APPENDIX 6

Aboriginal Cultural Heritage Assessment

ULAN COAL MINES LIMITED, CENTRAL TABLELANDS OF NEW SOUTH WALES: ULAN WEST MODIFICATION - ABORIGINAL CULTURAL HERITAGE ASSESSMENT

A report to

ULAN COAL MINES Limited

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by

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EXECUTIVE SUMMARY

Ulan Coal Mines Limited (UCML) is located approximately 38 kilometres north-northeast of Mudgee in the Central Tablelands of New South Wales, within the Mid-Western Regional Council Local Government Area. Mining at UCML has been undertaken since the early 1920s, with the open cut and underground mining operations as known today commencing in 1982 and 1986 respectively.

UCML obtained Project Approval (PA 08_0184) on 15 November 2010 under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the Ulan Coal - Continued Operations Project (UCCO Project). PA 08_0184 has since been modified on two occasions. The UCCO Project comprises an extension of open cut mining west of the existing pit, underground mining of the Ulan No.3 and Ulan West areas, and new infrastructure primarily associated with the operation of the Ulan West mine, along with continued use and/or modification of existing infrastructure.

Ongoing exploration and refinements to mine planning have identified additional coal resources within the existing approved UCCO Project Area and the adjacent Exploration Lease (EL) area EL7542. UCML is seeking approval for a change to the Ulan West mine plan that includes extending seven underground mining panels between 900 and 1300 metres within existing mining and exploration leases. This would result in extraction of approximately an additional 13 million tonnes of coal and extend the Ulan West mine life by two years. A Mining Lease Application (MLA 475) has been lodged for the southern portion of EL7542 with NSW Trade and Investment – Division of Resources and Energy. These variations to the PA 08_0184 are being sought via a modification under Section 75W of the EP&A Act (referred to herein as "the proposed modification"). The NSW Minister for Planning is the consent authority.

This supplementary report has been prepared by South East Archaeology for UCML to address the potential impacts of the proposed modification on Aboriginal cultural heritage.

Aboriginal heritage within the approved UCCO Project Area is managed in accordance with an approved Heritage Management Plan (HMP) (*ULN SD PLN 0013 Revision 5.0*). The HMP contains specific provisions relating to an assessment of a modification such as that proposed, particularly under Section 3.7.7 (*Assessment of Future Mine Plan Alterations*), Section 3.7.5 (*Survey of Areas Not Sampled During EA*) and Section 3.7.4 (*Future Proposed Small-Scale Surface Impacts*).

As such, this Aboriginal cultural heritage assessment of the proposed modification has proceeded in accordance with the approved HMP, particularly Sections 3.7.4, 3.7.5 and 3.7.7, including for the small section of land outside of the existing approved UCCO Project Area in MLA 475.

This investigation has also proceeded with reference to standard Department of Planning and Environment (DP&E) and Office of Environment and Heritage (OEH) policies, including the 2005 *Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation*, which reference the *Aboriginal Cultural Heritage Standards and Guidelines Kit* (DEC 1997) and *Interim Community Consultation Requirements for Applicants* (DEC 2004), along with the more recently introduced 2010 *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* and 2011 *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* OEH.

Consultation was undertaken with the Aboriginal community in accordance with the approved UCCO Project and Section 3.1 of the HMP. The *Interim Community Consultation Requirements for Applicants* (DEC 2004) had been applied for the UCCO Project. Consultation with the registered Aboriginal stakeholders (Warrabinga Native Title Claimants Aboriginal Corporation, North East Wiradjuri Company Ltd, Mudgee Local Aboriginal Land Council, Murong Gialinga Aboriginal and Torres Strait Islanders Corporation and Warranha Ngumbaay) continued for the proposed modification. The Wellington Valley Wiradjuri Aboriginal Corporation was also consulted as an additional interested organisation, as part of wider consultation separate to the HMP requirements.

For the purposes of this assessment, the key areas for investigation and relevant sections of the HMP in relation to the methodology included:

- Areas that have not been heritage surveyed to current standard within the zone of potential subsidence impacts in MLA 475 *outside of* the approved UCCO Project Area (approximately 123 hectares) for which archaeological survey has occurred for this modification assessment in accordance with Sections 3.7.7 and 3.7.5 of the HMP;
- Areas that have not been heritage surveyed to current standard within the zone of potential subsidence impacts *within* the approved UCCO Project Area, which will be addressed post-modification approval under the currently approved UCCO Project and HMP in accordance with Sections 3.7.7 and 3.7.5 of the HMP; and
- Reassessment of subsidence impacts on Aboriginal sites for the Ulan West longwall panel realignment within the approved UCCO Project Area, in accordance with the procedures in Section 3.7.7 of the HMP.

In relation to the proposed repositioning of some approved ventilation shafts and dewatering bores and the installation of additional ventilation shafts and associated infrastructure, the newly proposed surface impact area of approximately 56 hectares is almost entirely located within the approved UCCO Project Area. Other surface impact areas, totalling approximately 24 hectares within the approved UCCO Project Area, will now no longer be required to be constructed, resulting in a reduction in impacts in those areas.

As design and subsequent finalisation of these surface impact areas has occurred after completion of the heritage field survey, and approximately 66% of this newly proposed surface impact area had already been subject to heritage survey to current standards, consideration of the impacts of the proposed changes to minor surface infrastructure has occurred in accordance with Section 3.7.4 (*Future Proposed Small-Scale Surface Impacts*) of the HMP.

A comprehensive field survey sampling the 123 hectares that had not been subject to heritage survey to current standards *within* the zone of potential subsidence impacts *outside of* the approved UCCO Project Area was undertaken by South East Archaeology over five days in May 2014, assisted on every day by representatives of the registered Aboriginal stakeholders. An additional 51 hectares of adjacent land was also surveyed, including three of the four hectares within the proposed *surface impact* area in MLA 475.

The survey resulted in the recording of an additional 22 Aboriginal sites, comprising 13 artefact scatters, seven isolated finds and two rock shelters with artefacts, along with five rock shelter with Potential Archaeological Deposits (PADs).

Other contemporary cultural values associated with the surveyed area have also been identified by the Aboriginal stakeholders, including:

- In general terms, the use of subsistence or other resources;
- In general terms, the traditional use of the area by north-eastern Wiradjuri people, and an ongoing cultural and spiritual connection to the land and resources of the study area by the north-eastern Wiradjuri; and
- In relation to the large pagodas and sandstone formations within the valley adjacent to the main Cockabutta Creek tributary (survey area 'Mod 8') and the large sandstone formation in which sites ID# 161 and 162 are situated (survey area #836) the stakeholders expressed a strong spiritual and cultural connection with these areas.

The predictive model of site location for the surveyed area was reassessed in relation to the areas within the sampled zone that were not directly inspected. The predictions for the areas within the broader Ulan West subsidence and surface impact zones that have not been surveyed to current standards, or were not directly sampled during the survey, remains unchanged.

The significance of the Aboriginal heritage evidence identified during the survey was assessed, along with a number of previously recorded sites that are now within the potential impact area of the proposed modification (but which were not within the UCCO Project impact area and therefore were not considered further during that assessment). It is noted that all Aboriginal heritage is of interest and contemporary value to the Aboriginal community. Aboriginal heritage evidence represents a tangible link with the traditional past and with the lifestyle and values of community ancestors.

The potential impacts of the proposed modification on Aboriginal sites and cultural areas/values has been assessed. Excluding artefact scatters and isolated finds (as subsidence associated with the proposed modification will have no material impact on these site types), a total of 315 Aboriginal sites/PADs are known to occur within the zones of potential subsidence impact, both for the approved Ulan West mining area and for the proposed Ulan West mining area.

The primary potential impacts of the proposed modification on Aboriginal heritage relate to underground mining induced subsidence. The proposed modification would result in a decrease in potential subsidence impacts (from above to below the 10% threshold of probability of perceptible impacts) for eight sites and an increase in potential subsidence impacts (from below to above the 10% threshold of probability of perceptible impacts) for 18 sites.

Of the sites for which potential subsidence impacts will decrease, four are rock shelters with PADs of low significance, two are rock shelters with artefacts of low to moderate significance, one is a rock shelter with artefacts of moderate to high significance and one is a rock shelter with grinding grooves of low to moderate significance. These are mostly located in a new gap between the proposed Ulan West mining area and the approved Underground No. 3 mining area. However, advice from UCML is that a future modification to the No. 3 mine plan may occur and that such a modification could result in the restoration of impacts to these sites. Such impacts will require assessment in relation to any such proposed modification, when and if it occurs.

Of the sites for which potential subsidence impacts will increase as a result of the proposed modification, one is an ochre quarry of high significance (ID# 807), 12 are rock shelters with PADs of low significance, one is a rock shelter with artefacts of low significance, one is a rock shelter with artefacts of moderate significance (CC28), one is a rock shelter with artefacts of high significance (ID# 284) and two are rock shelters with art and artefacts of high significance (ID# 161 and 162). These are mainly located in the extension area south of the existing approved Ulan West mining area.

The three rock shelters of high significance and one of moderate significance, ID# 161 (CC19), 162 (CC20) and 284 (CC21) and CC28, represent several of the Cockabutta Creek rock shelter sites, an area of archaeological sensitivity identified by Haglund (1999a) for which it was recommended that the layout of the longwall panels within MLA80 (now ML1468) be designed and constructed to avoid any impacts. Under the subsequent UCCO PA 08_0184, avoidance of impacts was prescribed for these sites.

The proposed modification will also result in an increase in impacts to cultural areas and values identified by the Aboriginal stakeholders, particularly due to the 350 hectare increase in the spatial area of potential subsidence impacts associated largely with the southern extension, and in this southern extension area, the large pagodas and sandstone formations within the valley adjacent to the main Cockabutta Creek tributary (survey area 'Mod 8') and the large sandstone formation in which ID# 161 and 162 are situated (survey area 836).

The proposed changes to the surface impact area will result in a net decrease in impacts to identified Aboriginal heritage evidence (10 sites/PADs with a decrease in impacts compared with seven sites/PADs with an increase in impacts). However, there will be a net increase in impacts to sites/PADs of any potential significance (three sites/PADs with an increase in impacts compared with one site with a decrease in impacts).

The proposed modification would result in a net overall increase in impacts to Aboriginal heritage, particularly heritage evidence of scientific and cultural significance associated with the Cockabutta Creek area. Notwithstanding, it is concluded that in a broader regional context the overall impacts of the modified Project would remain relatively low subject to the implementation of appropriate management and mitigation measures.

The vast majority of the area of relevance to the proposed modification is situated within the approved UCCO Project Area and notwithstanding DP&E approval requirements necessary for the proposed modification, can be managed in accordance with the existing HMP. The portion of the proposed subsidence impact area and surface impact area outside of the approved UCCO Project Area can also be appropriately managed in accordance with the HMP, subject to any necessary amendments to the HMP and subsequent DP&E approval of those.

Assessment of potential management strategies for the identified Aboriginal sites and cultural values that are subject to either a material increase or decrease in potential subsidence impacts or surface impacts from the proposed modification has occurred in a manner consistent with the UCCO Project Environmental Assessment (EA), North 1 Panels Modification and HMP.

Consistent with PA 08_0184, the heritage assessment for the UCCO Project EA (Kuskie 2009) and the HMP, and with consideration of legal requirements under the NSW *National Parks and Wildlife Act 1974* (NP&W Act) and EP&A Act, the results of the present investigation and consultation with the local Aboriginal community, the following management and mitigation measures are proposed:

1) Provisions relating to Aboriginal heritage in the UCML HMP for the approved UCCO Project will continue to be implemented, with revisions and additional actions implemented where necessary that are relevant to the proposed modification. In particular, these revisions and additional actions include but are not limited to:

   a) Management strategies for individual sites as outlined here in Appendix 6, with the entries for each Aboriginal site within the revised approved Project Area replacing (or in the case of new sites, being added to) current entries in Appendix 2 of the HMP (Section 3.5 and Appendix 2 of the HMP);

   b) Amendment of the avoidance of impact provisions to several of the Cockabutta Creek sites (specifically ID# 161, 162 and 284 and CC28) in Section 3.4 of the HMP, to allow subsidence impacts to occur to these sites subject to the implementation of provision (c) below;

   c) Addition to the HMP of a new *Section 3.5.7 Cockabutta Creek Sites ID# 161, 162 and 284 and CC28*, including provisions for:

      - Undertaking an initial small test excavation in each rock shelter (ID# 161, 162 and 284 and CC28) in accordance with Step 2 of Section 3.5.4 of the HMP;
      - Undertaking more detailed salvage excavation in each rock shelter (ID# 161, 162 and 284 and CC28) in accordance with Step 4 of Section 3.5.4 of the HMP, as determined by an appropriately qualified and experience archaeologist, in consultation with the registered Aboriginal stakeholders;
      - Undertaking more detailed recording of ID# 161, 162 and 284 and CC28 (including by photography and accurate surveying, such as laser-scanning), and where feasible, removal of samples for further analysis (eg. chemical analysis and dating); and
      - Updating the HMP to define "appropriately qualified and experience archaeologist" in relation to any personnel involved in the excavation of rock shelter sites/PADs of moderate or higher significance, as comprising "minimum BA (Honours) degree in Aboriginal archaeology and ten years full-time experience in Aboriginal archaeology and three months prior experience in Aboriginal rock shelter excavations for the lead archaeologist, and minimum BA (Honours) degree in Aboriginal archaeology and two years full-time experience in Aboriginal archaeology and one months prior experience on Aboriginal rock shelter excavations for assistant archaeologists";

   d) Revision of the *Rock Shelter Test Excavation Sampling Strategy* (Kuskie 2013a) in relation to several material changes to potential subsidence impacts and consequent management strategies for several relevant rock shelter sites (Section 3.5.4 of the HMP);

   e) Additional investigation of the large open artefact site CC41, should future impacts be proposed, and conducting heritage surveys prior to any impacts occurring of the areas not sampled during the UCCO Project EA or subsequent investigations (as per Section 3.7.5 of the HMP) including;

      - Approximately 0.7 hectares *within* the zone of potential subsidence impacts and 1 hectare within the zone of potential *surface impacts* in MLA 475 and *outside* of the currently approved UCCO Project Area that was not surveyed during the present investigation;
      - Gaps totalling approximately 15 hectares *within* the approved UCCO Project Area in relation to the proposed modified surface impact area;
      - A gap in the northern portion of Ulan West *within* the approved UCCO Project Area that relates to property access issues at the time of the UCCO Project EA;

- A gap in the southern portion of the proposed modification area *within* the approved UCCO Project Area; and
- Other very minor gaps on some margins of Ulan West *within* the approved UCCO Project Area;

f) Addition to the UCML Aboriginal Site Database (with Ulan Site ID numbers attributed) of all Aboriginal sites outside of the currently approved Project Area but within any subsequently approved revised Project Area (Section 5.1 of the HMP);

g) Revision of the HMP within three months of any approval of the proposed modification, and where amendments are required to Section 3 of the HMP, provision to the registered Aboriginal stakeholders of notification and a minimum 15 working days to comment on any proposed amendments, with copies of any updated version of the HMP distributed to the registered Aboriginal stakeholders within 30 working days of completion. Consultation over any amendments would also be required with the DP&E and the OEH and Mid-Western Regional Council (Section 6 of the HMP);

2) UCML will continue consultation with the Aboriginal stakeholders in relation to identification of and agreement on other culturally acceptable mitigation and offsetting measures for the Cockabutta Creek rock shelter sites;

3) Under the terms of the NP&W Act it is an offence to harm or desecrate an object that the person knows is an Aboriginal object, or to harm an Aboriginal object ('strict liability offence'). Therefore, no activities or work should be undertaken within the Aboriginal site areas as described in this report without approval under Section 75W of Part 3A of the EP&A Act (or *in lieu* a valid Section 90 AHIP) and subsequent implementation of any relevant approval conditions; and

4) Copies of this report should be forwarded to each registered Aboriginal stakeholder and the DP&E and the OEH within 30 working days of completion.

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PLATES (APPENDIX 4)

1. INTRODUCTION

1.1 Background and Overview of Proposed Modification

Ulan Coal Mines Limited (UCML) is located approximately 38 kilometres north-north-east of Mudgee and 19 kilometres north-east of Gulgong in the Central Tablelands of New South Wales, within the Mid-Western Regional Council Local Government Area (refer to Figure 1).

Mining at UCML has been undertaken since the early 1920s, with the open cut and underground mining operations as known today commencing in 1982 and 1986 respectively. Since the commencement of mining UCML have both modified their existing approvals and received approval for new mining operations and associated infrastructure.

UCML obtained Project Approval (PA 08_0184) on 15 November 2010 from the then NSW Department of Planning and Infrastructure (DP&I)[1] under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the Ulan Coal - Continued Operations Project (UCCO Project). PA 08_0184 has since been modified on two occasions.

The UCCO Project comprises an extension of open cut mining west of the existing pit, underground mining of the Ulan No.3 and Ulan West areas, and new infrastructure primarily associated with the operation of the Ulan West mine, along with continued use and/or modification of existing infrastructure (refer to Figure 2).

UCML has approval to employ 931 people for continued mining operations of up to 20 million tonnes per annum (Mtpa) of product coal until 2031.

Ongoing exploration and refinements to mine planning have identified additional coal resources within the existing approved UCCO Project Area and the adjacent Exploration Lease (EL) EL7542. UCML is seeking approval for a change to the Ulan West mine plan that includes extending seven underground mining panels between 900 and 1300 metres within existing mining and exploration leases (refer to Figure 3). This would result in extraction of approximately an additional 13 million tonnes of coal and extend the Ulan West mine life by two years. A Mining Lease Application (MLA 475) has been lodged for the southern portion of EL7542 with NSW Trade and Investment – Division of Resources and Energy (DRE).

During 2013, a modification to the approved Ulan West mine plan resulted in the widening of longwall panels LW3 and LW4 by approximately 100 metres, with a consequent repositioning of the longwall panels to the west required. The proposed modification will allow for the repositioning of longwall panels LW5 to LW12 and minor changes to the northern extent of the Ulan West panels that are also necessary as a consequence of this realignment process.

Based on current planning, there will be no change to the currently approved location of coal handling and preparation infrastructure. There will be no change to the annual rates of coal extraction, processing or transportation, or to workforce numbers for currently approved operations. The proposed changes to the Ulan West mine plan will result in the repositioning of some approved ventilation shafts and dewatering bores, as well as the installation of additional ventilation shafts and associated infrastructure (refer to Figure 3).

[1] Previously the Department of Planning and Infrastructure (DP&I) was known as the Department of Planning (DoP) and is currently known as the Department of Planning and Environment (DP&E).

These variations to PA 08_0184 are being sought via a modification under Section 75W of the EP&A Act (referred to herein as "the proposed modification"). The NSW Minister for Planning is the consent authority. Further details on the proposed modification description are provided in the main text of the Environmental Assessment (EA) prepared by Umwelt (Australia) Pty Ltd (Umwelt).

1.2 Study Purpose and Scope

This Aboriginal cultural heritage assessment of the proposed modification has been prepared by South East Archaeology Pty Ltd for UCML.

A Preliminary Environmental Assessment (PEA) prepared by Umwelt (2014) identified that Aboriginal cultural heritage is a key issue, with the following requirements needing to be addressed:

- A description of the existing environment;
- Consideration of all relevant environmental planning instruments;
- An assessment of the potential impacts of the development, including cumulative impacts;
- Effective consultation with Aboriginal communities in determining and assessing impacts, and developing and selecting mitigation options and measures;
- A description of the measures that would be implemented to avoid, minimise and if necessary, offset the potential impacts of the development; and
- An assessment taking into account relevant guidelines, policies and plans.

The DP&E reviewed the PEA (Umwelt 2014) and had no further requirements for Aboriginal cultural heritage.

An EA of the UCCO Project was prepared by Umwelt, with an Aboriginal heritage impact assessment completed by South East Archaeology:

- *Ulan Coal Continued Operations: Aboriginal Heritage Assessment (Volumes A and B)* (Kuskie 2009).

A Heritage Management Plan (HMP) subsequently approved by the then DP&I was prepared to address the requirements of the EP&A Act, *National Parks and Wildlife Act 1974* (NP&W Act), *Heritage Act 1977* (NSW), *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the Part 3A UCCO Project Conditions of Approval, with one of its primary goals being to guide the management of Aboriginal heritage within the UCCO Project Area *in lieu* of a Section 90 Aboriginal Heritage Impact Permit (AHIP):

- *Heritage Management Plan* (*ULN SD PLN 0013 Revision 5.0*) (UCML 2011).

This report addresses the impacts of the proposed modification on Aboriginal heritage, consistent with the aims and methodology of the Aboriginal heritage impact assessment completed for the UCCO Project (Kuskie 2009), the UCCO Project Approval and UCML's HMP.

This report does not seek to repeat the information contained within the primary report (Kuskie 2009).

The proposed modification primarily relates to land within the approved UCCO Project Area, but also includes some land outside of the approved UCCO Project Area in the southern portion of EL7542 (hereafter referred to as MLA 475) (refer to Figures 3 and 4). Much of the land has been subject to Aboriginal heritage survey to current standards, but portions of the land within and outside of the approved UCCO Project Area have not been surveyed to current standards (provisions for which to do so are incorporated within the approved HMP) (refer to Figure 4).

The approved HMP contains specific provisions relating to an assessment of a modification such as that currently proposed, particularly:

- Section 3.7.7 (*Assessment of Future Mine Plan Alterations*);
- Section 3.7.5 (*Survey of Areas Not Sampled During EA*); and
- Section 3.7.4 (*Future Proposed Small-Scale Surface Impacts*).

As such, this Aboriginal cultural heritage assessment of the proposed modification will proceed in accordance with the approved HMP, particularly Sections 3.7.4, 3.7.5 and 3.7.7, including for the small section of land outside of the existing approved UCCO Project Area in MLA 475.

The participation of the registered Aboriginal stakeholders will continue as per Section 3.1 (*Aboriginal Community Involvement*) of the HMP. The Wellington Valley Wiradjuri Aboriginal Corporation (WVWAC) also expressed an interest in being involved and was consulted as an additional interested organisation, as part of wider consultation separate to the HMP requirements.

For the purposes of this assessment, the key areas for investigation and relevant sections of the HMP in relation to the investigation methodology are as follows (refer to Figure 4):

- Areas that have not been heritage surveyed to current standard within the zone of potential subsidence impacts in MLA 475 *outside of* the approved UCCO Project Area (approximately 123 hectares) for which archaeological survey will occur for this modification assessment in accordance with Sections 3.7.7 and 3.7.5 of the HMP;
- Areas that have not been heritage surveyed to current standard within the zone of potential subsidence impacts *within* the approved UCCO Project Area, which will be addressed post-modification approval under the currently approved UCCO Project and HMP in accordance with Sections 3.7.7 and 3.7.5 of the HMP;
- Reassessment of subsidence impacts on Aboriginal sites will occur for the Ulan West longwall panel realignment within the approved UCCO Project Area, in accordance with the procedures in Section 3.7.7 of the HMP; and
- Subsequent adjustments to the *Rock Shelter Test Excavation Sampling Strategy* (Kuskie 2013a) prepared under Section 3.5.4 of the HMP will ultimately be required (as a post-modification approval commitment).

In relation to the proposed repositioning of some approved ventilation shafts and dewatering bores and the installation of additional ventilation shafts and associated infrastructure (refer to Figure 3), the newly proposed surface impact area of approximately 56 hectares is almost entirely located within the approved UCCO Project Area (refer to Figure 12). Only a four hectare portion is located within MLA 475 *outside of* the approved UCCO Project Area, with the remaining 52 hectares being situated within the approved UCCO Project Area.

Other surface impact areas, totalling approximately 24 hectares within the approved UCCO Project Area, will now no longer be required to be constructed (refer to Figure 3), resulting in a reduction in impacts in those areas.

As design and subsequent finalisation of these surface impact areas has occurred after completion of the heritage field survey, and approximately 37 hectares or 66% of this newly proposed surface impact area had already been subject to heritage survey to current standards, consideration of the impacts of the proposed changes to minor surface infrastructure will occur in accordance with Section 3.7.4 (*Future Proposed Small-Scale Surface Impacts*) of the HMP. Essentially this involves the following zones and management measures:

- Areas that have not been heritage surveyed to current standard within the zone of potential surface impacts in MLA 475 *outside of* the approved UCCO Project Area (approximately four hectares) for which archaeological survey will occur for this modification assessment in accordance with Section 3.7.4 of the HMP;
- Areas that have not been heritage surveyed to current standard within the zone of potential surface impacts *within* the approved UCCO Project Area (approximately 15 hectares), which will be addressed post-modification approval under the currently approved UCCO Project and HMP in accordance with Section 3.7.4 of the HMP; and
- Reassessment of potential surface impacts on Aboriginal sites will occur for the areas that have been heritage surveyed to current standard within the zone of potential surface impacts *within* the approved UCCO Project Area (approximately 37 hectares), in accordance with Section 3.7.4 of the HMP. This assessment will also consider the reduction in potential surface impacts associated with the infrastructure areas totalling approximately 24 hectares within the approved UCCO Project Area that will now no longer be required to be constructed (refer to Figure 3).

The primary aims and tasks of this Aboriginal cultural heritage assessment have therefore been to:

- Building on the studies completed to date (Kuskie 2009, 2010, 2012a, 2013a), undertake register searches, research, Aboriginal community consultation and an archaeological survey to identify and record any Aboriginal heritage evidence or areas of potential evidence or cultural values within the investigation area, particularly areas outside of the currently approved UCCO Project Area that have not been surveyed to current standards (with areas not surveyed inside the approved UCCO Project Area continuing to be addressed under Section 3.7.5 of the approved HMP), in accordance with Sections 3.1, 3.6, 3.7.4, 3.7.5, 3.7.7, 5.1 and 5.5 of the HMP;
- Assess the potential impacts of the proposed modification upon identified and potential Aboriginal heritage evidence and cultural values, including the Ulan West longwall panel realignment within the approved UCCO Project Area (and area already surveyed to current standards), following procedures in Section 3.7.7 of the HMP;
- Assess the significance of relevant Aboriginal heritage evidence and cultural values, consistent with the procedures for the UCCO Project (Kuskie 2009);
- Provide details of any newly identified Aboriginal heritage evidence in accordance with the OEH[2] requirements (in accordance with Sections 3.6 and 5.1 of the HMP);

[2] Prior to April 2011 the NSW Office of Environment and Heritage (OEH) was known as the Department of Environment, Climate Change and Water (DECCW), and previously as the Department of Environment and Climate Change (DECC), Department of Environment and Conservation (DEC) and National Parks and Wildlife Service (NPWS).

- Consult with the Aboriginal community in accordance with Section 3.1 of the HMP, with the inclusion of another interested party that have expressed a desire to be involved (WVWAC) as part of wider consultation separate to the HMP requirements;
- Present recommendations for the management of identified Aboriginal heritage evidence and potential heritage resources and cultural values, consistent with Section 3.6 of the approved HMP and in accordance with Sections 3.7.4, 3.7.7 and 5.5 of the HMP;
- Prepare an Aboriginal heritage report to meet the requirements of UCML (primarily with reference to the DEC 1997 *Aboriginal Heritage Standards and Guidelines Kit*) in accordance with Sections 3.7.4, 3.7.7 and 5.5 of the HMP; and
- Update the UCML Aboriginal Site Database and GIS[3] and HMP Appendix 2 in accordance with Sections 3.6 and 5.1 of the HMP.

It is noted that relevant DP&E and OEH policies or guidelines may include:

- The draft *Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation* (DEC 2005) which reference the *Aboriginal Cultural Heritage Standards and Guidelines Kit* (DEC 1997) and *Interim Community Consultation Requirements for Applicants* (DEC 2004): - the UCCO Project (Kuskie 2009) and subsequent HMP and heritage activities at UCML, including Aboriginal stakeholder involvement, have occurred in accordance with these policies and guidelines;
- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* OEH (2011a) and *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b): - heritage activities undertaken at UCML in accordance with the HMP have been and are currently being undertaken to a best-practice standard essentially consistent with these more recently introduced OEH guidelines; and
- *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy (DECCW 2010c): - this policy supercedes the *Interim Community Consultation Requirements for Applicants* (DEC 2004) which has been applied for the UCCO Project, but is essentially very similar. Consultation with the registered Aboriginal stakeholders (Warrabinga Native Title Claimants Aboriginal Corporation, North East Wiradjuri Company Ltd, Mudgee Local Aboriginal Land Council, Murong Gialinga Aboriginal and Torres Strait Islanders Corporation and Warranha Ngumbaay) for the UCCO Project will continue for the proposed modification in accordance with the approved Project and Section 3.1 of the approved HMP, with WVWAC also being consulted as an additional interested organisation as part of wider consultation separate to the HMP requirements.

1.3 Authorship

This assessment has been prepared by Peter Kuskie, an archaeologist with a BA (Honours) degree in Aboriginal archaeology and over 24 years experience in the conduct of Aboriginal cultural heritage assessments throughout Australia, including 14 years experience in the locality of the investigation area.

The field investigation was undertaken by Peter Kuskie and Birgitta Stephenson. Birgitta Stephenson has a BA (Honours) degree in Aboriginal archaeology and Bachelor of Pharmacy degree and over three years experience in the conduct of Aboriginal heritage surveys and use-wear and residue analysis.

[3] GIS - Geographic Information System, in reference to UCML's database of Aboriginal sites and archaeological survey coverage to current standards.

Figure 1: Location of Ulan Coal Mines Limited (courtesy Umwelt).

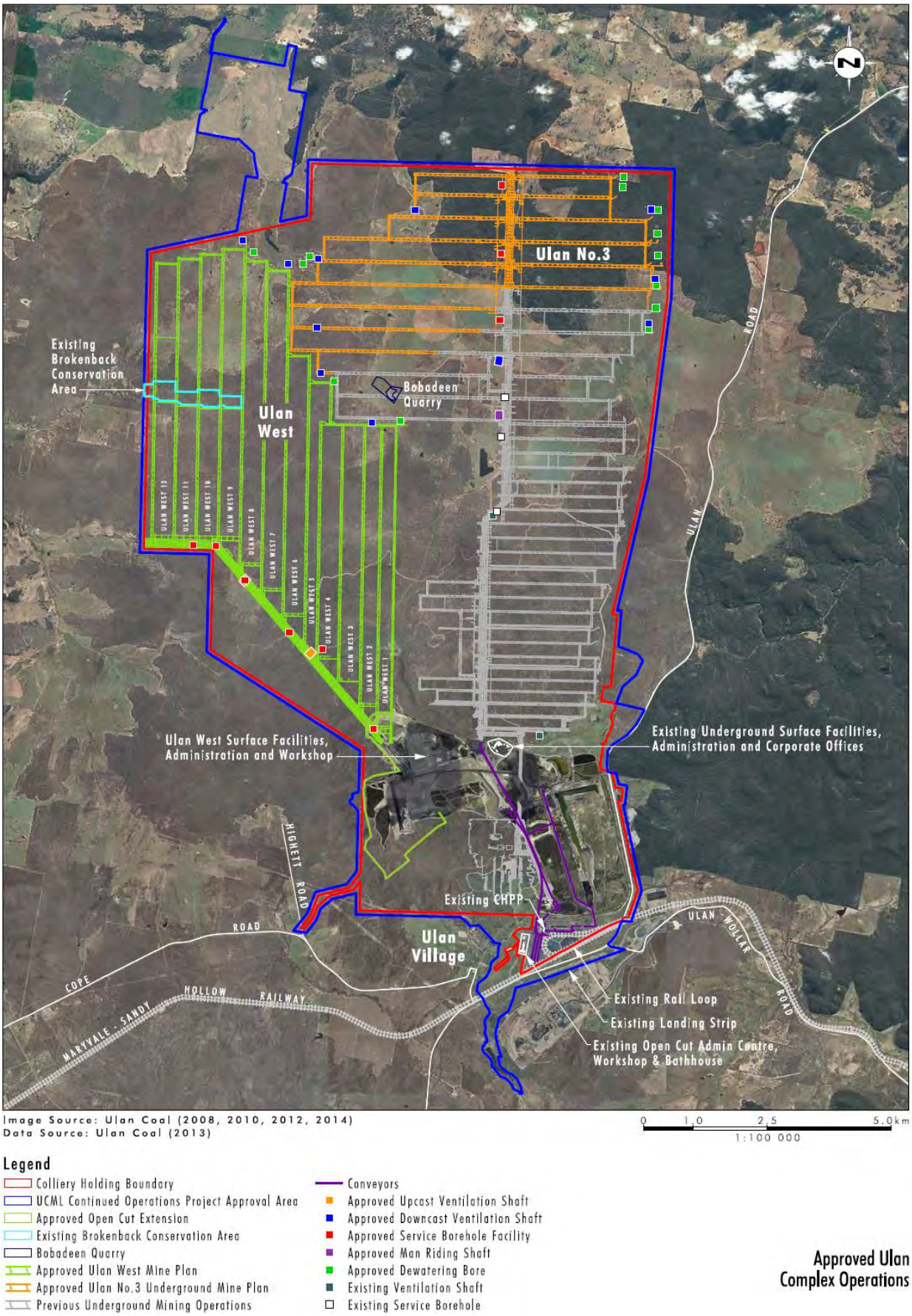


Figure 2: General arrangement of approved UCCO Project (courtesy Umwelt).

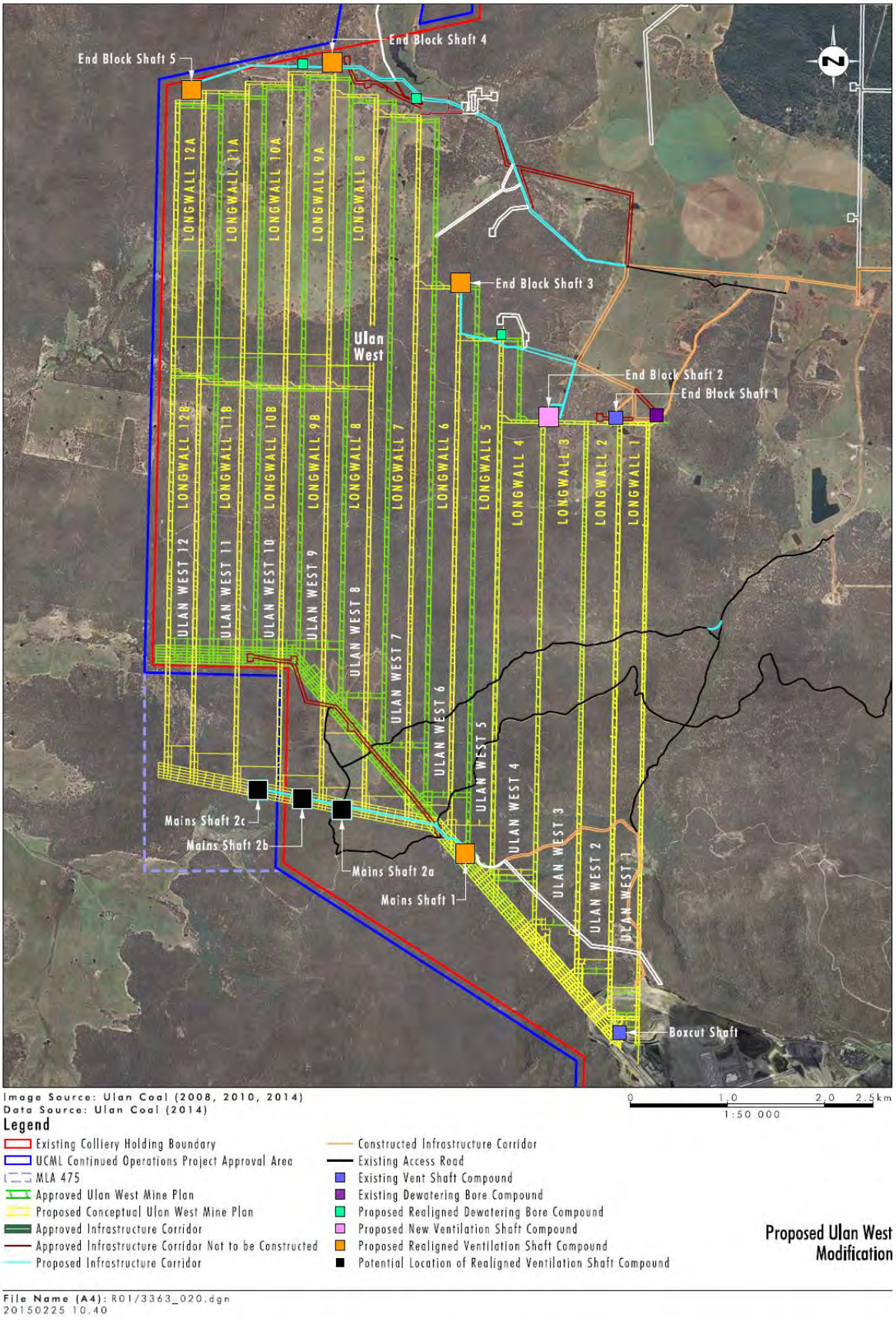
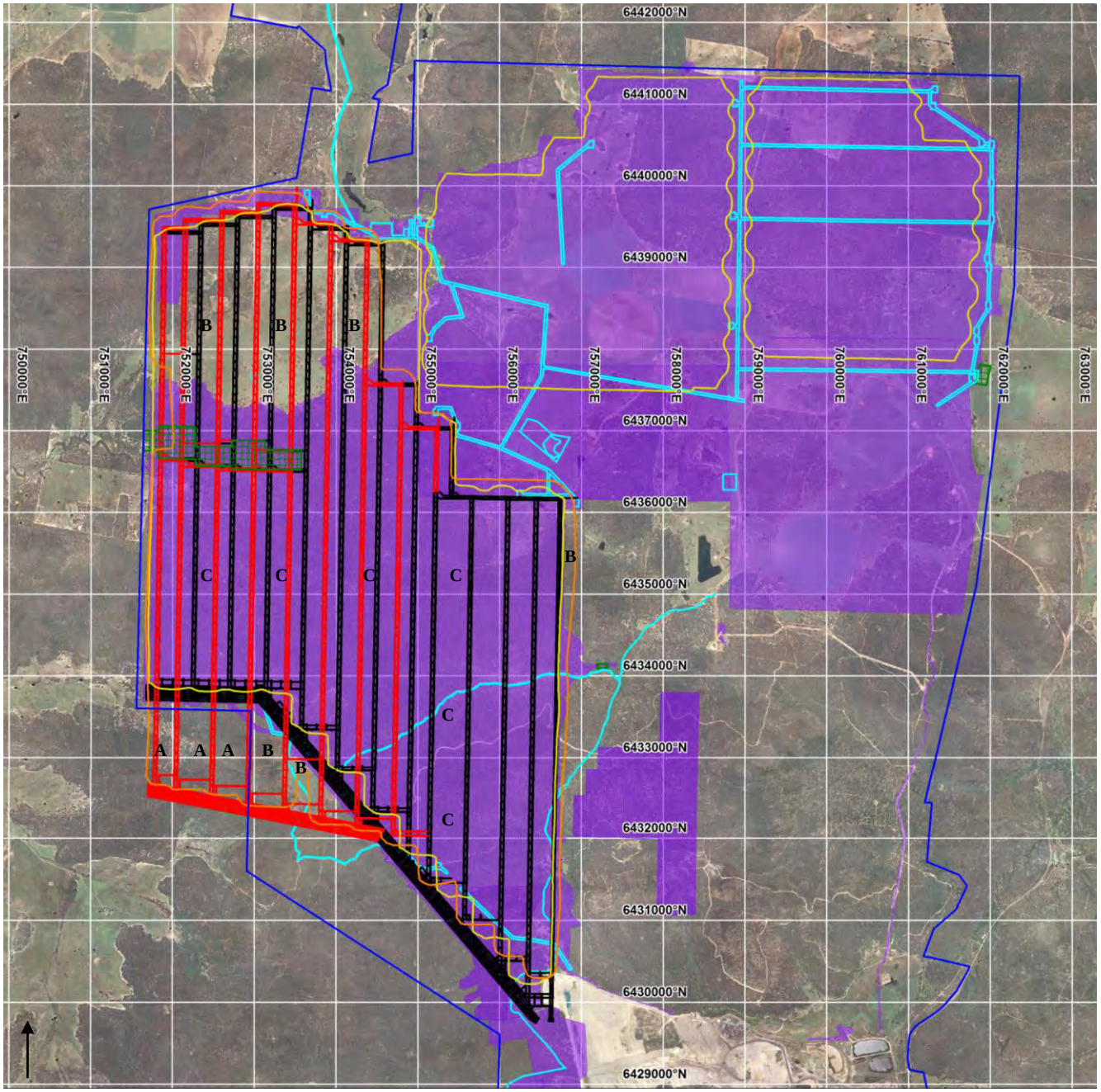


Figure 3: Proposed Ulan West modification (courtesy Umwelt).



UCML Continued Operations Part 3A Approved Project Area

Approved Ulan West Mine Plan

Potential Subsidence Impacts (Approved Mine Plan)

Potential Surface Impacts (Approved Mine Plan)

Proposed Ulan West Mine Plan (the Modification)

Potential Subsidence Impacts (Modification Mine Plan)

Brokenback Conservation Area

Areas Subject to Heritage Survey to Current Standards

A. Areas that have not been heritage surveyed to current standards within the zone of potential subsidence impacts in EL7542 *outside of* the approved Part 3A Project Area for which archaeological survey will occur for this Modification assessment in accordance with Sections 3.7.7 and 3.7.5 of the HMP.

B. Areas that have not been heritage surveyed to current standards within the zone of potential subsidence impacts *within* the approved Part 3A Project Area, which will be addressed post-Modification approval under the currently approved Project and HMP in accordance with Sections 3.7.7 and 3.7.5 of the HMP.

C. Areas that have been heritage surveyed to current standards for which re-assessment of subsidence impacts will occur for this Modification assessment in accordance with Section 3.7.7 of the HMP.

Figure 4: Proposed Ulan West modification and key elements in relation to the Aboriginal heritage assessment of the proposed underground mine plan changes.

2. ENVIRONMENTAL CONTEXT

The natural environment of the approved Ulan West mining area remains as described by Kuskie (2009).

The area that has not been subject to heritage survey to current standards within the zone of potential subsidence impacts in MLA 475 *outside of* the approved UCCO Project Area (approximately 123 hectares) is located immediately west of the mid-portion of the approved UCCO Project Area (refer to Figures 4 and 6). This portion of the proposed Ulan West mining area is situated immediately west of Box Hill and the Great Dividing Range, on the western fall of the range, within the Talbragar River catchment. The Talbragar River is located approximately ten kilometres north-west of this area.

Primarily this area comprises a broad valley associated with the headwater tributaries of Cockabutta Creek, with more elevated ridges and sandstone formations around the southern, northern and eastern margins.

Most of the Cockabutta Creek tributaries in this location are unlikely to have retained standing water for any significant time, due to the colluvial sandy soils across the valley, notwithstanding that post-European land clearance and consequent gully erosion has created ponded water in places at present. The drainages are mostly first and second order tributaries of Cockabutta Creek, with the higher order Cockabutta Creek located approximately two kilometres to the west. However, the lower portion of the main tributary of Cockabutta Creek is a third-order watercourse and prior to the gully erosion associated with non-indigenous vegetation removal and land use, the presence of a chain of ponds cannot be discounted.

In terms of the surface area of the 173.7 hectares of land subject to detailed archaeological sampling during the present survey (as derived from two-dimensional base mapping; refer to Figures 6 - 10), gently inclined slopes (1.45-5.45º, as per McDonald *et al* 1984) comprise 68.3% of this area, moderately and steeply inclined slopes (>5.45º) comprise 27.6% of this area and level to very gently inclined slopes (<1.45º) comprise 4.1% of this area. In relation to landform units, simple slopes occupy 76% of this area, drainage depressions 15.7%, spur crests 4.1%, ridge crests 2.5%, and scarps, hillocks and hill crests all less than 1% (refer to Table 3).

Note that the 173.7 hectares subject to detailed archaeological sampling during the present survey (refer to Figures 4 and 6 - 10) includes:

a) Approximately 123 hectares that had not been subject to heritage survey to current standards *within* the zone of potential subsidence impacts/angle of draw in MLA 475 *outside of* the approved UCCO Project Area (focus of the present survey);

b) Approximately 39 hectares that had not been subject to heritage survey to current standards *outside of* the zone of potential subsidence impacts/angle of draw in MLA 475 *outside of* the approved UCCO Project Area (this area was included within the initial study area, but subsequent refinements of the mine plan and angle of draw meant that it will no longer be subject to impacts), but includes three hectares within the proposed *surface impact* area in MLA 475;

c) Approximately 7.4 hectares that had not been subject to heritage survey to current standards *within* the zone of potential subsidence impacts/angle of draw *inside* the approved UCCO Project Area (this area was surveyed during the present assessment for efficiency and completeness, rather than being addressed post-approval under Section 3.7.5 of the HMP); and

d) Approximately 4.3 hectares that had not been subject to heritage survey to current standards *outside of* the zone of potential subsidence impacts/angle of draw and *inside* the approved UCCO Project Area (this area was surveyed during the present assessment for efficiency and completeness and because it was within the initial study area, rather than being addressed post-approval under Section 3.7.5 of the HMP, but subsequent refinements of the mine plan and angle of draw meant that it will no longer be subject to impacts).

Note also that:

i) Approximately 1.2 hectares *within* the zone of potential subsidence impacts/angle of draw in MLA 475 and *outside* the approved UCCO Project Area had previously been surveyed to current standards (Kuskie 2009);

ii) Approximately 0.7 hectares *within* the zone of potential subsidence impacts/angle of draw in MLA 475 and *outside* of the approved UCCO Project Area was not surveyed and will be addressed under Section 3.7.5 of the HMP post-approval; and

iii) Approximately 1 hectare *within* the zone of potential *surface impacts* in MLA 475 and *outside* of the approved UCCO Project Area was not surveyed and will be addressed under Section 3.7.4 of the HMP post-approval.

The geology of the area subject to detailed archaeological sampling during the present survey is dominated by Triassic era Narrabeen Group sandstone, mudstone and conglomerate. Outcrops of Narrabeen sandstone may form poorly consolidated layers and overhangs, resulting in largely unstable rock shelters with horizontal ceilings, sloping floors and protruding shelves comprised of thin layers of harder rock (Haglund 1999a). Sandstone rock formations occur widely in the locality, including boulders, shelters, overhangs and open surfaces. Sandstone rock formations can host evidence of Aboriginal occupation, such as deposits of artefacts and cultural material in rock shelters or overhangs, rock art on surfaces of shelters or overhangs, and grinding grooves on exposed bedrock or isolated cobbles/boulders.

Within the area subject to detailed archaeological sampling during the present survey, large sandstone formations are present along the elevated margins of the valley, but sizeable pagodas and residual sandstone bedrock exposed by erosion around a former ridge occur within the valley itself, adjacent to the main Cockabutta Creek tributary (refer to Plates 4 - 7 and 12 - 16 in Appendix 4).

Two soil landscapes dominate the area that has not been subject to heritage survey to current standards within the zone of potential subsidence impacts *outside of* the approved UCCO Project Area (Murphy and Lewis 1998):

- The Munghorn Plateau Soil Landscape occupies much of the valley and side-slopes: It comprises low undulating hills on sandstone plateaux with rock outcrops. Mainly siliceous sands and shallow soils are present on crests and upper slopes. Yellow earths and yellow podsolic soils are present on lower slopes and in drainage depressions. Some peats are also present in these depressions; and

- The Lees Pinch Landscape occupies the more elevated terrain along the southern and north-eastern margins of the investigation area: It consists of rolling hills and steep rocky slopes and valley sides and contains Narrabeen sandstone conglomerate, shale conglomerate, mudstone, chert, coal and torbanite seams. Shallow sandy soils, extensive rock outcrops, sandstone cliffs and debris slopes are present. It also includes grey and yellow earths and yellow podzolic soils on lower slopes.

The vegetation of this portion of the investigation area is dominated by Forest/Open Forest Formation, with cleared areas dominated by grass and recent regrowth in the western part of the valley (refer to Plates 1 - 16 in Appendix 4). Ironbark, Acacia, Scribbly Gum, pines and Geebung were noted during the survey. The cover of vegetation acts to reduce ground surface visibility and thereby reduces the potential to identify archaeological evidence during a field survey, particularly stone artefacts. Widespread extraction of timber in historical times is evident and large portions of the vegetation represent regrowth. Nevertheless, several mature native trees are present and the potential occurrence of carved or scarred trees cannot be discounted.

Recent land use impacts have been low, and are generally limited to timber extraction, with focalised impacts from several roads, farm dams and minor exploratory drilling. Typically, should sub-surface deposits of artefacts occur, they may exhibit reasonable integrity.

The investigation area only comprises a single resource zone (woodland/forest) in which higher order watercourses are absent. However, the lower portion of the main tributary of Cockabutta Creek is a third-order watercourse and in the past, prior to modern gully erosion, some retention of water in ponds may have been possible.

In the late Pleistocene, during the last glacial maximum from about 24,000 to 17,000 years ago, the climate was cooler (possibly 6-10º Celsius) and drier than at present. Potable water was probably not frequently available in the locality. In terms of subsistence resources and potable water, the investigation area would not have represented an environment conducive to Aboriginal occupation. After temperatures rose in the late Pleistocene/early Holocene, potable water may have been more frequently available in the locality, particularly in the higher order watercourses such as Cockabutta Creek. As such, the locality was more conducive to occupation in the Holocene period, although as discussed in Section 3, occupation may have been focused outside of much of the immediate investigation area in locations where conditions were more favourable.

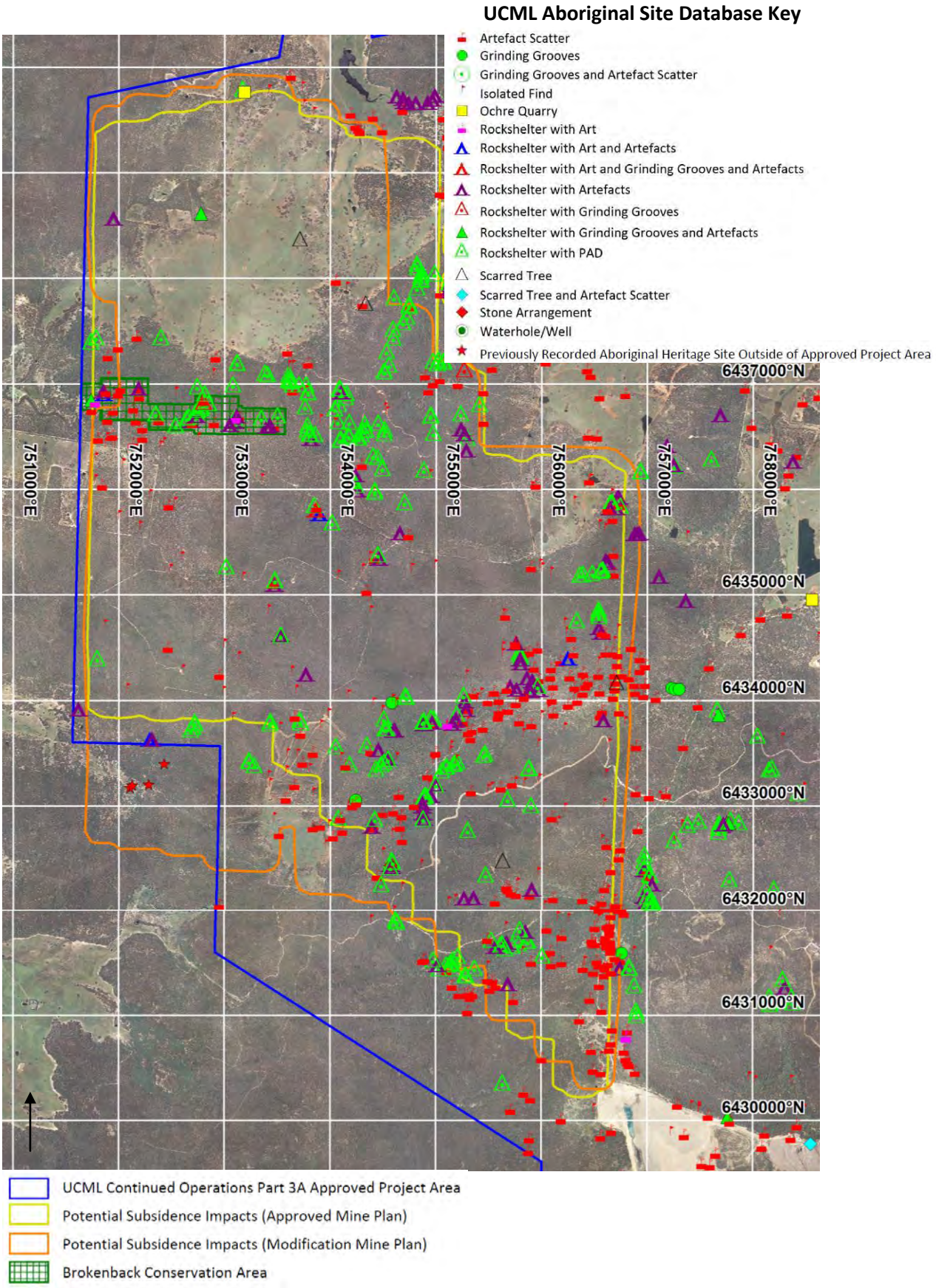


Figure 5: Ulan West and modification area and previously recorded Aboriginal heritage sites (Aboriginal site data from UCML Aboriginal Site Database Revision 14, June 2014 and OEH AHIMS; only valid for UCCO Project Area and potential subsidence impact area from modification mine plan).

3. ABORIGINAL ARCHAEOLOGICAL CONTEXT

3.1 Heritage Register Searches

Searches were undertaken on 21 May 2014 of the OEH Aboriginal Heritage Information Management System (AHIMS), between MGA grid coordinates 751000 and 755500 east and 6431000 and 6435000 north, a zone of 18 square kilometres that encompasses the area that has not been subject to heritage survey to current standards within the zone of potential subsidence impacts and zone of potential surface impacts in MLA 475 *outside of* the approved UCCO Project Area (along with portions of the approved Project Area).

This AHIMS information has been combined with the information maintained in the UCML Aboriginal Site Database (Revision 14, June 2014) to accurately document all known Aboriginal sites within the UCCO Project Area and proposed zones of potential subsidence and surface impacts associated with the proposed modification in MLA 475 *outside of* the approved UCCO Project Area. Known sites (prior to the conduct of the present survey) are marked on Figure 5 and summarised in Table 1.

In total, 1,507 Aboriginal sites/PADs were known to occur within this area, predominantly open artefact sites and rock shelters. Only four sites are listed within the zone of potential subsidence impacts associated with the proposed modification in MLA 475 *outside of* the approved UCCO Project Area. These comprise Cockabutta Creek 21, a rock shelter with artefacts recorded by Haglund (1999a), and three artefact scatters recorded by Kuskie (2013g) during a due diligence survey associated with drilling in MLA 475. Full descriptions of these sites are presented in Appendix 1.

Within the approved UCCO Project Area, the extension of longwall mining into MLA 475 will extend the zone of subsidence impacts into portions of the approved Project Area that were not proposed to be impacted under the UCCO Project (refer to different subsidence impact zones on Figure 5). As such, a number of Aboriginal sites that were not reported on or assessed in detail in the UCCO Project (Kuskie 2009), because no impacts were proposed, now require consideration. Full descriptions of these sites are also presented in Appendix 1. They include Cockabutta 18, 19 and 20 (all rock shelters recorded by Haglund 1999a) and several open artefact sites recorded during additional surveys conducted under the HMP (Brokenback 233 and 234). They also include a number of other sites recorded during the UCCO Project survey, but as they were reported in detail by Kuskie (2009) additional descriptions are not presented here. However, all sites that may be subject to alterations to their potential impact status are considered and discussed within this assessment of the proposed modification (refer to Appendix 6 and Sections 9 - 11).

The proposed modifications to the surface impact area (new impacts proposed within 56 hectares and no impacts proposed any longer within 24 hectares for which surface impacts had been approved under the UCCO Project; refer to Section 1 and Figure 12) are considered further in Sections 5, 9 - 11 and Appendix 6. These proposed surface impact area changes have the effect of reducing potential impacts to ten previously recorded sites (ID# 602, 606, 634, 635, 800, 804, 1194, 1195, 1201 and 1204) and increasing potential impacts to four previously recorded sites[4] (ID# 462, 825, 826 and 827) compared to the approved Project and approved HMP. These sites were reported in detail by Kuskie (2009) and additional descriptions are not presented here. However, all sites that may be subject to alterations to their potential impact status or management strategies as a consequence of the proposed changes in surface impacts are considered and discussed within this assessment of the proposed modification (refer to Appendix 6 and Sections 9 - 11).

[4] Along with another three sites identified during the present survey for the proposed modification.

Table 1: Summary of known Aboriginal sites within the approved UCCO Project Area and zone of potential subsidence impacts associated with the proposed modification in MLA 475 *outside of* the approved UCCO Project Area (based on UCML Aboriginal Site Database Revision 14, June 2014, and AHIMS search encompassing the proposed modification area).

Aboriginal Site Type	Total
Artefact Scatter	555
Grinding Grooves	14
Grinding Grooves and Artefact Scatter	4
Isolated Find	347
Ochre Quarry	3
Rockshelter with Art	9
Rockshelter with Art and Artefacts	4
Rockshelter with Art and Grinding Grooves and Artefacts	1
Rockshelter with Artefacts	178
Rockshelter with Grinding Grooves	3
Rockshelter with Grinding Grooves and Artefacts	8
Rockshelter with PAD	365
Scarred Tree	8
Scarred Tree and Artefact Scatter	2
Stone Arrangement	6
Waterhole/Well	1
Total	1507[#]

Only four sites are listed on the AHIMS register within the zone of potential subsidence impacts associated with the proposed modification in MLA 475 *outside of* the approved UCCO Project Area (ID# 284, 1570, 1571 and 1572, a rock shelter with artefacts and three artefact scatters).

No Aboriginal heritage sites are listed within the modification investigation area on any other heritage registers or planning instruments, including the *Mid-Western Regional Local Environmental Plan 2012*, *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* or the *EPBC Act 1999* (Commonwealth Heritage List or National Heritage List).

The Talbragar Reserve, or Talbragar Fish Fossil Reserve as it is known, is located in the northern portion of Ulan West. A Crown Land Reserve (#88025) of about four hectares was gazetted on 27 November 1970 for the preservation of this internationally significant fossil site. The site is an example of a Jurassic fresh water lake deposit. This item is listed for natural values on the Register of the National Estate (ID #465) and in Schedule 5, Environmental Heritage, of the *Mid-Western Regional Local Environmental Plan 2012* (item #I991).

3.2 Previous Archaeological Research

3.2.1 UCML

Comprehensive details of the archaeological investigations undertaken to date at UCML are presented by Kuskie (2009) and briefly summarised below. The investigation of the North 1 Panels modification and test excavation of three rock shelter sites within the North 1 Panels are reported by Kuskie (2010, 2012a).

Haglund and Associates had completed many of the heritage assessments at UCML prior to 2000 and South East Archaeology has undertaken investigations at UCML since that date. The key investigations are noted below (refer to Kuskie 2009 for further details):

- Haglund's (1980) initial work involved a preliminary archaeological survey of the Ulan Colliery and No. 2 Underground Mine areas (lease CCL741). This survey resulted in the identification and recording of six sites and numerous isolated finds, largely within the area proposed for open cut mining;
- Further studies were conducted of this area by Haglund between 1980 and 1981 (Haglund 1981a, 1981b). These studies involved the collection of historical and ethnographic information for the region, an intended minimum 50% survey coverage of areas to be affected by the proposed open cut mining and associated works, sampling of sites to be directly impacted by the mining activities, and test excavations of rock shelters and other sites;
- Corkill (1991) surveyed a four kilometre route of a coal conveyor between the ROM stockpile and just east of the Underground Office, and a 400 x 150 metre area to be impacted by mine infrastructure development northwest of the Underground Office, within CCL741. A proposed diversion channel for Ulan Creek was also investigated. Two artefact scatters and one isolated find were located;
- Haglund (1992) undertook further surveys in relation to a preliminary investigation of a northward extension of the Ulan No. 3 underground mine, a basalt quarry, a new access road and other infrastructure. Sixteen Aboriginal sites were recorded during these investigations, which included "intensive" survey of the areas of proposed surface facilities and access routes and "reconnaissance" inspection of the underground extension area;
- A shelter site recorded during Haglund's (1992) investigation, ID# 116 (OEH #36-3-177), was subsequently the focus of a salvage excavation (Haglund 1996a), which remains one of the few rock shelters to be excavated within the locality. The salvage excavation was undertaken in February 1996 with a total area of 20 m^2 excavated and 765 artefacts recovered at a density equating to 139 artefacts/m^3;
- Haglund (1996b) recorded eight rock shelter sites and three artefact scatters during a survey of Ulan No. 3 longwall panels 11 and 12 and associated surface infrastructure;
- Edgar (1997) surveyed Ulan No. 3 longwall panels 13-17 in the Spring Gully area in 1996 and recorded an additional 16 sites (to those previously recorded by Haglund), including a number of rock shelters and an ochre quarry;

- The SG5 (Spring Gully 5) rock shelter site (ID# 132), above Ulan No. 3 longwall panel 13, was subject to an extensive salvage excavation in May 1998, prior to undermining. The results were reported by Haglund (2001a, 2001b) and White (2001a, 2001b), with a section on use-wear and residue analysis by Therin (2000). A total of 37 m^2 was subject to salvage excavation and 10,002 stone artefacts recovered. Radiocarbon dates were obtained for a number of charcoal samples, including one of 4,147 ± 60 years Before Present (BP) (*NZA 10766*), which equates to an age calibrated to two standard deviations of 4840 - 4446 calBP;

- Further surveys were undertaken by Haglund from November 1995 to December 1997 as part of the preparation of an Environmental Impact Statement (EIS) for a second longwall mine (Ulan West) and additional lease area, now ML1468 (Haglund 1999a, 1999b). The survey focused on areas susceptible to subsidence impacts and areas of high archaeological potential, but the overall coverage involved a relatively small sample. A total of 59 rock shelters with archaeological deposits were found and at least seven shelters with rock art were also recorded (Haglund 1999a, 1999b). Five rock shelters were associated with grinding grooves, both portable and permanent. Sixteen artefact scatters were located, along with a grinding groove site in an open context;

- Haglund (1999c, 1999d) conducted further investigations for infrastructure in the northern Ulan No. 3 longwall panels, an irrigation area, earthworks at the aircraft landing strip south of Ulan Road and additional highwall trenches and associated water management measures west of the open cut mine (Open Cut Extension). A number of artefact scatters and potential Pleistocene creek terrace deposits were reported;

- Kuskie (2000a) investigated the grinding groove site Bobadeen 5 (BO5, ID# 202), within Ulan No. 3 longwall panels 25 and 26 and an offset site, Bobadeen 13 (ID# 323);

- A proposed basalt quarry was investigated in 2002 (Kuskie 2002);

- In 2003, as part of a proposal to consolidate existing development consents, South East Archaeology prepared a two volume report (Kuskie and Clarke 2003, Kuskie 2004) focused on the assessment of new works and a comprehensive review of all of the previous heritage assessments at UCML, along with preparation of a revised site database;

- Further investigations of the area west of the open cut were conducted by South East Archaeology (Kuskie 2004, Kuskie and Clarke 2005a), locating mainly open artefact sites, including evidence of tuff quarries;

- Kuskie and Clarke (2005a) undertook further investigations of the Open Cut Extension and irrigation area, confirming the probable presence of contexts suitable for the preservation of Pleistocene age evidence of Aboriginal occupation;

- Kuskie and Webster (2001) undertook a comprehensive survey of Ulan No. 3 longwall panels 18-22, with direct coverage of 57.8 hectares (12% of the 498 hectare study area) and 56 open artefact sites, one rock shelter with archaeological deposit and one ochre quarry located;

- Kuskie and Clarke (2005b) undertook a comprehensive survey of Ulan No. 3 longwall panels 23-26 and W1, with direct coverage of 85.8 hectares (10% of the 840 hectare study area) and 52 open artefact sites, seven rock shelters with artefacts, three grinding groove and artefact scatter sites, two other grinding groove sites and one scarred tree being recorded;

- Kuskie and Clarke (2007) undertook a comprehensive survey of Ulan No. 3 longwall panels W2 and W3, with direct coverage of 75.8 hectares (21% of the 351 hectare study area) and 22 open artefact sites, two rock shelters with grinding grooves and artefacts, two rock shelters with grinding grooves, and two rock shelters with artefacts reported (including several previously recorded sites);

- Kuskie (2009) investigated a large portion of the UCML lease area for the UCCO Project. An extensive field survey was conducted over 104 days in 2008, sampling an area of 4,785 hectares, and resulting in the development and refinement of a detailed model of occupation for the locality. During the survey 8,774 stone artefacts were recorded in detail and in total 709 Aboriginal sites and 296 rock shelters with PADs were recorded within the study area. These sites comprised 558 open artefact sites, nine open grinding groove sites, 128 rock shelters with artefacts, art and/or grinding grooves, five scarred trees, five stone arrangements, two ochre quarries, a waterhole/well and a combined groove and artefact scatter site. Overall, artefacts occurred at a very low mean density of 0.0176 per square metre of effective survey coverage and the spatial distribution and nature of evidence was inferred to be largely consistent with background discard, interspersed by occasional focalised areas of higher artefact density where activities or repeated activities occurred. This evidence indicated that Aboriginal utilisation of the study area was generally of a low intensity, which was inferred to relate to the limited presence of higher order watercourses within the analysis area (being situated on and around the crest of the Great Divide) (Kuskie 2009);

- Kuskie (2010) investigated the North 1 Panels, in relation to a modification to the UCCO Project approval. A comprehensive field survey sampling almost the entire 236 hectare investigation area was undertaken in 2010, with 32 rock shelters with PADs, nine rock shelters with artefacts, one rock shelter with art, one rock shelter with grinding grooves and artefacts and seven open artefact sites recorded;

- Test excavation of rock shelter sites ID# 104, 105 and 1420 within the North 1 Panels was undertaken by South East Archaeology (Kuskie 2012a). A total of 2,896 stone artefacts were retrieved in the three square metres of test excavations, comprising 1,709 artefacts from ID# 104, 904 artefacts from ID# 105 and 283 artefacts from ID# 1420. An Aboriginal fireplace in ID# 105 was radiocarbon dated to around 3,200 to 3,500 years ago;

- Salvage excavation of rock shelter sites ID# 104 and 105 within the North 1 Panels was undertaken by South East Archaeology in 2012, with excavation of 2 m^2 in ID# 105 and 6.75 m^2 in ID# 104;

- Test excavation by South East Archaeology of 12 rock shelter sites within Ulan No. 3 longwall panels W3 and W4 has been partially completed; and

- Numerous ongoing activities have occurred under the UCCO Project approved HMP (Kuskie 2011a-d, 2012b-d, 2013a-m, 2014a-e, other reporting pending), including surveys along roads, pipeline corridors, conveyor routes and other infrastructure locations with surface collections of artefact sites where required, surveys of areas previously not subject to inspection, blast monitoring of rock shelter sites, and salvage by collection and excavation of sites within the Open Cut Extension area.

3.2.2 Other Relevant Regional Investigations

In the broader Ulan region, there have been several relevant archaeological investigations, as listed below (refer to Kuskie 2009 for further discussion):

- Initial surveys in the Gulgong - Ulan - Cassilis area were undertaken by the Australian Museum in the period 1965 - 1967. A small rock shelter, BOB/1, was excavated in 1967, with the results reported by Moore (1970). A relatively high total of 16,609 artefacts were recovered from the small shelter, at a density of around 4,260 artefacts/m^3. Moore (1981) concluded that occupation of the site began about 6,000 years BP;

- Pearson (1981) undertook a broad-ranging PhD study of Aboriginal settlement in the Bathurst - Mudgee - Wellington region and more recent non-indigenous settlement. This included sample surveys for Aboriginal sites in various locations, including the "Mudgee - Cooyal area", extending across the Moolarben, Cooks Gap and Cooyal localities, along with test excavation of the Botobolar 5 rock shelter;

- McBryde conducted an archaeological survey that sampled portions of an area of 5,000 km^2 in the region of Dunedoo, Gulgong, Wollar and Coolah. Thirty Aboriginal heritage sites were located during this investigation, which was part of research focusing on rock art within the western slopes of the New England region (Haglund 1981a);

- Haglund (1985) undertook a desktop assessment of the Aboriginal heritage resources of Mudgee Shire;

- Haglund (1980b, 1981c) undertook a heritage study for the Kerrabee Dam proposal, across much of the area that is now conserved as the Goulburn River National Park. A total of 343 Aboriginal sites were recorded, including rock shelters with deposits and/or art, artefact scatters and grinding grooves; and

- Purcell (2002) undertook a broad regional cultural heritage study of the Brigalow Belt South Bioregion, which stretches west from the Ulan area to Dubbo and north to Moree and measures over 52,000 square kilometres in area. In a wide-ranging project, over 110 oral history interviews were conducted, 60 traditionally used plant species documented, extensive landform mapping was undertaken, and 1,110 Aboriginal sites were located and recorded.

3.2.3 Synthesis

The vast majority of the area to which the proposed modification relates has been investigated by heritage survey sampling during the UCCO Project (Kuskie 2009). As is evident on Figures 4 and 12, much of this area has been subject to archaeological survey to current standards, with the exceptions of:

- A gap in the northern portion of Ulan West *within* the approved UCCO Project Area that relates to property access issues at the time of the UCCO Project EA (which will be surveyed prior to any impacts occurring in accordance with Section 3.7.5 of the approved HMP);

- A gap in the southern portion of the proposed modification area *outside of* the approved UCCO Project Area (approximately 123 hectares) for which archaeological survey will occur for this modification assessment in accordance with Sections 3.7.7 and 3.7.5 of the HMP;

- A gap in the southern portion of the proposed modification area *within* the approved UCCO Project Area for which archaeological survey will occur post-modification approval prior to any impacts occurring in accordance with Sections 3.7.7 and 3.7.5 of the HMP;

- Other very minor gaps on some margins of Ulan West *within* the approved UCCO Project Area (which will be surveyed prior to any impacts occurring in accordance with Sections 3.7.7 and 3.7.5 of the approved HMP);

- In relation to the proposed modified surface impact area, a gap of approximately four hectares in the southern portion of the proposed modification area in MLA 475 *outside of* the approved UCCO Project Area, for which archaeological survey will occur for this modification assessment in accordance with Section 3.7.4 of the HMP; and

- In relation to the proposed modified surface impact area, other gaps totalling approximately 15 hectares *within* the approved UCCO Project Area, for which archaeological survey will occur post-modification approval prior to any impacts occurring in accordance with Section 3.7.4 of the HMP.

In relation to known Aboriginal sites, the key area of interest in relation to the proposed modification is the zones of potential subsidence impact for Ulan West, both for the approved UCCO Project and for the proposed modification (refer to Figure 5). Three potential *changes* to Aboriginal sites relating to subsidence impacts may occur from the proposed Ulan West modification:

a) Subsidence impacts that may have occurred under the approved UCCO Project will no longer occur under the proposed modification (decrease in impacts);

b) Subsidence impacts that would not have occurred under the approved UCCO Project will now occur under the proposed modification (increase in impacts);

c) Subsidence impacts that may have occurred under the approved UCCO Project will also occur under the proposed modification, but with an altered level of potential impact.

Additional areas of interest in relation to the proposed modification are the zones of potential surface impacts for Ulan West, both for the approved UCCO Project and for the proposed modification (refer to Figure 12), with similar potential change to Aboriginal sites occurring as listed above (decrease, increase or altered level).

The information from AHIMS has been combined with the information maintained in the UCML Aboriginal Site Database (Revision 14, June 2014) to accurately document all known Aboriginal sites within the UCCO Project Area and the proposed zones of potential subsidence and surface impacts associated with the modification in MLA 475 *outside of* the approved UCCO Project Area. Known sites (prior to the conduct of the present survey) are marked on Figure 5 and summarised in Table 1.

In total, 1,507 Aboriginal sites/PADs were known to occur within the UCCO Project Area and the proposed zones of potential subsidence and surface impacts associated with the modification in MLA 475 *outside of* the approved UCCO Project Area (refer to Table 1). These are predominantly open artefact sites and rock shelters. Only four sites were listed within the zone of potential subsidence impacts associated with the proposed modification in MLA 475 *outside of* the approved UCCO Project Area.

However, in the key area of interest in relation to the proposed modification (the zones of potential subsidence impact, both for the approved UCCO Project and for the proposed modification: refer to Figure 5), excluding open artefact sites (for which subsidence impacts are not anticipated to occur) the key sites are listed in Table 2.

These sites, along with the additional sites recorded during the present survey, will be the focus of the assessment of potential impacts associated with the proposed modification (refer to Sections 9 - 11). As noted above, the potential surface impacts associated with the proposed modification will also be assessed[5] (refer to Sections 9 - 11).

[5] Specifically for the 80 hectares in which either newly proposed surface impacts may occur (56 hectares) or previously approved surface impacts may no longer occur (24 hectares).

Table 2: Summary of known Aboriginal sites (excluding open artefact sites) within the approved UCCO Project and proposed modification zones of potential subsidence impacts (based on UCML Aboriginal Site Database Revision 14, June 2014, and AHIMS search encompassing the proposed modification area).

Aboriginal Site Type	Total
Grinding Grooves	2
Ochre Quarry	1
Rockshelter with Art	3
Rockshelter with Art and Artefacts	4
Rockshelter with Art and Grinding Grooves and Artefacts	1
Rockshelter with Artefacts	78
Rockshelter with Grinding Grooves	2
Rockshelter with Grinding Grooves and Artefacts	2
Rockshelter with PAD	210
Scarred Tree	4
Stone Arrangement	1
Total	**308**

Archaeological investigations at UCML and in the nearby Wilpinjong and Moolarben coal leases and elsewhere in the locality have resulted in the identification of a large number of rock shelter sites with archaeological deposits and/or rock art or grinding grooves, along with many shelters with potential deposits. The large numbers of shelter sites partly reflects the focus of the underground mining related surveys, which have predominantly targeted sandstone rock formations within elevated terrain. These sites have been identified in isolated rock formations (such as boulders and pagodas) and more commonly along more extensive rock formations (such as scarps and cliffs). The shelter sites vary widely in terms of topographical context (eg. distance to watercourse, size/order of watercourse and aspect), contents, nature (eg. size of shelter and extent of habitable floor area) and research potential (eg. depth and extent of potential artefact deposits). Apart from several major sites such as the "Hands on Rock" complex, rock art occurs relatively infrequently in the recorded shelters and tends to comprise red ochre hand stencils (Kuskie 2009).

Numerous open artefact occurrences have also been identified in the locality. The numbers of artefacts vary from minor scatters and numerous isolated finds, for which details have not often been recorded in earlier studies, to dense concentrations of lithic material with hundreds of artefacts present.

A conservative conclusion is that artefact evidence is distributed in a widespread manner across the locality, in generally low densities equating to background discard (manuport and artefactual material which is insufficient either in number or in association with other material to suggest focused activity in a particular location; *cf*. Rich 1993, Kuskie and Kamminga 2000), with occasional higher densities representing more focused occupation (eg. encampments, or events of longer duration or involving larger numbers of people) or repeated occupation in favourable environmental contexts. Such contexts appear to include elevated, well-drained and low gradient flats, terraces, spur crests, ridge crests and simple slopes adjacent to watercourses, particularly higher order watercourses and/or multiple subsistence resource zones.

The identified artefact evidence tends to predominantly comprise items associated with non-specific stone flaking, on quartz and to a lesser extent tuff, chert and other stone materials. Other activities are also represented, such as microblade and microlith production, discard of microliths and discard of non-microlith tools, many of which are associated with working of plant and/or animal materials, food preparation or tool maintenance (Kuskie 2009).

Grinding groove sites in the locality are typically located in sedimentary bedrock along watercourses, but also occur on open surfaces of sandstone in other contexts (eg. simple slopes) and on smaller sandstone slabs or surfaces in rock shelters.

Other Aboriginal site types have been recorded in low numbers within the Ulan locality, including scarred trees, ochre quarries, lithic quarries, stone arrangements and a possible burial. Sites of traditional or historical cultural significance to Aboriginal people (excluding the contemporary significance attached to the site types noted above), have also been reported within the locality.

Excavations of rock shelters provide valuable information about the nature and chronology of Aboriginal occupation in the locality. Moore's (1970, 1981) investigations of the Bobadeen 1 site provide a basal date of about 6,000 years BP for the locality, while Pearson (1981) recovered an occupation date of 5,500 years BP from a shelter at Botobolar, towards Mudgee. Nevertheless, a number of contexts have been identified within the locality that could host older evidence of Aboriginal occupation extending back into the Pleistocene period (ie. over 10,000 years of age), including creek terrace deposits covered by colluvial slopewash and rock shelter sites.

3.3 Local Aboriginal Culture

The UCCO Project Area lies within the north-eastern portion of the territory of the Wiradjuri people as defined by Tindale (1974) and Horton (1994, 2000), close to the boundary with the Kamilaroi to the north, and the Geawegal and Wonnarua further to the east.

Pearson (1981:75-76) inferred from the ethnohistorical evidence of Gunther, Lawson, Cox and others, that the upper Macquarie was inhabited by large localised groups of Aboriginal people, who in the normal course of life were divided into small groups of up to 20 people. These groups could easily come together for short periods for subsistence, ceremonial or social reasons and form larger groups of 80 to 150 people.

Pearson (1981:81) inferred that the Wiradjuri in the Upper Macquarie River region was probably subdivided into three groups, one centred in the general Mudgee-Rylstone area and the others in the general areas of Bathurst and Wellington. Haglund (1999a) noted that these groups may have comprised several clans each, with descendants of one of at least two clans in the Mudgee-Rylstone group still living in the locality. Pearson's (1981:81a) map of the hypothetical group distributions places the Mudgee-Rylstone group in the vicinity of the Ulan locality, albeit on the fringe of other (probable Kamilaroi) territory to the north.

A wide variety of subsistence resources were available in the past to the local Aboriginal people. Ethnohistorical and other evidence suggests that the diet of the local Aboriginal people would have included amongst other foods, possum, kangaroo, wallaby, wombat, kangaroo rat, platypus, lizards, snakes, goanna, tortoise, fish, mussels, crayfish, various birds, insects, and various plants (Pearson 1981:335). More than 20 species of native mammals, various reptiles and over 100 species of native birds have been recorded at Ulan, many of which would have been utilised as food resources.

The material culture of the local Aboriginal population would have included a range of items related to subsistence, cultural and social activities and shelter. However, in the archaeological record, few of these items are preserved. Stone, bone and shell are the materials most frequently represented in archaeological sites.

The influx of non-indigenous settlers into the region had profound effects upon the Wiradjuri, as the newcomers sought to gain the land for agricultural and pastoral utilisation and later for mining the valuable mineral resources present (Clayton and Barlow 1997). In the Ulan area, fighting between non-indigenous and Aboriginal people occurred in the 1820s as settlers sought to establish grazing runs, with hostilities peaking between 1824 and 1826 (Haglund 1999a). The dramatic increase in the number of non-indigenous settlers around Mudgee, Bathurst and Gulgong from the 1850s to the 1870s, during the gold rush, resulted in the displacement of the Aboriginal people and further incidents of warfare (Burless 1997).

Despite all this, the Wiradjuri people survived. A vibrant Aboriginal population remains in the region today and takes an active interest in the management of their heritage (refer to Section 6 for details of consultation with the Aboriginal community in relation to the present assessment).

3.4 Occupation Model and Predictive Model of Site Location

Kuskie and Clarke (2005b, 2007) proposed several elements that may relate to a general model of Aboriginal occupation for the Ulan locality. Kuskie (2009) further developed this model and identified the nature of evidence required to test the model, so that ultimately through field survey and excavation the model could be refined (refer to Sections 5 and 7.7 of Kuskie 2009 for details of the occupation model).

The portion of the proposed modification investigation area surveyed for the current assessment is located in contexts that do not conform to primary or secondary resource zones. These areas are distant from higher order watercourses (refer to Figures 7 - 10). According to the modelling of Kuskie (2009), occupation of these areas is therefore more likely to have related to hunting and gathering activities, along with transitory movement between locations and procurement of stone materials, and have been of a generally low intensity.

In general terms, the nature of occupation at each site within the area surveyed for the proposed modification could represent a variety of circumstances (Kuskie and Kamminga 2000; refer to Kuskie 2009: Section 5.1 for details), for example:

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

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

A predictive model of site location was constructed and tested by Kuskie (2009: refer to Sections 5.2 and 7.9) to identify areas of archaeological sensitivity (ie. locations where there is a potential of archaeological evidence occurring), so it can be used as a basis for the planning and management of Aboriginal heritage. Predictive modelling involves reviewing existing literature to determine basic patterns of site distribution. These patterns are then modified according to the specific environment of the investigation area to form a predictive model of site location. A sampling strategy is employed to test the predictive model and the results of the survey used to confirm, refute or modify aspects of the model.

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

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

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

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

The following is a brief description of the site types that may occur within the area of potential subsidence and surface impacts for Ulan West, including in areas that have not yet been subject to heritage survey to current standards, and areas within the sampled zone that were not directly inspected (*cf*. Kuskie 2009).

Artefact Scatters:

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

Due to the nature of the underlying evidence, its identification only within exposures created by erosion or disturbance, and the limited suitability of existing definitions, artefact scatter sites are defined within this study as the presence of one or more stone artefacts within a *survey area* (*cf*. Kuskie 2000b). The boundaries of the site are defined by the boundaries of the visible extent of artefacts within the survey area.

The survey areas are based on discrete, repeated *environmental contexts* or *archaeological terrain units* (eg. a particular combination of landform unit and class of slope). It is generally assumed that there is a similar probability for comparable evidence to occur elsewhere within the same survey area. As such, while the visible site boundaries are defined by the extent of visible evidence (consistent with the definition of an Aboriginal object under the NP&W Act), across the entire survey area in which a site is identified there exists a *potential resource* of comparable evidence.

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

Artefact scatters may represent the evidence of:

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

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

Artefact scatters are a common site type in the Ulan locality and the broader Central Tablelands region. There is a high potential for stone artefact evidence to occur in the investigation area wherever A unit soil is present, apart from in areas which have been substantially impacted by recent land-use (ie. areas in which the A unit or upper soil horizon has been totally removed). Kuskie (2009: Section 7.9) concluded that in the portions of the study area that have not been sampled, there remains a very high potential for additional open artefact sites to occur. The potential for additional open artefact sites to occur within the portions of the study area that have been sampled also remains very high.

In general, the stone artefact evidence may be of a low to very low density consistent with background discard, interspersed by a low number of activity areas (with consequent higher artefact density). The artefact evidence may involve a broad range of artefact and stone types, but will predominantly comprise evidence associated with non-specific stone flaking, on quartz and tuff stone materials.

However, a higher artefact density and potentially deposits of research significance may occur where more focused occupation (eg. encampments, or events of longer duration or involving larger numbers of people) and/or repeated Aboriginal occupation has occurred. These contexts may comprise elevated, well-drained and low gradient flats, terraces, spur crests, ridge crests and simple slopes adjacent to watercourses, particularly higher order watercourses.

The potential for deposits of research significance may be enhanced by the presence of a relatively deeper A unit soil (eg. along drainage depressions, basal slopes and flats) and lower levels of ground disturbance. In certain circumstances, the impacts of post-depositional processes can also be identified and controlled for (*cf*. Koettig 1989, Kuskie and Kamminga 2000).

Bora/Ceremonial Sites:

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

The potential for bora/ceremonial sites to occur within the study area was assessed by Kuskie (2009) as low, but could not be discounted. The presence of "Bora Creek", east of UCML, was noted, as is a reported bora/ceremonial ground on the ridge immediately north of Wilpinjong Creek (Mathews 1894). The potential for bora/ceremonial sites to occur within the study area was reassessed by Kuskie (2009: Section 7.9) as low, but cannot be discounted, for the portions of the study area that have not been sampled. However, the potential for additional bora/ceremonial sites to occur within the portions of the study area that have been sampled has been reassessed as very low or negligible, given the comprehensive nature of the survey and the obtrusive nature of this type of evidence (Kuskie 2009).

Burials:

Human remains tended to be placed in hollow trees, caves, rock shelters or sand deposits. The location of burials may once have been marked by carved trees (eg. Etheridge 1918:85), although subsequent tree clearing and the long passage of time since the disruption of this practice has rendered these markers extremely rare. Pearson (1981:102-104) noted on the basis of recorded burials and ethnohistorical observations that burials in the region took place relatively close to encampments, due to the fact that most people, unless killed by hunting accidents or in warfare, tended to die in or close to camp, and movement of bodies over long distances by foot was problematic. A number of these observations (eg. by Reverend Gunther and Dr Curtis) identify burials within a mile of a campsite, in soft ground, with carved trees around.

Usually burials are only identified when eroding out of sand deposits or creek banks, or when disturbed by development. The probability of detecting burials during archaeological fieldwork is extremely low.

The potential for burial sites to occur within the study area was assessed by Kuskie (2009) as low, but cannot be discounted in either sandy soils or rock shelters. One rock shelter "with possible burial" has previously been recorded in the broader UCML lease area (Ulan ID# 314, Haglund 1999a). It is a hollow in a sandstone rock formation, about 1.5 metres above the ground surface, with pieces of cut timber arranged on the floor of the hollow over possible dry grass and/or bark fibres. Mr David Maynard (MGATSIC) interpreted this evidence as a probable burial.

This assessment remains valid for the entire study area, given the limited potential of identifying this form of evidence through surface survey techniques alone (Kuskie 2009).

Carved Trees:

Carved trees were still relatively common in NSW in the early 20th century (Etheridge 1918). They were commonly used as markers for ceremonial or symbolic areas, including burials.

Both vegetation removal and the long passage of time since the practice of tree carving was prevalent have rendered this site type rare. Given these factors and the extent of recent land use impacts, the potential for carved trees to occur within the study area was assessed by Kuskie (2009) as very low, but cannot be discounted. This assessment remains valid for the portions of the study area that have not been sampled. However, the potential for carved trees sites to occur within the portions of the study area that have been sampled is very low or negligible, given the comprehensive nature of the survey and the obtrusive nature of this type of evidence (Kuskie 2009).

Cultural Significant Sites or Areas:

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

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

Although these sites do not qualify as Aboriginal objects under the NP&W Act they can be declared as Aboriginal places under the Act.

Mythological sites, or other sites of traditional, historical or contemporary significance to Aboriginal people, can occur in any location. Often natural landscape features may be related to important mythological stories. Consultation with the local Aboriginal community is essential to identify the presence of such cultural significant sites. Physical evidence of historical contact can occur in the form of artefacts manufactured from introduced materials (eg. porcelain or glass).

During the UCCO Project survey, the Aboriginal representatives did not disclose any specific knowledge of sites or places associated with ceremonies, spiritual/mythological beliefs or traditional knowledge, which date from the pre-contact period and have persisted until the present time, within the study area. The representatives also did not disclose any specific knowledge of sites or places associated with historical associations, which date from the post-contact period and are remembered by people today, within the study area. The possibility cannot be excluded however, that traditional or historical Aboriginal values or associations may exist that were not divulged by the persons consulted. It was not feasible to contact every single knowledge holder in the north-eastern Wiradjuri community. Nevertheless, Haglund's (1997) conclusion that "for various reasons, mainly relating to actions by authorities and settlers, cultural knowledge relating to features of the landscape (eg. mythological aspects) appears to have been totally lost, at least for the Ulan area", is noted (Kuskie 2009).

The stakeholders did however disclose a number of associations with the UCCO Project study area of contemporary significance. The potential for further associations of contemporary significance within the portions of the study area that have not been sampled cannot be discounted. However, sites of traditional or historical significance are not anticipated to occur (Kuskie 2009).

Physical evidence of historical contact can occur in the form of artefacts manufactured from introduced materials (eg. porcelain or glass). Several probable artefacts manufactured on bottle glass have been identified within the UCML area, and further items may occur.

Grinding Grooves:

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

Grinding grooves are typically located in sedimentary bedrock along watercourses, but also occur in the Ulan locality on open surfaces of sandstone in other contexts (eg. simple slopes) and on smaller sandstone slabs or surfaces in rock shelters. Sandstone rock formations are common within the study area and the potential for additional grinding grooves sites to occur, both in association with rock shelters and in open contexts, was assessed by Kuskie (2009) as very high.

This initial assessment of a high potential for additional grinding groove sites to occur within the study area, both in association with rock shelters and in open contexts, was confirmed by the UCCO Project survey. Additional grinding groove sites have a high potential to occur in the portions of the study area that have not been sampled, in either rock shelters or open contexts where suitable rock formations are present. The potential for additional grinding groove sites to occur within the portion of the study area that have been sampled has been reassessed as low, given the comprehensive nature of the survey and the relatively obtrusive nature of this site type. However, sites may still occur in areas that were not directly sampled or are currently obscured by sediment or vegetation/leaf litter. Similarly, additional grooves may be present at the recorded sites, which are currently obscured by sediment or vegetation/leaf litter (Kuskie 2009).

Quarry Sites:

A lithic quarry is the location of an exploited stone source (Hiscock and Mitchell 1993:32). Sites will only be located where exposures of a stone type suitable for use in artefact manufacture occurs.

Stone materials suitable for manufacturing Aboriginal artefacts were anticipated to be present in various locations throughout the study area, including pebbles of quartz, along with other fine-grained materials (eg. chert and volcanics), basalt and tuff. The potential for evidence of lithic procurement within the study area was assessed by Kuskie (2009) as moderate to high.

Ochre quarry sites are an uncommon site type, however, several have been previously recorded in the UCML lease areas (eg. ID# 152 and 158 by Edgar 1997). Ochre quarries take the form of circular depressions or tunnels and are frequently associated with artefacts utilised in the process of extracting ochre (Hiscock and Mitchell 1993:62). The potential for evidence of ochre quarries within the study area was assessed by Kuskie (2009) as moderate.

Two ochre quarries were identified within the UCCO Project study area, confirming initial predictions of a moderate potential for this site type. Additional ochre quarries may occur in the portions of the study area that have not been sampled, where suitable sources exist. The potential for additional ochre quarries to occur within the portions of the study area that have been sampled can be reassessed as low, given the comprehensive nature of the survey and the relatively obtrusive nature of this site type (Kuskie 2009).

Direct evidence of the procurement and reduction of stone from colluvial gravel sources (lithic quarries) was identified in at least two open artefact sites, ID# 580 (with quartz and chert) and 804 (with quartz, quartzite, acidic volcanics and chert) (Kuskie 2009). These and similar sources, particularly the widespread distribution of quartz, quartzite and other pebbles from the decomposed conglomerate within the study area, would have enabled casual, opportunistic procurement of much of the stone material utilised at Ulan, without the need for special-purpose trips or particular effort. Hence, initial predictions of a moderate to high potential for this site type, where suitable stone sources are present, were confirmed during the UCCO Project survey.

Additional lithic quarries may occur in the portions of the study area that have not been sampled, where suitable sources exist. The potential for additional lithic quarry evidence (in the broad sense of 'procurement from a stone source') to occur within the portions of the study area that have been sampled has been reassessed as high, both within identified open artefact sites where stone sources occur, and in other locations where stone sources occur. For example, quartzite pebbles and cobbles were reported in various sites and in many survey areas. Quartz pebbles were noted in even more numerous locations across the study area (Kuskie 2009).

Two sites in the open cut extension, ID# 400 and 412, have been noted as possible tuff lithic quarries/procurement areas. Tuff occurs widely in the Ulan locality, as seams exposed in the scarps and slopes of the dissected sandstone terrain (including occasional manifestation within rock shelters) and as tabular colluvial gravels on the slopes and also in the drainage depressions where it has migrated further downwards. Significant outcrops of tuff occur in the southern portion of the open cut extension area, including seams several metres thick on the steep slopes and upper drainages around the 490 metre contour, and as a widespread distribution of tabular pieces on the surrounding slopes. These sources contain both high quality tuff and lower quality, coarser tuff and tuffaceous material. Outcrops were also noted in the Ulan West area, particularly around the elevated margins of the Valley Way tributary of Ulan Creek. Hence, the potential for additional lithic quarry evidence relating to tuff to occur within the portions of the study area that have been sampled is very high (Kuskie 2009).

Rock Engravings:

Rock engravings include outlines or filled-in figures, created on rock surfaces (typically sedimentary stone) by pecking, hammering or scraping.

Rock engravings are more common on exposed sandstone bedrock on ridge and spur crests than in the bases of valleys or margins of steep slopes. Although rock engravings have not been recorded within the Ulan locality, suitable sandstone bedrock may be present in the investigation area and engravings are known to occur elsewhere in the region (Haglund 1985, Navin 1990). The potential for rock engravings was assessed by Kuskie (2009) as very low, but cannot be discounted. This assessment remains valid for the portions of the study area that have not been sampled. However, the potential for rock engravings to occur within the portions of the study area that have been sampled is very low or negligible, given the comprehensive nature of the UCCO Project survey (Kuskie 2009).

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

Rock shelters include rock overhangs, shelters or caves which were used by Aboriginal people. Rock shelter sites may contain artefacts, deposits and/or rock art or grinding grooves. These sites will only occur where suitable geological formations are present.

Numerous rock shelter sites have been identified in the Ulan locality, many with artefacts and some with art and/or grinding grooves. Numerous other rock shelters have been noted with PADs. Although artefacts may not have been visible at the time of recording, these shelters have some probability of containing artefact deposits, which can be confirmed or refuted by test excavation. These sites have been recorded in isolated rock formations (such as boulders and pagodas) and along more extensive rock formations (such as scarps and cliffs)

Rock shelter sites in the locality vary widely in terms of contents (eg. containing artefacts, potential deposits, painted art and/or grinding grooves), location (eg. topographic context, distance to watercourse, size/order of watercourse and aspect), nature (eg. size of shelter, extent of habitable floor area, number and types of artefacts and stone materials) and research potential (eg. depth and extent of potential artefact deposits). Stone artefacts would be the primary form of expected evidence within the rock shelters, in anything from very low to very high densities. Charcoal from fireplaces/hearths may also occur, as may bones and/or shell from fauna used by Aboriginal people for subsistence (or incorporated into the deposit by other means, such as animal activity or natural processes). The presence of other evidence, such as the remains of wooden implements, cannot be discounted, even though their occurrence has rarely been documented in the region.

Apart from several major sites such as the "Hands on Rock" complex adjacent to the UCCO Project Area, rock art occurs relatively infrequently in the recorded shelters and tends to comprise red ochre hand stencils. Hand stencils were part of a complex form of communication and utilised in the representation of signatures, special occasions, individuals, messages, stories, myths and spiritual events.

Sandstone rock formations occur widely in the study area, including boulders, shelters and overhangs. Kuskie (2009) concluded that in the portions of the study area that have not been sampled, there remains a high potential for additional rock shelter sites to occur where suitable rock formations exist, potentially including artefacts, deposits, art and/or grinding grooves. The potential for additional rock shelter sites to occur within the portions of the study area that have been sampled was reassessed as very low to negligible, given the comprehensive nature of the UCCO Project survey and the obtrusive nature of this site type. However, excavation of any of the identified PADs may reveal artefact deposits, which are presently obscured by sediment and/or leaf litter (Kuskie 2009).

Scarred Trees:

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

Six scarred trees had previously been recorded within the UCML lease area, prior to the UCCO Project survey. Considering the long period of time that has elapsed since this practice was prevalent and the extent of vegetation removal in the substantially cleared portions of the study area, the potential for scarred tree sites to occur within these cleared areas was assessed by Kuskie (2009) as low, but cannot be discounted where mature native trees remain. The potential for scarred trees to occur in the majority of the study area, which retains mature native vegetation, was assessed as low to moderate (Kuskie 2009).

Five scarred trees were identified during the UCCO Project survey, confirming initial predictions of a low to moderate potential where mature native vegetation remains. Additional scarred trees may occur in the portions of the study area that have not been sampled, where mature native vegetation exists. The potential for additional scarred trees to occur within the portions of the study area that have been sampled was reassessed as low to very low, given the comprehensive nature of the survey and the obtrusive nature of this site type (Kuskie 2009).

Stone Arrangements:

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

Hill tops and ridge crests which contain stone outcrops or surface stone, and have been subject to minimal impacts from recent land use practices, are potential locations for stone arrangements. Pearson (1981:105-106) noted that no ethnographic records from the upper Macquarie River region pertain to the use of stone arrangements, even though their existence was recorded as early as 1815 (Macquarie's visit to the Mt Pleasant cairns near Bathurst). Pearson (1981:106) noted that stone arrangements in the region typically occur as lines or cairns on bare, exposed hill crests in the plateau/isolated hill areas, or on bare areas of flat land where flatter land predominates. The stone arrangements on hill crests are noted as being often a considerable distance from water, and therefore not within close proximity of any camp sites.

One stone arrangement site had previously been recorded within the UCML lease area (ID# 177, Haglund 1999a) prior to the UCCO Project survey. The potential for stone arrangements to occur within the study area was initially assessed by Kuskie (2009) as low to moderate in the forested areas, and low to very low in the cleared areas. Five stone arrangements were identified during the UCCO Project survey, four in cleared areas. As such, the potential for further stone arrangements to occur within the remainder of the study area (predominantly cleared land) was revised upward to 'low to moderate'. The potential for additional stone arrangement sites to occur within the portions of the study area that have been sampled was reassessed as low to very low. Consistent with the predictive model, most of the stone arrangements comprised lines of stone, were located on hill tops and ridge crests, and were a considerable distance from higher order watercourses (Kuskie 2009).

4. METHODOLOGY

During the initial stages of the investigation, research was conducted into the environmental, cultural and archaeological background of the investigation area, building on the substantial work already completed by South East Archaeology at UCML (for example, Kuskie 2000a, 2002, 2004, 2009, 2010, 2011a-d, 2012a-d, 2013a-m, 2014a-e, Kuskie and Clarke 2003, 2005a, 2005b, 2007, Kuskie and Webster 2001). Searches were undertaken of the OEH Aboriginal Heritage Information Management System for the portion of the proposed modification outside of the approved UCCO Project Area and of other relevant heritage registers and planning instruments (refer to Section 3.1).

As noted in Section 1.2, this report seeks to address the impacts of the proposed modification on Aboriginal heritage, consistent with the aims and methodology of the Aboriginal heritage impact assessment completed for the UCCO Project (Kuskie 2009), the Part 3A UCCO Project Approval and UCML's HMP, particularly Sections 3.7.7 (*Assessment of Future Mine Plan Alterations*), 3.7.5 (*Survey of Areas Not Sampled During EA*) and Section 3.7.4 (*Future Proposed Small-Scale Surface Impacts*), which specifically relate to a modification such as that proposed.

For the purposes of this assessment, the key areas for investigation of subsidence impacts and relevant sections of the HMP in relation to the investigation methodology comprise (refer to Figure 4):

- Areas that have not been heritage surveyed to current standard within the zone of potential subsidence impacts in MLA 475 *outside of* the approved UCCO Project Area (approximately 123 hectares) for which archaeological survey will occur for this modification assessment in accordance with Sections 3.7.7 and 3.7.5 of the HMP;
- Areas that have not been heritage surveyed to current standard within the zone of potential subsidence impacts *within* the approved UCCO Project Area, which will be addressed post-modification approval under the currently approved UCCO Project and HMP in accordance with Sections 3.7.7 and 3.7.5 of the HMP;
- Reassessment of subsidence impacts on Aboriginal sites for the Ulan West longwall panel realignment within the approved UCCO Project Area, in accordance with the procedures in Section 3.7.7 of the HMP; and
- Subsequent adjustments to the *Rock Shelter Test Excavation Sampling Strategy* (Kuskie 2013a) prepared under Section 3.5.4 of the HMP (as a post-modification approval commitment).

In addition, for the purpose of the assessment of proposed changes to the surface impact areas (comprising newly proposed impacts within 56 hectares and reduced impacts within 24 hectares), the key areas for investigation of surface impacts and relevant sections of the HMP in relation to the investigation methodology comprise (refer to Figure 12):

- Areas that have not been heritage surveyed to current standard within the zone of potential surface impacts in MLA 475 *outside of* the approved UCCO Project Area (approximately four hectares) for which archaeological survey will occur for this modification assessment in accordance with Section 3.7.4 of the HMP;
- Areas that have not been heritage surveyed to current standard within the zone of potential surface impacts *within* the approved UCCO Project Area (approximately 15 hectares), which will be addressed post-modification approval under the currently approved UCCO Project and HMP in accordance with Section 3.7.4 of the HMP; and

- Reassessment of potential surface impacts on Aboriginal sites will occur for the areas that have been heritage surveyed to current standard within the zone of potential surface impacts *within* the approved UCCO Project Area (approximately 37 hectares), in accordance with Section 3.7.4 of the HMP. This assessment will also consider the reduction in potential surface impacts associated with the infrastructure areas totalling approximately 24 hectares within the approved UCCO Project Area that will now no longer be required to be constructed (refer to Figures 3 and 12).

Consultation with the registered Aboriginal stakeholders for the UCCO Project (Warrabinga Native Title Claimants Aboriginal Corporation, North East Wiradjuri Company Ltd, Mudgee Local Aboriginal Land Council, Murong Gialinga Aboriginal and Torres Strait Islanders Corporation and Warranha Ngumbaay) has continued for the proposed modification in accordance with the approved UCCO Project and Section 3.1 of the approved HMP, with WVWAC also being consulted as an additional interested organisation as part of wider consultation separate to the HMP requirements. The UCCO Project (Kuskie 2009) involved a comprehensive program of Aboriginal community consultation in accordance with the *Interim Community Consultation Requirements for Applicants* (DEC 2004) and ongoing consultation has subsequently occurred in accordance with the HMP.

This report addresses the requirements of Sections 3.7.7 and 5.5 of the HMP and has been prepared with reference to the DEC (1997) *Aboriginal Heritage Standards and Guidelines Kit*, draft *Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation* (DEC 2005), and more recently introduced *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* OEH (2011) and *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b).

This report builds on the previous heritage assessments (particularly Kuskie 2009) and does not seek to repeat background information contained within those reports.

The registered Aboriginal parties and WVWAC were provided details of the proposed modification on 2 May 2014 and invited to attend the archaeological survey. An on-site meeting and reconnaissance inspection with WVWAC was also held on 16 May 2014 to discuss UCML projects, the proposed modification and inspect the Grinding Groove Conservation Areas and Brokenback Conservation Area.

Field inspection of the portion of the investigation area as marked on Figure 6 was undertaken over five days (26 - 30 May 2014) by Peter Kuskie and Birgitta Stephenson of South East Archaeology, assisted by representatives of the registered Aboriginal parties (refer to Section 6). Full details of the Aboriginal community involvement in the survey are presented in the consultation database in Appendix 5. During the course of the survey, assistance was provided by the following individuals:

- North-East Wiradjuri Company Ltd (NEWCO) - Shaen Morgan and Chaos DeLauney;
- Warrabinga NTCAC (Warrabinga) - Coral Williams and Kelsey Williams-Fawcett;
- Murong Gialinga Aboriginal and Torres Strait Islanders Corporation (MGATSIC) - Shannon Foley, Steven Flick and Larry Foley;
- Mudgee Local Aboriginal Land Council (Mudgee LALC) - Tammy Peterson, Gemma Williams, James Williams, Larry Foley and Debbie Foley; and
- Wellington Valley Wiradjuri Aboriginal Corporation (WVWAC) - Brendon Doherty.

All registered parties were invited to attend (and many participated in) a Heritage Revew Meeting on 28 June 2014 to discuss the proposed modification and proposed changes to the mine plan (refer to Section 6 and Appendix 5). Further discussion also occurred at another Heritage Review Meeting on 11 December 2014 (refer to Section 6 and Appendix 5).

All registered parties attended a further meeting on 25 November 2014 at which the proposed modification, draft heritage report and potential management strategies were discussed. Inspection was made of the sites of moderate to high significance within the Cockabutta Creek area (refer to Section 6 and Appendix 5).

As outlined in Section 2, a total of 173.7 hectares was subject to detailed archaeological sampling during the present survey (refer to Figures 6 - 10), including:

a) Approximately 123 hectares that had not been subject to heritage survey to current standards *within* the zone of potential subsidence impacts/angle of draw in MLA 475 *outside of* the approved UCCO Project Area (focus of the present survey);

b) Approximately 39 hectares that had not been subject to heritage survey to current standards *outside of* the zone of potential subsidence impacts/angle of draw in MLA 475 *outside of* the approved UCCO Project Area (this area was included within the initial study area, but subsequent refinements of the mine plan and angle of draw meant that it will no longer be subject to impacts), but includes three hectares within the proposed *surface impact* area in MLA 475;

c) Approximately 7.4 hectares that had not been subject to heritage survey to current standards *within* the zone of potential subsidence impacts/angle of draw *inside* the approved UCCO Project Area (this area was surveyed during the present assessment for efficiency and completeness, rather than being addressed post-approval under Section 3.7.5 of the HMP); and

d) Approximately 4.3 hectares that had not been subject to heritage survey to current standards *outside of* the zone of potential subsidence impacts/angle of draw and *inside* the approved UCCO Project Area (this area was surveyed during the present assessment for efficiency and completeness and because it was within the initial study area, rather than being addressed post-approval under Section 3.7.5 of the HMP, but subsequent refinements of the mine plan meant it will no longer be subject to impacts).

Approximately 0.7 hectares *within* the zone of potential subsidence impacts/angle of draw in MLA 475 and *outside* the approved UCCO Project Area was not surveyed for logistical reasons and will be addressed under Section 3.7.5 of the HMP post-approval. Approximately 1 hectare *within* the zone of potential *surface impacts* in MLA 475 and *outside* of the approved UCCO Project Area was not surveyed and will be addressed under Section 3.7.4 of the HMP post-approval.

Consistent with the UCCO Project (Kuskie 2009), the investigation area was divided into particular combinations of environmental variables that are assumed to relate to Aboriginal usage of the area (refer to Figures 7 - 10). These *archaeological terrain units* or *environmental contexts* were defined on the basis of landform element and class of slope (following McDonald *et al* 1984). They are discrete, recurring areas of land for which it is assumed that the Aboriginal land use and resultant heritage evidence in one location may be extrapolated to other similar locations. Therefore *survey areas* were defined as the individual environmental context that is bounded on all sides by different environmental contexts (*cf*. Kuskie 2000b).

Detailed recording of the archaeological *survey areas* was made on survey recording forms, including environmental variables and heritage resources identified or potentially present. Each *survey area* was assigned a unique sequential number after the modification (Mod) initials (refer to survey coverage database in Appendix 2).

Within each *survey area*, the areas inspected on foot correspond to the DECCW (2010b) definition of *survey units*. The *survey units* typically comprised general transects through vegetated terrain, or coverage of and separate recording of specific exposure types, such as vehicle tracks. Data for each *survey unit* was recorded separately on the survey area recording forms and representative photographs of survey units and survey areas were taken and are included in Appendix 4 where relevant and informative (refer also to site photographs in Appendix 3).

For the purposes of the analysis, *survey unit* data from each *survey area* are combined (refer to Appendix 2), and data from each survey area can be combined with comparable survey areas to analyse coverage and artefact density with respect to environmental variables such as landform element and slope (refer to Table 3). For a thorough discussion of the rationale for use of the individual artefact as the basic unit of analysis, including the problems with open artefact site definitions due to exposure/obscurement issues, and the margins of error, variables and constraints associated with the data collection procedures and analysis, refer to the comprehensive discussion in Kuskie (2000b).

The general survey procedure involved working together as a single team or separation of the crew into two teams, each comprising an archaeologist and several Aboriginal community representatives, inspecting each survey area.

The survey teams were equipped with high resolution 1:3,000 scale mapping of the investigation area, with one metre contours, a 100 metre MGA grid and an aerial photograph underlay. Along with the use of hand-held Global Positioning System (GPS) units (generally accurate to within five metres), these features assisted with defining survey areas and survey units and accurately establishing the location of Aboriginal sites and marking the above onto the detailed base mapping (refer to Figures 6 - 10 and Appendix 3).

Hence, the survey sampled the entire geographic extent of the proposed modification area that had not previously been subject to heritage survey to current standards *within* the zone of potential subsidence impacts *outside of* the approved UCCO Project Area (apart from 0.7 hectares that could not be surveyed for logistical reasons), within individual survey areas based on specific combinations of landform element and class of slope. The extent of the sample and nature of survey coverage is discussed in Section 5.1.

As discussed in Section 3.2.3, the vast majority of the remainder of the area to which the proposed modification relates has been investigated by heritage survey sampling during the UCCO Project (Kuskie 2009). As is evident on Figures 4 and 12, much of this area has been subject to archaeological survey to current standards, with the exceptions (after the completion of the current survey) of:

- A gap in the northern portion of Ulan West *within* the approved UCCO Project Area that relates to property access issues at the time of the UCCO Project EA (which will be surveyed prior to any impacts occurring in accordance with Section 3.7.5 of the approved HMP);
- A gap in the southern portion of the proposed modification area *within* the approved UCCO Project Area for which archaeological survey will occur post-modification approval prior to any impacts occurring in accordance with Sections 3.7.7 and 3.7.5 of the HMP;

- Other very minor gaps on some margins of Ulan West *within* the approved UCCO Project Area (which will be surveyed prior to any impacts occurring in accordance with Sections 3.7.7 and 3.7.5 of the approved HMP);
- Minor gaps of 0.7 hectares within the zone of potential subsidence impacts and 1 hectare within the zone of potential *surface impacts* in MLA 475 *outside* of the approved UCCO Project Area (which will be surveyed post-modification approval prior to any impacts occurring in accordance with Sections 3.7.4 and 3.7.5 of the approved HMP); and
- In relation to the proposed modified surface impact area, other gaps totalling approximately 15 hectares *within* the approved UCCO Project Area (for which archaeological survey will occur post-modification approval prior to any impacts occurring in accordance with Section 3.7.4 of the HMP).

Within each survey area:

- Inspection was made widely for the obtrusive site types, such as rock shelters with deposit and/or art, grinding grooves and scarred trees; and
- Inspection was also made for stone artefacts and other cultural evidence, focusing on areas with ground surface visibility.

Aboriginal heritage site recording forms for each identified site were also completed. Spatially separate locations of heritage evidence were recorded as separate site loci named after the sequential "landform patterns" system of Haglund (1999a) (effectively, watercourse catchment areas). All newly recorded sites were located within the Cockabutta Creek (CC) catchment and hence are numbered CC 23 - 49. The Ulan ID numbering system will not be applied to these sites unless the modification is approved and they are then effectively situated within the approved revised UCCO Project Area (or unless they are currently located within the approved UCCO Project Area).

Detailed descriptions of all newly identified sites are presented in Appendix 3, along with re-recordings of several previously reported sites (Haglund 1999a). Additional information on previously recorded sites (not included within Kuskie 2009) is presented in Appendix 1. Descriptions of sites recorded during the UCCO Project within the approved UCCO Project Area are reported by Kuskie (2009) and not repeated here.

As required under Section 89A of the NP&W Act, site records have been completed for all new site recordings conducted during this assessment and lodged with the OEH.

Stone artefacts were recorded on a lithic item recording form, including details about provenance, stone material type, artefact type, size class, cortex and other relevant attributes (refer to Appendix 3).

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

- Sites or places associated with ceremonies, spiritual/mythological beliefs and traditional knowledge, which date from the pre-contact period and have persisted until the present time;
- Sites or places associated with historical associations, which date from the post-contact period and are remembered by people today (for example, plant and animal resource use areas and known camp sites); and

- Sites or places of contemporary significance (apart from those areas for which Aboriginal objects remain, which are discussed above), for which the significance has been acquired in recent times.

The results of the investigation are presented in Section 5. Photographs of the identified sites are presented in Appendix 3 for newly recorded sites and Appendix 1 for previously recorded sites, and additional photographs of survey areas and the general investigation area are presented in Appendix 4.

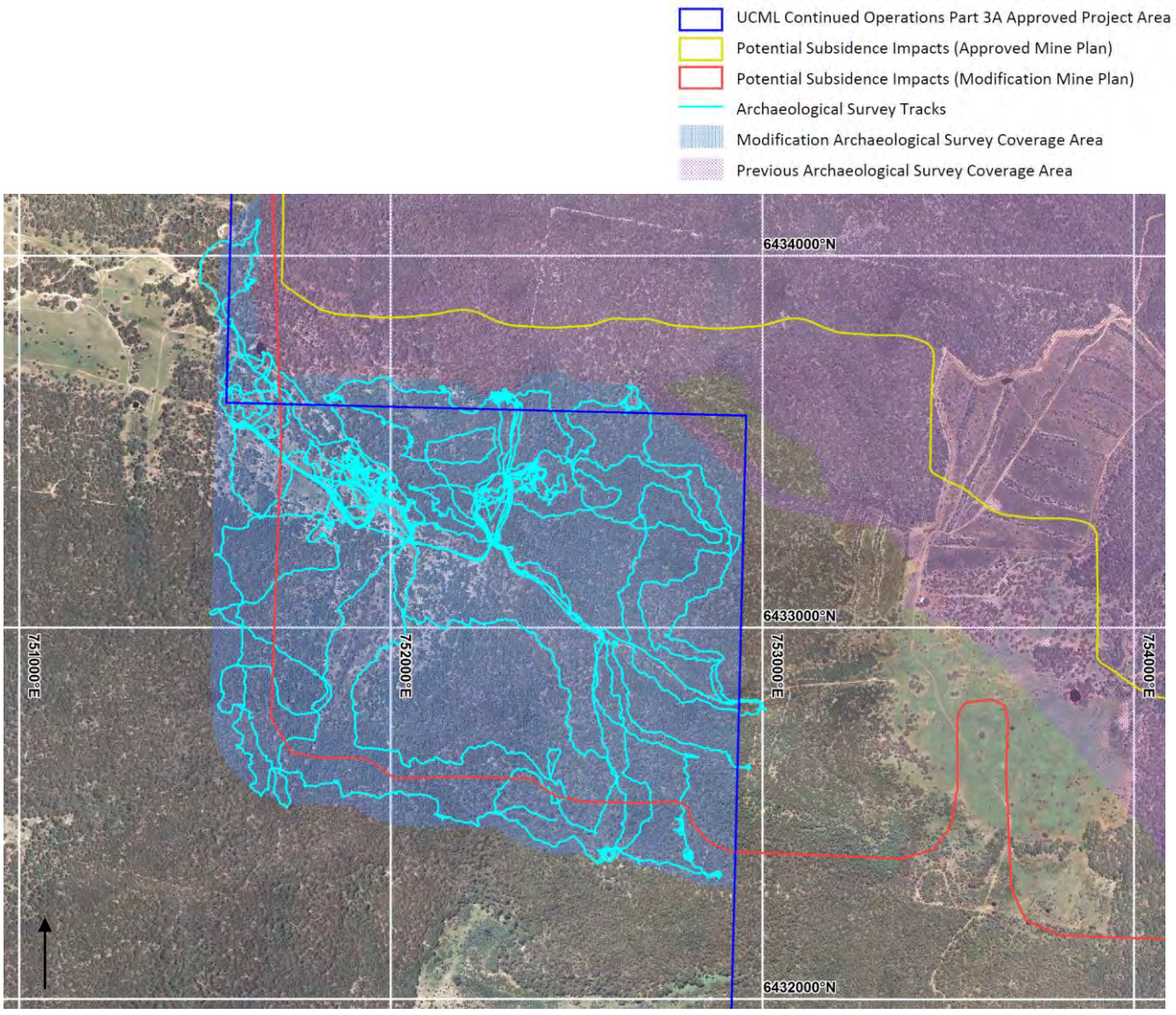


Figure 6: Approximate location of GPS recorded archaeological survey transects within the investigation area and extent of survey coverage (noting that vegetation cover limited the effectiveness and accuracy of the hand-held GPS units at times; that the field teams involved a number of participants, only one of which in each team carried a GPS unit) (aerial photograph courtesy UCML; one kilometre MGA grid).

5. RESULTS AND DISCUSSION

5.1 Survey Coverage

Comprehensive archaeological survey coverage was obtained across the geographic extent of the 123 hectares that had not been subject to heritage survey to current standards *within* the zone of potential subsidence impacts *outside of* the approved UCCO Project Area (refer to Figures 6 - 10). Coverage was also obtained of approximately 39 hectares of land now *outside of* the zone of potential subsidence impacts in MLA 475 *outside of* the approved UCCO Project Area (but this area included three of the four hectares within the proposed *surface impact* area in MLA 475), 7.4 hectares *within* the zone of potential subsidence impacts *inside* the approved UCCO Project Area and 4.3 hectares *outside of* the zone of potential subsidence impacts *inside* the approved UCCO Project Area.

The total area of 173.7 hectares subject to detailed archaeological sampling during the present survey (refer to Figures 6 - 10) was subdivided into a total of 40 archaeological survey areas (Mod 1 - 40), each representing a specific combination of landform unit and class of slope (definitions as per McDonald *et al* 1984). Each archaeological survey area was inspected for Aboriginal heritage evidence. The environmental contexts surveyed included the seven landform elements and four classes of slope present (refer to Table 3).

The locations of the individual survey areas are marked on Figures 7 - 10 and descriptions are presented in Appendix 2. A summary of the survey coverage is presented in Table 3 for the combined environmental contexts and individual classes of slope and landform elements.

The total survey coverage (ground physically inspected for heritage evidence) equated to approximately 271,860 m^2, or 15.6% of the sampled area. As this coverage only refers to an area of several metres width directly inspected by each member of the survey team, the actual coverage for obtrusive site types (for example, scarred trees and rock shelters) was significantly greater than this. The total effective survey coverage (*visible* ground surface physically inspected with potential to host heritage evidence) equated to around 7,814 m^2, or 0.4% of the sampled area.

Conditions of surface visibility were generally low across the investigation area, due to the dense cover of vegetation and leaf litter (Appendix 2). Archaeological visibility, the actual visible ground surface with potential for heritage evidence (accounts for factors such as ground disturbance and sediment deposition), was generally similar to surface visibility. Mean archaeological visibility across the entire survey sample was approximately 3%. Exposures tended to be present along vehicle tracks and other areas of recent ground disturbance, such as animal diggings and erosion.

Several mature native trees exist within the investigation area and where identified, these were inspected for evidence of Aboriginal scarring. Large sandstone formations are present along the elevated margins of the valley, and sizeable pagodas and residual sandstone bedrock exposed by erosion occur around a former ridge within the valley itself, adjacent to the main Cockabutta Creek tributary (refer to Plates 4 - 7 and 12 - 16 in Appendix 4). These rock formations were targeted for inspection during the survey. Minimal sandstone bedrock was identified as being exposed within the drainage depressions or slopes.

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

Nevertheless, in view of the predictive modelling and results obtained from the sample of effective coverage, it is concluded that the survey provides a valid basis for formulating recommendations for the management of the identified and potential Aboriginal heritage resources in relation to the proposed modification.

Table 3: Environmental contexts, class of slope and landform elements - summary of survey coverage and artefact density for modification survey.

Environmental Context	Total Area of Context (m^2)	% Context Comprises of Investigation Area	Total Area Surveyed (m^2)	% Surveyed of Context	Effective Survey Coverage Total (m^2)	% Effective Survey Coverage of Context	Total # Artefacts (open sites)	Artefact Density (# artefacts per m^2 effective survey coverage)
gentle drainage depression	253,820	14.6%	61,200	24.1%	1,634	0.6%	37	0.023
moderate drainage depression	18,666	1.1%	4,000	21.4%	80	0.4%	2	0.025
level-very gentle simple slope	33,210	1.9%	16,000	48.2%	800	2.4%	362	0.453
gentle simple slope	839,380	48.3%	103,700	12.4%	2,919	0.3%	73	0.025
moderate simple slope	447,538	25.8%	65,320	14.6%	1,473	0.3%	3	0.002
gentle spur crest	71,469	4.1%	6,960	9.7%	165	0.2%	0	-
level-very gentle ridge crest	30,521	1.8%	5,200	17.0%	248	0.8%	1	0.004
gentle ridge crest	12,340	0.7%	600	4.9%	60	0.5%	0	-
steep scarp	12,538	0.7%	5,440	43.4%	272	2.2%	0	-
level-very gentle hill crest	7,910	0.5%	2,100	26.5%	105	1.3%	2	0.019
gentle hillock	9,827	0.6%	1,340	13.6%	58	0.6%	0	-
Totals/Means	**1,737,219**	**100%**	**271,860**	**15.6%**	**7,814**	**0.4%**	**480**	**0.061**
Class of Slope								
level-very gentle	71,641	4.1%	23,300	32.5%	1,153	1.6%	365	0.317
gentle	1,186,836	68.3%	173,800	14.6%	4,836	0.4%	110	0.023
moderate	466,204	26.8%	69,320	14.9%	1,553	0.3%	5	0.003
steep	12,538	0.7%	5,440	43.4%	272	2.2%	0	-
Totals/Means	**1,737,219**	**100%**	**271,860**	**15.6%**	**7,814**	**0.4%**	**480**	**0.061**
Landform Element								
drainage depression	272,486	15.7%	65,200	23.9%	1,714	0.6%	39	0.023
simple slope	1,320,128	76.0%	185,020	14.0%	5,192	0.4%	438	0.084
spur crest	71,469	4.1%	6,960	9.7%	165	0.2%	0	-
ridge crest	42,861	2.5%	5,800	13.5%	308	0.7%	1	0.003
scarp	12,538	0.7%	5,440	43.4%	272	2.2%	0	-
hill crest	7,910	0.5%	2,100	26.5%	105	1.3%	2	0.019
hillock	9,827	0.6%	1,340	13.6%	58	0.6%	0	-
Totals/Means	**1,737,219**	**100%**	**271,860**	**15.6%**	**7,814**	**0.4%**	**480**	**0.061**

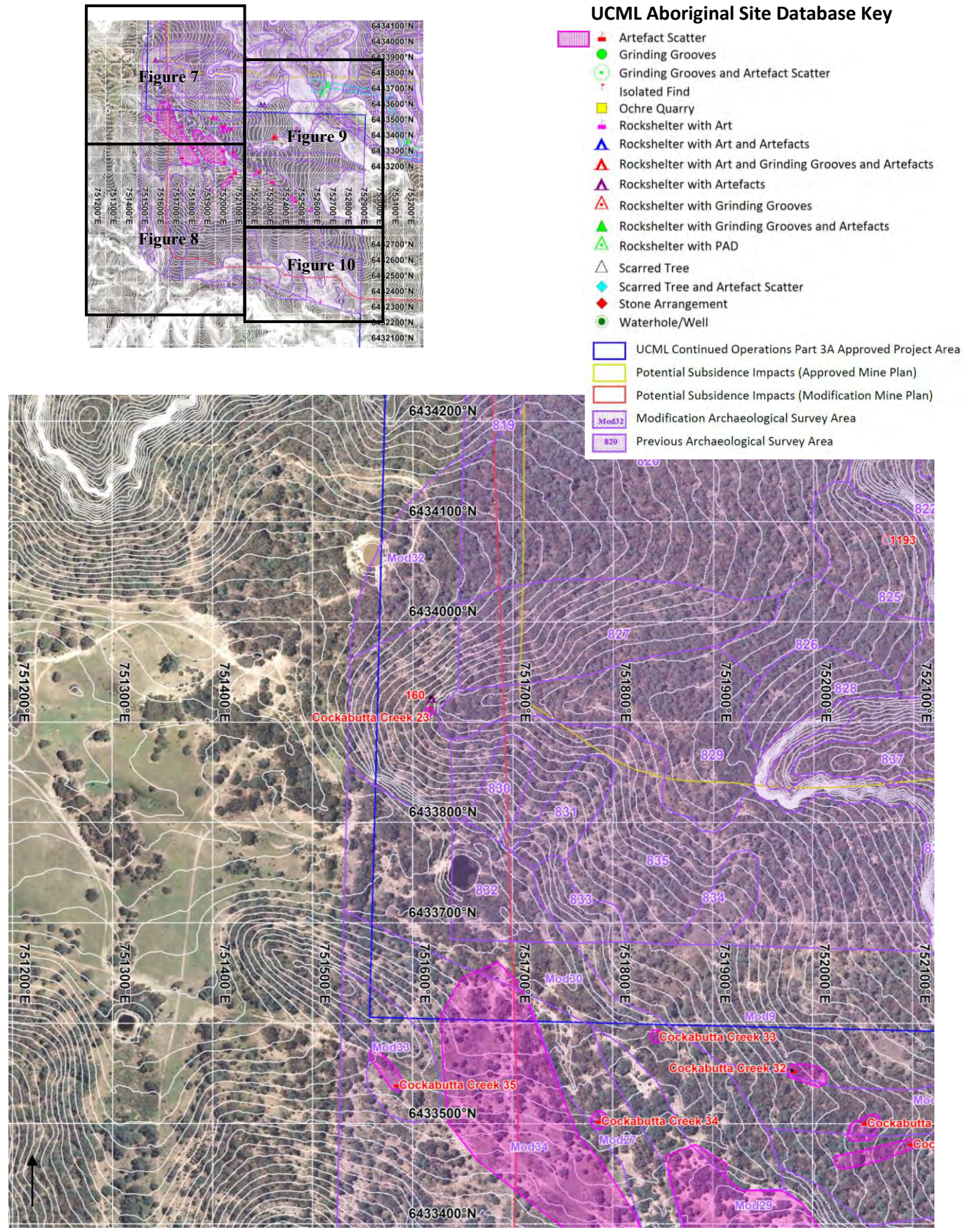


Figure 7: North-western portion of area surveyed for proposed modification showing archaeological survey areas and Aboriginal heritage sites (aerial photograph and one metre contours courtesy UCML; 100 metre MGA grid).

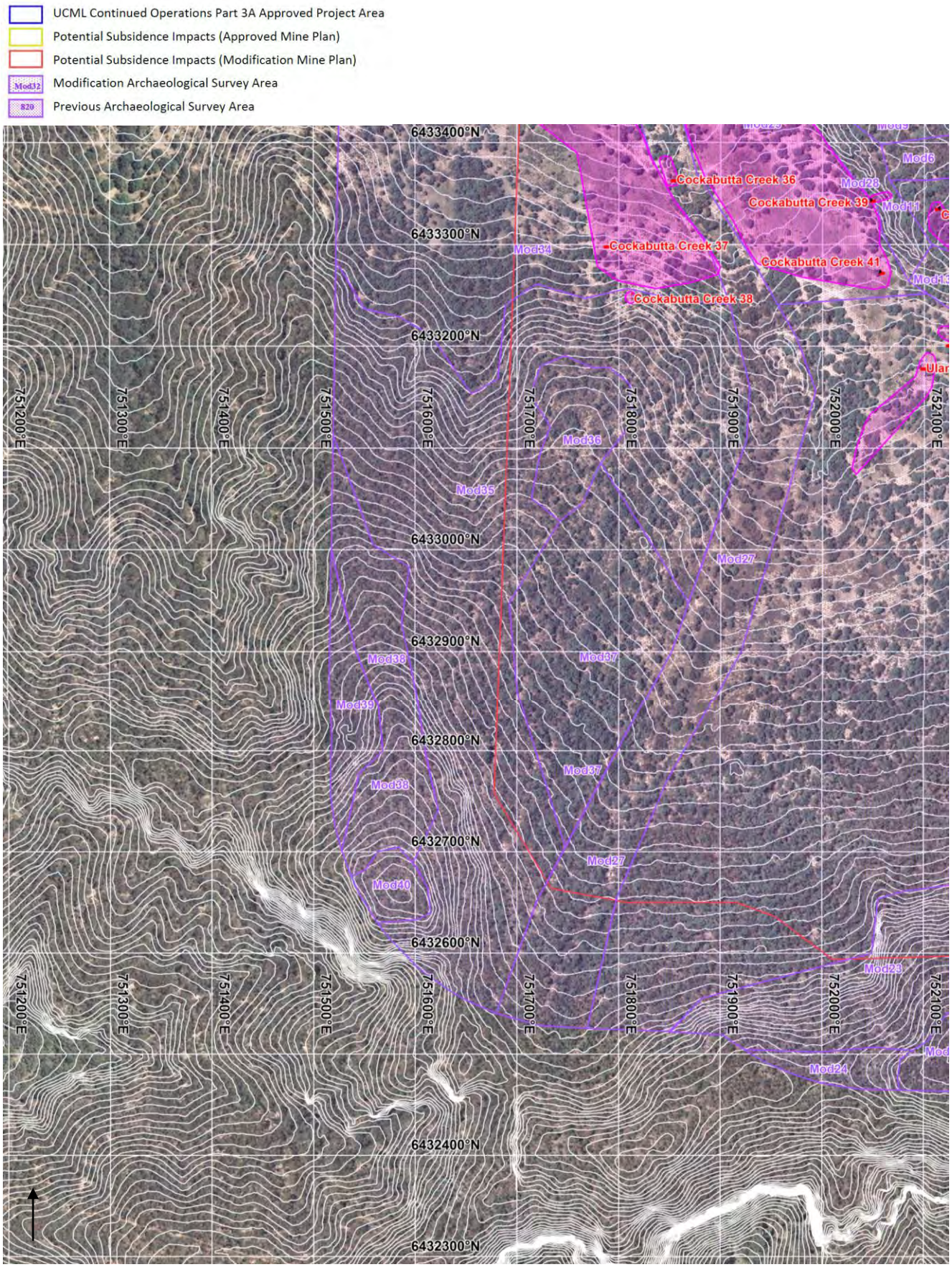


Figure 8: South-western portion of area surveyed for proposed modification showing archaeological survey areas and Aboriginal heritage sites (aerial photograph and one metre contours courtesy UCML; 100 metre MGA grid).

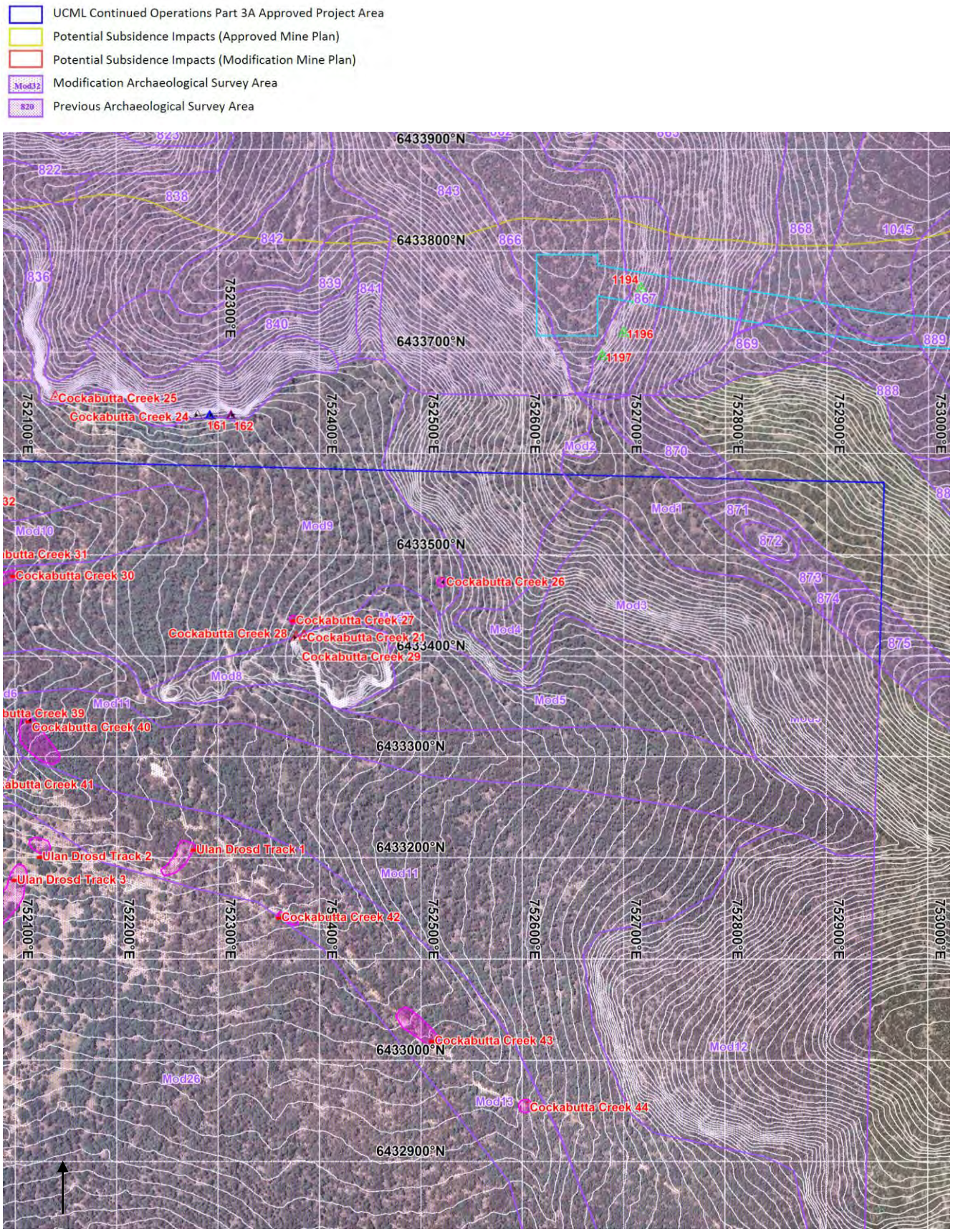


Figure 9: North-eastern portion of area surveyed for proposed modification showing archaeological survey areas and Aboriginal heritage sites (aerial photograph and one metre contours courtesy UCML; 100 metre MGA grid).

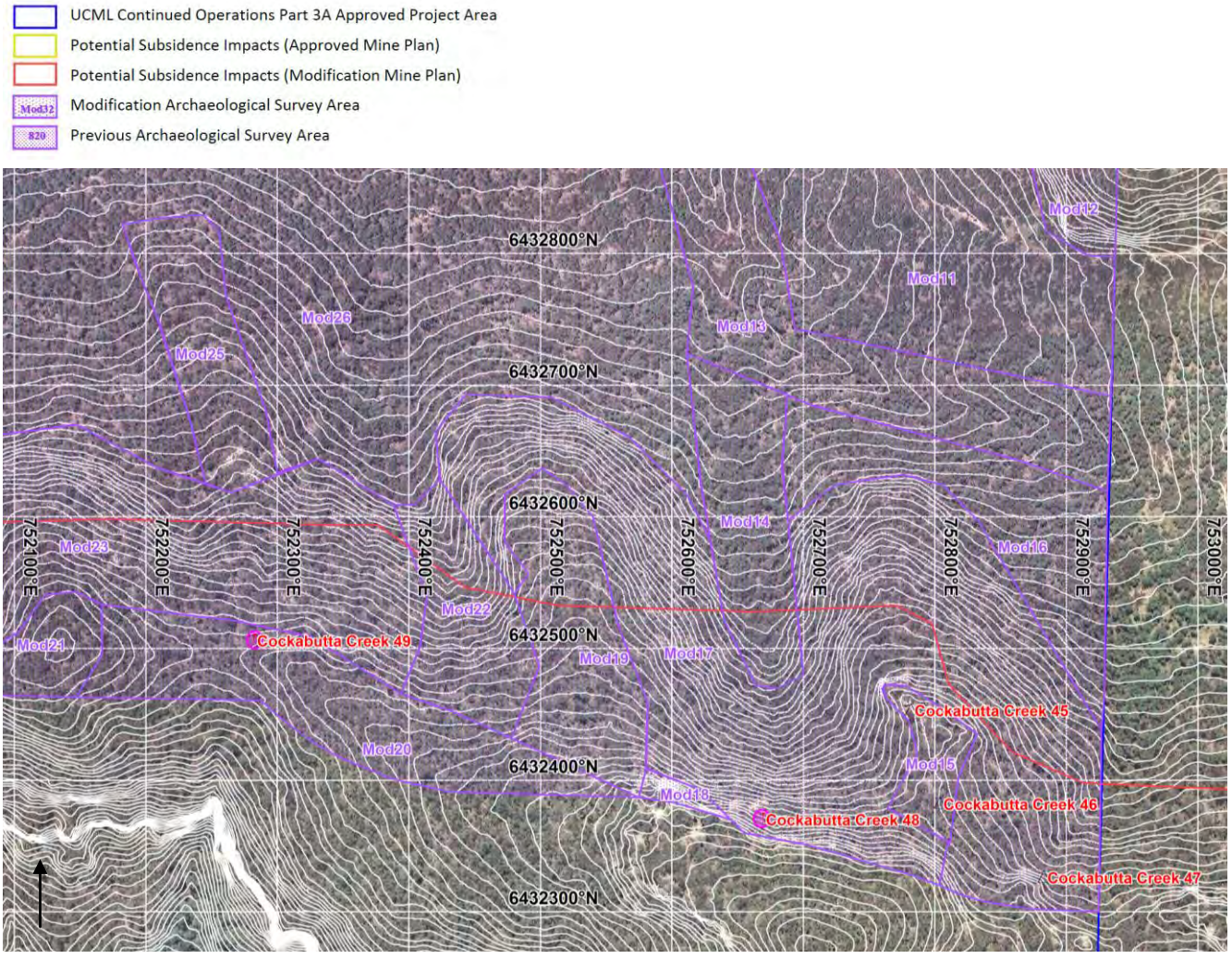


Figure 10: South-eastern portion of area surveyed for proposed modification showing archaeological survey areas and Aboriginal heritage sites (aerial photograph and one metre contours courtesy UCML; 100 metre MGA grid).

5.2 Aboriginal Heritage Evidence

5.2.1 Overview

The present survey for the proposed modification has resulted in the recording of an additional 22 Aboriginal sites, comprising 13 artefact scatters, seven isolated finds and two rock shelters with artefacts, along with five rock shelter with PADs (refer to Figures 7 - 10). Full descriptions of all newly identified sites and PADs recorded during the current survey are presented in Appendix 3.

Seven of these sites or PADs are located in land now *outside of* the zone of potential *subsidence impacts* of the proposed modification (or the originally approved UCCO Project), including three isolated finds (CC23, CC48 and CC49), an artefact scatter (CC35) and three rock shelters with PADs (CC 45 - 47). However, two of the rock shelters with PADs (CC45 and CC46) and one isolated find (CC48) are located within the potential *surface impact area* in MLA 475, which was finalised after completion of the heritage survey. For completeness, the sites outside of the potential subsidence or surface impact area of the proposed modification are included in the assessment of impacts and management strategies (all are within 30-70 metres of the proposed modification area).

A number of the previously recorded sites (Appendix 1) were relocated and re-recorded (refer to Appendix 3). The grid references of several of these sites were revised. Updated mapping of all site locations within the investigation area is presented in Figures 7 - 10, with detailed maps of site locations in Appendix 3.

In relation to known Aboriginal sites, the key areas of interest in relation to the proposed modification are the zones of potential subsidence impact for Ulan West, both for the approved UCCO Project and for the proposed modification (refer to Figure 5). Three potential *changes* may occur from the proposed Ulan West modification to Aboriginal sites and therefore all Aboriginal sites and PADs within these categories have been included in the assessment of subsidence impacts and management strategies for the modification (refer to Sections 9 and 10 and Appendix 6):

d) Sites/PADs with a decrease in impacts, as subsidence impacts that may have occurred under the approved UCCO Project will no longer occur under the proposed modification;

e) Sites/PADs with an increase in impacts, as subsidence impacts that would not have occurred under the approved UCCO Project will now occur under the proposed modification; and

f) Sites/PADs with an altered level of impacts, where subsidence impacts that may have occurred under the approved UCCO Project will also occur under the proposed modification, but at a different level.

Excluding artefact scatters and isolated finds (as subsidence associated with the proposed modification will have no material impact on these site types), the key sites of interest in relation to the modification (the zones of *potential subsidence impact*, both for the approved UCCO Project and for the proposed modification) are summarised in Table 4 and listed in Appendix 6 and marked on Figure 11. However, the additional open artefact sites recorded during the present survey within the modification impact area are included in the assessment of significance (refer to Section 7.2), assessment of impacts (Section 9) and management strategies (Section 10) for completeness and in relation to *potential surface impacts* (refer below).

Table 4: Summary of known Aboriginal sites (excluding open artefact sites) within the approved UCCO Project and proposed modification zones of potential subsidence impacts after completion of the modification heritage survey.

Aboriginal Site Type	Total
Grinding Grooves	2
Ochre Quarry	1
Rockshelter with Art	3
Rockshelter with Art and Artefacts	4
Rockshelter with Art and Grinding Grooves and Artefacts	1
Rockshelter with Artefacts	80
Rockshelter with Grinding Grooves	2
Rockshelter with Grinding Grooves and Artefacts	2
Rockshelter with PAD	215
Scarred Tree	4
Stone Arrangement	1
Total	**315**

Also of interest with respect to identified Aboriginal sites and the proposed modification are the zones of *potential surface impacts*, both for the approved UCCO Project and for the proposed modification (refer to Figure 12). Three potential *changes* may occur from the proposed Ulan West modification to Aboriginal sites:

a) Sites/PADs with a decrease in impacts (ID# 602, 606, 634, 635, 800, 804, 1194, 1195, 1201 and 1204), as surface impacts that may have occurred under the approved UCCO Project will no longer occur under the proposed modification (relevant to an approximately 24 hectare area as identified on Figures 3 and 12)[6];

b) Sites/PADs with an increase in impacts (ID# 462, 825, 826 and 827, and CC 45, 46 and 48), as surface impacts that would not have occurred under the approved UCCO Project will now occur under the proposed modification (relevant to an approximately 56 hectare area as identified on Figures 3 and 12)[7]; and

c) Sites/PADs with an altered level of impacts (for example, ID# 512, 791 and 796), where surface impacts that may have occurred under the approved UCCO Project will also occur under the proposed modification, but either at a different level or within a different portion of the site.

[6] Excludes sites on the margins of the previously approved surface impact area such as ID# 167, 594, 595, 599, 601 and 1282, for which it was assumed that surface impacts would not occur under the approved UCCO Project (and also will not occur under the proposed modification).

[7] Excludes sites such as ID# 169, 458, 460, 461, 469, 639, 640, 648, 683 and 836 for which surface impacts had already been assumed under the approved UCCO Project (and will also occur under the proposed modification) for which appropriate management strategies are already included in the approved HMP (as such, additional consideration is not required here as there is no material change in the status of potential impacts).

These sites were reported in detail by Kuskie (2009) and additional descriptions are not presented here (apart from the newly identified sites - refer to Appendix 3). All sites that may be subject to a material increase or decrease to their potential impact status or management strategies as a consequence of the proposed changes in surface impacts are considered and discussed within this assessment of the proposed modification (refer to Appendix 6 and Sections 9 - 11).

While the above discussion focuses on Aboriginal objects and physical evidence of Aboriginal occupation, contemporary cultural values associated with the investigation area have been identified by the Aboriginal stakeholders. These include:

- In general terms, the use of subsistence or other resources, with comments made about the presence of various native flora and fauna where observed. These comments were not of a historical nature (ie. did not relate to plant and animal resource use areas known from the post-contact period) but rather were general observations of the occurrence of particular species and their known traditional uses (eg. for food, medicine, tools, etc.);
- In general terms, the traditional use of the area by north-eastern Wiradjuri people, and an ongoing cultural and spiritual connection to the land and resources of the study area by the north-eastern Wiradjuri;
- In relation to the large pagodas and sandstone formations within the valley adjacent to the main Cockabutta Creek tributary (survey area 'Mod 8'; refer to Plates 4 - 7 and 12 - 16 in Appendix 4) the Aboriginal stakeholders expressed a strong spiritual and cultural connection with this locality; and
- In relation to the large sandstone formation in which ID# 161 and 162 are situated (survey area #836), the Aboriginal stakeholders also expressed a strong spiritual and cultural connection with this locality.

In addition to these places, other archaeological sites (for example, rock shelters, grinding grooves and artefact scatters) identified within the Ulan West area are of contemporary significance to the Aboriginal community, as they represent a tangible link with the traditional past and with the lifestyle and values of community ancestors (refer to Section 7).

The possibility cannot be excluded that further Aboriginal values or associations may exist within the locality of the investigation area that were not divulged to South East Archaeology by the persons consulted. However, the representatives did not disclose any specific knowledge of sites or places associated with ceremonies, spiritual/mythological beliefs or traditional knowledge, which date from the pre-contact period and have persisted until the present time, within the proposed modification area. The representatives also did not disclose any specific knowledge of sites or places associated with historical associations, which date from the post-contact period and are remembered by people today (for example, plant and animal resource use areas and known camp sites), within the study area.

In general terms, the attachment of the north-eastern Wiradjuri people to the landscape and continuing strong cultural connections with the locality of the Ulan West area is evident (refer to Kuskie 2009). As noted by Goulding (2002:63) land is a fundamental part of Aboriginal culture, and such cultural connections are integral to the health and wellbeing of Aboriginal people, although can be complex and are not always obvious to others.

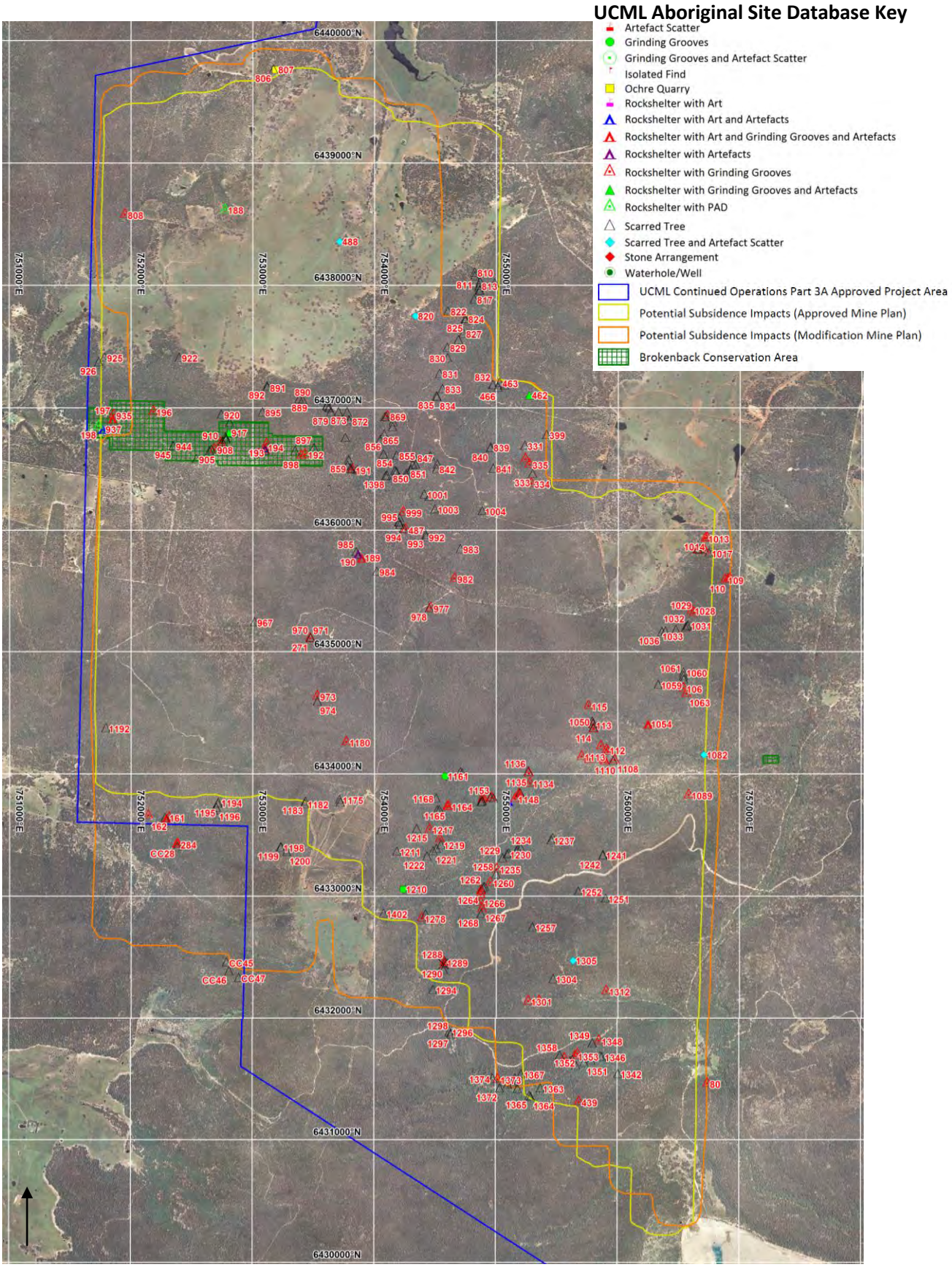


Figure 11: Recorded Aboriginal heritage sites (excluding open artefact sites) within the approved Ulan West subsidence impact area and proposed modification subsidence impact area (one kilometre MGA grid; aerial photograph courtesy UCML).

5.2.2 Open Artefact Sites

A total of 20 open artefact sites were identified during the present survey within the area sampled outside of the approved UCCO Project Area (refer to Figures 7 - 10 and Appendix 3). As noted in Section 5.2.1, three isolated finds (CC23, CC48 and CC49) and an artefact scatter (CC35) are located in land now *outside of* the zone of potential subsidence impacts of the proposed modification (or the originally approved UCCO Project), due to subsequent refinements to the impact area after completion of the survey. However, site CC48 is within the zone of potential surface impacts of the proposed modification.

A summary of open artefact sites recorded during the current survey is presented in Table 5 (excluding re-recordings or extensions of several previously recorded sites). Typically these are small, low density open isolated finds or open artefact scatters with ten or less artefacts. However, sites CC41 (with 362 artefacts) and CC37 (with 45 artefacts) extended over broad areas adjacent to the main tributary of Cockabutta Creek (a location where it becomes a third order watercourse).

Three sites were located on level to very gentle gradients (which also had a significantly higher mean artefact density than the other classes of slope), 12 on gentle gradients and five on moderate gradients. Ten sites occur on simple slopes, eight on drainage depressions and one site each on hill crests and ridge crests.

The identified artefacts probably only represent a small fraction of the entire artefact resource that is present within the surveyed area, because the vast majority of evidence is likely to be currently obscured by vegetation and soil. Substantial portions of the area were not directly sampled for artefacts, and where the sample was obtained, conditions of surface visibility were typically low (mean archaeological visibility across the entire survey sample was 3%: refer to Section 5.1).

5.2.3 Rock Shelters

An additional two rock shelters with artefacts and five rock shelters with PADs were identified during the present survey (refer to Figures 7 - 10 and Appendix 3). As noted in Section 5.2.1, three rock shelters with PADs (CC 45 - 47) are located in land now *outside of* the zone of potential subsidence impacts of the proposed modification (or the originally approved UCCO Project Area), due to subsequent refinements to the impact area after completion of the survey. However, two of these rock shelters with PADs (CC45 and CC46) are now within the zone of *potential surface impacts* of the proposed modification, and given the proximity of CC47 to the proposed modification area boundary, it is included in the assessment of subsidence impacts and management strategies for completeness.

A summary of the new rock shelter sites and PADs recorded during the current survey is presented in Table 6 (excluding re-recordings of several previously recorded sites). Only single artefacts were present and typically the shelters had small habitable floor areas and/or PADs. However, site CC28, adjacent to the previously recorded CC21, exhibited a moderate sized habitable floor area and PAD and a high potential for a deposit of research value.

Table 5: Summary of open artefact sites recorded during the present survey.

Site Name	Landform Element	Slope	Distance to Water	Vegetation	Ground Disturbance	Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m^2)	Mean Surface Visibility of Locus (%)	Mean Archaeological Visibility of Locus (%)	Effective Locus Area (m^2)	# of Artefacts	# of Artefacts/m^2 of Effective Locus Area	Sub-Surface Deposit	Comments	MGA Reference Easting	MGA Reference Northing
CC23	simple slope	moderate	<50	2	low	varies	varies	1	1	1	10	10	0.1	1	10.000	unlikely	18m from rock shelter site ID# 160; dense leaf litter	751617	6433910
CC26	simple slope	moderate	>50	2	low	varies	varies	1	1	1	10	10	0.1	1	10.000	possible	long way from water; low potential for deposit of value; sandy soil; minor quartz around; ironbark, gums in forest but heavily logged in past, abundant fallen timber	752520	6433473
CC27	simple slope	gentle	>50	2	low	varies	varies	1	1	1	10	10	0.1	2	20.000	possible	20 metres northwest of shelters; geebung, ironbark forest - heavily logged in past; quartz pebbles around	752374	6433436
CC30	simple slope	gentle	<50	2	low	varies	varies	75	5	375	5	5	19	4	0.210	probable	extension of adjacent site in drainage; ironbark; quartz available	752098	6433480
CC31	drainage depression	gentle	<50	2	low	varies	varies	35	20	700	10	10	70	19	0.271	probable	sandy soil; ironbark; low disturbance from vegetation removal and erosion; quartz available	752052	6433501
CC32	simple slope	gentle	>50	2	low	varies	varies	35	15	525	50	50	262	6	0.023	probable	just east of small outcrop of boulders; sandy soil; ironbarks; low disturbance from vegetation removal and erosion	751981	6433553
CC33	drainage depression	gentle	<50	2	low	5	1	1	1	1	10	10	0.1	1	10.000	unlikely	eroded edge of drainage; leaf litter, eucalypts, sifton bush; minor pebbles available	751844	6433587
CC34	drainage depression	gentle	<50	2	low	varies	varies	4	2	8	40	40	3	2	0.625	possible	edge of drainage; impacts from erosion	751786	6433503
CC35	hill crest	level-very gentle	>50	2	low	varies	varies	40	2	80	20	20	16	2	0.125	possible	almost saddle on crest; cleared - grass, acacia, ironbark; vehicle track and ants nest adjacent	751584	6433539
CC36	drainage depression	gentle	<50	2	low - mod	varies	varies	20	4	80	30	30	24	5	0.208	possible	edge of drainage; old machinery dumped; animal bones, broken brown glass present; impacts from erosion	751854	6433364
CC37	simple slope	gentle	<50	1, 2	low	varies	varies	450	90	40500	10	10	4050	45	0.011	probable	grass, acacia, ironbark; partly cleared; sandy soil; quartz available; moderate potential near creek	751788	6433299
CC38	simple slope	moderate	>50	2	low	varies	varies	1	1	1	5	5	0.05	1	20.000	unlikely	less dense vegetation on lower portion of slope; sifton, geebung, eucalypts	751812	6433247
CC39	drainage depression	moderate	<50	2	low	varies	varies	12	2	24	5	5	1.2	2	1.667	possible	edge of eroded drainage; small exposure; shrubs, acacia, eucalypts around; quartz pebbles available	752049	6433344

Table 5 (continued): Summary of open artefact sites recorded during the present survey.

Site Name	Landform Element	Slope	Distance to Water	Vegetation	Ground Disturbance	Visible Extent of Surface Exposures: Length (m)	Visible Extent of Surface Exposures: Width (m)	Visible Extent of Evidence: Length (m)	Visible Extent of Evidence: Width (m)	Visible Locus Area (m²)	Mean Surface Visibility of Locus (%)	Mean Archaeological Visibility of Locus (%)	Effective Locus Area (m²)	# of Artefacts	# of Artefacts/m² of Effective Locus Area	Sub-Surface Deposit	Comments	AGA Reference Easting	AGA Reference Northing
CC40	simple slope	gentle	<50	2	low	varies	varies	50	15	750	10	10	75	14	0.187	probable	adjacent to confluence of minor drainage and main creek; deep sand; probably many more artefacts; low visibility off site; forest, geebungs; wombat burrows; quartz available; low to possibly moderate research potential	752113	6433336
CC41	simple slope	level-very gentle	<50	1	low	varies	varies	280	120	33600	5	5	1680	362	0.215	probable	broad sandy 'flat' come very gentle simple slope adjacent to creek; grassy; low disturbance; quartz available; extensive site, numerous more artefacts and sub-surface deposits of research value probably present; 71 artefacts recorded in detail, another 291 counted but not recorded due to time constraints and subsidence only area including 25 in cluster between 752009:6433327 and 751994:6433348 and creek, 99 in cluster between 751990:6433360 and creek and 752011:6433380 and 751993:6433411 and 751971:6433399 and 751974:6433385, 40 in cluster between 751956:6433422 and 751934:6433425 and 751930:6433415 and 751967:6433415, 20 in cluster between 751955:6433379 and creek and 751965:6433429, 47 in cluster between 751912:6433412 and 751924:6433438 and 751903:6433435 and 751900:6433414, and 51 others	752058	6433273
CC42	drainage depression	gentle	<50	2	low	varies	varies	15	5	75	80	80	60	3	0.050	probable	along and adjacent to vehicle track next to drainage; sandy; grass, forest; low disturbance - unformed track, erosion	752360	6433142
CC43	drainage depression	gentle	<50	2	low	varies	varies	40	10	400	10	10	40	6	0.150	possible	edge of small eroded drainage channel; grass, small acacia and eucalypt regrowth; minor pebbles of quartz available	752511	6433020
CC44	drainage depression	gentle	<50	2	low	5	1	1	1	1	5	5	0.05	1	20.000	unlikely	edge of small eroded drainage channel; grass, small acacia and eucalypt regrowth; minor pebbles of quartz available	752605	6432954
CC48	simple slope	moderate	>50	2	low	varies	varies	1	1	1	10	10	0.1	1	10.000	unlikely	extensive views to north; marginally outside investigation area; ironbark	752669	6432370
CC49	ridge crest	level-very gentle	>50	2	low	varies	varies	1	1	1	5	5	0.05	1	20.000	unlikely	sandstone cobbles, outcrops around; ironbark, geebung, acacia; site on saddle on ridge; low research potential	752282	6432506

Vegetation: 1 = cleared/grass; 2 = forest/bush/regrowth.

Table 6: Summary of rock shelter sites and PADs recorded during the present survey.

Site Name	Site Type	Landform Element	Distance to Water (m)	Rock Material	Outcrop Type	Outcrop Form	Aspect	Erosion	Surface Condition	Soils	Disturbance to Deposit	Causes of Disturbance	# of Artefacts	Mean Archaeological Visibility (%)	Shelter Floor Area (m^2)	Potential Depth of PAD (mm)	Comments	MGA Easting	MGA Northing
CC24	rockshelter with PAD	scarp	>50	sandstone	rockshelter	scarp	south	cavernous	accretions	sand	low	erosion	0	10%	3	>200	dimensions 1.5m deep and 2m wide, 2m high at dripline; pad 2 x 1.5m; small shelter immediately west of ID# 161 and 162; low potential but part of cluster	752280	6433638
CC25	rockshelter with artefacts	scarp	>50	sandstone	rockshelter	scarp	south	cavernous	exfoliating, accretions	sand	moderate - high	animal burrows	1	20%	8	>500	dimensions 1.2m deep and 2.4m wide and 1.2m high in alcove at front, 2 x 2.4m in inner cavern with 1.3m high roof; disturbance from wombat burrow at front and other animal impacts in cavern; small pads 2 x 2m in cavern and 2 x 1m in front alcove; low potential	752140	6433655
CC28	rockshelter with artefacts	scarp	>50	sandstone	rockshelter	scarp	north	cavernous	exfoliating, exposed/ weathered	sand	low		1	50%	18	>400	dimensions 1.5m deep and 7m wide and 1.6m deep and 4.8m wide; 3.5m high at dripline; adjacent to another shelter (recorded separately); friable sandstone and conglomeritic sandstone, erodes easily, soft, art unlikely to survive; high potential for deposit of research value; deep deposit likely; wasps in portion of ceiling; located in massive pagoda; iron and goethite staining; sloping back wall; minor erosion from east side probable in very wet periods;	752377	6433418
CC29	rockshelter with PAD	scarp	>50	sandstone	rockshelter	scarp	west	exfoliation; cavernous	exfoliating, exposed/ weathered	rocky, sand, gravel	moderate	erosion, animal burrows	0	10%	5	>100	dimensions 2m deep and 2.7m wide and 2m deep and 2.7m wide (adjoining); southern chamber 2.8m high at dripline, northern chamber 1.5m high at dripline; small shelter; crumbly sandstone; eroded; low research potential	752380	6433400

Table 6 (continued): Summary of rock shelter sites and PADs recorded during the present survey.

Site Name	Site Type	Landform Element	Distance to Water (m)	Rock Material	Outcrop Type	Outcrop Form	Aspect	Erosion	Surface Condition	Soils	Disturbance to Deposit	Causes of Disturbance	# of Artefacts	Mean Archaeological Visibility (%)	Shelter Floor Area (m^2)	Potential Depth of PAD (mm)	Comments	MGA Easting	MGA Northing
CC45	rockshelter with PAD	spur crest	>50	sandstone	rockshelter	boulder	north	cavernous	exposed/ weathered	rocky, silt	moderate	erosion	0	80%	6	uncertain	dimensions 1.3m deep and 3.8m wide where roof 2.5m high and habitable floor area; adjoining area of 1.6m deep and 3.8m wide under low roof, between large boulder and rear wall (tunnel); small pad 4 x 1m; extensive views to north; deposit highly compacted and possible erosion impacts; different context, therefore possibly low to moderate potential	752782	6432453
CC46	rockshelter with PAD	spur crest	>50	sandstone	rockshelter	boulder	south	cavernous, honeycomb	exfoliating	rocky, sand	low - moderate	erosion, animal burrows	0	80%	12	uncertain	dimensions 5m deep to back wall but rear 3.5m less than 1m high, by 8m wide; habitable area c.8 x 1.5m; roof 2.1m high at dripline but mostly lower; small pad 1.5 x 1m; mostly rocky floor; low potential	752804	6432382
CC47	rockshelter with PAD	simple slope	>50	sandstone	rockshelter	boulder	north	cavernous	exfoliating, exposed/ weathered	rocky, sand	moderate	erosion	0	50%	14	uncertain	dimensions 5m deep to back wall and 7m wide but mostly higher ledge and sloping bedrock floor and low roof; pad only 2m x 0.5m; 2.7m high at dripline; pad affected by erosion; low potential	752883	6432326

5.2.4 Cultural Values

Contemporary cultural values associated with the area subject to survey have been identified by the Aboriginal stakeholders. Some of these relate to physical objects, including items that qualify as *Aboriginal objects* as defined under the NP&W Act. However, some relate to intangible values, associations or landscape features that do not qualify as *Aboriginal objects.* These include:

- In general terms, the use of subsistence or other resources, with comments made about the presence of various native flora and fauna where observed. These comments were not of a historical nature (ie. did not relate to plant and animal resource use areas known from the post-contact period) but rather were general observations of the occurrence of particular species and their known traditional uses (eg. for food, medicine, tools, etc.);
- In general terms, the traditional use of the area by north-eastern Wiradjuri people, and an ongoing cultural and spiritual connection to the land and resources of the study area by the north-eastern Wiradjuri;
- In relation to the large pagodas and sandstone formations within the valley adjacent to the main Cockabutta Creek tributary (survey area 'Mod 8') the Aboriginal stakeholders expressed a strong spiritual and cultural connection with this locality; and
- In relation to the large sandstone formation in which ID# 161 and 162 are situated (survey area 836), the Aboriginal stakeholders also expressed a strong spiritual and cultural connection with this locality. Notably, the two stakeholders accompanying the archaeologist in survey area 'Mod 10' at MGA reference 752408:6433637 both simultaneously reported hearing a woman's voice in Aboriginal language. Obvious sources of the voice were not evident, as the other survey team was a considerable distance away. This location is only 100 metres east of ID# 161, where Haglund (1999a) reported that Mr David Maynard "tentatively identified the shelter as a women's site" (refer to Appendix 1). It is understood that these particular stakeholders had no prior knowledge of this report. However, after visiting ID# 161, both stakeholders were satisfied that ID# 161 was not necessarily a 'women's site'.

In addition to these places, other archaeological sites (for example, rock shelters, grinding grooves and artefact scatters) identified within the Ulan West area are of contemporary significance to the Aboriginal community, as they represent a tangible link with the traditional past and with the lifestyle and values of community ancestors (refer to Section 7).

In general terms, the attachment of the north-eastern Wiradjuri people to the landscape and continuing strong cultural connections with the locality of the Ulan West area is evident (refer to Kuskie 2009).

5.3 Discussion

The results of the survey conducted for the present investigation are discussed below, including the potential integrity of the evidence, nature of the evidence and interpretations of the evidence.

5.3.1 Integrity of Evidence

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

As discussed in Section 2, recent non-Aboriginal land-use practices have had a generally low impact on the investigation area. Levels of ground disturbance were recorded during the survey, after McDonald *et al* (1984) (Appendix 2). The survey areas typically exhibited low levels of ground disturbance.

The open artefact sites tend to be located in exposures where minimal vegetation was present, but exhibit generally low levels of impacts. At most sites and locations, should sub-surface deposits of artefacts occur, they may exhibit reasonable integrity.

At the rock shelter sites and PADs recorded during the present survey, disturbance levels (primarily to the potential deposit) varied, but were typically moderate or even high due to erosion and/or animal activity. Only CC24 and CC28 exhibited low disturbance levels. However, without excavation, it is often problematic to resolve the level of post-depositional impacts to any evidence. There remains a potential within many rock shelters, particularly where soil deposits are deep, for deposits that may be *in situ* and/or of research potential. In certain circumstances the impacts of post-depositional processes can also be identified and controlled for (*cf*. Haglund 2001a).

5.3.2 Lithic Assemblage

A total of 229 lithic items were recorded during the survey, including within several previously recorded sites and rock shelters (eg. ID# 161, 162 and 284). These items are listed for each site in Appendix 3 and summarised in Table 7. Most of the items were recorded in the two large open artefact sites CC41 (71 artefacts recorded out of a total observed of 362) and CC37 (45 artefacts). In the largest site, CC41, a further 291 artefacts were observed but not recorded (recommendations to address this consistent with Section 3.7.2 of the HMP are presented in Section 11).

In terms of stone materials, consistent with assemblages from the locality (for example, the overall Ulan assemblage of Kuskie 2009 of over 9,000 artefacts), the combined assemblage is overwhelmingly dominated by quartz (including crystal quartz; 80% of the combined assemblage), with lower frequencies of other materials such as chert, tuff, acidic volcanic, sandstone, petrified wood and quartzite.

In terms of artefact types, consistent with assemblages from the locality (for example, the overall Ulan assemblage of Kuskie 2009), the combined assemblage is overwhelmingly dominated by flakes (31%), flake portions (17%), lithic fragments (23%), cores (14%) and core fragments (7%). These items may represent the fragmented debris of on-site knapping of primary flakes and/or microblades or other on-site fracture, such as accidental breakage, or accidental discard.

Several less common items were identified, including grindstone fragments, a ground pounder, two ground edge axes, a topstone fragment, a muller, a muller/pounder/anvil and most significantly, a quartz knife (refer to site CC 21, 23, 35 and 41 photographs and artefact descriptions in Appendix 3). The latter item (#30 at site CC41) is highly unusual, a utilised backed flake of very high quality quartz, and it possibly represents a men's initiation knife.

Table 7: Summary of stone artefacts recorded during the present heritage survey (including within rock shelters and several previously recorded sites).

	Stone Material								
Lithic Item Type	acidic volcanic	chert	crystal quartz	petrified wood	quartz	quartzite	sandstone	tuff	**Total**
backed artefact - medial					1				1
backed artefact butt					1				1
blade - medial			1						1
blade - proximal								1	1
bondi point					1				1
core		3	2	3	20	1		3	32
core fragment		1	2		12				15
flake	4	3	11		49			4	71
flake - distal			2		11				13
flake - longitudinal				1	12				13
flake - medial					4				4
flake - proximal	1	2		1	5				9
geometric microlith					1				1
grindstone fragment							2		2
ground pounder							1		1
ground-edge axe	2								2
hammerstone					1				1
knife					1				1
lithic fragment	1	2	2		44	1	1	2	53
microblade - proximal					1				1
muller							1		1
muller/pounder/anvil							1		1
retouched piece	1								1
retouched utilised piece		1							1
topstone fragment							1		1
Total	**9**	**12**	**20**	**5**	**164**	**2**	**7**	**10**	**229**

5.3.3 Spatial Distribution and Site Interpretation

The spatial distribution of evidence identified during the survey can be examined, particularly in relation to environmental variables such as slope and landform element. However, the inferences that can be made from this comparison are limited by the small nature of the sample.

Overall, artefacts in open contexts in the surveyed area occur at a low mean density of 0.06 per square metre of effective survey coverage (refer to Table 3). Apart from sites CC 37 and 41, the spatial distribution and nature of evidence is largely consistent with background discard, manuport and artefactual material which is insufficient either in number or in association with other material to suggest focused activity in a particular location (*cf*. Kuskie and Kamminga 2000).

In general terms, the artefact density indicates a generally low-intensity utilisation of the surveyed areas, comparable (albeit slightly higher) to the low mean density of 0.02 per square metre of effective survey coverage within the broader UCML analysis area (Kuskie 2009).

Although the identified open artefact evidence probably only represents a fraction of the artefact resource that is present within the investigation area, because the majority of evidence is likely to be currently obscured by vegetation and soil (*cf.* Kuskie 2009), much of the surveyed area is located in contexts that do not conform to primary or secondary resource zones under the model of occupation. These areas are generally distant from higher order watercourses, where more reliable potable water and subsistence resources would have been available, and/or of moderate to steep gradient. As such, rather than having represented focused occupation, Aboriginal use of these portions of the surveyed area is therefore more likely to have related to hunting and gathering activities, along with transitory movement between locations and procurement of stone materials, and would have been of a generally low intensity.

However, the lower portion of the main tributary of Cockabutta Creek is a third-order watercourse and prior to the gully erosion associated with non-indigenous vegetation removal and land use, chain of ponds type water retention may have been possible. The largest open artefact sites, CC41 and CC37, are situated in this area. Although perhaps not a secondary resource zone under the occupation model, the nature and range of artefact evidence indicates that occupation of this area may have included camping by small parties of hunters/gatherers and nuclear/extended family groups, in addition to hunting and gathering and transitory movement. Sites CC41 and CC37 contain relatively high numbers of artefacts, diverse ranges of stone materials and artefact types, and have a high potential for substantial sub-surface deposits.

Mean artefact densities were substantially higher on level to very gentle gradients than the other classes of slope, largely due to the occurrence of site CC41. This is typical of results throughout southeastern Australia but contrasts to the results of the UCCO Project survey (refer to Kuskie 2009 for discussion). Most artefacts were located on simple slopes and this landform also had the highest mean density.

The open artefact and rock shelter evidence identified during the survey is generally consistent with the occupation model for the locality (refer to Kuskie 2009). The inferences that can be made about the nature of occupation at the rock shelter sites is limited by the small nature of the sample.

In general terms, the nature of occupation within the surveyed area could represent a variety of circumstances as outlined in detail in Section 3.4, particularly transitory movement between locations, hunting and gathering activities, and possibly camping by small parties of hunters/gatherers and nuclear/extended family groups along the lower portion of the main tributary of Cockabutta Creek. The evidence at particular locations could represent single or multiple episodes of one or more of the above types of occupations. The episodes of occupations could have occurred at different times over the entire time-span of occupation in the region. Each episode of occupation could also have been for a different duration of time (refer to Kuskie 2009).

The inferences that can be drawn from the evidence obtained during the survey are largely consistent with those reported by Kuskie (2009) for the broader UCML area. The generally very low density of artefacts within the surveyed area, the distribution of these artefacts and the topography of the surveyed area (minimal presence of higher order watercourses and absence of swamps/wetlands or other similar subsistence resource zones) indicates that in the broader locality focused occupation was more likely to have occurred outside of the direct surveyed area, in association with those such contexts (for example, to the west along the higher order portions of Cockabutta Creek, and along the Talbragar River and around Narragamba Swamp) where more preferential circumstances existed for water and subsistence resources.

5.3.4 Regional Context

The nature of the evidence from the surveyed area can be compared with other evidence from the Ulan locality and the wider region (refer to Kuskie 2009: Section 7.8). The primary purpose is to identify similarities and differences with other reported evidence, in order to provide a framework for interpreting representativeness and assessing potential cumulative impacts.

Several primary similarities have been identified with other survey results in the locality including the:

- Occurrence of similar open artefact sites and rock shelter sites/PADs in similar topographical contexts;
- Similar stone material and artefact types;
- Generally low artefact numbers and densities; and
- Presence of evidence in similar environmental contexts, including landform elements and gradients.

The extent of any feasible comparison is limited by the small nature of the sample obtained from the present survey. Although generally comparable with the overall evidence from UCML, the surveyed area did exhibit a higher mean artefact density than for the broader UCML analysis area (Kuskie 2009), a relatively higher artefact density on level to very gentle gradients than the other classes of slope, and several less common artefact types, particularly the quartz knife in site CC41 which is rare within a regional context.

5.3.5 Reassessment of Predictive Model

In view of the survey results, the predictive model of site location for the surveyed area (refer to Section 3.4) can be reassessed in relation to the areas within the sampled zone that were not directly inspected. The predictions for the areas within the broader Ulan West subsidence or surface impact zone that have not been surveyed to current standards, or were not directly sampled during the survey, remains unchanged (refer to Section 3.4 and Kuskie 2009).

The potential for bora/ceremonial, carved tree, scarred tree, rock engraving, rock shelter and stone arrangement sites to occur within the portions of the surveyed area that have not been directly sampled can be reassessed as very low or negligible (generally consistent with the conclusions of Kuskie 2009 for the much larger Ulan West area) given the comprehensive nature of the survey and/or the relatively obtrusive nature of these site types.

No direct evidence of lithic procurement sites was identified, however the potential for casual, opportunistic procurement of stone, such as quartz, from colluvial gravels within the surveyed area cannot be discounted.

No evidence was encountered of burial sites, and although the potential for skeletal remains to occur within the surveyed area is considered to be very low, it cannot be discounted.

Areas of exposed sandstone bedrock were identified within the surveyed area and widely sampled for the presence of grinding grooves. The potential for open grinding groove sites to occur can be revised downward to very low, but cannot be discounted in areas that were not directly sampled or are currently obscured by sediment or vegetation/leaf litter.

Sites of traditional cultural significance (such as mythological sites) were not identified by the Aboriginal representatives involved in the investigation. The Aboriginal stakeholders also did not disclose any specific knowledge of other cultural values/places (for example, historically known places or resource use areas). Although the possibility cannot be excluded that traditional or historical Aboriginal values or associations may exist that were not divulged by the persons consulted, this potential is reassessed as low. The Aboriginal stakeholders did identify contemporary values/associations with the investigation area and previously recorded values have been reported by Haglund (1999a) and Kuskie (2009).

A number of open artefact sites were identified within the surveyed area. There remains potential for additional open artefact evidence to occur in the areas that were not directly sampled or are currently obscured by vegetation, as per the predictions in Section 3.4 and Kuskie (2009). In most of the surveyed area, this evidence is likely to comprise a low to very low density sub-surface deposit of artefacts, consistent with the survey results and occupation model and generally representing background discard, although a low frequency of activity areas (with consequent higher artefact density) may be present. However, around the lower portion of the main tributary of Cockabutta Creek (for example, in the vicinity of sites CC 37, 40 and 41) there is a high potential for numerous more artefacts and sub-surface deposits, including deposits that may be of research value.

6. ABORIGINAL CONSULTATION

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

The Aboriginal heritage impact assessment for the UCCO Project involved a program of consultation with the Aboriginal community that complied with the *Interim Community Consultation Requirements for Applicants* (DEC 2004) policy requirements of the OEH that were introduced on 1 January 2005 and were applicable to the Project (refer to Kuskie 2009: Section 8 and Appendix 6 for full details).

Substantial and ongoing additional consultation has been undertaken with the Aboriginal community after completion of the UCCO Project EA in accordance with the approved UCML HMP (for example, refer to Kuskie 2010, 2011a-d, 2012a-d, 2013a-m and 2014a-e).

Consultation with the registered Aboriginal stakeholders (Warrabinga Native Title Claimants Aboriginal Corporation, North East Wiradjuri Company Ltd, Mudgee Local Aboriginal Land Council, Murong Gialinga Aboriginal and Torres Strait Islanders Corporation and Warranha Ngumbaay) for the UCCO Project has continued for the proposed modification in accordance with the approved UCCO Project and Section 3.1 of the approved HMP, with WVWAC also being consulted as an additional interested organisation as part of wider consultation separate to the HMP requirements.

Key aspects of the HMP relevant to this assessment of the proposed modification include:

- HMP Section 3.1: *UCML will provide the registered Aboriginal stakeholders with details of the proposed methodology of any forthcoming archaeological survey, salvage collection or excavation (where that methodology is different from that already approved by the stakeholders for the Continued Operations Project or in this Plan) and allow a minimum of 15 working days to provide comment, including identification of issues or areas of cultural significance that might affect, inform or allow refinement of the methodology. UCML will document and take into account all comment provided by the registered Aboriginal stakeholders and identify how these comments were considered in finalising the methodology.*

  - The survey methodology was the same as implemented for the UCCO Project (Kuskie 2009) and as such, additional consultation in relation to the methodology was not required. All stakeholders, along with the WVWAC, were informed of the proposed modification by correspondence and by meeting and their input was invited (refer to Appendix 5).

- HMP Section 3.1: *UCML will engage representatives of the registered Aboriginal stakeholders to participate in any archaeological survey, collection, excavation or monitoring required under this Plan. UCML may engage registered Aboriginal stakeholders through a competitive selection process involving criteria such as demonstrated qualifications in cultural heritage, skills or experience in the conduct of heritage studies in the local area, specific cultural knowledge of the Project area and/or ability to report the results to the broader Aboriginal community, consistent with Part C of the* Interim Community Consultation Requirements for Applicants Policy (DEC 2004).

  - All stakeholders, along with the WVWAC, were invited to attend the field survey. Representatives of each organisation attended on a daily basis for each of the five days of the field survey (26 - 30 May 2014), as documented in the consultation database in Appendix 5.

- HMP Section 3.1: *UCML will provide the registered Aboriginal stakeholders engaged for any field investigation with a minimum of five working days notice of the date of commencement of the field investigation, unless a shorter period is agreed to by the engaged stakeholders. UCML will provide safe access to the investigation area and induct representatives to an appropriate level for Occupational Health and Safety purposes*.

  - All stakeholders, along with the WVWAC, were informed of the starting date of the survey with at least five working days notice, and access was facilitated by UCML personnel (refer to Appendix 5).

- HMP Section 3.1: *The registered Aboriginal stakeholders will provide suitably qualified and/or experienced representatives to participate in any archaeological survey, collection, excavation or monitoring required under this Plan. The representatives will comply with all requirements of UCML at all times when in the Project area*.

  - The registered Aboriginal stakeholders and WVWAC provided suitably experienced representatives to participate in the survey and complied with UCML requirements.

- HMP Section 3.1: *UCML will ensure that any heritage reports produced under this Plan that require the review and input of the registered Aboriginal stakeholders (for example, further investigations as set out in Section 3.7 of this Plan) are distributed in a draft format to the registered Aboriginal stakeholders for review where specified in this Plan, with a minimum 15 working days allowed for comment. Final heritage reports would be prepared that address and incorporate any input received within the specified timeframe from the registered Aboriginal stakeholders*.

  - A draft version of this report was forwarded to the Aboriginal stakeholders on 2 December 2014, along with the WVWAC, and a minimum 15 working days allowed for comment. This final report has been prepared and incorporates and addresses input received from the Aboriginal stakeholders (refer to Table 8 and Appendix 5).

- HMP Section 3.1: *UCML will provide the registered Aboriginal stakeholders with final hard copies of all heritage reports produced under this Plan (for example, in relation to further investigations in Section 3.7) within 30 working days of the completion of the report*.

  - Copies of the final heritage assessment report will be provided to the registered Aboriginal stakeholders, along with the WVWAC, within 30 working days of completion.

- HMP Section 3.7.7: *Where the alterations to the underground mine plan are proposed in areas already subject to heritage survey sampling (consistent with the methodology and standards in the EA; Kuskie 2009), this will involve an assessment of potential subsidence impacts by a qualified subsidence expert and reconsideration of the management strategies for relevant identified sites presented in Appendix 2 of this Plan by an appropriately qualified and experienced archaeologist, in consultation with the registered Aboriginal stakeholders*.

  - Potential subsidence impacts on relevant Aboriginal sites have been assessed (refer to Section 9 of this report) and consultation with the Aboriginal stakeholders, along with the WVWAC, has occurred through provision of a draft version of this report for comment.

- HMP Section 3.7.7: *Where the alterations to the underground mine plan or open cut mine plan are proposed in areas that have not been subject to heritage survey sampling (consistent with the methodology and standards in the EA; Kuskie 2009), the procedures outlined in Section 3.7.5 of this Plan will be implemented*.

  - A detailed survey was undertaken by appropriately qualified and experienced archaeologists from South East Archaeology and representatives of the Aboriginal stakeholders of the 123 hectares that had not been subject to heritage survey to current standards *within* the zone of potential subsidence impacts *outside of* the approved UCCO Project Area. As discussed in Section 3.2.3, the vast majority of the remainder of the area to which the proposed modification relates has been subject to heritage survey to current standards during the UCCO Project (Kuskie 2009). In accordance with Sections 3.7.7, 3.7.4 and 3.7.5 of the HMP, the areas *within* the approved UCCO Project Area that have not been surveyed to current standards (gap in the northern portion of Ulan West, gap in the southern portion of the proposed modification area, gaps relating to the changed surface impact areas and other very minor gaps on some margins of Ulan West) will be surveyed prior to any impacts occurring in accordance with Section 3.7.5 of the approved HMP.

- HMP Section 3.7.7: *A report will be prepared with reference to the DEC Aboriginal Heritage Standards and Guidelines Kit (1997) and the requirements of this Plan and where relevant, DP&I, documenting the results of any heritage assessment of future proposed alterations to the underground mine plan or open cut mine plan or Approved Project. Any draft reports will be distributed to the registered Aboriginal stakeholders for review, with a minimum 15 working days allowed for comment. Final heritage reports would be prepared that address and incorporate any input received within the specified timeframe from the registered Aboriginal stakeholders. Hard copies of any final reports will be distributed to the registered Aboriginal stakeholders, DP&I and OEH within 30 working days of completion (refer to Section 5.5 of this Plan)*.

  - This report has been prepared in accordance with the requirements of the HMP and consistent with the *Aboriginal Heritage Standards and Guidelines Kit* (DEC 1997), documenting the results of this assessment of the proposed modification. A draft version of this report was forwarded to the Aboriginal stakeholders and a minimum 15 working days been allowed for comment. This final report has been prepared that incorporates input received from the Aboriginal stakeholders (refer to Table 8 and Appendix 5). Copies of the final heritage assessment report will be provided to the registered Aboriginal stakeholders, along with the WVWAC, within 30 working days of completion.

All registered stakeholders, along with the WVWAC, attended a further meeting on 25 November 2014 at which the proposed modification, draft heritage report and potential management strategies were discussed. Inspection was made of the sites of moderate to high significance within the Cockabutta Creek area. Further discussion also occurred at another Heritage Review Meeting on 11 December 2014 (refer to Appendix 5).

Correspondence received from the Aboriginal stakeholders is included in Appendix 5. Issues raised by the stakeholders during the course of the assessment and subsequent consultation and how they have been addressed are outlined in Table 8. Each issue number has been noted on correspondence provided by the stakeholder in Appendix 5. MGATSIC, Mudgee LALC, Murong Gialinga Aboriginal and Torres Strait Islanders Corporation and Warranha Ngumbaay all provided correspondence endorsing the draft report (refer to Appendix 5).

Table 8: Summary of Aboriginal stakeholders key comments and how they have been addressed by the proposed modification.

Issue #	Issue	Raised by	Modification Team Response
1	In response to draft heritage report, suggested trial of potential mitigation technique of trenching around rock shelter occurs at site of low significance to test strategy and evaluate outcome.	Brad Bliss, WVWAC, 5/1/15	As per Recommendation #2, UCML will continue consultation with the Aboriginal stakeholders in relation to identification of and agreement on other culturally acceptable mitigation and offsetting measures for the Cockabutta Creek rock shelter sites. Trenching around shelter sites has been considered, in discussion with the stakeholders, but it is concluded that the significant costs, associated environmental (surface) impacts and uncertainty of success outweigh any potential benefits. Other strategies have been identified as providing better heritage and community outcomes, including those outlined in Section 11.
2	In response to draft heritage report, suggested examine cost-benefit of rock shelter trenching mitigation technique and potential offsets by investments in stakeholder projects such as cultural heritage centres or education programs.	Brad Bliss, WVWAC, 5/1/15	As per Recommendation #2, UCML will continue consultation with the Aboriginal stakeholders in relation to identification of and agreement on other culturally acceptable mitigation and offsetting measures for the Cockabutta Creek rock shelter sites.
3	In response to draft heritage report, acknowledged that impacts to heritage sites are unavoidable, albeit not preferred, and suggested that where possible new technology and salvage methods are used to protect significant sites such as rock art, rock shelters and ochre quarries.	Brad Bliss, WVWAC, 5/1/15	As per Recommendation #2, UCML will continue consultation with the Aboriginal stakeholders in relation to identification of and agreement on other culturally acceptable mitigation and offsetting measures for the Cockabutta Creek rock shelter sites. As per Recommendation #1c, UCML will ensure test and salvage excavations within the Cockabutta Creek sites ID# 161, 162 and 284 and CC28 are undertaken by appropriately qualified and experience archaeologists in consultation with the registered Aboriginal stakeholders, and more detailed recording of ID# 161, 162 and 284 and CC28 (including by photography and accurate surveying, such as laser-scanning), and where feasible, removal of samples for further analysis (eg. chemical analysis and dating) occurs.

7. SIGNIFICANCE ASSESSMENT

7.1 Criteria

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

Consistent with the UCCO Project (Kuskie 2009), the significance of Aboriginal heritage evidence has been assessed along the following criteria, widely used in Aboriginal heritage management and derived from the relevant aspects of the International Council on Monuments and Sites (ICOMOS) *Burra Charter*:

I. Scientific (Archaeological) value;

II. Importance to Aboriginal people (Cultural value);

III. Educational value;

IV. Historic value; and

V. Aesthetic value.

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

Scientific (Archaeological) Value:

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

Research Potential:

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

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

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

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

a) Potential to address locally specific research questions;

b) Potential to address regional research questions;

c) Potential to address general methodological or theoretical questions;

d) Potential deposits; and

e) Potential to address future research questions.

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

Representativeness:

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

The main criteria used for assessing representativeness include:

a) The extent to which the evidence occurs elsewhere in the region;

b) The extent to which this type of evidence is subject to existing or potential future impacts in the region;

c) The integrity of the evidence compared to that at other localities in the region;

d) Whether the evidence represents a prime example of its type within the region; and

e) Whether the evidence has greater potential for educational or demonstrative purposes than at other similar localities in the region.

Nature of Evidence:

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

a) Presence, range and frequency of stone materials;

b) Presence, range and frequency of artefact types; and

c) Presence and types of other features.

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

Integrity:

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

The criteria used in assessing integrity include:

a) Horizontal and vertical spatial distribution of artefacts;

b) Preservation of intact features such as midden deposits, hearths or knapping floors;

c) Preservation of site contents such as charcoal and shell which may enable accurate direct dating or other analysis; and

d) Preservation of artefacts which may enable use-wear/residue analysis.

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

Aboriginal (Cultural) Significance:

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

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

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

Educational Value:

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

Historic Value:

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

Aesthetic Value:

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

7.2 Significance of Heritage Evidence Within the Proposed Modification Investigation Area

The significance of the 1,005 recorded Aboriginal heritage sites or PADs within the UCCO Project study area (ie. those sites/PADs that were potentially subject to impacts at the time of the UCCO Project EA and required further management consideration) was assessed in relation to the criteria presented in Section 7.1 (refer to Section 9.2 and Appendix 4 of Kuskie 2009 and Appendix 2 of the HMP). A number of these sites are relevant to the proposed modification. The significance of these sites is addressed by Kuskie (2009) and not repeated here (refer also to Appendix 2 of the HMP).

The significance of the Aboriginal heritage sites, cultural areas/values and PADs within or immediately adjacent to the modification investigation area that were recorded during the present survey or are now within the potential impact area of the proposed modification (but were not within the UCCO Project impact area and therefore were not considered further in that assessment) has been assessed in relation to the criteria presented in Section 7.1, consistent with the assessment undertaken for the UCCO Project (Kuskie 2009). The significance assessment is presented for each of these sites in Table 9. These 73 sites comprise:

a) Sites/PADs within the zone of potential subsidence impact for the proposed modification but outside of the zone of potential subsidence impact for the approved UCCO Project (refer to Figures 5 and 11) for which the significance was not reported in Kuskie (2009) or in the current HMP Appendix 2. These sites/PADs include those recorded during the present survey (refer to Appendix 3 and Figures 7 - 10) and those previously recorded during the UCCO Project survey (Kuskie 2009: refer to Volume B) or recently during other ongoing UCML heritage management activities (refer to Section 3.2.1); and

b) Sites/PADs recorded during the present survey that are located in land now *outside of* the zone of potential subsidence or surface impacts of the proposed modification (or the originally approved UCCO Project), due to subsequent refinements to the impact area after completion of the survey (these sites are included for completeness).

The significance of sites/PADs for which the potential surface impacts of the proposed modification are materially different to the approved UCCO Project has been previously assessed (refer to Kuskie 2009), apart from newly identified sites which are assessed here.

The significance assessment involves ratings of 'low', 'low-moderate', 'moderate', 'moderate-high' and 'high'. Key criteria are included in Table 9.

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

The response of several Aboriginal stakeholders is that all identified sites and cultural values, along with the modification area itself, are of cultural significance (refer to Table 9 and Appendix 5). Some Aboriginal stakeholders are reluctant to engage in any comparative or ranking process (as is inherent within any system of significance assessment) and prefer to identify all sites and the investigation area as being of cultural significance. Nevertheless, a specifically high value has been noted for the large pagodas and sandstone formations within the valley adjacent to the main Cockabutta Creek tributary (survey area 'Mod 8') and the large sandstone formation in which ID# 161 and 162 are situated (survey area 836).

The key conclusions of the significance assessment are presented below for each site type for the 73 sites not previously assessed. In overall terms, 69.9% of the sites are assessed as being of low significance within a local context (compared with 74.8% for the much larger sample of 1,005 sites assessed in the UCCO Project), with 9.6% of sites assessed as being of low to moderate or 'low to possibly moderate' significance (compared with 10.7% for the overall UCCO Project), 6.8% of moderate significance (6.3% for the overall UCCO Project), 8.2% of moderate to high or 'moderate to possibly high' or 'possibly moderate to high' significance (4.9% for the overall UCCO Project) and 5.5% of high significance (3.3% for the overall UCCO Project) (refer to Table 9).

It is noted that a number of sites (for example, ID# 109 - 111) have been previously recorded during earlier surveys at UCML and are in locations yet to be surveyed to current heritage standards. Refinement of the significance assessment may occur for these sites subsequent to their future survey and recording under Section 3.7.5 of the HMP.

It is also noted that if occupation deposits were to be identified through controlled excavation in rock shelters or open contexts that relate to occupation earlier than the mid-late Holocene period (older than say 5,000 years BP), these sites may rate as being of regional significance.

Artefact Scatters and Isolated Finds

One of the open artefact occurrences (CC 41) is assessed as being of high significance within a local context, due to its broad range of evidence and extent, high research potential, presence of uncommon types and location within a complex of sites around the Cockabutta Creek tributary. Two of the open artefact occurrences (ID# 1328 and 1514) are assessed as being of moderate to high significance, two (ID# 1321 and 1515) as being of moderate significance, four as being of low to moderate or 'low to possibly moderate' significance, and 37 (80%) as being of low significance (refer to Table 9).

Artefact scatters and isolated artefacts are common occurrences throughout the region and are therefore generally of low representative value. The sites tended to be of lower significance if levels of ground disturbance were high (and therefore the integrity of any evidence low), there was a limited range and nature of artefact evidence, and/or the potential for deposits of research value was low. Artefact occurrences tended to be of higher significance if the site integrity was high and there was a higher potential for deposits of research value, a broad range and nature of evidence was present, and/or rare or unusual types were present.

Research potential relates to the probability that the sites contain sub-surface deposits that may yield evidence useful in addressing locally relevant research questions, such as those relating to occupation patterns or stone technology. This was assessed in relation to the detailed model of occupation presented by Kuskie (2009) and thus assumes that deposits of higher research potential will generally be located where more focused occupation has occurred, such as in the primary and secondary resource zones. As discussed in Section 5 and by Kuskie (2009), the occurrence of these contexts within the study area is limited.

Rock Shelters with Artefacts and/or Art and Rock Shelters with PADs

Three of the rock shelter sites (ID# 161, 162 and 284) are assessed as being of high significance within a local context, four (ID# 80, 109, 110 and 111) as being of 'moderate to possibly high' or 'possibly moderate to high' significance, three of moderate significance (ID# 1371 and 1374 and CC28), three of low to moderate or 'low to possibly moderate' significance, and 14 of low significance (refer to Table 9).

The three rock shelter sites of high significance are all located within the proposed southern extension of the longwall panels in the Cockabutta Creek catchment (refer to Figure 11).

The research potential of rock shelters was one of the primary criteria used in assessing their significance, as there can be stratified deposits with datable cultural evidence (potentially extending back many thousands or even tens of thousands of years) and typically, due to sedimentation processes or other visibility constraints, any evidence visible on the surface of the shelter floor does not necessarily provide an accurate indication of the nature of the buried deposits.

The research potential and significance of the rock shelter sites was assessed with reference to various criteria (refer to Table 9), including:

1) Size of the habitable floor area: A larger habitable floor area (the floor area of a rock shelter where the ceiling height is about one metre or more) equates to higher potential, as family groups may have been accommodated, a broader range of activities performed, and overnight camps and stays of longer duration been more feasible. Conversely, a small floor area limits the potential to short-duration/low-intensity activities such as people having sought temporary shelter from adverse weather;

2) Internal roof height: A low internal roof height (eg. less than standing height) is inferred to have reduced the attractiveness of a shelter for occupation of any more intensity than temporary shelter from adverse weather;

3) Nature of artefacts (count, density, range, specific types): As with artefact sites, a broader range and nature of evidence, including less common or rare items, is an indicator of higher potential and significance. However, due to site formation processes and factors influencing the visibility of items on the current shelter floors, the absence of evidence or a limited range of visible evidence is not taken to be a factor that lowers the level of significance;

4) Depth of deposit: The deeper the deposit within a rock shelter, the higher the potential for stratification and spatially (vertically) separate evidence of discrete episodes of occupation from different time periods. Hence, a deeper deposit equates to higher potential and a shallower deposit equates to lower potential;

5) Extent of potential deposit: A larger PAD, including often in areas marginally forward of the dripline, equates to higher potential, whereas a smaller PAD equates to lower potential;

6) Complexity (presence of grooves and/or art): The presence of grooves and/or art adds to the range of activities performed in a shelter and equates to higher significance and possibly research potential;

7) Proximity to potable water: The topographic context of each shelter was considered, particularly proximity to potable water, especially higher order watercourses (refer to the detailed model of occupation presented by Kuskie (2009), which assumes that deposits of higher research potential will generally be located where more focused occupation has occurred, such as in the primary and secondary resource zones); and

8) Potential integrity: Although problematic to assess in the absence of controlled hand excavation, where low integrity was inferred (typically due to shallow deposits and clear evidence of extensive animal activity, such as wombat burrows, and/or erosion) this typically negates most other criteria and equates to low research potential and low significance.

Rock shelter sites of low significance typically had small habitable floor areas and/or potential deposits, occasionally with shallow deposits and/or low internal roof heights. Consequently they had low research potential. Such shelters may not even have been used by Aboriginal people (in the case of PADs where evidence is not visible), or if occupied, may only have been for short-duration/low-intensity activities, such as the seeking of temporary shelter from adverse weather. However, without excavation of a sample from a shelter, where artefacts are not visible it cannot be stated that the shelter was not occupied by Aboriginal people, nor can the nature and resulting evidence of any occupation be known.

Rock shelter sites of moderate or high potential often had no obvious substantial ground disturbance (ie. most or all of the PAD appeared relatively intact, albeit that integrity can only fully be clarified through controlled excavation of deposits) and had moderate to large habitable floor areas and potential deposits, often with moderate or deep deposits. Often low internal roof heights were not a constraint in shelters of moderate or high significance. For some shelters, the presence of other features such as art added to the level of significance. The level of significance was also enhanced for a number of shelters where a broad range and nature of evidence was present, and/or rare or unusual types were present. Shelters of moderate to high significance are more likely to have been occupied by groups of people, for overnight or longer stays, and been used for a wider range of activities than just temporary shelter from adverse weather.

Nevertheless, as noted above, in any shelter irrespective of the assessed level of potential, this factor can only be adequately assessed through controlled excavation. Without excavation, the nature of any evidence present in sub-surface deposits cannot be adequately identified. Controlled excavation of any shelter may lead to a revision of the assessment of significance, either upward (in the case of a shelter where deposits of higher research value than anticipated are revealed) or downward (in the case of a shelter where anticipated deposits of research value do not exist or are in a state of low integrity).

Other Cultural Values

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

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

The representatives also disclosed a number of associations with the surveyed area of contemporary cultural significance, including:

- In general terms, the use of subsistence or other resources, with comments made about the presence of various native flora and fauna where observed. These comments were not of a historical nature (ie. did not relate to plant and animal resource use areas known from the post-contact period) but rather were general observations of the occurrence of particular species and their known traditional uses (eg. for food, medicine, tools, etc.);
- In general terms, the traditional use of the area by north-eastern Wiradjuri people, and an ongoing cultural and spiritual connection to the land and resources of the study area by the north-eastern Wiradjuri;
- In relation to the large pagodas and sandstone formations within the valley adjacent to the main Cockabutta Creek tributary (survey area 'Mod 8', including in the vicinity of sites ID# 284, CC28 and CC29) the Aboriginal stakeholders expressed a strong spiritual and cultural connection with this locality; and
- In relation to the large sandstone formation in which ID# 161 and 162 are situated (survey area 836), the Aboriginal stakeholders also expressed a strong spiritual and cultural connection with this locality.

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

Table 9: Significance assessment of Aboriginal sites, cultural areas/values and potential archaeological deposits within or immediately adjacent to the modification investigation area that have not been reported on previously (for example, in Kuskie 2009).

Ulan ID#	Site Name	Site Type	Significance					
			Overall	Archaeological / Scientific	Aboriginal / Cultural[8]	Aesthetic	Educational	Historic
80	S16	rockshelter with artefacts	moderate - possibly high	small to moderate habitable floor area and PAD; modest range of evidence; moderate to possibly high research potential; part of Old Ulan site complex		low	low	nil
109	S31	rockshelter with artefacts	possibly moderate - high	moderate to large habitable floor area and PAD; possibly moderate to high research potential		low	low	nil
110	S32	rockshelter with artefacts	possibly moderate - high	moderate to large habitable floor area and PAD; possibly moderate to high research potential		low	low	nil
111	S33	rockshelter with artefacts	possibly moderate - high	moderate to large habitable floor area and PAD; possibly moderate to high research potential		low	low	nil
161	CC19	rockshelter with art and artefacts	high	moderate to large habitable floor area and PAD; deep deposit; high research potential; complex - artefacts and art present; partly low integrity; part of ID# 161-162-1574 cluster	high	high	low - moderate	nil
162	CC20	rockshelter with art and artefacts	high	large habitable floor area and PAD; deep deposit; high research potential; complex - artefacts and art present; high integrity; part of ID# 161-162-1574 cluster	high	high	low - moderate	nil
284	CC21	rockshelter with artefacts	high	small to moderate habitable floor area and PAD; probably deep deposit; high integrity; moderate range of artefact evidence; several less common types; high research potential; part of CC21-28-29 cluster in large pagodas	high	high	low - moderate	nil
444	OCE80/A	artefact scatter	low	common; low potential		low	low	nil

[8] Several Aboriginal stakeholders have expressed the view that all of the sites/places are of high cultural significance (ie. high importance) and make no differentiation on the comparative level of value between any site or place. This is acknowledged and respected.

Ulan ID#	Site Name	Site Type	Significance					
			Overall	Archaeological / Scientific	Aboriginal / Cultural[8]	Aesthetic	Educational	Historic
1070	UC92	artefact scatter	low	common; low potential		low	low	nil
1081	UC103	artefact scatter	low	common; low potential		low	low	nil
1086	UC108	isolated find	low	common; low potential		low	low	nil
1200	BB219	rockshelter with pad	low	small habitable floor area and PAD; low internal roof height; low research potential		low	low	nil
1203	UC193	artefact scatter	low	common; low potential		low	low	nil
1205	UC195	isolated find	low	common; low potential		low	low	nil
1279	UC267	artefact scatter	low	common; low potential		low	low	nil
1281	UC269	isolated find	low	common; low potential		low	low	nil
1284	UC272	isolated find	low	common; low potential; low integrity		low	low	nil
1294	UC282	rockshelter with pad	low	small habitable floor area and PAD; low internal roof height; low integrity; low research potential		low	low	nil
1296	UC284	rockshelter with pad	low	small habitable floor area and PAD; low research potential		low	low	nil
1297	UC285	rockshelter with pad	low	relatively small PAD; low research potential		low	low	nil
1298	UC286	rockshelter with pad	low	small habitable floor area and PAD; low internal roof height; low research potential		low	low	nil
1321	UC309	artefact scatter	moderate	modest range and extent; high potential		low	low	nil
1322	UC310	artefact scatter	low	common; low potential		low	low	nil
1328	UC316	artefact scatter	moderate - high	part of Old Ulan site complex; modest range; high potential; potential historical associations		low	low	nil
1359	UC347	artefact scatter	low	common; low to possibly moderate potential		low	low	nil
1366	UC354	rockshelter with pad	low	moderate habitable floor area and PAD; low internal roof height; sloping floor; low research potential		low	low	nil

Ulan ID#	Site Name	Site Type	Significance					
			Overall	Archaeological / Scientific	Aboriginal / Cultural[8]	Aesthetic	Educational	Historic
1368	UC356	rockshelter with pad	low - possibly moderate	small to moderate habitable floor area and PAD; low internal roof height; low to possibly moderate research potential		low	low	nil
1369	UC357	rockshelter with pad	low	relatively small PAD; difficult access; low research potential		low	low	nil
1370	UC358	rockshelter with pad	low	relatively small habitable floor area and PAD; sloping floor; low research potential		low	low	nil
1371	UC359	rockshelter with pad	moderate	moderate habitable floor area and PAD; moderate depth of deposit; moderate research potential		moderate	low	nil
1372	UC360	rockshelter with pad	low	relatively small PAD; low research potential		low	low	nil
1373	UC361	rockshelter with artefacts	low - moderate	relatively large habitable floor area and PAD; low to moderate research potential		moderate	low	nil
1374	UC362	rockshelter with pad	moderate	relatively large habitable floor area and PAD; moderate research potential		moderate	low	nil
1474	UC442	isolated find	low	common; low potential		low	low	nil
1475	UC443	isolated find	low	common; low potential		low	low	nil
1490	BB232	isolated find	low	common; low potential		low	low	nil
1491	BB233	isolated find	low	common; low potential		low	low	nil
1492	BB234	artefact scatter	low	common; low potential		low	low	nil
1506	UC464	isolated find	low	common; low potential; low integrity		low	low	nil
1514	UC472	artefact scatter	moderate - high	modest range and extent; high potential		low	low	nil
1515	UC473	artefact scatter	moderate	modest range; high potential		low	low	nil
1516	UC474	artefact scatter	low - moderate	moderate potential; limited range of evidence		low	low	nil
1522	UC480	artefact scatter	low	common; low potential		low	low	nil
1573	CC23	isolated find	low	less common type; but isolated, low potential		low	low	nil
1574	CC24	rockshelter with pad	low	small habitable floor area and PAD; low research potential; part of ID# 161-162-1574 cluster		moderate	low	nil
1575	CC25	rockshelter with artefacts	low	small habitable floor area and PAD; low internal roof height; low research potential		low	low	nil

Ulan ID#	Site Name	Site Type	Significance					
			Overall	Archaeological / Scientific	Aboriginal / Cultural[8]	Aesthetic	Educational	Historic
	CC26	isolated find	low	common; low potential		low	low	nil
	CC27	artefact scatter	low	common; low potential		low	low	nil
	CC28	rockshelter with artefacts	moderate	small to moderate habitable floor area and PAD; probably deep deposit; high research potential; part of CC21-28-29 cluster in large pagodas		high	low	nil
	CC29	rockshelter with pad	low	small habitable floor area and PAD; low research potential; part of CC21-28-29 cluster in large pagodas		moderate	low	nil
	CC30	artefact scatter	low	common; low potential		low	low	nil
	CC31	artefact scatter	low	common; low potential		low	low	nil
	CC32	artefact scatter	low	common; low potential		low	low	nil
	CC33	isolated find	low	common; low potential; part of site complex around Cockabutta Creek tributary		low	low	nil
	CC34	artefact scatter	low	common; low potential; part of site complex around Cockabutta Creek tributary		low	low	nil
	CC35	artefact scatter	low - possibly moderate	low to possibly moderate potential; one less common type; limited range of evidence; part of site complex around Cockabutta Creek tributary		low	low	nil
	CC36	artefact scatter	low	common; relatively low potential; part of site complex around Cockabutta Creek tributary		low	low	nil
1576	CC37	artefact scatter	low - moderate	moderate potential; modest range of evidence; broad extent of site; part of site complex around Cockabutta Creek tributary		low	low	nil
	CC38	isolated find	low	common; low potential		low	low	nil
	CC39	artefact scatter	low	common; low potential; part of site complex around Cockabutta Creek tributary		low	low	nil
	CC40	artefact scatter	low - possibly moderate	low to possibly moderate potential; several less common types; part of site complex around Cockabutta Creek tributary		low	low	nil

Ulan ID#	Site Name	Site Type	Significance					
			Overall	Archaeological / Scientific	Aboriginal / Cultural[8]	Aesthetic	Educational	Historic
	CC41	artefact scatter	high	high potential; broad range of evidence and extent of site; several less common types; part of site complex around Cockabutta Creek tributary		low	low	nil
	CC42	artefact scatter	low	common; low potential		low	low	nil
	CC43	artefact scatter	low	common; low potential		low	low	nil
	CC44	isolated find	low	common; low potential		low	low	nil
	CC45	rockshelter with pad	low - possibly moderate	small habitable floor area and PAD; low to possibly moderate research potential; different/less common context		moderate	low	nil
	CC46	rockshelter with pad	low	small PAD; low internal roof height; low research potential		low	low	nil
	CC47	rockshelter with pad	low	small PAD; low research potential		low	low	nil
	CC48	isolated find	low	common; low potential		low	low	nil
	CC49	isolated find	low	common; low potential		low	low	nil
	Ulan Drosd Track 1	artefact scatter	low	common; low potential		low	low	nil
	Ulan Drosd Track 2	artefact scatter	low	common; low potential		low	low	nil
	Ulan Drosd Track 3	artefact scatter	low	common; low potential		low	low	nil
	Modification Surveyed Area	Cultural area/value	low - high	n/a	high	low	low	nil
	Use of subsistence and other resources	Cultural area/value	low	n/a	high	low	low	nil
	Large pagodas and sandstone formations within the valley adjacent to the main Cockabutta Creek tributary (survey area 'Mod 8')	Cultural area/value	high	high as part of CC21-28-29 cluster of rock shelters in pagodas	high	high	moderate	nil
	Contemporary significance of Aboriginal objects	Cultural area/value (refer above to individual sites)						

8. STATUTORY OBLIGATIONS

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

8.1 Commonwealth

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

Environment Protection and Biodiversity Conservation Act 1999:

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

- A National Heritage List of natural, indigenous and historic places of national heritage significance;
- A Commonwealth Heritage List of heritage places owned or managed by the Commonwealth; and
- Consideration of heritage in the planning and development approvals process.

Commonwealth Heritage places are protected in that:

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

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

- Develop heritage strategies;
- Produce a register of the heritage places under their control;
- Develop a management plan to manage these places consistent with the Commonwealth Heritage Management Principles prescribed in regulations to the Act;
- Ensure the ongoing protection of the Commonwealth heritage values of the place when selling or leasing a Commonwealth heritage place; and

- Ask the Minister for advice about taking an action, if the action has, will have, or is likely to have, a significant impact on a Commonwealth heritage place.

The environmental assessment process of the EPBC Act protects matters of national environmental significance (including national heritage places), along with the environment where actions proposed are on, or will affect, Commonwealth land and/or where Commonwealth agencies are proposing to take an action. When a proposal is identified as having the potential to have a significant impact on a matter of national environmental significance, the proponent must refer the action to the Commonwealth Department of Environment. The matter is made public and referred to the relevant state, territory and Commonwealth ministers for comment. The Minister then decides whether the likely environmental impacts of the action are such that it should be assessed under the EPBC Act. State governments may, under agreement with the Commonwealth, assess actions that may have an impact on matters of national environmental significance. Following assessment, the Minister or their delegate may approve the action (with or without conditions) or not approve the action.

Australian Heritage Council Act 2003:

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

Aboriginal and Torres Strait Islander Heritage Protection Act 1984:

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

8.2 State

National Parks and Wildlife Act 1974:

The NP&W Act provides the primary basis for the legal protection and management of Aboriginal heritage in NSW. With respect to development proposals and planning approvals, the EP&A Act is the primary legislation.

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

Section 2A of the Act, defines its objects to include 'the conservation of nature, including …

(b) the conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to:

(i) places, objects and features of significance to Aboriginal people, and
(ii) places of social value to the people of New South Wales.

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

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

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

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

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

The precautionary principle is relevant to the OEH's consideration of potential impacts to Aboriginal cultural heritage where:

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

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

With the exception of some artefacts in collections, the NP&W Act generally defines all Aboriginal objects to be the property of the Crown. The Act then provides various controls for the protection, management of and impacts to these objects. An 'Aboriginal object' is defined under Section 5(1) as:

> 'any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains'.

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

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

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

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

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

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

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

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

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

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

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

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

- Of most relevance to development proposals generally, the offences under Section 86(1), (2) and (4) have a defence to prosecution under Section 87(1) if the harm or desecration was authorised by an Aboriginal Heritage Impact Permit (AHIP) and the conditions to which that AHIP were subject have not been contravened;

- The strict liability offence under Section 86(2) has a defence to prosecution under Section 87(2) if the person exercised *due diligence* to determine whether the act or omission constituting the alleged offence would harm an Aboriginal object and reasonably determined that no Aboriginal object would be harmed. Section 87(3) and the regulations associated with the Act (National Parks and Wildlife Regulation 2009) enable due diligence to be achieved through compliance with industry-specific Codes of Practice approved by the Minister. These include the DECCW (2010a) *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* and other approved codes such as the *NSW Minerals Industry Due Diligence Code of Practice for the Protection of Aboriginal Objects* (NSW Minerals Council 2010).

  The 'due diligence' process is essentially intended to provide a defence to the strict liability offence under Section 86(2) of the NP&W Act, if an activity were subsequently to unknowingly harm an Aboriginal object in the absence of an AHIP. If Aboriginal objects are present or are likely to be present and an activity will harm those objects, then an AHIP application is required (excluding Part 3A projects). While the DECCW (2010a) *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* sets out procedures to determine whether or not Aboriginal objects are, or are likely to be present, identify whether the activity may harm objects and whether an AHIP is necessary, it does not constitute a level of Aboriginal heritage impact assessment that is typically required to satisfy the assessment requirements for projects under Part 4 and Part 5 of the EP&A Act. However, the conduct of an environmental impact assessment for a Part 4 or Part 5 project that satisfies the requirements of the Code of Practice will satisfy the 'due diligence' defence to Section 86(2) of the NP&W Act;

- The strict liability offence under Section 86(2) has a defence to prosecution under Section 87(4) if the person shows that the act or omission constituting the alleged offence is prescribed by the regulations as a low impact act or omission.

  Clause 80B of the National Parks and Wildlife Regulation 2009 describes low impact acts or omissions as including:

  - Maintenance work on land already disturbed (such as maintenance of existing roads, tracks or utilities);

- Farming and land management works on land already disturbed (such as cropping or leaving paddocks fallow, or construction of farm dams, fences, irrigation infrastructure, ground water bores, flood mitigation works, erosion control or soil conservation works, or maintenance of various existing infrastructure);
- Grazing of animals;
- Activity on already disturbed land that comprises exempt development or was the subject of a complying development certificate issued under the EP&A Act;
- Mining exploration work (such as costeaning, bulk sampling or drilling) on land already disturbed;
- Geological mapping, surface geophysical surveys and sub-surface surveys involving downhole logging, sampling or coring using hand-held equipment except where conducted as part of an archaeological investigation (exempted where the DECCW 2010 *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* is followed);
- Removal of isolated dead or dying vegetation if there is minimal ground disturbance;
- On already disturbed land seismic surveying or groundwater monitoring bores;
- Environmental rehabilitation work (such as silt fencing, tree planting, bush regeneration and weed removal, but not erosion control or soil conservation works).

For the purposes of Clause 80B, land is considered to be 'already disturbed' if it 'has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable' (for example, soil ploughing, construction of rural infrastructure such as dams and fences, construction of roads, tracks and trails, clearing of vegetation, construction of buildings, installation of utilities, substantial grazing involving the construction of rural infrastructure, or construction of earthworks related to the above);

- The defence of honest and reasonable mistake of fact applies under Section 86(5) to the strict liability offence of Section 86(2) and to offences against Aboriginal places under Section 86(4);

- The offences under Section 86(1) and (2) do not apply under Section 86(6), with respect to an Aboriginal object that is dealt with in accordance with section 85A (refer below);

- Exemptions are available under Section 87A to Section 86(1)-(4) for various emergency situations, conservation works and conservation agreements; and

- Exemptions are available under Section 87B to Section 86(1), (2) and (4) for Aboriginal people in relation to the carrying out of traditional cultural activities.

Consents regarding impacts to Aboriginal objects or areas with potential for Aboriginal objects are managed through the OEH Aboriginal Heritage Impact Permit (AHIP) system, as outlined in Section 90 of the NP&W Act and clauses 80D and 80E of the Regulations. The issuing of an AHIP is dependent upon adequate archaeological assessment and review (cultural heritage assessment report), together with an appropriate level of Aboriginal community liaison and involvement.

Typically, to support an AHIP, an Aboriginal cultural heritage assessment must be undertaken in accordance with the OEH (2011a) *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*, which effectively involves an assessment following the DECCW (2010b) *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* and Aboriginal community consultation in accordance with the DECCW (2010c) *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy.

The DECCW (2010b) *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* contains detailed requirements for heritage assessments. Key features include:

- Investigations must be undertaken by people with appropriate skills and experience, specified in Section 1.6 as:

    1) A minimum of a Bachelor's degree with honours in archaeology or relevant experience in the field of Aboriginal cultural heritage management, and

    2) The equivalent of two years full-time experience in Aboriginal archaeological investigation, including involvement in a project of similar scope, and

    3) A demonstrated ability to conduct a project of the scope required through inclusion as an attributed author on a report of similar scope.

- Archaeological test excavation will be necessary when (regardless of whether or not there are objects present on the ground surface) it can be demonstrated through Requirements 1, 2, 3, 4, and 5 of the Code that sub-surface Aboriginal objects with potential conservation value have a high probability of being present in an area, and the area cannot be substantially avoided by the proposed activity; and

- A Section 90 AHIP is not required for test excavations undertaken in compliance with the Code (implementation of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy is required however).

Under clause 80D of the National Parks and Wildlife Regulation 2009, the cultural heritage assessment report that accompanies the AHIP application must address:

- The significance of the Aboriginal objects or Aboriginal places that are the subject of the application;

- The actual or likely harm to those Aboriginal objects or Aboriginal places from the proposed activity that is the subject of the application;

- Any practical measures that may be taken to protect and conserve those Aboriginal objects or Aboriginal places;

- Any practical measures that may be taken to avoid or mitigate any actual or likely harm to those Aboriginal objects or Aboriginal places; and

- Include any submission received from a registered Aboriginal party under clause 80C and the applicant's response to that submission.

The OEH determination of AHIP applications is guided by the OEH (2011a) *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*, OEH (2011b) *Applying for an Aboriginal Heritage Impact Permit: Guide for Applicants*, and OEH (2011c) *Guide to Aboriginal Heritage Impact Permit Processes and Decision-Making* policy.

AHIPs may be issued in relation to a specified Aboriginal object, Aboriginal place, land, activity or person or specified types or classes of Aboriginal objects, Aboriginal places, land, activities or persons. AHIPs may be transferred or varied (subject to conditions and approval of the Director-General). AHIPs may be refused. An application is taken to be refused (unless otherwise granted or refused earlier), 60 days after the date on which the application was received by the Director-General (not including any period during which an applicant is required to supply to the Director-General further information under Section 90F).

The Director-General may attach any conditions seen fit to any AHIP granted. Failure to comply with a condition is deemed under Section 90J to be a contravention of the Act. Such offences may result in a maximum penalty of 1,000 penalty units and/or imprisonment for six months, and, in the case of a continuing offence, a further 100 penalty units for each day the offence continues, for an individual, with double the fines for a corporation.

Under Section 90K of the NP&W Act, in making a decision in relation to an AHIP, the Director-General must consider the following matters (but only these matters):

a) The objects of the Act;

b) Actual or likely harm to the Aboriginal objects or Aboriginal place that are the subject of the permit;

c) Practical measures that may be taken to protect and conserve the Aboriginal objects or Aboriginal place that are the subject of the permit;

d) Practical measures that may be taken to avoid or mitigate any actual or likely harm to the Aboriginal objects or Aboriginal place that are the subject of the permit;

e) The significance of the Aboriginal objects or Aboriginal place that are the subject of the permit;

f) The results of any consultation by the applicant with Aboriginal people regarding the Aboriginal objects or Aboriginal place that are the subject of the permit (including any submissions made by Aboriginal people as part of a consultation required by the regulations);

g) Whether any such consultation substantially complied with any requirements for consultation set out in the regulations (specified in Section 90N of the NP&W Act and clause 80C of the National Parks and Wildlife Regulation 2009 and in the DECCW *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*);

h) The social and economic consequences of making the decision;

i) Any documents accompanying the application and any public submission that has been made under the EP&A Act in connection with the activity to which the permit application relates and that has been received by the Director-General; and

j) Any other matter prescribed by the regulations.

An appeals process is available under Section 90L of the NP&W Act whereby an applicant, dissatisfied with the refusal of the Director-General to grant a Section 90 AHIP, or with any conditions attached to the AHIP, may appeal to the Land and Environment Court. The appeal must be made within 21 days after notice of the decision that is being appealed. The decision of the Land and Environment Court on the appeal is final and is binding on the Director-General and the appellant.

Under Section 85A of the NP&W Act, the Director-General may 'dispose' of Aboriginal objects that are the property of the crown:

a) By returning the Aboriginal objects to an Aboriginal owner or Aboriginal owners entitled to, and willing to accept possession, custody or control of the Aboriginal objects in accordance with Aboriginal tradition, or

b) By otherwise dealing with the Aboriginal objects in accordance with any reasonable directions of an Aboriginal owner or Aboriginal owners referred to in paragraph (a), or

c) If there is or are no such Aboriginal owner or Aboriginal owners - by transferring the Aboriginal objects to a person, or a person of a class, prescribed by the regulations for safekeeping (typically implemented by way of a Care Agreement between the OEH and the Aboriginal person or organisation).

Under Section 85A(3) of the NP&W Act, the regulations may make provision as to the manner in which any dispute concerning the entitlement of an Aboriginal owner or Aboriginal owners to possession, custody or control of Aboriginal objects for the purposes of this section is to be resolved.

Under Section 91AA of the NP&W Act, if the Director-General is of the opinion that any action is being, or is about to be carried out that is likely to significantly affect an Aboriginal object or Aboriginal place or any other item of cultural heritage situated on land reserved under the Act, the Director-General may make a stop-work order for a period of 40 days. Various exemptions exist, such as for emergency situations and for approved developments under the EP&A Act. A person that contravenes a stop-work order may be penalised up to 1,000 penalty units and an additional 100 units for every day the offence continues (10,000 units and 1,000 units respectively in the case of a corporation). Under Section 91A, the Director-General may also make recommendations to the Minister for an Interim Protection Order in respect of land which has cultural significance, including Aboriginal objects, for a duration of up to two years. The existence of an AHIP does not prevent the making of a stop-work order or an interim protection order (Section 90O).

Under Section 91L of the NP&W Act the Director-General may direct a person to carry out remediation work to Aboriginal objects or places, if they have been harmed as a result of an offence under the Act. The remediation work may involve protection, conservation, maintenance, remediation or restoration of the harmed Aboriginal object or place. The maximum penalties under Section 91Q for contravening a remediation direction are 2,000 penalty units and 200 penalty units for each day the offence continues for a corporation.

Environmental Planning and Assessment Act 1979:

The EP&A Act requires that environmental impacts (including those to cultural heritage) be considered in land use planning and decision-making. Various planning instruments such as Local Environmental Plans (LEPs) or Development Control Plans (DCPs) may be made under the EP&A Act. These planning instruments may identify places and features of cultural heritage significance and define statutory requirements regarding the potential development, modification and conservation of these items. In general, places of identified significance, or places requiring further assessment, are listed in heritage schedules that form part of an LEP. Listed heritage items are then protected from certain defined activities, unless consent has been gained from an identified consent authority (typically the local government authority).

In determining a Development Application (DA) under Part 4 of the EP&A Act, a consent authority, such as a local government authority, must take into consideration matters such as the provisions of environmental planning instruments (for example, LEPs), DCPs, the likely impacts of that development, including environmental impacts on the natural and built environments, and social and economic impacts on the locality (Section 79C{1}).

If Aboriginal objects are known to exist on the land to which the development application applies prior to the application being made, under Part 4 of the EP&A Act an 'Integrated Development Application' (IDA) must be submitted to the consent authority. Any Development Approval issued for development of this kind must be consistent with the General Terms of Approval (GTA's) or requirements provided by the relevant State Government agency (for example, the OEH).

Under Part 5 of the EP&A Act, public authorities and government agencies that carry out activities have a duty to take into account to the fullest extent possible all matters affecting or likely to affect the environment (including cultural heritage) by reason of that activity. This typically takes the form of a Review of Environmental Factors (REF) or Environmental Impact Statement (EIS), with the agency (proponent) acting as the determining authority.

Part 3A of the EP&A Act has been repealed, but under Division 4.1 of Part 4, 'State Significant Development' is treated in a similar manner to the former Part 3A. The Minister is the Consent authority for State Significant Development applications, although for staged developments, the Minister may determine the local Council as the Consent authority for subsequent stages. As for other development applications under Part 4, the environmental impacts of the proposal need to be considered, including those on heritage.

Similar to the previous Part 3A legislation, under Section 89J of Part 4 of the EP&A Act, a Section 90 AHIP to impact Aboriginal objects is not required for an approved State Significant Development or for any investigative or other activities required to be carried out for the purpose of complying with environmental assessment requirements issued in connection with a development application for any such development. *In lieu* of a Section 90 AHIP, Aboriginal heritage needs to be managed post-approval under an Aboriginal Heritage Management Plan subject to the approval of the DP&E.

UCML is a Part 3A Major Project (notwithstanding that this Part of the Act has now been repealed). This proposed modification is being assessed under Section 75W of the EP&A Act.

The interplay of the NP&W Act and Regulation and the planning system is complex. For proposed developments, the specific level of Aboriginal heritage impact assessment and Aboriginal community consultation required, and any requirement for an AHIP, is highly dependent upon not just the NP&W Act and Regulation, but the nature of the proposal, the Part and Division of the EP&A Act under which planning approval is required, any specific project approval requirements issued by DP&E and/or the OEH, the presence or otherwise of Aboriginal objects, and the potential for Aboriginal objects to occur.

8.3 Local

Under the EP&A Act the Minister may make various planning instruments such as Local Environment Plans (LEPs), that are administered at a local government level. These plans set out objectives and controls for the development of land in the local government areas.

The *Mid-Western Regional Local Environmental Plan 2012* applies to the investigation area, however it is noted that the NSW Minister for Planning is the consent authority for the proposed modification, as the UCCO Project is a Major Project approved under Part 3A of the EP&A Act.

9. POTENTIAL IMPACTS

The proposed modification to PA 08_0184 involves a change to the Ulan West mine plan that includes extending seven underground mining panels between 900 and 1,300 metres within existing mining and exploration leases, and a longwall panel realignment within the approved UCCO Project area, along with repositioning of some approved ventilation shafts and dewatering bores and the installation of additional ventilation shafts and associated infrastructure (refer to Figure 3 and Section 1).

The impacts of the proposed modification on Aboriginal heritage (comprising both the identified Aboriginal objects, the potential resource and cultural values) can potentially manifest itself in two distinct ways:

- Direct impacts from surface works; and
- Indirect impacts to the ground surface through underground mining induced subsidence.

Additional impacts unrelated to the proposed modification may also occur from continued land use or other UCML activities (for example, exploratory drilling), and these also require consideration from a heritage management perspective (for example, within the HMP).

In relation to known Aboriginal sites, the key areas of interest in relation to the proposed modification are the zones of *potential subsidence impact* for Ulan West, both for the approved UCCO Project and for the proposed modification (refer to Figure 5). Three potential *changes* may occur from the proposed Ulan West modification to Aboriginal sites:

a) Subsidence impacts that may have occurred under the approved UCCO Project will no longer occur under the proposed modification (decrease in impacts);

b) Subsidence impacts that would not have occurred under the approved UCCO Project will now occur under the proposed modification (increase in impacts); and

c) Subsidence impacts that may have occurred under the approved UCCO Project will also occur under the proposed modification, but with an altered level of potential impact.

At the conclusion of the present survey for the proposed modification, excluding artefact scatters and isolated finds (as subsidence associated with the proposed modification will have no material impact on these site types), a total of 315 Aboriginal sites/PADs are known to occur within the zones of potential subsidence impact, both for the approved UCCO Project (Ulan West area only) and for the proposed modification (refer to Figure 11, summary in Table 4 and complete list in Appendix 6). These sites will be the focus of the assessment of potential impacts associated with the proposed modification.

Also of interest with respect to identified Aboriginal sites and the proposed modification are the zones of *potential surface impacts*, both for the approved UCCO Project and for the proposed modification (refer to Figure 12). Three potential *changes* may occur from the proposed Ulan West modification to Aboriginal sites:

a) Surface impacts that may have occurred under the approved UCCO Project will no longer occur under the proposed modification (decrease in impacts);

b) Surface impacts that would not have occurred under the approved UCCO Project will now occur under the proposed modification (increase in impacts); and

c) Surface impacts that may have occurred under the approved UCCO Project will also occur under the proposed modification, but with an altered level of potential impact.

The potential impacts of the proposed modification on each of the Aboriginal sites and cultural areas/values within or immediately adjacent to the investigation area are presented in Appendix 6. The level of impacts may be reduced by the implementation of various mitigation measures and management strategies, as outlined in Sections 10 and 11.

9.1 Potential Surface Impacts

The primary potential impacts of the proposed modification on Aboriginal heritage relate to underground mining induced subsidence (refer to Section 9.2).

Minor surface impacts (such as those associated with ventilation infrastructure, exploratory drilling, environmental monitoring and access roads) are approved for the current UCCO Project. Based on current planning, there will be no change to the currently approved location of coal handling and preparation infrastructure and there will be no change to the annual rates of coal extraction, processing or transportation, or to workforce numbers for currently approved operations.

The nature of these potential surface impacts was considered in the EA (refer to Kuskie 2009) and subsequently addressed in the approved HMP (refer to Sections 1.4.4, 3.5, 3.6.1 and 3.7 and Appendix 2). The nature and level of potential direct surface impacts of relevance to Aboriginal heritage was categorised by Kuskie (2009) as follows (excluding the open cut mining operations, which are of no relevance to the Ulan West underground mine):

- Small-scale high level impacts, potentially with some flexibility in location (eg. linear impacts such as conveyors, water pipelines and power lines, and small area impacts such as exploratory drilling, ventilation shafts, service boreholes, man riding shafts and dewatering bores);
- Low-level continuing land-use impacts (eg. irrigation, pastoral and rural use[9]); and
- Low-high level continuing land-use impacts (eg. maintenance and use of lightly formed or unformed vehicle tracks).

However, the proposed changes to the Ulan West mine plan will result in the repositioning of some approved ventilation shafts and dewatering bores, as well as the installation of additional ventilation shafts and associated infrastructure (refer to Figures 3 and 12 and Section 1). The newly proposed surface impact area of approximately 56 hectares is almost entirely located within the approved UCCO Project Area, with only a four hectare portion located within MLA 475 *outside of* the approved UCCO Project Area (refer to Figure 12). Other surface impact areas, totalling approximately 24 hectares within the approved UCCO Project Area, will now no longer be required to be constructed, resulting in a reduction in impacts in those areas (refer to Figures 3 and 12).

With respect to identified Aboriginal sites/PADs and the proposed changes to the zone of *potential surface impacts* for the proposed modification compared with the approved UCCO Project, the key changes to impacts comprise (refer to Tables 10 and 11):

[9] These impacts are not necessarily directly related to or a component of the UCCO Project or proposed modification, but should be considered in terms of the overall management of the Aboriginal heritage resource within the UCCO Project Area and HMP.

a) Sites/PADs with a decrease in impacts (ID# 602, 606, 634, 635, 800, 804, 1194, 1195, 1201 and 1204), as surface impacts that may have occurred under the approved UCCO Project will no longer occur under the proposed modification (relevant to an approximately 24 hectare area as identified on Figures 3 and 12)[10];

b) Sites/PADs with an increase in impacts (ID# 462, 825, 826 and 827, and CC 45, 46 and 48), as surface impacts that would not have occurred under the approved UCCO Project will now occur under the proposed modification (relevant to an approximately 56 hectare area as identified on Figures 3 and 12)[11]; and

c) Sites/PADs with an altered level of impacts (for example, ID# 512, 791 and 796), where surface impacts that may have occurred under the approved UCCO Project will also occur under the proposed modification, but either at a different level or within a different portion of the site.

As identified in Tables 10 and 11, the proposed changes to the surface impact area affect seven rock shelters with PADs, one rock shelter with grinding grooves, six artefact scatters and three isolated artefacts. Most of these sites/PADs are of low significance, however impacts will increase to three of the four sites of low to possibly moderate significance (rock shelter with grinding grooves ID# 462 and rock shelter with PAD ID# 825 and CC45), while impacts will reduce for the one site of moderate to high significance (artefact scatter ID# 804). As the proposed impacts are subject to detailed design and are within the "small-scale high level impacts" category, there may be some potential that impacts to these rock shelters can be avoided.

The proposed changes to the surface impact area will result in a net decrease in impacts to identified Aboriginal heritage evidence (10 sites/PADs with a decrease in impacts compared with seven sites/PADs with an increase in impacts). However, there will be a net increase in impacts to sites/PADs of any potential significance (three sites/PADs with an increase in impacts compared with one site with a decrease in impacts).

Several newly identified open artefact sites recorded during the present survey and other previously recorded open artefact sites that were not included in the current HMP Appendix 2 (as they were outside of either the potential impact area and/or the approved UCCO Project Area) are to be added post-modification approval to the HMP Appendix 2 as they would be within the new approved Project Area and potential subsidence or surface impact zone (notwithstanding nil impacts are anticipated to occur from subsidence - refer to Section 9.2). Although specific direct impacts are not proposed, for completeness and to address any future minor works (eg. exploratory drilling or maintenance of access roads), management strategies for these open artefact sites are included within Appendix 6. If the proposed modification is approved, the entries for each Aboriginal site within the revised approved Project Area in Appendix 6 are intended to replace (or in the case of new sites, be added to) current entries in Appendix 2 of the HMP[12].

[10] Excludes sites on the margins of the previously approved surface impact area such as ID# 167, 594, 595, 599, 601 and 1282, for which it was assumed that surface impacts would not occur under the approved UCCO Project (and also will not occur under the proposed modification).

[11] Excludes sites such as ID# 169, 458, 460, 461, 469, 639, 640, 648, 683 and 836 for which surface impacts had already been assumed under the approved UCCO Project (and will also occur under the proposed modification) for which appropriate management strategies are already included in the approved HMP (as such, additional consideration is not required here as there is no material change in the status of potential impacts).

[12] Noting that the HMP and its Appendix 2 will require revision should the proposed modification be approved and that these revisions will need to be implemented and approved in accordance with Section 6 of the HMP and the conditions of any approval for the modification, prior to any impacts occurring (unless such impacts are already approved under the existing Project Approval and HMP).

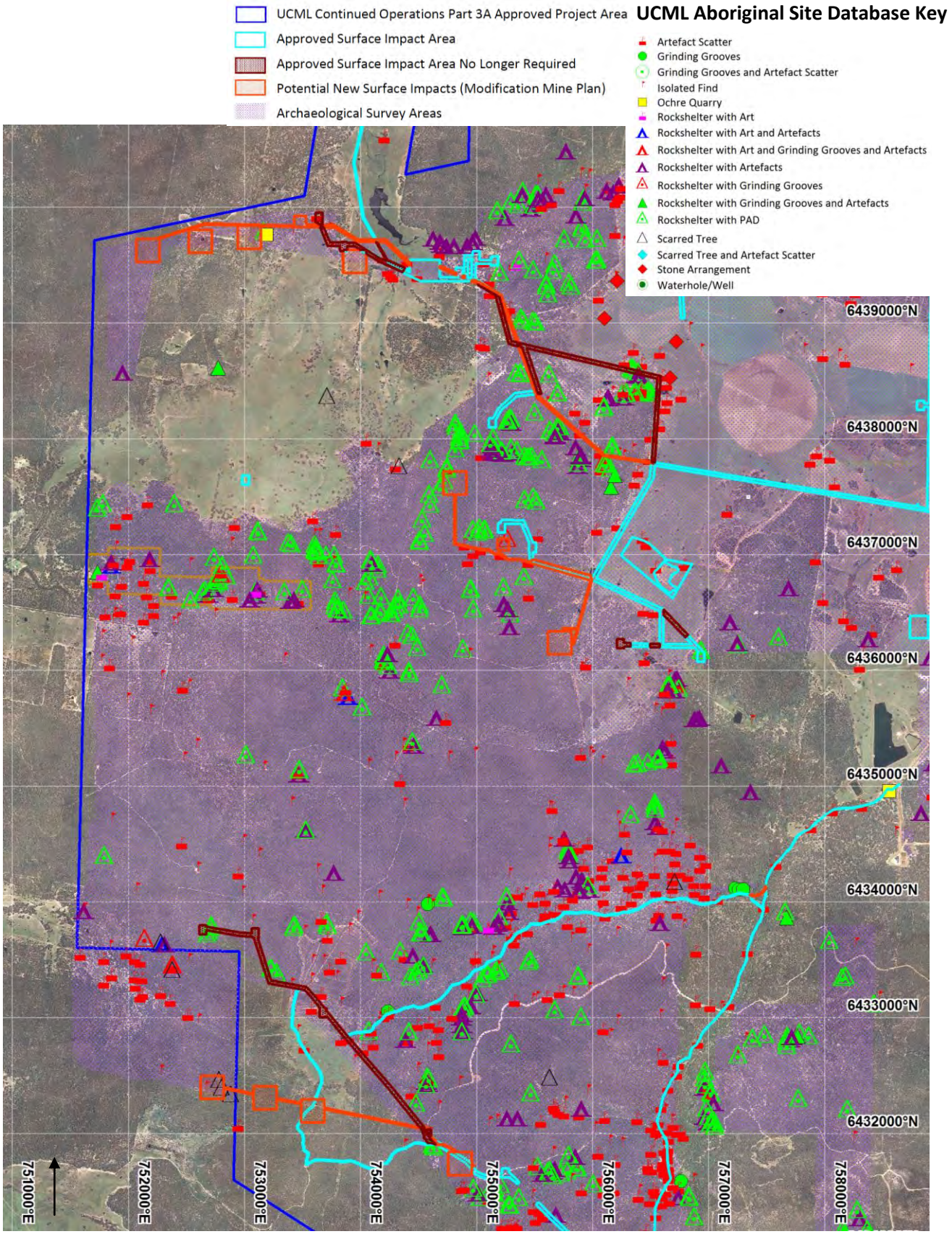


Figure 12: Proposed changes to surface impact areas with archaeological survey coverage and Aboriginal sites (one kilometre MGA grid; aerial photograph courtesy UCML).

Table 10: Key changes in potential surface impacts from the proposed modification compared to the approved UCCO Project for identified Aboriginal sites.

Ulan Site ID#	Site Name	Site Type	Significance Assessment	Potential Impacts
462*	MC39/A	rockshelter with grinding grooves	low -possibly moderate	increase from proposed modification
602	MC114	artefact scatter	low	decrease from proposed modification
606	MC118	artefact scatter	low	decrease from proposed modification
634	MC146	artefact scatter	low	decrease from proposed modification
635	MC147	isolated find	low	decrease from proposed modification
800	MC312	artefact scatter	low - possibly moderate	decrease from proposed modification
804	MC316	artefact scatter	moderate - high	decrease from proposed modification
825	MC336	rockshelter with pad	low - possibly moderate	increase from proposed modification
826	MC337	rockshelter with pad	low	increase from proposed modification
827	MC338	rockshelter with pad	low	increase from proposed modification
1194*	BB213	rockshelter with pad	low	decrease from proposed modification
1195*	BB214	rockshelter with pad	low	decrease from proposed modification
1201	BB220	isolated find	low	decrease from proposed modification
1204	UC194	artefact scatter	low	decrease from proposed modification
-	CC45	rockshelter with pad	low - possibly moderate	increase from proposed modification
-	CC46	rockshelter with pad	low	increase from proposed modification
-	CC48	isolated find	low	increase from proposed modification

* Note: ID# 462 also has a reduction in subsidence impacts and ID# 1194 and 1195 have an increase in subsidence impacts (refer to Section 9.2).

Significance - refer to Section 9 of Kuskie (2009) and Section 7 of this report for discussion:

***Green Shading** = low significance*
***Yellow Shading** = low-moderate or moderate significance*
***Red Shading**= moderate-high or high significance*

Potential impacts of proposed modification compared to approved UCCO Project:

Ulan ID	**Site Name**	Where proposed modification results in a material increase in potential surface impacts.
Ulan ID	**Site Name**	Where proposed modification results in a material decrease in potential surface impacts.

Table 11: Summary of key changes in potential surface impacts from the proposed modification compared to the approved UCCO Project with respect to Aboriginal site type and significance (pink indicates increased chance of impact, green indicates reduced chance of impact).

		Significance		
Site Type	**Changed Impacts**	**Low**	**Low - Possibly Moderate**	**Moderate - High**
Rockshelter with PAD	Increase	3 (ID# 826, 827 and CC46)	2 (ID# 825 and CC45)	
	Decrease	2 (ID# 1194, 1195)		
Rockshelter with grinding grooves	Increase		1 (ID# 462)	
	Decrease			
Isolated find	Increase	1 (CC48)		
	Decrease	2 (ID# 635, 1201)		
Artefact scatter	Increase			
	Decrease	4 (ID# 602, 606, 634, 1204)	1 (ID# 800)	1 (ID# 804)
Total	Increase	4	3	
Total	Decrease	8	1	1

9.2 Potential Subsidence Impacts

The primary potential impacts of the approved UCCO Project and proposed modification on Aboriginal heritage relate to underground mining induced subsidence.

For the purposes of this assessment of the proposed modification, the key zones in relation to subsidence and Aboriginal heritage include:

1. The Ulan West longwall panel realignment *within* the approved UCCO Project area, much of which has been subject to heritage survey to current standards but portions which have not (refer below and to Section 3.2.3 and Figure 4) which has required a reassessment of subsidence impacts on Aboriginal sites in accordance with the procedures in Section 3.7.7 of the HMP;

2. The extension of underground mining panels *within* the approved UCCO Project area, extending the zone of potential subsidence impacts into new areas that have been heritage surveyed to current standard (Kuskie 2009), which has required an assessment of subsidence impacts on Aboriginal sites in accordance with the procedures in Section 3.7.7 of the HMP;

3. The extension of underground mining panels *within* the approved UCCO Project area, extending the zone of potential subsidence impacts into new areas that have not been heritage surveyed to current standard, which has required an assessment of subsidence impacts on known Aboriginal sites in accordance with the procedures in Section 3.7.7 of the HMP and for which archaeological survey of the coverage gaps will occur post-modification approval prior to any impacts occurring in accordance with Sections 3.7.7 and 3.7.5 of the HMP; and

4. The extension of underground mining panels in MLA 475 *outside of* the approved UCCO Project Area, for which archaeological survey has occurred for this modification assessment in accordance with Sections 3.7.7 and 3.7.5 of the HMP, and which has required an assessment of subsidence impacts on Aboriginal sites.

An assessment of potential subsidence impacts has been prepared by Dr Ken Mills. Dr Mills provided a table (refer to Table 12) identifying subsidence impacts and advised that the approach to estimating impacts has generally not changed from previous assessments (eg. Mills 2009, 2010).

Dr Mills (pers. comm. 2014) advised that the subsidence predictions made for the UCCO Project EA were undertaken based on the subsidence information available at the time from mining at Ulan No. 3 underground mine and focused more generally across the broad areas of future mining at Ulan No. 3 underground mine and all of Ulan West. The revised subsidence assessment specific to Ulan West has considered the modifications to panel geometry for Ulan West and improvements in survey techniques and applied a conservative maximum mining height of 3.2 metres to assess the maximum subsidence above the average mining height of 2.9 metres. The current assessment (Mills 2014) takes into account recent outcomes of subsidence monitoring, including several previously unseen phenomena associated with steps and compression overrides that have been observed in recent longwall panels at Ulan No. 3.

Mills (pers. comm. 2014) identifies that the general experience of mining under cliff formations indicates that rock falls can be expected on up to 20% of the length of cliff formation located directly over extracted longwall panels and the intermediate chain pillar between extracted longwall panels. No rock falls are expected outside the outermost goaf edge of longwall extraction. Perceptible impacts are expected on up to 70% of the length of cliff formations located directly over extracted longwall panels and to a distance of up to about 0.4 times overburden depth outside the goaf edge.

A summary of the subsidence predictions is presented in Table 12 and compared with the UCCO Project EA predictions in Table 13. Predictions for each relevant Aboriginal site within the modification assessment area (refer to points 1 - 4 above) are included in Appendix 6 ('Potential Impacts' column).

As for the UCCO Project EA (refer to Kuskie 2009, Section 11), the assessment of potential subsidence impacts for each rock shelter site or PAD relates to the potential for rock falls and the probability of 'perceptible impacts'. 'Perceptible impact' is taken to refer to any changes in the rock formations that are associated with mining activity and subsidence movements. Such impacts may include tensile cracking, ranging from fine cracks to major fractures, shear movements on bedding planes and through intact strata, perceptible disturbance of any formations, and rock falls, ranging from minor dislocation of material through to major falls.

The probability of perceptible impacts is a generic estimate based on the stratigraphic horizon in which the rock shelters are formed, rather than the specific geometries of individual sites. Large, continuous, overhanging formations are likely to be more susceptible to rock falls than pagoda features and isolated rocks, so there may be significant differences in potential impacts at individual sites that cannot be captured without a specific site assessment (Mills 2009, 2010). A specific site assessment was undertaken by Dr Mills for ID# 161, 162 and 284 and CC28, involving a site inspection on 10 November 2014 and further consideration of the potential impacts at these sites and potential management strategies.

Table 12: Summary of subsidence predictions for the proposed Ulan West mining area (Mills pers. comm).

Overburden Depth (m)	65	100	140	180	220
Maximum Subsidence in Centre of Panel (mm)	2100	2100	1900	1600	1600
Subsidence Over Chain Pillars (mm)	100	150	200	300	500
Goaf Edge Subsidence (mm)	150	150	150	180	200
Angle of Draw (°)	45	45	45	45	45
Tilt (mm/m)	162	105	68	44	36
Maximum Horizontal Movement (mm)	600	600	600	600	600
Maximum Tensile Strain (mm/m)	48	32	20	13	11
Maximum Compressive Strain (mm/m)	65	42	27	18	15
Crack Width (Not Steps and Ripples) (mm)	250	200	150	100	50
Potential for Steps	No	No	Yes	Yes	No
Potential for Compression Ripples	Yes	Yes	No	No	Yes

Table 13: Comparison of summary of subsidence predictions for the proposed Ulan West mining area with the UCCO Project EA (Mills pers. comm).

Overburden Depth	<140m		>140m	
	EA	Mod	EA	Mod
Maximum Subsidence in Centre of Panel (m)	1.6	2.1	1.6	1.9
Subsidence over Chain Pillars (mm)	200	150	800	500
Angle of Draw (°)	10-30	45	15-41	45
Tilt (mm/m)	40-100	162	10-40	68
Maximum Horizontal Movement (mm)	500	600	500	600
Maximum Tensile Strain (mm/m)	50	48	5-15	20
Maximum Compressive Strain (mm/m)	50	65	5-15	27
Maximum Crack Width (mm)	250	250	100-150	150

Mills (2009, 2010, 2014) describes the probability for subsidence impacts on sandstone rock formations in various categories:

- Almost certain: >90% probability;
- Likely: 50 - 90% probability;
- Possible: 11 - 49% probability;
- Unlikely: 1 - 10% probability; and
- Most unlikely: <1% probability.

Despite the predicted changes in subsidence parameters, Mills (pers. comm. 2014) identifies that in general, no significant changes in subsidence impacts are expected from those described in the UCCO Project EA except where the mining area has increased to cause impacts to areas that were previously outside the mining area (zones 2 - 4 above) or the mining area has reduced so that features described as being impacted in the EA are no longer impacted (parts of zone 1 above).

In terms of subsidence impacts and identified Aboriginal sites/PADs, the changes from the approved UCCO Project with respect to the proposed modification are listed in Table 14 and summarised in Table 15. The changes relate to:

- Site types that may be affected by subsidence (particularly rock shelters and grinding grooves). Mills (2009, 2010) has previously concluded that mining subsidence is not expected to significantly affect the context of any of the open artefact sites; and
- Sites where the potential impacts from subsidence have moved above or below the 10% threshold of probability of perceptible impacts (consistent with the EA and monitoring observations to date).

The proposed modification would result in a decrease in potential subsidence impacts (from above to below the 10% threshold of probability of perceptible impacts) for eight sites and an increase in potential subsidence impacts (from below to above the 10% threshold of probability of perceptible impacts) for 18 sites, most of which are located in the extension area outside of the currently approved Ulan West mine plan (refer to Tables 14 and 15).

Of the sites for which potential subsidence impacts will decrease, four are rock shelters with PADs of low significance (ID# 331, 333, 339 and 859), two are rock shelters with artefacts of low to moderate significance (ID# 334 and 336), one is a rock shelter with artefacts of moderate to high significance (ID# 335) and one is a rock shelter with grinding grooves of low to moderate significance (ID# 462). These are mostly located in an area between the proposed Ulan West modification mine plan and the approved Underground No. 3 mine plan[13].

Of the sites for which potential subsidence impacts will increase as a result of the proposed modification, one is an ochre quarry of high significance (ID# 807), 12 are rock shelters with PADs of low significance (CC29 and ID# 919, 1182, 1183, 1194-1200 and 1574), one is a rock shelter with artefacts of low significance (ID# 1575), one is a rock shelter with artefacts of moderate significance (CC28), one is a rock shelter with artefacts of high significance (ID# 284) and two are rock shelters with art and artefacts of high significance (ID# 161 and 162). These are mainly located in the extension area south of the existing approved Ulan West mine plan.

The three rock shelters of high significance and one of moderate significance, ID# 161 (CC19), 162 (CC20) and 284 (CC21) and CC28, represent several of the Cockabutta Creek rock shelter sites, an area of archaeological sensitivity identified by Haglund (1999a) for which it was recommended that the layout of the longwall panels within MLA80 (now ML1468) be designed and constructed to avoid any impacts. Condition 3.3(c)(iii) of the subsequent ML1468 Development Consent specified that 'Conservation Area 3' be established to include sites CC18 - CC20, with the conservation area boundaries a minimum distance of 150 metres from each site and no secondary workings to occur. Under the subsequent UCCO Project Approval (PA 08_0184), avoidance of impacts was prescribed under Condition 24 for these sites ('nil impacts for the Cockabutta Creek rock shelter sites'; refer to Section 3.4 of HMP).

[13] Advice from UCML is that a future modification to the No. 3 mine plan may occur and that such a modification could result in the restoration of impacts to these sites. Such impacts will require assessment in relation to any proposed modification.

Table 14: Key changes in potential subsidence impacts from the proposed modification compared to the approved UCCO Project for identified Aboriginal sites (only includes changes that transfer an Aboriginal site above or below the 10% threshold of perceptible impacts from subsidence).

Ulan Site ID#	Site Name	Site Type	Significance Assessment	Potential Impacts
161	CC19	rockshelter with art and artefacts	high	subsidence 70% risk
162	CC20	rockshelter with art and artefacts	high	subsidence 70% risk
284	CC21	rockshelter with artefacts	high	subsidence 70% risk
331	BB14/A	rockshelter with pad	low	subsidence 5% risk
333	BB14/C	rockshelter with pad	low	subsidence 0% risk
334	BB14/D	rockshelter with artefacts	low - moderate	subsidence 0% risk
335	BB14/E	rockshelter with artefacts	moderate - high	subsidence 0% risk
336	BB14/F	rockshelter with artefacts	low - moderate	subsidence 5% risk
399	MC33/A	rockshelter with pad	low	subsidence 0% risk
462	MC39/A	rockshelter with grinding grooves	low -possibly moderate	subsidence 0% risk
807	MC319	ochre quarry	high	subsidence 10% risk
859	BB43	rockshelter with pad	low	subsidence 0% risk
919	BB103	rockshelter with pad	low	subsidence 50% risk
1182	BB203	rockshelter with pad	low	subsidence 50% risk
1183	BB204	rockshelter with pad	low	subsidence 50% risk
1194	BB213	rockshelter with pad	low	subsidence 50% risk
1195	BB214	rockshelter with pad	low	subsidence 50% risk
1196	BB215	rockshelter with pad	low	subsidence 50% risk
1197	BB216	rockshelter with pad	low	subsidence 50% risk
1198	BB217	rockshelter with pad	low	subsidence 50% risk
1199	BB218	rockshelter with pad	low	subsidence 50% risk
1200	BB219	rockshelter with pad	low	subsidence 50% risk
1574	CC24	rockshelter with pad	low	subsidence 70% risk
1575	CC25	rockshelter with artefacts	low	subsidence 70% risk
	CC28	rockshelter with artefacts	moderate	subsidence 70% risk
	CC29	rockshelter with pad	low	subsidence 70% risk

Significance - refer to Section 9 of Kuskie (2009) and Section 7 of this report for discussion:

***Green Shading** = low significance*
***Yellow Shading** = low-moderate or moderate significance*
***Red Shading**= moderate-high or high significance*

Potential impacts of proposed modification compared to approved UCCO Project:

Ulan ID	**Site Name**	Where proposed modification results in a material increase in impacts (only includes changes that transfer a site from below to above the 10% threshold of perceptible impacts) the Ulan ID and Site Name boxes are shaded pink.
Ulan ID	**Site Name**	Where proposed modification results in a material decrease in impacts (only includes changes that transfer a site from above to below the 10% threshold of perceptible impacts) the Ulan ID and Site Name boxes are shaded green.

Table 15: Summary of key changes in potential subsidence impacts from the proposed modification compared to the approved UCCO Project with respect to Aboriginal site type and significance (only includes changes that transfer an Aboriginal site above or below the 10% threshold of perceptible impacts from subsidence; pink indicates increased chance of impact, green indicates reduced chance of impact).

		Significance				
Site Type	**Changed Impacts**	**Low**	**Low - Moderate**	**Moderate**	**Moderate - High**	**High**
Ochre Quarry	Increase					1 (ID# 807)
	Decrease					
Rockshelter with PAD	Increase	12 (CC29, ID# 919, 1182, 1183, 1194-1200, 1574)				
	Decrease	4 (ID# 331, 333, 399, 859)				
Rockshelter with artefacts	Increase	1 (ID# 1575)		1 (CC28)		1 (ID# 284)
	Decrease		2 (ID# 334, 336)		1 (ID# 335)	
Rockshelter with art and artefacts	Increase					2 (ID# 161, 162)
	Decrease					
Rockshelter with grinding grooves	Increase					
	Decrease		1 (ID# 462)			
Total	Increase	13		1		4
Total	Decrease	4	3		1	

The proposed modification will also result in an increase in impacts to cultural areas and values identified by the Aboriginal stakeholders, particularly:

- By virtue of the approximately 350 hectare increase in the spatial area of potential subsidence impacts associated largely with the southern extension, an increase in impacts associated with the ongoing cultural and spiritual connection to the land and resources of the study area by the north-eastern Wiradjuri and other Aboriginal persons;
- By virtue of the southern extension, impacts to the large pagodas and sandstone formations within the valley adjacent to the main Cockabutta Creek tributary (survey area 'Mod 8', with sites CC28, CC29 and ID# 284), an area for which the Aboriginal stakeholders have expressed a strong spiritual and cultural connection with; and
- By virtue of the southern extension, impacts to the large sandstone formation in which ID# 161 (CC19) and 162 (CC20) are situated (survey area 836), an area for which the Aboriginal stakeholders have expressed a strong spiritual and cultural connection with.

The proposed modification would result in a net overall increase in impacts to Aboriginal heritage, particularly heritage evidence of scientific and cultural significance associated with the Cockabutta Creek area.

9.3 Regional Context and Cumulative Impacts

The assessment of cumulative impacts or impacts within a regional context remains unchanged from Kuskie (2009: Section 11.3). For the UCCO Project, following from the conclusion that the impacts of the overall Project would be relatively low within a regional context prior to, and very low after, the implementation of mitigation measures, it logically followed that the cumulative impact of the UCCO Project within a regional context (in combination with other mining projects in the region such as Moolarben Stages 1 and 2 and Wilpinjong) would be very low (Kuskie 2009).

Notwithstanding that the proposed modification itself would result in a net overall increase in impacts to Aboriginal heritage at a local level, particularly heritage evidence of scientific and cultural significance associated with the Cockabutta Creek area, it is concluded that in a broader regional context the overall impacts of the UCCO Project incorporating the proposed modification will remain relatively low subject to the implementation of appropriate management and mitigation measures (refer to Sections 10 and 11).

10. POTENTIAL MITIGATION AND MANAGEMENT STRATEGIES

In the UCCO Project EA (refer to Kuskie 2009: Section 12.1) a discussion is presented of the general strategies that are typically available for the management of identified and potential Aboriginal heritage resources. In selecting suitable strategies, a key consideration has been the recognition that Aboriginal heritage is of primary importance to the Aboriginal community, and that decisions about the management of the sites should be made in consultation with the relevant Aboriginal stakeholders.

Specific options for the proposed modification are discussed below and the recommended strategies are presented in Section 11 and Appendix 6.

Of particular significance to the selection of appropriate management strategies is the approved HMP that applies to the approved UCCO Project Area. The vast majority of the area of relevance to the proposed modification is situated within the approved UCCO Project Area and notwithstanding DP&E approval requirements necessary for the modification, can be managed in accordance with the existing HMP. The portion of the proposed subsidence and surface impact area outside of the approved UCCO Project Area can also be appropriately managed in accordance with the HMP, subject to any necessary amendments to the HMP and subsequent DP&E approval of those.

The Sections of the approved HMP of particular relevance to the ongoing management of heritage within the approved UCCO Project Area (both before and after any approval of the proposed modification) include:

- *Section 3.1: Aboriginal community involvement* - specifies procedures for involvement of stakeholders in heritage actions, notification times for field investigations, stakeholder review of reports and proposed HMP changes and relevant timeframes for such, and Aboriginal Heritage Review Meetings;
- *Section 3.3: Aboriginal conservation areas* - specifies procedures for the Brokenback Conservation Area, Valley Way Grinding Groove Conservation Area and Bobadeen Grinding Groove Conservation Area;
- *Section 3.4: Protection of Aboriginal sites where impacts are avoided* - specifies procedures for continued avoidance of impacts to the Cockabutta Creek 18 - 20 sites (ID# 160 - 162) and Mona Creek 23 - 30 rock shelter sites (ID# 180 - 187) and future archaeological survey of these locations and consideration to establishment of Conservation Areas should UCML obtain ownership or control of the land on which they are located, assessment of heritage within the Ground Disturbance Permit process, minimising inadvertent impacts to identified sites, and minimising impacts to known sites where works occur in close proximity;
- *Section 3.5: Management of identified Aboriginal heritage evidence* - specifies procedures for surface collections of specific sites, surface scrapes and localised hand excavations of specific sites, broad area hand excavation of specific sites, development of a sampling strategy and the conduct of test and salvage excavations within the rock shelters of low to moderate or higher significance that are susceptible to subsidence impacts, continued implementation of AHIP #1101386 and AHIP #123 for longwall panels 26 and W3 in Ulan No. 3, and test excavation and salvage of specific rock shelters within the North 1 Panels;

- *Section 3.6: Management of previously unrecorded Aboriginal heritage evidence* - specifies procedures for management of previously unrecorded evidence that is identified within the UCCO Project Area during the course of operations or further heritage investigations, with consideration of the nature of the evidence, significance of the evidence and nature of proposed impacts, along with relevant updates to Appendix 2 of the HMP, the Aboriginal site database and OEH site records, and reporting;

- *Section 3.7: Additional Aboriginal heritage investigation required* - specifies procedures for additional investigation of specific Aboriginal heritage sites and areas, including specific stone arrangement sites, several large open artefact sites, reassessment of planned surface impacts after detailed design, assessment of future proposed small-scale surface impacts consistent with PA 08_0184, heritage survey of areas not sampled during the UCCO Project EA investigation, heritage survey of the portions of the open cut potential blast impact zone that have not been sampled, assessment of future mine plan alterations (such as the current proposed modification) and Subsidence Management Plan requirements;

- *Section 3.8: Curation of heritage evidence* - specifies procedures for the curation of all salvaged Aboriginal objects;

- *Section 3.9: Heritage awareness training* - specifies procedures for the training of staff and contractors in heritage awareness;

- *Section 5.1: Aboriginal site database and site records* - specifies procedures for maintenance of the UCML Aboriginal site database, lodgement of site records with the OEH and record keeping;

- *Section 5.2: Aboriginal site monitoring* - specifies procedures for monitoring of subsidence impacts for rock shelter and grinding groove sites, a stone arrangement site, and sites associated with blast monitoring;

- *Section 5.5: Reporting requirements* - specifies procedures for completion, review by stakeholders and submission of heritage reports required under the HMP; and

- *Section 6: Review and improvement* - specifies procedures for review and amendment of the HMP in consultation with the Aboriginal stakeholders, including with respect to any modifications to PA 08_0184.

In relation to the identified Aboriginal sites and cultural values that are subject to either a material increase or decrease in potential subsidence impacts from the proposed modification (refer to Tables 14 and 15 and Appendix 6):

- Of the eight sites for which potential subsidence impacts materially decrease with the proposed modification, four (ID# 331, 333, 399 and 859) are of low significance and there is no change in management strategy - management of these sites remain as 'no action required';

- Of the eight sites for which potential subsidence impacts materially decrease with the proposed modification, four (ID# 334, 335, 337 and 462) are of low to moderate or moderate to high significance and there is a material change in management strategy - these sites are revised from 'monitor, and consider as part of rock shelter test excavation sample, with potential salvage collection and excavation' to 'no action required'[14];

[14] Advice from UCML is that a future modification to the No. 3 mine plan may occur and that such a modification could result in the restoration of impacts to these sites. Such impacts will require assessment in relation to any proposed modification.

- Of the 18 sites for which potential subsidence impacts materially increase with the proposed modification, 13 (CC29 and ID# 919, 1182, 1183, 1194 - 1200, 1574 and 1575) are of low significance and there is no change in management strategy - management of these sites remain as 'no action required';

- Of the 18 sites for which potential subsidence impacts materially increase with the proposed modification, four (ID# 161, 162 and 284 and CC28) are of moderate or high significance and there is a material change in management strategy, from none specified previously (as no impacts were proposed under the UCCO Project[15]), to 'include within rock shelter test excavation sample, with salvage collection and excavation, and other culturally appropriate mitigation and offsetting measures as agreed with the Aboriginal stakeholders'; and

- Of the 18 sites for which potential subsidence impacts materially increase with the proposed modification, one, the ochre quarry (ID# 807), is of high significance and has a material change in management strategy, from none specified previously in relation to subsidence (as no subsidence impacts were proposed), to 'monitor' in relation to the possible subsidence impacts, to evaluate subsidence predictions and potential effects for this site type.

In relation to the newly identified open artefact sites recorded during the present survey (refer to Table 5), Mills (2009, 2014) concludes that impacts from subsidence are unlikely, but for completeness and to address any possible future impacts from continuing land use or other small-scale activities (such as exploratory drilling, environmental monitoring and maintenance of access roads), management strategies for these sites are included in Appendix 6.

As discussed by Kuskie (2009, 2010), three key strategies can be implemented to mitigate the effects of subsidence on rock shelter sites, comprising avoidance of impacts, further investigation and salvage, and/or monitoring. Assessment of potential management strategies for the identified Aboriginal sites and cultural values that are subject to either a material increase or decrease in potential subsidence impacts from the proposed modification has occurred in a manner consistent with the UCCO Project EA, North 1 Panels Modification and HMP, as discussed below.

Through establishment of the 58 hectare Brokenback Conservation Area (refer to Kuskie 2009 and Figures 4 and 5) subsidence impacts will be avoided to a total of 27 rock shelter sites, comprising one rock shelter with art, one rock shelter with art and artefacts, one rock shelter with grinding grooves, nine rock shelters with artefacts and 15 rock shelters with PADs[16]. Most importantly, these conserved sites include six of high significance that would have been susceptible to impacts if not subject to conservation, four of moderate to high significance, and three of moderate significance. Continued conservation of these sites, including several with rock art, would serve to offset to some extent any proposed impacts for the Cockabutta Creek rock shelter sites.

[15] Albeit the UCCO Project approval and Section 3.4 of the approved HMP specify that no impacts will occur to these Cockabutta Creek sites.

[16] Including the rock shelter with PAD ID# 919 of low heritage significance, which under the proposed modification, now has a more than 10% chance of perceptible impacts.

Nevertheless, the southern extension associated with the proposed modification would result in a net overall increase in impacts to Aboriginal heritage, particularly heritage evidence of scientific and cultural significance associated with the Cockabutta Creek area. The three rock shelters of high significance (ID# 161 - CC19, ID# 162 - CC20 and ID# 284 - CC21) and one of moderate significance (CC28), represent several of the Cockabutta Creek rock shelter sites identified by Haglund (1999a) for which it was recommended that the layout of the longwall panels within MLA80 (now ML1468) be designed and constructed to avoid any impacts. Condition 3.3(c)(iii) of the subsequent ML1468 Development Consent specified that 'Conservation Area 3' be established to include sites CC18 - CC20, with the conservation area boundaries a minimum distance of 150 metres from each site and no secondary workings to occur. Under the subsequent PA 08_0184, avoidance of impacts was prescribed under Condition 24 for these sites ('nil impacts for the Cockabutta Creek rock shelter sites') and consequently included in Section 3.4 of the HMP.

Given the significance of the identified evidence and cultural values in this locality, increased impacts of the proposed modification compared with the approved UCCO Project, and absence of other additional conservation offsets, avoidance of impacts is warranted, consistent with the current UCCO Project Approval. However, these sites are located in the centre of a proposed longwall panel and as a consequence, avoidance of impacts would be highly problematic without a major revision to the mine plan and resulting non-extraction of substantial quantities of coal, at a significant economic cost to the proponent and the State.

The Aboriginal stakeholders attended a meeting on 25 November 2014, which included inspection of these Cockabutta Creek rock shelter sites and discussion of numerous potential management options. UCML is committed to ongoing discussions with the Aboriginal stakeholders in order to identify and agree on culturally acceptable mitigation and offsetting measures, should impacts occur to these rock shelter sites.

The second key strategy available to mitigate the impacts of subsidence on rock shelter sites is to further investigate and salvage sites that may be affected (refer to Kuskie 2009: Section 12.2.8). A program involving the four-phase investigation of a representative sample of shelter sites of low to moderate or higher significance, that may be subject to subsidence impacts, has been established for the overall UCCO Project (refer to Section 3.5.4 of the HMP and the *Rock Shelter Test Excavation Sampling Strategy* [Kuskie 2013a] prepared under Section 3.5.4). The addition to this representative sample of the four Cockabutta Creek rock shelter sites of moderate or high significance, or more appropriately as per Section 3.5.6 of the HMP, definite inclusion of these sites for test excavation and if required, more detailed salvage excavation (as per the rock shelter sites of significance ID# 104, 105 and 1420 in the North 1 Panels Modification) would assist in mitigating impacts of the proposed modification to these sites of high scientific and cultural significance.

The third key strategy with respect to subsidence and rock shelter sites is monitoring. Inspecting and recording the condition of identified rock shelter sites before and after undermining has taken place, in order to identify if any subsidence related impacts have occurred, can assist with refining the modelling involved in assessing potential subsidence impacts and thereby guide future assessments within the locality, and enable documentation of the actual impacts of the project and provide an understanding of the intact heritage resource post-mining (refer to Section 12.2.8 of Kuskie 2009). Monitoring of sites in a manner consistent with that established in Section 5.2 of the HMP remains warranted. The ochre quarry site (ID# 807), is a warranted addition to the monitoring strategy, given its high significance and low level of predicted impacts, to evaluate subsidence predictions and the potential effects on this type of site.

Implementation of the measures above will assist in offsetting and reducing the potential subsidence impacts of the proposed modification, and provide cultural and scientific benefits. Notwithstanding the implementation of these measures, the proposed modification will result in a net increase in subsidence impacts to nine rock shelters with PADs and one rock shelter with artefacts of low significance (refer to Table 15). Considering the limited potential for these shelters to yield deposits of research value or contribute to a greater understanding of Aboriginal occupation of the locality, along with the inclusion of a sample of these shelters within the Brokenback Conservation Area and in other areas where impacts will not occur, unmitigated impact is a feasible strategy for these shelters.

In relation to the identified Aboriginal sites that are subject to either a material increase or decrease in potential *surface impacts* from the proposed modification (refer to Tables 10 and 11 and Appendix 6):

- Of the ten sites for which potential surface impacts materially decrease with the proposed modification, eight (ID# 602, 606, 634, 635, 1194, 1195, 1201 and 1204) are of low significance and the management strategy in relation to surface impacts changes from 'unmitigated impact' or 'reassess in relation to detailed design of surface infrastructure' to 'no action required';
- Of the ten sites for which potential surface impacts materially decrease with the proposed modification, one (ID# 800) is of low to possibly moderate significance and there is a material change in management strategy from 'reassess in relation to detailed design of surface infrastructure - ensure impacts avoided or surface collection and/or test/salvage excavation if impacts cannot be avoided' to 'no action required';
- Of the ten sites for which potential surface impacts materially decrease with the proposed modification, one (ID# 804) is of moderate to high significance and there is a material change in management strategy from 'reassess in relation to detailed design of surface infrastructure - ensure impacts avoided' to 'no action required';
- Of the seven sites for which potential surface impacts materially increase with the proposed modification, one (CC48) is a newly identified isolated find of low significance and the management of this site is 'no action required';
- Of the seven sites for which potential surface impacts materially increase with the proposed modification, two (ID# 826 and 827) are rock shelters with PADs of low significance and the management of these sites changes to 'reassess in relation to detailed design of surface infrastructure - avoid impacts if feasible';
- Of the seven sites for which potential surface impacts materially increase with the proposed modification, one (CC46) is a newly identified rock shelter with PAD of low significance and the management of this site is 'reassess in relation to detailed design of surface infrastructure - avoid impacts if feasible';
- Of the seven sites for which potential surface impacts materially increase with the proposed modification, one (ID# 462) is a rock shelter with grinding grooves and one (ID# 825) is a rock shelter with PAD, both of low to possibly moderate significance, and the management of these sites changes to 'reassess in relation to detailed design of surface infrastructure - ensure impacts avoided'; and
- Of the seven sites for which potential surface impacts materially increase with the proposed modification, one (CC45) is a newly identified rock shelter with PAD of low to possibly moderate significance and the management of this site is 'reassess in relation to detailed design of surface infrastructure - ensure impacts avoided'.

Approval of the proposed modification would trigger a review of the HMP, as required by the current UCCO Project approval conditions and reflected in Section 6 of the HMP. The key actions required under the HMP or potential revisions to the HMP that would be required if the proposed modification were to be approved include:

- *Section 3.1: Aboriginal community involvement* - UCML will provide the registered Aboriginal stakeholders notification of and a minimum 15 working days to comment on any proposed amendments to the HMP. UCML will ensure that copies of any updated version of the HMP are distributed to the registered Aboriginal stakeholders within 30 working days of completion;

- *Section 3.4: Protection of Aboriginal sites where impacts are avoided* - amendment of the avoidance of impact provisions to several of the Cockabutta Creek sites (specifically ID# 161, 162 and 284 and CC28);

- *Section 3.5: Management of identified Aboriginal heritage evidence* - the entries for each Aboriginal site within the revised approved Project Area in Appendix 6 would need to replace (or in the case of new sites, be added to) current entries in Appendix 2 of the HMP. Revisions to the *Rock Shelter Test Excavation Sampling Strategy* (Kuskie 2013a) prepared under Section 3.5.4 of the HMP would be required, in relation to several material changes to potential subsidence impacts and consequent management strategies for several relevant rock shelter sites. A new *Section 3.5.7 Cockabutta Creek Sites ID# 161, 162 and 284 and CC28* would need to be inserted, including provisions for:

    - Undertaking an initial small test excavation in each rock shelter (ID# 161, 162 and 284 and CC28) in accordance with Step 2 of Section 3.5.4 of the HMP;
    - Undertaking more detailed salvage excavation in each rock shelter (ID# 161, 162 and 284 and CC28) in accordance with Step 4 of Section 3.5.4 of the HMP, as determined by an appropriately qualified and experience archaeologist, in consultation with the registered Aboriginal stakeholders;
    - Undertaking more detailed recording of ID# 161, 162 and 284 and CC28 (including by photography and accurate surveying, such as laser-scanning), and where feasible, removal of samples for further analysis (eg. chemical analysis and dating); and
    - Updating the HMP to define "appropriately qualified and experience archaeologist" in relation to any personnel involved in the excavation of rock shelter sites/PADs of moderate or higher significance, as comprising "minimum BA (Honours) degree in Aboriginal archaeology and ten years full-time experience in Aboriginal archaeology and three months prior experience in Aboriginal rock shelter excavations for the lead archaeologist, and minimum BA (Honours) degree in Aboriginal archaeology and two years full-time experience in Aboriginal archaeology and one months prior experience on Aboriginal rock shelter excavations for assistant archaeologists";

- *Section 3.7: Additional Aboriginal heritage investigation required* - as specified in Appendix 6, additional investigation of the large open artefact site CC41 is required should future impacts be proposed, and heritage survey is required prior to any impacts occurring of the areas not sampled during the UCCO Project EA or subsequent investigations as per Sections 3.7.4 and 3.7.5 of the HMP including:

    - Approximately 0.7 hectares *within* the zone of potential subsidence impacts and 1 hectare within the zone of potential *surface impacts* in MLA 475 and *outside* the approved UCCO Project Area that was not surveyed during the present investigation;
    - Gaps totalling approximately 15 hectares *within* the approved UCCO Project Area in relation to the proposed modified surface impact area;
    - A gap in the northern portion of Ulan West *within* the approved UCCO Project Area that relates to property access issues at the time of the UCCO Project EA;

- A gap in the southern portion of the proposed modification area *within* the approved UCCO Project Area; and
- Other very minor gaps on some margins of Ulan West *within* the approved UCCO Project Area (refer to Figure 4);

- *Section 5.1: Aboriginal site database and site records* - Aboriginal sites outside of the currently approved UCCO Project Area but within any subsequently approved revised Project area would require addition to the UCML Aboriginal Site Database (with Ulan Site ID numbers attributed). Site records have been lodged with the OEH for all new sites recorded during the present investigation;

- *Section 6: Review and improvement* - the HMP would require review and revision within three months of any approval of the modification, and where amendments are required to Section 3 of the HMP, UCML will provide the registered Aboriginal stakeholders notification of and a minimum 15 working days to comment on any proposed amendments, and ensure that copies of any updated version of the HMP are distributed to the registered Aboriginal stakeholders within 30 working days of completion. Consultation over any amendments would also be required with the DP&E and the OEH and Mid-Western Regional Council; and

- *Appendix 2* - the entries for each Aboriginal site within the revised approved Project Area in Appendix 6 would need to replace (or in the case of new sites, be added to) current entries in Appendix 2 of the HMP.

11. RECOMMENDATIONS

This Aboriginal cultural heritage assessment has been prepared by South East Archaeology for UCML in relation to an approval being sought from the DP&E under Section 75W of Part 3A of the EP&A Act for a proposed modification to the UCCO Project Approval (PA 08_0184).

The modification relates to a proposed change to the Ulan West mine plan that includes extending seven underground mining panels between 900 and 1300 metres within existing mining and exploration leases (refer to Figure 3).

The proposed modification would result in a net overall increase in impacts to Aboriginal heritage, particularly heritage evidence of scientific and cultural significance in the Cockabutta Creek area, associated with the southern extension of longwall panels into MLA 475. Notwithstanding, it is concluded that in a broader regional context the overall impacts of the modified Project would remain relatively low subject to the implementation of appropriate management and mitigation measures (refer below).

Consistent with PA 08_0184, the heritage assessment for the UCCO Project EA (Kuskie 2009) and the UCML HMP, and with consideration of legal requirements under the NSW NP&W Act and EP&A Act, the results of the present investigation and consultation with the local Aboriginal community, the following management and mitigation measures are proposed:

1) Provisions relating to Aboriginal heritage in the UCML HMP for the approved UCCO Project will continue to be implemented, with revisions and additional actions implemented where necessary that are relevant to the proposed modification. In particular, these revisions and additional actions include but are not limited to[17]:

    a) Management strategies for individual sites as outlined here in Appendix 6, with the entries for each Aboriginal site within the revised approved Project Area replacing (or in the case of new sites, being added to) current entries in Appendix 2 of the HMP (Section 3.5 and Appendix 2 of the HMP);

    b) Amendment of the avoidance of impact provisions to several of the Cockabutta Creek sites (specifically ID# 161, 162 and 284 and CC28) in Section 3.4 of the HMP, to allow subsidence impacts to occur to these sites subject to the implementation of provision (c) below;

    c) Addition to the HMP of a new *Section 3.5.7 Cockabutta Creek Sites ID# 161, 162 and 284 and CC28*, including provisions for:

        - Undertaking an initial small test excavation in each rock shelter (ID# 161, 162 and 284 and CC28) in accordance with Step 2 of Section 3.5.4 of the HMP;
        - Undertaking more detailed salvage excavation in each rock shelter (ID# 161, 162 and 284 and CC28) in accordance with Step 4 of Section 3.5.4 of the HMP, as determined by an appropriately qualified and experience archaeologist, in consultation with the registered Aboriginal stakeholders;

[17] Refer to the UCML Heritage Management Plan for all management policies and actions relevant to Aboriginal heritage that may require implementation for the proposed modification and UCCO Project.

- Undertaking more detailed recording of ID# 161, 162 and 284 and CC28 (including by photography and accurate surveying, such as laser-scanning), and where feasible, removal of samples for further analysis (eg. chemical analysis and dating); and
- Updating the HMP to define "appropriately qualified and experience archaeologist" in relation to any personnel involved in the excavation of rock shelter sites/PADs of moderate or higher significance, as comprising "minimum BA (Honours) degree in Aboriginal archaeology and ten years full-time experience in Aboriginal archaeology and three months prior experience in Aboriginal rock shelter excavations for the lead archaeologist, and minimum BA (Honours) degree in Aboriginal archaeology and two years full-time experience in Aboriginal archaeology and one months prior experience on Aboriginal rock shelter excavations for assistant archaeologists";

d) Revision of the *Rock Shelter Test Excavation Sampling Strategy* (Kuskie 2013a) in relation to several material changes to potential subsidence impacts and consequent management strategies for several relevant rock shelter sites (Section 3.5.4 of the HMP);

e) Additional investigation of the large open artefact site CC41, should future impacts be proposed, and conducting heritage surveys prior to any impacts occurring of the areas not sampled during the UCCO Project EA or subsequent investigations (as per Section 3.7.5 of the HMP) including;

- Approximately 0.7 hectares *within* the zone of potential subsidence impacts and 1 hectare within the zone of potential *surface impacts* in MLA 475 and *outside* of the currently approved UCCO Project Area that was not surveyed during the present investigation;
- Gaps totalling approximately 15 hectares *within* the approved UCCO Project Area in relation to the proposed modified surface impact area;
- A gap in the northern portion of Ulan West *within* the approved UCCO Project Area that relates to property access issues at the time of the UCCO Project EA;
- A gap in the southern portion of the proposed modification area *within* the approved UCCO Project Area; and
- Other very minor gaps on some margins of Ulan West *within* the approved UCCO Project Area (refer to Figure 4);

f) Addition to the UCML Aboriginal Site Database (with Ulan Site ID numbers attributed) of all Aboriginal sites outside of the currently approved Project Area but within any subsequently approved revised Project Area (Section 5.1 of the HMP);

g) Revision of the HMP within three months of any approval of the proposed modification, and where amendments are required to Section 3 of the HMP, provision to the registered Aboriginal stakeholders of notification and a minimum 15 working days to comment on any proposed amendments, with copies of any updated version of the HMP distributed to the registered Aboriginal stakeholders within 30 working days of completion. Consultation over any amendments would also be required with the DP&E and the OEH and Mid-Western Regional Council (Section 6 of the HMP);

2) UCML will continue consultation with the Aboriginal stakeholders in relation to identification of and agreement on other culturally acceptable mitigation and offsetting measures for the Cockabutta Creek rock shelter sites;

3) Under the terms of the NP&W Act it is an offence to harm or desecrate an object that the person knows is an Aboriginal object, or to harm an Aboriginal object ('strict liability offence'). Therefore, no activities or work should be undertaken within the Aboriginal site areas as described in this report without approval under Section 75W of Part 3A of the EP&A Act (or *in lieu* a valid Section 90 AHIP) and subsequent implementation of any relevant approval conditions;

4) Copies of this report will be forwarded to each registered Aboriginal stakeholder and the DP&E and the OEH within 30 working days of completion.

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