hunter Valley). For a tree to possess a significant Aboriginal related scar the tree would have had to be of a significant size at that time (150 years ago). This suggests that, for a tree to now show Aboriginal related scarring, it would now have to be at least 170 to 200 years old (i.e. at least 20 to 50 years old at the time of scarring). This is significantly older than the accepted maximum age span of remnant upper canopy species in the upper Hunter Valley. This simple consideration generally excludes many scars from being of Aboriginal origin.

Wound Repair and Scar Age

The estimated age of scarring is based on the estimated rate of wound repair as indicated by the depth of new wood around the wound.

One particularly relevant study involved a scar of known age on a Narrow–leaf Ironbark (*Eucalyptus crebra*) located on the corner of Common and Coal Roads approximately two kilometres north east of Muswellbrook on similar soil to that in the study area. The marked tree is shown below (***Plate 1***).

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Plate 1: Thirty year old scar on Narrow-leaf Ironbark near Muswellbrook (photo taken 2002)

Inquiry revealed that this tree was marked for survey purposes on 10 February 1972 by John Dennis Hickey from the East Maitland Lands office and identified as D5057/2003. While the tree had been lopped and had recently died six months prior to the photograph, the recent date of the tree's death (at that time) allowed an assessment of the growth rate of wound repair. The scar revealed that the tree had put on 200 mm of scar tissue (depth of over-growth) over a 30 year period. This gives an over growth repair rate of 6.6 mm per annum and thus supports the conservative scar growth rate of 5 mm per annum (a radial increase) or 10 mm per annum (diameter increment) assumed for this study (Global Soil Systems 2005).

This conservative approach has been adopted to avoid equivocation and it is likely that both tree and scar ages have been over stated in this report and that both are younger than proposed. If so, this makes the likelihood of scars being caused by pre-European Aboriginal activity even more unlikely. Hence if a scar is 15cm deep it has been estimated at 30 years old. Justification for this rate is based on many other observations in the upper Hunter Valley.

The above estimated growth increments are also conservative as a result of the age of the tree when scarring occurred. Tree growth is far more rapid in the early and mid-stages of growth and slows considerably as trees mature. Regrowth from scarring in all four trees in this assessment occurred when trees where relatively mature. Hence, scar regrowth would have been slower than would have been the case in younger trees where incremental wound regrowth would have been significantly higher than in these older trees.

Estimation of Tree Age and Time Since Scarring

The above scar tree example also provides information on the likely age of the above tree. If we assume that the above 5 mm growth (radial wound regrowth) reflects the annual (one side of the tree) increase in tree growth, then the annual increase in the diameter of the trunk can be estimated at 10 mm (1 cm) (i.e. 2 x the annual radial increase (5 mm) of the wound). Consequently, as the diameter of the above reference tree was 110 cm at death its age was estimated at 110 years. As the depth of the scar was 20cm scar age was estimated at 40 years. Hence, the scar was formed when the tree was approximately 70 years old (110 - 40).

As mentioned above this estimate of diameter growth is most likely very conservative for many trees. As an example, incremental diameter growth in young trees (5 to 30 years old) in the central and Upper Hunter Valley (based on commercial forestry experience) has been frequently observed to be in the range 2 to 6 cm per annum and greater (author's personal experience). The growth of planted trees on Bengalla mine over the last 15 years further supports these growth estimates.

The practical effect of the above is that both trees and scars are most likely younger then estimated. If this is true than this makes the likelihood of scarring being Aboriginal related even more unlikely.

A secondary point is that, due to the pyramidal way a tree puts on growth, any damage to a tree trunk does not get any higher off the ground with age. Consequently, the heights of scars in this study are still the same as when damage first occurred.

A third point is that a tree would normally have to be of a reasonable size to be used for Aboriginal purpose. Hence, scar age is normally much less than tree age and the age of the tree at the time of scarring needs to be considered in the equation.

As mentioned, the above matching of tree diameter with age is consistent with many field observations by the author over many years in forestry, mine rehabilitation and farm extension work in the Hunter Valley. While the ratio of growth rate to age may change slightly between species the above estimates are still considered a reasonable ball-park average approximation.

Dead Tree Considerations

The above calculations are relatively simple in trees that are still alive at the time of assessment. The evaluation process becomes more difficult and less clear in fallen or dead trees where the age since tree death has to be factored in. Calculating time since the tree died can be assisted by evidence such as whether the tree was felled/damaged by a chainsaw. As chainsaws only started to become widely used in the Hunter Valley in the late 1950's/early 1960's trees that were felled by chainsaws (e.g. Tree 2 in this report) have most likely been dead for a maximum of 50-55 years.

Other factors can also be used to approximate how long ago a tree died. As small branches fall off and decay first after death, the size of remnant branches can give some guidance. Similarly, bark slowly falls off the stump of a dead tree over time. The more bark - the shorter the time since death. In addition, the extent of weathering on a chainsaw felled tree can also be used to determine the age of other felled trees.

In addition, if a tree has been felled and the remnant crown has disappeared in that time (loggers only take the main trunk), this means that remnant wood has either been eaten by termites or rotted away, or been burnt by bush fires in that time. Prior to mine protection (say late 1970's onwards) wildfire was a frequent occurrence in Hunter woodlands and forests and remnant timber on the forest floor quickly disappeared as a result. This type of simple calculation can be used to assess tree, and hence scar age.

Despite this, there are still some dead trees where the time since death can only be guessed at based on observation and practical experience.

4.0 METHODOLOGY

The following trees were inspected.

Tree Reference	(MGA) E	(MGA) N
Tree 1	292756	6427129
Tree 2	292698	6428743
Tree 3	293161	6426412
Tree 4	293257	6426726

The location of these trees is shown in **Figure 1** below.

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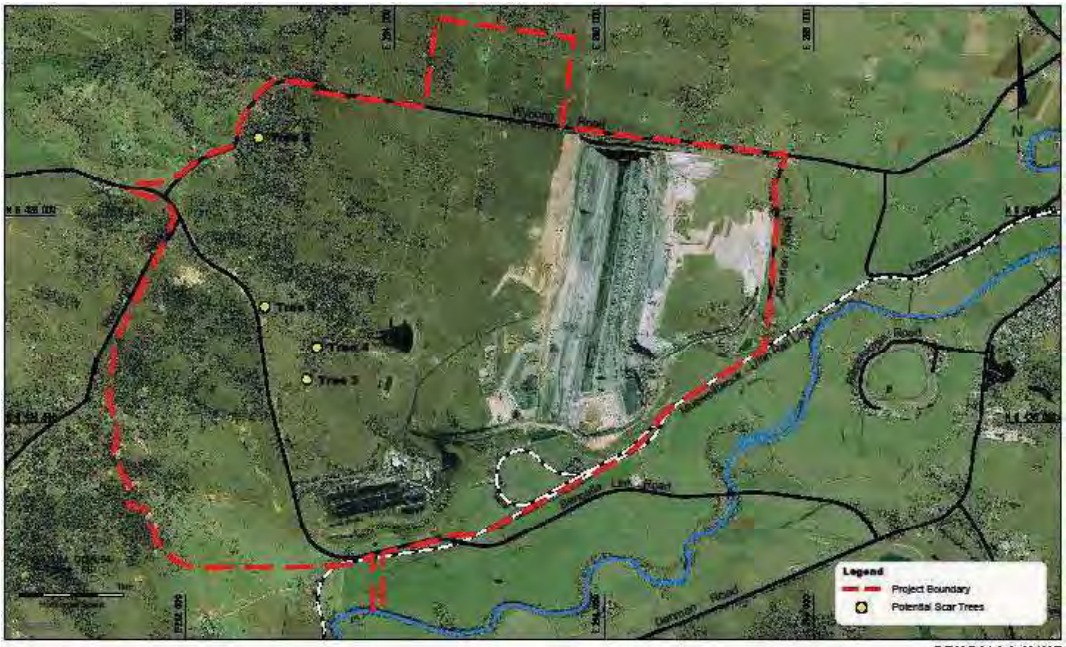
FIGURE 1. LOCATION OF SCAR TREES – BENGALLA COAL MINE
AUGUST 2012



BENGALLA MINE

Potential Scar Trees

FIGURE 1

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The methodology employed was in accordance with "Scarred Trees, An Identification and Recording Manual" (Andrew Long 2005) and the preamble in this report. For each scar tree the following data was recorded:

- Tree species.
- Tree age
  - Live trees (likely growth rate based on tree diameter)
  - Dead trees (age at death + time since death)
- Condition of tree.
- Girth of tree at 1.5m height.
- Diameter of tree.
- Diameter of tree over bark since death.
- Scar dimensions Length -
  Width –
  Height of base of scar above ground -
- Overgrowth measurements Thickness –
  Width -
- Scar orientation.
- Origin of scar – European/Aboriginal/natural/uncertain.
- Type of scar.
- Axe marks present and type (Aboriginal/European).

5.0 RESULTS

Tree 1 292756E 6427129N

A photograph of this scar tree is shown in ***Plate 2*** below.

Plate 2: Potential Scar Tree 1

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Characteristics			
Tree #	Tree 1		
Plate #	Plate 2		
Species	Eucalyptus moluccana (Grey Box)		
Tree Age	Tree dead for approximately 25 years Age at death - 107 years		
Condition of Tree	Dead		
Girth at 1.5 m Height	305 cm		
Diameter 1.5 m	97 cm		
Estimated Diameter with Bark (at death)	107 cm		
Scar Dimensions	Length - Width - Height from ground -	156 18 0	cm cm cm
Overgrowth Measurements	Thickness – Width -	23 15	cm cm
Scar Orientation	South East		
Origin of Scar	Natural (branch tear/termites)		
Type of Scar	Vertical		
Axe Marks?	No		

Comments and Discussion
This tree was dead at the time of assessment.

This tree was estimated to be approximately 107 years old at death and 25 years since death (total 132 years). The scar was estimated at approximately 23 years old at death. Hence, the estimated time since scar formation is estimated at 48 years (i.e. time since death = 25 years + scar age at death = 23 years). This is well after the likely cessation of Aboriginal related scarring.

The pyramidal and largely irregular shape of the scar, which extends down to a broad base at ground level also suggests a natural cause. It is likely initial scarring occurred through branch tear (see notch at top of scar) and has extended downwards as a result of borer and termite activity (both noted). This pattern of scarring (pyramidal) is typical of scarring on many other trees in the Hunter Valley not considered to be related to Aboriginal cultural activity. Other trees in this vicinity, not considered possible Aboriginal scar trees, showed similar scarring.

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Tree 2 292698E 6428743N

A photograph of this scar tree is shown in ***Plate 3*** below.

Plate 3: Scar Tree 2

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Characteristics			
Tree #	Tree 2		
Plate #	Plate 3		
Species	Eucalyptus crebra (Narrow-leaf Ironbark)		
Tree Age	Estimated age at death - 83 years Estimated years since death - approximately 7 years (maximum)		
Condition of Tree	Dead. Fallen using chain saw		
Girth at 1.5 m Height	260 cm		
Diameter (over bark) at1.5 m	83 cm		
Estimated Diameter with Bark	N/A		
Scar Dimensions	Length - Width - Height from ground -	120 28 70	cm cm cm
Overgrowth Measurements	Thickness – Width -	15 10	cm cm
Scar Orientation	East		
Origin of Scar	Natural – Branch Tear		
Type of Scar	Vertical/elliptical		
Axe Marks?	Yes – European - after scarring		

Comments and Discussion

This tree was dead at the time of assessment and had been felled with a chain saw.

This tree was estimated to be approximately 83 years old at death and approximately seven years to now since death (90 years total). The relatively recent felling of this tree is supported by the presence of remnant bark on the stump. Based on wound depth the scar was estimated to be 15 years old at death. This dates the initial scarring at approximately 22 years old (i.e. time since death = 7 years + scar age at death = 15 years) and younger than the estimated 150 years considered the latest likely date for Aboriginal cultural scarring.

The location of the scar also suggests a natural cause and is consistent with the loss of an epicormic shoot (a secondary stem) near the base of tree which has died and fallen off. This conclusion is supported by the presence of fully closed over scar tissue below the dead wood (see ridge of healed scar tissue extending down to ground level below the dead scar wood). Again, this is a typical pattern of natural scarring observed on numerous other older trees in the upper Hunter Valley.

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Tree 3 293161E 6426412N

A photograph of this scar tree is shown in ***Plate 4*** below.

Plate 4: Scar Tree 3

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Characteristics			
Tree #	Tree 3		
Plate #	Plate 4		
Species	Eucalyptus blakelyi (Blakelys Red Gum)		
Tree Age	Age as at 2012	142 years (max)	
Condition of Tree	Living - healthy		
Girth at 1.5 m Height	445 cm		
Diameter 1.5 m	142 cm		
Estimated Diameter with Bark (at death)	N/A		
Scar Dimensions	Length - Width - Height from ground -	70 28 62	cm cm cm
Overgrowth Measurements	Thickness – Width -	48 35	cm cm
Scar Orientation	West		
Origin of Scar	Natural/Branch or lower shoot tear		
Type of Scar	Vertical/oval		
Axe Marks?	No		

Comments and Discussion

This is a very large Red Gum and one of the largest trees in this vicinity. Red Gums are known to be fast growers (particularly when young) and quicker than other species such as Narrow-leaf Ironbark and Box. As such, applying the annual diameter increment assumption in this report (10 mm/year), which is based on the slower growing Narrow-leaf Ironbark, is probably very conservative and has most likely resulted in the age of this tree (and the scar) being over estimated by previous consultants.

Despite this, applying this conservative growth rate indicates that the tree was approximately 142 years old and that the scar was approximately 70 years old. That is, the scar was initiated when the tree was approximately 72 years old. These results indicate that scarring occurred well after the likely cessation of Aboriginal cultural scarring.

Tree 4 293257E 6426726N

A photograph of this scar tree is shown in ***Plate 5*** below.

Plate 5: Scar Tree 4

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Characteristics			
Tree #	Tree 4		
Plate #	Plate 5		
Species	Eucalyptus crebra (Narrow-leaf Ironbark)		
Tree Age	As at 2012	115 years	
Condition of Tree	Alive/Relatively healthy		
Girth at 1.5 m Height	362 cm		
Diameter 1.5 m	102 cm		
Estimated Diameter with Bark	115 cm		
Elliptical Scar Dimensions (section on ground)	Length - Width - Height from ground -	182 12 80	cm cm cm
Overgrowth Measurements	Thickness – Width -	28 34	cm cm
Scar Orientation	East		
Origin of Scar	Natural/Branch or lower shoot tear		
Type of Scar	Vertical/thin		
Axe Marks?	No		

Comments and Discussion

This is a very large Narrow-leaf Ironbark and one of the largest of this species in this vicinity. The tree was estimated at 115 years old and the scar at approximately 28 years old. It was estimated that the scar was approximately 28 years old and obviously occurred well after the likely cessation of Aboriginal cultural scarring approximately 150 years ago.

Again, the most likely cause of scar ignition was the loss of a low epicormic stem at the base of the trunk. This is a common cause of low trunk scars on trees of this age and size in this area and was also observed in Tree 2 in this report. This conclusion is supported by the presence of healed scar wood below the existing scar opening (see above photograph). Other supporting evidence is the presence of a large root, located immediately below the original shoot. A similar scar/root pattern was observed in Trees 2, 3 and 4 in this study and strongly supports the original presence of a secondary stem/shoot.

5.0 SUMMARY AND CONCLUSIONS

This report has made certain assumptions based on:

1. Cessation of Aboriginal scarring (estimated no later than 150 years ago).
2. Tree growth rates.
3. Rate of wound regrowth.

1860 has been used as the latest date of Aboriginal scarring. However, it is likely that the Hunter Valley was well colonized by that time. For instance Maitland was proclaimed as a town in 1833.

Average annual diameter increment has been estimated at 1 cm (10 mm) per year which is twice the radial growth rate as demonstrated by the rate of wound regrowth (0.5cm/year – a radius measurement) concluded using the example cited in Section 3. This rate of growth is considered very conservative as there is considerable evidence that many trees on the floor of the Valley grow faster than this (see discussion in Section 3).

Much of the scar damage observed in this report appears to relate to a period approximately 20 – 60 years ago when extensive ring-barking, felling and general tree damage appeared widespread within the Hunter Valley. The size of adjacent regrowth, observed in this study, further confirms general growth rate assumptions used in this report.

In terms of the life span of trees growing on the floor of the Valley the presence of European survey marks, such as that cited in Section 3, provide reliable data on scar and hence diameter growth, which can be used as guidelines.

In addition, extensive field experience by the author in commercial and farm forestry together with other general tree experience in the Hunter Valley over a 38 year period supports the conclusion that most dominant native forest/woodland trees do not live much beyond 100 – 140 years and grow at the rates suggested.

Based on the above assumptions and experience none of the scars in this study were considered to be of Aboriginal origin, with several occurring relatively recently within the last 40 years.

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6.0 REFERENCES

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