Aboriginal Cultural Heritage Assessment
Aboriginal Archaeological Assessment of Proposed Ammonium Nitrate Emulsion Production Facility, and Continued Operation of Orica Mining Services Technology Centre, Richmond Vale NSW

October 2009
Aboriginal Archaeological Assessment of Proposed Ammonium Nitrate Emulsion Production Facility, and Continued Operation of Orica Mining Services Technology Centre, Richmond Vale NSW

Prepared by

Umwelt (Australia) Pty Limited

on behalf of

Orica Australia Pty Ltd

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1.0 Introduction

1.1 Project Description

Orica is seeking a new project approval for the existing operations at the Technology Centre and the proposed Ammonium Nitrate Emulsion (ANE) Production Facility (the Project). Umwelt (Australia) Pty Limited was commissioned by Orica Australia (Orica) to undertake an Aboriginal archaeological assessment for the Project. The Technology Centre is located on George Booth Drive, south of Kurri Kurri in the Hunter Valley region of NSW (refer to Figure 1.1). Development Consent was granted in 1991 for an explosives research and production facility at the Technology Centre (DA 118/690/257). Orica is seeking a new development consent for existing operations and the proposed ANE Production Facility to allow for the production of alternative products and an increase in the production rate.

This report identifies the Aboriginal archaeological and cultural heritage values contained within the survey area and assesses the significance of any impacts on these values potentially resulting from the construction and operation of the proposed ANE Production Facility. This Aboriginal archaeological assessment comprises part of the larger Environmental Assessment (EA) being prepared for the Project.

1.2 Project Area

In 1991 ICI Australia Operations Pty Limited (now Orica) was granted approval to construct an office building, laboratories and workshops, production facilities, magazines (explosives storage), an explosives test cell and an underwater test facility at the Technology Centre. The development was to occur in a number of stages over an approximate ten year period.

Archaeological survey of the entire Technology Centre site area was carried out in 1991 (Koettig 1990 cited in Mitchell McCotter 1990). However, the Department of Environment and Climate Change (DECC) expects that areas are resurveyed if the original survey is more than five years old, especially if the scope of the original works has been modified. As DECC’s requirements and guidelines have changed significantly since 1991, it is also likely that the results of the initial survey would not be sufficient to satisfy present requirements.

For the purposes of this report, the study area refers to the entire Technology Centre area within the site boundary, while the survey area refers to the areas surveyed for this assessment, and includes the proposed ANE Production Facility and access road. The study area is approximately 292 hectares and the survey area is approximately eight hectares (refer to Figure 1.2). The continuation of the existing operations at the Technology Centre have not been included in the survey area, as they are not proposed to change substantially from existing operations and are not expected to involve any further ground disturbance.

The proposed ANE Production Facility will require the construction of new infrastructure adjacent to existing Orica facilities. The proposed ANE Production Facility will comprise a number of structures including:

- chemical, fuel and product storage tanks;
- an emulsion manufacturing plant;
- truck weighing, loading and unloading facilities;
• an access road from the site entrance to the proposed ANE production facility;
• utilities including hot water and compressed air systems, electricity distribution cables and a transformer;
• stormwater/spill management structures;
• an office, control room, switch-room, and quality control laboratory; and
• a bushfire buffer zone surrounding the infrastructure up to 30 metres.

Construction of the proposed ANE production facility will involve clearing of vegetation in the survey area including a bushfire buffer zone, excavation for and laying of civil foundations, structural steel erection, equipment and piping installation and instrument and electrical installation. The survey area will be clearly demarcated prior to the commencement of construction activities.

The clearing and construction activities have the potential to damage or destroy any Aboriginal sites that may occur in the survey area (if any).

1.3 Relevant Cultural Heritage Legislation

As this development is a ‘Major Project’ which will be assessed under Part 3A of the Environmental Planning and Assessment Act 1979, the provisions of the National Parks and Wildlife Act 1974 do not apply. This means that Section 87 permits and Section 90 consents under the National Parks and Wildlife Act 1974 will not be required for any investigation/salvage works undertaken as part of this project, if approved. This does not mean that the level of assessment work required or the way issues are managed changes, it mainly relates to reducing the number of separate approvals and time required to start a project once approved. Prior to granting approval for a project the Department of Planning will consider cultural heritage issues and consult with DECC regarding the project to ensure that cultural heritage issues are appropriately considered when a decision is made about whether or not to approve a project. They will also consider what management requirements need to be implemented.

As there are no Section 87 permits or 90 consents required for an approved project, the proponent will be required to manage cultural heritage issues in accordance with the management recommendations made in the Aboriginal archaeology assessment report and with any approval conditions imposed by the Department of Planning. This may include salvage of artefacts, subsurface works, conservation outcomes or any other management strategies. The management of cultural heritage resources within the survey area is discussed in Section 8.

Consultation with Aboriginal stakeholders is essential for identifying and assessing the significance of Aboriginal objects and/or places and for determining appropriate mitigation strategies to offset impacts on Aboriginal heritage. Consultation with Aboriginal stakeholders in relation to this project has been undertaken in accordance with the NPWS Standards and Guidelines for Archaeological Report Writing 1997 and DECC’s draft Part 3A assessment guideline Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation, July 2005. Aboriginal consultation has been undertaken in accordance with the above guidelines and following DECC’s Interim Community Consultation Requirements for Applicants 2004.
1.4 Objectives and Structure of the Report

The objectives of this report are to assess and report the Aboriginal archaeological and cultural heritage significance of the survey area and to provide strategies to mitigate and manage the impacts of the project on Aboriginal cultural heritage, where appropriate. The Aboriginal archaeological assessment includes:

- A discussion of the consultation undertaken with Aboriginal stakeholders regarding the Aboriginal significance of the survey area, and any actual or potential Aboriginal sites/artefacts that may be included within the survey area (refer to Section 2);

- A discussion of the archaeological, cultural and environmental context of the study area to obtain an understanding of the archaeological potential of the survey area and the possible impacts of European land use on any sites it may contain (refer to Sections 3 and 4);

- A search of the Aboriginal Heritage Information Management System (AHIMS) database to determine the location of any previously recorded Aboriginal heritage sites within the study area and its surrounds (refer to Section 4);

- A field survey of the survey area (conducted with Aboriginal stakeholder representatives) to identify and record any Aboriginal heritage sites or potential sites present within the survey area (refer to Section 5);

- A discussion of the results of the field survey and the significance of any identified sites within the survey area (refer to Section 5); and

- The provision of relevant strategies to mitigate and manage the impacts of the project on Aboriginal cultural heritage (Sections 8 and 9).

1.5 Project Team

This report was written by Amanda Reynolds (Archaeologist), with assistance from Mary-Jean Sutton (Senior Archaeologist). Jan Wilson (Cultural Heritage Manager) reviewed and edited this report. The archaeological fieldwork was undertaken by Amanda Reynolds and Nicola Roche (Senior Archaeologist).
2.0 Aboriginal Stakeholder Consultation

Aboriginal stakeholder groups are the primary determinants of the significance of their heritage and therefore Aboriginal stakeholder consultation is integral to the assessment of Aboriginal cultural heritage. The consultation and assessment process recognises the importance of Aboriginal stakeholder groups in the assessment and management of their heritage.

Aboriginal stakeholder groups were provided with the opportunity to participate in any field survey, site identification and recording. The consultation process was aimed at ensuring that Aboriginal stakeholder groups had the opportunity to contribute to assessment outcomes by:

- assisting with the design of the survey strategy;
- involvement in the identification of Aboriginal heritage sites through participation in fieldwork;
- influencing the assessment of cultural significance;
- providing relevant information regarding the cultural values of Aboriginal objects/places;
- contributing to the development of the cultural heritage management strategy; and
- commenting on the draft assessment report prior to its submission.

2.1 Notification and Registration

The DEC (now DECC) Interim Community Consultation Requirements for Applicants (2004) (the requirements) establish protocols for consultation with Aboriginal stakeholders regarding any approvals that are sought under Part 6 of the NPW Act. All consultation for the project was undertaken in accordance with these requirements. A summary of the consultation undertaken for the project is included in Section 2.4.

The notification process involved the placement of a public advertisement in the Koori Mail and the Newcastle Herald on 19 November 2008 (refer to Appendix A). Notification also included letters providing an overview of the proposed assessment and a request for further assistance to identify known Aboriginal stakeholder groups/individuals that may have an interest in participating in the consultation for the Project (refer to Appendix A). These letters were sent on 28 November 2008 (with a closing date of 8 December 2008) to the following agencies:

- DECC;
- NSW Native Title Services;
- The Office of the Registrar of Aboriginal Owners;
- Cessnock City Council; and
- Awabakal Local Aboriginal Land Council (ALALC).

Cessnock City Council replied by email on 10 December 2008 and the DECC response was received on 15 December 2008 after the closing date for responses.
In addition to ALALC seven Aboriginal stakeholder groups formally registered an interest in the project in response to the newspaper advertisements; Wonnarua Cultural Heritage (WCH), Gidawaa Walang Cultural Heritage Consultancy (GWCHC), Awabakal Descendents Traditional Owners Aboriginal Corporation (ADTOAC), Awabakal Traditional Owners Aboriginal Corporation (ATOAC), Wonn1 Contracting (Wonn1), Culturally Aware (CA) and Black Creek Aboriginal Corporation (BCAC). There were no other interest groups known to Umwelt to have previously registered an interest in other projects in the area.

2.1.1 Native Title Search

A search of the National Native Title Tribunal (NNTT) was undertaken on 9 December 2008 for the Cessnock Local Government Area (LGA). The results of the search show that there are no active NNTT applications in the Cessnock LGA.

2.2 Draft Survey Strategy

Letters providing a proposed draft survey strategy for comment were sent by Orica to the following Aboriginal stakeholder groups who registered an interest in being consulted in regard to the Project:

- ATOAC;
- CA;
- ADTOAC;
- WCH;
- GWCHC;
- Wonn1;
- BCAC; and
- ALALC.

ATOAC ADTOAC, BCAC and GWCHC provided written comment supporting the survey strategy on 4 December 2008, and their comments are included in Appendix B. No other Aboriginal stakeholders provided written comment on the draft survey strategy within the 21 day comment period or thereafter. However, as the survey strategy included 100 per cent coverage of the survey area it was considered that it would be appropriate to go ahead with the survey as proposed, despite the lack of comment by some of the stakeholders. As discussed in Section 2.3 the survey was conducted on 8 January 2009.

Due to the refinements to the design of the proposed ANE Production Facility an additional area needed to be surveyed (refer to Figure 2.1). The survey strategy and methodology remained the same as for the initial survey. The Aboriginal stakeholders were provided with a copy of the new survey area, with a description of the survey strategy and an invitation to participate in fieldwork on 18 June 2009. All of the registered Aboriginal stakeholders were telephoned on 22 June 2009, to confirm the details of the survey. GWCHC provided comment on the survey strategy, agreeing with the proposed 100 per cent survey of the area, and this is included in Appendix B.
2.3 Fieldwork Involvement

The initial field survey for the Project was carried out on 8 January 2009. All Aboriginal stakeholder groups who registered an interest in the Project were invited to participate in the survey. The Aboriginal stakeholders participating in the survey were David Ahoy (ALALC), Shane Frost (ADTOAC), Annie Hickey (GWCHC), Arthur Fletcher (Wonn1), and Tracey Skene (CA), who were accompanied by Amanda Reynolds (Archaeologist, Umwelt), Nicola Roche (Senior Archaeologist, Umwelt) and Ward Cullen (Orica). BCAC did not have a representative available to attend the survey. Kerrie Brauer (ATOAC) said that she was unable to attend when contacted by telephone on 6 January 2009. Gordon Griffiths (WCH) chose not to participate in the survey on the morning of 8 January 2009 upon learning that the study area is located within the ALALC boundary.

During the survey period, Aboriginal stakeholder representatives were asked whether they had any additional cultural information to provide about the study area. The Aboriginal stakeholders raised some concerns about the clearing of some of the larger, older trees, in particular Angophora species. All mature trees of a potential age to have been scarred by Aboriginal people by the removal of bark and/or bark and heartwood for the manufacture of bowls, shields, etc. were inspected for scars, and no cultural scarring was observed. The existence of Aboriginal resource plants and animals was noted by the Aboriginal stakeholders and these are discussed in Section 3.0.

A copy of the draft assessment report relating to the 8 January 2009 survey was provided to ALALC, ATOAC, ADTOAC, CA, GWCHC, WCH, Wonn1 and BCAC on 13 March 2009.

A second field survey was undertaken on 1 July 2009 as a result of changes to the project design. The Aboriginal stakeholders participating in the survey were David Ahoy (ALALC), Shane Frost (ADTOAC), Kerrie Brauer (ATOAC), Annie Hickey (GWCHC), and Arthur Fletcher (Wonn1), who were accompanied by Amanda Reynolds. BCAC did not have a representative available to attend the survey. Tracey Skene (CA) was unable to provide a representative to participate on the survey on the day. Gordon Griffiths (WCH) was not present on the day of the survey, and was not contactable by telephone to confirm his absence on the day.

As with the initial survey, the Aboriginal stakeholder representatives were asked to provide any additional cultural information regarding the study area and survey area. Concerns regarding the clearing of the larger, older trees were raised again, including some ironbarks, angophoras, spotted gums and grass trees. No cultural scarring of Aboriginal origin was observed during the survey. Again, the existence of Aboriginal resource plants and animals was noted by the Aboriginal stakeholders and these are discussed in Section 3.0.

Recommendations were made by ADTOAC and ATOAC after the initial survey requesting monitoring of the topsoil removal. This recommendation was accepted by Orica, and is included in the management recommendations outlined in Section 7.

A draft copy of the current assessment was provided to all registered stakeholders on 10 August 2009 and it was requested that they provide written comments on the draft report by 1 September 2009. A letter reminding the relevant stakeholders of the closing date for comment was issued on 26 August 2009 and the remaining stakeholder groups who had not submitted comment by 8 September 2009 received a final reminder phone call or email.

Written comments were received from ATOAC, ADTOAC and Gidawaa Walang. These comments are included in full in Appendix B and summarised below.

On behalf of ATOAC, Kerrie Brauer provided general agreement with the recommendations outlined in Section 7, the proposed care arrangements discussed in Section 8 and the
methodology provided in Appendix C. ATOAC also emphasise the importance of taking a holistic view of the area, particularly in relation to the flora of the area. It is suggested that Orica could consider furthering additional analytical research regarding the area.

On behalf of ADTOAC, Shane Frost similarly provided general agreement with the recommendations in Section 7 and the methodology in Appendix C. Additionally, it is recommended that the Aboriginal stakeholders be involved in developing a strategy in consultation with Orica regarding removing and relocating protected flora species that are within the project area. It is also emphasised that recommendations for monitoring should also apply to any sub-surface works (such as sewerage lines). In relation to the care of any salvaged artefacts, it is requested that the artefacts be held by Umwelt and then returned close to their original location following the completion of construction.

Annie Hickey (on behalf of Gidawaa Walang) provided agreement with the recommendations provided in Section 7.

On behalf of Wonn1 Contracting, Arthur Fletcher verbally stated that he agreed with the recommendations and methodology provided in the draft report provided that all ground disturbance is confined to the project area. It was also suggested that any habitat trees that are removed during the course of the project should be retained elsewhere within the Technology Centre area. Furthermore, landscaping of the area post-construction should include the same types of species that are currently present within the project area, with grass trees to be retained for landscaping where possible.

Due to a family emergency, WCH were unable to provide comment. No comment was received from ALALC.

2.4 Summary

The ALALC, ATOAC, ADTOAC, BCAC, CA, GWCHC, WCH, and Wonn1 were consulted for this Project in accordance with the DECC (part of NSW National Parks and Wildlife Service) Aboriginal Cultural Heritage Guidelines for Archaeological Survey Reporting (NSW NPWS 1997:18) and the Interim Community Consultation Requirements for Applicants circulated by DEC (now DECC) in December 2004. Table 2.1 provides a summary of all consultation for the Project.

Table 2.1 – Summary of Consultation

<table>
<thead>
<tr>
<th>Date</th>
<th>Form of Consultation</th>
<th>Stakeholders Contacted</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 November 2008</td>
<td>An advertisement seeking the registration of interest in general Orica projects was placed in the Public Notices Section of The Newcastle Herald and the Koori Mail.</td>
<td>N/A</td>
</tr>
<tr>
<td>19 November 2008</td>
<td>Registration to be consulted for the Project received.</td>
<td>CA</td>
</tr>
<tr>
<td>19 November 2008</td>
<td>Registration to be consulted for the Project received.</td>
<td>WCH</td>
</tr>
<tr>
<td>20 November 2008</td>
<td>Registration to be consulted for the Project received.</td>
<td>GWCHC</td>
</tr>
<tr>
<td>23 November 2008</td>
<td>Registration to be consulted for the Project received.</td>
<td>ADTOAC</td>
</tr>
<tr>
<td>24 November 2008</td>
<td>Registration to be consulted for the Project received.</td>
<td>ATOAC</td>
</tr>
</tbody>
</table>
**Table 2.1 – Summary of Consultation (cont)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Form of Consultation</th>
<th>Stakeholders Contacted</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 November 2008</td>
<td>Letters of notification were sent by Umwelt to agencies including those indicated in DECC’s guidelines for stakeholder consultation.</td>
<td>ALALC, New South Wales Native Title Services, Cessnock City Council, Office of the Registrar of Traditional Owners, DECC</td>
</tr>
<tr>
<td>4 December 2008 to 24 December</td>
<td>Orica sent an invitation to eight registered Aboriginal stakeholder groups to participate in the consultation program and comment on a draft survey strategy. An invitation was sent for fieldwork involvement by Orica.</td>
<td>ALALC, ATOAC, ADTOAC, BCAC, CA, GWCHC, WCH and Wonn1</td>
</tr>
<tr>
<td>4 December 2008</td>
<td>ADTOAC, GWCHC provided written comment on the draft survey strategy.</td>
<td>ADTOAC, GWCHC</td>
</tr>
<tr>
<td>5 December 2008</td>
<td>Registration to be consulted for the Project received.</td>
<td>Wonn1</td>
</tr>
<tr>
<td>9 December 2008</td>
<td>NNTT response to Native Title search received.</td>
<td>NNTT</td>
</tr>
<tr>
<td>10 December 2008</td>
<td>Agency response to Umwelt’s letter of notification with a list of known Aboriginal stakeholders.</td>
<td>Cessnock City Council</td>
</tr>
<tr>
<td>15 December 2008</td>
<td>Agency response to Umwelt’s letter of notification with a list of known Aboriginal stakeholders.</td>
<td>DECC</td>
</tr>
<tr>
<td>16 December 2008</td>
<td>Registration to be consulted for the Project received.</td>
<td>BCAC</td>
</tr>
<tr>
<td>23 December 2008</td>
<td>ATOAC, BCAC supplied written comment on the draft survey strategy.</td>
<td>ATOAC, BCAC</td>
</tr>
<tr>
<td>December 2008 to January 2009</td>
<td>Written acceptance of nominated representatives for fieldwork was made by ALALC, ATOAC, ADTOAC, CA, GWCHC, WCH and Wonn1.</td>
<td>ALALC, ATOAC, ADTOAC, CA, GWCHC, WCH and Wonn1</td>
</tr>
<tr>
<td>6 January 2009</td>
<td>Additional telephone consultation was undertaken with the Aboriginal stakeholder groups to confirm the date of the field survey.</td>
<td>ALALC, ATOAC, ADTOAC, CA, GWCHC, WCH and Wonn1</td>
</tr>
<tr>
<td>8 January 2009</td>
<td>The field survey was undertaken with representatives of the registered Aboriginal stakeholder groups. Opportunity to comment in the field was provided.</td>
<td>ALALC, ADTOAC, CA, GWCHC and Wonn1</td>
</tr>
<tr>
<td>13 March 2009</td>
<td>The draft Aboriginal cultural heritage assessment report from the first survey was provided to Aboriginal stakeholder groups for comment.</td>
<td>ALALC, ATOAC, ADTOAC, BCAC, CA, GWCHC, WCH and Wonn1</td>
</tr>
<tr>
<td>April 2009</td>
<td>Aboriginal stakeholder group comments were considered and integrated into the assessment.</td>
<td>ALALC, ATOAC, ADTOAC, BCAC, CA, GWCHC, WCH and Wonn1</td>
</tr>
<tr>
<td>19 June 2009</td>
<td>Orica sent an invitation to eight registered Aboriginal stakeholder groups to participate in the consultation program and comment on a draft survey strategy for a revised survey area. An invitation to participate in fieldwork was also provided to the Aboriginal stakeholder groups.</td>
<td>ALALC, ATOAC, ADTOAC, BCAC, CA, GWCHC, WCH and Wonn1</td>
</tr>
</tbody>
</table>
Table 2.1 – Summary of Consultation (cont)

<table>
<thead>
<tr>
<th>Date</th>
<th>Form of Consultation</th>
<th>Stakeholders Contacted</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 June 2009</td>
<td>Telephone confirmation of nominated representatives for fieldwork was made with all Aboriginal stakeholder groups.</td>
<td>ALALC, ATOAC, ADTOAC, BCAC, CA, GWCHC, WCH and Wonn1</td>
</tr>
<tr>
<td>1 July 2009</td>
<td>The field survey was undertaken with representatives of the registered Aboriginal stakeholder groups. Opportunity to comment in the field was provided.</td>
<td>ALALC, ADTOAC, ATOAC, GWCHC, Wonn1</td>
</tr>
<tr>
<td>10 August 2009</td>
<td>The draft Aboriginal cultural heritage assessment report from the second survey was provided to Aboriginal stakeholder groups for comment.</td>
<td>ALALC, ATOAC, ADTOAC, BCAC, CA, GWCHC, WCH and Wonn1</td>
</tr>
<tr>
<td>08 September 2009</td>
<td>Aboriginal stakeholder group comments were considered and integrated into the final assessment.</td>
<td>ALALC, ATOAC, ADTOAC, BCAC, CA, GWCHC, WCH and Wonn1</td>
</tr>
</tbody>
</table>
3.0 Environmental Context

This section of the report describes the environmental context of the survey area and the wider study area including the topography, geology, soils, flora and fauna. These are important factors that relate to Aboriginal resource availability and associated site distribution within these areas. Prior land use and disturbance of the survey area has implications for the survival and integrity of any Aboriginal sites that may be present within the survey area. The information provided in this section is used (in conjunction with the cultural context provided in Section 4) to prepare a predictive model for site location and site type for the survey area (refer to Section 4.4).

3.1 Topography and Hydrology

The region of the survey area is characterised by low undulating to rolling hills and includes the westerly facing slopes and foothills of the Sugarloaf Range. The survey area includes a low gentle slope, which rises to the east towards a spur which characterises the south-eastern portion of the study area. The elevation in the region varies from 20 metres to 160 metres AHD in the areas of rolling hills. In the study area, the elevation ranges from 30 metres to 130 metres AHD, and within the survey area the elevation ranges from 30 metres to 50 metres AHD.

Surveyors Creek is the nearest permanent freshwater supply, one kilometre north of the study area. One second order tributary of Surveyors Creek flows through the western portion of the study area, 900 metres from the survey area, and a first order tributary of Surveyors Creek flows through the eastern side of the site, 750 metres from the survey area. The two tributaries which run through the study area are ephemeral and would not have been a permanent water supply. A dam is located one kilometre west of the study area and this, along with possible drainage line alterations due to erosion after clearing, may have changed water resource availability.

3.2 Geology and Soils

The geology of the area is Newcastle Coal Measures, which consist of conglomerate, sandstone, tuff, shale and coal, and the Tomago Coal Measures which consist of shale, mudstone, sandstone, tuff and coal (Geological Survey of NSW 1976, 1:100,000 map).

The study area lies over four soil landscapes, the Beresfield, Killingworth, Sugarloaf and Cockle Creek soil landscapes. The Beresfield and Killingworth soil landscapes dominate the study area, with the Beresfield soil landscape dominant in the western section of the study area and the Killingworth soil landscape dominant in the eastern section of the study area. The survey area is predominantly within the Beresfield landscape, with part of the access road located within the Killingworth landscape.

The Beresfield landscape can be characterised as:

- moderately deep (<120 cm), moderately well to imperfectly drained Yellow Podzolic Soils,
- Brown Podzolic Soils and brown Soloths occur on crests with moderately deep (<120 cm), well-drained Red Podzolic Soils and Red Soloths on upper slopes, moderately well to imperfectly drained brown Soloths and Yellow Soloths on sideslopes and deep (>200 cm), imperfectly to poorly drained Yellow Podzolic Soils, Yellow Soloths and Gleyed Podzolic Soils on lower slopes (Matthei 1995: 30).
The Beresfield landscape is subject to water erosion hazard, with seasonal water logging and high run-on on lower slopes. The soils are highly acidic and of low fertility.

The Killingworth landscape can be characterised as:

Shallow (<60 cm) to moderately deep (150 cm), well to imperfectly drained Yellow Podzolic Soils, Yellow Soloths, Gleyed Podzolic Soils and Gleyed Soloths on crests and hillslopes, with shallow (<60 cm) well-drained Structured Loams, Bleached Loams and Lithosols on some crests. (Matthei 1995: 132).

The Killingworth landscape has a high water erosion hazard, localised foundation hazard, localised shallow soils and localised seasonal water logging. The soils are strongly acidic and of low fertility.

The geology of the area includes sandstone, which may be used for making tools such as axes and spears. Grinding grooves have been recorded along creek lines in the nearby Sugarloaf Range (refer to Section 4.0 for further details). As there are creek lines within the study area, there is the potential that sandstone outcrops suitable as a substrate for grinding stone artefacts may be associated with these watercourses. However, there are no creek lines within the survey area.

3.3 Flora

The vegetation of the survey area contains a wide variety of flora resources, and is dominated by native species. A total of 84 plant species were identified during the ecological assessment of the survey area including one introduced species (Umwelt 2009 in prep.). Three vegetation communities are known to occur in the region of the study area, two of these, the Lower Hunter Spotted Gum - Ironbark Forest and the Coastal Plains Smooth-barked Apple Woodland occur within the survey area (Umwelt 2009 in prep).

A number of flora species identified during the ecological assessment are known to have been used by Aboriginal people and are listed in Table 3.1.

Table 3.1 – Aboriginal Resource Plants Recorded within the Survey Area

<table>
<thead>
<tr>
<th>Common and Scientific Name</th>
<th>Use</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple berry</td>
<td>Fruit eaten.</td>
<td>Low 1989:40 Zola &amp; Gott 1992:26</td>
</tr>
<tr>
<td><em>Billardiera scandens</em> var. <em>scandens</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>black wattle</td>
<td>This plant has gum that is used for food. It has leaves which are crushed and soaked to waterproof nets. Wood used for boomerangs, clubs and digging sticks. A fat pink witchetty grub lives under this plant and is used as a food resource.</td>
<td>McBride 2006 (in Umwelt 2007 Appendix 1)</td>
</tr>
<tr>
<td><em>Acacia</em> <em>sp.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banksia</td>
<td>Nectar eaten; cones used to carry fire.</td>
<td>Low 1989:170 Stewart &amp; Percival 1997:13</td>
</tr>
<tr>
<td><em>Banksia</em> <em>spp.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottle brush</td>
<td>Food plant. The flowers are sucked as a source of nectar.</td>
<td>Stewart &amp; Percival 1997: 11</td>
</tr>
<tr>
<td><em>Callistemon</em> <em>sp.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bracken fern</td>
<td>The underground fibrous stem roasted and beaten with a stone to remove starch.</td>
<td>Zola &amp; Gott 1992: 37</td>
</tr>
<tr>
<td><em>Pteridium</em> <em>esculentum</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3.1 – Aboriginal Resource Plants Recorded within the Survey Area (cont)

<table>
<thead>
<tr>
<th>Common and Scientific Name</th>
<th>Use</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burrawang cycad  <em>Macrozamia communis</em></td>
<td>Pounded seed washed in running water for days to remove toxins, pulp then made into a cake and roasted.</td>
<td>Stewart &amp; Percival 1997:37</td>
</tr>
<tr>
<td>Casuarinas sp.</td>
<td>Resource plant. Clubs and boomerangs were made from casuarinas.</td>
<td>Australian National Botanic Gardens Education Services, 2000</td>
</tr>
<tr>
<td>coast wattle  <em>Acacia longifolia</em> var. <em>longifolia</em></td>
<td>Food plant.</td>
<td>Low 1989:85</td>
</tr>
<tr>
<td>false sarsaparilla  <em>Hardenbergia violacea</em></td>
<td>Medicinal plant.</td>
<td>Low 1989: 210</td>
</tr>
<tr>
<td>flax lily  <em>Dianella cerulean</em> var. <em>producta</em></td>
<td>The berries are eaten, seeds inside can be chewed and are nutty in flavour. The leaves can be split and used for weaving. The base of the leaves is edible. The roots are edible after pounding and roasting. The plant is used as a whistle to attract birds.</td>
<td>Low 1989:8 Stewart and Percival 1997:24</td>
</tr>
<tr>
<td>Geebungs  <em>Persoonia sp.</em></td>
<td>Ripe fruit pulp eaten; fine scrapings of wood from young stems mixed with breast milk for use as eye treatment; solution made from bark strengthened fishing lines.</td>
<td>Stewart &amp; Percival 1997:42</td>
</tr>
<tr>
<td>gum tree  <em>Eucalyptus sp.</em></td>
<td>Food and resource plant.</td>
<td>Low 1989:100</td>
</tr>
<tr>
<td>Hakea  <em>Hakea sp.</em></td>
<td>Food plant. The flowers are sucked as a source of nectar.</td>
<td>Stewart &amp; Percival 1997: 11</td>
</tr>
<tr>
<td>kangaroo grass  <em>Themeda sp.</em></td>
<td>Food and resource plant.</td>
<td>Zola &amp; Gott 1992:58</td>
</tr>
<tr>
<td>Lemon-scented tea tree  <em>Leptospermum polygalifolium</em> subsp. <em>polygalifolium</em></td>
<td>Popularly used to make a drink with nectar and also used for food.</td>
<td>Low 1989:32</td>
</tr>
<tr>
<td>mat rush  <em>Lomandra sp.</em></td>
<td>Long pliable leaves used for weaving baskets, leaf bases and the flowers are edible.</td>
<td>Low 1989: 131, 174; Zola &amp; Gott 1992:59</td>
</tr>
<tr>
<td>Melaleuca  <em>Melaleuca decora</em></td>
<td>Papery soft bark used to wrap babies, roof structures, wrap food; timber used to make spears, clubs and digging sticks; liquid from leaves boiled to make tea; blossoms soaked in water to make sweet drink; steam from boiling or burning leaves inhaled to treat cold &amp; flu symptoms.</td>
<td>Zola &amp; Gott 1992:63 Low 1989:32 Stewart &amp; Percival 1997:39</td>
</tr>
<tr>
<td>Mistletoe  <em>Amyema sp.</em></td>
<td>Food plant. The berries are eaten.</td>
<td>Low 1989: 14; Zola &amp; Gott 1992: 54</td>
</tr>
<tr>
<td>narrow-leaved geebung  <em>Persoonia linearis</em></td>
<td>Fruit eaten.</td>
<td>Low 1989: 43-44</td>
</tr>
<tr>
<td>native cherry  <em>Exocarpos cupressiformis</em></td>
<td>The enlarged succulent stalklet (pedicel) can be eaten.</td>
<td>Low 1989: 46</td>
</tr>
</tbody>
</table>
### Table 3.1 – Aboriginal Resource Plants Recorded within the Survey Area (cont)

<table>
<thead>
<tr>
<th>Common and Scientific Name</th>
<th>Use</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>red ironbark <em>Eucalyptus fibrosa</em></td>
<td>Resource plant.</td>
<td>Low 1989:110</td>
</tr>
<tr>
<td>red-stemmed wattle <em>Acacia myrtifolia</em></td>
<td>Food plant.</td>
<td>Low 1989:85</td>
</tr>
<tr>
<td>snow in summer <em>Melaleuca linariifolia</em></td>
<td>Blossoms used for nectar and honey as food resource.</td>
<td>Low 1989: 171</td>
</tr>
<tr>
<td>tea tree <em>Melaleuca sp.</em></td>
<td>Some species of tea tree were used by Aboriginal people for medicinal purposes. Leaves could be crushed and inhaled for coughs and colds, leaves could be soaked to make an infusion. Sores and burns were washed with the leaf infusion. The bark was used for bedding and for bandages.</td>
<td>Low 1990: 95</td>
</tr>
<tr>
<td>sickle wattle <em>Acacia falcata</em></td>
<td>Food plant.</td>
<td>Low 1989:85</td>
</tr>
<tr>
<td>wombat berry vine <em>Eustrephus latifollius</em></td>
<td>Small sugary tubers eaten.</td>
<td>Low 1989: 17</td>
</tr>
</tbody>
</table>

### 3.4 Fauna

An Open Forest habitat type was recognised within the survey area as part of the ecological assessment (Umwelt 2009 *in prep*.). The habitat assessment revealed that the study area contains high quality habitat for fauna species.

Only one faunal species which could have been exploited by Aboriginal people was observed during the ecological survey, the kookaburra (*Dacelo* spp) (Umwelt 2009, *in prep*).

Historically, eastern grey kangaroo, red-necked wallaby, koalas, wombats, native bush rat, echidna, ringtail possum and long-nosed bandicoot are mammals Aboriginal people targeted for hunting and which would have existed in the region. Goanna, eastern water dragon, red-bellied black snake, eels and tortoises were also noted to occur in the lower reaches of the major creeks in the Killingworth soil landscape, within one kilometre of the project area, along with various species of small fish (Umwelt 2003a, b). Previously members of ALALC have stated that their people hunted abundant kangaroos, wallabies, koalas, wombats, bush turkeys and possums across this area for their meat and skins (Umwelt 2003b- Appendix 2).

From historic and ethnographic records, the study area would have supported a high quality fauna habitat and would have been relatively rich in fauna species hunted by Aboriginals, though these were likely to have been widely distributed and possibly difficult to hunt in a forest environment.
3.5 Past Land Use and Disturbance

The study area is adjacent to George Booth Drive and approximately 2.5 kilometres to the north-west of Tasman Mine. The area for the construction is located off Orica's internal access road Echidna Drive, adjacent to the existing Orica infrastructure. Sections of the study area were cleared in 1991 to allow the existing Orica office, testing and laboratory, and production infrastructure to be built. Numerous fire trails and some four-wheel drive tracks have been historically cleared through the woodland of the site and a 90 metre wide 132kV electricity easement runs through the north-eastern portion of the study area.

The primary historic land uses in the region were tree clearing for timber and farming. Although the current vegetation is relatively dense, the majority is regrowth. Many trees in the region were felled, especially for use as pit props for the underground coal mines in the region from the 1850s, and continuing into the 20th Century (Umwelt 2003b, West Wallsend Public School 1987). The recent vegetation clearance (1991) was more localised for current Orica infrastructure.

The previous clearing of native vegetation in the area has a number of implications in relation to cultural heritage. These include:

- the potential removal of scarred and/or carved trees that may have been present;
- the removal of floral species that were valued resources for Aboriginal people;
- the removal of faunal species that were used by Aboriginal people; and
- increased rates of erosion resulting in the lateral and horizontal movement of artefacts and the conflation of artefacts from a number of different sites or locations within a site.

3.6 Implications of the Environmental Context on Aboriginal Use of the Survey Area

The survey area is situated on a gentle slope, with a gradient that would not preclude short term camping, however water sources within the survey area consist of two ephemeral tributaries that would only have supplied drinking water for short periods after rain. The nearest permanent freshwater supply is Surveyors Creek, one kilometre north of the survey area. Based on the availability of drinking water, Surveyors Creek was more likely to have been a location suitable for comparatively longer term occupation by Aboriginal people, with the study area being used for very short term camp sites or transient use by hunting and gathering parties.

Heavy vegetation clearing in the study area will have impacted flora and fauna communities so it is unlikely that their current availability (density and complexity) will reflect pre-European times. Many native flora species have been cleared, however despite this a wide range of Aboriginal resource plants were identified during the ecological and archaeological assessment (refer to Table 3.1). The resource plant species available suggest that the area would have been suitable for at least seasonal hunting and gathering activities. The potential for scarred trees to occur is limited as a result of the heavy clearing undertaken in the past.

Vegetation clearance would also have increased rates of erosion in the area, with cleared areas within the survey area likely to have suffered erosion to varying degrees. Soils within the area are also subject to seasonal water logging. The occurrence of vegetation clearance and associated erosion have the capacity to expose and/or move or destroy Aboriginal sites.
that may have been present in the area and will have affected the archaeological integrity of any artefacts that may remain.

Overall, hunting and foraging by small groups of Aboriginal hunter-gatherers is the most likely scenario for the use of the survey area based on the environmental context. Such activities generally do not result in the discard of sufficient cultural material to make the use of the area archaeologically visible (i.e. so few stone implements are discarded that they are unlikely to be observed during survey). Furthermore, the level of vegetation clearance and erosion in the survey area is likely to have impacted on the archaeological integrity of any artefacts that may remain.
4.0 Cultural Context

This section of the report describes the archaeological context of the study area, including ethnohistoric information, known Aboriginal sites from the DECC AHIMS register, and other archaeological work undertaken in the region. This information is taken into account in creating a predictive model that will assist in predicting the likelihood of Aboriginal archaeological sites existing within the study area.

4.1 Ethnohistoric Information

The study area is presently situated within the boundaries of the ALALC. While there are numerous ethnohistoric accounts relating to the Awabakal people, particularly in the Lake Macquarie area, the reliability and accuracy of these accounts is affected by a number of factors. The majority of records were written by non-Aboriginal men who did not have access to all aspects of Aboriginal society. The Awabakal territory was settled a number of years after Sydney, and by this time introduced diseases had begun to have their affect on the Aboriginal populations in the area (Butlin 1982). The early settlers typically held an incorrect view that Aboriginal culture was ‘primitive’ and often their accounts reinforced this stereotype, whether intentionally or unintentionally.

Within the Lake Macquarie area, a large volume of ethnohistoric data was recorded by Lancelot Threlkeld, who founded a mission for Aboriginal people at Lake Macquarie in 1825 (Clouten 1967:21) and recorded the Awabakal dialect. Threlkeld recorded aspects of the Aboriginal diet in the Lake Macquarie area and this is focused on the coastal life at Lake Macquarie. Threlkeld refers to the hunting or collection and preparation of a range of items including witchetty grubs, lizards, snakes, wild dogs, wild ducks, geese, pigeons, bandicoots, kangaroos, whale, porpoises, crayfish, fish, and cockles (in Gunson 1974:55). The Awabakal people were able to move from the coast to the mountains if food became scarce at any time or if a change in diet was sought (Umwelt 2003a).

Mount Sugarloaf, three kilometres away from the study area, and the Sugarloaf Range is an important place for the Awabakal people. Mount Sugarloaf provides a vantage point for all the areas that belong to the Awabakal people, making it an important teaching place. The Awabakal also have a creation story about Mount Sugarloaf, and it is a place where sacred ceremonies are known to have taken place (Umwelt 2003a). The Sugarloaf Range landscape is considered significant to all Aboriginal groups in the area, with a number of comments indicating Dreamtime stories, and ceremonial importance of the Sugarloaf Range (Umwelt 2003a, b).

4.2 Known Aboriginal Sites

A search of the DECC AHIMS register was undertaken on 18 December 2008. The results indicate that 43 sites have been recorded within an area of six kilometres by seven kilometres (AMG coordinates E360000 - 366000 and N6358500 - 6365500) surrounding the study area. Within these site search results, five site types were recorded in the search area (Appendix D). Figure 4.1 shows the location of these sites in relation to the study area. Table 4.1 provides a list of Aboriginal sites recorded on the AHIMS register.
Table 4.1 – Aboriginal Sites Recorded on the AHIMS Register

<table>
<thead>
<tr>
<th>Site Type</th>
<th>Site Feature(s) (as shown on DECC AHIMS)</th>
<th>Number of Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stone Arrangement</td>
<td>STA (stone arrangement)</td>
<td>1</td>
</tr>
<tr>
<td>Grinding Groove</td>
<td>GDG or GDG with PAD</td>
<td>20</td>
</tr>
<tr>
<td>Artefact Scatter</td>
<td>AFT (artefact)</td>
<td>7</td>
</tr>
<tr>
<td>Artefact (no type or number provided by DECC)</td>
<td>AFT-</td>
<td>4</td>
</tr>
<tr>
<td>Isolated Find</td>
<td>AFT-1</td>
<td>7</td>
</tr>
<tr>
<td>Potential Archaeological Deposit (PAD)</td>
<td>PAD</td>
<td>3</td>
</tr>
<tr>
<td>Aboriginal Resources and Gathering</td>
<td>ARG</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total Sites</strong></td>
<td></td>
<td><strong>43</strong></td>
</tr>
</tbody>
</table>

A number of Aboriginal cultural heritage sites have been recorded within the AHIMS search area which surrounds the survey area. These sites include isolated finds, small artefact scatters (less than ten artefacts), grinding grooves, a stone arrangement, areas with Potential Archaeological Deposit and an area of Aboriginal resources.

Grinding grooves are the most frequent site type in the search area (47 per cent). Artefact scatters and isolated finds are equally the next most frequent site type (16 per cent) within the search area. The majority of the isolated finds and artefact scatters are associated with drainage lines.

4.2.1 Site Types Identified in AHIMS Search Area

There are five site types located within the search area and these include:

**Open Camp Sites**

Open campsites consist of isolated finds (single artefacts), or artefact scatters, in the open landscape rather than in a rockshelter or cave. Stone artefacts are the best preserved Aboriginal archaeological materials, and artefact scatters may indicate a single activity, or multiple episodic activities in a single place. Isolated finds may represent lost or discarded artefacts, but may also be the surface evidence of a larger subsurface artefact scatter.

**Grinding Grooves**

Grinding grooves are grooves on exposed rock surfaces that have been created by the sharpening of stone axe heads, stone chisels, stone adzes or fire hardened wooden spear points. Stone implements that required a sharp cutting edge were generally ground on sandstone. Within the Sugarloaf Range they are commonly located on sandstone outcrops in creek beds and on outcrops along the banks of the creeks. The availability of water enhanced the speed with which grinding proceeded.

**Stone Arrangements**

Stone arrangements can consist of simple stone mounds or complex features and pathways constructed from deliberately placed stones. Stone arrangements are found throughout inland NSW as well as the coast.
Potential Archaeological Deposit (PAD)

The term PAD is somewhat subject to interpretation however, in general terms, sites listed as PADs on the AHIMS register are locations within the landscape that hold the potential to have subsurface deposits. The primary importance of the deposits is the possibility that they will provide information that can be used to interpret changes in the archaeological record. A PAD should be a location that has not been significantly disturbed by activities such as, animal burrowing, erosion, vegetation clearance, track construction and vehicle activity. Artefacts with limited post-depositional disturbance have a higher potential to retain high archaeological integrity and the artefacts are more likely to reflect the circumstances leading to their deposition. The presence of PAD should be assessed in light of the environmental context (including topography, resource availability, geomorphic patterns and the depth of the topsoil horizon) and the local archaeological context (in relation to the patterning of site location within the local area).

Aboriginal Resources and Gathering

Aboriginal Resources and Gathering defines an area related to everyday activities such as food gathering, hunting, or collection and manufacture of materials and goods for use or trade.

Summary of site types located in the AHIMS search area

The closest sites to the study area are three artefact scatters, three isolated finds and an Aboriginal resource and gathering location all identified along an electricity easement which runs 500 metres south of the study area. One PAD along Surveyors Creek is registered in the search area, one kilometre east of the study area boundary. The majority of sites in the search area are located within fifty metres of creek lines or drainage lines. A number of the grinding grooves present in the region are located on Mount Sugarloaf and in the Sugarloaf Range, two kilometres south of the study area.

4.3 Previous Archaeological Research

This section provides a summary of previous archaeological research within the locality.

A review of previous archaeological research in the locality indicates that there are no known sites or PADs within the survey area or the study area.

4.3.1 Mitchell McCotter 1990

An environmental impact statement was prepared for the Orica Mining Services Technology Park by Mitchell McCotter, in which the current study area was subject to an archaeological survey. The survey was conducted by Koettig (1990) across the whole site, in transects at 30 metre intervals, focusing on the tracks present. Mature trees were inspected for scars and exposed bedrock in the tributaries was inspected for grinding grooves. No Aboriginal sites were identified during the survey (Koettig 1990: 3 cited in Mitchell McCotter 1990: 5.35). The alluvial flats, a focal point for Aboriginal occupation, were low lying and waterlogged in the study’s survey area, and would not have been suitable for camping.

As the survey transects and exposed tracks covered most topography types and no archaeological material was observed, it was suggested that archaeological material in the area was not likely to be detectable through archaeological survey.
4.3.2 Resource Planning 1991

Resource Planning (1991) carried out an archaeological assessment along a section of George Booth Drive between the Northville Drive roundabout and Cameron Park Drive, 8.3 kilometres south-east of the study area. One artefact scatter (consisting of a flaked piece and a core), and one isolated find (a flaked piece) were identified as part of this assessment (1991:5). The area was assessed as heavily disturbed.

4.3.3 Umwelt 2002

Umwelt (Australia) Pty Limited prepared an archaeological assessment of the Tasman Mine surface facilities for the Newcastle Coal Company in 2002. The Tasman Mine is located 2.5 kilometres to the south-east of the study area. A field survey of the area was undertaken, during which no Aboriginal artefacts or sites were located. Some mature trees were inspected for scarring and there was no evidence of rock shelters, caves or grinding grooves within any areas of sandstone outcrop.

4.3.4 Umwelt 2003a

Umwelt (Australia) Pty Limited undertook a cultural heritage assessment of the Minmi Corridors in the western part of the Newcastle Local Government Area (LGA), extending west to Mount Sugarloaf in Cessnock City Council and south into Lake Macquarie City Council. The objectives of the project were to assess the natural and heritage values of the area and to identify habitats and landscapes that have cultural heritage values. The western part of the study area, incorporating the Mount Sugarloaf reserve is located approximately two kilometres south of George Booth Drive, where the current study area is located. Mount Sugarloaf and the Sugarloaf Range were identified as important areas for the Awabakal people, containing many natural resources. Grinding grooves, generally a rare and culturally and archaeologically significant site type, were found to be prevalent in this area, due to ideal geology.

4.3.5 Umwelt 2003b, 2006a, 2006b

Detailed archaeological investigations have been undertaken within a regional context for the proposed F3 to Branxton Highway Link (refer to Helen Brayshaw Heritage Consultants 2001, Umwelt 2003b and Umwelt 2006a, 2006b).

Umwelt (Australia) Pty Limited prepared an Aboriginal heritage assessment of the Roads and Traffic Authority’s proposed F3 to Branxton Extension. This extension is proposed to continue from the Link Road junction and run near George Booth Drive towards Kurri Kurri, approximately one kilometre north of the study area. This study predicted artefact scatters would be small and were most likely to be located on areas of level ground near creeklines, and that isolated finds were most likely to be located along creeklines. PADs were assessed as likely to be associated with Surveyors Creek and grinding grooves as most likely to exist in areas of sandstone outcropping in and near creeklines, and within the Sugarloaf Range.

Subsequent inspections and subsurface investigations supported the initial predictions, however, it was found that PAD was unlikely as most subsurface artefacts located had been disturbed by tree clearance and subsequent erosion (Umwelt 2006a). Thus, even though small numbers of artefacts were located in a subsurface context near the main channel of Surveyors Creek, these were assessed as being in a secondary deposition context (i.e. they had moved with the soils following tree clearance and then become reburied).
The results of the survey work carried out (Umwelt 2006a) between the period December 2003 and May 2005 in the Sugarloaf Range Area found that there was only a very low number of sites in this area, the artefact scatter sites were generally located on benches above the creeklines and on ridge crests, the sites had generally less than ten artefacts, and approximately 90 per cent of the stone used for stone implement manufacture was Nobbys Tuff, most likely sourced from Nobbys Headland at Newcastle. The remainder of the raw materials were chert, volcanics and silcrete, with all materials imported into the Sugarloaf Range area.

4.4 Predictive Model

The number of known sites in the region is directly related to the amount of archaeological survey undertaken and this must be considered when assessing the potential for Aboriginal sites to exist in the survey area. The potential for Aboriginal sites within the survey area can be predicted based on the review of previous archaeological research, information related to known sites in the region and resources available in the local environment.

Based on the information presented in Section 3 and within the previous parts of Section 4, the following predictive model has been developed.

- Aboriginal grinding grooves are the most frequent site type identified in the locality. These sites are predicted only where sandstone outcrops are found which are suitable for grinding and this potential is increased with proximity to a water source. Sandstone exists in the geology of the study area and creek tributaries flow through the edges of the study area. However, potential for Aboriginal grinding grooves within the study area is predicted as low based on the results of Koettig’s previous survey of the study area (cited in Mitchell McCotter 1990) and the lack of creeklines in the survey area.

- Open camp sites, made up of artefact scatters and isolated finds, are another frequent site type identified in the locality. The potential for isolated finds and small, low density artefact scatters to exist within the broader study area is low. The presence of tributaries of Surveyors Creek which would have provided ephemeral water sources and the likelihood that the numerous floral and faunal resources would have attracted Aboriginal people to hunt and gather in the area suggest that it is possible that small sites may be in the study area. The potential for large artefact scatters (>30 artefacts) associated with camp sites is considered highly unlikely due to the presence of more suitable camping areas nearby on Surveyors Creek. Previous land use history will also have accelerated erosion within the study area meaning the potential for PAD within the survey area is limited, as it is likely that erosion has removed some or most of the topsoil and moved artefacts (if any) downslope where they may have been reburied in a secondary depositional context.

- There is limited to no potential for Aboriginal scarred trees to be identified in the survey area or the broader study area based on the previous land use history. No scarred trees were identified within the locality in the 1991 survey or as a result of the site search (refer to Figure 4.1).

- Though one stone arrangement exists in the locality there is limited to no potential for stone arrangements to exist in the survey area or the broader study area based on the previous land use history. No stone arrangements were identified within the locality in the 1991 survey or as a result of the site search (refer to Figure 4.1).

- There are no known contact sites within the locality or within the study area or survey area based on known historical and ethnographic information.
The soils within the broader study area are acidic and subject in low-lying areas to wetting and drying and are therefore not conducive to the preservation of human remains. The soils within the survey area are similarly acidic and have been subject to ongoing land clearance activities and erosion and thus it is unlikely that burials (if any ever occurred) will remain extant within the area.
5.0 Results of Surveys

5.1 Survey 8 January 2009

This section contains the survey methodology, including the survey transects, the effective coverage of the survey and ground surface visibility and a discussion of the results obtained from the survey.

5.1.1 Methodology

A pedestrian survey of the previously proposed ANE Production Facility and access road impact area (as shown on Figure 1.2) was carried out on 8 January 2009. The objectives of the survey included:

- sampling all environmental contexts and landforms within the survey area (refer to Figure 5.1);
- targeting areas of higher archaeological visibility such as exposures and scalds, whilst still ensuring that all environmental contexts were sampled;
- inspecting mature trees for evidence of Aboriginal scarring, stone outcrops for evidence of extraction and sandstone exposures for evidence of grinding grooves;
- incorporating any areas specifically identified by the Aboriginal stakeholder groups for their potential cultural heritage values; and
- recording any cultural knowledge or stories and information about the cultural heritage values of the survey areas that may be supplied by the Aboriginal stakeholder groups.

The survey involved:

- the detailed inspection of all areas in which visibility and/or exposure could permit the identification of artefacts (should any be present);
- the detailed inspection of all areas that could contain mature trees, and sandstone exposures; and
- broad scale inspection of the remainder of the survey area in order to assess archaeological potential and cultural heritage value.

Survey data was recorded using a hand-held GPS, maps, compass and standardised field recording forms. Information recorded during the survey included:

- the nature of the landforms and vegetation;
- the nature of drainage lines and the effects of erosion on bank stability and surface exposure;
- the effects of erosion and disturbance on the area as a whole;
- the availability of Aboriginal resources;
- the likelihood of PAD within the survey area; and
any information provided by Aboriginal stakeholders regarding the cultural significance of the survey areas.

The survey conducted on 8 January 2009 was undertaken in two stages. The proposed building infrastructure area was divided into four north-west-south-east transects of approximately 35 metres in width (estimated on seven people walking at five metre intervals) and the proposed access road was surveyed as a single transect of approximately 35 metres in width.

5.1.2 Field Team

The field survey was carried out on 8 January 2009. The Aboriginal stakeholders participating in the survey were David Ahoy (ALALC), Shane Frost (ADTOAC), Annie Hickey (GWCHC), Arthur Fletcher (Wonn1), and Tracey Skene (CA), who were accompanied by Amanda Reynolds (Archaeologist, Umwelt), Nicola Roche (Senior Archaeologist, Umwelt) and Ward Cullen (Orica).

5.1.3 Landform Elements

The previous survey area was assessed by landform element in order to satisfy the DECC’s requirements. Dividing the landform into elements and recording landform elements in the field is a tool used to gain an understanding of archaeological site patterning and Aboriginal occupation across the landscape. It also aids when comparing and interpreting evidence of Aboriginal occupation of the survey area with the evidence of Aboriginal occupation in the general locality.

Figure 5.1 shows the landform elements of the study area, with both of the survey areas defined within this boundary. Definitions of the various landform elements (McDonald et al 1990) are provided in Table 5.1.

<table>
<thead>
<tr>
<th>Tabler Title: Table 5.1 – Landform Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spur</td>
</tr>
<tr>
<td>Moderately Inclined Slope</td>
</tr>
<tr>
<td>Gently Inclined Slope</td>
</tr>
<tr>
<td>Simple Slope</td>
</tr>
<tr>
<td>Bench</td>
</tr>
<tr>
<td>Flat</td>
</tr>
<tr>
<td>Creek line</td>
</tr>
<tr>
<td>Creek bank</td>
</tr>
<tr>
<td>Modified</td>
</tr>
</tbody>
</table>

Only two of the landform elements within the study area exist within the previous survey area, a simple slope and modified landform. Simple slopes make up 89 per cent of the previous survey area and 11 per cent of the previous survey area is modified by road and track construction. While the majority of the previous survey area is not modified significantly, the survey confirmed that the landscape has undergone past vegetation clearance, ground surface disturbance and erosion (clearly visible on the fire trails).
5.1.4 Description of Survey Transects

The survey area was broken down into two distinct areas, the proposed building infrastructure area and the proposed access road. Within the infrastructure area there is one landform unit, a gentle simple slope, rising west to east. The access road is within two landform units, the gentle simple slope and modified landscape.

During the survey, a small pool of standing water was observed approximately 50 metres south of the infrastructure area, in a minor drainage depression on a fire trail. This indicates that water may have been available for a short period of time after heavy rains. No distinct chain of ponds was observed.

No suitable sandstone outcrops for Aboriginal grinding grooves were identified during the survey. One sandstone outcrop was observed, but was outside the previous survey area. This was inspected and the sandstone was unsuitable for, and did not have grinding grooves.

5.1.5 Effective Coverage

<table>
<thead>
<tr>
<th>Survey Area</th>
<th>Landform Element</th>
<th>Total Sample Area of transect (m²)</th>
<th>General Surface Visibility (%)</th>
<th>General Surface Visibility (m²)</th>
<th>Exposures (m²)</th>
<th>Exposure Visibility (%)</th>
<th>Total Exposed Area (m²)</th>
<th>Total Exposed Area (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Simple Slope</td>
<td>111,000</td>
<td>5%</td>
<td>5,550</td>
<td>461</td>
<td>70%</td>
<td>323</td>
<td>5.3</td>
</tr>
<tr>
<td>2</td>
<td>Modified</td>
<td>14,000</td>
<td>70%</td>
<td>9,800</td>
<td>2,500</td>
<td>80%</td>
<td>2,000</td>
<td>84.3</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>125,000</td>
<td>12%</td>
<td>15,350</td>
<td>2,961</td>
<td>78%</td>
<td>2,323</td>
<td>14</td>
</tr>
</tbody>
</table>

In calculating the results of Table 5.2 the general surface visibility in square metres was combined with the total exposed area in square metres. The percentage of this value of the total sample area is the total exposed area (%), which is the effective coverage total. The results of Table 5.2 show that general ground surface visibility ranged between 5 per cent and 70 per cent within the previous survey area, and that visibility conditions ranged from excellent to low with an average effective coverage of 14 per cent. The highest effective coverage was observed in the modified areas of the previous survey area, especially within the electricity easement. Within the simple slope, the areas of exposure were along the electricity easement and fire trails (three to five metres wide), which run through the previous survey area, where vegetation has been cleared. The remainder of the previous survey area had much lower visibility, with grass and foliage cover limiting effective coverage to five per cent.

The above results indicate that ground surface visibility within the previously unmodified parts of the previous survey area is generally low, with very few exposures outside the modified landform/fire trails.

Ground cover across the simple slope consisted of grasses, leaf and tree litter. The visible soil in the exposures was characterised as light grey silty sand. The fire trails were noted to have erosion scours resulting from vehicular traffic and water running downslope along the trails. Apart from the fire trails, there was an additional small exposure with 15 per cent visibility. Despite the relatively large areas of visibility afforded by the power easement and
the fire trails, no Aboriginal sites or artefacts were located during the survey on 8 January 2009.

High levels of disturbance were observed associated with historic tree clearance, construction and maintenance of the Energy Australia 132 KV transmission line and accompanying easement, the creation and maintenance of bush fire trails throughout the previous survey area, vehicle movements, erosion, and at the north-east end of the survey transect related to the construction of the access to the Orica site from George Booth Drive.

5.1.6 Discussion of Archaeological Results

All mature trees in the previous survey area were inspected for Aboriginal scarring however, none were identified. A range of Aboriginal resource plants were observed in the survey area, however only one species of animal known to have been exploited by Aboriginal people was recorded, indicating a change in the landscape.

Based on the predictive model for the study area, low potential exists for a low number of isolated highly disturbed artefacts to exist in a subsurface context (or obscured by vegetation) within the vegetated areas of the survey area. However no artefacts were observed on the surface of the previous survey area despite excellent ground surface visibility afforded by the electricity easement and fire trails.

Taking into account the multiple historic land-use practices that have impacted the integrity of the landscape, the survey area is assessed as having no likelihood of PAD; and if small numbers of artefacts are present in a subsurface context, or covered by vegetation, there is no likelihood of these being located in their initial area of discard.

5.1.7 Aboriginal Stakeholder Information Provided During Survey

During the survey period, Aboriginal stakeholder representatives were asked whether they had any additional cultural information to provide about the study area/survey area. The Aboriginal stakeholders raised some concerns about the clearing of some of the larger, older trees, in particular the Angophoras. Two of the Aboriginal stakeholders stated that they would appreciate if some of the Angophoras within the study area could be retained, but were not concerned about those within the previous survey area.

The existence of scarred trees on Mount Sugarloaf was mentioned by Shane Frost (ADTOAC) and all mature trees within the survey area were inspected for scars, however, no cultural scarring was observed.

Ann Hickey (GWCHC) and Shane Frost (ADTOAC) also identified a number of Aboriginal resource plants during the survey of the survey area, including, smooth-barked apple (*Angophora costata*), appleberry (*Billardiera scandens*), Banksia (*Banksia sp.*) bracken fern (*Pteridium esculentum*), bush cherry (*Exocarpos cupressiformis*), flax lily (*Dianella sp.*), geebung (*Persoonia sp.*), grass tree (*Xanthorrhoea sp.*), kangaroo grass (*Themeda australis*), mat rush (*Lomandra sp.*), paper bark (*Melaleuca sp.*), Sago Palm (*Macrozamia*), sarsaparilla (*Hardenbergia violacea*), and wombat berry (*Eustrephus latifolius*). Shane Frost (ADTOAC) also noted traces of kangaroos within the previous survey area.

5.1.8 Summary

No Aboriginal sites or artefacts were located during the 8 January survey despite the entire previous survey area being surveyed on foot. Low ground surface visibility significantly decreased the level of effective coverage in the majority of the simple slope landform
element, however, where excellent ground surface visibility was afforded by an electricity easement and fire trails there were no sites or artefacts located.

There is a very low potential for a low number of highly disturbed artefacts to exist in a subsurface context (or obscured by vegetation) within the vegetated areas of the previous survey area. The level of previous ground disturbance in the previous survey area is assessed as having removed any likelihood of PAD.

The Aboriginal stakeholders identified Aboriginal plant resources and a desire to see some of the mature Angophoras retained within the broader study area.

5.2 Survey 1 July 2009

This section contains the survey methodology employed when undertaking the fieldwork in the current survey area and a discussion of the results obtained from the survey.

5.2.1 Methodology

A pedestrian survey of the current proposed ANE production facility, access road and intersection of Echidna Drive with George Booth Drive (as shown on Figure 1.2) was carried out on 1 July 2009, following the same methodology as outlined in Section 5.1.1.

The current survey area was surveyed in two stages, five north-east to south-west transects of 50 metres (estimated based on six people walking at 8 metre intervals), to survey the proposed access road followed by three 50 metre transects creating a triangle in the proposed building infrastructure area.

5.2.2 Field Team

The field survey was carried out on 1 July 2009. The Aboriginal stakeholders participating in the survey were David Ahoy (ALALC), Shane Frost (ADTOAC), Kerrie Brauer, (ATOAC), Annie Hickey (GWCHC), and Arthur Fletcher (Wonn1), who were accompanied by Amanda Reynolds (Archaeologist, Umwelt).

5.2.3 Landform Elements

As with the January 8 survey, the current survey area was assessed by landform element in order to satisfy the DECC’s requirements. The current survey area did not differ significantly from the original survey area, and covered the same two landforms, a simple slope and a modified landform. Simple slopes make up 87 per cent of the survey area and 13 per cent of the survey area is modified. While the majority of the current survey area is not modified significantly, the survey confirmed that the landscape has undergone past vegetation clearance, ground surface disturbance and erosion which is visible on the fire trails.

5.2.4 Results

This section presents a discussion of the survey results, including the survey transects, the effective coverage of the survey and ground surface visibility of the current survey area.

5.2.4.1 Description of Survey Transects

The survey area was broken down into two distinct areas, the proposed building infrastructure area and the proposed access road. The proposed infrastructure area remains
located within a single landform unit, a gentle simple slope, rising west to east. The access road is within two landform units, the gentle simple slope and modified landscape.

No suitable sandstone outcrop for Aboriginal grinding grooves was identified during the survey. An area of sandstone was observed within the survey area, near George Booth Drive. The sandstone was broken into smaller boulders. This was inspected and the sandstone was unsuitable for, and did not have grinding grooves.

5.2.4.2 Effective Coverage

<table>
<thead>
<tr>
<th>Survey Transect</th>
<th>Landform Element</th>
<th>Total Sample Area of transect (m²)</th>
<th>General Surface Visibility (%)</th>
<th>General Surface Visibility (m²)</th>
<th>Exposures (m²)</th>
<th>Average Exposure Visibility (%)</th>
<th>Total Exposed Area (m²)</th>
<th>Total Exposed Area (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Modified</td>
<td>9500</td>
<td>0%</td>
<td>0</td>
<td>475</td>
<td>3%</td>
<td>14</td>
<td>0.14%</td>
</tr>
<tr>
<td>2</td>
<td>Modified</td>
<td>1000</td>
<td>1%</td>
<td>9</td>
<td>106</td>
<td>58%</td>
<td>61.5</td>
<td>7.05%</td>
</tr>
<tr>
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<td>Simple slope</td>
<td>654</td>
<td>1%</td>
<td>6.54</td>
<td>20.0625</td>
<td>20%</td>
<td>4.0625</td>
<td>1.62%</td>
</tr>
<tr>
<td>3</td>
<td>Simple slope</td>
<td>9000</td>
<td>1%</td>
<td>90</td>
<td>426</td>
<td>51%</td>
<td>219.15</td>
<td>3.44%</td>
</tr>
<tr>
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<td>3375</td>
<td>0%</td>
<td>0</td>
<td>1501</td>
<td>44%</td>
<td>660.4</td>
<td>19.6%</td>
</tr>
<tr>
<td>5</td>
<td>Simple slope</td>
<td>23760</td>
<td>0%</td>
<td>0</td>
<td>505</td>
<td>79%</td>
<td>400.5</td>
<td>1.7%</td>
</tr>
<tr>
<td>6</td>
<td>Simple slope</td>
<td>13300</td>
<td>0%</td>
<td>0</td>
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<td>72%</td>
<td>440.6</td>
<td>3.3%</td>
</tr>
<tr>
<td>7</td>
<td>Simple slope</td>
<td>20082</td>
<td>0%</td>
<td>0</td>
<td>75</td>
<td>50%</td>
<td>37.5</td>
<td>0.19%</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td></td>
<td><strong>80671</strong></td>
<td><strong>0.1%</strong></td>
<td><strong>105.45</strong></td>
<td><strong>3722.0625</strong></td>
<td><strong>49%</strong></td>
<td><strong>1837.65</strong></td>
<td><strong>2.4%</strong></td>
</tr>
</tbody>
</table>

The results in Table 5.3 show that general ground surface visibility was very low, with zero to one per cent general visibility. Exposures within the survey area totalled 3,722 square metres, with an average 49 per cent visibility. The highest effective coverage was observed in transects 5 and 6, with over 70 per cent visibility, due to the fire trail which crosses through the survey area. During the July survey, the electricity easement had significantly less visibility, and nearly complete grass coverage. The majority of the survey area had very little visibility, with grass and foliage cover limiting effective coverage to 2.4 per cent.

The above results indicate that ground surface visibility within the previously unmodified parts of the current survey area is low, with very few exposures outside the modified landform/fire trails.

Ground cover across the simple slope consisted of grasses, leaf and tree litter. The visible soil in the exposures was characterised as light grey and light brown silty sand. Apart from the fire trails, there were 19 additional small exposures with moderate visibility.

5.2.4.3 Orica Artefact Scatter

During the survey, one Aboriginal site was located, in a modified midslope (refer to Figure 5.2). A site card for this site is contained in Appendix E. The site, Orica artefact
FIGURE 5.2
Location of Artefact Scatter Orica AS

Legend
- Technology Centre Boundary
- Proposed ANE Production Facility and Access Road
- June 2009 Survey Area
- Artefact Scatter

scatter (AS), is a small artefact scatter consisting of three artefacts, located in a five metre by five metre area within a 20 metre by five metre windrow exposure with 60 per cent visibility along side the road. The area contains some imported soils and has been subject to disturbance as a result of road construction. The artefacts included a banded mudstone core, a tuff core and a chert flake.

The site is located on the exposed gravel bank next to the road, in a disturbed context. There was no evidence of artefacts eroding out of the bank. Due to the disturbed nature of the location, these artefacts are unlikely to have spatial integrity.

High levels of disturbance were observed around the site, associated with historic tree clearance, and construction and maintenance of existing infrastructure.

### 5.2.4.4 Discussion of Archaeological Results

All mature trees in the current survey area were inspected for Aboriginal scarring, and none was identified. A range of Aboriginal resource plants were observed in the survey area, with one species of animal known to have been exploited by Aboriginal people recorded during the ecology survey, indicating a drastic change in the landscape.

Based on the results of the predictive model in Section 4.4 and the results of the survey, a very low potential exists for a low number of isolated highly disturbed artefacts to exist in a subsurface context (or obscured by vegetation) within the vegetated areas of the survey area. That is, despite a single small artefact scatter being located in a modified exposure, the likelihood of large artefact scatters with spatial or stratigraphic integrity remains low, due to increased erosion levels from previous clearance and likelihood that the area was used more for hunting and foraging rather than camping.

The multiple historic land-use practices that have impacted the integrity of the landscape indicates the survey area has no likelihood of PAD; and if small numbers of artefacts are present in a subsurface context, or covered by vegetation, there is no likelihood of these being located in their initial area of discard.

### 5.2.4.5 Aboriginal Stakeholder Information Provided During Survey

During the survey period, Aboriginal stakeholder representatives were asked whether they had any additional cultural information to provide about the study area/current survey area. When inspecting Orica AS for artefacts, some of the Aboriginal stakeholders indicated they thought there may be artefacts in the area to the south of the site. It was not suggested that the site itself continued beyond the area immediately surrounding the find. It was noted that the majority of the survey area south of the existing 132kV transmission line consisted of old growth forest, and the Aboriginal stakeholders again raised concerns about the clearing of such a large number of older trees. Specifically a large old angophora located just on the southern edge of the proposed survey area was highlighted as a tree which they did not want to see removed. Some of the Aboriginal stakeholders also stated that they would like to see some of the mature grass trees within the study area be relocated or passed onto parks or nurseries for public landscaping rather than just being destroyed in clearing.

Ann Hickey (GWCHC) and Shane Frost (ADTOAC) also identified a number of the Aboriginal resource plants during the survey of the survey area, including, *Acacia*, smooth-barked apple (*Angophora costata*), appleberry (*Billiardiera scandens*), Banksia (*Banksia sp.*) Blady grass (*Imperata cylindrical*), Blue bell (*Wahlenbergia sp.*), Bottle brush (*Callistemon sp.*) bracken fern (*Pteridium esculentum*), bush cherry (*Exocarpos cupressiformis*), *Casuarina*, flax lily (*Dianella sp.*), geebung (*Persoonia sp.*), grass tree (*Xanthorrhoea sp*), Hakea sp, iron bark (*Eucalyptus fibrosa*) kangaroo grass (*Theda australis*), mat rush (*Lomandra sp.*),
Melaleuca (*Melaleuca decora*), Mistletoe (*Amyema sp.*), native cherry (*Exocarpos cupressiformis*), native rosemary (*Westringia fruticosa*), Native sundew (*Drosera*), paper bark (*Melaleuca sp.*), Rasp fern (*Doodia aspera*), red ironbark (*Eucalyptus fibrosa*), running postman (*Kennedia prostrata*), Sago Palm (*Macrozamia*), sarsaparilla (*Hardenbergia violacea*), spotted gum (*Corymbia maculate*), Turpentine tree (*Syncarpia*) and wombat berry (*Eustrephus latifolius*). Shane Frost (ADTOAC) Kerrie Brauer (ATOAC) and Ann Hickey (GWCHC) also noted traces of kangaroos, possums and yabbies (*Cherax destructor*) within the current survey area.

5.2.4.6 Summary

Only one Aboriginal site was located during the survey despite the entire current survey area being surveyed on foot. Low ground surface visibility significantly decreased the level of effective coverage in the majority of the simple slope landform element, however, in areas where improved ground surface visibility was afforded by the fire trails and exposures there were no sites or artefacts located. The site Orica AS was found in the modified landform in a disturbed context along the edge of a road.

There is a very low potential for a low number of highly disturbed artefacts to exist in a subsurface context (or obscured by vegetation) within the vegetated areas of the current survey area. The level of previous ground disturbance in the survey area is assessed as having removed any likelihood that any of these areas could be considered a PAD.

The Aboriginal stakeholders on site identified Aboriginal plant and animal resources. A desire was expressed to see some of the mature trees retained within the broader study area, and an attempt at preserving some of the more mature grass trees from within the current survey area.
6.0 Significance Assessment

The Burra Charter defines cultural significance in terms of aesthetic, scientific, historic and social values. Aboriginal cultural heritage is typically assessed according to its social and scientific significance; however other values may also be of importance. The assessment of cultural significance is critical in establishing mitigation and management strategies for cultural heritage (refer to Pearson and Sullivan 1994:21).

The assessment of significance provides a guideline for determining appropriate mitigation and management strategies. The relationship between levels of significance and management strategies can be summarised as follows:

- High significance – the site should be conserved and protected from the impacts of development, where possible.
- Moderate significance – the site should be protected if possible, however, if impacts to the site are unavoidable, appropriate mitigation strategies should be implemented prior to impact.
- Low significance – the site should be protected if possible, however, if impacts to the site are unavoidable, the presence of the site should not impede the Project.

6.1 Aboriginal Cultural Significance

Aboriginal stakeholders are responsible for assessing the significance of their cultural heritage. In assessing this significance a range of factors may be considered and this can extend beyond the physical presence of a site and its contents. Archaeological material, cultural knowledge, natural resources and landscape may all be considered.

No comments were made regarding any particular cultural importance or stories associated with the study area prior to the field survey. During the survey Ann Hickey (GWCHC) and Shane Frost (ADTOAC) related information about Aboriginal resource plants and animals which were found throughout the survey area. This information is summarised in the survey results (refer to Section 5.2.4.6).

As Aboriginal cultural significance relates to the values of a site, place or landscape to Aboriginal people, it must be determined by Aboriginal people. A draft copy of this report was provided to all relevant Aboriginal stakeholders on 10 August 2009 and it is requested that comment be provided regarding the Aboriginal cultural significance of the survey area. These comments will be summarised in this section and included in full in Appendix B.

6.2 Archaeological Significance

The Burra Charter defines the archaeological significance of an Aboriginal site, object or place according to its potential to address research questions and provide greater insight into Aboriginal society and chronological changes in how Aboriginal people utilised the landscape and its resources (Australian ICOMOS Incorporated 2000:12). Rarity and representativeness of a site, integrity and intactness and overall research potential are the primary factors in assessing archaeological significance.

Each of these concepts is relatively self-explanatory, however the concept of representativeness warrants further discussion. Representativeness is closely linked to rarity.
and relates to the degree to which a site encapsulates the typical aspects of sites of its type at a local, regional and, in some cases, national level. For example, an artefact scatter that contains the range of artefact types and raw materials found at other sites throughout the region and that is located in a similar context to other sites of the same type has low representative value if other sites representing the same artefactual and landform context have been conserved. In simple terms, the representative value should be considered in terms of whether a site embodies the essential characteristics of sites of that type in the locality and region and whether sites of that type remain extant in a context that will allow for their continued conservation.

One archaeological site and no potential archaeological deposits were identified within the current survey area. Orica AS is a small artefact scatter, with artefacts of mudstone, chert and tuff. Most sites in the Hunter Valley are made up of open sites, consisting of artefact scatters and isolated finds. The key raw materials used for artefacts in the Hunter Valley are silcrete, mudstone and tuff, with chert also not uncommon. Orica AS is not a rare site, and as it does not have spatial or stratigraphic integrity and is not intact, it has no research potential. The site cannot be considered as an outstanding example of its site type within the local area, with other sites containing a broader range of artefacts remaining extant in a local context. For this reason, Orica AS is considered to have low value for representativeness and the site as a whole has low archaeological significance.

6.3 Significance of the Landscape

High levels of disturbance due to previous infrastructure construction and landscape clearing and modification have affected the archaeological significance of the landform elements within the survey area. Thirteen per cent of the survey area has been highly modified and is assessed as having no archaeological significance. The modified area has no potential to contain sites by which their study could address research questions or provide greater insight into Aboriginal society or chronological changes in how Aboriginal people utilised the landscape and its resources.

The unmodified sections of the simple slope landform have also been impacted by lower levels of disturbance associated with tree clearance and erosion and thus this area is also assessed as having very low to no archaeological significance. These areas have low to no potential to contain sites which by their study address could research questions or provide greater insight into Aboriginal society and chronological changes in how Aboriginal people utilised the landscape and its resources.

In addition, the topography, distance to fresh water (ephemeral and permanent sources) and the unsuitability of the sandstone for grinding, indicate that grinding groove sites are unlikely to be present within the area and that any artefact scatters that may be present but not detectible are likely to be small (in terms of area/artefact numbers), disturbed, and have low archaeological significance. Based on the results of the survey and predictive modelling, the survey area is assessed as being of low archaeological significance.

The landscape of the study area is not assessed as part of this report.
7.0 Recommendations

The following recommendations apply to the current survey area (refer to Figure 1.2) and have been developed in light of the archaeological context of the locality, the findings of the survey, the results of consultation with Aboriginal stakeholders, the potential impacts of the project and current cultural heritage legislation:

- It is recommended that surface collection of artefact scatter Orica AS should be undertaken prior to any ground disturbing works within the current survey area and prior to the development proceeding. The surface collection should be conducted in accordance with the methodology present in Appendix C.

- In accordance with the requests of Aboriginal stakeholders consulted regarding the project, all topsoil removal within the survey area should be subject to monitoring as an Aboriginal cultural heritage project. This monitoring would be in accordance with the methodology presented in Appendix C.

In recognition that it is possible, but very unlikely that undetected archaeological material may occur within the survey area, the following recommendations are made:

- Should skeletal material be identified during ground disturbance works within the survey area, all work must cease and the NSW Police, DECC and the Aboriginal stakeholders contacted immediately.

- Should additional artefactual material be exposed during ground disturbance works within the survey area, the artefacts will be collected in accordance with the collection methodology in Appendix C. As all ground disturbing works are to be monitored by Aboriginal stakeholders (in accordance with the methodology included in Appendix C), management of significant artefacts located can be discussed on site.

- Should sandstone with evidence of Aboriginal axe grinding grooves be exposed during ground disturbance works within the survey area, work should cease in the immediate area. As all ground disturbing works are to be monitored by Aboriginal stakeholders (in accordance with the methodology included in Appendix C), management of grinding groove sites (in the unlikely event that they are exposed during monitoring) will be determined in consultation with Aboriginal stakeholders and DECC.
8.0 Care and Control of Archaeological Material

It is recognised that Aboriginal stakeholder representatives have a part in the decision about the final location of salvaged Aboriginal archaeological material. There are a number of options available for the Care and Control of salvaged artefacts, and a decision regarding this will be determined based on comments and suggestions received from the Aboriginal stakeholders.

Some possibilities to consider include:

- return the artefacts to the Awabakal Local Aboriginal Land Council for secure storage;
- housing and display of artefacts in a secure display case within the Orica office.

Further discussions will be held with the Aboriginal stakeholders during the monitoring program regarding the care and control of the artefacts salvaged.
9.0 References


Geological Survey of NSW 1976, 1:100,000 map.


West Wallsend Public School Centenary Committee 1987. *'Neath Mount Sugarloaf*.

APPENDIX A

Notification Letters and Agency Consultation
### INVOICE TO
UMWELT AUSTRALIA PTY LTD
PO BOX 838
TORONTO NSW 2283

<table>
<thead>
<tr>
<th>RATE</th>
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<td>12</td>
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</table>

**TOTALS**

- **SUBTOTAL**: 204.00
- **GST TOTAL**: 20.40

Total inclusive of GST: $224.40

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**PAID**
24 DEC 2008

**ENTERED**
28 November 2008

Cheryl Kitchener  
Awabakal Local Aboriginal Land Council  
PO Box 437  
HAMILTON NSW 2303

Dear Cheryl,

Re: Stakeholder Consultation in Relation to Cultural Heritage Works at Orica Mining Services Technology Park, Richmond Vale, NSW

Orica Australia Pty Limited (Orica) is currently proposing to undertake a project at the Orica Mining Services Technology Park, Richmond Vale, New South Wales. As part of this process, survey and assessment will be conducted and it is anticipated that an application for Section 87/Section 90 could be required under Part 6 of the National Parks and Wildlife Act 1974 for sites which may be identified within the area proposed for impact.

Orica has commissioned Umwelt (Australia) Pty Limited (Umwelt) to undertake the necessary cultural heritage works in consultation with Aboriginal stakeholders. The purpose of this notification is to ascertain if Awabakal Local Aboriginal Land Council is aware of any Aboriginal stakeholder groups/individuals in the Cessnock LGA that may wish to be consulted in relation to the project. In order to facilitate the consultation process, Umwelt would be grateful if you could advise, in writing, of any stakeholder groups/individuals that may wish to be consulted by no later than 8 December 2008.

Should you have any queries or wish to discuss this matter, please do not hesitate to call Kym McNamara on 4950 5322.

Yours faithfully,

John Merrell  
Associate
28 November 2008

New South Wales Native Title Services
PO Box 2105
STRAWBERRY HILLS NSW 2012

To Whom It May Concern

Re: Stakeholder Consultation in Relation to Cultural Heritage Works at Orica Mining Services Technology Park, Richmond Vale, NSW

Orica Australia Pty Limited (Orica) is currently proposing to undertake a project at the Orica Mining Services Technology Park, Richmond Vale, New South Wales. As part of this process survey and assessment will be conducted and it is anticipated that an application for Section 87/Section 90 could be required under Part 6 of the National Parks and Wildlife Act 1974 for sites which may be identified within the area proposed for impact.

Orica has commissioned Umwelt (Australia) Pty Limited (Umwelt) to undertake the necessary cultural heritage works in consultation with Aboriginal stakeholders. The purpose of this notification is to ascertain if New South Wales Native Title Services is aware of any Aboriginal stakeholder groups/individuals in the Cessnock LGA that may wish to be consulted in relation to the project. In order to facilitate the consultation process, Umwelt would be grateful if you could advise in writing, of any stakeholder groups/individuals that may wish to be consulted as soon as possible and no later than 8 December 2008.

Should you have any queries or wish to discuss this matter, please do not hesitate to call Kym McNamara on 4950 5322.

Yours faithfully

John Merrell
Associate
28 November 2008

The General Manager
Cessnock City Council
PO Box 152
CESSNOCK NSW 2325

Dear Sir/Madam

Re: Stakeholder Consultation in Relation to Cultural Heritage Works at Orica Mining Services Technology Park, Richmond Vale, NSW

Orica Australia Pty Limited (Orica) is currently proposing to undertake a project at the Orica Mining Services Technology Park, Richmond Vale, New South Wales. As part of this process, survey and assessment will be conducted and it is anticipated that an application for Section 87/Section 90 could be required under Part 6 of the National Parks and Wildlife Act 1974 for sites which may be identified within the area proposed for impact.

Orica has commissioned Umwelt (Australia) Pty Limited (Umwelt) to undertake the necessary cultural heritage works in consultation with Aboriginal stakeholders. The purpose of this notification is to ascertain if Cessnock Council is aware of any Aboriginal stakeholder groups/individuals in the Cessnock LGA that may wish to be consulted in relation to the project. In order to facilitate the consultation process, Umwelt would be grateful if you could advise in writing, of any stakeholder groups/individuals that may wish to be consulted as soon as possible and no later than 8 December 2008.

Should you have any queries or wish to discuss this matter, please do not hesitate to call Kym McNamara on 4950 5322.

Yours faithfully

John Merrell
Associate
28 November 2008

Office of the Registrar of Aboriginal Owners
Department of Aboriginal Affairs
Level 13, Tower B
Centennial Plaza
280 Elizabeth Street
SYDNEY NSW 2000

Dear Megan

Re: Stakeholder Consultation in Relation to Cultural Heritage Works at Orica Mining Services Technology Park, Richmond Vale, NSW

Orica Australia Pty Limited (Orica) is currently proposing to undertake a project at the Orica Mining Services Technology Park, Richmond Vale, New South Wales. As part of this process, survey and assessment will be conducted and it is anticipated that an application for Section 87/Section 90 could be required under Part 6 of the National Parks and Wildlife Act 1974 for sites which may be identified within the area proposed for impact.

Orica has commissioned Umwelt (Australia) Pty Limited (Umwelt) to undertake the necessary cultural heritage works in consultation with Aboriginal stakeholders. The purpose of this notification is to ascertain if Office of the Registrar of Aboriginal Owners is aware of any Aboriginal stakeholder groups/individuals in the Cessnock LGA that may wish to be consulted in relation to the project. In order to facilitate the consultation process, Umwelt would be grateful if you could advise in writing, of any stakeholder groups/individuals that may wish to be consulted as soon as possible and no later than 8 December 2008.

Should you have any queries or wish to discuss this matter, please do not hesitate to call Kym McNamara on 4950 5322.

Yours faithfully

John Merrell
Associate
28 November 2008

Brett Nudd
Acting Manager
Planning & Aboriginal Heritage Section
North East Climate Change & Environmental Protection Group
Locked Bag 914
COFFS HARBOUR NSW 2450

Dear Brett

Re: Stakeholder Consultation in Relation to Cultural Heritage Works at Orica Mining Services Technology Park, Richmond Vale, NSW

Orica Australia Pty Limited (Orica) is currently proposing to undertake a project at the Orica Mining Services Technology Park, Richmond Vale, New South Wales. As part of this process survey and assessment will be conducted and it is anticipated that an application for Section 87/Section 90 could be required under Part 6 of the National Parks and Wildlife Act 1974 for sites which may be identified within the area proposed for impact.

Orica has commissioned Umwelt (Australia) Pty Limited (Umwelt) to undertake the necessary cultural heritage works in consultation with Aboriginal stakeholders. The purpose of this notification is to ascertain if the Department of Environment and Climate Change (DECC) is aware of any Aboriginal stakeholder groups/individuals in the Cessnock LGA that may wish to be consulted in relation to the project. In order to facilitate the consultation process, Umwelt would be grateful if DECC could advise in writing, of any stakeholder groups/individuals that may wish to be consulted as soon as possible and no later than 8 December 2008.

Should you have any queries or wish to discuss this matter, please do not hesitate to call Kym McNamara on 4950 5322.

Yours faithfully

[Signature]

John Merrell
Associate
APPENDIX B

Registration of Interest and Comments from Aboriginal Stakeholder Groups
Dear Kym,

This is to confirm that Wonnarua Culture Heritage would like to be involved with the Oppen mining Services P.T.Y.LTD project re-George Booth Drive if you require more info you can contact me on the above mobile number.

Kind Regards

P Griffiths
Thursday 20th November 2008

Kym McNamara
Archaeologist
Umwelt (Australia) Pty Limited
PO Box 838
Toronto NSW 2283

Dear Kym,

RE: Orica Mining Services Technology Park, Richmond Vale

Gidawaa Walang Cultural Heritage Consultancy would like to register our interest in the above project. Our interest comes from various members of our community including Elders. Our organisation is made up of Members, Staff, Management and Community from various tribal boundaries including Awabakal, Wonnarua, Worimi, Biripi, Camilarol, Wiradjuri and Eora country.

I would also like to thank you for the opportunity to register our interest in the project and look forward to meeting you in the future.

Yours sincerely

Ann Hickey
Project Officer
Date: 23 November 2008

Attention: Kym McNamara (Archaeologist)
Umwelt (Australia)
PO Box 838
Toronto NSW 2283

Re: Cultural Heritage Projects at Orica’s Mining Services Technology Park, George Booth Drive, Richmond Vale, NSW.

ALLA (Hello in Awabakal) Kym,

I am writing to you in regard to the Aboriginal Heritage Survey and Assessment projects that are proposed for Orica’s Mining Services Technology Park, George Booth Drive, Richmond Vale, NSW. I would like to notify you of the Awabakal Descendants Traditional Owners Aboriginal Corporations registration of interest for the proposed Survey/Assessments and that it is our desire to be consulted in regard to any Aboriginal archaeological management or consultation that is to take place for this area.

We are a registered Aboriginal Corporation under the Federal Governments Aboriginal Corporations Act to carry out business within Australia in regard to the representation of our people through this corporation known as the Awabakal Descendants Traditional Owners Aboriginal Corporation.

Being the direct descendants of the Traditional Awabakal People of the Lake Macquarie/Newcastle area I take this opportunity in a few sentences to quickly formalise our position with you.

Our great great great Grandmother was one of the first Aboriginal People to be recorded in the Lake Macquarie and Newcastle area in 1828 when the Reverend L.E.Threlkeld made the first list of the Aboriginal People of the Newcastle and Lake Macquarie district from his mission station at Belmont. At Warner's Bay my great great great Grandmother and her daughter, our great great Grandmother were recorded by Jonathan Warner in 1833 and then again at Toronto in 1836 by L.E.Threlkeld at his mission there. Our people still live and maintain our cultural ties with our Traditional Country and are concerned and desire to be involved in all the affairs that may affect that Cultural Heritage which is vital to our people in maintaining connectedness in respect of our Traditional Country.

The area in which the Aboriginal Archaeological Survey/Assessments are to be conducted is located within the Traditional Tribal Country of our people, the Awabakal. This area is significant because our people have lived around Newcastle and Lake Macquarie for many thousands of years, these resource rich areas were utilised on many occasions to hunt, fish and carry on traditions that have been passed down for centuries. This particular area is of great importance because it is an area that our people frequented on many occasions being close to Sugarloaf Mountain and its environs. There are many sites located within the surrounding area which provide tangible evidence of the Cultural Heritage of our people.
As you can understand this area and every part of our Traditional Country is special to us, not just for the Physical aspect but also the Spiritual and Oral aspect which all combine to give us our complete culture. Our Cultural Heritage and Traditional Tribal Country are two of the reasons why we take every opportunity to make ourselves available for consultation in regard to the very important issues and decisions that need to be made in regard to protecting what is ours and what gives us the right through birth to be called Traditional Awabakal People.

Given the opportunity to take part in the survey/assessments, I would make representation on behalf of our people bringing the necessary qualifications you require in regard to cultural knowledge of the study area. Also I am physically capable to undertake the survey due to spending many hours walking our Awabakal Country carrying out survey work for cultural and educational purposes.

As far as field identification or survey techniques are concerned, I was brought up in the bush around Lake Macquarie and the mountains and have years of experience spending most of my life being told and shown much by my Father and Grandmother in regard to our places, stories, tools/weapons and foods and how to acquire/use them. I have also been actively involved with many Aboriginal archaeological heritage assessments conducted within our Awabakal Country, accompanying archaeologist from well known companies, (located from within and outside our area) in the field and have also taken part in many projects where monitoring for artefacts during excavation works were carried out and subsequently many artefacts were located. Umwelt being one of those companies I have worked with on many occasions along with, ERM, ENSR, Insite Heritage and many others on major projects located within our area. We are presently involved with many other ongoing long term projects, working with organisations to see favourable outcomes in relation to Awabakal Cultural Heritage issues. It is imperative that we be present at these survey/assessments because of our people’s connection to this area for thousands of years and subsequent knowledge.

Also as far as communicating the results of the survey back to stakeholder community and returning advice on the response, as CEO of our corporation I have the ability and opportunity to contact our members for any comments and information that may be pertinent to this survey and also have the necessary experience in production and reporting of any information in written format in relation to a draft report.

We do hold the relevant insurances needed to participate and the representative of our corporation is covered by public liability and workers compensation insurance. The certificates of currency are supplied separately to this letter due to confidentiality.

The rate of payment for our representative to take part in any fieldwork which would be inclusive of all relevant and associated costs for us to participate in this survey are supplied separately to this letter for confidentiality reasons.

I hope this addresses any queries you may have Kym, if not and further information is required please don’t hesitate to contact me ASAP. My contact details are as follows.

NGI NOA (Farewell in Awabakal)

Shane Frost
CEO: Awabakal Descendants Traditional Owners Aboriginal Corporation
Email: shanefrost@bigpond.com Phone: 49964362 Fax: 49964325 Mobile: 0428320671
24 November 2008

Umwelt Australia P/L
Attn: Kym McNamara
Archaeologist
PO Box 838
Toronto NSW 2283

Re: Registration of Interest Regarding the Aboriginal Heritage Assessment at the Orica Site

Dear Kym,

As Traditional Descendants of the land concerned, the Awabakal Traditional Owners Aboriginal Corporation wishes to register our interest in the proposed Aboriginal Heritage Assessment as stakeholders for the proposed Aboriginal Heritage Assessment at the Orica Site.

We wish to comment on the Aboriginal Cultural Heritage being undertaken as participants in the assessment and consultation process archaeological investigation of the proposed project.

The Awabakal People have a cultural association with this area as the Richmond Vale region is well within our Cultural Boundary.

Should you require further information please do not hesitate to call me.

Kind regards,

K. Brauer
Secretary and Public Officer
Wonn 1 Contracting
Arthur Fletcher
Fieldworker

Tuesday, 2nd December 2008

Attn: Kym McNamara
Umwelt Australia Pty Ltd
PO Box 838
Toronto NSW 2283

Dear Kym,

RE: Orica Mining Services Technology Park, Richmond Vale NSW Aboriginal Heritage and Cultural Survey

I would like to express my interest in the above study as a fieldworker and as an aboriginal consultant for the aforementioned project. I am a local Aboriginal man of Gringal-Wonnarua decent who has a continued vested cultural interest in the area and would like to participate in any discussion/work/consultation that occurs in connection to the project.

Yours Sincerely,

A. E. Fletcher

Arthur Fletcher
Fieldworker Wonn1 Contracting
Hi Kim
Great to have a chat hope to see you in the field one day soon.
Just putting my expression of Interest in for Orica Technology Park at Richmond Vale, NSW.
Could you please put me o the Consultation list for this project when it comes up.
Most appreciated
Tracey Skene
7 Crawford Place, Millfield NSW 2325
Email: anigunya@hotmail.com
Mobile: 0447 266 595

Sell your car for just $40 at CarPoint.com.au It's simple!

Multiple prizes and the ultimate dream beach house! Take a summer road trip with Windows Live Hotmail.
Hi Kym

Black Creek Aboriginal Corporation would like to register an interest in the above project. However, as precise moment I cannot guarantee that we will have a representative available on the date mentioned (8 January 2009). If a representative is not present, we would appreciate it, if we could have any reports and be able to make comment on those reports.

Regards
Tracey White
Secretary
Black Creek Aboriginal Corporation
23 December 2008

Kym McNamara
Archaeologist
Umwelt (Australia) Pty Ltd
PO Box 838
Toronto NSW 2283

Re: Comments on the Survey Methodology for the Proposed Surface Works at Orica Mining Services Technology Park

Dear Kym,

With regard to the Survey Methodology for the Proposed Surface Works at Orica Mining Services Technology Park we recognise the Proposed Survey Methodology prepared by Umwelt is reasonably comprehensive. We agree with the approach regarding the survey strategy.

We reserve the right and reluctance to share our cultural heritage with others in respect to aspects of the cultural significance that connects us to our country. It is believed by our people that those who shouldn’t be privy to this cultural knowledge have no rights or entitlements to it.

For any further information please do not hesitate to call me on (02) 49156947 or 0412866357.

Yours sincerely,

K. Brauer

Kerrie Brauer
Secretary/Public Officer
Date: 10 December 2008

Attention: Kym McNamara (Archaeologist)
Umwelt (Australia)
PO Box 838
Toronto NSW 2283

Re: Cultural Heritage Projects at Orica’s Mining Services Technology Park, George Booth Drive, Richmond Vale, NSW.

ALLA (Hello in Awabakal) Kym,

I am writing to you in regard to the Aboriginal Heritage Survey and Assessment projects that are proposed for Orica’s Mining Services Technology Park, George Booth Drive, Richmond Vale, NSW. I would like to notify you that the Awabakal Descendants Traditional Owners Aboriginal Corporation responded on 23rd November 2008 to your invitation in regard to registration of interest for the proposed Aboriginal Heritage Survey/Assessment and that it is our desire to be consulted in regard to any Aboriginal archaeological management or consultation that is to take place for this area. We have also read the proposed draft survey strategy/methodology covered in your letter dated 4th December 2008 and agree that it is reasonably comprehensive and it covers most areas of concern.

I hope this addresses any queries you may have Kym, if not and further information is required please don’t hesitate to contact me ASAP. My contact details are as follows.

NGI NOA (Farewell in Awabakal)

Shane Frost
CEO: Awabakal Descendants Traditional Owners Aboriginal Corporation
Email: shanefrost@bigpond.com Phone: 49964362 Fax: 49964325 Mobile: 0428320671
Amanda Reynolds

From: Kym McNamara [kmnamara@umwelt.com.au]
Sent: Tuesday, 23 December 2008 12:28 AM
To: 'Allison Sharp'; 'Jan Wilson (Umwelt)'
Subject: FW: Orica Mining Services Technology Park

Kym McNamara
Archaeologist

Umwelt (Australia) Pty Limited
PO Box 838
2/20 The Boulevard
Toronto NSW 2283

Ph (02) 4950 5322
Fax (02) 4950 5737
Mb 0427 125 687
www.umwelt.com.au

PLEASE NOTE:
This email and any files transmitted with it are confidential and are for the use of the intended recipient only. If you have received this email in error, please notify us immediately and delete all copies of this email and attachments. We maintain regular virus checks; however, before opening or using any attachments, check them for viruses and defects. Contents which do not relate to the formal business of Umwelt (Australia) Pty Limited are not endorsed by the company.

From: Tracey White [mailto:rara01@bigpond.com]
Sent: 23 December 2008 05:36
To: Kym McNamara
Subject: Orica Mining Services Technology Park

Hi Kym,
I have read the Survey Strategy in regard to the above project. As discussed in an earlier email, Black Creek Aboriginal Corporation may not be in a position to provide a representative in January, but are entirely interested in the project.
A pedestrian survey detailing the information reported in the proposal would be agreed to by our members. However, we do ask that we receive any reports in regard to the possible Indigenous inhabitation of the area of the survey.
We have received a copy from Orica of a Conditions of Engagement.
Regards
Tracey

PS enjoy your holiday and your Christmas

x-noarchive
Wednesday 10th December 2008

Kym McNamara  
Archaeologist  
Umwelt (Australia) Pty Limited  
2/20 The Boulevard  
PO Box 838  
Toronto NSW 2283

Dear Kym,

Re: survey Methodology for Proposed Surface Works at Orica Mining Services Technology Park

Gidawaa Walang agrees with the proposed methodology for the above project.

Yours Sincerely

Ann-Marie Hickey  
Project Officer

76 Lang Street  
Kurri Kurri  
NSW 2327

Phone: 49371094  
Fax: 49364449  
Mob: 0411196991
19th June 2009

Amanda Reynolds  
Archaeologist  
Umwelt (Australia ) Pty Ltd  
2/20 The Boulevarde  
PO Box 838  
Toronto NSW 2283

Dear Amanda

Re: Survey Methodology for Changes to Proposed Surface Works at Orica Mining Services Technology Centre

Gidawaa Walang Cultural Heritage Consultancy agrees with the survey methodology for the above project.

Yours Sincerely

Annie Hickey  
Project Officer
2 September 2009

Umwelt Australia P/L
Attn: Jan Wilson
Manager Cultural heritage
PO Box 838
Toronto NSW 2283

Dear Jan,

Re: Draft Aboriginal Heritage Assessment Report: Proposed Ammonium Nitrate Emulsion Production Facility, Technology Park, Richmond Vale NSW.

With regard to the Draft Aboriginal Heritage Assessment Report: Proposed Ammonium Nitrate Emulsion Production Facility, Technology Park, Richmond Vale, we recognise the evaluation by Umwelt Australia appears to be reasonably comprehensive.

Our comments to the contents of the Draft Aboriginal Assessment Report are as follows:

Section 2.3, We would like to reaffirm our concerns regarding the old growth trees within the proposed project area, in particular the Angophora species, as they hold both cultural and environmental value as stated in this section.

Section 3.4, With reference to the comments regarding members of the ALALC who have stated that their people hunted in the area, this declaration was not added to Appendix 2 as stated. We believe that this statement needs more clarification, and to whom the ALALC are referring to, as we are of the understanding that the ALALC members are from other nations.

Section 3.6, Looking at the site holistically, the area holds much thriving native flora which may succumb to destruction when the Proposed Ammonium Nitrate Emulsion Production Facility commences. We have some ideas which we would like to share with Orica Mining on ways that this destruction could be minimised as well as assisting the Aboriginal Stakeholders and Community.

Section 6.0, We recommend that Umwelt may need to consider the value of 'place' within the Heritage and Cultural weighting, as this consideration is to insure the protection and conservation of Place & Objects which impact significantly on the spirituality, cultural, historic and general legacy needs of Aboriginal people to address inequalities in social and community well being.
Section 7. We agree with the recommendation outlined in this section, as we believe that Umwelt Australia and Orica Mining are committed and supportive in adequately addressing the many aspects related to the perspectives and diversity that is associated with Aboriginal Cultural Heritage. We would like to mention our appreciation of the informative process that the representative from Umwelt has outlined in the Draft Report and the due diligence in addressing our concerns.

Section 8. With regards to the Care and Control of archaeological material we agree that the final location of salvaged Aboriginal material should be discussed and agreed upon by the Aboriginal Stakeholder representatives.

Appendix 5. We believe that the proposed methodology is appropriate and agree with the proposed philosophy, method and approach for how the proposed methodology would proceed for the Proposed Ammonium Nitrate Emulsion Production Facility project area.

We appreciate the opportunity and inclusive approach from Orica Mining for supporting the Aboriginal Stakeholders in monitoring the topsoil removal within the proposed project area.

We also believe that caution is recommended as the Draft Report does not address the impact on the environment surrounding the proposed project area. Essentially we are concerned with the extent of potential damage that the excavation itself will create on Aboriginal sites, including access roads for trucks as well as the supporting equipment that will be needed.

Appendix 5, 2.8. With regards to the Monitoring Methodology we suggest that there is an opportunity for further analytical research concerning the region. Therefore, we propose that Orica Mining consider the advantages of implementing a Research Excavation Methodology Design for the proposed project to support the monitoring investigative areas within the Proposed Ammonium Nitrate Emulsion Production Facility Project area. The program analysis would support a conceived piece of archaeological research design to address research questions which are common to the Hunter Region. The research design would pioneer active principles to unravel the geological history of the regions layers to encompass and create a data collective of the regions ethos.

We believe that Orica Mining could take this opportunity to go beyond what is required by relevant legislation policies as a pioneer of contributing to their ongoing commitment and supportive awareness in adequately addressing the many aspects related to the perspectives and diversity that is associated with Aboriginal Cultural Heritage.

If you require any further information please do not hesitate in contacting me.

Yours sincerely,

Kerrie Brauer
Director | Administration
Date: 30 August 2009

Attention: Jan Wilson (Manager Cultural Heritage)
Umwelt (Australia) Pty Limited
PO Box 838
Toronto NSW 2283

Re: Draft Aboriginal Heritage Assessment Report: Proposed Ammonium Nitrate Emulsion Production Facility, and Continued Operation of Orica Mining Services Technology Centre, Richmond Vale, NSW.

ALLA Jan,

I am writing to you regarding the Draft Aboriginal Heritage Assessment Report: Proposed Ammonium Nitrate Emulsion Production Facility, and Continued Operation of Orica Mining Services Technology Centre, Richmond Vale, NSW. I would like to notify you that the Awabakal Descendants Traditional Owners Aboriginal Corporation has considered the contents of the draft report and would like to make the following comments based on the report furnished to us by Umwelt (Australia) Pty Limited dated the 10 August 2009 regarding the proposed project.

This draft report is reasonably comprehensive and covers most of our concerns which were raised in our original report sent to Umwelt and dated 30th March 2009 regarding the previous assessment. I have included a part of what was raised previously and it can be seen as set out below.

- Due to the issues we have detailed above, we would like to see these addressed in the appropriate manner with respect of our people, the Awabakal and our Cultural Heritage and due consideration given to the particulars as pointed out previously that this land the development is proposed for has been used by Awabakal People for thousands of years, there are many sites of great diversity within close proximity and the likely hood of artefacts to be present in the landscape. Taking these factors into account we would like to see the developer (Orica) support the protection and preservation of our Cultural Heritage through the implementation of a programme for monitoring by the Aboriginal Stakeholder groups of the development area during any or all expected clearing, excavations or earthworks which may be commenced by the developers of this proposal. As stated above our main concern is to Protect and Preserve ALL of our Cultural Heritage whether it is considered by others as low potential, insignificant, minimal or otherwise, it is ALL even the smallest of artefacts significant to our people.

The issue here was that we had not located any artefacts at this time during the previous assessment but we were still aware that because of the many thousands of years of occupation by our people, the Awabakal, and the many sites recorded within the vicinity it was logical to presume that there would be Aboriginal archaeological evidence within the boundaries of the proposed development, and as can be seen with the subsequent assessment this proved to be the case.
We made these comments/recommendations previously with one thing in mind and that is to see the protection and preservation of our Cultural Heritage and we would like to make a couple of further comments/recommendations;

a) We would like to recommend that the Aboriginal stakeholders be given the opportunity to meet with representatives from Orica to discuss the fate of protected flora species (such as the Xanthorrhias/Grass Trees) which are growing in great numbers within the footprint of the proposed development area. We would envisage this meeting to provide an opportunity to plan the management of a suitable strategy and outcome for the removal and possible relocation of these protected species to the wider community for landscaping etc and to also outline the role the Aboriginal stakeholders could take in relation to this matter.

b) Also we would like to see the artefacts that have already been identified and are to be collected and any that may be located during the monitoring program to be held by Umwelt (Australia) for the interim period during the construction phase of the development and on the completion of the development, be returned to the area close to their original location.

c) Also where there are subsurface excavations mentioned within our previous report/letter to Umwelt regarding the original assessment, we are also referring to any sewerage lines drainage etc also.

Therefore with this said we would like to support the recommendations as set out in section 7.0 Recommendations within the draft and also the surface collection and monitoring methodology contained within the Appendices of the Draft Aboriginal Heritage Assessment Report: Proposed Ammonium Nitrate Emulsion Production Facility, and Continued Operation of Orica Mining Services Technology Centre, Richmond Vale, NSW. We would also like to acknowledge and applauded both Umwelt and Orica for addressing the concerns raised in our previous response to the original draft dated 30th March 2009

As Aboriginal people whose families have lived for thousands of years in this area, it is imperative that we be involved in all the affairs that may affect our Cultural Heritage and the protection and preservation of what is vital to our people in maintaining that physical connection which is the evidence of what our ancestors have left us and which ultimately helps connect us through the combination of all aspects of our Cultural Heritage respecting our Traditional Country and culminates in what gives us the right through birth to be called Awabakal.

I hope this addresses any queries you may have Jan, if not and further information is required please don’t hesitate to contact me ASAP. My contact details are as follows.

NGI NOA (Farewell in Awabakal)
Shane Frost
CEO: Awabakal Descendants Traditional Owners Aboriginal Corporation
Email: shanefrost@bigpond.com Phone: 49964362 Fax: 49964325 Mobile: 0428320671
Monday 7th September 2009

Umwelt (Australia) Pty Limited
2/20 The Boulevarde
PO Box 838
Toronto NSW 2283


Gidawaa Walang Cultural Heritage Consultancy agrees with the recommendations of the report page 7.1

Yours sincerely

[Signature]
Annie Hickey
Project Officer

76 Lang Street
Kurri Kurri
NSW 2327
APPENDIX C

Surface Collection and Monitoring Methodology
Appendix C - Surface Collection and Monitoring Methodology

1.0 Salvage Methodology

The methodology presented in this section relates specifically to the proposed surface collection of site Orica AS and the monitoring of mechanical topsoil removal within the project impact area. The monitoring methodology incorporates a methodology for manual excavation, should specified triggers be identified during the monitoring program.

1.1 Methodology for the Surface Collection of Site Orica AS

The surface collection of site Orica AS will involve the salvage of all visible surface artefacts in the immediate vicinity of the recorded site. During the collection all surface artefacts will be flagged so that their distribution can be photographed and their GPS coordinates can be recorded prior to bagging of the artefacts. Detailed survey plans are not warranted due to the site’s location in a disturbed context, the small number of surface artefacts and the displacement of the artefacts that has occurred due to historical factors.

2.0 Monitoring Methodology

The Aboriginal stakeholders requested the opportunity to conduct monitoring of topsoil removal associated with the Project. This is not considered warranted on archaeological grounds; however Orica has agreed to accommodate the Aboriginal stakeholders’ request. Given that there are no archaeological grounds for topsoil monitoring, it is not proposed to develop a research design or to produce a detailed report. However, as discussed in Section 3.0, a short report will be prepared for submission to DECC.

DECC generally insists that an archaeologist is present during monitoring to ensure that in the event artefactual material is encountered that it is recognised, its significance assessed and the details of the find are recorded in sufficient detail to meet their standards. Due to the nature of the monitoring works and the need to ensure that the monitoring works are completed in an efficient and safe manner, it is suggested that the opportunity to participate in monitoring works should be provided to three Aboriginal stakeholder representatives and a qualified archaeologist (i.e. on any given day of monitoring works, an opportunity will be provided for three Aboriginal stakeholder representatives to participate in the monitoring. All participants in the monitoring will be required to comply with Orica’s Safety, Health and Environment requirements whilst onsite at the Orica Technology Park. This will include successfully completing the site and project inductions, working in accordance with the Construction Safety and Environmental Management Plan and the Job Safety and Environmental Risk Assessment.
2.1 Monitoring of Topsoil Removal

The following suggested methodology is proposed as suitable for monitoring of topsoil removal from the project impact area. This methodology also includes triggers and contingencies in the highly unlikely event that a feature (such as a hearth or knapping floor) and/or human skeletal material are discovered during the monitoring program.

As there was no Aboriginal scarred trees identified during the two surveys and due to the high level of regrowth vegetation within the area it is not proposed to commence monitoring prior to vegetation clearance, unless vegetation clearance is likely to result in ground surface disturbance. To assist with proposed monitoring trees that may impede the topsoil monitoring should (where practicable) be felled in a manner that does not result in substantial ground surface impact. If this method of felling is not practicable and it is necessary to mechanically remove vegetation and tree stumps, this is likely to result in a degree of ground surface disturbance, Aboriginal stakeholder representatives should be provided with the opportunity to monitor this work.

Following vegetation removal monitoring should occur according to the following methodology:

- the topsoil will be removed mechanically in vertical spits of an approximate maximum depth of 10 centimetres, with the orientation and dimensions of the scrapes to be determined in the field based on conditions and the type of machinery used;
- at the completion of each scrape, the scraped area will be subject to inspection;
- the windrow built up during the scraping of each spit will be subject to inspection;
- if artefacts are encountered in the scraped area their provenance will be recorded (i.e. MGA grid coordinate, approximate subsurface depth) and the artefact location(s) will be flagged, the find site photographed and the artefact(s) collected and placed in appropriately labelled individual bags, with topsoil removal to continue following removal of the artefact(s);
- if artefacts are recovered from the windrow they will be noted as unprovenanced, the approximate subsurface depth of the corresponding scrape recorded (e.g. 0 to 10 centimetres, 11 to 20 centimetres etc.), they will be collected and placed in appropriately labelled individual bags, with topsoil removal to continue following removal of the artefact(s) and or completion of raking (if undertaken);
- any section of windrow having an artefact/artefacts may be manually raked over a length of approximately five metres either side of the find to ensure there are no further artefacts within that section of windrow;
- monitoring will cease once all topsoil within the selected area has been removed or may cease prior to this depth if agreed upon by the majority of Aboriginal stakeholder representatives;
- if a suspected hearth, heat treatment feature or knapping floor is identified during monitoring, the mechanical excavation will cease for 10 metres either side of the feature and it will be removed manually in accordance with the methodology provided in Section 2.2. Topsoil removal may then resume at a distance agreed upon by the Aboriginal stakeholder representatives and the archaeologist;
• if human skeletal material/suspected human skeletal material is encountered all ground disturbing work must cease (refer to Section 2.3 for details of managing human skeletal material/suspected human skeletal material);

• all artefacts collected will be subject to the Care and Control outcomes decided upon in consultation with the Aboriginal stakeholders.

2.2 Manual Excavation of Features (if any) Identified During Monitoring

If a feature in the form of a suspected hearth, heat treatment feature or knapping floor is identified during monitoring the feature will be manually excavated. The methodology proposed for the manual excavation of suspected features is as follows:

• an area of 10 metres square surrounding the feature will be cordoned off;

• an initial area covering the exposed feature will be strung up into 1 metre squares which will be excavated as 0.5 metre quadrants;

• the quadrants will be removed using 5 centimetre arbitrary spits or stratigraphically whenever appropriate;

• hearths and heat treatment pits will be excavated in cross-section so that their internal contents/stratigraphic profile can be recorded in detail;

• wherever possible suitable materials will be collected for the generation of absolute dates;

• X, Y, Z coordinates will be recorded for all artefacts located in the excavation;

• the excavation will be continued to the clay or bedrock (including decomposed bedrock) or until there has been two sterile spits;

• in areal extent the excavation will continue until the Aboriginal stakeholder representatives and the archaeologist agree that the entire feature has been removed;

• a stratigraphic profile will be drawn;

• soil samples will be collected for Munsell, pH and geomorphic analysis;

• all artefacts recovered will be bagged separately and labelled appropriately;

• all soil/sand removed during the manual excavation will be sieved using 5 millimetre and 2 millimetre nested sieves. The only exception to this would be sediments associated with a hearth or heat treatment pit. If a feature of this nature was excavated all the deposit removed would be retained for laboratory analysis (e.g. microscopic and macroscopic plant/seed collection, flotation to collect charcoal if charcoal is scarce and/or highly fragmented); and

• all artefacts collected will be retained for analysis before being subject to the care and control arrangements outlined in Section 9.0 of the report.
2.3 Human Skeletal Material Protocols

Should skeletal material identified as human/possibly human be located during ground disturbing works all work shall cease in the area surrounding the remains and the relevant Aboriginal stakeholders, DECC (Special Line 131 555) and the NSW Police Department should be notified immediately. No further work will be undertaken in the vicinity of the skeletal material until management outcomes have been decided in consultation with the relevant Aboriginal stakeholders, DECC and NSW Police Department.

A suitably qualified forensic archaeologist/anthropologist will undertake the necessary studies of the *in situ* skeletal material to determine if it is human and to identify whether it is Aboriginal or non-Aboriginal in origin and whether the area is a crime scene or a burial. If the skeletal material is identified as human, of appropriate historical age, and Aboriginal in origin and the death is not suspicious in nature; the Aboriginal stakeholders and the DECC will make a decision in relation to management of the remains. If the skeletal material is non-Aboriginal and/or the death suspicious in nature, the management of the skeletal material and any subsequent further action will be at the discretion of the NSW Police Department.

Before work may recommence in the vicinity of the skeletal material the Aboriginal stakeholders and the DECC and/or the NSW Police Department will collaborate and advise on the size of a buffer zone to appropriately safeguard the skeletal material. Work can only recommence in the vicinity of the skeletal material with the approval of the relevant Aboriginal stakeholders, DECC and/or the NSW Police Department, following the implementation of appropriate management of the remains.

3.0 Reporting

Following the completion of the surface collection and monitoring of topsoil removal, a report will be provided to DECC that details the results of the salvage activities including (but not limited to):

- a description of the location and distribution of any salvaged artefacts;
- a description of the salvaged artefacts;
- a discussion of the context in which artefacts, if any, were found; and
- an overall review of the results of the salvage activity.
APPENDIX D

AHIMS Register Search
Umwelt (Australia) Pty Limited
PO Box 838
Toronto NSW 2283

Thursday, 18 December 2008

Attention: Amanda Reynolds

Dear Sir or Madam:

Re: AHIMS Search for the following area at E:360000-366000;N:6358500-6365500

I am writing in response to your recent inquiry in respect to Aboriginal objects and Aboriginal places registered with the NSW Department of Environment and Climate Change (DECC) at the above location.

A search of the DECC Aboriginal Heritage Information Management System (AHIMS) has shown that 43 Aboriginal objects and Aboriginal places are recorded in or near the above location. Please refer to the attached report for details.

The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not to be made available to the public.

The following qualifications apply to an AHIMS search:

- AHIMS only includes information on Aboriginal objects and Aboriginal places that have been provided to DECC;
- Large areas of New South Wales have not been the subject of systematic survey or recording of Aboriginal history. These areas may contain Aboriginal objects and other heritage values which are not recorded on AHIMS;
- Recordings are provided from a variety of sources and may be variable in their accuracy. When an AHIMS search identifies Aboriginal objects in or near the area it is recommended that the exact location of the Aboriginal object be determined by re-location on the ground; and
- The criteria used to search AHIMS are derived from the information provided by the client and DECC assumes that this information is accurate.

All Aboriginal places and Aboriginal objects are protected under the National Parks and Wildlife Act 1974 (NPW Act) and it is an offence to destroy, damage or deface them without the prior consent of the DECC Director-General. An Aboriginal object is considered to be known if:

- It is registered on AHIMS;
- It is known to the Aboriginal community; or
- It is located during an investigation of the area conducted for a development application.
If you considering undertaking a development activity in the area subject to the AHIMS search, DECC would recommend that an Aboriginal Heritage Assessment be undertaken. You should consult with the relevant consent authority to determine the necessary assessment to accompany your development application.

Yours Sincerely

[Signature]

Freeburn, Sharlene
Administrator
Information Systems & Assessment Section
Culture & Heritage Division
Phone: (02) 9585 6471
Fax: (02) 9585 6094
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**Grid Reference Type** = AGD (Australian Geodetic Datum), Zone = 56, Easting From = 360000, Easting to = 368000, Northing From = 6358500, Northing to = 6366500, Requestor like 3661%, Service ID = 24589, Feature Search Type = AHIMS Features

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APPENDIX E

Site Card for Orica AS
**Aboriginal Site Recording Form**

**AHIMS Registrar**
PO Box 1967, Hurstville NSW 2220

---

### Site Number

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**Entered by (I.D.)**

---

### Information Access

- [ ] Gender/male
- [ ] Gender/female
- [ ] Location restriction
- [ ] General restriction
- [ ] No access

**For Further Information Contact:**

#### Nominated Trustee

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#### Knowledge Holder

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**Aboriginal Heritage Unit or Cultural Heritage Division Contacts**

<p>| | |</p>
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### Geographic Location

**Site Name**: Orica AS

**Easting**: 363136
**Northing**: 6363127

**Mapsheet**: Beresfield

**Zone**: 56

**AGD/GDA**: AGD

**Location Method**: Non-Differential GPS

---

### Primary Recorder

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<tr>
<td>Ms</td>
<td>Reynolds</td>
<td>Amanda</td>
<td>L</td>
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**Organisation**: Umwelt (Australia) Pty Ltd

**Address**: 2/20 The Boulevard, Toronto

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<th>Fax</th>
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<tr>
<td>02 4950 5322</td>
<td>02 4950 5737</td>
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**Date recorded**

---
NPWS Aboriginal Site Recording Form - Site Information

Site Context

Landform
- Mountainous
- Plain
- Rolling hills
- Steep hills
- Undulating plain

Slope
- degrees

Landform Unit
- Beach
- Coastal rock platform
- Dune
- Intertidal flat
- Lagoon
- Tidal Creek
- Tidal Flat
- Cliff
- Crest
- Flat
- Lower slope
- Mid slope
- Upper slope
- Plain
- Ridge
- Tor
- Valley flat
- Levy

Vegetation
- Closed forest
- Grasslands
- Isolated clumps of trees
- Open forest
- Open woodland
- Scrub
- Woodland
- Cleared
- Revegetated
- N/A

Land use
- Conservation
- Established urban
- Farming-intensive
- Farming-low intensity
- Forestry
- Industrial
- Mining
- Pastoral/grazing
- Recreation
- Semi-rural
- Service corridor
- Transport corridor
- Urban expansion
- N/A

Water
- Distance to permanent water source
- Distance to temporary water source
- Name of nearest permanent water source
- Name of nearest temporary water

Directions for Relocation
Head west onto Echidna Drive, off George Booth Drive. The site is located 200 metres along on the south side of the road.

Site Location Map

Current Land Tenure
- Public
- National Park / other Government Dept.
- Private

Primary report
I.D.
(l.D. Office Use only)
### General Site Information

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<tr>
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<td>Boulder</td>
<td>Sandstone platform</td>
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<tr>
<td>Wind erosion</td>
<td>Silica gloss</td>
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<td>Water erosion</td>
<td>Tessellated</td>
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<tr>
<td>Rock collapse</td>
<td>Weathered</td>
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<td>Other platform</td>
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<table>
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<td>Silica gloss</td>
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### Features

- 1. Aboriginal Ceremony & Dreaming
- 2. Aboriginal Resource & Gathering
- Art
- 4. Artefact
- 5. Burial
- 6. Ceremonial Ring
- 7. Conflict
- 8. Earth Mound
- 9. Fish Trap
- 10. Grinding Groove
- 11. Habitation Structure
- 12. Hearth
- 14. Ochre quarry
- 15. Potential Archaeological Deposit
- 16. Stone Quarry
- 17. Shell
- 18. Stone Arrangement
- 19. Modified Tree
- 20. Water Hole

### Site Plan

Indicate scale, boundaries of site, features

### Site Dimensions

#### Closed Site Dimensions (m)
- Internal length
- Internal width
- Shelter height
- Shelter floor area

#### Open Site Dimensions (m)
- Total length of visible site
- Average width of visible site
- Estimated area of visible site
- Length of assessed site area
Aboriginal Community Interpretation and Management Recommendations

Preliminary Site Assessment
Site Cultural & Scientific Analysis and Preliminary Management Recommendations
The site is a small artefact scatter consisting of three artefacts, located in a five metre by five metre area within a 20 metre by five metre windrow exposure with 60 per cent visibility along side the road. The area has seen some imported soils and land disturbance for road construction. The artefacts included a banded mudstone core, a tuff core and a chert flake.

This section should only be filled in by the Endorsees

Endorsed by:  
Knowledge Holder  Nominated Trustee  Native Title Holder  Community Consensus

Title
Surname
First Name
Initials
Organisation
Address
Phone number
Fax

Attachments (No.)  Comments
A4 location map
B/W photographs
Colour photographs
Slides
Aerial photographs
Site plans, drawings
Recording tables
Other
Feature inserts-No.