F3 Freeway to Branxton link
Stage 3 Research Design and Methodology
MARCH 2007
Proposed National Highway Link F3 to Branxton - Stage 3
Research Design and Methodology to Accompany a DEC Section 90 Consent Application

May 2006
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*Umwelt (Australia) Pty Limited  
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**APPENDICES**

1 Proposed National Highway Link F3 to Branxton Preliminary Report: Stage 2 Section 90 Salvage and Section 87 Investigations  
2 Correspondence from Aboriginal Interest Groups
1.0 INTRODUCTION

The Roads and Traffic Authority (RTA) propose to construct a four lane dual carriageway approximately 40 kilometres in length exiting the existing F3 Freeway near Seahampton and rejoining the New England Highway near Black Creek, west of Branxton (hereafter the F3 to Branxton). The route alignment of the highway link is designed to provide a road transport artery through the Lower Hunter that will have the capacity to meet increasing traffic loads and facilitate future economic development in the region (Figure 1.1). RTA has undertaken the first two stages of the archaeological salvage of the route alignment. Salvage undertaken to date includes the collection of surface artefacts from Aboriginal sites under Department of Environment and Conservation (DEC) Section 90 Consents #1940 and #2102 and the subsurface investigation of sites, potential archaeological deposits (PADs) and landform units under Section 87 Permit #2096.

This document provides a detailed Research Design and Methodology to accompany the attached Section 90 Consent application related to the Stage 3 salvage of sites located during inspections of the route alignment for the F3 to Branxton Highway Link (Brayshaw 1994, 2001; Umwelt 2004, 2005a, 2006, in prep.). The Research Design and Methodology and Section 90 also relate to sites located as a result of the subsurface testing of potential archaeological deposits and landform units undertaken under DEC Section 87 Permit #2096.

1.1 PRECEDING STAGES

In line with the Development Approval conditions and in consultation with the Aboriginal community and the DEC the salvage for the F3 to Branxton is being undertaken in four stages. Stage 1 of the salvage incorporated the surface collection and subsurface salvage of sites under DEC Section 90 Consent #1940 (approved 7 June 2004) within the Sugarloaf Range area. Stage 2 of the salvage incorporated surface collections and subsurface investigations undertaken under DEC Section 90 Consent #2102 and Section 87 Permit #2096 issued on 14 February 2005 for the entire length of the route alignment.

Under the Conditions of the Consents/Permit approved for Stage 1 and 2 a preliminary report was to be provided to the DEC ahead of the application for Section 90 Consent for the Stage 3 (final) salvage program for the F3 to Branxton project. The preliminary report (Umwelt 2006a) was forwarded to the DEC in January 2006 (a copy of this report is included in Appendix 1). As per the Consent/Permit Conditions, the final report incorporating the full details of the entire salvage forms Stage 4 of the salvage program and will be provided to the DEC following the completion of the Stage 3 salvage discussed within this document.

The Research Design and Methodology provided in this document is the same Research Design and Methodology prepared for Stage 1 (Sugarloaf Range area - Umwelt 2004) and Stage 2 (entire route alignment - Umwelt 2005b) of the salvage program. This Research Design and Methodology has been approved by the Aboriginal community groups involved in the project and the DEC.

Descriptions of the sites/PADs and landforms and the results of the earlier salvage/subsurface testing are provided in Appendix 1.
FIGURE 1.1
Approved Route of the F3 to Branxton Highway Link

Legend:
- Main road
- Minor road
- Railway line
- Creek
- Urban area

Source: Connell Wagner
1.2 **ABORIGINAL CONSULTATION**

Aboriginal groups involved in this project are:

- Awabakal Local Aboriginal Land Council (ALALC);
- Barkuma Neighbourhood Centre (BNC);
- Black Creek Aboriginal Corporation (BCAC);
- Lower Wonnarua Tribal Council (now Lower Wonnarua Tribal Consultancy - LWTC);
- Mindaribba Local Aboriginal Land Council (MLALC); and
- Wonnarua Nation Aboriginal Corporation (WNAC).

Aboriginal community consultation for the attached Section 90 application and this Research Design and Methodology has been ongoing over the period of fieldwork associated with the Stage 1 and Stage 2 salvage and subsurface testing program which was undertaken over the period from mid 2004 to October 2005 (refer to Appendix 1 for details of the full Aboriginal consultation program undertaken for this project to date).

At the conclusion of the Stage 1 and 2 salvage/subsurface investigations the Aboriginal groups were afforded the opportunity to return to the sites/areas investigated to discuss further salvage requirements. This visit was undertaken on 28 September 2005 and recommendations for further salvage were discussed at this time.

On 18 November 2005 the relevant Aboriginal groups were invited to an all day meeting at Umwelt during which the results of the Stage 1 and Stage 2 salvages and subsurface investigations were discussed along with recommendations for the final Stage 3 salvage program. Agreement on the Stage 3 salvage was tentatively reached following this meeting. It was proposed that Umwelt prepare a draft Section 90 application and that the groups would provide comment on that document. The draft was provided to the groups on 21 March 2006 and letters of comment from the groups are attached in Appendix 2. MLALC provided their response in a telephone conversation held on 19 May 2006.

All of the groups have indicated their agreement with the recommendations and the research design and methodology included in this report.

1.3 **CONTENTS OF THE DOCUMENT**

Section 2 of this document provides information in relation to the sites requiring Section 90 Consent as part of the final Stage 3 salvage and provides the rationale for the salvage measures proposed.

Section 3 discusses the conservation measures to be put in place to protect and/or lessen impact on sites and sensitive areas within the route alignment corridor.

Section 4 of this document provides information in relation to the Research Design accepted by the DEC and the participating Aboriginal community groups for this project.

Section 5 presents the proposed methodology for the surface collections and subsurface investigations.
Section 6 discusses the analysis proposed for the stone artefact recovered during the proposed surface collections and subsurface salvage.

Section 7 discusses ‘Care’ of the artefacts recovered during the salvage.

Section 8 provides a list of references referred to in the text.
2.0 SITES REQUIRING SECTION 90 CONSENT

Table 2.1 provides details of the sites for which Section 90 Consent is proposed in the attached Section 90 application. The table discusses the nature of the Section 90 consent proposed for each site. Detailed descriptions of the sites, results of prior subsurface testing and justification for further salvage requirements are included in Appendix 1. Figures 2.1 and 2.2 indicate the location of the sites and the nature of the salvage requirement for the site. It should be noted that the salvage of sites has already been undertaken for the easternmost four kilometres of the route alignment under Section 90 Consent #1940 and that 68 sites have been surface collected along the remainder of the route alignment under Section 90 Consent #2102 (refer to Appendix 1).

The salvage proposed in Table 2.1 will be the final stage of the RTA F3 to Branxton field salvage and the current Section 90 Consent application applies to all impact proposed along the entire length (40 kilometres) and width (150 metres) of the route alignment as indicated on Figures 2.1 and 2.2. Within this area there are, however, 13 sites and two areas where site conservation, partial site conservation or disturbance minimisation is planned. These sites/areas form the topic of Section 3 of this report.

Following the completion of the current salvage program and on reaching agreement with the Aboriginal groups participating in the project and the DEC on the nature of the requisite Aboriginal Cultural Heritage Offsets (refer to Appendix 1), and completion of the Aboriginal Heritage Management Plan for the project; RTA will be able to commence work on highway link construction.
### Table 2.1 - Summary of Proposed Section 90 Salvage Requirements

<table>
<thead>
<tr>
<th>Site Name</th>
<th>DEC Site No.</th>
<th>Stage 3 Salvage Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anvil Creek RTA 3 (incorporating Anvil Creek PAD 16)</td>
<td>#37-6-1368</td>
<td>Partial Section 90 Consent (collection, partial subsurface salvage and partial conservation) to collect surface artefacts from the site and to undertake subsurface salvage of an area on the south-eastern side of the creek that retains the greatest integrity (formerly PAD 16) and is within the highway link impact area. A 5 metre by 5 metre excavation is proposed. The RTA will bury an area 60 metres either side of the creek with imported fill within their area of impact to conserve the remainder of the site. The route alignment should be temporarily fenced during the construction period to avoid impacting sections of the site outside the route alignment.</td>
</tr>
<tr>
<td>Anvil Creek RTA 27 IF</td>
<td>#37-6-1601</td>
<td>Section 90 Consent (collection only).</td>
</tr>
<tr>
<td>Black Creek RTA 2</td>
<td>#37-6-1339</td>
<td>Partial Section 90 Consent (collection, partial subsurface salvage and partial conservation) to collect surface artefacts from the site (along the southern side of the New England Highway) and also to undertake subsurface salvage within the highway link impact area on the second creek terrace. A 6 metre by 6 metre stepped excavation is proposed. The RTA will bury the remainder of the site within their area of impact (first, second and third creek terrace/lower slope) with imported fill and the site outside (south) of the route alignment will be fenced off to prevent accidental damage. Soil excavated for the bridge pylons will remain within the site area and be covered by fill.</td>
</tr>
<tr>
<td>Swamp Creek RTA 1</td>
<td>#38-4-0813</td>
<td>Section 90 Consent (collection only).</td>
</tr>
<tr>
<td>Wallis Creek RTA 2</td>
<td>#38-4-0815</td>
<td>Section 90 Consent (partial salvage and partial conservation). Route alignment to be temporarily fenced during construction to avoid accidental impact to the area of the site outside the route alignment.</td>
</tr>
<tr>
<td>Anvil Creek PAD 17 (to be renamed Anvil Creek RTA 28)</td>
<td>#37-6-1369</td>
<td>Section 90 Consent (no further salvage).</td>
</tr>
<tr>
<td>Anvil Creek PAD 18 (to be renamed Anvil Creek RTA 29)</td>
<td>#37-6-1370</td>
<td>Section 90 Consent (no further salvage).</td>
</tr>
</tbody>
</table>
## Table 2.1 - Summary of Proposed Section 90 Salvage Requirements (cont)

<table>
<thead>
<tr>
<th>Site Name</th>
<th>DEC Site No.</th>
<th>Stage 3 Salvage Requirement</th>
</tr>
</thead>
</table>
| Anvil Creek PAD 21  
(to be incorporated into the existing Redhouse Creek 1 site) | #37-6-1602 | Partial Section 90 Consent (partial subsurface salvage and partial conservation). EnergyAustralia will be required to excavate two new pole locations in this area to lift powerlines over the Branxton Interchange. The pole locations will be salvaged under Section 90 Consent. A 1 metre by 1 metre excavation is proposed at each pole location. The RTA will bury the PAD 21 area (first creek terrace) within their area of impact and will temporarily construct a boundary fence to protect the Redhouse Creek 1 site; that falls outside their route alignment. |
| Bishops Creek PAD 15  
(to be renamed Bishops Creek RTA 10) | #37-6-1367 | Section 90 Consent (no further salvage). |
| Black Creek PAD 20  
(to be incorporated into Black Creek RTA 2) | #37-6-1371 | Refer to Black Creek RTA 2 (above) |
| Black Waterholes Creek PAD 11 | #37-6-1363 | Not a PAD/no further investigation required. |
| Sawyers Gully PAD 12  
(to be renamed Sawyers Gully RTA 11) | #37-6-1364 | Section 90 Consent (collection only). |
| Sawyers Gully PAD 13  
(to be incorporated into the Sawyers Gully RTA 3 site) | #37-6-1365 | Sawyers Gully RTA 3 has already been collected under Section 90 Consent # 2102, therefore, no further consent requirements. |
| Sawyers Gully PAD 14  
(to be incorporated into Sawyers Gully RTA 6) | #37-6-1366 | Sawyers Gully RTA 6 has already been surface collected under Section 90 Consent #2102. An application will be made to the DEC to undertake subsurface salvage within the highway link impact area. A 5 metre by 5 metre excavation is proposed. |
| Surveyors Creek PAD 3 | #38-4-0823 | Not a PAD/no further investigation required. |
| Surveyors Creek PAD 4  
(to be renamed Surveyors Creek RTA 9 IF) | #38-4-0824 | Section 90 Consent (no further salvage). |
| Surveyors Creek PAD 5  
(to be renamed Surveyors Creek RTA 10) | #38-4-0825 | Section 90 Consent (subsurface salvage) to undertake subsurface salvage within the highway link impact area. A 5 metre by 5 metre excavation is proposed. |
<table>
<thead>
<tr>
<th>Site Name</th>
<th>DEC Site No.</th>
<th>Stage 3 Salvage Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surveyors Creek PAD 6&lt;br&gt; (to be renamed Surveyors Creek RTA 11)</td>
<td>#38-4-0826</td>
<td>Section 90 Consent (no further salvage).</td>
</tr>
<tr>
<td>Swamp Creek PAD 9&lt;br&gt; (to be renamed Swamp Creek RTA 11 IF)</td>
<td>#37-6-1362</td>
<td>Section 90 Consent (no further salvage).</td>
</tr>
<tr>
<td>Wallis Creek PAD 1&lt;br&gt; (to be renamed Wallis Creek RTA 4)</td>
<td>#38-4-0821</td>
<td>Section 90 Consent (no further salvage).</td>
</tr>
<tr>
<td>Wallis Creek PAD 2&lt;br&gt; (to be renamed Wallis Creek RTA 6)</td>
<td>#38-4-0822</td>
<td>Partial Section 90 Consent (partial salvage and partial conservation) to undertake subsurface salvage within the highway link impact area. A 5 metre by 5 metre excavation is proposed.</td>
</tr>
<tr>
<td>Wallis Creek PAD 8&lt;br&gt; (to be incorporated into Wallis Creek RTA 2)</td>
<td>#38-4-0828</td>
<td>Refer to Wallis Creek RTA 2 (above).</td>
</tr>
<tr>
<td>Anvil Creek Landform Testing&lt;br&gt; (area with artefacts to be incorporated into Anvil Creek RTA 3)</td>
<td>N/A</td>
<td>Refer to Anvil Creek RTA 3 (above)</td>
</tr>
<tr>
<td>Bishops Creek Landform Testing&lt;br&gt; (area with artefacts to be renamed Bishops Creek 10)</td>
<td>N/A</td>
<td>Section 90 Consent (no further salvage).</td>
</tr>
<tr>
<td>Black Creek Landform Testing&lt;br&gt; (area to be incorporated into Black Creek RTA 2)</td>
<td>N/A</td>
<td>Refer to Black Creek RTA 2 (above)</td>
</tr>
<tr>
<td>Black Waterholes Creek Landform Testing</td>
<td>N/A</td>
<td>Not a PAD/no further investigation required.</td>
</tr>
<tr>
<td>Sawyers Gully Landform Testing&lt;br&gt; (area with artefacts to be incorporated into Sawyers Gully RTA 3)</td>
<td>N/A</td>
<td>Refer to Sawyers Gully PAD 13 (above)</td>
</tr>
</tbody>
</table>
## Table 2.1 - Summary of Proposed Section 90 Salvage Requirements (cont)

<table>
<thead>
<tr>
<th>Site Name</th>
<th>DEC Site No.</th>
<th>Stage 3 Salvage Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surveyors Creek Landform Testing</td>
<td>N/A</td>
<td>Refer to Surveyors Creek PAD 5.</td>
</tr>
<tr>
<td>(to be incorporated into Surveyors Creek RTA 10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swamp Creek Landform Testing</td>
<td>N/A</td>
<td>Not a PAD/no further investigation required.</td>
</tr>
<tr>
<td>Wallis Creek Landform Testing</td>
<td>N/A</td>
<td>Refer to Wallis Creek RTA 2 (above).</td>
</tr>
<tr>
<td>(to be incorporated into Wallis Creek RTA 2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.0 SITES TO BE CONSERVED/AREAS WHERE IMPACTS WILL BE MINIMISED

In addition to the salvage proposed in Table 3.1, the RTA has agreed to undertake the conservation/partial conservation of a number of sites along the F3 to Branxton route alignment and to the minimisation of impacts to areas of sensitivity identified by Awabakal Local Aboriginal Land Council. These sites/areas are listed in Table 3.1 and shown on Figures 3.1 and 3.2.

Details of the conservation methodologies proposed will be provided in the Aboriginal Heritage Management Plan being prepared by Umwelt (in prep.). The Aboriginal Heritage Management Plan will address how RTA will ensure the ongoing conservation of the sites during the highway link construction phase which will be undertaken by contractors.

The Aboriginal Heritage Management Plan will be completed in consultation with the relevant Aboriginal groups as soon as the DEC’s final requirements for the Stage 3 salvage are known (i.e. following approval of the attached Section 90 application). The Aboriginal Heritage Management Plan will be completed and approved by the relevant Aboriginal groups and the DEC prior to work commencing on the construction of the F3 to Branxton highway link project.

As indicated in Table 3.1 the conservation methods related to sites include:

- bridging sites;
- burial/partial burial of sites with geotextile and imported fill to protect them from damage by highway link construction;
- emplacement of sediment traps (to protect grinding groove sites);
- temporary fencing of buffer zones around sites during the highway link construction period; and
- temporary fencing of the route alignment (where necessary) to protect areas of sites outside the route alignment during the highway link construction period.
Table 3.1 - Sites/Areas to be Conserved/Protected/Impact Minimised

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Site Card No.</th>
<th>Location in relation to Development Impact</th>
<th>Management Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anvil Creek RTA 3 (incorporating Anvil Creek PAD 16)</td>
<td>#37-6-1368</td>
<td>Within and extending outside the route alignment</td>
<td>Partial Section 90 Consent is proposed for the collection of the surface artefacts within the route alignment to avoid their damage/destruction during works. A 5 metre by 5 metre salvage is proposed for the PAD 16 area. In order to conserve as much of the site as possible, RTA will cover the area they will impact within the route alignment with imported fill for a distance of 60 metres either side of the creekline. The route alignment should be temporarily fenced during the construction period to avoid impacting sections of the site outside the route alignment.</td>
</tr>
<tr>
<td>Area of High Cultural Heritage Value on Blue Gum Creek</td>
<td>N/A</td>
<td>The area is crossed by the route alignment and a sediment basin is also planned within this area.</td>
<td>Some tree clearance will be required for access for construction of the sediment basin and for the construction of the highway link. ALALC has requested that tree clearance and surface disturbance be minimised as far as possible in this sensitive area.</td>
</tr>
<tr>
<td>Area of High Cultural Heritage Value—Aboriginal Pathway Stockrington Road</td>
<td>N/A</td>
<td>Within the route alignment. The area where the route alignment crosses Stockrington Road will impact a known Aboriginal pathway.</td>
<td>ALALC recognise that the area has already been heavily disturbed by the construction of Stockrington Road, the installation of the gas pipeline that runs subparallel to Stockrington Road and by rubbish dumping. Therefore the only management recommendation required by ALALC is that all impact in the area is minimised as far as possible.</td>
</tr>
<tr>
<td>Black Creek RTA 1 (Brayshaw's Black Creek)</td>
<td>#37-6-0685</td>
<td>20 metres south of the southern boundary of the route alignment</td>
<td>Due to modifications to the route alignment this site will no longer be impacted by highway link construction. If construction works approach within 30 metres of this site it should be temporarily fenced.</td>
</tr>
</tbody>
</table>
### Table 3.1 - Sites/Areas to be Conserved/Protected/Impact Minimised (cont)

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Site Card No.</th>
<th>Location in relation to Development Impact</th>
<th>Management Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Creek RTA 2 (now incorporating PAD 20)</td>
<td>#37-6-1339</td>
<td>Within and extending outside route alignment</td>
<td>Results of the subsurface testing of this area indicate that it requires further salvage due to its archaeological research potential and also for its Aboriginal cultural heritage value. The area of the site; however is so extensive and the deposits so deep that salvage of the entire area is not feasible (or necessary). Thus a section of the site will be subject to further subsurface salvage under a partial Section 90 Consent to enable further examination of its research potential (refer to Section 4.4.2 for details). Areas of the site not impacted by subsurface works (such as the emplacement of bridge pylons) should be buried with imported fill and the highway link constructed on the imported fill. The boundary of the actual route alignment to the south should be fenced during highway link construction to avoid impact to this area. The site does not extend to the north.</td>
</tr>
<tr>
<td>Blue Gum Creek 5 Grinding Grooves</td>
<td>#38-4-0817</td>
<td>The grooves are approx 60 metres north and upstream of centreline but will not be directly impacted by highway link construction.</td>
<td>No vehicular access is to be permitted across the site. Track to site to be temporarily blocked to close off access across the site from the road corridor during highway link construction. Coal and Allied to be informed of site location. On the advice of ALALC and DEC, Coal and Allied to be requested to undertake works to permanently close the track in this area to prevent 4WD vehicles from driving over the grinding grooves. Coal and Allied to discuss matter with DEC and ALALC to assess manner in which road should be closed and any requirements for DEC/AHIMS Permits to undertake this work.</td>
</tr>
</tbody>
</table>
### Table 3.1 - Sites/Areas to be Conserved/Protected/Impact Minimised (cont)

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Site Card No.</th>
<th>Location in relation to Development Impact</th>
<th>Management Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Gum Creek Grinding Grooves (a)</td>
<td>#38-4-0235</td>
<td>The site is located 100 metres to the south of the centreline of the highway link route alignment and 50 metres south of a proposed sediment basin and 75 metres west and upstream of an access track and 75 metres downslope of an access track. The site will not be directly impacted by the development and it is recognised that the sediment basin will assist with reducing sediment load in the creek and indirect impact on the grinding grooves.</td>
<td>It is recommended that a ‘no go’ buffer zone be implemented 50 metres north (upslope) of this section of Blue Gum Creek during sediment basin construction. If this buffer is not feasible the site should be temporarily fenced to avoid accidental impact during sediment basin construction. The fence should incorporate an area 10 metres upstream and downstream of the site and on each side of Blue Gum Creek.</td>
</tr>
<tr>
<td>Blue Gum Creek Grinding Grooves (b)</td>
<td>#38-4-0236</td>
<td>The site is located 125 metres to the south of the centreline of the highway link route alignment and 75 metres southwest of a proposed sediment basin and 130 metres west and upstream of an access track and 120 metres downslope of an access track. The site will not be directly impacted by the development and it is recognised that the sediment basin will assist with reducing sediment load in the creek and indirect impact on the grinding grooves.</td>
<td>It is recommended that a ‘no go’ buffer zone be implemented 50 metres north (upslope) of this section of Blue Gum Creek during sediment basin construction. If this buffer is not feasible the site should be temporarily fenced to avoid accidental impact during sediment basin construction. The fence should incorporate an area 10 metres upstream and downstream of the site and on each side of Blue Gum Creek.</td>
</tr>
<tr>
<td>Minmi Creek Stone Arrangements</td>
<td>#38-4-0819 &amp;  #38-4-0820</td>
<td>Within the route alignment</td>
<td>The area containing the stone arrangements to be fenced during the construction period and the area to be spanned by the highway link and not impacted by construction works. Fenced area to allow at least a 5 metre buffer zone either side of Minmi Creek in the vicinity of the stone arrangements and a buffer 25 metres upstream and 30 metres downstream of the site area. This area will incorporate the two European heritage weirs and the stone wall also located along this section of Minmi Creek.</td>
</tr>
</tbody>
</table>
### Table 3.1 - Sites/Areas to be Conserved/Protected/Impact Minimised (cont)

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Site Card No.</th>
<th>Location in relation to Development Impact</th>
<th>Management Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redhouse Creek RTA 1 (now incorporating Anvil Creek PAD 21)</td>
<td>#37-6-1603</td>
<td>Within and outside route alignment</td>
<td>PAD 21 was subsurface tested under Section 87 Permit #2096. The subsurface testing indicated that the PAD was an extension of the previously recorded Redhouse Creek 1 site. Agreement was reached with the RTA that the area of the site to be impacted by construction of the Branxton Interchange was to be buried with imported fill to avoid impact to subsurface deposits. It will be; however, necessary to excavate two holes approximately 1 metre in diameter within the site (and within an existing EnergyAustralia easement) to emplace two power poles to lift the existing powerlines over the Branxton Interchange. Application will be made to the DEC for Partial Section 90 with subsurface salvage for the two power pole locations.</td>
</tr>
<tr>
<td>Seahampton 2 Grinding Groove Site</td>
<td>38-4-0393</td>
<td>This site is approximately 50 metres upstream of the area of direct impact from construction of the F3 Interchange or highway link.</td>
<td>In order to prevent accidental damage it is recommended that the site area is fenced during the construction period. The fenced area should incorporate a buffer zone 5 metres either side of Minmi Creek and 5 metres upstream and downstream of the site.</td>
</tr>
<tr>
<td>Wallis Creek RTA 6 (formerly Wallis Creek PAD 2)</td>
<td>#38-4-0822 (PAD ID)</td>
<td>Within and extending outside the route alignment</td>
<td>PAD 2 was subsurface tested under Section 87 Permit #2096. The subsurface testing indicated that the PAD was a site (named Wallis Creek RTA 6). It is proposed that the site extends along the ridge crest in this area and well outside the area to be impacted by highway link construction. Results of the subsurface testing of this area indicate that it requires further salvage due to its archaeological research potential and also for its Aboriginal cultural heritage value. The route alignment in this area should be fenced during construction to avoid additional impacts to the site area outside of the impact area. Application will be made to the DEC for Partial Section 90 with subsurface salvage within the route alignment.</td>
</tr>
</tbody>
</table>
Table 3.1 - Sites/Areas to be Conserved/Protected/Impact Minimised (cont)

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Site Card No.</th>
<th>Location in relation to Development Impact</th>
<th>Management Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wallis Creek RTA 5 (formerly Wallis Creek PAD 7)</td>
<td>#38-4-0827 (PAD ID)</td>
<td>Route alignment modified to put the area outside the route alignment</td>
<td>PAD 7 was subsurface tested under Section 87 Permit #2096. The subsurface testing indicated that the PAD was a site (named Wallis Creek RTA 5) with a relatively high subsurface concentration of artefacts. Modifications to property access in this area mean that the site can be conserved. The site area (landform unit) was identified by the relevant Aboriginal community and archaeologists from Umwelt. This area will be temporarily fenced during highway link construction to avoid accidental impact.</td>
</tr>
<tr>
<td>Wallis Creek RTA 2 (now incorporating Wallis Creek PAD 8)</td>
<td>#38-4-0828</td>
<td>Extensive site that is within route alignment but also extends outside area of route alignment. Sediment basin required in this area to prevent sediment entering tributary of Wallis Creek. The Wallis Creek grinding groove site (see below) will also be protected by this sediment basin.</td>
<td>Subsurface testing under Section 87 Permit #2096 indicated that further subsurface salvage was not required for the section of the site that lies within the route alignment and that surface collection under a Section 90 Consent would be adequate management for this section of the site. The route alignment should be temporarily fenced in the site area to avoid accidental impact during highway link construction.</td>
</tr>
<tr>
<td>Wallis Creek RTA 3 Grinding Grooves</td>
<td>#38-4-0816</td>
<td>120 metres southwest of centreline of the route alignment.</td>
<td>RTA will construct a drain at the base of the batter, upslope of the site, to ensure that additional sediment does not enter the watercourse as this would increase abrasion and erosion of the grinding grooves.</td>
</tr>
</tbody>
</table>
4.0 RESEARCH DESIGN

Since Umwelt began involvement in the F3 to Branxton Project in 2002, the direction of research has been toward gaining an understanding of the Aboriginal sensitivity of the various landscapes crossed by the proposed route alignment in terms of their Aboriginal cultural heritage values. The Aboriginal Cultural Heritage Assessments prepared as Task 1 of the project (Umwelt 2003) indicate for the contemporary Aboriginal community these values are closely allied to the useful resources (both economic and spiritual) contained within the landscape and also the routes used by their ancestors as they moved around the landscape to access these resources.

4.1 RESEARCH FRAMEWORK FOR THE SALVAGE PROGRAM

The research design adopts a landscape based approach. A landscape based research design recognises the relationship between Aboriginal people and the economic and spiritual resources provided by the land. A landscape based approach evaluates the resources (stone, water, food and medicine, shelter, connectedness) that an area provided for its Aboriginal inhabitants as well as any known ceremonial, spiritual, totemic and tribal associations that past Aboriginal communities had to an area.

For the F3 to Branxton project detailed information has been collected in relation to the Aboriginal resources (both economic and spiritual) of the area crossed by the route alignment and a corridor five kilometres either side. This information was gathered during the preparation of Aboriginal Cultural Heritage Assessments (Umwelt 2003) and during the route alignment inspection (Umwelt in prep). This information was used to frame and scope the research questions and will be used further to assist with the interpretation of the archaeological evidence supplied by the sites previously salvaged/tested and the sites proposed for salvage in the attached Section 90 application.

As mentioned in Section 1.1 the salvage program has been planned in four stages. Details of those stages are included in Appendix 1 and Umwelt 2004. The research questions provided below will be addressed as Stage 4 (the final report) of the program.

4.2 RESEARCH QUESTIONS

The research questions provided below were prepared in full consultation with the relevant Aboriginal groups and the DEC.

4.2.1 The Awabakal/Wonnarua Tribal Boundary

On the basis of information recorded during the route alignment inspection and in light of the results of salvage and subsurface testing undertaken in Stage 1 and 2, it is thought possible to attempt to address the following questions related to the tribal boundaries in the area:

- Is the location of the Awabakal/Wonnarua tribal boundary evident from the analysis of the archaeological material recorded/collected/excavated during the project?
- Was the Awabakal/Wonnarua tribal boundary permeable or impermeable (i.e. did people/resources cross this boundary)?

The type of evidence that will be relevant here focuses on raw materials used for artefact manufacture (some of which are known to have quite distinct sources), and both flaked and edge ground implements will be considered wherever possible (refer Section 6 for details).
Stage 1 and 2 preliminary artefact analyses has shown a clear trend for there to be a distinct difference in the raw materials used for stone artefact manufacture in the sites to the east of the Surveyors Creek catchment and those sites to the west. Further subsurface investigation in the Surveyors Creek RTA 10 and Wallis Creek RTA 6 sites is proposed to assist with answering the research questions related to tribal boundaries.

4.2.2 Aboriginal Use of the Landscape

On the basis of information recorded during the route alignment inspection, prior archaeological research and in light of the results of salvage and subsurface testing undertaken in Stage 1 and 2, it is thought possible to attempt to address the following questions related to the Aboriginal use of the landscape.

- Do site locations relate to the location of specific resources?
- Do the artefacts in sites reflect the use of specific resources (artefact type, use-wear, residues)?
- Do the artefacts in sites reflect movement across the landscape that can be related to seasonal resource exploitation (attribute analysis, residues)?
- Are broad patterns of occupation (occupation strategies) distinguishable across the major landscape styles that are traversed by the F3 to Branxton alignment?
- Is a pattern that can be attributed to the influence of significant water bodies outside the route alignment apparent (i.e. different types of occupation evidence associated with major creeks, proximity to wetland etc)?
- Does the evidence associated with assumed reliable resource zones (low risk areas such as adjacent to permanent creeks or swamps) differ from the evidence in higher risk zones (such as in the first and second order tributaries in the tops of the catchments), where access may be constrained by water availability?
- Are there differences in sites/site contents in areas known from the Aboriginal oral history to be associated with ceremony or to be of spiritual significance?
- Is gender evident through the nature of the artefacts left at sites?

The results of the Stage 1 and 2 salvages/investigations and the preliminary artefact analyses indicate that for many of these questions to be answered larger assemblages are required than those collected/excavated to date. Thus further broad area manual excavation is proposed for sites that indicate they have the potential to contain complex assemblages in a subsurface context. These sites include:

- Anvil Creek RTA 3 (incorporating PAD 16);
- Black Creek RTA 2 (incorporating PAD 20);
- Sawyers Creek Gully RTA 6 (formerly PAD 14 - please note this site has already been surface collected under Section 90 Consent #2102. Details of the rationale for further investigation in this site are provided in Appendix 1);
- Surveyors Creek RTA 10 (formerly PAD 5); and
• Wallis Creek RTA 6 (formerly PAD 2).

Also targeted for two small area excavations is:

• Redhouse Creek 1 (incorporating PAD 21).

Though this site has been targeted for conservation, the necessity of emplacing two power poles in the PAD 21 area means these areas must be salvaged and that it is highly likely that further artefacts will be recovered for analysis which will be useful in answering the research questions (refer to Section 5 for methodology).

Further artefacts will also be collected for analysis from the surface of the following sites:

• Anvil Creek RTA 3 (incorporating PAD 16);
• Anvil Creek RTA 27IF;
• Black Creek RTA 2 (incorporating PAD 20);
• Sawyers Gully RTA 11 (incorporating PAD 12);
• Swamp Creek RTA 1; and
• Wallis Creek RTA 2 (incorporating PAD 8).

Surface collection only is proposed for Swamp Creek RTA 1 and Wallis Creek RTA 2 as subsurface investigation of these sites indicated they would not return complex assemblages from further subsurface salvage. Analysis of the surface artefacts from these sites; however, will assist by providing further assemblages for analysis from sites throughout the various creek catchments (and within different landform units).

4.2.3 Chronology of Use of the Landscape/Changes over Time

On the basis of the disturbance history of the soil profile along the route alignment, only one site is though to have the capacity to provide information in relation to chronological change. This site is Black Creek RTA 2 which is targeted for further subsurface salvage and partial conservation (refer to Appendix 1 for details).
5.0 METHODOLOGY

The following methodology for the Stage 3 salvage has been prepared in consultation with the relevant Aboriginal groups.

5.1 ARTEFACT COLLECTION

The sites to be collected are:

- Anvil Creek RTA 3 (incorporating PAD 16);
- Anvil Creek RTA 27IF;
- Black Creek RTA 2 (incorporating PAD 20);
- Sawyers Gully RTA 11 (incorporating PAD 12);
- Swamp Creek RTA 1; and
- Wallis Creek RTA 2 (incorporating PAD 8).

The artefact collections will be undertaken using the same methodology applied to Stages 1 and 2:

- the artefacts will be flagged and the site photographed;
- scale plans will be prepared indicating the artefact distribution within the sites;
- the artefacts will be collected, bagged and labelled;
- all artefacts collected will be subject to detailed attribute analysis (refer Section 6); and
- all artefacts will be packaged according to Australian Museum standards and a catalogue of artefacts produced.

5.2 SUBSURFACE SALVAGE

In view of the results of the Stage 1 salvage and the Stage 2 salvage and subsurface testing of sites and PADs and systematic testing of landform units (refer to Appendix 1); six sites have been chosen for further detailed manual investigation ahead of impact by highway link construction. The areal extent and the methodology for these excavations has been chosen taking into account comparability of the results, the extent of the area to be impacted by RTA, the extent of the area of the site that can be conserved (by burial) by the RTA and the depth of the deposits.

In general the manual excavations will be 5 metre by 5 metre squares (Umwelt has recently completed numerous excavations for other clients in the Hunter Valley of the same size, allowing for comparability over a broader geographic area); however, two sites; Black Creek RTA 2 and Redhouse Creek 1, will have a slightly modified areal extent to take into account the specific nature of the sites and the extent to which they can be conserved - refer to Appendix 1 for detailed accounts of the all the sites proposed for subsurface salvage and the rationale for their salvage).
The following methodology applies to:

- **Anvil Creek RTA 3** (incorporating PAD 16);
- **Sawyers Gully RTA 6** (formerly PAD 14);
- **Surveyors Creek RTA 10** (formerly PAD 5); and
- **Wallis Creek RTA 6** (formerly PAD 2).

A 5 metre by 5 metre broad area excavation will be undertaken at each of the four sites. The methodology is as follows:

- the excavations will be undertaken manually using trowels and spades;
- the excavations will be undertaken as 1 metre squares excavated as 50 cm quadrats and arbitrary 5 cm spits. Stratigraphic excavation will be employed if features are located;
- all soil excavated will be sieved through 5 mm and 2 mm nested sieves;
- at least one soil sample will be collected from each spit of each 1 metre square for Munsell, pH and geomorphological analysis. Further samples will be collected if features are observed. For consistency the Munsell and pH readings will all be undertaken by one person under the same light conditions after the completion of the excavations;
- XYZ coordinates will be recorded within the manual excavations for features and for artefacts associated with features (e.g. artefacts associated with a possible heat treatment pit or burnt stump, hearth etc.);
- where possible charcoal and sediments will be collected using the techniques recommended by the dating laboratories for radiocarbon or thermoluminescence dating where applicable; and
- the excavation will cease when the clay (B horizon) is encountered.

The following methodology relates to:

- **Black Creek RTA 2**

Due to the depth of the soil at this site it is proposed to step the excavation (refer to Appendix 1 for detailed description of the subsurface testing of this site); to assist with the general propensity of the soil to slump into the excavation and also to abide by OH&S requirements.

A 6 metre by 6 metre square is proposed:

- the excavation will be taken down to 75 cm (the spit above the artefact concentrations recorded during the test pit investigations) using a mechanical excavator;
- the mechanical excavator will remove the soil as 1 metre squares and as 5 cm arbitrary spits;
- all soil removed will be sieved through 5 and 2 mm nested sieves;
- at least one soil sample will be collected from each spit of each 1 metre square for Munsell, pH and geomorphological analysis. Further samples will be collected if features are observed. For consistency the Munsell and pH readings will all be
undertaken by one person under the same light conditions after the completion of the excavations;
- if features are encountered mechanical excavation will cease and manual excavation will be undertaken to remove the entire feature;
- XYZ coordinates will be recorded within these manual excavations for the features and for artefacts associated with the feature;
- where possible charcoal and sediments will be collected using the techniques recommended by the dating laboratories for radiocarbon or thermoluminescence dating where applicable;
- the mechanical excavation will cease at 75 cm below the ground surface (at the base of Spit 15);
- a 5 metre by 5 metre square will then be excavated manually using trowels and spades within this area using the extra 1 metre (width) as a bench;
- the excavations will be undertaken as 1 metre squares excavated as 50 cm quadrats and in arbitrary 5 cm spits. Stratigraphic excavation will be employed if features are located;
- all soil excavated will be sieved through 5 and 2 mm nested sieves;
- at least one soil sample will be collected from each spit of each 1 metre square for Munsell, pH and geomorphological analysis. Further samples will be collected if features are observed. For consistency the Munsell and pH readings will all be undertaken by one person under the same light conditions after the completion of the excavations;
- XYZ coordinates will be recorded within the manual excavation for features and for artefacts associated with features (e.g. artefacts associated with a possible heat treatment pit or burnt stump, hearth etc);
- where possible charcoal and sediments will be collected using the techniques recommended by the dating laboratories for radiocarbon or thermoluminescence dating where applicable; and
- the excavation will cease when the clay (B horizon) is encountered or following the removal of five sterile spits (25 cm).

If a further 1 metre in depth is reached within the 5 metre by 5 metre excavation, the excavation area will be reduced to a 3 metre by 3 metre square (and so on until clay is reached or the deposits are sterile for at least five spits). Based on the results of the test pits; however, the excavation is likely to be halted around 1.5 metres.

The following methodology relates to:

- **Redhouse Creek 1 (incorporating PAD 21)**

As the majority of this site will be conserved with the exception of two areas where EnergyAustralia are required to excavate two holes for poles approximately 80 cm in diameter, a large manual excavation is not warranted. Therefore, the following methodology is proposed.

A 2 metre by 2 metre broad area excavation will be undertaken at the power pole locations. The methodology proposed is as follows:

- the excavations will be undertaken manually using trowels and spades;
- the excavations will be undertaken as 1 metre squares excavated as 50 cm quadrats and arbitrary 5 cm spits. Stratigraphic excavation will be employed if features are located;
- all soil excavated will be sieved through 5 and 2 mm nested sieves;
- at least one soil sample will be collected from each spit of each 1 metre square for Munsell, pH and geomorphological analysis. Further samples will be collected if features are observed. For consistency the Munsell and pH readings will all be
undertaken by one person under the same light conditions after the completion of the excavations;
- XYZ coordinates will be recorded within the manual excavation for features and for artefacts associated with features (e.g. artefacts associated with a possible heat treatment pit or burnt stump, hearth etc);
- where possible charcoal and sediments will be collected using the techniques recommended by the dating laboratories for radiocarbon or thermoluminescence dating where applicable; and
- the excavation will cease when the clay (B horizon) is encountered.

All artefacts recovered from the surface collections and subsurface salvages will be subject to detailed attribute analysis. **Section 6** provides information in relation to the attributes to be recorded and the way in which the analysis of the attribute will be used to address the research questions.

A full report will be provided to the DEC as Stage 4 of the salvage program. This report will provide details of all surface collections, subsurface investigations and subsurface salvages undertaken during Stage 1, 2 and 3 of the F3 to Branxton project.

In order to address the research questions use-wear and residue analysis will be undertaken for 30 artefacts.
6.0 DISCUSSION OF ATTRIBUTES TO BE RECORDED FOR STONE ARTEFACTS

The attributes to be recorded for the stone artefacts recovered during the salvage/subsurface testing program or recorded in-situ in sites located in proximity to the F3 to Branxton route alignment and/or access tracks are outlined below. A discussion follows each attribute, detailing the proposed method of recording, potential problems with the method proposed, and the possible behavioural implications of each attribute. Not all attributes can be measured on all artefacts (e.g. termination type cannot be measured on proximal flake pieces). Therefore, after a discussion of the most basic common attributes, subsequent attributes are divided into sections, with subsections for categories.

The attribute analysis proposed is one that Umwelt is now using for all their artefact analyses enabling us to build up a data base derived from across the Hunter Region for comparative purposes.

6.1 COMMON ATTRIBUTES

6.1.1 Artefact Class

Description: Artefact class is a technological category reflecting the mechanical processes which resulted in the physical form of the artefact at the time of recording. Classes used will include flakes, broken flakes, retouched flakes, flaked pieces, cores, flake-cores, hammerstones, grindstones, ground-edge axes, heat-shattered fragments, and non-diagnostic fragments.

Problems: Classing artefacts does not usually entail significant problems, other than occasional ambiguities between flaked pieces and broken flakes, and between (retouched) flakes and flake-cores (see Retouch for a further explanation).

Uses: This category will be used to assess differences in provisioning strategies (e.g. core provisioning vs. flake provisioning), differences in site function/use/gender (e.g. presence/absence of grindstones), and the presence of purposeful heat treatment of stone vs. heat affects from natural fires.

6.1.2 Raw Material

Description: A largely self-explanatory attribute, raw materials expected to be present include several varieties of tuff including Nobbys tuff, silcrete, indurated mudstone, quartz, chert, quartzite, sandstone and basic volcanics.

Problems: This category is usually without problems, though it is acknowledged that some disagreement exists as to the appropriate nomenclature for the material most frequently referred to as ‘indurated mudstone’. Strong arguments have been made for replacing the term with indurated rhyolitic tuff, however, as the category is nominal and not technical or geological the only criteria guiding the choice of term here are that the meaning of the term be understandable to others and that it be applied consistently. For these reasons, the term indurated mudstone will be used to make the class more easily compared with other studies and to differentiate this raw material from other tuffs that will have different sources (e.g. Nobbys tuff).

Uses: Raw material is an important attribute, which may broadly indicate the place of origin of an artefact. The dominance of one raw material or another may also be used to group or differentiate sites. Raw material is also frequently used in concert with attributes in the
creation of analytic units for more in-depth inter and intra site comparisons. In the present analysis it will also be used to look at the question of permeability of tribal boundaries and the location of tribal boundaries.

6.1.3 Artefact Weight

Description: Artefact weight will be measured for all salvaged artefacts to one tenth of a gram.

Problems: Due to the sensitivity of the scales it is not possible to use them in the field and thus this attribute cannot be recorded for in-situ artefacts.

Uses: Weight is a reasonably effective approximation of volume for a given raw material. As such it most accurately reflects the amount of stone being brought to a site. Average weight within a given artefact class is also a good indication of the amount of ‘stress’ that has been placed on the provisioned material. Large pieces of stone still retaining usable potential are unlikely to be discarded when people are conserving their technological resources (for example, as they move increasingly away from places where replacement material is available). Alternatively, when people are close to the raw material source, or when they are provisioning larger amounts of material to a site, the pressure on the ‘exhaustion threshold’ is relieved and there should be a resultant rise in the average weight of discarded artefacts. Tribal boundaries may place restrictions on the availability of some raw materials and this may be indicated by a dramatic drop off in weight when a tribal boundary is crossed. This has been shown to be the case for artefacts such as axes (Wilson 1994).

6.1.4 Dimensions

6.1.4.1 Percussive Dimensions

Description: Percussive dimensions measure the length of the flake in the direction of force application from the point that force was applied. In this regard it relates to the length of core face that was removed during the manufacture of the artefact. Width is oriented across the face of the flake from the mid-point of length, and thickness from the mid-point of length and width of the ventral to the corresponding point on the ventral.

Problems: While not as arbitrary as maximum dimensions, there is some uncertainty as to what these attributes are actually measuring in terms of the flake manufacturing process.

Use: Variations in average flake dimensions, and in the distribution of flake sizes in histograms, are expected to correlate with differences in the provisioning and reduction strategies at different places. For example, the reduction of cores at a site will produce a large number of moderate to small flakes and some larger flakes. As a result the histogram of flake length will show a relatively consistent increase in number of flakes from large to small. Contrastingly, when most flakes are the result of retouching or maintenance tasks on other flakes, the majority of the flakes remaining should be very small, with comparably few large to moderate flakes. However, it may be the case that a few moderate to large flakes will be discarded at the site as they are exhausted through excessive/heavy retouch or simply thrown away prior to a reprovisioning event. In such a case, a histogram of artefact size should show a bimodality in regard to length (a small peak in the moderate range and a large peak in the small range), and an even more pronounced bimodality in regard to thickness (most retouching flakes being very thin).
6.1.4.2 Maximum Dimensions

**Description:** Maximum length, width and thickness will be measured on all artefacts. ‘Length’ will arbitrarily be measured along the longest plain, with width the longest of the plains at 90° to length, and thickness measured at 90° to both.

**Problems:** There are no problems associated with taking this measurement, although it needs to be noted that the definitions of length, width and thickness are entirely arbitrary and do not reflect any aspect of artefact manufacture.

**Uses:** This measure is most useful as a broad measure of size, and may have a role in assessing fragmentation rates (particularly in the case of heat-shattered fragments) and calculating Minimum Numbers of Artefacts (MNA).

6.1.5 Cortex – Amount and Type

**Description:** Cortex refers to the ‘skin’ of a rock – the surface that has been weathered to a different texture and colour by exposure to the elements over a long period. The amount of cortex as a percentage of surface area will be measured on all artefacts (in relation to flakes, cortex can, by definition only occur on the dorsal, termination and platform surfaces). The nature of cortex – its shape and texture – will vary depending on where the raw material was sourced. Cortex will be recorded in all instances where cortex is present.

**Problems:** This is a relatively unambiguous descriptive category.

**Use:** When a natural cobble is first selected it will usually be covered in cortex. Therefore the first artefacts produced from it will have a complete coverage of cortex on the dorsal side (primary reduction). As the cobble is increasingly reduced the amount of cortex on each artefact will rapidly decrease (secondary reduction) until it ceases to be present on artefacts (tertiary reduction). As a result of this trend, it should be possible to determine how early in the reduction sequence the artefact was produced. If large numbers of artefacts or a high proportion of the artefacts of a raw material retain cortex it may indicate that the site is located in close proximity to the raw material source. Differences between the proportions of artefacts retaining cortex between different raw materials in sites indicates relative differences in distance to source. This does not necessarily mean distance in terms of measurable distance across the landscape; it may also reflect length of time since leaving the source. For example, the last campsite when a group is returning to the source of the raw material may be very close to the source in terms of distance, but distant in terms of time elapsed since the group left the source. If artefacts with cortex are occurring in sites a long distance from the place of origin of the natural cobble, then it is likely that cobbles were being transferred to the site when still only slightly reduced. This would imply an attempt to maximize the amount of stone being provisioned with the weight of transported material being a relatively minor concern.

Cortex type may help to clarify the source of the raw material (e.g. from river gravels [rounded, cortex many microscopic conchoidal fractures], surface scree [cortex weathered, porous, often oxidised, can be angular or rounded] or from outcrops [dependent on raw material type, more likely to have flat angular surfaces or recorticated flake scars]).

6.2 ATTRIBUTES TO BE RECORDED ON FLAKES

In most circumstances flakes, whether broken or whole, will account for the majority of artefacts in an assemblage. Flakes are frequently produced in large numbers during reduction events, though most are never subject to use. Flakes are generally inferred to be the most utilitarian of the basic artefact categories, usually possessing a sharp edge along the
entire circumference when whole and amenable to reworking patterns which may yield formal ‘implements’ or ‘tools’, such as backed artefacts and scrapers.

### 6.2.1 Knapping Type

**Description:** Three main knapping methods are used in the production of flakes, resulting in flakes with distinctive characteristics. The first is freehand percussion, where the objective piece is held in the hand and struck with a hard hammer (e.g. a hammerstone), resulting in ‘classic’ flakes with a single bulb, and a ringcrack/PFA. The second is bipolar, where the objective piece is rested against an anvil and struck. This results in flakes that have straight sheer faces and crushing at both ends. The third is pressure flaking, where an indenter is placed against the edge from which the flake is to be removed and force is applied. The resulting flakes have a characteristically diffuse bulb, with no errailure scar and no PFA.

**Problems:** Ambiguities do exist in this classification, and the identification of pressure flakes in particular may be difficult, however difficulties are expected to be relatively infrequent.

**Use:** Freehand percussion, bipolar and pressure flaking are all different approaches to reduction, with different advantages and disadvantages. Pressure flaking is the most controlled method, in terms of how much force is applied and to where. However pressure flaking does not produce large flakes and is usually associated with fine retouching work. Bipolar reduction is usually viewed as a system employed to increase core use-life. As cores become small their inertia thresholds drop making it difficult to reduce flakes via the freehand method. Resting the core and applying bipolar technique allows flakes to be reduced from a core too small to hold or from small round pebbles with no platform angle to initiate reduction. Pressure flaking when undertaken using an anvil often results in a form of bipolar reduction. Patterns in the distribution of flakes resulting from backing may be used to locate areas of backed artefact manufacture. Patterns in the distribution of flakes produced by bipolar knapping maybe used to indicate where there was pressure to maximize core potential.

### 6.2.2 Artefact Type

**Description:** Artefact type is a formal (e.g. less strictly technological), nominal category, similar to artefact class. Artefact types expected to be located include Bondi points, backed blades, eloueras, grindstones, geometric microliths, scrapers, and adzes.

**Problems:** Ambiguity is an inherent feature of artefact typology, with the lines between different types frequently imprecise. Working definitions for each class used will be specified in the text of the analysis.

**Use:** Despite the problem discussed above, typology proceeds on the basis that at different places and at different times people manufactured artefacts with specific shapes and characteristics. As a result, the general period during which an artefact was made can be inferred if it is of a specific form. It is also not uncommon to infer that a given artefact form implies a given artefact function, and that from the shape of the artefact the activities taking place at the site can be specified, though these suggestions so far lack archaeological support. The problems with both of these uses are well documented, and any such inferences drawn here will be sparing. There is, however, some potential benefit in approaches based on subsistence patterns and the organisation of technology. On this basis, it may be possible to make some assertions from artefact typology as to the way subsistence may have been organised at different places through the landscape. It may also be able to discern some differences in use of artefact types or in the manufacturing technique of artefact types across tribal boundaries.
6.2.3 Artefact Breakage

**Description:** At a basic level, flakes break in six different ways. Three are transverse (at 90° to the direction of percussion) – proximal, medial, distal; two are longitudinal (along the plane of percussion) – left, right (oriented from the ventral view); and one ambiguous – marginal (where dorsal and ventral can be clearly distinguished, but the margin from which the piece has detached is uncertain). All such breaks will be recorded.

**Problems:** It is occasionally difficult to be certain of the breakage on an artefact. In most cases, however, the kind of breakage can be ascertained.

**Use:** It is important to differentiate broken from complete flakes for the purposes of analysis, as the two are not comparable in regard to a number of measures. The amount of artefact breakage in an assemblage also indicates the degree of fragmentation to which the assemblage has been subject. In highly fragmented assemblages, the actual number of artefacts represented may be significantly exaggerated. Quantifying breakage allows a more accurate approximation of artefact numbers to be made.

6.2.4 Heat Affect

**Description:** Heat will affect artefacts in different ways, depending on the way it has occurred. Most heat affected flakes on fine-grained material will reveal a greasy surface lustre on newly flaked surfaces and some discoloration (e.g. silcrete turns from grey or tan to red), however as heat becomes excessive signs such as pot-lidding (the ‘popping’ of small plate-like pieces off the flake) or crazing (multiple fracture lines in multiple directions across the face of the flake) will occur. The presence of any of these features will be recorded.

**Problems:** This is a relatively unambiguous descriptive attribute for fine-grained materials – its application to coarse-grained materials is perhaps less certain.

**Use:** Trends in the spatial distribution of heat-affected artefacts may be used to indicate either heat-treatment (the controlled application of heat to improve flaking qualities) or post-depositional burning (uncontrolled heating through bush-fires or stump burning) depending on the signs of heating and associated archaeological features (e.g. hearths).

6.2.5 Platform Size – Width and Thickness

**Description:** The platform is the surface into which force is applied in the formation of a flake. Platform width is measured across the platform in the same direction as flake width, while platform thickness follows flake thickness.

**Problems:** Some ambiguity exists on ‘where to stop measuring’ platform width and thickness, particularly on primary cortical flakes on rounded cobbles (the first flakes removed from a natural cobble), and platform surfaces comprised of multiple flake scars. Despite this the measure appears to work quite well for the majority of flakes.

**Use:** Platform size is expected to decrease under two circumstances. The first is when flakes are produced from small cores. The second is somewhat more speculative and based on the premise of a correlation between very small (focussed) platforms and the production of parallel-sided flakes (blades) associated with backed artefact manufacture.

Differences in platform size averages within and between sites will be examined to test these correlations and to infer what these mean in terms of human behaviour patterns e.g. curation of stone, expedient use of stone.
6.2.6 Platform Surface

**Description:** Platform surface will be recorded as one of the following: cortical, single flake scar, multiple flake scars, or faceted.

**Problems:** This is a largely unambiguous descriptive attribute.

**Use:** The surface of a platform provides information about the history of the core prior to the detachment of the flake, and also about methods employed to control the flaking process. Faceting in particular has been linked to the systematic production of ‘blades’. Patterns in the spatial distribution of these attributes may be used to infer differences in reduction strategies.

6.2.7 Overhang Removal

**Description:** Frequently prior to the detachment of a flake from a core, the thin overhanging ‘lip’ of the core was removed in order to stop ‘crushing’ or force dissipation at the point of force application. This process is known as overhang removal.

**Problems:** This is a largely unambiguous descriptive attribute.

**Use:** Overhang removal is often seen as a form of raw material conservation. If a knapper desires to remove thin flakes from the face of the core by striking close to its edge, overhang removal may avoid the platform crushing and the resultant flake ending in a step termination which must be removed from the face of the core before flake production can continue. Thus, raw materials within assemblages that have high relative proportions of overhang removal, or total assemblages that have high relative proportions of overhang removal will be used to indicate raw material conservation, which can then be interpreted in relation to human resource use patterns/preferences.

6.2.8 Dorsal Scar Count

**Description:** The dorsal face of a flake provides a partial record of previous flaking episodes to have occurred down the core face at or near the same point. The number of flake scars on the dorsal surface of a flake which can be oriented relative to their direction of percussion and which are clearly discernable will be recorded.

**Problems:** There is some ambiguity in this measure, hence the use of the term ‘clearly discernable’ above. Furthermore, by the nature of the flaking process, each subsequent scar will remove traces of the previous scars, resulting in an incomplete record. For these reasons, this measure needs to be treated with some caution.

**Use:** Dorsal scar count is a rough indication of how much flaking has occurred prior to the detachment of the flake in question. It also provides a maximum against which to form ratios of ‘aberrant to non-aberrantly terminating scars’, ‘parallel to non-parallel scars’ and ‘number of scars per rotation’ (see next three attributes), all of which may assist in clarifying the reduction process and assist in understanding differences in the Aboriginal use of raw materials and sites.

6.2.9 Number of Aberrantly Terminating Dorsal Scars

**Description:** Aberrant terminations are further discussed below under Terminations. For the purposes of this description it is sufficient to say that flake scars terminating as steps and hinges will be recorded as aberrant in this assessment.

**Problems:** The problem(s) with this count are the same as those for the previous.
Use: As cores become smaller and more heavily reduced, the inertia threshold will fall and platform angle will increase, resulting in an increase in the number of aberrant terminations as a percentage of the number of flakes removed. Flakes which have a high number of aberrantly terminating flake scars as a percentage of the total are expected to have been produced towards the exhaustion threshold of the core. This measure will be used to indicate pressure on raw material availability and provisioning strategies.

6.2.10 Number of Parallel Flake Scars

Description: A basic count of the number of parallel flake scars.

Problems: As previous.

Use: Examining the ratio of parallel to non-parallel scars on the dorsal surface of flakes may help to clarify the prevalence of ‘blade’ production in the reduction systems at different places. It may also be possible from examining this ratio in relation to flake size to test whether blade production occurred at a specific stage in the reduction sequence, or whether it was present throughout the complete reduction sequence.

6.2.11 Presence of Parallel Arrises

Description: Arrises or dorsal ridges are a way of controlling artefact morphology. Flakes struck down an existing ridge will tend to follow the direction that the ridge takes. This attribute will involve noting the presence or absence of dorsal ridges that run parallel to the length of the flake.

Problems: Unlike the previous measures, this attribute is largely unambiguous.

Use: Like faceting, the presence of parallel arrises is associated with more controlled flaking methods such as blade production. The relationship between flake size and the presence of parallel arrises may provide similar information to the previous attribute (while at a lower resolution, being presence/absence based, this attribute is less ambiguous than number of parallel scars), as well as helping clarify the spatial distribution of different reduction strategies.

6.2.12 Dorsal Scar Rotation Count

Description: As a core is reduced it may be turned or rotated to provide new platforms or overcome problems with increasing platform angles. As a result, flakes may be detached which cut across old flake scars. The result should be apparent as dorsal scars in different direction to the direction of percussion of the flake being recorded.

Problems: The problem with this measure is the same as that for dorsal scar counts in general.

Use: Core rotation is increasingly likely towards the exhaustion threshold of cores, when platform angles increasingly approach or exceed 90° (it becomes very difficult to remove flakes from platforms with angles exceeding 90°). If it is possible to show a correlation between flake size and number of dorsal scar rotations then it will become possible infer from differences in the spatial distribution of this data that core exhaustion was more frequently approached in some areas than in others. If it is not possible to show this correlation, then it may be taken to suggest that core rotation was part of the reduction strategy throughout the reduction continuum.
6.2.13 Termination

**Description:** Termination refers to the way in which force leaves a core during the detachment of a flake. Every complete flake has a termination. There are patterns in the form which terminations will take, with the four major categories (those to be used here) being: feather, hinge, step, and outrepasse (or plunging).

**Problems:** This is a largely unambiguous descriptive attribute. The only point at which uncertainty does enter is in differentiating some transversely snapped flakes from step terminated flakes. In the majority of cases, however, this problem does not arise.

**Use:** Different terminations have different implications both for flake and core morphology. A flake with a feather termination (in which force exits the core at a low or gradual angle) will have a continuous sharp edge around the periphery beneath the platform. This has advantages in terms of the amount of the flake edge which can be used for cutting, and also makes the flake far more amenable to subsequent retouching or resharpening activities. Detaching flakes with feather terminations also has minimal impact on the effective platform angle of the core, and so platform angle thresholds are reached relatively slowly while feather terminating flakes continue to be produced.

Hinge and step terminating flakes have none of these advantages. They result in edges which are amenable neither to cutting nor to retouching. Furthermore, hinge and step terminations lead to rapidly increasing effective platform angles, leading to a requirement for core rejuvenation and core exhaustion. For these reasons, such terminations are considered undesirable or aberrant. The number of aberrant flake terminations is expected to increase towards the end of a core’s use life, as reduction in core size and increase in core platform angle make it increasingly difficult to detach feather terminating flakes. In areas where aberrantly terminating flakes are relatively common it may be inferred that core potential was more thoroughly exploited. From this it may in turn be inferred that the pressure to realize core potential (e.g. a strategy of heavy raw material conservation) was greater. Increased mobility/emphasis on portability is one possible explanation of such a pattern.

Outrepasse flakes have the opposite effect on core morphology to step and hinge flakes, in that they remove the entire core face and part of the core bottom. As a result, such flakes may be used to rejuvenate cores in which core angles have become high but which still retain useable potential (e.g. are still quite large). The presence of outrepasse flakes may be taken to indicate core rejuvenation and the requirement to increase core use-life.

6.2.14 Retouch

**Description:** Retouch is the term given to alterations made to a flake by the striking of subsequent flakes from its surface. Retouching may be done either to alter artefact form or to rejuvenate (resharpen) dulled edges, and possibly both. Degree/amount of will be recorded as presence/absence.

**Problems:** This is a largely unambiguous descriptive attribute. The only area in which difficulty may arise is in instances where edge damage cannot be differentiated from retouch. This occurs infrequently, as edge damage is usually a modern alteration to artefact form which can be noted through differences in surface colour between the flake scar and the rest of the artefact surface.

**Use:** The two main uses of retouch need to be separated for the purposes of this discussion. Retouch to achieve form (for example, artefact backing) is distinct from retouch for the purposes of edge rejuvenation. ‘Formally retouched’ artefacts are anticipated to occur at places of manufacture and places of discard. Importantly, such artefacts will be manufactured prior to use as part of a gearing up or preparation for activities such as hunting.
The presence of concentrations of such artefacts, including incomplete specimens may indicate the base-camp locations from which mobile subsistence activities were conducted. Such artefacts are also expected to be present among very small assemblages at distances from occupational foci, as the result of discard, loss, or breakage.

Edge rejuvenation retouch is expected to increase as the availability of replacement materials decreases. Such artefacts are expected to represent ‘personal gear’, an implement carried with a person and maintained for repeated use. Unlike formally retouched pieces, artefacts with edge rejuvenation will not be produced in preparation for activities. The sharpest and most useful edge is a fresh edge. Rather, rejuvenation will occur as need arises. The presence of such artefacts at occupational foci is likely to represent discard following use and prior to reprocessing/retooling. The percentage of artefacts exhibiting retouch is expected to increase in systems where large amounts of replacement raw material are not available.

It needs to be noted that a third type of retouch also occurs, aimed at neither formalisation of shape or edge rejuvenation. This is when a flake (usually a large to very large flake) has been used for the subsequent production of utilitarian flakes (e.g. when it has been used as a core). This strategy is quite prevalent in the Hunter Valley. Differentiating such artefacts from other retouched artefacts is empirically difficult, however, is intuitively quite easy. Any such intuitive judgements can, however, be tested during the analysis phase, as such flakes are expected to be quite distinct from other retouched artefacts in size and weight.

6.2.15 Retouch Type

**Description**: Retouch type is a technological attribute relating the way in which retouch was carried out. Categories to be used are steep, acute, unifacial, bifacial, tranchet and/or used as core.

**Problems**: This is a largely unambiguous descriptive attribute.

**Use**: Whether retouch results in a steep or acute edge is important in relation to the possible functions of those edges. Acute retouch results in sharp edges suitable for cutting whilst steep retouch can be used to totally remove a sharp edge (to blunt as in backed artefacts) or to produce thick strong edges suitable for adzing or scraping. Thus, artefact function can be suggested by recording this attribute (residue and use-wear analysis is also planned to substantiate these interpretations). The recording of the technique used for retouch addresses questions related to techniques of implement manufacture and thus another form of human behaviour that can be analysed within and between assemblages.

6.2.16 Retouch Location

**Description**: Each flake will be divided into eight segments: proximal end, proximal left, proximal right, marginal left, marginal right, distal left, distal right, and distal end; with the presence or absence of retouch in each to be recorded.

**Problems**: Apportioning sections relies on a visual division of the flake, which may be slightly inaccurate. This is not expected to be a significant effect.

**Use**: An examination of retouch location may reveal trends in distance decay (e.g. increasing number of margins retouched over distance, or may simply reveal non-random patterns in the way retouching was carried out. If the former, then the trend may be used to suggest trajectories along which flakes were being carried as personal gear. In the case of the latter, the information would provide an insight into the manufacturing/reduction systems being employed.
6.3 **ATTRIBUTES TO BE RECORDED ON CORES**

The following attributes are to be recorded on cores. Most of information taken from cores concerns the way in which they were reduced – what pressures, controls and systems were applied.

6.3.1 **Percentage of Surface Flaked**

*Description:* This attribute involves an estimate of the percentage of the outer surface of the core which has had flake scars removed from it.

*Problems:* This is a visual estimate and liable to prove reasonably inaccurate and coarse. Nevertheless, it remains useful.

*Use:* This measure can be useful in assessing degree of core reduction. In particular, it can be useful in locating areas of heavy core reduction, particularly when used in concert with the following two measures.

6.3.2 **Number of Flake Scars**

*Description:* This measure mirrors dorsal scar count from the previous section. All scars over the length of 10 mm will be measured (there are usually large numbers of flake scars between 10-3 mm, which relate more to platform preparation than flake production.

*Problems:* Most of the problems with this measure arise from fact that subsequent scars remove traces of former scars, leaving an incomplete record of the past. As a result, this measure will always underestimate the number of flakes removed from the core.

*Use:* Dorsal scar count provides an estimate of the amount of reduction to which a core has been subject. Used in concert with measures such as number of rotations and percentage of surface flaked, it may be help to locate differences in the degree of core reduction at different locations.

6.3.3 **Number of Rotations**

*Description:* This measure mirrors dorsal scar rotation count as discussed above.

*Problems:* This measure has the same problems as number of flake scars.

*Use:* Different reduction systems use core rotation in different ways. In some systems, cores are rotated only once, after the striking of the initial flake to form a platform. All subsequent scars are removed in one direction from that platform. Other systems will involve repeated rotations between two platforms, or may involve continuous core rotation and numerous platforms. It may be the case that through the use-life of a core a number of different strategies will be used.

Assessing core rotation may help to clarify reduction systems, and the stage in the reduction system at which the individual core was discarded. This can be used to indicate differences in use of raw materials both within assemblages and between assemblages.

6.3.4 **Number of Aberrantly Terminating Scars**

*Description:* Flake scars terminating as steps and hinges will be recorded as aberrant in this assessment.

*Problems:* There should be no problems with this simple count.
Use: As cores become smaller and more heavily reduced, the inertia threshold will fall and platform angle will increase, resulting in an increase in the number of aberrant terminations as a percentage of the number of flakes removed. Flakes which have a high number of aberrantly terminating flake scars as a percentage of the total are expected to have been produced towards the exhaustion threshold of the core. This measure will be used to indicate pressure on raw material availability and provisioning strategies.

6.3.5 Number of Parallel Flake Scars

Description: A basic count of the number of parallel flake scars.

Problems: There should be no problems with this simple count.

Use: Examining the ratio of parallel to non-parallel scars on cores may help to clarify the prevalence of ‘blade’ production in the reduction systems at different places. It may also be possible from examining this ratio in relation to flake size to test whether blade production occurred at a specific stage in the reduction sequence, or whether it was present throughout the complete reduction sequence.

6.3.6 Comments

Description: A column will be supplied in the data base for recording comments. This may include comments on attributes such as artefact colour, granularity, presence and nature of inclusions, or other comments that do not fit snugly inside one of the attribute classes.

Problems: There should be no problems.

Use: Descriptions of artefacts can sometimes be useful for assisting in locating conjoins.
7.0 CARE AND CONTROL OF ARTEFACTUAL MATERIAL

The ALALC have applied and have been granted permission (NPWS Permit for Care of Cultural Items #1944) by DEC for Care and Control of the artefacts recovered during the Stage 1 salvage of the Section 1 area (there were no artefacts located during the Stage 2 salvage). ALALC will retain the artefacts for display within their Land Council/Keeping Place.

After initial consultation with representatives of BCAC, BNC, MLALC, LWTC and WNAC it was not possible to obtain agreement on ‘Care’ of the artefacts recovered during the Stage 2 or Stage 3 salvage. It was therefore decided that ‘care’ of the artefactual material would be vested in the Australian Museum. The groups could then apply individually to the Australian Museum to borrow the assemblages for teaching or display purposes.

However, at a meeting with the DEC (Claire Everett) on 12 April 2006, the RTA (Allan Bowditch) and Umwelt (Jan Wilson, Manager Cultural Heritage and Kym McNamara, Archaeologist) were advised that the Australian Museum is not accepting artefacts at the present point in time. The groups were advised via fax and letter on 21 April 2006 that in accordance with DEC instructions, changes have been made to the ‘Care and Control of Artefactual Material’ section of this report. It was suggested that since MLALC is the only group associated with this project in the Wonnarua area with a keeping place that they may be considered appropriate to ‘care’ for the artefactual material. The groups were unable to agree to this recommendation.

Following consultation with the DEC, Umwelt and the RTA, a number of options for ‘care’ were presented to the Aboriginal groups for their consideration. They were advised that if they did not agree with any or some of the options they may cross them out. They were also invited to provide other options which DEC may or may not consider. The six options are outlined below:

Option 1 - The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then reburied within the road reserve on RTA land in an area that is to be conserved and not impacted during the construction of the F3. The artefacts would be placed in a closed container and the location of the reburied artefacts would be recorded with the information forwarded to the DEC.

Option 2 - The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then placed in the RTA’s care until such time that a Wonnarua Keeping Place is established or agreement is reached between all of the Aboriginal stakeholder groups for this project. If an agreement is not reached within two years then the artefacts would be reburied in the same manner as outlined in Option 1.

Option 3 - The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then with the assistance of the RTA be placed in storage facilities at an individual group’s office location. A group may nominate another group to care for the artefactual material if they do not wish to do so or do not have the room to house a storage facility.

Option 4 - The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then responsibility for the care and control of the artefacts would be divided between appropriate local museums and the Mindaribba Local Aboriginal Land Council.

Option 5 - The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then responsibility for the care and control of the artefacts would be placed with Mindaribba Local Aboriginal Land Council.
**Option 6** - No further salvage for this project would take place

The following responses were received:

**BCAC**

Option 5 was given first preference followed by Option 1 and then Option 4. Options 2, 3 and 6 were not considered viable by BCAC. No further comments were included.

**BNC**

BNC chose Option 1 as their first preference. They did not consider any of the other alternatives appropriate. The following comment was also included:

‘After community consultation, we have all agreed the other options are culturally inappropriate and don’t sustain our heritage for future generations. Members of the community that were consulted are of the opinion to their knowledge the artefactual material is within the tribal boundary of Awabakal land as opposed to the reference of Wonnarua land. Oldest member being 88 years of age and a third generation to inhabit the land known as Awabakal.’

**LWTC**

LWTC gave first preference to Option 2. Second preference Option 1, third preference Option 3, fourth preference Option 6, fifth preference Option 5 and sixth preference Option 4. They also included the following comment with their response:

‘We the LWTC would like to have care and control of the artefacts collected for the proposed keeping place that we have asked for in the Aboriginal Cultural Heritage Assessment by LWTC for the RTA Sept 03 Appendix 5.0, 5.1, dot 2 page 15 as part of our recommendations.’

**MLALC**

Option 5 was given first preference by MLALC. Although Option 2 was given second preference they requested that the MLALC be used instead of the RTA. Because that altered option was not presented to all groups and MLALC did not actually chooses Option 2 as it was written, their preference for Option 2 will not be included in the results presented in Table 7.1. Options 1, 3, 4 and 6 were not considered to be alternatives by MLALC. The following comment was included in the response:

‘There are numerous options which haven’t been considered in this pro forma, however I won’t go into any detail. After reading the options there are only 2 we would give serious consideration. However we would change that from RTA to MLALC then when keeping place is established hand them to Wonnarua.’

**WNAC**

WNAC stated that they were unable to make an informed response to the care and control document. They decided that they would respond when they received confirmation from the Australian Museum as to why ‘they appear to be abrogating their legal responsibility to receive these materials.’

Even though they have not received a response from the Australian Museum they have now responded to the ‘care and control’ document. Option 2 was the only option that would be considered by the WNAC.
Each preference was given the following weightings:

First preference = 6
Second preference = 5
Third preference = 4
Fourth preference = 3
Fifth preference = 2
Sixth preference = 1

Table 7.1 - Care and Control Preferences

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<th>BNC</th>
<th>LWTC</th>
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</table>

Option 1 is the option preferred by the majority by the Aboriginal groups with BNC giving it first preference and both BCAC and LWTC giving it second preference. With Option 1, the artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then reburied within the road reserve on RTA land in an area that is to be conserved and not impacted during the construction of the F3. The artefacts would be placed in a closed container and the location of the reburied artefacts would be recorded with the information forwarded to the DEC.
8.0 REFERENCES


APPENDIX 1

Proposed National Highway Link
F3 to Branxton Preliminary
Report: Stage 2 Section 90
Salvage and Section 87
Investigations
Proposed National Highway Link
F3 to Branxton
Preliminary Report Stage 2
Section 90 Salvage and Section 87
Subsurface Investigation

May 2006
EXECUTIVE SUMMARY

The Roads and Traffic Authority (RTA) propose to construct a four lane dual carriageway approximately 40 kilometres in length exiting the existing F3 Freeway near Seahampton and rejoining the New England Highway near Black Creek, west of Branxton (hereafter the F3 to Branxton). The route alignment of the highway link is designed to provide a road transport artery through the Lower Hunter that will have the capacity to meet increasing traffic loads and facilitate future economic development in the region (Figure 1.1). RTA has undertaken the first two stages of the archaeological salvage of the route alignment. Salvage undertaken to date includes the collection of surface artefacts from Aboriginal sites and the subsurface investigation of potential archaeological deposits (PADs) and landform units within each catchment of interest to the Aboriginal groups participating in the project.

This document provides the preliminary results of the Stage 1 surface collections and subsurface salvages undertaken under Department of Environment and Conservation (DEC) Section 90 Consent #1940 (approved 7 June 2004) and the Stage 2 surface collections and subsurface investigations undertaken under DEC Section 90 Consent #2102 and Section 87 Permit #2096 (approved 14 February 2005). Under the Conditions of the Consents/Permit this preliminary report is to be provided to the DEC ahead of the application for Section 90 Consent for the Stage 3 (final) salvage program for the F3 to Branxton project. As per the Consent Conditions, the final report incorporating the full details of the entire salvage program forms Stage 4 of the salvage program and will be provided to the DEC following the completion of the Stage 3 salvage.

The Stage 1 collections related to the eastern-most four kilometres of the route alignment were undertaken under Section 90 Consent #1940 and incorporated the surface collection of three sites located within the Blue Gum Creek catchment (refer to Figure 2.3 and Table 4.1). Section 90 Consent #1940 also incorporated the surface collection and subsurface salvage of two artefact scatter sites; one in the Minmi Creek catchment and one in the Blue Gum Creek catchment. All Section 90 salvage approved under Section 90 Consent #1940 is now complete and there are no requirements for the RTA to undertake further salvage in the Blue Gum Creek or Minmi Creek area. There are, however, requirements for RTA to undertake works related to the conservation of several of the sites in this area (please refer to Table 5.2 for details).

The Stage 2 surface collections relate to 36 kilometres of the route alignment from the Surveyors Creek catchment on the western fall of the Sugarloaf Range to Black Creek at Branxton (refer to Figures 4.3 to 4.10). The Stage 2 collections were undertaken under Section 90 Consent #2102. There were 68 sites subject to surface collection in the Anvil Creek, Bishops Creek, Black Creek, Black Waterholes Creek, Sawyers Gully, Surveyors Creek and Wallis Creek catchments (refer to Figures 2.3 to 2.10 and Table 4.2). All surface collections approved under Section 90 Consent #2102 are now complete and there are no requirements for the RTA to undertake further salvage in 57 of these sites. Further salvage is; however, proposed for one site, where subsurface testing of an adjacent PAD indicated large numbers of artefacts in a subsurface context.

Subsurface testing undertaken under Section 87 Permit #2096 included the 40 kilometre length of the route alignment and included investigation of five sites, 19 PADs and nine Landform Testing areas (each incorporating test pits on creek terraces/floodplains, lower, mid and upper slopes and spur crests). The subsurface testing of the sites indicated that three of the sites will require further salvage. The subsurface testing of PADS resulted in the location of new sites and the incorporation of larger areas into previously recorded sites. The subsurface testing of the landform units had similar results. Table 5.1 summarises the sites proposed for further salvage as part of Stage 3 of the salvage program.
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2 PAD and Site Descriptions
1.0 INTRODUCTION

The Roads and Traffic Authority (RTA) propose to construct a four lane dual carriageway approximately 40 kilometres in length exiting the existing F3 Freeway near Seahampton and rejoining the New England Highway near Black Creek, west of Branxton (hereafter the F3 to Branxton). The route alignment of the highway link is designed to provide a road transport artery through the Lower Hunter that will have the capacity to meet increasing traffic loads and facilitate future economic development in the region (Figure 1.1). RTA has undertaken the first two stages of the archaeological salvage of the route alignment. Salvage undertaken to date includes the collection of surface artefacts from Aboriginal sites and the subsurface investigation of potential archaeological deposits (PADs) and landforms of interest to the Aboriginal groups participating in the project.

This document provides the preliminary results of the Stage 1 surface collections and subsurface salvages undertaken under Department of Environment and Conservation (DEC) Section 90 Consent #1940 (approved 7 June 2004) and the Stage 2 surface collections and subsurface investigations undertaken under DEC Section 90 Consent #2102 and Section 87 Permit #2096 (approved 14 February 2005). Under the Conditions of the Consents/Permit this preliminary report is to be provided to the DEC ahead of the application for Section 90 Consent for the Stage 3 (final) salvage program for the F3 to Branxton project. As per the Consent Conditions, the final report incorporating the full details of the entire salvage program forms Stage 4 of the salvage program and will be provided to the DEC following the completion of the Stage 3 salvage.

1.1 CONDITIONS OF CONSENT F3 TO BRANXTON PROJECT (2001)

In September 2001 the Chief Executive of RTA decided to proceed with the proposed F3 to Branxton Highway Link and subsequently sought the concurrence of the Director-General National Parks and Wildlife Service (NPWS) and the approval of the NSW Minister for Planning. Conditional concurrence was granted by Director-General of NPWS on 3 October 2001 and on 7 November 2001 the Minister for Planning granted conditional approval for the highway link.

It should be noted that the wording of Conditions of Approval No. 110 and 111 as recommended by the Director-General of the Department of Urban Affairs and Planning were modified by the Minister in the approval of the project.

Conditions 100 to 112 (inclusive) of the Approval by the Minister for Planning relate to Heritage and Archaeology (refer to Attachment 1). Condition 100 of the Approval by the NSW Minister for Planning (Andrew Refshauge MP, also Minister for Aboriginal Affairs at this time) identified the appropriate Aboriginal community groups for involvement in the consultation process as:

- Awabakal Local Aboriginal Land Council;
- Lower Wonnarua Tribal Council;
- Mindaribba Local Aboriginal Land Council; and
- Wonnarua Nation Aboriginal Corporation.

On the advice of NPWS, RTA increased this list to include consultation with:

- Barkuma Neighbourhood Centre; and
FIGURE 1.1
Approved Route of the F3 to Branxton Highway Link

Source: Cennell Wagner
Black Creek Aboriginal Corporation.

In order to meet the conditions imposed by the Minister for Planning, RTA was required to complete six tasks. The tasks are broadly described as follows:

1. coordinate and assist Aboriginal community groups with the preparation of Aboriginal Cultural Heritage Assessments;

2. undertake a comprehensive Aboriginal Heritage Offset Study;

3. prepare a detailed research program and undertake a series of test excavations;

4. identify and document management zones for the ongoing management of sites along the route corridor;

5. prepare a Cultural Heritage Plan of Management; and

6. undertake a salvage program as required by the NPWS and the local Aboriginal community groups.

Umwelt (Australia) Pty Limited (Umwelt) was commissioned to facilitate Task 1 in September 2002; Task 3 (including the Aboriginal consultation and preparation of the Section 90 Consent application for Task 6) in November 2003 and Tasks 2, 4 and 5 in October 2005.

1.2 CONTENTS OF THE DOCUMENT

The document will provide the DEC with the results to date for each of the tasks listed in Section 1.1 and specifically for Task 3 (prepare a detailed research program and undertake a series of test excavations). This information is provided to the DEC so that it can make informed decisions in relation to the Section 90 application and Research Design and Methodology associated with Task 6 (final salvage and report) currently being prepared by Umwelt.

Section 2 will detail the Aboriginal consultation undertaken to date for the overall project.

Section 3 will address the current status of each of the six tasks listed in Section 1.1. It will discuss the issues and recommendations put forward by the Aboriginal groups following Task 1 in relation to the preconstruction, construction and post construction phases of the project and how the RTA has addressed/will address those concerns and recommendations.

Section 4 will provide the preliminary results of Task 3 in compliance with the Conditions of Consent for Section 90 Consent #1940 and #2102 and Section 87 Permit #2096. This section will also summarise the final salvage program proposed for the F3 to Branxton route alignment and proposed conservation outcomes for sites/areas along the route alignment.

Section 5 provides a list of references cited in the text.
2.0 ABORIGINAL CONSULTATION

Aboriginal community consultation for the F3 to Branxton project commenced when the route alignment was surveyed by Helen Brayshaw in 1994. Mindaribba Local Aboriginal Land Council was involved at that time. One of the conditions of the development consent for the F3 to Branxton project (see Section 3 for further details) was the provision of documentation from appropriate Aboriginal groups about their views on cultural heritage values in the landscape and the definition of sensitive cultural landscapes along the route alignment. This information would underpin further investigations of archaeology and cultural values associated with the project.

Umwelt was commissioned by the RTA to assist six local Aboriginal groups to prepare Aboriginal Heritage Assessments (Umwelt 2003 - please note that Wonnarua Nation Aboriginal Corporation later chose not to participate in the documentation of cultural heritage values but have joined the project for subsequent tasks). The Section 1 area of the F3 to Branxton route alignment falls entirely within Awabakal Local Aboriginal Land Council’s (ALALC) boundary (refer to Figure 1.1). This boundary also coincides with the boundary between Cessnock and Lake Macquarie Local Government areas and the drainage divide between Blue Gum Creek and Surveyors Creek. For this project, the area to the west of this boundary (Section 2) is the area of interest of Black Creek Aboriginal Corporation (BCAC), Barkuma Neighbourhood Centre (BNC), Lower Wonnarua Tribal Consultancy Pty Ltd (LWTC), Mindaribba Local Aboriginal Land Council (MLALC) and Wonnarua Nation Aboriginal Corporation (WNAC).

The results of detailed consultation with Aboriginal groups and documentation of cultural values along and adjacent to the proposed F3 to Branxton route (Task 1), were submitted to NPWS in September 2003 (Umwelt 2003). The areas chosen as sensitive by the Aboriginal groups are indicated on Figures 2.1 and 2.2 and details of the assessment process are provided in Section 3.

Following the preparation of these community based reports on cultural heritage values, it was agreed that further detailed inspection of the route alignment was warranted. The Aboriginal groups agreed that ALALC would participate in the inspection and assessment of the eastern end of the route alignment (Section 1), and that the five other groups would participate in the inspection of the remainder of the route (Section 2). The inspections were conducted from December 2003 to April 2005. A full report of the inspections and community consultation that occurred during the process is in preparation, and pertinent details are presented within this document (refer to Section 4).

The cultural heritage research strategy that is outlined in this document (refer to Section 5) draws on the results of the community cultural heritage assessments, the fieldwork in which all six Aboriginal groups participated and an analysis of the landform units crossed by the route alignment. It also draws on the results of the surface collections and subsurface investigations undertaken during 2004 and 2005.

2.1.1 Section 1 of the F3 to Branxton Route Alignment

Consultation with ALALC has been ongoing in relation to the highway link project from August 2002 and inspection of the Section 1 area was undertaken with ALALC during the period 15 to 18 December 2003 and 17 and 18 February 2004. Participants in the inspections were Kevin Gordon (representing ALALC), Jan Wilson (Archaeologist Umwelt) and Greg Aurisch (Surveyor RTA). On 20 February 2004, Ron Gordon (Coordinator ALALC) was taken to visit the sites/PADs/areas of Aboriginal sensitivity located during the inspection and management recommendations were discussed at this time. Also present on that day were Allan Bowditch (RTA Project Development Manager), Phil Vine (RTA
Technical Project Coordinator), Phil Davies (RTA Project Design Manager), Greg Aurisch and Jan Wilson.

On 19 April 2004, a meeting was held at the ALALC office and the Preliminary Research Design and Methodology and the accompanying Section 90 Consent for Stage 1 were reviewed and edited in line with ALALC comment.

Section 90 Consent #1940 was approved by the DEC on 7 June 2004 and the surface collection of sites and subsurface investigation of PADs associated with two of the sites was undertaken with representatives of ALALC in July 2004 (refer to Section 4 for the results).

On 18 August 2004, a further meeting was held at the ALALC office and a draft of the final Research Design and Methodology and the accompanying Section 90 Consent and Section 87 Permit for Stage 2 of the route alignment was discussed and reviewed and edited in line with ALALC comment. Of interest to ALALC in this document was subsurface testing of the landforms associated with Blue Gum Creek (refer to Figure 2.3)

Following DEC (October 2004) comment on the Research Design and Methodology several changes were made to the document which affected some details of the salvage proposed for the Section 2 area. The changes required were discussed with ALALC in December 2004, however, as the Section 2 area was outside the area of direct interest of ALALC they chose not to comment on the changes.

DEC Section 90 Consent #2102 and Section 87 Permit #2096 were approved on 14 February 2005. On 30 August 2005, the final subsurface investigations were undertaken with representatives of ALALC (refer to Section 4 for the results).

2.1.2 Section 2 of the F3 to Branxton Route Alignment

Consultation with BCAC, BNC, LWTC, MLALC and WNAC has been ongoing in relation to the highway link project from August 2002 and inspection of the route alignment and access tracks was undertaken with the groups during the period 6 January 2004 to 6 February 2004 and 1 to 3 March 2004. Participants in the inspections were: Tracey White, Hazel Bradford, Janelle Davies, Megan Hartley, Mark White and Scott Dennis (representing BCAC); Joanne Perry, Debbie Dacey, Anne Hickey, Richard Sullivan and Tshinta Dacey (representing BNC); Barry Anderson, Kate McLachlan, Rodney Jackson and Maree Waugh (representing LWTC); Gordon Griffiths, Travis Daley, Sean Hill, Clint Torrens, Trevor Kennedy, Jim Brennan and Carl McDonald (representing MLALC) and David Jackson, Melissa Lambkin and Chris Turnbull (representing WNAC). Leila McAdam (Archaeologist) represented Umwelt and Tim Chapman (Surveyor) represented RTA.

A meeting was held at the Umwelt Office in Toronto on 20 April 2004 during which the results of the Section 2 survey were discussed and management recommendations agreed upon for each of the sites located during the inspection. A presentation was prepared for the meeting which included slides of all of the sites and each group was provided with a hard copy of the presentation. The hard copy had provision for the groups to record their management recommendations for each of the sites beside the slide of the site.

Prior to deciding upon the management recommendations the groups were taken through the preliminary research design and methodology for Section 1 and agreement was reached that this was appropriate for the entire route alignment, with the provision that the groups had input into further questions they would like addressed by the salvage project. The management recommendations were formulated taking into account how the various forms of salvage would fit within the overall research strategy.
being prepared by Umwelt and will be finalised when discussions have been completed between the Aboriginal groups and the RTA.

2.1.5 Aboriginal Cultural Heritage Management Plan

Work has commenced on the Aboriginal Cultural Heritage Management Plan (ACHMP). The ACHMP; however, cannot be finalised until the DEC has endorsed the final stage of the salvage, as the details of the management of Aboriginal cultural heritage along the F3 route alignment will depend on the number of sites salvaged and the number of sites for which in situ conservation is thought possible. It is proposed that the ACHMP will be finalised within four weeks of the approval of the final Section 90 Consent.
3.0 CURRENT STATUS OF TASKS 1 TO 6

A number of concerns and recommendations arose as a result of the Task 1 Aboriginal Cultural Heritage Assessments (ACHAs). These concerns and recommendations relate to all of the Tasks 1 through 6. This section of the report provides details of Task 1 and how the issues and recommendations arising from that report have been addressed/will be addressed by RTA.

3.1 ABORIGINAL CULTURAL HERITAGE ASSESSMENTS

The consultation process began in early November 2002 when Umwelt supplied the relevant Aboriginal groups with an Information Booklet outlining the project and the requirements of the ACHAs. Consultation continued until May 2003 when the draft ACHAs were completed. Multiple copies of the drafts were produced by Umwelt for comment and endorsement by each community group. Following community comment and endorsement all editorial changes requested were made to the documents and final copies of the ACHA produced. Overall, consultation to complete Task 1 extended over an 18 month period. The report was finalised and forwarded to the DEC in April 2004.

The structure of the ACHAs was at the discretion of each of the Aboriginal groups, however, they were each asked to provide information to indicate:

1. that the group understood what is involved in the construction of the proposed F3 highway link from Seahampton to Branxton;

2. the importance of the Sugarloaf Range landscape to their group;

3. the Aboriginal cultural heritage value and sensitivity of the landscapes within 5 kilometres of the approved route alignment, including if there are areas within the landscape around the route alignment that have similar Aboriginal cultural heritage values to areas to be impacted by the route alignment (that would be appropriate for consideration as Aboriginal Cultural Heritage Offsets);

4. the group’s understanding of how the approved route alignment would impact on their Aboriginal cultural heritage values; and

5. how the construction of the highway link could be managed to provide long term protection of Aboriginal cultural heritage values. Are there areas where further investigation or salvage excavation is needed? Are there areas near the approved route alignment that would contain similar values to those affected by the route alignment, and which could be managed for conservation?

All of the groups chose to follow a format that broke the report into five sections relating to each of the points above. In order to assist the groups with the preparation of their ACHAs Umwelt provided information related to the landscape context of the route and a corridor five kilometres either side of the route. This information provided details relevant to the assessment of Aboriginal resource availability, land-use practices and disturbance, known site locations and predicted site locations. This information was presented in an informal manner during discussions with the groups, generally in the field during route inspections.

In order to make the information manageable, the route was broken down into the major four soil landscapes (Killingworth, Wallis, Neath and Branxton). As only Mindaribba LALC had been involved in the initial surveys of the route alignment, information was also provided to the groups in relation to the results of earlier archaeological surveys.
A landscape based approach to Aboriginal cultural heritage value assessment recognises the relationship between Aboriginal people and the economic and spiritual resources provided by the land and is not restricted to the known sites (physical evidence of Aboriginal occupation). A landscape based approach evaluates the resources (stone, water, food and medicine, shelter) that an area provided for its Aboriginal inhabitants as well as any ceremonial, spiritual and totemic associations that past and contemporary Aboriginal communities had or have to the land. An area identified as having high cultural heritage value can, but will not always, incorporate physical evidence of Aboriginal occupation.

3.1.1 Sensitive Areas and Potential Offsets

Based on information provided by the Aboriginal community in relation to their known cultural heritage values, supplemented by the information provided by the landscape analysis, the groups selected areas along the route corridor that were sensitive from an Aboriginal cultural heritage value perspective. The groups then identified areas within the five kilometre corridor either side of the approved route alignment in that landscape zone that had similar values and that met their criteria for an Aboriginal Cultural Heritage Offset. Multiple offsets were selected within each major soil landscape as the groups acknowledged that the final areas to be set aside as Aboriginal Cultural Heritage Offsets would be determined to a large degree by the availability of the land for purchase (refer to Figure 2.1).

When the areas chosen as potential Aboriginal Cultural Heritage Offsets by each of the groups were compared there were several areas of overlap. These were in the Sugarloaf Range area (including potential ecological compensatory habitat Candidate Areas 11, 12 and 13), the Kurri Sand Swamp Woodland area to the west of the Wallis Creek floodplain (including parts of potential ecological compensatory habitat Candidate Areas 22 and 23 containing Kurri Sand Swamp Woodland), a section of Black Waterholes Creek to the north-west of the Alcan Smelter (also Kurri Sand Swamp Woodland), the Anvil Creek area west of Greta (incorporating a small section of potential ecological compensatory habitat Candidate Area 42) and the Black Creek area west of Branxton. These areas are representative of the Killingworth landscape (Sugarloaf Range area), the Wallis Creek landscape (Candidate Area 22 and 23), the Neath landscape (area on Black Waterholes Creek) and the Branxton landscape (areas associated with Anvil Creek and Black Creek) and thus, provide a representative sample of the four major landscape zones (refer to Figure 2.2).

3.1.2 Management of Freeway Construction

As part of the ACHA process each of the groups was asked to comment on how freeway construction could be managed to provide long term protection of Aboriginal cultural heritage values. The major points to arise from this discussion can be placed into three categories relating to the preconstruction, construction and post construction period. Details of each group’s response can be found in Appendices 2 to 6 in Umwelt 2003 and a summary of the most common issues/recommendations are presented in point form below. Also provided is discussion (in italics) related to each point to elucidate actions that have been undertaken by RTA at the time of writing. In fulfilling these requirements the RTA is also fulfilling the requirements associated with their Conditions of Approval.

3.1.2.1 Prior to Construction

Prior to commencement of construction of the F3 to Branxton the majority of the Aboriginal groups requested the following be considered:

1. as the route alignment was not pegged during the 1993 or 1997 surveys all groups felt that the entire route would require inspection after it had been surveyed and pegged;
2. all areas to be impacted by construction including interchanges, rest areas, parking bays for heavy machinery, workshop areas, dump sites etc. to be inspected prior to impact;

*In relation to Points 1 and 2, RTA agreed to an inspection of the route alignment and all access tracks and other areas of impact. The majority of that survey was completed by all of the relevant Aboriginal groups and Umwelt archaeologists over a period extending from late 2003 to mid 2005. The report for the inspection is in preparation and will be completed when one remaining area (the Kurri Kurri Meatworks area) which has not been inspected (due to access problems), is subject to inspection.*

3. prior to the surveys RTA should organise for a training school (at least two days) for Aboriginal representatives that will participate in the inspections to ensure that all participants are adequately trained;

*Umwelt archaeologists provided on the job training for all personnel supplied by the relevant Aboriginal groups (where necessary).*

4. RTA should organise to have their employees and all contractors involved in the construction of the highway link undertake cultural heritage awareness training so that they recognise cultural heritage material;

*RTA supplied cultural heritage awareness training to all subcontractors that have been involved in works (geotechnical) to date. This training included artefact and site recognition as well as providing an understanding of the Aboriginal cultural value of the landscape along the proposed F3 route alignment.*

5. following the inspection of the pegged route alignment, when all parties are better informed of the locations of sites and PADs relative to the approve route alignment, further consultation will be required with the Aboriginal groups to prepare a detailed research design for any investigations of PADs/sites to be undertaken under a Section 87 Permit or of sites undertaken under a Section 90 Permit;

*To date two Section 90 Consents #1940 (approved by DEC on 7 June 2004 and #2102 approved by DEC on 14 February 2005) and Section 87 Permit #2096 (approved by DEC on 14 February 2005) have been prepared in consultation with the relevant Aboriginal groups. Site salvage and subsurface investigation of sites and potential archaeological deposits (PADs) along the F3 route alignment has been undertaken on an ongoing basis since July 2004 until October 2005. The salvages and subsurface investigations undertaken formed Stage 1 and Stage 2 of the overall salvage program. The entire salvage program has been/will be undertaken using a Research Design and Methodology approved by the relevant Aboriginal groups and the DEC.*

6. all subsurface investigations and surface collections approved by the Aboriginal groups to be undertaken prior to construction works commencing in that area;

*All of the Stage 1 and Stage 2 salvage and subsurface investigations have been completed. All that remains is for the surface and subsurface salvage of those sites and PADs (that proved to be sites) that require further salvage from an Aboriginal cultural or archaeological perspective (Stage 3). It may also be necessary to undertake further salvage within the Kurri Kurri Meatworks area not yet inspected due to the landholder refusing access.*

7. all areas to be set aside as Aboriginal Cultural Heritage Offsets of similar value to the areas to be impacted by construction should be determined prior to road construction commencing;
8. inspections will also be undertaken of the areas set aside as compensatory habitat and areas proposed as Aboriginal Cultural Heritage Offsets (where the purchase of these properties is possible) so that informed management plans for these areas can be formulated;

As outlined in Section 2.1.4 there are ongoing discussions between RTA and the Aboriginal groups in relation to the Aboriginal Cultural Heritage Offsets. It is proposed that discussions will be completed and an acceptable outcome reached by March 2006.

9. Aboriginal Cultural Heritage Management Plans will be prepared in consultation with the Aboriginal groups, NPWS and RTA to manage the cultural heritage sites and values along the route alignment and within the Compensatory Habitats and Aboriginal Cultural Heritage Offsets.

As discussed in Section 2.1.5 work has commenced on the Aboriginal Cultural Heritage Management Plan (ACHMP) for the route alignment. It is proposed that the ACHMP will be finalised within four weeks of the approval of the final Section 90 Consent. Management Plans for Aboriginal Cultural Heritage Offsets cannot be prepared until the Aboriginal community make a decision in relation to suitable offsets.

3.1.2.2 During Construction

During construction of the F3 to Branxton the majority of the Aboriginal groups have requested:

1. monitoring of the initial ground disturbance works;

   Rather than monitoring, the RTA agreed to subsurface testing of landform units within each creek catchment (creek bank, floodplain, lower, mid and upper slope and crest) along the route alignment. This subsurface testing program was agreed to by the relevant Aboriginal groups and was undertaken during the Stage 2 subsurface investigations under Section 87 Permit (#2096). Monitoring of initial ground disturbing works is therefore no longer a requirement.

2. if a site is located during construction all works in that area will cease and the relevant Aboriginal groups and NPWS/DEC will be consulted to determine the management of the site; and

3. if skeletal material is located during construction all works in that area will cease and the relevant Aboriginal groups, NPWS and NSW Police Department will be consulted to determine the nature and management of the burial.

Points 2 and 3 will be addressed within the ACHMP and will apply when construction commences.

3.1.2.3 After Construction

After construction of the F3 to Branxton highway link the majority of the Aboriginal groups have requested:

a) Aboriginal participation in works associated with the set up and ongoing maintenance of the Aboriginal Cultural Heritage Offsets.
Awabakal LALC also suggested:

b) appropriate Aboriginal names for rest areas and signage for sections of the F3 (e.g. notification of traditional Awabakal and Wonnarua territories, Land Council Zones).

Points 2 and 3 will be addressed within the ACHMP and the Offset Study, both currently in preparation.
4.0 PRELIMINARY RESULTS OF STAGE 1 AND 2 SALVAGE (TASK 3)

Task 3 incorporated the Stage 1 (Section 1) and Stage 2 (Sections 1 and 2) salvage and subsurface investigations. This section of the report provides a description of the salvage/investigation undertaken at each site and PAD in compliance with the relevant Section 87 Permit and Section 90 Consent conditions. It also presents the results of the salvage/investigation and any further salvage requirements for each site/PAD proposed as part of the final (Stage 3) salvage program. The descriptions of the sites and PADs recorded during the 2004 inspection and the rationale provided for their salvage/investigation at that time are included in Attachment 2. For ease of reference the sites are presented in alphabetical order and the PADs in numerical order in Attachment 2.

The locations of the sites/PADs and Landforms tested are shown on Figures 2.3 to 2.10.

4.1 STAGE 1 COLLECTIONS

The Stage 1 collections were undertaken under Section 90 Consent #1940 and incorporated the surface collection of three sites located within the Blue Gum Creek catchment (refer to Figure 2.3). Table 4.1 presents the results of the surface collections. Blue Gum Creek 3 IF was an isolated find, the remaining two sites were small artefact scatters - refer to Attachment 2 for site details).

Table 4.1 - Sites collected under Section 90 Consent

<table>
<thead>
<tr>
<th>Site Name</th>
<th>DEC Site No.</th>
<th>No. of Artefacts Collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Gum Creek 1</td>
<td>#38-4-0760</td>
<td>2</td>
</tr>
<tr>
<td>Blue Gum Creek 2</td>
<td>#38-4-0761</td>
<td>32</td>
</tr>
<tr>
<td>Blue Gum Creek 3 IF</td>
<td>#38-4-0762</td>
<td>Unable to locate the single artefact</td>
</tr>
</tbody>
</table>

The artefacts collected were flakes, broken flakes and flaked pieces manufactured predominantly from Nobby's tuff and with minor numbers of basalt and silcrete. The majority of the artefacts collected from Blue Gum Creek 2 were very small sections of broken flakes and heat shattered flakes manufactured from Nobby's tuff. It is assessed that the 32 fragmentary artefacts in this site reflect a much smaller assemblage at the time of discard. The artefacts have been damaged due to road construction/use in the area and bushfire.

4.2 STAGE 1 SURFACE COLLECTION AND SUBSURFACE SALVAGE

The Stage 1 surface collection and subsurface salvage was undertaken under Section 90 Consent #1940 and incorporated two artefact scatter sites; one in the Minmi Creek catchment and one in the Blue Gum Creek catchment (refer to Attachment 2 for site details and Figure 2.3).

4.2.1 Blue Gum Creek 4 Artefact Scatter (#38-4-0763)

A total of eight artefacts were collected from an eroded foot/motor bike track and from the surface of a conglomerate rock exposure on the south-eastern side of Blue Gum Creek. Artefact types included flakes and broken flakes manufactured from Nobby's tuff, basalt and
quartz. The majority of the artefacts exhibited evidence of being exposed to uncontrolled heat from bushfire (burnt, crazed, shattered).

An area 1 metre x 0.5 metre of sediment accumulation on the track (behind a log) was sieved to ascertain if it contained artefacts washed down from upslope. No artefacts were located within the sediment. The sediment was 30 cm in depth beside the log and reduced in depth upslope to 10 cm.

Four 1 x 1 metre squares were excavated on a heavily grassed, level bench on the slope on the eastern side of the track. At the time of site recording it was proposed that this area had the potential to have retained some topsoil (which had been eroded from the remainder of the slope); however, the excavations found that the majority of the topsoil was also missing from this area with only an extremely gravelly A2 horizon of 5 to 15 cm in depth over the clay.

One broken basalt flake was located in Spit 1 of Square 2 and one broken silcrete flake was located in Spit 1 of Square 4.

4.2.2 Sugarloaf 1 Artefact Scatter (#38-4-0759)

A total of 23 artefacts were collected from an area at the intersection of two roads on a low ridge crest between a tributary of Minmi Creek and Minmi Creek. The artefacts were spread along the roads over an area approximately 100 metres in length by 5 to 8 metres in width. The artefacts consisted of flakes, broken flakes, flaked pieces and a single core. The majority of the artefacts were manufactured from Nobbys tuff. There was one silcrete core and one silcrete flaked piece (probably broken off the core by impact with the dozer during road construction). The artefacts had been badly damaged from road construction, vehicular traffic and bushfire.

Four 1 x 1 metre squares were excavated in areas off the road on the crest of the low ridge. The areas chosen for excavation were those deemed to be the least disturbed by prior tree clearance and road construction and were located within close proximity of the surface artefacts. The soil consisted of remnant A2 horizon, less than 15 cm in depth.

Square 1 contained three Nobbys tuff broken flakes, two in Spit 1 and one in Spit 3. Square 3 contained one silcrete broken flake in Spit 2.

4.2.3 Blue Gum Creek Landform Testing

The nine landform testing squares commenced on the lower slope on the northern side of Blue Gum Creek. The landform testing was conducted within the vicinity of the subsurface testing of the Blue Gum Creek 4 Artefact Scatter (refer to Section 4.2.1).

The excavation of square 1 was taken down two spits to a depth of 10 cm. No artefactual or cultural material was identified. Square 1 was located on the lower slope approximately 210 metres north from Blue Gum Creek.

Square 2 was excavated for two spits to a depth of 10 cm. No artefactual or cultural material was identified. Square 2 was located on the lower slope 230 metres north of Blue Gum Creek.

The excavation of square 3 was taken down two spits to a depth of 10 cm. No artefactual or cultural material was identified. Square 3 was located on the mid slope 280 metres north of Blue Gum Creek.
Square 4 was excavated for two spits to a depth of 10 cm before the clay, C horizon was reached. No artefactual or cultural material was identified. Square 4 was on the mid slope approximately 260 metres north of Blue Gum Creek.

Square 5 was excavated for one spit to a depth of 5 cm. No artefactual or cultural material was identified. Square 5 was on the mid slope approximately 305 metres north of Blue Gum Creek.

The excavation of square 6 was extremely shallow with only one spit removed to 5 cm. No artefactual or cultural material was identified. Square 6 was on the upper slope approximately 315 metres north of Blue Gum Creek.

Square 7 was excavated to a depth of 10 cm. No artefactual or cultural material was identified. Square 7 was on the upper slope approximately 320 metres north of Blue Gum Creek.

Two spits were excavated in square 8 to a depth of 10 cm. No artefactual or cultural material was identified. Square 8 was on the upper slope approximately 340 metres north of Blue Gum Creek.

The excavation of square 9 was taken down three spits to a depth of 15 cm with no artefactual or cultural material identified. The square was located on the ridge crest approximately 330 metres north of Blue Gum Creek.

Discussion

No stone artefacts were identified during the Blue Gum Creek Landform Testing. The depth of deposit was consistently shallow with no pattern evident in relation to distance from the creek or in relation to the landform elements tested.

On-site discussions with the Aboriginal group representatives participating in the project reached agreement that no further archaeological investigation was required in this area.

Summary and Management Recommendations

Although the heavily disturbed area was extensively tested, no artefactual evidence was identified.

No further archaeological investigation is required within this area.

4.2.4 Requirements for Further Salvage in Section 1 of the F3 to Branxton Route Alignment

RTA has fulfilled their Section 90 Consent (#1940) requirements related to the salvage of known sites within the Section 1 area (Blue Gum Creek and Minmi Creek catchments). No further salvage is required for the known sites from an Aboriginal cultural heritage or archaeological perspective. Further salvage; however, may be required should additional sites be located during highway link construction. RTA must also undertake work to conserve/lessen impact on other sites and areas within the Blue Gum Creek and Minmi Creek areas. These requirements are discussed in Section 4.7.

Detailed results of the surface collections and subsurface salvages undertaken under Section 90 Consent #1940 will be provided in the final report prepared for the DEC following the Stage 3 salvage (as per the consent conditions).
4.3 STAGE 2 SITE COLLECTIONS

The Stage 2 surface collection was undertaken under Section 90 Consent #2102. There were 68 sites subject to surface collection in the Anvil Creek, Bishops Creek, Black Creek, Black Waterholes Creek, Sawyers Gully, Surveyors Creek and Wallis Creek catchments (refer to Figures 2.3 to 2.10). Table 4.2 provides a summary of the artefacts collected from each of the 68 sites targeted for collection only. Those sites with ‘IF’ in their titles were isolated finds at the time they were recorded, the remainder were artefact scatters.

Table 4.2 - Sites collected under Section 90 Consent #2102

<table>
<thead>
<tr>
<th>Site Name</th>
<th>DEC Site No.</th>
<th>No. of Artefacts Collected</th>
</tr>
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Table 4.2 - Sites collected under Section 90 Consent #2102 (cont)

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*Anvil Creek RTA 15 was targeted for partial collection only (the section of the site along a proposed access track), the remainder of the site area was to be protected under the AHMP, however, works subsequent to the survey by the Mine Subsidence Board had destroyed that section of the site proposed for conservation by the time of the collection.*
Despite intensive searches in the area of all the sites it was not possible to locate the artefacts in 10 of the isolated find sites or in two of the artefact scatters. These artefact scatters were each recorded as containing only two artefacts. Thus it was not possible to collect 14 of the previously recorded artefacts from 12 of the sites.

**Detailed results of the surface collections undertaken under Section 90 Consent #2102 will be provided in the final report prepared for the DEC following the Stage 3 salvage (as per the consent conditions).**

### 4.4 STAGE 2 SUBSURFACE INVESTIGATIONS (SITES)

This section of the report will discuss the subsurface investigation of four sites in the Section 2 area undertaken under Section 87 Permit #2096. The four sites were identified as having high Aboriginal significance and three were identified as having archaeological research potential (Anvil Creek RTA 3, Black Creek RTA 2 and Wallis Creek RTA 2 - Umwelt 2005b).

Four 1 metre squares where manually excavated within each site area. The four squares were set at the corners of a 10 metre square grid. The excavations were undertaken using arbitrary 5 cm spits and were continued until the clay was reached or until all participants agreed that the excavation could cease. The exception to this was Black Creek RTA 2. At this site the topsoil was very deep and manual excavations were halted when the excavations became too dangerous. As detailed in the Section 87 Permit application (Umwelt 2005b), in this event the excavation was to be undertaken mechanically. Thus an excavator was brought in to excavate a trench, 1 metre by 2 metres as agreed with the DEC.

All excavated material was sieved through 5 and 2 mm sieves with all identified artefacts bagged and labelled for later analysis. Stratigraphic profiles were drawn for each square containing artefacts. Soil samples were taken for each spit for later pH, Munsell and geomorphological analysis.

#### 4.4.1 Anvil Creek RTA 3 (#37-6-1368)

The test pits were located on the lower slope on the north-eastern side of a tributary of Anvil Creek. The excavation was 5 metres from the creek. Squares 1 and 2 were furthest from the creek. The area has been affected by tree clearance, farm road construction, grazing and soil loss due to slope wash. The creek is highly eroded and deeply entrenched. More than 200 stone artefacts were previously recorded across the surface of the site; these artefacts still remain in the site to be salvaged as part of Stage 3 (Task 6). The artefacts are located within 30 metres of the creek bank and many are actually located on the eroding banks and within the channel.

**Square 1** was excavated to a depth of 10 cm. Forty-two artefacts were excavated from spit 1 and none from spit 2. Charcoal samples were collected from spit 1. No ceramic, glass, metal or shell was identified within this test pit excavation.

**Square 2** was excavated for three spits to a depth of 15 cm. Sixty-eight stone artefacts were excavated from this test pit including: seventeen from spit 1; forty-six from spit 2; and five from spit 3. Charcoal samples were taken from spits 2 and 3. No ceramic, glass, metal or shell was identified within this test pit excavation.

Three spits were excavated in **Square 3** to a depth of 15 cm. Twelve stone artefacts were excavated from the three spits including: five from spit 1; one from spit 2; and six from spit 3. No charcoal, ceramic, glass, metal or shell was identified within this test pit excavation.
Square 4 was taken down six spits to a depth of 30 cm. Thirteen stone artefacts were identified within spits 3, 4 and 5 including: two from spit 3; eight from spit 4; and three from spit 5. Charcoal samples were collected from spit 4. No ceramic, glass, metal or shell was identified within this test pit excavation.

The artefacts retrieved from the test pits included flakes, flaked pieces and one core. These were manufactured from silcrete, mudstone and quartz with the majority being silcrete and mudstone.

Discussion

The soil depth was found to increase towards the creek, however, artefact numbers (in a subsurface context) were found to decrease towards the creek. There was no evidence of older buried soil profiles in the area and prior disturbance indicates that there is a lack of site integrity. Though charcoal was recovered from Squares 1, 2 and 4, there was no evidence to suggest that the charcoal was related to the artefacts located within the squares.

Other subsurface testing, was undertaken on the opposite, south-eastern side of the creek, within Anvil Creek PAD 16 and as part of the Landform Testing program (refer Sections 4.5.1 and 4.6.1). Though artefact numbers were slightly down on the south-eastern side of the creek, the deeper, aggrading, alluvial deposits and slightly less disturbed nature in proximity to the creek suggested that it would provide a better area for further targeted salvage if that was a requirement.

As the area recorded as PAD 16 was found to have artefacts it will now be incorporated into the Anvil Creek RTA 3 site and a revised site card will be forwarded to the DEC along with the Section 90 application for the Stage 3 salvage (Task 6).

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project identified the PAD area on the south-eastern side of the creek as the area they would like to see subject to further salvage. A similar conclusion was reached from an archaeological perspective due to its less disturbed nature.

As the RTA will be required to construct a culvert within the creek channel, the area on the south-eastern side of the creek (in line with this culvert) is the area proposed for further salvage. A 5 metre by 5 metre manual excavation is proposed. In relation to the remainder of the site, it is proposed to collect the surface artefacts and to have the RTA bury the area 60 metres either side of the creek (within their area of impact) rather than subject it to ground disturbance.

The Aboriginal groups also suggested that the route alignment be temporarily fenced during the construction period to avoid impacting sections of the site outside the route alignment.

Summary and Management Recommendations

More than 200 surface artefacts have been recorded within this site. One hundred and thirty-five stone artefacts were excavated from the four test pits located within the site area on the north-western side of the creek. The majority of these (68) were excavated from square 2.

Artefact numbers were higher away from the creek (but within 20 metres), but soil depth was greater nearer the creek. The area has been subject to high levels of disturbance and the site area on the north-western side of the creek is seen to have little integrity.
An application will be made to the DEC for Section 90 Consent (collection, partial subsurface salvage and partial conservation) to collect surface artefacts from the site and to undertake subsurface salvage of an area on the south-eastern side of the creek that retains the greatest integrity (formerly PAD 16) and is within the highway link impact area. A 5 metre by 5 metre excavation is proposed.

The RTA will bury an area 60 metres either side of the creek with imported fill within their area of impact to conserve the remainder of the site. The route alignment should be temporarily fenced during the construction period to avoid impacting sections of the site outside the route alignment.

4.4.2 Black Creek RTA 2 (#37-6-1339)

The Black Creek RTA 2 site is located on the second creek terrace on the western side of Black Creek, and on the southern side of the New England Highway at Branxton (refer to Figure 2.10). The second creek terrace landform unit does not extend to the northern side of the New England Highway (which is a vineyard) but does extend to the south of the New England Highway as far as the Main Northern Railway (a distance of approximately 400 metres). The area is currently grazed and has been subject to irrigation and cultivation. Cultivation is likely to have disturbed the top 30 - 35 cm of the soil profile.

Excavations were halted at Black Creek RTA 2 due to safety reasons associated with the extreme depth and narrow width of the test pits, not because clay was reached. Wet weather encountered during the test pitting period resulted in the alluvial deposits near the base of the excavation flowing into the excavation causing wall collapse. It was assessed that sufficient information had been gathered to ascertain that further salvage in this area was warranted and thus test pit excavations were ceased to allow the soil profile to dry and to avoid further detrimental impact on the area.

When an attempt was made to extend Square 2 into a trench it collapsed after only two spits. It was deemed necessary to excavate a separate trench (trench 2a) adjacent to Square 2. The trench was excavated using a backhoe and then an excavator and was 2 metres x 1 metre in area. The trench excavation was also halted due to wall collapse.

Twenty-four spits were excavated from Square 1 to a depth of 120 cm. Fifty-nine stone artefacts were identified including: five in spit 12; forty-five in spit 20; and nine in spit 22. One piece of glass was located in spit 3. No charcoal samples were retrieved. No ceramic, metal or shell was located during the excavation of this test pit.

Twenty-five spits were excavated in Square 2 to a depth of 125 cm. Eighty stone artefacts were identified with the majority recovered from spits 15 to 25. Stone artefacts were distributed in the following manner: one in spits 1, 5 and 14; seven in spit 15; eleven in spit 16; nine in spit 17; seventeen in spit 18; four in spit 19; nine in spit 20; three in spit 21; five in spit 22; eleven in spit 23; and one in spit 25. Charcoal samples were recovered from spits 3-4, 8-9, 13-14, 22 and 24. Ten pieces of ceramic material were identified including: one in spits 1 and 2; five in spit 3; and three in spit 5. Twenty pieces of glass were also located including: five in spit 2; six in spit 3; four in spit 4; four in spit 5; and one in spit 7. No metal or shell was identified.

Trench 2a was excavated adjacent to Square 2 on its northern side, as the walls of Square 2 collapsed after only two spits, when an excavator was brought in to extend the square into a trench. Trench 2a was taken down thirty-two spits to a depth of 160 cm. Clay had not been reached at this stage but the excavation was halted due to OH&S issues and the potential for cross contamination between spits arising from use of the excavator (the bucket continually knocks material from higher spits into the excavation). Forty-three artefacts were identified in the deposit from spits 14-22, with the main concentration in spit 21. The distribution of
artefacts is as follows: two in spit 14; one in spit 15; two in spit 17; four in spit 19; two in spit 20; thirty-one in spit 21; and one in spit 22. No charcoal, ceramic, glass, metal or shell was located during the excavation of this trench.

The excavation of **Square 3** was taken down twenty-six spits to a depth of 130 cm. Thirty stone artefacts were identified within the excavation including: two in spit 1; five in spit 2; one in spit 3; 2 in spit 4; three in spit 5; one in spits 9, 17 and 18; nine in spit 19; three in spit 21; and two in spit 23. Charcoal samples were only taken from spit 7. Thirty-six pieces of glass were located in the deposits of spits 1-5 with one piece in spit 1, fifteen pieces in spit 2; eight in spit 3; five in spit 4; and seven in spit 5. Eighteen pieces of ceramic material were identified including: thirteen in spit 2; two in both spits 3 and 4; and one in spit 7. Square 3 also contained five pieces of unidentifiable bone in spit 2. One piece of metal was located in spit 6 and one piece of a clay pipe stem was identified within the deposit of spit 2. No shell was identified within this test pit excavation.

Twenty-five spits were excavated in **Square 4** down to a depth of 125 cm. Twenty-eight stone artefacts were located in spits 5-21 with the largest number (9) found in spit 20. One stone artefact was found in each of the following spits: 5, 8-9, 11, 13-15 and 17-21. The remainder were distributed as follows: three in spit 14; one in spit 15; five in spit 17; one in spit 18; three in spit 19; and one in spit 21. Charcoal samples were recovered from spits 4-6, 8, 10-11, 13 and 16-24. Ceramic material was recovered throughout the excavation with one piece from both spits 3 and 4, two from spit 5 and one from both spits 14 and 20. Seven pieces of glass were identified in spits 2-6 with one in spit 2, two in spit 3, one in spit 4, two in spit 5 and one in spit 6. No metal or shell was identified.

The 240 artefacts excavated from Black Creek RTA 2 were manufactured from silcrete, mudstone, quartzite and included retouched flakes, flakes, flaked pieces and cores.

**Discussion**

Trench 2a was the deepest excavation (160 cm); clay was not encountered at the base of the excavation, but changes in the deposit suggest that the excavation was nearing the clay. The last 35 cm of the Trench 2a excavation was sterile. Square 2 had the highest concentration of artefacts with 80 artefacts excavated from the deposit between spits 1 and 25. The majority of artefacts were excavated between spits 15 and 23 at depths between 75 cm and 115 cm.

European material included modern glass (beer bottle and windscreen glass), plus glass and ceramics dating to earlier periods. A section of clay pipe in association with Aboriginal artefacts (Spit 2 Square 3) suggests the site has artefacts dating from the contact period.

European material was mostly concentrated between spits 1 and 7 in all squares, however within the excavation of Square 4 ceramic material was also recovered from spits 14 and 20. This result could be indicative of material moving vertically down through the deposit; however, it is more likely that it is symptomatic of cross contamination between spits caused by the excavator bucket knocking deposit from the edges of the excavation to be included in the deposits from the deeper spits.

The European artefacts are mostly restricted to the cultivation zone, whilst the majority of the Aboriginal artefacts are located below the cultivation zone suggesting a degree of vertical integrity. Preliminary assessment of the artefacts indicate that the artefacts from the lower levels of the test pits have been subject to greater degrees of chemical weathering suggesting a longer period of burial indicative of greater antiquity.

Preliminary geomorphic assessment of the soil profile indicates five stratigraphic units with the deposits becoming lighter in colour and finer in texture with depth (refer to **Figure 4.1**).
The depth to the clay is still unknown; however, it was assessed from the changes in the soil profile in Trench 2a that it was approaching the clay at 160 cm. There was no evidence of a buried soil profile within any of the excavations.

The site area will be extended to incorporate the Black Creek PAD 20 area (refer to Section 4.5.6) and the area related to the Black Creek Landform Testing (refer to Section 4.6.3). This area extends beyond the F3 to Branxton route alignment and the second creek terrace and includes the first creek terrace and third creek terrace/lower slope. Results of this broader subsurface testing indicate that whilst all this area was utilised by Aboriginal people, the second creek terrace was the area of most concentrated Aboriginal occupation.

During discussions with RTA in relation to the Black Creek RTA 2 site, agreement was reached to endeavour to conserve as much of the subsurface deposit in this area as was feasible. As well as highway link construction, RTA is required to construct two bridges in this area and therefore, cannot avoid all subsurface impact due to the necessity of emplacement of the bridge pylons.

Management options for the site included:

a) manually excavate only those narrow areas impacted by bridge pylon excavation and bury the remainder of the site; or

b) undertake a broad area manual excavation on the second creek terrace, bury all of the site not impacted by bridge pylon excavations (place soil from pylon excavations over site and bury).

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project reached agreement that a broad area manual excavation was more likely to encounter datable features and higher numbers of artefacts than the narrow excavations associated with the bridge pylons. Thus option “b” was preferred. Option “b” was also preferred from an archaeological perspective (greater research value) and from an OH&S perspective (deep narrow excavations are very dangerous in unstable deposits).

Summary and Management Recommendations

Table 4.3 provides a summary of the artefact distribution within the spits and stratigraphic units. The artefact numbers from all five excavations have been combined within the table to show the total number of artefacts per spit for the Black Creek RTA 2 excavations. The table also indicates the number of European artefacts located in each spit (i.e. glass and ceramic fragments, metal and clay pipe).

<table>
<thead>
<tr>
<th>Spit</th>
<th>Depth in cm</th>
<th>Stone artefacts</th>
<th>European Material</th>
<th>Stratigraphic Unit/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>SU1</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>6</td>
<td>42</td>
<td>SU1</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>1</td>
<td>25</td>
<td>SU1, 2a</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td>2</td>
<td>13</td>
<td>SU2, 2a</td>
</tr>
<tr>
<td>5</td>
<td>25</td>
<td>5</td>
<td>19</td>
<td>SU2, 2a</td>
</tr>
<tr>
<td>6</td>
<td>30</td>
<td>0</td>
<td>2</td>
<td>SU2, 2a</td>
</tr>
</tbody>
</table>
### Table 4.3 - Summary of Artefact Distribution/Spit and Stratigraphic Unit (cont)

<table>
<thead>
<tr>
<th>Spit</th>
<th>Depth in cm</th>
<th>Stone artefacts</th>
<th>European Material</th>
<th>Stratigraphic Unit/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>35</td>
<td>0</td>
<td>3</td>
<td>SU2 Base of cultivation zone</td>
</tr>
<tr>
<td>8</td>
<td>40</td>
<td>1</td>
<td>0</td>
<td>SU3</td>
</tr>
<tr>
<td>9</td>
<td>45</td>
<td>2</td>
<td>0</td>
<td>SU3</td>
</tr>
<tr>
<td>10</td>
<td>50</td>
<td>0</td>
<td>0</td>
<td>SU3, 3a</td>
</tr>
<tr>
<td>11</td>
<td>55</td>
<td>1</td>
<td>0</td>
<td>SU3, 3a, 3b</td>
</tr>
<tr>
<td>12</td>
<td>60</td>
<td>5</td>
<td>0</td>
<td>SU3, 3a, 3b</td>
</tr>
<tr>
<td>13</td>
<td>65</td>
<td>1</td>
<td>0</td>
<td>SU3, 3a, 3b</td>
</tr>
<tr>
<td>14</td>
<td>70</td>
<td>6</td>
<td>1</td>
<td>SU3, 3b</td>
</tr>
<tr>
<td>15</td>
<td>75</td>
<td>9</td>
<td>0</td>
<td>SU3, 3b</td>
</tr>
<tr>
<td>16</td>
<td>80</td>
<td>11</td>
<td>0</td>
<td>SU3, 3b</td>
</tr>
<tr>
<td>17</td>
<td>85</td>
<td>17</td>
<td>0</td>
<td>SU3, 4</td>
</tr>
<tr>
<td>18</td>
<td>90</td>
<td>19</td>
<td>0</td>
<td>SU3, 4</td>
</tr>
<tr>
<td>19</td>
<td>95</td>
<td>20</td>
<td>0</td>
<td>SU4</td>
</tr>
<tr>
<td>20</td>
<td>100</td>
<td>65</td>
<td>1</td>
<td>SU4</td>
</tr>
<tr>
<td>21</td>
<td>105</td>
<td>38</td>
<td>0</td>
<td>SU4</td>
</tr>
<tr>
<td>22</td>
<td>110</td>
<td>15</td>
<td>0</td>
<td>SU4</td>
</tr>
<tr>
<td>23</td>
<td>115</td>
<td>13</td>
<td>0</td>
<td>SU4</td>
</tr>
<tr>
<td>24</td>
<td>120</td>
<td>0</td>
<td>0</td>
<td>SU4 Base of Square 1</td>
</tr>
<tr>
<td>25</td>
<td>125</td>
<td>1</td>
<td>0</td>
<td>SU4 Base of Square 2 &amp; 4</td>
</tr>
<tr>
<td>26</td>
<td>130</td>
<td>0</td>
<td>0</td>
<td>SU4 Base of Square 3</td>
</tr>
<tr>
<td>27</td>
<td>135</td>
<td>0</td>
<td>0</td>
<td>SU4</td>
</tr>
<tr>
<td>28</td>
<td>140</td>
<td>0</td>
<td>0</td>
<td>SU4, 5</td>
</tr>
<tr>
<td>29</td>
<td>145</td>
<td>0</td>
<td>0</td>
<td>SU4, 5</td>
</tr>
<tr>
<td>30</td>
<td>150</td>
<td>0</td>
<td>0</td>
<td>SU5, 5a</td>
</tr>
<tr>
<td>31</td>
<td>155</td>
<td>0</td>
<td>0</td>
<td>SU5, 5a</td>
</tr>
<tr>
<td>32</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>SU5, 5a Base of Trench 2A</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>240</strong></td>
<td><strong>110</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The table indicates that European artefacts are mainly restricted to the cultivation zone (0 to 35 cm). Aboriginal stone artefacts; however, continue until a depth of 125 cm with a concentration between 80 cm and 115 cm. There were no physical barriers or features observed within the deposits to suggest that the artefacts had been accumulating between 80 cm and 115 cm due to a non-cultural reason (e.g. the downward movement of the artefacts due to processes such as bioturbation being halted by a lens of impenetrable material).

The general lack of European material within the deeper levels of the test pits suggest that this site has the capacity to retain a degree of stratigraphic integrity below the cultivation zone and therefore, it has the potential to provide evidence related to a long period of Aboriginal occupation. The charcoal collected from the test pits; however, was not able to
be directly associated with the cultural material and therefore has not been used for radiocarbon dating at this time. Instead it is proposed by opening a broader area excavation it may be possible to locate a datable feature such as a hearth. If this is not the case, thermoluminescence dating will also be proposed as part of the salvage methodology for this site (to be detailed in the Research Design and Methodology to accompany the Section 90 application - Umwelt in prep.).

Black Creek RTA 2 is therefore, proposed for further broad area excavation prior to impact by highway link construction. A 6 metre by 6 metre square is proposed. The excavation will be taken down to 75 cm (the spit above the artefact concentration) using a mechanical excavator. All of this material will be removed as 1 metre squares and 5 cm arbitrary spits and all will be sieved through 5 and 2 mm nested sieves. A 5 metre by 5 metre square will then be excavated manually within this area using the extra 1 metre (width) as a bench therefore lessening the overall OH&S limitations related to excavating at depth (1.75 metres is the greatest depth allowable without shoring). If a further 1 metre in depth is reached within the 5 metre by 5 metre excavation, the excavation area will be reduced to a 3 metre by 3 metre square (and so on until clay is reached or the deposits are sterile for at least 5 spits). Based on the results of the test pits; however, the excavation is likely to be halted around 1.5 metres.

An application will be made to the DEC for Partial Section 90 Consent (collection, partial subsurface salvage and partial conservation) to collect surface artefacts from the site (along the southern side of the New England Highway) and also to undertake subsurface salvage within the highway link impact area on the second creek terrace.

The RTA will bury the remainder of the site within their area of impact (first, second and third creek terrace/lower slope) with imported fill and the site outside (south) of the route alignment will be fenced off to prevent accidental damage. Soil excavated for the bridge pylons will remain within the site area and be covered by fill.

Full details of the methodology proposed for the excavation will be supplied to the DEC with the Research Design and Methodology that accompanies the Section 90 application (Umwelt in prep.).

4.4.3 Swamp Creek RTA 1 (#38-4-0813)

The site was located on an access track within a heavily disturbed EnergyAustralia easement. The four squares were excavated approximately 250 metres northeast of Swamp Creek on the same spur crest as the artefact scatter recorded as Swamp Creek RTA 3, but not within the scatter (as it was too eroded and too disturbed in that area). Squares 2 and 4 were located closest to the creek. Surface artefacts recorded during the initial survey could not be located at the time of the subsurface testing (refer to Table 4.2 and Figure 2.8).

Square 1 was excavated for five spits to a depth of 25 cm with charcoal samples taken from spits 1, 4 and 5. No stone artefacts, ceramic, glass, metal or shell was identified during the test pit excavation.

The excavation of Square 2 was taken down four spits to a depth of 20 cm. Charcoal samples were taken from spits 2 and 3. No stone artefacts, ceramic, glass, metal or shell was identified during the test pit excavation.

Seven spits were excavated in Square 3 to a depth of 35 cm. One stone artefact was identified in spit 1 and charcoal samples taken from spits 1-2 and 4-7. No ceramic, glass, metal or shell was identified during the test pit excavation. The stone artefact identified is a heat affected mudstone flaked piece.
Square 4 was excavated for six spits to a depth of 30 cm with charcoal samples taken from all spits. No stone artefacts, ceramic, glass, metal or shell was identified during the test pit excavation.

The one artefact identified within square 3 was a heat affected mudstone flaked piece.

Discussion

One stone artefact was located during the subsurface testing of this site (in spit 1 of square 3). Charcoal samples were also taken from this spit but there is no evidence to suggest any relationship between the charcoal and the artefact. The greatest depth of deposit in the site is 35 cm with soil depth quite consistent throughout the four test pits. The area is heavily disturbed and the soil profile lacks integrity. The area is regularly used for rubbish dumping.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project reached agreement that due to low number of artefacts located in the site area and the highly disturbed nature of the soil profile, that no further subsurface testing or salvage is warranted. Although the surface artefacts could not be located at the time of the subsurface testing, the groups requested an application be made to the DEC for a Section 90 Consent (collection only) so that another attempt can be made to locate and collect the surface artefacts during the Stage 3 salvage program.

Summary and Management Recommendations

One artefact was identified and collected during the subsurface testing of the site. The low number of artefacts located in the site area and the highly disturbed nature of the soil profile indicates that no further subsurface testing or salvage is warranted.

Although the surface artefacts could not be located at the time of the subsurface testing, at the request of the Aboriginal groups an application will be made to the DEC for a Section 90 Consent (collection only) so that another attempt can be made to locate and collect the artefacts during the Stage 3 salvage program.

Additional site information will be supplied to the DEC for this site with the Section 90 application for Stage 3.

4.4.4  Wallis Creek RTA 2 (#38-4-0815)

The area originally identified as Wallis Creek RTA 2 is located within an EnergyAustralia easement which has been heavily disturbed. Apart from disturbance from easement clearing, parts of this area have been excavated, filled with rubbish and backfilled.

The four test pits excavated within Wallis Creek RTA 2 were located approximately 25 metres north of a tributary of Wallis Creek on the creek terrace and lower slope. Squares 2 and 4 were located closest to the tributary. The squares were excavated in an area previously undisturbed by excavation for rubbish dumping.

Square 1 was excavated for five spits to a depth of 25 cm with charcoal samples obtained from spits 4 and 5. Two stone artefacts were identified in spit 4. No ceramic, glass, metal or shell was identified during the test pit excavation.

Square 2 was excavated for seven spits to a depth of 35 cm. No charcoal samples were obtained during the excavation of this square. Seven stone artefacts were excavated, all from spit 2. No ceramic, glass, metal or shell was identified during the test pit excavation.
Square 3 was excavated to a depth of 35 cm. Twenty-five stone artefacts were identified including: nine in spit 1; six in spit 2; one in spit 3; five in spit 4; two in spit 5; one in spit 6; and one in spit 7. Charcoal samples were obtained from spit 3. No ceramic, glass, metal or shell was identified during the test pit excavation (please note that Wallis Creek RTA 2 Square 3 is also identified as Wallis Creek Landform Testing Square 5 - refer to Section 4.6.8).

Square 4 was excavated for six spits to a depth of 30 cm with no charcoal samples obtained. Twenty-three stone artefacts were excavated including: three in spit 2; eleven in spit 4; four in spit 5; and five in spit 6. No ceramic, glass, metal or shell was identified during the test pit excavation.

The majority of the 57 stone artefacts retrieved (55) were manufactured from mudstone and silcrete. The remainder were chert (1) and quartz (1). The assemblage was made up of flakes, broken flakes and flaked pieces.

Discussion

Fifty-seven stone artefacts were excavated from the test pits within this site with the majority identified in squares 3 (25) and 4 (23). The greatest depth of deposit was 35 cm which was excavated from both square 2 (closest to the creek) and square 3 (greatest distance from the creek). Charcoal samples were taken from squares 1 and 3 with no evidence to suggest any direct correlation with the stone artefacts. No ceramic, glass, metal or shell was identified during the test pit excavations of the site.

The soil depth was found to be fairly consistent throughout the test pits with only a 10 cm variation in depth, however, artefact numbers were found to increase towards the tributary of Wallis Creek.

Wallis Creek PAD 8 testing and Landform testing (refer Sections 4.5.19 and 4.6.8 and Figures 2.4 and 2.5) were also undertaken in this area (to the north-west and south-east of the site). Artefact numbers were found to be higher just north of the tributary but steadily decreased towards the spur crest. The subsurface testing therefore indicates that the Wallis Creek RTA 2 site extends across the creek terrace, slopes and spur crest on the western side of Wallis Creek and Averys Lane near Kurri Kurri.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project reached agreement that the overall site area was so highly disturbed, that the subsurface testing already undertaken was sufficient subsurface salvage for this area.

This was agreed provided that the route alignment in this area was temporarily fenced to avoid impact to the site area outside the alignment and that further subsurface salvage was undertaken at Wallis Creek PAD 2 (refer to Section 4.5.17) and that the Wallis Creek PAD 7 area was conserved (refer to Section 4.5.18) and that all surface artefacts within the Wallis Creek RTA 2 site were collected.

Summary and Management Recommendations

Fifty-seven stone artefacts were excavated from the test pits within this site with the majority identified in squares 3 (25) and 4 (23). The area has been subject to high levels of disturbance and the site area is assessed as having little archaeological integrity.

Additional information will be provided to the DEC incorporating PAD 8 and the Wallis Creek Landform Testing areas into the previously recorded Wallis Creek RTA 2 site.
Further subsurface investigation is not assessed as warranted in this area from an archaeological perspective due to its lack of integrity and in the light of site conservation and further subsurface investigation proposed for Wallis Creek PAD 2 - refer to Section 4.5.17. The route alignment in the Wallis Creek RTA 2 site area should be temporarily fenced to avoid impact to the site area outside the alignment during highway link construction.

An application will be made to the DEC for a partial Section 90 Consent (partial salvage and partial conservation) to collect the surface artefacts that remain within the route alignment and conserve the remainder of the site outside the route alignment.

4.5 STAGE 2 PADS

A total of 19 PADs were subsurface tested under Section 87 Permit #2092. The PADs were identified by the Aboriginal community groups during the inspection of the route alignment (Umwelt in prep.) and tested at their request. PADs 1, 2, 5, 6, 7, 9, 11, 12, 13, 14, 15, 16, 17, 20, 21 were also identified for subsurface testing from an archaeological perspective. In general, prior disturbance was noted in all of the PAD areas; however, as most were in areas where very little was known about Aboriginal occupation it was thought necessary to test the areas to see if complex assemblages could be recovered by further excavation as part of Stage 3 of the salvage program.

For comparative purposes the same subsurface investigation methodology was used (where possible) for the PADs as was used for the sites discussed above. Four 1 metre by 1 metre squares were excavated on a 10 metre grid in each PAD identified for subsurface testing (Umwelt 2005b). In some areas it was impossible to place the squares on the grid system due to the shape and size of the area to be tested. In these cases the squares were usually placed in a straight line retaining the 10 metre spacing.

The squares were excavated manually using spades and trowels and were excavated as 5 cm arbitrary spits. The excavations were halted when the clay horizon was encountered or when all of the participants agreed that the excavation should be halted. Although an excavator would have been used if the depth of excavation exceeded 1.75 cm this did not eventuate as the depth did not exceed this level.

All excavated material was sieved through 5 and 2 mm nested sieves with artefacts bagged and labeled for later analysis. Stratigraphic profiles were drawn for each square that contained artefacts. Soil samples were taken for each spit for later pH, Munsell and geomorphological analysis.

4.5.1 Anvil Creek PAD 16 (#37-6-1368)

The four test pits excavated at Anvil Creek PAD 16 were located on the creek terrace; on the south-eastern side of the creek approximately 200 metres from Anvil Creek RTA 3 (refer to Section 4.4.1 and Figure 2.8). Squares 1 and 2 were located approximately 5 metres from the Creek and squares 3 and 4, 15 metres from the creek. The PAD area, although affected by tree clearance, erosion and grazing was less affected then the area designated as Anvil Creek RTA 3.

Square 1 was excavated for five spits to a depth of 25 cm. Thirty-five artefacts were identified with one in spit 1, four in spit 3, twenty-seven in spit 4 and three in spit 5. Charcoal samples were taken from spit 4. No ceramic glass, metal or shell was excavated from this square.

Four spits were excavated from square 2 to a depth of 20 cm. Twenty-four stone artefacts were excavated from this square, with seven in spit 2 and seventeen in spit 3. Charcoal
samples were taken from spits 2-4. No ceramic glass, metal or shell was excavated from this square.

**Square 3** was excavated for six spits to a depth of 30 cm. Charcoal samples were taken from spits 3 and 4. One stone artefact was located in spit 3 and one in spit 5. No ceramic glass, metal or shell was excavated from this square.

**Square 4** was excavated for five spits to a depth of 25 cm. Charcoal samples were only taken from spit 3. Sixteen stone artefacts were identified in spits 3 (ten) and 4 (six). No ceramic glass, metal or shell was excavated from this square (please note that Anvil Creek PAD 16 Square 4 is the same square as Anvil Creek Landform Testing Square 1 - refer to Section 4.6.1).

The majority of the artefacts are flakes and flaked pieces, however, there is one silcrete retouched flake and one mudstone core. The artefact assemblage is predominantly silcrete but in square 2 the majority of the artefacts are manufactured from mudstone. Some of the silcrete and mudstone artefacts are heat affected.

**Discussion**

Seventy seven artefacts were identified during the test pit excavations of Anvil Creek PAD 16. The majority of stone artefacts were found in squares 1 and 2 closest to the creek. The soil depth was found to be fairly consistent throughout the excavation area, however, artefact numbers were found to increase towards the creek. There was no evidence of older buried soil profiles in the area and prior disturbance indicates that there is a lack of site integrity. Though charcoal was recovered from squares 1, 2 and 4, there was no evidence to suggest that the charcoal was related to the artefacts located within the squares.

Anvil Creek RTA 3 testing (north-western side of creek) and Landform Testing (beginning in the PAD - refer Section 4.6.1) were also undertaken in this area. Though artefact numbers were slightly down in the PAD, as opposed to the Anvil Creek RTA 3 site on the other side of the creek, the deeper, aggrading, alluvial deposits and slightly less disturbed nature of the PAD suggested that it would provide a better area for further targeted salvage.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project identified the PAD 16 area on the south-eastern side of the creek as the area they would like to see subject to further salvage. A similar conclusion was reached from an archaeological perspective due to its less disturbed nature.

As the RTA will be required to construct a culvert within the creek, the area on the southern side of the creek in line with this culvert is the area proposed for further salvage. A 5 metre by 5 metre manual excavation is proposed. In relation to the remainder of the site, it is proposed to collect the surface artefacts and to have the RTA bury the area within 60 metres either side of the creek, (within their area of impact) to protect the majority of the subsurface artefacts remaining in the site. Therefore, an application will be made to the DEC for a partial Section 90 Consent (collection, partial subsurface salvage and partial conservation) for the site (now incorporating PAD 16).

The route alignment should be temporarily fenced during the construction period to avoid impacting sections of the site outside the route alignment.

The area formerly recorded as PAD 16 will now been incorporated into the Anvil Creek RTA 3 site and a revised site card will be forwarded to the DEC along with the Section 90 Consent (collection, partial subsurface salvage and partial conservation) application for the Stage 3 salvage.
Summary and Management Recommendations

Seventy seven artefacts were identified during the test pit excavations of Anvil Creek PAD 16. The majority of stone artefacts were found in squares one and two closest to the creek. Soil depths were relatively similar throughout the excavations.

A partial Section 90 Consent (collection, partial subsurface salvage and partial conservation) is proposed for the Anvil Creek PAD 16 area. RTA will bury the area within 60 metres either side of the creek, (within their area of impact) to protect the majority of the subsurface artefacts remaining in the site.

The route alignment should be temporarily fenced during the construction period to avoid impacting sections of the site outside the route alignment.

Anvil Creek PAD 16 will be incorporated into the previously recorded site Anvil Creek RTA 3 (NPWS #37-6-1368). Additional site card information will be supplied to the DEC with the partial Section 90 application for the site.

Full details of the methodology proposed for the excavation will be supplied to the DEC with the Research Design and Methodology that accompanies the Section 90 application (Umwelt in prep.).

4.5.2 Anvil Creek PAD 17 (#37-6-1369)

The four test pit excavations were carried out on the first creek terrace on the northern side of the creek. Even though both sides of the creek were identified as having PAD, the location of the excavation was chosen on advice from Geomorphologist Pam Dean-Jones, who suggested that the integrity and depth of deposit (from alluvial and colluvial sources) would be more substantial on the northern side of the creek (refer to Figure 2.9). Despite the aggrading nature of the soil in this area, it had still been subjected to disturbance related to tree clearance and grazing, which was evidenced by the hummocky nature of the ground surface. The test pits in this area were placed along the length of the creek; 10 metres apart and approximately at the same distance from the creek.

Twenty-two spits were excavated from square 1, with one artefact found in spit 12 and two in spit 14 (110 cm). No ceramic glass, metal shell or charcoal was excavated from this square.

Twenty-one spits were excavated from square 2 to a depth of 105 cm. No artefacts were identified with the excavation. Charcoal was identified in the majority of spits between spits 4 and 20. No ceramic glass, metal shell or charcoal was excavated from this square.

Seventeen spits were excavated from square 3 to a depth of 75 cm and charcoal samples were removed from spits 3, 5, 9 and 11. No stone artefacts were identified within this square. No ceramic glass, metal or shell was excavated from this square.

Square 4 was excavated to a depth of 100 cm before clay was encountered. Although no stone artefacts, ceramic, glass, metal or shell was identified; charcoal samples were removed from the majority of spits between spits 2 and 20.

Two heat affected mudstone flakes (spits 12 and 14) and one silcrete flake (spit 14) were identified, all within square 1.
Discussion

The artefacts identified in square 1 were all located between the depths of 60 and 70 cm. Square 1 had the greatest depth of deposit and was excavated to a depth of 110 cm. Sediment depth varied between 75 cm and 110 cm along the length of the creek.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project determined that no further salvage was required in this area due to the low number of artefacts and the disturbed nature of the area. From an archaeological perspective the low artefact number and high level of disturbance give the area a low research potential and thus further salvage of this area is unwarranted.

Summary and Management Recommendations

Only three artefacts were identified during the test pit excavations of Anvil Creek PAD 17. The three artefacts were all found in square 1, the most westerly square. There was no other cultural material located within the test pit excavations.

An application will be made to DEC for a Section 90 Consent (no further salvage).

A site card will be submitted to the DEC providing additional information and renaming the PAD, Anvil Creek RTA 28.

4.5.3 Anvil Creek PAD 18 (#37-6-1370)

The four test pits were excavated on the footslope on the western side of a northerly flowing ephemeral tributary of Anvil Creek (refer to Figure 2.9). The area has been subject to disturbance relating to tree clearance and grazing but appeared relatively less disturbed than the surrounding area. Squares 2 and 4 were located the closest to the creek (approximately 10 metres from the creek).

Square 1 was excavated for 14 spits to a depth of 70 cm. One artefact was found in spit 6 and one in spit 8. No ceramic, glass, metal or shell was identified within this test pit excavation.

The excavation of square 2 consisted of 14 spits to a depth of 70 cm before clay was encountered. Charcoal was located in spits 5 through to 8 and in spit 10. Thirteen stone artefacts were identified in spits 6 through to 12 with the main concentration of four stone artefacts identified in spit 7. No ceramic, glass, metal or shell was identified within this test pit excavation.

Seven spits were excavated in square 3 to a depth of 35 cm. One artefact was identified in spit 4 and charcoal samples taken from spit 5. No ceramic, glass, metal or shell was identified within this test pit excavation.

Twelve spits were excavated from square 4 to a depth of 60 cm. Charcoal samples were taken from spits 3, 9, 10 and 11. No stone artefacts, ceramic, metal glass or shell were located within the excavation.

The sixteen stone artefacts were manufactured from silcrete and mudstone with the majority being mudstone. The assemblage includes flakes and flaked pieces. Two of the mudstone flakes were quite large (approximately 7 cm in maximum length) with the remainder of the assemblage being very small in size.
Discussion

Sixteen stone artefacts were identified during the test pit excavations of Anvil Creek PAD 18 in squares 1, 2 and 3, with the majority excavated from square 2. Only in the square 2 excavation were charcoal samples taken from the same spits as the excavated stone artefacts; however, there is no evidence to suggest any correlation between the charcoal and the stone artefacts.

Soil depth increases as you move further north along the tributary. There appears to be no relationship between depth of deposit and artefact density.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project reached agreement that due to the small number of artefacts identified in this location that no further salvage was required in this area. From an archaeological perspective the low artefact number gives the area a low research potential and thus further salvage of this area is unwarranted.

Summary and Management Recommendations

Sixteen stone artefacts were excavated with thirteen of those coming from square 2.

An application will be made to DEC for a Section 90 Consent (no further salvage).

Additional site card information will be supplied to the DEC renaming PAD 17, as Anvil Creek RTA 29.

4.5.4 Anvil Creek PAD 21 (#37-6-1602)

Anvil Creek PAD 21 was located during an inspection of the area proposed for the Branxton Interchange (Umwelt 2005a). Permission was granted by the DEC to add the subsurface investigation of this PAD to Section 87 Permit #2096 on 1 August 2005. The PAD is located approximately 150 metres south-east of the extensive Redhouse Creek 1 site (which is outside the route alignment and at the confluence of Redhouse and Anvil Creek - refer to Figure 2.9). It was suspected; however, that the site may extend into the PAD 21 area.

PAD 21 is located on a first creek terrace on the northern side of Anvil Creek. The terrace is approximately 40 metres wide and about 1 metre higher than the current floodplain. The PAD is within an existing power easement so disturbance from easement construction and maintenance is evident. The topsoil in this area has been disturbed by clearing, pole emplacement, cultivation and grazing, however, it was assessed that there was sufficient depth of soil to allow for intact alluvial deposits below the plough zone/disturbance zone. Square 3 was the closest square to Anvil Creek, approximately 15 metres from the creek.

Ten spits were excavated from square 1 to a depth of 50 cm. One stone artefact was identified in spit 8. Charcoal samples were taken from spits 3 and 6. No ceramic, glass, metal or shell was identified within this test pit excavation.

Square 2 was excavated for seven spits to a depth of 35 cm with no artefactual or cultural material identified.

Square 3 was excavated for 14 spits to a depth of 70 cm. Charcoal samples were taken for all spits between 3 and 11. Thirty-three stone artefacts were excavated from this square: three from spit 5; eight from spit 6; ten from spit 7; and twelve from spit 8. No ceramic, glass, metal or shell was identified within this test pit excavation.
Ten spits were excavated from square 4 to a depth of 50 cm. Five stone artefacts were excavated from spit 5. Charcoal samples were taken from spits 3, 7 and 8. No ceramic, glass, metal or shell was identified within this test pit excavation.

The 39 artefacts were predominantly manufactured from silcrete with a few mudstone artefacts also identified. The assemblage includes flakes, broken flakes and flaked pieces.

**Discussion**

The depth of deposit increased closer to the creek along with the artefact density. Although charcoal samples were taken from squares 1, 3 and 4 there is no evidence to suggest that there is any relationship between the charcoal and stone artefacts.

The location of artefacts within the PAD indicates that this area is an extension of the Redhouse Creek 1 site and thus the site area will need to be increased. The RTA has previously agreed to the conservation of the area of the Redhouse Creek 1 site that falls outside the route alignment. Agreement has been reached during discussions with RTA since the excavation of PAD 21 that soil will be brought into the area and the section of first creek terrace to be impacted by construction will be buried and a bridge constructed over the creek in this area. The section of the site outside the impact area will be fenced off to ensure it is not adversely impacted by highway link construction. However, it will be necessary for EnergyAustralia to emplace two new and larger power poles to lift the powerlines over the Branxton Interchange. Thus there will be a necessity to obtain a partial Section 90 Consent for the subsurface salvage of the two small areas to be impacted by pole emplacement.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project reached agreement that the conservation of the majority of the site was the preferred option from both an Aboriginal and archaeological perspective. Partial Section 90 Consent to allow the excavation of the two pole emplacement areas was supported.

**Summary and Management Recommendations**

Thirty-nine artefacts were identified during the test pit excavations of Anvil Creek PAD 21 and the PAD will now be incorporated into the Redhouse Creek 1 site.

The RTA has agreed to undertaking works to conserve the majority of the Redhouse Creek 1 site; with only a partial Section 90 Consent (partial salvage and partial conservation) required for power pole emplacement by EnergyAustralia. A 1 metre by 1 metre excavation is proposed for the power pole locations.

Additional information will be supplied to the DEC incorporating this PAD into the previously recorded Redhouse Creek 1 site (#37-6-1603). This information will be supplied along with the Section 90 application (Umwelt in prep.).

Full details of the methodology proposed for the excavation will be supplied to the DEC with the Research Design and Methodology that accompanies the Section 90 application (Umwelt in prep.).

### 4.5.5 Bishops Creek PAD 15 (#37-6-1367)

The four test pits were excavated on the flat and footslope on the northern bank of Bishops Creek approximately 15 metres from the creek (refer to Figure 2.8). Squares 3 and 4 were located closest to the creek.
**Square 1** was excavated to a depth of 25 cm when the clay was encountered. No artefacts or associated cultural material was identified within this test pit excavation (please note that Square 1 is the same square as Bishops Creek Landform Testing Square 1 – refer to Section 4.6.2).

**Square 2** was excavated for four spits to a depth of 20 cm. One artefact was identified in each of the first three spits and charcoal samples were taken from spits 2 and 3. No other cultural material was recovered.

The excavation of **square 3** was carried out to a depth of 25 cm before clay was reached. No artefacts or associated cultural material was identified within this test pit excavation.

Six pits were excavated in **square 4** to a depth of 30 cm. Of the three stone artefacts identified during this excavation, one was from spit 2 and two from spit 3. Charcoal samples were taken from spits 3 and 4. No artefacts or associated cultural material was identified within this test pit excavation.

The artefact assemblage includes five heat affected silcrete flakes and one quartz flake.

**Discussion**

Only six stone artefacts were identified during the excavation of this PAD; with three excavated from square 2 and three from square 4. Charcoal samples were obtained from square 4 but there is no evidence to suggest any direct correlation between the charcoal and the stone artefacts excavated. No other cultural material was identified within the test pit excavations.

The greatest depth of deposit was found in square 4 with 30 cm excavated before clay was encountered. Soil depth, while deepest closer to the creek, was not highly variable throughout the test pit excavations.

The area has been disturbed by logging and possibly bulldozing in the past. Now that the PAD has been found to contain artefacts it will be renamed Bishops Creek RTA 10. Landform Testing (refer to Section 4.6.2) was also carried out in this area. As artefacts were also located during the landform testing, this area will also be incorporated into Bishops Creek RTA 10.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project reached agreement that no further salvage was required in this area due to the low artefact numbers and high disturbance levels. For the same reasons no further salvage is warranted in this area from an archaeological perspective. Thus it is proposed to make an application to the DEC for a Section 90 Consent (no further salvage).

**Summary and Management Recommendations**

Only six artefacts were located in this disturbed area and no further salvage is thought warranted.

An application will be made to DEC for a Section 90 Consent (no further salvage).

Additional site card information will be supplied to the DEC renaming this PAD Bishops Creek RTA 10 and incorporating the Landform Testing area. This information will be provided in association with the Section 90 Consent application.
4.5.6 Black Creek PAD 20 (#37-6-1371)

Black Creek PAD 20 was located on the western side of Black Creek and the southern side of the existing New England Highway at Branxton. The Black Creek PAD 20 excavations were conducted on the first creek terrace approximately 30 metres west of the creek with squares 2 and 4 located closest to the creek. The Black Creek RTA 2 site was located around 50 metres west of PAD 20 (refer Figure 2.10). The area is currently grazed and has been subject to irrigation and cultivation. Cultivation is likely to have disturbed the top 30 – 35 cm of the soil profile.

Square 1 was taken down twelve spits to a depth of 60 cm and to the clay. One stone artefact was identified in spit 2. A piece of ceramic material was located in spit 1 and a piece of glass in spit 8. No charcoal samples, metal or shell was identified during this test pit excavation.

The excavation of square 2 was taken down ten spits to a depth of 50 cm and to the clay. Charcoal samples were taken from spit 5. No stone artefacts, ceramic, glass, metal or shell was located during this test pit excavation.

Square 3 was excavated to a depth of 105 cm. This excavation was extended into the clay to determine if a buried soil horizon was present. There was no buried soil horizon identified. Clay was first encountered at spit 10 (50 cm). One stone artefact was identified in both spits 1 and 3. Charcoal samples were taken from spits 11, 14, 15, 17 and 19. Three pieces of ceramic material was recovered from spit 3. Nine pieces of glass were identified including: three in spit 1; one in spit 2; one in spit 4; two in spit 5; and two in spit 6. No metal or shell was identified.

Ten spits were excavated in square 4 to a depth of 50 cm. Two pieces of glass were recovered from spit 1. No stone artefacts, charcoal, ceramic, metal or shell was located during the excavation of this test pit.

All of the artefacts identified during these test pit excavations were manufactured from silcrete and all were flakes.

Discussion

Only three stone artefacts were identified during the excavation of PAD 20. One artefact was identified in spit 2 of square 1 and one in both spits 1 and 3 of square 3. The depth of deposit decreases closer to the creek and increases towards the second creek terrace.

Subsurface investigation of the second creek terrace (Black Creek RTA 2 - refer to Section 4.4.2) and associated surface artefacts in this area, suggest that Aboriginal occupation was concentrated on the second creek terrace. Landform testing across the first, second and third creek terrace/lower slope supports this assumption (refer to Section 4.6.3).

Due to the location of artefacts in Black Creek PAD 20, it will be incorporated into the Black Creek RTA 2 site which will now extend across the first, second and third creek terrace/lower slope.

The first creek terrace should be spanned by the bridges to be constructed by the RTA in this area; however, on-site discussions with the Aboriginal community reached agreement that the first creek terrace should be buried by fill to avoid any accidental damage during highway link construction.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project reached agreement that further
subsurface investigation of the first creek terrace is not warranted from an Aboriginal or archaeological perspective. It was agreed that further salvage would; however, be undertaken on the second creek terrace as part of a partial Section 90 Consent for the Black Creek RTA 2 site (refer to Section 4.4.3 for details).

Summary and Management Recommendations

Only three stone artefacts were identified during the excavation of PAD 20.

Further subsurface salvage in this area (first creek terrace) was not assessed as warranted from an Aboriginal or archaeological perspective; providing the terrace was buried with imported fill and not impacted by highway link construction; and that further subsurface excavation was carried on the second creek terrace and within the previously recorded Black Creek RTA 2 site.

PAD 20 will be incorporated into the previously recorded Black Creek RTA 2 site and a revised site card will be provided to the DEC along with an application for partial Section 90 Consent (collection, partial subsurface salvage and partial conservation).

4.5.7 Black Waterholes Creek PAD 11 (#37-6-1363)

The four test pits were excavated on the creek terrace and adjacent lower slope on the western side of Black Waterholes Creek approximately 5 metres from the creek (refer to Figure 2.7). Squares 3 and 4 were located closest to the creek on the creek terrace. The area is heavily disturbed and is located within, and adjacent to, an EnergyAustralia easement. In addition, the area has been heavily logged, grazed and is used as an illegal rubbish dumping area. During the excavation of this PAD and the associated Landform Testing (refer to Section 4.6.4) no artefacts were identified.

Square 1 was excavated for seven spits; to a depth of 35 cm. Charcoal samples were taken from spits 1, 3 and 5. No stone artefacts, ceramic, glass, metal or shell was identified (please note that Black Waterholes Creek PAD 11 Square 1 is the same square as Black Waterholes Creek Landform Testing Square 1 - refer to Section 4.6.4).

The excavation of square 2 was taken down twelve spits to a depth of 60 cm. Charcoal samples were taken from spits 4 and 12. No stone artefacts, ceramic, glass, metal or shell was identified.

Nineteen spits were excavated in square 3 down to a depth of 95 cm. Charcoal samples were taken for all spits between 3 and 10, and 15 and 19. No stone artefacts, ceramic, glass, metal or shell was identified.

Square 4 was excavated for 14 spits to a depth of 70 cm. Charcoal samples were only taken from spits 4 and 5. No stone artefacts, ceramic, glass, metal or shell was identified.

Discussion

No stone artefacts were identified during the excavations of Black Waterholes Creek PAD 11 or within associated Landform Testing excavations. The depth of deposit was deeper closest to the creek.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project reached agreement that as there was no cultural material located in the PAD there will be no further requirement for salvage in this area. The DEC will be requested to remove this PAD from the site register.
Summary and Management Recommendations

Although the heavily disturbed area was extensively tested, no artefactual evidence was identified.

Additional information will be supplied to the DEC for the PAD requesting it be removed from the site register.

No consent/permit will be required by RTA to commence work in this area.

4.5.8 Sawyers Gully PAD 12 (#37-6-1364)

The five test pits were excavated on a narrow alluvial terrace and gentle footslope at the confluence of a tributary and Sawyers Gully (refer to Figure 2.7). The squares were approximately 5 metres from Sawyers Gully. Squares 1, 1a and 2 were located closest to Sawyers Gully (approximately 5 metres) and on the creek terrace. Square 3 was also excavated on the creek terrace and Square 4 was excavated on the footslope. The area has been disturbed by tree clearance, bulldozing and grazing.

During the subsurface investigation, four surface artefacts were identified within the PAD area which had not been identified during the initial inspection. The artefacts had been exposed by ongoing erosion in the area.

Square 1 was excavated for six spits to a depth 30 cm. No cultural material was identified. The excavation of this test pit was halted before the clay horizon was encountered due to the presence of a large tree root. Square 1a was then opened up approximately 10 metres to the east of square 2 to ensure that the PAD was properly tested. The square was also excavated to a depth of 30 cm; however the clay horizon was encountered at this depth. Charcoal samples were taken from spit 4. No stone artefacts, ceramic, glass, metal or shell was identified.

Square 2 was excavated for eleven spits to a depth of 55 cm and to the clay. No stone artefacts, charcoal, ceramic, glass, metal or shell was identified.

Square 3 was excavated for fourteen spits to a depth of 70 cm. and it too yielded. No stone artefacts, charcoal, ceramic, glass, metal or shell was identified.

Square 4 was excavated for sixteen spits to a depth of 80 cm before reaching the clay. Charcoal samples were taken from spits 2, 5, 6 and 10-15. Stone artefacts were identified in all spits 1, 2, 4-6, 8 and 11-14. Twenty-two artefacts in total were excavated from this test pit, with the majority (10) removed from spits 4 – 6. Two pieces of metal were identified in spit 3. No ceramic, glass or shell was identified.

The twenty-two artefacts identified were manufactured from mudstone and silcrete, however the majority were silcrete. The assemblage included flakes and flaked pieces.

Discussion

Twenty-two stone artefacts were excavated from Square 4 of this PAD, the majority at a depth between 20 and 30 cm. Charcoal samples were obtained from this square but there is no evidence to indicate a direct relationship between the samples and the stone artefacts. A piece of metal was identified at a depth of approximately 15 cm. Indicative of past disturbance in the area.

As both surface and subsurface artefacts are now known for this area, a revised site card will be supplied to the DEC upgrading this location from a PAD to Sawyers Gully RTA 11.
On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project recognised that the PAD had been subject to high levels of disturbance and that the salvage already undertaken under Section 87 Permit #2096 was sufficient subsurface salvage for this area. It was agreed; that a Section 90 Consent (collection only) without any requirement for further subsurface salvage was adequate for this area, providing the four surface artefacts were collected and subsurface salvage was undertaken in the PAD14 area (refer to Section 4.5.10). This was also assessed as an appropriate management option from an archaeological perspective.

Summary and Management Recommendations

Four previously undetected artefacts were identified in this area and 22 artefacts were excavated from square 4.

Further subsurface testing is not assessed as warranted from an Aboriginal or archaeological perspective and an application will be made to the DEC for a Section 90 Consent (collection only) to collect the surface artefacts identified during the test pitting program.

Additional information will be supplied to the DEC upgrading this location from the previously identified PAD 12 to Sawyers Gully RTA 11.

4.5.9 Sawyers Gully PAD 13 (#37-6-1365)

The PAD is located on the lower slope on the western side of a tributary of Sawyers Gully and just upstream of its confluence with a second tributary (refer to Figure 2.7). Squares 3 and 4 are located closest to the creek. Relatively heavy disturbance has occurred in the area due to logging activities and subsequent erosion. The PAD is located approximately 50 metres west of the Sawyers Gully RTA 3 site. The surface artefacts were collected from Sawyers Gully RTA 3 under Section 90 Consent #2102.

**Square 1** was excavated for five spits to a depth of 25 cm. One stone artefact was identified in spit 4. No charcoal, ceramic, metal glass or shell was identified.

**Square 2** was excavated for four spits to a depth of 20 cm. Charcoal samples were taken from spit 3. No stone artefacts, ceramic, glass, metal or shell was located during this test pit excavation.

Four spits were excavated from **square 3** to a depth of 20 cm. Charcoal samples were taken from spits 3 and 4. Seven stone artefacts were also taken from spit 3. No ceramic, metal glass or shell was identified (please note that this test pit is also identified as Sawyers Gully landform testing square 1 - refer to Section 4.6.5).

**Square 4** was excavated for five spits to a depth of 25 cm. Fifteen stone artefacts were excavated with the major concentration (11) in spits 2 and 3. Charcoal samples were taken from spits 2, 3 and 4. No ceramic, metal glass or shell was identified.

Discussion

Twenty-three stone artefacts were identified during the excavations with the majority being identified in squares 3 and 4 in spits 2 and 3. Charcoal samples were obtained from both squares; however, there is no evidence to suggest a direct association with the excavated artefacts. The greatest depth of deposit within this PAD is 25 cm (square 4).
The two squares located closest to the creek yielded all but one of the artefacts excavated during the test pit excavations. It was also these squares (3 and 4) that had the greatest depth of deposit.

Prior disturbance in this general area due to logging and erosion indicate little integrity within the PAD. The location of the 22 artefacts in a subsurface context indicates that the PAD should be incorporated into the associated Sawyers Gully RTA 3 site. Surface artefacts were collected from this site under #Section 90 Consent 2102.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project recognised that the PAD 13 area had been subject to high levels of disturbance and that the salvage already undertaken under Section 87 Permit #2096 was sufficient subsurface salvage for this area, providing subsurface salvage was undertaken in the PAD 14 area (refer to Section 4.5.10). This was also assessed as an appropriate management option from an archaeological perspective.

Summary and Management Recommendations

Twenty-two artefacts were recovered from PAD 13. The location of artefacts in the PAD means that it requires upgrading to a site. Additional information will be supplied to the DEC incorporating PAD 13 into the previously identified site Sawyers Gully RTA 3 (previously collected under Section 90 Consent 2102).

Due to low artefact numbers and high levels of disturbance it was assessed that further subsurface salvage in the PAD 13 area was not warranted.

4.5.10 Sawyers Gully PAD 14 (#37-6-1366)

The site is located on a narrow alluvial terrace within a sharp meander bend on the northern bank of a tributary of Sawyers Gully (refer to Figure 2.7). The surrounding area has been heavily disturbed by recent bulldozing for tree clearance (to remove Casuarina regrowth) and grazing; however, the small narrow PAD area appeared relatively less disturbed than the adjacent floodplain deposits. The four squares were placed in a line 10 metres apart along the peninsula with square 1 located closest to the meander bend.

Square 1 was taken down two spits to a depth of 10 cm. The excavation located two stone artefacts within the spit 1. No charcoal, ceramic, metal glass or shell was identified.

Square 2 was excavated for three spits to a depth of 15 cm. Stone artefacts were identified from within the deposit of spits 1 and 2 with one located in spit 1 and one in spit 2. No charcoal ceramic, metal glass or shell was identified.

Four spits were excavated from square 3 to a depth of 20 cm. Stone artefacts were identified in all four spits with two in spit 1, one in spit 2, thirteen in spit 3 and four in spit 4. No charcoal ceramic, metal glass or shell was identified.

The excavation of square 4 was taken to a depth of 15 cm. Charcoal samples were taken from spits 2 and 3. Stone artefacts were recovered from the deposit in all three spits. One stone artefact was identified in spit 1, sixty-five in spit 2 and forty-two in spit 3. No ceramic, glass, metal or shell was identified during the test pit excavations.

The flakes, flaked pieces and retouched flake identified from these excavations were manufactured from mudstone and silcrete; with silcrete the dominant raw material.
Discussion

A total of 132 stone artefacts were identified in Sawyers Gully PAD 14 in an extremely shallow alluvial deposit. The majority (108) of these were identified in spits 2 and 3 of square 4. Charcoal samples were also taken from these spits but there is no evidence to suggest a direct relationship between the samples taken and the stone artefacts identified.

Square 4 was located at the point where the narrow peninsula adjoined the broader floodplain area. From the shallowness of the soil profile it appears that although the narrow peninsula was not impacted by the most recent bulldozing activities, it has been subject to a general loss of topsoil (alluvial deposit) most likely related to earlier episodes of tree clearance.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project agreed that although the soil profile in the PAD 14 area is highly disturbed and unlikely to retain any stratigraphic integrity; the large number of artefacts located in square 4 suggests that a relatively complex assemblage may be collected by undertaking a broad area excavation in this area. As there is currently very little known about the Aboriginal occupation of the Sawyers Gully area further salvage under Section 90 consent is thought warranted from an archaeological perspective.

Due to the location of artefacts in PAD 14 it will be incorporated into the adjacent Sawyers Gully RTA 6 site. The surface artefacts in the Sawyers Gully RTA 6 site have been collected under Section 90 Consent #2102.

Summary and Management Recommendations

A total of 132 artefacts were identified during the subsurface testing of the PAD. An application will be made to the DEC for a Section 90 Consent (subsurface salvage) to undertake a broad area manual excavation in this area.

For comparability it proposed to apply for Section 90 consent to excavate a 5 metre x 5 metre square as proposed for most other manual excavations to be undertaken as Stage 3 (Task 6) of the F3 to Branxton salvage.

Additional information will be supplied to the DEC incorporating PAD 14 into the previously identified site Sawyers Gully RTA 6.

4.5.11 Surveyors Creek PAD 3 (#38-4-0823)

The four test pit excavations were conducted on a broad, low spur crest approximately 250 metres from Surveyors Creek. A small tributary of Surveyors Creek runs either side of the spur crest (refer to Figure 2.4). The area had been disturbed by bulldozing to clear trees and has been subject to subsequent bulldozing to remove scrubby regrowth, limiting its potential for intact archaeological deposits. The PAD was investigated at the request of the Aboriginal groups who (rightly) identified this as a likely area for a camp site.

Square 1 was excavated to a depth of 15 cm with a charcoal sample taken from spit 3. No stone artefacts, ceramic, glass, metal or shell was identified during the test pit excavation.

Square 2 was excavated for four spits to a depth of 20 cm. Charcoal samples were taken from pit 3. No stone artefacts, ceramic, glass, metal or shell was identified during the test pit excavation.
Square 3 was excavated for three spits to a depth of 15 cm. No stone artefacts, charcoal, ceramic, glass, metal or shell was identified during the test pit excavation.

Square 4 was excavated to a depth of 20 cm. No stone artefacts, charcoal, ceramic, glass, metal or shell was identified during the test pit excavation.

No stone artefacts were identified during the test pit excavations of Surveyors Creek PAD 3.

Discussion

Since the area had been disturbed by bulldozing to clear trees and scrubby regrowth it was expected that this location would not provide intact archaeological deposits. This prediction was borne out by the results of the test pitting program carried out in this area. It is recognised; however, that the topsoil removed during bulldozing operations may well have contained artefactual material.

In line with discussions with the Aboriginal group representatives it was agreed that due to the lack of artefactual material identified the PAD should be removed from the site register. Additional information will be supplied to the DEC for this location.

Summary and Management Recommendations

No stone artefacts were identified during the excavation of this PAD 3. Due to the lack of artefactual material identified it is recommended that the PAD be removed from the DEC site register.

Additional information will be supplied to the DEC for this location. No further archaeological investigation is required.

4.5.12 Surveyors Creek PAD 4 (#38-4-0824)

The four test pit excavations were conducted on a broad, low spur crest approximately 150 metres from Surveyors Creek (refer to Figure 2.4). The spur slopes gently to the southwest and down to Surveyors Creek. The area has been disturbed by bulldozing to clear trees and then scrubby regrowth, limiting its potential for intact archaeological deposits. The area was subsurface tested at the request of the Aboriginal groups as it was recognised that the area was a likely camp site location.

Square 1 was excavated seven spits to a depth of 35 cm with no cultural material identified.

Square 2 was excavated five spits to a depth of 25 cm. One stone artefact was identified in spit 1. No charcoal, ceramic, glass, metal or shell was identified during the test pit excavation.

Square 3 was excavated four spits to a depth of 20 cm with no cultural material identified.

Square 4 was excavated 10 spits to a depth of 50 cm with no cultural material identified.

The one artefact identified was a heat affected mudstone flake.

Discussion

One artefact was identified in spit one of square 2. No other associated cultural material was identified. Although the area could be considered to have been a well drained campsite it is likely than any artefactual material was removed by prior bulldozing activities.
On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project agreed that no further salvage was required for this PAD.

The identification of one artefact means that the PAD will be upgraded to a site - Surveyors Creek RTA 9 IF. Information in relation to the new site will be forwarded to the DEC along with a Section 90 Consent application (no further salvage) so that the RTA may commence highway link construction in this area.

**Summary and Management Recommendations**

One artefact has been identified and collected during the subsurface testing of the PAD.

The PAD will be upgraded to a site and renamed Surveyors Creek RTA 9 IF.

An application will be made to DEC for a Section 90 Consent (no further salvage).

No further archaeological investigation is required.

### 4.5.13 Surveyors Creek PAD 5 (#38-4-0825)

The four test pits were excavated on the lower slope on the southern side of Surveyors Creek. The area is subject to the deposition of colluvium from the slope above and alluvium from flood events. There has been considerable disturbance from logging and the area is unlikely to have retained any archaeological integrity.

**Square 1** was excavated for eight spits to a depth of 40 cm. Charcoal samples were taken from spits 3, 5 and 6. Four stone artefacts were identified with two located in spit 1, one in spit 2 and one in spit 3. No ceramic, glass, metal or shell was identified during the test pit excavation.

Seven spits were excavated in **square 2** to a depth of 35 cm. Spits 1-3 each contained one stone artefact. No charcoal, ceramic, glass, metal or shell was identified during the test pit excavation.

**Square 3** was excavated for seven spits to a depth of 35 cm. Of the fifteen stone artefacts located during the excavation of this square, nine were from spit 1, five from spit 2 and one from spit 3. No charcoal, ceramic, glass, metal or shell was identified during the test pit excavation (please note that this square was also Surveyors Creek Landform Testing square 1 - refer to **Section 4.6.6**).

**Square 4** was excavated to a depth of 50 cm. One stone artefact was located in spit 1. No charcoal, ceramic, glass, metal or shell was identified during the test pit excavation.

The artefacts consisted of flakes, broken flakes and flaked pieces, some heat affected. The artefacts were manufactured from mudstone and silcrete

**Discussion**

A total of 23 stone artefacts were identified during the excavation of this PAD. The majority (15) of these were identified in spits 1 to 3 in square 3. Charcoal samples were only taken from square 1. There is no evidence to suggest a direct relationship between the artefacts collected and the charcoal samples taken. No ceramic, glass, metal or shell was identified in any of the squares.
On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project determined that further salvage was required in this area due to the relatively high number of artefacts located in an area where very little is known about Aboriginal occupation.

From an archaeological perspective the site has relatively high research potential, in that a broad area excavation would provide a larger assemblage which will assist with answering the research questions posed in relation to raw material distributions and tribal boundaries in the area (Umwelt 2005b). Thus further subsurface salvage is thought warranted for this PAD. Full details of the proposed salvage, including rationale and methodology will be provided in the Research Design and Methodology to be forwarded to the DEC along with the Section 90 Consent application (Umwelt in prep.).

The location of the artefacts in the PAD means that it will be upgraded to a site (Surveyors Creek RTA 10).

**Summary and Management Recommendations**

A total of 23 artefacts have been identified and collected during the subsurface testing of Surveyors Creek PAD 5.

An application will be made to the DEC for a Section 90 Consent (subsurface salvage). The further subsurface salvage proposed is a 5 metre by 5 metre broad area excavation.

A revised site card will be forwarded to the DEC upgrading the PAD to a site (Surveyors Creek RTA 10).

**4.5.14 Surveyors Creek PAD 6 (#38-4-0826)**

The four test pits were excavated on the lower slope 5 metres to the west of a northerly flowing tributary of Surveyors Creek and 70 metres to the south of the confluence of two tributaries (refer to Figure 2.3). Squares 1 and 3 were located closest to the creek. There has been some disturbance from logging; however, the area is assessed as relatively undisturbed in relation to other areas in the Surveyors Creek catchment.

Eighteen spits were excavated from square 1 to a depth of 90 cm with no cultural material identified.

Square 2 was excavated for nineteen spits to a depth of 95 cm. Four stone artefacts were identified with one located in each of the following spits: 5, 13, 15 and 17. Charcoal samples were taken from spits 7, 9 and 15-19. No ceramic, glass, metal or shell was identified during the test pit excavation.

Thirteen spits were excavated from square 3 to a depth of 65 cm. Eight stone artefacts were identified in spits 1, 6, 10 and 13. One was found in each spit except for spit 13 where five were identified. A charcoal sample was taken from spit 7. No ceramic, glass, metal or shell was identified during the test pit excavation.

The excavation of square 4 was excavated for eight spits to a depth of 40 cm. No cultural material was identified.

The assemblage includes silcrete and mudstone flakes and flaked pieces; however the majority were manufactured from silcrete.
Discussion

A total of 12 stone artefacts were excavated from Surveyors Creek PAD 6, eight in square 3 and four in square 2. Charcoal samples were taken from squares 2 and 3 but there is no evidence to suggest a direct relationship between the samples and the stone artefacts collected.

The location of artefacts in the PAD means that it will be upgraded to a site (Surveyors Creek RTA 11).

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project determined that further salvage was not required in this area providing further subsurface salvage is undertaken in the PAD 5 area. From an archaeological perspective the site has relatively less research potential than PAD 5, due to the smaller assemblage located during the subsurface testing. Thus, further subsurface salvage is not thought warranted for this PAD, as long as PAD 5 is subject to further investigation. Therefore, Section 90 Consent without further salvage is proposed for this PAD.

Summary and Management Recommendations

Artefacts have been identified and collected during the subsurface testing of the PAD.

Additional information will be provided to the DEC renaming PAD 6 as Surveyors Creek RTA 11.

An application will be made to DEC for a Section 90 Consent (no further salvage) on the understanding that PAD 5 will be subject to further subsurface salvage.

4.5.15 Swamp Creek PAD 9 (#37-6-1362)

The four test pits were excavated on a flat, high terrace on the western side of Swamp Creek (refer to Figure 2.5). Squares 2 and 4 were located closest to the creek at a distance of approximately 250 metres. There has been some disturbance to the area from the clearing of trees and grazing; however, it was assessed that there was sufficient depth of topsoil that there may be artefacts below the disturbance zone.

Square 1 was excavated for ten spits to a depth of 50 cm. One stone artefact was identified in spit 7. Charcoal samples were taken from spits 7-9. Three pieces of glass were excavated from spit 2 and fourteen pieces of metal were identified in spits 3-6. In spit 3, three pieces of shell were identified. No ceramic material was recovered from the excavation.

Nine spits were excavated from square 2 to a depth of 45 cm. Charcoal samples were taken from spits 1 and 3-8. One piece of metal was located in spit 3. No stone artefacts, ceramic, glass or shell was identified during the test pit excavation.

The excavation of square 3 was excavated for seven spits to a depth of 35 cm. Charcoal samples were taken from spit 3. No stone artefacts, ceramic, glass, metal or shell was identified during the test pit excavation.

Square 4 was excavated for nine spits to a depth of 45 cm. Within spit 2, two ceramic, one glass and two metal pieces were located. Charcoal samples were taken from spits 3, 4 and 8. No stone artefacts or shell was identified within the excavation.

The one artefact identified is a mudstone flake.
Discussion

Only one stone artefact was identified during the test pit excavations at this location. This was identified in spit 7 of square 1. Ceramic and glass material was quite common in squares 1 and 4 suggesting a high level of disturbance in the area. Three shell fragments located in Spit 3 of square 1 were associated with modern material and 20 cm above the only stone artefact located.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project determined that further no salvage was required for Swamp Creek PAD 9 due to the very low number of artefacts and the highly disturbed nature of the area. For similar reasons no further salvage is required from an archaeological perspective. Thus it is proposed that an application will be made to the DEC for a Section 90 Consent without further salvage as no further investigation is warranted for the PAD.

Summary and Management Recommendations

One artefact was identified and collected during the subsurface testing of Swamp Creek PAD 9.

Additional information will be supplied to the DEC renaming this location as Swamp Creek RTA 5 IF.

An application will be made to the DEC for a Section 90 Consent (no further salvage) as no further investigation is warranted for the PAD.

4.5.16 Wallis Creek PAD 1 (#38-4-0821)

The four test pits were excavated on a creek terrace on the western side of a tributary of Wallis Creek. Squares 2 and 4 are located closest to the creek at a distance of approximately 10 metres. There has been some disturbance from the clearing of trees, cultivation and grazing. A permanent spring was located adjacent to the terrace.

Square 1 was excavated for twenty spits to a depth of 100 cm. One stone artefact was identified in spit 17. A charcoal sample was taken from spit 4. No ceramic, glass, metal or shell was identified during the test pit excavation.

Twenty-one spits were excavated from square 2 to a depth of 105 cm. Charcoal samples were taken from spit 6, 7, 9, 10 and 11. No stone artefacts, ceramic, glass, or shell was identified during the test pit excavation.

The excavation of square 3 was excavated for sixteen spits to a depth of 80 cm. One stone artefact was identified in spit 4. Charcoal samples were taken from spit 3. No ceramic, glass, metal or shell was identified during the test pit excavation.

Square 4 was excavated for eighteen spits to a depth of 90 cm with charcoal absent from the excavated sediment of all spits. No stone artefacts, ceramic, glass, metal or shell was identified during the test pit excavation.

The two artefacts include a mudstone flaked piece from Square 1 and a silcrete flaked piece from Square 3.
Discussion

Two flaked pieces were excavated from Wallis Creek PAD 1. It is assessed that these small artefacts are likely to have washed into the area and been deposited during a flood event. The excavations did not reach the clay. They were not excavated any deeper than 105 cm due to the lack of cultural material and the high moisture content of the alluvium.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project determined that further salvage was not required in this area due to the very small number of artefacts which are most likely not in situ.

From an archaeological perspective the site has no research potential, thus further subsurface salvage is not thought warranted.

A Section 90 Consent (no further salvage) is proposed for Wallis Creek PAD 1.

Summary and Management Recommendations

Only two artefacts, assessed as washed into the PAD area, were located during the subsurface testing of Wallis Creek PAD 1.

Due to the location of artefacts in the PAD it will be upgraded to a site (Wallis Creek RTA 4).

An application will be made to DEC for a Section 90 Consent (no further salvage).

No further investigation of the PAD is warranted.

4.5.17 Wallis Creek PAD 2 (#38-4-0822)

The four test pits were excavated on the eastern side of a bedrock controlled spur which runs along the centre of the Wallis Creek floodplain and on the western side of the present channel of Wallis Creek (refer to Figure 2.4). Squares 2 and 4 were located closest to Wallis Creek at a distance of approximately 400 metres. There has been some disturbance to this area from the clearing of trees and grazing.

Square 1 was excavated for three spits to a depth of 15 cm. Fifty-eight stone artefacts were identified including: seventeen from spit 1; twenty from spit 2; and twenty-one from spit 3. No charcoal, ceramic, glass, metal or shell was identified during the test pit excavation.

Four spits were excavated from square 2 to a depth of 20 cm. Charcoal samples were taken from spit 4. Of the twenty-four stone artefacts located during the excavation of this square, five were in spit 1, six in spit 2, one in spit 3 and twelve in spit 4. No ceramic, glass, metal or shell was identified during the test pit excavation.

Three spits were excavated from square 3 to a depth of 15 cm. Fourteen artefacts were identified with: two in spit 1; five in spit 2; and seven in spit 3. Charcoal samples were taken from spit 2. No ceramic, glass, metal or shell was identified during the test pit excavation.

Square 4 was excavated for four spits to a depth of 20 cm. Forty-eight stone artefacts were identified including: three in spit 1; sixteen in spit 2; twenty-seven in spit 3; and two in spit 4. No charcoal, ceramic, glass, metal or shell was identified during the test pit excavation.
Discussion

A total of 140 stone artefacts were excavated from the four test pits in Wallis Creek PAD 2. Squares 1 and 4 contained the majority of stone artefacts. No charcoal samples were taken from squares 1 or 4. The deposit was only 20 cm deep with the majority of artefacts located within spit 3.

The extremely large number of artefacts was not surprising as the PAD is located in an area that would have been very rich in food resources. The spur provided a high, dry, camp site in an area that appears to have been very swampy before being infilled with sand following European land clearance upstream. The height of the spur may have provided respite from mosquitoes.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project determined that further salvage was necessary in the Wallis Creek PAD 2 area due to the very high number of artefacts located during the test pit excavations. From an archaeological perspective, though the soil profile is shallow and disturbed, the area has the potential to provide a large and complex assemblage that will assist with answering the research questions proposed in the Research Design and Methodology for salvage program (Umwelt 2005b).

Moving the route alignment would not assist as it would simply mean impacting on another section of what is likely to be a site that extends along the top of the length of the spur. Thus a 5 metre by 5 metre manual excavation is proposed for the impact area. It is also proposed to have RTA temporarily demarcate the route alignment so that sections of the site outside their impact area are not damaged during highway link construction.

As the site is assessed as extending outside the route alignment only a partial Section 90 (partial salvage and partial conservation) is proposed.

Summary and Management Recommendations

A total of 140 artefacts have been identified and collected during the subsurface testing of Wallis Creek PAD 2.

Additional information will be supplied to the DEC upgrading the PAD to a site (Wallis Creek RTA 6).

An application will be made to DEC for a partial Section 90 Consent (partial subsurface salvage and partial conservation).

Full details of the methodology proposed for the excavation will be supplied to the DEC with the Research Design and Methodology that accompanies the Section 90 application (Umwelt in prep.).

4.5.18 Wallis Creek PAD 7 (#38-4-0827)

The PAD is located on a bench at the base of the lower slope and above a short steep sandstone cliff that drops away to the area of Wallis Creek PAD 1 (refer to Section 4.5.16 and Figure 2.5). The area has been cleared and grazed and is lightly disturbed.

Square 1 was excavated for six spits to a depth of 30 cm with charcoal samples taken from spits 5 and 6. Fifteen stone artefacts were identified: thirteen in spit 4; and two in spit 5. No ceramic, glass, metal or shell was identified during the test pit excavation.
Square 2 was excavated for five spits to a depth of 25 cm. Charcoal samples were taken from spit 1. Thirteen stone artefacts were excavated including: two in spit 1; five in spit 2; four in spit 3; and two in spit 4. No ceramic, glass, metal or shell was identified during the test pit excavation.

Eight spits were excavated in square 3 to a depth of 40 cm. Thirty-one stone artefacts were excavated including: eight in spit 2; seven in spit 3; ten in spit 4; three in spit 5; and 3 in spit 6. Charcoal samples were taken from spits 4-8. No ceramic, glass, metal or shell was identified during the test pit excavation.

Square 4 was excavated for six spits to a depth of 30 cm with charcoal absent from the excavated sediment of all spits. Stone artefacts were excavated from all spits including: three from spit 1; sixty from spit 2; forty-seven from spit 3; one hundred and thirty-one from spit 4; seventy-eight from spit 5; and thirty-one from spit 6. No ceramic, glass, metal or shell was identified during the test pit excavation.

The assemblage is manufactured from mudstone and silcrete and includes retouched flakes, flakes and flaked pieces.

Discussion

Wallis Creek PAD 7 had the highest concentration of artefacts excavated during the salvage program with 409 artefacts excavated from the four test pits. The largest depth of deposit was 40 cm which was excavated from square 3. A total of 350 of the artefacts were identified in the six spits excavated from square 4. There was no associated charcoal, ceramic, glass, metal or shell identified during the excavations.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project determined that further salvage was not appropriate for this PAD if it was possible for it to be conserved.

Discussions with the RTA indicate that it is possible for the entire landform on which the PAD sits to be conserved. Thus there will be no Section 90 application required.

The location of artefacts in the site indicates that it must be upgraded to a site. The PAD will be renamed Wallis Creek RTA 5 and a revised site card forwarded to the DEC.

Summary and Management Recommendations

A total of 409 artefacts have been identified and collected during the subsurface testing of Wallis Creek PAD 7.

Additional information will be provided to the DEC and the PAD will be renamed Wallis Creek RTA 5.

The RTA will construct a temporary fence to protect the site area during construction of the highway link to ensure its conservation.

4.5.19 Wallis Creek PAD 8 (#38-4-0828)

Wallis Creek PAD 8 extends across a lower, mid and upper slope and ridge crest. The four test pit excavations were carried out on the upper slope north of the area recorded as Wallis Creek RTA 2 (refer to Section 4.4.4 and Figure 2.5). The area excavated had partial disturbance from tree clearing and erosion. The remainder of the PAD area was subsurface tested as part of the Wallis Creek Landform Testing (refer to Section 4.6.8 - please note that Wallis Creek PAD 8 Square 1 is also identified as Wallis Creek Landform Testing Square 2).
Square 1 was excavated for nine spits to a depth of 45 cm. One stone artefact was identified in spit 7. Charcoal samples were taken from spits 6-8. No ceramic, glass, metal or shell was identified during the test pit excavation.

Nine spits were excavated from square 2 to a depth of 45 cm. Charcoal samples were taken from spit 2. One stone artefact was located in spit 2 during the excavation of this square. No ceramic, glass, metal or shell was identified during the test pit excavation.

The excavation of square 3 was taken down six spits to a depth of 30 cm. One stone artefact was identified in spit 3. Charcoal samples were taken from spit 4. No ceramic, glass, metal or shell was identified during the test pit excavation.

Square 4 was excavated for eight spits to a depth of 40 cm. Charcoal samples were taken from spit 4. No stone artefacts, ceramic, glass, metal or shell was identified during the test pit excavation.

The assemblage includes a silcrete broken flake in square 1, a silcrete flake in square 2 and a quartz flaked piece in square 3.

Discussion

Three artefacts were identified during the test pit excavations of Wallis Creek PAD 8. Charcoal samples were taken from all squares but there is no evidence to suggest any relationship between the samples and the artefacts collected. No ceramic, glass, metal or shell was identified during the excavations. The greatest depth of deposit was 45 cm in both squares 1 and 2.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project determined that no further subsurface investigation was required for PAD 8 based on the results of the subsurface investigation of the PAD and the associated site and Landform Testing. This was providing that the surface artefacts in Wallis Creek RTA 2 are collected, Wallis Creek PAD 7 is conserved, Wallis Creek PAD 2 is subject to further salvage and provided that the route alignment in the Wallis Creek RTA 2 area was temporarily fenced to avoid impact to the site area outside the alignment.

From an archaeological perspective the low number of subsurface artefacts and high levels of disturbance indicate that no further subsurface salvage is required for this PAD.

Additional information will be provided to DEC incorporating this PAD and the Wallis Creek Landform Testing area into the previously recorded site, Wallis Creek RTA 2.

Summary and Management Recommendations

Three artefacts have been identified and collected during the subsurface testing of Wallis Creek PAD 8.

The PAD will be incorporated into the Wallis Creek RTA 2 site.

An application will be made to the DEC for a Section 90 Consent (partial salvage and partial conservation) to collect surface artefacts within the broader Wallis Creek RTA 2 site.

Detailed results of the subsurface testing undertaken under Section 87 Permit #2096 will be provided in the final report prepared for the DEC following the Stage 3 salvage.
4.6 STAGE 3 LANDFORM TESTING

A total of nine landform units were subsurface tested across nine different creek catchments along the F3 to Branxton route alignment. The catchments and the areas subject to subsurface testing are indicated on Figures 2.3 to 2.10. The landform units tested included test pits in areas that generally extended from the banks of the creek to the ridge crest. The test pits were one metre square and located at 50 metre intervals (approximately). The landform testing was undertaken at the request of the Aboriginal groups involved in the project. The areas tested were those that the Aboriginal groups identified as requiring monitoring during initial ground disturbing works. As RTA wanted to avoid the problems arising from monitoring (having to stand down construction crews at huge expense when artefacts are located during monitoring) it was agreed to undertake the Landform Testing program to assess the real potential of the areas to contain artefacts in a subsurface context.

In some areas the Landform Testing squares fell in the same area as squares excavated for sites and/or PADs and incorporated these excavation squares, rather than excavating further squares in these areas.

4.6.1 Anvil Creek Landform Testing

The Anvil Creek Landform Testing incorporated test pits on the floodplain/creek terrace, lower, mid and upper slopes and the spur crest associated with a tributary of Anvil Creek in the Greta area (refer to Figure 2.8). The Landform Testing area has been disturbed by tree clearing, erosion and grazing. The six test pits began within Anvil Creek PAD 16 and on the opposite side of the tributary to the Anvil Creek RTA 3 site (refer to Sections 4.4.1 and 4.5.1).

**Square 1** was located on the small creek terrace/floodplain of the tributary and was excavated for five spits to a depth of 25 cm. Charcoal samples were only taken from spit 3. Sixteen stone artefacts were identified in spits 3 (ten) and 4 (six). No ceramic glass, metal or shell was excavated from this square (please note Anvil Creek Landform Testing square 1 is the same square as Anvil Creek PAD 16 square 4).

Four spits were excavated in **square 2** to a depth of 20 cm. Square 2 was used to test the lower slope landform element and was located approximately 50 metres from the tributary and within the F3 route alignment footprint. A total of nine stone artefacts were excavated from the deposit: one in spit 2; three in spit 3; and five in spit 4. Charcoal samples were taken from spits 2-4. No ceramic glass, metal or shell was excavated from this square.

The excavation of **square 3**, located on the midslope approximately 100 metres from the tributary, was taken down four spits to a depth of 20 cm. One stone artefact was located in spit 4 and charcoal samples were taken from spits 2 and 4. No ceramic glass, metal or shell was excavated from this square.

**Square 4** had four spits excavated to a depth of 20 cm. It was also located on the midslope and was excavated approximately 150 metres from the tributary. One stone artefact was identified in both spits 3 and 4. Charcoal samples were taken from spit 4. No ceramic glass, metal or shell was excavated from this square.

The excavation of **square 5** was shallow with only 10 cm of deposit removed. However, four artefacts were identified with one in spit 1 and three in spit 2. No charcoal, ceramic glass, metal or shell was excavated from this square. Square 5 was used to test the upper slope landform element and was located approximately 200 metres from Anvil Creek.
Four spits were excavated in square 6 to a depth of 20 cm. This test pit excavation was located on the spur crest approximately 250 metres south-west of the tributary. No stone artefacts, charcoal, ceramic, glass, metal or shell was excavated from this square.

The artefacts were manufactured from silcrete and mudstone and included a mudstone retouched flake, a silcrete core and flakes and flaked pieces produced predominantly from silcrete.

**Discussion**

Thirty-two stone artefacts were excavated from the six landform testing squares; however, 16 of these were identified within square 1, the square also excavated as Anvil Creek PAD 16 square 4. Charcoal samples were taken from squares 1, 2, 3 and 4, with samples taken from within the same square as the majority of artefacts but there is no evidence to suggest a direct relationship between these samples and the stone artefacts salvaged.

There are two concentrations of artefacts, one on the creek terrace and lower slope (highest density) and then another on the mid and upper slope (medium density). The depth of deposit is largely uniform except for on the upper slope where the depth of deposit was only 10 cm in square 5. The artefact density pattern could be indicative of two separate but related areas of utilisation with the mid and upper slope area being used less frequently than areas close to the creek (e.g. during times of creek flooding). Additionally, erosion would have caused the downslope movement of topsoil from the upper and mid slopes towards the creek, therefore creating higher artefact densities on the lower slope and creek terrace.

The location of artefacts on the creek terrace and slopes associated with the tributary indicates that the previously recorded Anvil Creek RTA 3 site extends to both sides of the tributary and incorporates the adjoining slopes to the south-east. A revised site card will be forwarded to the DEC incorporating this information.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project identified the PAD 16 area on the south-eastern side of the creek as the area they would like to see subject to further salvage. A similar conclusion was reached from an archaeological perspective due to its less disturbed nature and potential to provide a complex artefact assemblage for analysis.

As the RTA will be required to construct a culvert within the creek, the PAD 16 area in line with this culvert will be the area proposed for further salvage. A 5 metre by 5 metre manual excavation is proposed. In relation to the broader Anvil Creek RTA 3 site, it is proposed to collect the surface artefacts on the north-western side of the tributary and have RTA bury the area within 60 metres either side of the creek (within their area of impact) to protect this area of the site which has the potential for the greatest subsurface artefact density. The route alignment in this area will be temporarily fenced to prevent accidental damage during the construction period to areas of the site outside the route alignment.

It is proposed to apply to the DEC for partial Section 90 Consent (collection, partial subsurface salvage and partial conservation) of the Anvil Creek 3 site area (incorporating part of the Landform Testing area and PAD 16). The salvage will include the collection of surface artefacts and the subsurface salvage of a 5 metre by 5 metre area of PAD 16.

**Summary and Management Recommendations**

The Anvil Creek Landform Testing located a total of 32 artefacts, the majority of which were located within the creek terrace/lower slope landform unit (previously recorded as PAD 16).
It is proposed to apply to the DEC for partial salvage and partial conservation of the Anvil Creek 3 site area (incorporating part of the Landform Testing area and PAD 16).

Additional site information will be provided to the DEC to incorporate the landform testing area and Anvil PAD 16 into the site Anvil Creek RTA 3.

4.6.2 Bishops Creek Landform Testing

The Bishops Creek Landform Testing was conducted to test the creek terrace, lower, mid and upper slopes and the spur crest associated with Bishops Creek (refer to Figure 2.8). The area has been disturbed by logging and bulldozing in the past. The twenty test pits commenced on the creek terrace and within Bishops Creek PAD 15.

**Square 1**, located on the creek terrace, was excavated to a depth of 25 cm. No stone artefacts or other cultural material was identified within this test pit excavation (please note that Bishops Creek Landform Testing square 1 is the same square as Bishops Creek PAD 15 square 1 - Section 4.5.5). No ceramic, metal, glass or shell was identified within the test pit excavation.

The excavation of **square 2** was carried out to a depth of 20 cm. It was situated on the creek terrace approximately 50 metres from Bishops Creek. Five stone artefacts were identified in spit 4 and charcoal samples were taken from the first four spits. No ceramic, metal, glass or shell was identified within the test pit excavation.

Seven spits were excavated in **square 3** to a depth of 35 cm. One stone artefact was identified in spit 4 and one in spit 6. This test pit was excavated on the creek terrace approximately 100 metres from Bishops Creek. Charcoal samples were taken from spit 5. No ceramic, metal, glass or shell was identified within the test pit excavation.

**Square 4** was located on the creek terrace approximately 150 metres from Bishops Creek, and was excavated for six spits to a depth of 30 cm. No stone artefacts or other cultural material was identified within this test pit excavation.

The excavation of **square 5** yielded no stone artefacts or other cultural material. The test pit was excavated for seven spits to a depth of 35 cm, on the creek terrace approximately 200 metres from Bishops Creek.

**Square 6** could be excavated to a depth of 10 cm. No stone artefacts or other cultural material was identified. It was the last test pit excavated on the creek terrace and was situated approximately 250 metres from Bishops Creek.

Three spits were excavated in **square 7** to a depth of 15 cm. Charcoal was present in all three spits. No stone artefacts or other cultural material was identified. This square was excavated on the lower slope approximately 300 metres from Bishops Creek.

**Square 8** was excavated for three spits to a depth of 15 cm. Charcoal samples were recovered from spit 3. No stone artefacts or other cultural material was identified. The test pit was excavated on the lower slope approximately 350 metres from Bishops Creek.

Three spits were excavated in **square 9**. No stone artefacts or other cultural material was identified. The test pit was located on the lower slope approximately 400 metres from Bishops Creek.
Square 10 was excavated for two spits to a depth of 10 cm. No stone artefacts or other cultural material was identified. This square was the last excavated on the lower slope and was located approximately 450 metres from Bishops Creek.

Four spits were excavated from square 11 with charcoal samples taken from spit 2. No stone artefacts or other cultural material was identified. This test pit was the first square excavated on the mid slope approximately 500 metres from Bishops Creek.

Three spits were excavated in both square 12 and square 13 to a depth of 15 cm. No stone artefacts, ceramic, glass, metal charcoal or shell was identified in either square. Both squares were excavated on the mid slope, approximately 550 metres and 600 metres respectively from Bishops Creek.

Square 14 had only one spit (5 cm) removed before the clay was reached. A charcoal sample was taken from this spit. No other cultural material was identified. This square was on the mid slope and was located approximately 650 metres from Bishops Creek.

Two spits were excavated in square 15 to a depth of 10 cm. A charcoal sample was taken from spit one. No stone artefacts or other cultural material was identified during the excavation. The test pit was located approximately 700 metres from Bishops Creek on the mid slope.

Square 16 was excavated for two spits to a depth of 10 cm. No stone artefacts or other cultural material was identified. The square was located on the upper slope approximately 750 metres from Bishops Creek.

Three spits were excavated in square 17 and square 18 to a depth of 15 cm. No stone artefacts or other cultural material was identified. Both squares were excavated on the upper slope, approximately 800 metres and 850 metres respectively from Bishops Creek.

Square 19 and square 20 were excavated for two spits to a depth of 10 cm. No stone artefacts or other cultural material was identified. Both squares were excavated on the spur crest, approximately 900 metres and 950 metres respectively away from Bishops Creek.

Artefacts were manufactured from mudstone, silcrete and quartz, with the majority being silcrete. Artefacts types include flakes and flaked pieces.

Discussion

None of the excavated squares contained any ceramic, glass, metal or shell. Only two of the excavated squares contained stone artefacts. Five stone artefacts were excavated from square 2, spit 4 and two stone artefacts were excavated from square 3 also in spit four. Therefore, artefacts were only found on the creek terrace associated with Bishops Creek and no artefacts were excavated on the lower, mid and upper slopes and the spur crest.

The majority of the squares were only excavated to a depth of 15 cm due to the shallow depth of the topsoil.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project concluded that no further subsurface salvage was warranted in this area due to low artefact numbers and the heavily disturbed nature of the soil profile. It was also assessed that no further subsurface investigation was warranted from an archaeological perspective for the same reasons.
Summary and Management Recommendations

Only five stone artefacts were identified from the 20 test pits and all artefacts recovered were within the creek terrace landform unit.

An application will be made to DEC for a Section 90 Consent (no further salvage) on the understanding that the artefacts identified during the excavation have already been collected. No further salvage is required.

Additional site card information will be supplied to the DEC incorporating the results of the Landform Testing into a new site Bishops Creek RTA 10.

4.6.3 Black Creek Landform Testing

The Black Creek landform testing was conducted to test the landform elements of the second and third creek terrace and lower slope associated with Black Creek (refer to Figure 2.10). All of the area tested has been subject to tree clearance, cultivation and grazing. The seven test pits began on the second creek terrace 550 metres west of Black Creek. The areas closer to the creek had previously intensively subsurface tested (the first creek terrace was tested as part of Black Creek PAD 20 - refer to Section 4.5.6 and the area of second creek terrace closer to the creek was tested as part of the Black Creek RTA 2 site - refer Section 4.4.2).

Square 1 was excavated for six spits to a depth of 30 cm with no cultural material identified. The first landform testing square was located approximately 550 metres from Black Creek on the second creek terrace.

The excavation of square 2 was taken down two spits to a depth of 10 cm. It was located on the second creek terrace approximately 600 metres from Black Creek. One piece of ceramic material and four pieces of glass were identified in spit 1. No stone artefacts, charcoal, metal or shell was identified.

Two spits were excavated in square 3 to a depth of 10 cm. Square 3 was excavated on the third creek terrace approximately 650 metres from Black Creek. Three stone artefacts and eight pieces of glass were identified in spit 2. Charcoal samples were taken from both spits. No ceramic, metal or shell was identified.

Squares 4 and 5 were both taken down two spits to a depth of 10 cm with no artefactual or cultural material identified. Both squares were excavated on the third creek terrace, 700 metres and 750 metres respectively from Black Creek.

Square 6 was excavated to a depth of 15 cm and square 7 to 5 cm with no artefactual or cultural material identified. Squares 6 and 7 are both located on the lower slope approximately 800 metres and 850 metres respectively from Black Creek.

The artefacts identified include one quartz flaked piece and two mudstone flakes.

Discussion

Only three stone artefacts were identified within the seven landform testing squares with all found within square 3 on the second creek terrace. Eight pieces of glass were also identified in this spit reflecting the disturbed nature of the soil profile (from cultivation). The greatest depth of deposit, 30 cm was excavated in square 1. The depth of deposit decreases substantially as the excavations are further away from the creek.

Additional information gained from the Black Creek Landform Testing program will be added to a revised site card for Black Creek RTA 2.
On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project reached agreement that the area initially recorded and subsurface tested as Black Creek RTA 2 (closer to Black Creek - refer to Section 4.4.2) was the area of greatest artefact density and the area they would like to target for further subsurface salvage and not the area investigated as part of the Landform Testing program.

Summary and Management Recommendations

Three artefacts were located within the second creek terrace landform during the Black Creek Landform Testing. The location of the artefacts indicates that the Black Creek RTA 2 is more extensive than initially recorded and a revised site card will be forwarded to the DEC for Black Creek RTA 2.

An application will be made to the DEC for a Section 90 Consent (collection, partial salvage and partial conservation) for the Black Creek RTA 2 site (including the area identified during the Landform Testing - refer to Section 4.4.2 for details).

4.6.4 Black Waterholes Creek Landform Testing

The Black Waterholes Creek Landform Testing was conducted to test the landform units of the creek terrace, lower, mid and upper slope and spur crest associated with Black Waterholes Creek (refer to Figure 2.7). The twenty-five test pits began on the creek terrace in Black Waterholes Creek PAD 11 (refer to Section 4.5.7). The area is heavily disturbed and is located within and adjacent to an EnergyAustralia easement. It has also been logged, grazed and used as a rubbish dumping area.

Square 1 was excavated for seven spits, to a depth of 35 cm. Charcoal samples were recovered from spits 1, 3 and 5. No stone artefacts, ceramic, glass, metal or shell was identified (please note that Black Waterholes Creek Landform Testing square 1 is the same square as Black Waterholes Creek PAD 11 square 1). Square 1 was on the creek terrace approximately 50 metres from Black Waterholes Creek.

Square 2 was excavated for 16 spits to a depth of 80 cm. Charcoal samples were recovered from four of these spits including spits 3, 4, 5 and 11. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit excavation. Square 2 was on the creek terrace approximately 100 metres from Black Waterholes Creek.

The excavation of square 3 was shallow with only five spits excavated to a depth of 25 cm. The sieved deposits revealed no stone artefacts or other identifiable cultural material including ceramic, glass, metal or shell. Square 3 was on the lower slope approximately 150 metres from Black Waterholes Creek.

Square 4 was excavated for four spits to a depth of 20 cm before the clay, C horizon was reached. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit excavation. Square 4 was on the lower slope approximately 200 metres from Black Waterholes Creek.

Square 5 was excavated for eight spits to a depth of 40 cm. Charcoal samples were recovered from the spit 1. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit excavation. Square 5 was on the lower slope approximately 250 metres from Black Waterholes Creek.

The excavation of square 6 was extremely shallow with only two spits removed to 10 cm. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit
excavation. Square 6 was on the lower slope approximately 300 metres from Black Waterholes Creek.

**Square 7** was excavated to a depth of 20 cm. Charcoal samples were taken from spit 3. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit excavation. Square 7 was on the lower slope approximately 350 metres from Black Waterholes Creek.

Two spits were excavated in **square 8** to a depth of 10 cm. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit excavation. Square 8 was on the lower slope approximately 400 metres from Black Waterholes Creek.

The excavation of **square 9** was shallow with only three spits removed down to a depth of 15 cm. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit excavation. Square 9 was on the lower slope approximately 450 metres from Black Waterholes Creek.

The excavation of **square 10** was extremely shallow with only two spits removed to a depth of 10 cm. No stone artefacts, ceramic, glass, metal or shell was identified. Charcoal samples were recovered from spit 2. Square 10 was on the mid slope approximately 500 metres from Black Waterholes Creek.

The excavation of **square 11** was shallow with only three spits removed down to a depth of 15 cm. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit excavation. Square 11 was on the mid slope approximately 550 metres from Black Waterholes Creek.

**Square 12** was excavated for five spits to a depth of 25 cm. No stone artefacts, charcoal, ceramic, glass, metal or shell was identified. Square 12 was on the mid slope approximately 600 metres from Black Waterholes Creek.

The excavation of **square 13** was extremely shallow with only two spits removed to 10 cm. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit excavation. Square 13 was on the mid slope approximately 650 metres from Black Waterholes Creek.

**Square 14** had only one spit removed down to a depth of 5 cm. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit excavation. Square 14 was on the mid slope approximately 700 metres from Black Waterholes Creek.

The excavation of **square 15** was shallow with only two spits removed to 10 cm. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit excavation. Square 15 was on the mid slope approximately 750 metres from Black Waterholes Creek.

**Square 16** was excavated to a depth of 15 cm with three spits removed. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit excavation. Square 16 was on the mid slope approximately 800 metres from Black Waterholes Creek.

The deposit removed from **square 17** was 35 cm deep and charcoal samples were taken from spits 1, 2 and 4. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit excavation. Square 17 was on the upper slope approximately 850 metres from Black Waterholes Creek.

**Square 18** was excavated for three spits down to a depth of 15 cm. Charcoal samples were taken from spit 1. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit excavation. Square 18 was on the upper slope approximately 900 metres from Black Waterholes Creek.
The excavation of **square 19** was taken to a depth of 30 cm. Charcoal was absent and no stone artefacts, ceramic, glass, metal or shell was identified during the test pit excavation. Square 19 was on the upper slope approximately 950 metres from Black Waterholes Creek.

Three spits were removed from the excavation of **square 20** to a depth of 15 cm. Charcoal was absent and no stone artefacts, ceramic, glass, metal or shell was identified during the test pit excavation. Square 20 was on the upper slope approximately 1000 metres from Black Waterholes Creek.

The excavation of **square 21** was taken to a depth of 45 cm. No artefactual or cultural material was identified. Square 21 was on the upper slope approximately 1050 metres from Black Waterholes Creek.

**Square 22** was excavated for six pits to a depth of 30 cm. Charcoal samples were recovered from spit 5. No stone artefacts, ceramic, glass, metal or shell was identified during the test pit excavation. Square 22 was on the upper slope approximately 1100 metres from Black Waterholes Creek.

Four spits were excavated from **square 23** to a depth of 20 cm. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit excavation. Square 23 was on the upper slope approximately 1150 metres from Black Waterholes Creek.

**Square 24** was excavated for five spits to a depth of 25 cm. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit excavation. Square 24 was on the upper slope approximately 1200 metres from Black Waterholes Creek.

**Square 25** was excavated for seven spits to a depth of 35 cm. Charcoal samples were taken from spits 2 and 3. No stone artefacts, ceramic, glass, metal or shell was identified during this test pit excavation. Square 25 was on the upper slope approximately 1250 metres from Black Waterholes Creek.

No artefactual material was identified in the twenty-five landform testing squares.

**Discussion**

No stone artefacts were identified during the Black Waterholes Creek Landform Testing or within the excavations of the associated PAD (Black Waterholes Creek PAD 11). The depth of deposit showed no clear pattern in relation to distance from the creek or in relation to the landform elements tested.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project reached agreement that no further archaeological investigation was required in this area.

**Summary and Management Recommendations**

Although the heavily disturbed area was extensively tested, no artefactual evidence was identified.

Additional information will be supplied to the DEC for this location and the Black Waterholes Creek PAD 11 recommending that the PAD be removed from the site register.

No further archaeological investigation is required for the Black Waterholes Creek area.
4.6.5 Sawyers Gully Landform Testing

The Sawyers Gully Landform Testing tested the landform units of the lower, mid and upper slopes and spur crest associated with Sawyers Gully (refer to Figure 2.7). The ten test pits began on the lower slope in the same location as Sawyers Gully PAD 13 (refer to Section 4.5.9) which is located on the western side of a tributary of Sawyers Gully and just upstream of its confluence with a second tributary. The area has been subject to considerable disturbance including logging and bulldozing.

Four spits were excavated from square 1 to a depth of 20 cm. This square was located on the lower slope adjacent to Sawyers Gully. Charcoal samples were taken from spits 3 and 4. Seven stone artefacts were also identified in spit 3. No ceramic, metal, glass or shell was identified (please note that this test pit is also identified as Sawyers Gully PAD 13, square 3 - refer to Section 4.5.9).

Square 2 was excavated for six spits to a depth of 30 cm. No ceramic, metal, glass or shell was identified. The test pit was excavated on the lower slope approximately 50 metres from Sawyers Gully.

Square 3 was excavated for four spits to a depth of 20 cm. Two stone artefacts were identified in spit 3. No charcoal, ceramic, glass, metal or shell was identified during the test pit excavation which was located on the lower slope approximately 100 metres from Sawyers Gully.

Five spits were excavated from square 4 to a depth of 25 cm. One stone artefact was identified in spit 5. No charcoal, ceramic, glass, metal or shell was identified during the test pit excavation. Square 4 was the first square used to test the mid slope and was located approximately 150 metres from Sawyers Gully.

Squares 5 and 6 were excavated to a depth of 15 cm with no artefactual or cultural material identified. Both squares were located on the midslope approximately 200 metres and 250 metres respectively from Sawyers Gully.

Square 7 was excavated for two spits to a depth of 10 cm. No cultural material was identified. Square 7 was located on the upper slope approximately 300 metres from Sawyers Gully.

Square 8 was excavated to a depth of 15 cm with no cultural material identified. Square 8 was located on the upper slope approximately 350 metres from Sawyers Gully.

Square 9 was excavated to a depth of 10 cm. No cultural material was identified. This square was the first excavated on the spur crest and was located approximately 400 metres from Sawyers Gully.

Only 5 cm, one spit, was excavated from square 10 with no cultural material identified. The square was located approximately 450 metres from Sawyers Gully on the spur crest.

The artefacts were manufactured from mudstone (4) and silcrete (6) and included flakes and flaked pieces.

Discussion

Although 10 stone artefacts were identified in the landform testing squares, seven of these were found in square 1, which is also identified as square 3 within the Sawyers Gully PAD 13 test pit excavations (refer to Section 4.5.9). Of the other three artefacts, two were identified in spit 3 of square 3 and one in spit 5 of square 4.
All artefacts were identified within 150 metres of the creek on the lower and mid slope. The absence of artefacts in the test pit excavations from 150-450 metres away from the creek also coincided with a marked decrease in the depth of the soil profile. This may in part reflect the erosion of the topsoil from this area and its movement downslope towards the creek line. Prior erosion and the disturbance in the area indicate a lack of stratigraphic integrity.

Additional information will be supplied to the DEC incorporating this landform testing location and Sawyers Gully PAD 13 into the previously identified site Sawyers Gully RTA 3 site. The RTA has an existing Section 90 Consent (#2102) for the surface collection of artefacts from this site.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project reached agreement that no further archaeological investigation was required in this area due to the disturbed nature of the soil profile and the low number of artefacts. It was also assessed that no further subsurface investigation was warranted from an archaeological perspective for the same reasons.

**Summary and Management Recommendations**

Ten stone artefacts have been identified and collected during the Sawyers Gully Landform Testing. The area with artefacts will be incorporated into the Sawyers Gully 3 site which has an existing Section 90 Consent.

Due to the small number of artefacts and previous disturbance in the area no further archaeological salvage is required.

### 4.6.6 Surveyors Creek Landform Testing

The 15 landform testing squares commenced within Surveyors Creek PAD 5 (refer to Section 4.5.13) on the lower slope on the southern side of Surveyors Creek. The area is subject to the deposition of colluvium from the slope above and alluvium from flood events. There had been considerable disturbance from logging and the area is unlikely to have retained any archaeological integrity.

The excavation of **square 1** was taken down seven spits to a depth of 35 cm. Of the fifteen stone artefacts located during the excavation, nine were from spit 1, five from spit 2 and one from spit 3. No charcoal, ceramic, glass, metal or shell was identified during the test pit excavation. Square 1 was located on the lower slope 50 metres from Surveyors Creek. This square was also identified as Surveyors Creek PAD 5 square 3.

**Square 2** was excavated for four spits to a depth of 20 cm. No artefactual or cultural material was identified. Square 2 was located on the lower slope 100 metres from Surveyors Creek.

The excavation of **square 3** was taken down three spits to a depth of 15 cm. Two stone artefacts were located with one in spit 1 and one in spit 2. No charcoal, ceramic, glass, metal or shell was identified during the test pit excavation. Square 3 was located on the lower slope 150 metres from Surveyors Creek.

**Square 4** was only excavated for one spit to 5 cm before the clay horizon was encountered. No artefactual or cultural material was identified. Square 4 was located on the midslope 200 metres from Surveyors Creek.
Two spits were excavated in squares 5, 6 and 7 were excavated to a depth of 10 cm. No cultural material identified in the squares which were located on the midslope at 250, 300 and 350 metres from Surveyors Creek respectively.

The excavations of square 8 and 9 were taken down three spits to a depth of 15 cm with no cultural material identified in the squares which were located on the midslope at 400 and 450 metres from Surveyors Creek respectively.

Square 10 was excavated for two spits to a depth of 10 cm. No cultural material was identified in the square which was located on the midslope 500 metres from Surveyors Creek.

Square 11 was excavated for three spits to a depth of 15 cm. No cultural material was identified in the square which was located on the upper slope 550 metres from Surveyors Creek.

Square 12 was excavated for two spits to a depth of 10 cm. No cultural material was identified in the square which was located on the upper slope 600 metres from Surveyors Creek.

Square 13 was excavated for five spits to a depth of 25 cm. No cultural material was identified in the square which was located on the upper slope 650 metres from Surveyors Creek.

Square 14 was excavated for four spits to a depth of 20 cm. No cultural material was identified in the square which was located on the upper slope 700 metres from Surveyors Creek.

Square 15 was excavated for five spits to a depth of 25 cm. No cultural material was identified in the square which was located on the upper slope 750 metres from Surveyors Creek.

The 15 artefacts are heat affected silcrete flakes and flaked pieces and mudstone flakes and flaked pieces.

Discussion

Seventeen stone artefacts were excavated from the squares 1 and 3 on the lower slope during the Surveyors Creek Landform Testing. Fifteen of these had already been recorded from the subsurface testing of Surveyors Creek PAD 5 square 3. The additional two artefacts were located in spit 1 and spit 2 of landform testing square 3. The remaining squares did not contain any artefactual or cultural material. The greatest depth of deposit was found in square 1 which was 35 cm.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project reached agreement that further archaeological investigation was required in this area. From an archaeological perspective the area subsurface tested has indicated a potential to return a sufficiently complex assemblage from a broad area excavation (5 metres by 5 metres) to assist with answering some of the research questions posed for the overall salvage program.

Additional information will be supplied to the DEC combining this location and Surveyors Creek PAD 5 (refer to Section 4.5.13) and recording the area as Surveyors Creek RTA 10.
Summary and Management Recommendations

Seventeen artefacts have been identified and collected during the Surveyors Creek Landform Testing, all from the lower slope landform unit.

It is proposed to apply to the DEC for a Section 90 Consent (subsurface salvage) for this area (refer to Section 4.6.6 for further details).

Additional information will be supplied to the DEC combining this location and Surveyors Creek PAD 5 (refer to Section 4.5.13) and recording the area as Surveyors Creek RTA 10.

4.6.7 Swamp Creek Landform Testing

The ten landform testing squares were excavated starting on the spur crest and tested the upper, mid and lower slope associated with the Swamp Creek catchment. There has been considerable disturbance from tree clearing, grazing, tracks and recreational use within all of the Swamp Creek catchment and the area chosen for Landform Testing was assessed as the least disturbed (though still highly disturbed).

Square 1 and square 2 were excavated for eight spits to a depth of 40 cm. No cultural material was identified. Squares 1 and 2 were located on the spur crest approximately 250 metres and 300 metres respectively from Swamp Creek.

Six spits were excavated in square 3 to a depth of 30 cm. Square 3 was excavated on the upper slope approximately 350 metres from Swamp Creek. Charcoal samples were taken from spit 2. No stone artefacts, ceramic, glass, metal or shell was identified during the test pit excavation.

The excavation of square 4 was excavated four spits to a depth of 20 cm. No artefactual or cultural material was identified. The excavation of square 4 was used to test the upper slope and was located approximately 400 metres from Swamp Creek.

Square 5 and square 6 were excavated for six spits to a depth of 30 cm with no cultural material identified. Squares 5 and 6 were both located on the mid slope approximately 450 metres and 500 metres from Swamp Creek respectively.

The excavation of square 7 was taken down five spits to a depth of 25 cm. No artefactual or cultural material was identified. Square 7 was the last test pit excavated on the midslope and was located approximately 550 metres from Swamp Creek.

The excavation of square 8 excavated for five spits to a depth of 25 cm with charcoal samples taken from spit 1. No stone artefacts, ceramic, glass, metal or shell was identified during the test pit excavation. The excavation of square 8 was conducted approximately 600 metres from Swamp Creek on the lower slope.

The excavation of square 9 was taken down four spits to a depth of 20 cm. No artefactual or cultural material was identified. Square 9 was excavated on the lower slope approximately 650 metres from Swamp Creek.

Seven spits were excavated in square 10 to a depth of 35 cm. No stone artefacts, charcoal, ceramic, glass, metal or shell was identified during the test pit excavation. Square 10 was located approximately 700 metres from Swamp Creek on the lower slope.

No stone artefacts were identified during the testing of the landform elements associated with Swamp Creek.
Discussion

The landform elements of lower, mid and upper slope and spur crest associated with Swamp Creek were tested. Charcoal samples were taken from both squares 3 and 8 but no cultural material was identified within any of the test pits. Soil depth was deepest on the spur crest closest to the creek but since the depth of soil only ranged from 20-40 cm throughout the testing program this is not considered significant.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project reached agreement that no further archaeological investigation was required in this area. From an archaeological perspective the area subsurface tested has no research potential and thus does not warrant further investigation.

Summary and Management Recommendations

Ten squares were excavated during the Swamp Creek Landform Testing. No stone artefacts or other cultural material was identified.

No further archaeological investigation/salvage is warranted in this area.

4.6.8 Wallis Creek Landform Testing

The Wallis Creek landform testing was conducted to test the landform units of the creek terrace, lower, mid and upper slopes and spur crest associated with Wallis Creek. The nine test pits began on the spur crest to the northwest of Wallis Creek PAD 8 and finished on the southern side of Wallis Creek to the south east of Wallis Creek RTA 2 (refer to Section 4.5.19 and Section 4.4.4 and Figure 2.5). Sections of the landform testing area were located within an EnergyAustralia easement. The area had been subject to logging, clearing and grazing. There had also been an excavation within this area for the purpose of a rubbish dump. This area was avoided during the subsurface testing.

Square 1 was excavated to a depth of 40 cm before clay was reached. Thirty-eight stone artefacts were identified including: one in spit 2; four in spit 3; thirty-one in spit 4; and two in spit 5. Charcoal samples were taken from all spits except for spits 3 and 6. No other cultural material was identified within this test pit excavation. Square 1 is located approximately 225 metres to the north of Wallis Creek on the spur crest.

Square 2 was excavated for nine spits to a depth of 45 cm. One stone artefact was identified in spit 7. Charcoal samples were taken from spits 6-8. No ceramic, glass, metal or shell was identified during the test pit excavation. Square 2 is located approximately 175 metres north of Wallis Creek on the upper slope (please note that Wallis Creek Landform Testing square 2 is also identified as Wallis Creek PAD 8 square 1 – refer to Section 4.5.19).

Twenty spits were excavated in square 3 to a depth of 100 cm. Charcoal samples were only taken from spit 12. No stone artefacts, ceramic, glass, metal or shell was identified. Square 3 is located approximately 125 metres north of Wallis Creek on the mid slope.

Square 4 was excavated for seven spits to a depth of 35 cm. Thirty-six stone artefacts were identified including: fifteen in spit 2; four in spit 3; ten in spit 4; five in spit 5; and two in spit 6. Charcoal samples were taken from spits 3, 4, 5 and 7. No other cultural material was identified within this test pit excavation. Square 4 is located approximately 75 metres north of Wallis Creek on the lower slope.

Square 5 was excavated to a depth of 35 cm. Twenty-five stone artefacts were identified including: nine in spit 1; six in spit 2; one in spit 3; five in spit 4; two in spit 5; one in spit 6;
and one in spit 7. Charcoal samples were taken from spit 3. No ceramic, glass, metal or shell was identified during the test pit excavation. Square 5 is located approximately 25 metres north of Wallis Creek on the creek terrace (please note that Wallis Creek Landform Testing square 5 is also identified as Wallis Creek RTA 2 square 3).

**Square 6** was excavated to 50 cm before the clay C horizon was encountered. Three stone artefacts were identified, with one in each of spits 4, 9 and 10. Charcoal samples were taken from spit 10. No other cultural material was identified. Square 6 is located approximately 25 metres north of Wallis Creek on the creek terrace.

Eight spits were excavated in **square 7** to a depth of 40 cm. Although no stone artefacts, ceramic, glass, metal or shell was identified, charcoal samples were taken from spits 2, 3 and 8. Square 7 is located approximately 25 metres to the south of Wallis Creek on the creek terrace.

**Square 8** was excavated for eight spits to a depth of 40 cm. Five stone artefacts were excavated from spit 7. No charcoal or other cultural material was identified. Square 8 is located approximately 75 metres to the south of Wallis Creek on the lower slope.

The nine spits that were excavated in **square 9** yielded two stone artefacts in spit 4. No other cultural material was identified. Square 9 is located approximately 125 metres to the south of Wallis Creek on the mid slope.

Flakes, broken flakes and flaked pieces were identified during the Wallis Creek Landform Testing. The artefacts were manufactured from silcrete and mudstone with mudstone artefacts dominant.

**Discussion**

The Wallis Creek Landform Testing identified 110 stone artefacts. Due to the Landform testing crossing the Wallis Creek RTA 2 site and Wallis Creek PAD 8, 26 of these artefacts had been previously identified in the earlier excavations. One stone artefact in Wallis Creek Landform Testing Square 2 was also identified within the results of Wallis Creek PAD 8 Square 1, and 25 stone artefacts excavated from Wallis Creek Landform Testing Square 5 were also identified within the results of Wallis Creek RTA 2 Square 3.

The greatest depth of deposit (100 cm) was excavated from square 3 on the mid slope. Charcoal samples were taken from squares 1-7 but there is no evidence to suggest a relationship between the samples and the artefacts identified. No ceramic, glass, metal or shell was identified during the landform testing.

Additional site card information will be supplied to the DEC incorporating the landform testing area and Wallis Creek PAD 8 into the Wallis Creek RTA 2 site.

On-site discussions and discussions held at a meeting on 18 November 2005 with the Aboriginal group representatives participating in the project reached agreement that the overall site area (incorporating the landform testing area, PAD8 and Wallis Creek RTA 2) was so highly disturbed, that the subsurface testing already undertaken was sufficient subsurface salvage for this area. This was agreed provided that; further subsurface salvage was undertaken at Wallis Creek PAD 2 (refer to **Section 4.5.17**); that Wallis Creek PAD 7 area was conserved (refer to **Section 4.5.18**); that all surface artefacts within the Wallis Creek RTA 2 site were collected; and that the route alignment in the Wallis Creek RTA 2 area was temporarily fenced to avoid impact to the site area outside the alignment.
Summary and Management Recommendations

The Wallis Creek Landform Testing identified 110 stone artefacts in an area that has been heavily disturbed by logging, then the establishment and maintenance of the EnergyAustralia easement and prior and subsequent agricultural activities (including the excavation of a large area that was used for rubbish dumping and then covered over).

Additional site card information will be supplied to the DEC incorporating the landform testing area and Wallis Creek PAD 8 into the Wallis Creek RTA 2 site.

It is proposed to apply to the DEC for a Section 90 Consent (partial salvage and partial conservation) to collect surface artefacts from the site area. No further subsurface salvage is required provided that further subsurface salvage is undertaken at Wallis Creek PAD 2 (refer to Section 4.5.17), that Wallis Creek PAD 7 area is conserved (refer to Section 4.5.18), and that the route alignment in the Wallis Creek RTA 2 site area was temporarily fenced to avoid impact to the site area outside the alignment.

Detailed results of the subsurface testing undertaken under Section 87 Permit #2096 will be provided in the final report prepared for the DEC following the Stage 3 salvage.

4.7 SUMMARY OF RESULTS

Table 4.4 provides a summary of the artefacts salvaged from each site, PAD, Landform Testing Area. Proposed requirements for further site salvage and for site conservation are discussed in Section 5.

Table 4.4 - Summary of the artefacts salvaged from each site, PAD, Landform Testing Area

<table>
<thead>
<tr>
<th>Site/PAD/Landform Name</th>
<th>No. of artefacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Anvil Creek Landform Testing</td>
<td>32</td>
</tr>
<tr>
<td>*Anvil Creek PAD 16</td>
<td>77</td>
</tr>
<tr>
<td>Anvil Creek PAD 17</td>
<td>3</td>
</tr>
<tr>
<td>Anvil Creek PAD 18</td>
<td>16</td>
</tr>
<tr>
<td>Anvil Creek PAD 21</td>
<td>39</td>
</tr>
<tr>
<td>Anvil Creek RTA 3</td>
<td>135</td>
</tr>
<tr>
<td>*Bishops Creek Landform Testing</td>
<td>6</td>
</tr>
<tr>
<td>*Bishops Creek PAD 15</td>
<td>6</td>
</tr>
<tr>
<td>Black Creek Landform Testing</td>
<td>3</td>
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<tr>
<td>Black Creek PAD 20</td>
<td>3</td>
</tr>
<tr>
<td>Black Creek RTA 2</td>
<td>240</td>
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<tr>
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</tr>
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<td>Black Waterholes Creek PAD 11</td>
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</tr>
<tr>
<td>Blue Gum Creek Landform Testing</td>
<td>0</td>
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<td>Sawyers Gully PAD 12</td>
<td>22</td>
</tr>
<tr>
<td>*Sawyers Gully PAD 13</td>
<td>33</td>
</tr>
<tr>
<td>Sawyers Gully PAD 14</td>
<td>132</td>
</tr>
<tr>
<td>*Surveyors Creek Landform Testing</td>
<td>17</td>
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</table>
## Table 4.4 - Summary of the artefacts salvaged from each site, PAD, Landform Testing Area (cont)

<table>
<thead>
<tr>
<th>Site/PAD/Landform Name</th>
<th>No. of artefacts</th>
</tr>
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<tbody>
<tr>
<td>Surveyors Creek PAD 3</td>
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<tr>
<td>Surveyors Creek PAD 4</td>
<td>1</td>
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<td>Surveyors Creek PAD 5</td>
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<tr>
<td>Swamp Creek Landform Testing</td>
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<td>Swamp Creek PAD 9</td>
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</tr>
<tr>
<td>Swamp Creek RTA 1</td>
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</tr>
<tr>
<td>Wallis Creek Landform Testing</td>
<td>118</td>
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<tr>
<td>Wallis Creek PAD 1</td>
<td>2</td>
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<tr>
<td>Wallis Creek PAD 2</td>
<td>144</td>
</tr>
<tr>
<td>Wallis Creek PAD 7</td>
<td>409</td>
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<tr>
<td>Wallis Creek PAD 8</td>
<td>3</td>
</tr>
<tr>
<td>Wallis Creek RTA 2</td>
<td>57</td>
</tr>
</tbody>
</table>

*16 stone artefacts excavated from PAD 16 square 4 were also recorded for square 4 of the Landform Testing

* Although PAD 15 square 1 is also recorded as square 4 of the Landform Testing no stone artefacts were located in the test pit

+15 stone artefacts excavated from PAD 5 square 3 were also recorded for square 1 of the Landform Testing

+1 stone artefact excavated from PAD 8 square 1 was also recorded for square 2 of the Landform Testing

>25 stone artefacts excavated from Wallis Creek RTA 2 square 3 were also recorded for square 5 of the Landform Testing
5.0 PROPOSED REQUIREMENTS FOR FURTHER SALVAGE OF SECTION 2 OF THE F3 TO BRANXTON ROUTE ALIGNMENT

Table 5.1 provides a summary of the Stage 3 salvage requirements proposed for the sites located in the Section 2 area of the F3 to Branxton Route alignment (refer to Figure 1.1). Figures 5.1 and 5.2 have the sites colour coded to indicate the level of salvage proposed. The PADs and Landform Testing areas that have been upgraded to sites are shown as their new site name as indicated in Table 5.1.

It should be noted that the 68 sites listed in Table 4.2 have been collected under Section 90 Consent #2102 and require no further salvage from an Aboriginal cultural heritage or archaeological perspective (many of these sites were on access tracks required during geotechnical testing and will not be impacted by road construction - refer to Attachment 2 for details).

Please note that a new site Anvil Creek RTA 27 IF (refer to Figure 2.9) is included in Table 5.1. This site was located during the inspection of the Branxton Interchange (Umwelt 2005a) and was not included in the surface collection undertaken under Section 90 Consent #2102. Collection of the isolated find site is proposed as part of the Stage 3 salvage.
Table 5.1 - Summary of Proposed Salvage Requirements for Stage 3 of the Salvage Program

<table>
<thead>
<tr>
<th>Site Name</th>
<th>DEC Site No.</th>
<th>Stage 3 Salvage Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anvil Creek RTA 3 (incorporating Anvil Creek PAD 16)</td>
<td>#37-6-1368</td>
<td>Partial Section 90 Consent (collection, partial subsurface salvage and partial conservation) to collect surface artefacts from the site and to undertake subsurface salvage of an area on the south-eastern side of the creek that retains the greatest integrity (formerly PAD 16) and is within the highway link impact area. A 5 metre by 5 metre excavation is proposed. The RTA will bury an area 60 metres either side of the creek with imported fill within their area of impact to conserve the remainder of the site. The route alignment should be temporarily fenced during the construction period to avoid impacting sections of the site outside the route alignment.</td>
</tr>
<tr>
<td>Anvil Creek RTA 27 IF</td>
<td>#37-6-1601</td>
<td>Section 90 Consent (collection only).</td>
</tr>
<tr>
<td>Black Creek RTA 2</td>
<td>#37-6-1339</td>
<td>Partial Section 90 Consent (collection, partial subsurface salvage and partial conservation) to collect surface artefacts from the site (along the southern side of the New England Highway) and also to undertake subsurface salvage within the highway link impact area on the second creek terrace. A 6 metre by 6 metre stepped excavation is proposed. The RTA will bury the remainder of the site within their area of impact (first, second and third creek terrace/lower slope) with imported fill and the site outside (south) of the route alignment will be fenced off to prevent accidental damage. Soil excavated for the bridge pylons will remain within the site area and be covered by fill.</td>
</tr>
<tr>
<td>Swamp Creek RTA 1</td>
<td>#38-4-0813</td>
<td>Section 90 Consent (collection only).</td>
</tr>
<tr>
<td>Wallis Creek RTA 2</td>
<td>#38-4-0815</td>
<td>Section 90 Consent (partial salvage and partial conservation). Route alignment to be temporarily fenced during construction to avoid accidental impact to the area of the site outside the route alignment.</td>
</tr>
<tr>
<td>Anvil Creek PAD17 (to be renamed Anvil Creek RTA 28)</td>
<td>#37-6-1369</td>
<td>Section 90 Consent (no further salvage).</td>
</tr>
<tr>
<td>Anvil Creek PAD 18 (to be renamed Anvil Creek RTA 29)</td>
<td>#37-6-1370</td>
<td>Section 90 Consent (no further salvage).</td>
</tr>
</tbody>
</table>
Table 5.1 - Summary of Proposed Salvage Requirements for Stage 3 of the Salvage Program (cont)

<table>
<thead>
<tr>
<th>Site Name</th>
<th>DEC Site No.</th>
<th>Stage 3 Salvage Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anvil Creek PAD 21 (to be incorporated into the existing Redhouse Creek 1 site)</td>
<td>#37-6-1602</td>
<td>Partial Section 90 Consent (partial subsurface salvage and partial conservation). EnergyAustralia will be required to excavate two new pole locations in this area to lift powerlines over the Branxton Interchange. The pole locations will be salvaged under Section 90 Consent. A 1 metre by 1 metre excavation is proposed at each pole location. The RTA will bury the PAD 21 area (first creek terrace) within their area of impact and will temporarily construct a boundary fence to protect the Redhouse Creek 1 site; that falls outside their route alignment.</td>
</tr>
<tr>
<td>Bishops Creek PAD 15 (to be renamed Bishops Creek RTA 10)</td>
<td>#37-6-1367</td>
<td>Section 90 Consent (no further salvage).</td>
</tr>
<tr>
<td>Black Creek PAD 20 (to be incorporated into Black Creek RTA 2)</td>
<td>#37-6-1371</td>
<td>Refer to Black Creek RTA 2 (above)</td>
</tr>
<tr>
<td>Black Waterholes Creek PAD 11</td>
<td>#37-6-1363</td>
<td>Not a PAD/no further investigation required.</td>
</tr>
<tr>
<td>Sawyers Gully PAD 12 (to be renamed Sawyers Gully RTA 11)</td>
<td>#37-6-1364</td>
<td>Section 90 Consent (collection only).</td>
</tr>
<tr>
<td>Sawyers Gully PAD 13 (to be incorporated into the Sawyers Gully RTA 3 site)</td>
<td>#37-6-1365</td>
<td>Sawyers Gully RTA 3 has already been collected under Section 90 Consent # 2102, therefore, no further consent requirements.</td>
</tr>
<tr>
<td>Sawyers Gully PAD 14 (to be incorporated into Sawyers Gully RTA 6)</td>
<td>#37-6-1366</td>
<td>Sawyers Gully RTA 6 has already been surface collected under Section 90 Consent #2102. An application will be made to the DEC to undertake subsurface salvage within the highway link impact area. A 5 metre by 5 metre excavation is proposed.</td>
</tr>
<tr>
<td>Surveyors Creek PAD 3</td>
<td>#38-4-0823</td>
<td>Not a PAD/no further investigation required.</td>
</tr>
<tr>
<td>Surveyors Creek PAD 4 (to be renamed Surveyors Creek RTA 9 IF)</td>
<td>#38-4-0824</td>
<td>Section 90 Consent (no further salvage).</td>
</tr>
<tr>
<td>Surveyors Creek PAD 5 (to be renamed Surveyors Creek RTA 10)</td>
<td>#38-4-0825</td>
<td>Section 90 Consent (subsurface salvage) to undertake subsurface salvage within the highway link impact area. A 5 metre by 5 metre excavation is proposed.</td>
</tr>
</tbody>
</table>

Umwelt (Australia) Pty Limited
May 2006

2100/RO2/V3
Table 5.1 - Summary of Proposed Salvage Requirements for Stage 3 of the Salvage Program (cont)

<table>
<thead>
<tr>
<th>Site Name</th>
<th>DEC Site No.</th>
<th>Stage 3 Salvage Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surveyors Creek PAD 6</td>
<td>#38-4-0826</td>
<td>Section 90 Consent (no further salvage).</td>
</tr>
<tr>
<td>(to be renamed Surveyors Creek RTA 11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swamp Creek PAD 9</td>
<td>#37-6-1362</td>
<td>Section 90 Consent (no further salvage).</td>
</tr>
<tr>
<td>(to be renamed Swamp Creek RTA 11 IF)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wallis Creek PAD 1</td>
<td>#38-4-0821</td>
<td>Section 90 Consent (no further salvage).</td>
</tr>
<tr>
<td>(to be renamed Wallis Creek RTA 4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wallis Creek PAD 2</td>
<td>#38-4-0822</td>
<td>Partial Section 90 Consent (partial salvage and partial conservation) to undertake subsurface salvage within the highway link impact area. A 5 metre by 5 metre excavation is proposed.</td>
</tr>
<tr>
<td>(to be renamed Wallis Creek RTA 6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wallis Creek PAD 8</td>
<td>#38-4-0828</td>
<td>Refer to Wallis Creek RTA 2 (above).</td>
</tr>
<tr>
<td>(to be incorporated into Wallis Creek RTA 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anvil Creek Landform Testing</td>
<td>N/A</td>
<td>Refer to Anvil Creek RTA 3 (above)</td>
</tr>
<tr>
<td>(area with artefacts to be incorporated into Anvil Creek RTA 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bishops Creek Landform Testing</td>
<td>N/A</td>
<td>Section 90 Consent (no further salvage).</td>
</tr>
<tr>
<td>(area with artefacts to be renamed Bishops Creek 10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Creek Landform Testing</td>
<td>N/A</td>
<td>Refer to Black Creek RTA 2 (above)</td>
</tr>
<tr>
<td>(area to be incorporated into Black Creek RTA 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Waterholes Creek Landform Testing</td>
<td>N/A</td>
<td>Not a PAD/no further investigation required.</td>
</tr>
<tr>
<td>Sawyers Gully Landform Testing</td>
<td>N/A</td>
<td>Refer to Sawyers Gully PAD 13 (above)</td>
</tr>
<tr>
<td>(area with artefacts to be incorporated into Sawyers Gully RTA 3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5.1 - Summary of Proposed Salvage Requirements for Stage 3 of the Salvage Program (cont)

<table>
<thead>
<tr>
<th>Site Name</th>
<th>DEC Site No.</th>
<th>Stage 3 Salvage Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surveyors Creek Landform Testing</td>
<td>N/A</td>
<td>Refer to Surveyors Creek PAD 5</td>
</tr>
<tr>
<td>(to be incorporated into Surveyors Creek RTA 10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swamp Creek Landform Testing</td>
<td>N/A</td>
<td>Not a PAD/no further investigation required.</td>
</tr>
<tr>
<td>(to be incorporated into Swamp Creek RTA 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wallis Creek Landform Testing</td>
<td>N/A</td>
<td>Refer to Wallis Creek RTA 2 (above).</td>
</tr>
<tr>
<td>(to be incorporated into Wallis Creek RTA 2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Full details of the methodology proposed for the subsurface salvages will be supplied to the DEC with the Research Design and Methodology that accompanies the Section 90 application (Umwelt in prep.).
5.1 SITE CONSERVATION/PROTECTION/IMPACT MINIMISATION

RTA has agreed to the conservation or partial conservation (by burial) of several sites/partial sites that fall within the route alignment. RTA has also agreed to minimise the impact on two areas crossed by the route alignment that were identified by ALALC as being sensitive from an Aboriginal cultural heritage perspective. These sites/areas are listed in Table 5.2 and shown on Figures 5.3 and 5.4. Details of the conservation methodologies proposed will be provided in the Research Design and Methodology being prepared to accompany the Section 90 application for the final Stage 3 salvage.

The management of the sites will also be detailed in the Aboriginal Heritage Management Plan to be prepared by Umwelt as soon as the DEC has provided approval of the Section 90 Consent application for the final stage of the F3 to Branxton salvage program (Umwelt in prep.).
## Table 5.2 - Sites/Areas to be Conserved/Protected/Impact Minimised

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Site Card No.</th>
<th>Location in relation to Development Impact</th>
<th>Management Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anvil Creek RTA 3 (incorporating Anvil Creek PAD 16)</td>
<td>#37-6-1368</td>
<td>Within and extending outside the route alignment</td>
<td>Partial Section 90 Consent is proposed for the collection of the surface artefacts within the route alignment to avoid their damage/destruction during works. A 5 metre by 5 metre salvage is proposed for the PAD 16 area. In order to conserve as much of the site as possible, RTA will cover the area they will impact within the route alignment with imported fill for a distance of 60 metres either side of the creekline. The route alignment should be temporarily fenced during the construction period to avoid impacting sections of the site outside the route alignment.</td>
</tr>
<tr>
<td>Area of High Cultural Heritage Value on Blue Gum Creek</td>
<td>N/A</td>
<td>The area is crossed by the route alignment and a sediment basin is also planned within this area</td>
<td>Some tree clearance will be required for access for construction of the sediment basin and for the construction of the highway link. ALALC has requested that tree clearance and surface disturbance be minimised as far as possible in this sensitive area.</td>
</tr>
<tr>
<td>Area of High Cultural Heritage Value—Aboriginal Pathway Stockrington Road</td>
<td>N/A</td>
<td>Within the route alignment. The area where the route alignment crosses Stockrington Road will impact a known Aboriginal pathway</td>
<td>ALALC recognise that the area has already been heavily disturbed by the construction of Stockrington Road, the installation of the gas pipeline that runs subparallel to Stockrington Road and by rubbish dumping. Therefore the only management recommendation required by ALALC is that all impact in the area is minimised as far as possible.</td>
</tr>
<tr>
<td>Black Creek RTA 1 (Brayshaw's Black Creek)</td>
<td>#37-6-0685</td>
<td>20 metres south of the southern boundary of the route alignment</td>
<td>Due to modifications to the route alignment this site will no longer be impacted by highway link construction. If construction works approach within 30 metres of this site it should be temporarily fenced.</td>
</tr>
<tr>
<td>Site Name</td>
<td>Site Card No.</td>
<td>Location in relation to Development Impact</td>
<td>Management Strategy</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------</td>
<td>----------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Black Creek</td>
<td>#37-6-1339</td>
<td>Within and extending outside route alignment</td>
<td>Results of the subsurface testing of this area indicate that it requires further salvage due to its archaeological research potential and also for its Aboriginal cultural heritage value. The area of the site; however is so extensive and the deposits so deep that salvage of the entire area is not feasible (or necessary). Thus a section of the site will be subject to further subsurface salvage under a partial Section 90 Consent to enable further examination of its research potential (refer to Section 4.4.2 for details). Areas of the site not impacted by subsurface works (such as the emplacement of bridge pylons) should be buried with imported fill and the highway link constructed on the imported fill. The boundary of the actual route alignment to the south should be fenced during highway link construction to avoid impact to this area. The site does not extend to the north.</td>
</tr>
<tr>
<td>Blue Gum Creek 5 Grinding Grooves</td>
<td>#38-4-0817</td>
<td>The grooves are approx 60 metres north and upstream of centreline but will not be directly impacted by highway link construction</td>
<td>No vehicular access is to be permitted across the site. Track to site to be temporarily blocked to close off access across the site from the road corridor during highway link construction. Coal and Allied to be informed of site location. On the advice of ALALC and DEC, Coal and Allied to be requested to undertake works to permanently close the track in this area to prevent 4WD vehicles from driving over the grinding grooves. Coal and Allied to discuss matter with DEC and ALALC to assess manner in which road should be closed and any requirements for DEC/AHIMS Permits to undertake this work.</td>
</tr>
<tr>
<td>Site Name</td>
<td>Site Card No.</td>
<td>Location in relation to Development Impact</td>
<td>Management Strategy</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Blue Gum Creek Grinding</td>
<td>#38-4-0235</td>
<td>The site is located 100 metres to the south of the centreline of the highway link route alignment and 50 metres south of a proposed sediment basin and 75 metres west and upstream of an access track and 75 metres downslope of an access track. The site will not be directly impacted by the development and it is recognised that the sediment basin will assist with reducing sediment load in the creek and indirect impact on the grinding grooves</td>
<td>It is recommended that a ‘no go’ buffer zone be implemented 50 metres north (upslope) of this section of Blue Gum Creek during sediment basin construction. If this buffer is not feasible the site should be temporarily fenced to avoid accidental impact during sediment basin construction. The fence should incorporate an area 10 metres upstream and downstream of the site and on each side of Blue Gum Creek.</td>
</tr>
<tr>
<td>Grooves (a)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue Gum Creek Grinding</td>
<td>#38-4-0236</td>
<td>The site is located 125 metres to the south of the centreline of the highway link route alignment and 75 metres southwest of a proposed sediment basin and 130 metres west and upstream of an access track and 120 metres downslope of an access track. The site will not be directly impacted by the development and it is recognised that the sediment basin will assist with reducing sediment load in the creek and indirect impact on the grinding grooves</td>
<td>It is recommended that a ‘no go’ buffer zone be implemented 50 metres north (upslope) of this section of Blue Gum Creek during sediment basin construction. If this buffer is not feasible the site should be temporarily fenced to avoid accidental impact during sediment basin construction. The fence should incorporate an area 10 metres upstream and downstream of the site and on each side of Blue Gum Creek.</td>
</tr>
<tr>
<td>Grooves (b)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minmi Creek Stone</td>
<td>#38-4-0819 &amp; #38-4-0820</td>
<td>Within the route alignment</td>
<td>The area containing the stone arrangements to be fenced during the construction period and the area to be spanned by the highway link and not impacted by construction works. Fenced area to allow at least a 5 metre buffer zone either side of Minmi Creek in the vicinity of the stone arrangements and a buffer 25 metres upstream and 30 metres downstream of the site area. This area will incorporate the two European heritage weirs and the stone wall also located along this section of Minmi Creek.</td>
</tr>
</tbody>
</table>
Table 5.2 - Sites/Areas to be Conserved/Protected/Impact Minimised (cont)

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Site Card No.</th>
<th>Location in relation to Development Impact</th>
<th>Management Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redhouse Creek RTA 1 (now incorporating Anvil Creek PAD 21)</td>
<td>#37-6-1603</td>
<td>Within and outside route alignment</td>
<td>PAD 21 was subsurface tested under Section 87 Permit #2096. The subsurface testing indicated that the PAD was an extension of the previously recorded Redhouse Creek 1 site. Agreement was reached with the RTA that the area of the site to be impacted by construction of the Branxton Interchange was to be buried with imported fill to avoid impact to subsurface deposits. It will be, however, necessary excavate two holes approximately 1 m in diameter within the site (and within an existing EnergyAustralia easement) to emplace two power poles to lift the existing powerlines over the Branxton Interchange. Application will be made to the DEC for Partial Section 90 with subsurface salvage for the two power pole locations.</td>
</tr>
<tr>
<td>Seahampton 2 Grinding Groove Site</td>
<td>38-4-0393</td>
<td>This site is approximately 50 metres upstream of the area of direct impact from construction of the F3 Interchange or highway link.</td>
<td>In order to prevent accidental damage it is recommended that the site area is fenced during the construction period. The fenced area should incorporate a buffer zone 5 metres either side of Minmi Creek and 5 metres upstream and downstream of the site.</td>
</tr>
<tr>
<td>Wallis Creek RTA 6 (formerly Wallis Creek PAD 2)</td>
<td>#38-4-0822 (PAD ID)</td>
<td>Within and extending outside the route alignment</td>
<td>PAD 2 was subsurface tested under Section 87 Permit #2096. The subsurface testing indicated that the PAD was a site (named Wallis Creek RTA 6). It is proposed that the site extends along the ridge crest in this area and well outside the area to be impacted by highway link construction. Results of the subsurface testing of this area indicate that it requires further salvage due to its archaeological research potential and also for its Aboriginal cultural heritage value. The route alignment in this area should be fenced during construction to avoid additional impacts to the site area outside of the impact area. Application will be made to the DEC for Partial Section 90 with subsurface salvage within the route alignment.</td>
</tr>
</tbody>
</table>
### Table 5.2 - Sites/Areas to be Conserved/Protected/Impact Minimised (cont)

<table>
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</thead>
<tbody>
<tr>
<td>Wallis Creek RTA 5 (formerly Wallis Creek PAD 7)</td>
<td>#38-4-0827</td>
<td>Route alignment modified to put the area outside the route alignment</td>
<td>PAD 7 was subsurface tested under Section 87 Permit #2096. The subsurface testing indicated that the PAD was a site (named Wallis Creek RTA 5) with a relatively high subsurface concentration of artefacts. Modifications to property access in this area mean that the site can be conserved. The site area (landform unit) was identified by the relevant Aboriginal community and archaeologists from Umwelt. This area will be temporarily fenced during highway link construction to avoid accidental impact.</td>
</tr>
<tr>
<td>Wallis Creek RTA 2 (now incorporating Wallis Creek PAD 8)</td>
<td>#38-4-0828</td>
<td>Extensive site that is within route alignment but also extends outside area of route alignment. Sediment basin required in this area to prevent sediment entering tributary of Wallis Creek. The Wallis Creek grinding groove site (see below) will also be protected by this sediment basin</td>
<td>Subsurface testing under Section 87 Permit #2096 indicated that further subsurface salvage was not required for the section of the site that lies within the route alignment and that surface collection under a Section 90 Consent would be adequate management for this section of the site. The route alignment should be temporarily fenced in the site area to avoid accidental impact during highway link construction.</td>
</tr>
<tr>
<td>Wallis Creek RTA 3 Grinding Grooves</td>
<td>#38-4-0816</td>
<td>120 metres southwest of centreline of the route alignment</td>
<td>RTA will construct a drain at the base of the batter, upslope of the site, to ensure that additional sediment does not enter the watercourse as this would increase abrasion and erosion of the grinding grooves.</td>
</tr>
<tr>
<td>Wallis Creek RTA 5 (formerly Wallis Creek PAD 7)</td>
<td>#38-4-0827</td>
<td>Route alignment modified to put the area outside the route alignment</td>
<td>PAD 7 was subsurface tested under Section 87 Permit #2096. The subsurface testing indicated that the PAD was a site (named Wallis Creek RTA 5) with a relatively high subsurface concentration of artefacts. Modifications to the route of the highway link mean that the site can be conserved. The site area (landform unit) was identified by the relevant Aboriginal community and archaeologists from Umwelt. This area will be temporarily fenced during highway link construction to avoid accidental impact.</td>
</tr>
<tr>
<td>Wallis Creek RTA 2 (now incorporating Wallis Creek PAD 8)</td>
<td>#38-4-0828</td>
<td>Extensive site that is within route alignment but also extends outside area of route alignment. Sediment basin required in this area to prevent sediment entering tributary of Wallis Creek. The Wallis Creek grinding groove site (see below) will also be protected by this sediment basin</td>
<td>Subsurface testing under Section 87 Permit #2096 indicated that further subsurface salvage was not required for the section of the site that lies within the route alignment and that surface collection under a Section 90 Consent would be adequate management for this section of the site. The route alignment should be temporarily fenced in the site area to avoid accidental impact during highway link construction.</td>
</tr>
</tbody>
</table>
### Table 5.2 - Sites/Areas to be Conserved/Protected/Impact Minimised (cont)

<table>
<thead>
<tr>
<th>Site Name</th>
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<th>Location in relation to Development Impact</th>
<th>Management Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wallis Creek RTA 3 Grinding Grooves</td>
<td>#38-4-0816</td>
<td>120 metres southwest of centreline of the route alignment</td>
<td>Measures should be implemented to avoid additional sediment entering creekline in the area upstream of the grinding grooves or near the grinding grooves. Additional sediment in the watercourse will increase abrasion and erosion of the grinding grooves. It will also act to infill waterholes associated with the grinding grooves. Therefore, sediment fencing and sediment basin construction is required upslope with all care taken to prevent direct or indirect impact to grinding grooves (refer Wallis Creek RTA 2).</td>
</tr>
</tbody>
</table>
6.0 REFERENCES


Attachment 1

Consent Conditions
ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

APPROVAL UNDER SECTION 115B(2) IN RELATION TO THE PROPOSED HIGHWAY LINK BETWEEN THE F3 AND BRANXTON

I, the Minister for Urban Affairs and Planning after:

1. examining and considering various matters including the:
   i. Proposed Highway Link – F3 Freeway to Branxton, Environmental Impact Statement (EIS) (Connell Wagner June 1995);
   iii. Representations Report, Volumes 1, 2 and 3 (RTA, October 2001);
   iv. Representations made in respect to the exhibition of the EIS and FIS; and
   v. The Director-General's Report.

2. after consulting and considering the matters raised by the Minister for Roads, Minister for Transport, and pursuant to Section 115B(2) of the Environmental Planning and Assessment Act 1979, give approval for the Roads and Traffic Authority to carry out the proposal subject to the conditions stated in Schedule 1 to this approval. The reasons for the imposition of these conditions are set out in a report entitled Roads and Traffic Authority – Proposed F3 to Branxton Highway Link - Director-General's Report.

Dated this 7 day of November, 2001

Andrew Refshauge MP
Deputy Premier
Minister for Urban Affairs and Planning
Minister for Aboriginal Affairs
Minister for Housing
Schedule 1
Conditions of Approval – F3 to Branxton Highway Link

The following acronyms and abbreviations are used in this section:

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFFAR</td>
<td>Additional Flora and Fauna Assessment Report</td>
</tr>
<tr>
<td>ARI</td>
<td>Average Recurrence Interval</td>
</tr>
<tr>
<td>CLG</td>
<td>Community Liaison Group</td>
</tr>
<tr>
<td>CMS</td>
<td>Construction Method Statement</td>
</tr>
<tr>
<td>Department, the</td>
<td>Department of Urban Affairs and Planning</td>
</tr>
<tr>
<td>Director-General, the</td>
<td>Director-General of the Department of Urban Affairs and Planning or delegate</td>
</tr>
<tr>
<td>DLWC</td>
<td>Department of Land and Water Conservation</td>
</tr>
<tr>
<td>DUAP</td>
<td>Department of Urban Affairs and Planning</td>
</tr>
<tr>
<td>EIS</td>
<td>Environmental Impact Statement</td>
</tr>
<tr>
<td>EMP</td>
<td>Environmental Management Plan</td>
</tr>
<tr>
<td>EMR</td>
<td>Environmental Management Representative</td>
</tr>
<tr>
<td>ENCMI</td>
<td>Environmental Noise Control Manual</td>
</tr>
<tr>
<td>EP&amp;A Act</td>
<td>Environmental Planning and Assessment Act 1979</td>
</tr>
<tr>
<td>EPA</td>
<td>Environment Protection Authority</td>
</tr>
<tr>
<td>FIS</td>
<td>Fauna Impact Statement</td>
</tr>
<tr>
<td>Minister, the</td>
<td>Minister for Urban Affairs and Planning</td>
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<td>NPWS</td>
<td>National Parks and Wildlife Service</td>
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<td>NPWS Concurrence</td>
<td>Concurrence given by the Director-General of National Parks and Wildlife under the TSC Act</td>
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<td>Proponent</td>
<td>Roads and Traffic Authority</td>
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<tr>
<td>Relevant Councils</td>
<td>Coonabarabran City Council, Lake Macquarie City Council, Maitland City Council, and Singleton Shire Council</td>
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<td>RTA</td>
<td>Roads and Traffic Authority</td>
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<td>TSC Act</td>
<td>Threatened Species Conservation Act 1995</td>
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General

1. The proposal shall be carried out in accordance with:
   i. *Proposed Highway Link – F3 Freeway to Branxton, Environmental Impact Statement (EIS)* (Connell Wagner June 1995);
   iii. *Additional Flora and Fauna Assessment (AFFA)* (Connell Wagner May 2001) to supplement the original FIS;
   iv. Representations Report, Volumes 1, 2 and 3 (RTA, October 2001);
   v. *Supplementary Review of Environmental Factors (SREF) for the Allandale to Illalong Section Comparison of Options* (Connell Wagner August 2000);
   vi. *Kurri Sand Swamp Woodland Recovery Assessment* (Biosis Research), a report commissioned jointly by the RTA and NPWS in August 2001;
   vii. *Additional Environmental and Engineering Assessment* (Connell Wagner May 2001); and
2. This approval relates to the construction of the proposal in its entirety.

3. Despite the above, in the event of any inconsistency with the proposal as described in the EIS and/or Representations Report, the Conditions of Approval granted by the Minister shall prevail.

4. These conditions do not relieve the Proponent of the obligation to obtain all other approvals and licences from all relevant authorities required under any other Act. Without affecting the generality of the foregoing, the Proponent shall comply with the terms and conditions of such approvals and licences.

5. It shall be the ultimate responsibility of the Proponent to ensure compliance with all conditions of approval granted by the Minister.

Compliance

General

6. The Proponent shall comply with, or ensure compliance with, all requirements of the Director-General in respect of the implementation of any measures arising from the conditions of this approval.

7. The Proponent shall bring to the attention of the Director-General any matter that may require further investigation and the issuing of instructions from the Director-General. The Proponent shall ensure that these instructions are implemented to the satisfaction of the Director-General within such time that the Director-General may specify.

Pre-Construction Compliance Report

8. At least one month prior to commencement of substantial construction (or within such period as otherwise agreed by the Director-General), the Proponent shall submit for approval of the Director-General a compliance report detailing compliance with all relevant conditions that apply prior to commencement of substantial construction and shall address:
   i. the dates of submissions of the various studies and/or requirements of various relevant conditions, and their approval and terms of approval; and
   ii. action taken or proposed to implement the recommendations made in terms of approvals and/or studies.

Pre-Operation Compliance Report

9. At least one month prior to commissioning of the proposal (or discrete sections of the proposal as agreed by the Director-General), the Proponent shall submit for approval of the Director-General a compliance report detailing compliance with all relevant conditions that apply prior to commencement of operation and shall address:
   i. the dates of submissions of the various studies and/or requirements of various relevant conditions, and their approval and terms of approval; and
   ii. action taken or proposed to implement the recommendations made in terms of approvals and/or studies.

The Period of one month referred to in this condition may be altered as agreed by the Director-General.

Dispute Resolution

1 The environmental evaluation of staging the proposal has not been undertaken, and therefore any staging will require separate assessment in accordance with the EP&A Act.
10. The Proponent shall endeavour, as far as possible, to resolve any dispute with relevant public authorities arising out of the implementation of the conditions of this approval. Should this not be possible, the matter shall be referred to the Director-General and, if the matter cannot be resolved, then to the Minister for resolution. The Minister’s determination of the disagreement shall be final and binding on all parties.

Contact Telephone Number

11. Prior to the commencement of construction, the Proponent shall institute, publicise and list with a telephone company a 24 hour toll-free complaints contact telephone number, which would enable any member of the general public to reach a person who can arrange appropriate response action to the complaint.

Complaints Register

12. The Proponent shall record details of all complaints received during construction and ensure that an initial response to the complaint is provided within 24 hours and a detailed response within 10 days. Information on all complaints received shall be made available on request to the Director-General and all relevant government agencies.

13. The Proponent shall nominate an appropriate person(s) to receive, log, track and respond to complaints within the specified timeframe. The name and contact details of this person(s) shall be provided to the relevant Council(s) and the Director-General upon appointment or upon any changes to that appointment.

Project Commencement

14. The Proponent shall notify the Director-General and all relevant authorities in writing of the project commencement both in terms of construction and operation (ie commissioning).

Advertisement of Activities

15. Prior to the commencement of construction and then at three-monthly intervals, the Proponent shall advertise in relevant local newspapers the nature of the works proposed for the forthcoming three months, the areas in which these works are proposed to occur, the hours of operation and a contact telephone number.

16. The Proponent shall ensure that the local community and businesses are kept informed (by appropriate means such as: local newsletters; leaflets; newspaper advertisements; and community noticeboards; etc.) of the progress of the project, including any traffic disruptions and controls, construction of temporary detours and work required outside the nominated working hours, prior to such works being undertaken.

17. The Proponent shall establish a project internet site prior to the commencement of construction and maintain the internet site until 6 months after commencement of operation of the project. The internet site shall contain monthly updates of work progress and consultation activities, including but not be limited to:
   i. a description of relevant approval authorities and their areas of responsibility;
   ii. a list of environmental management reports that are publicly available and the executive summaries of those reports;
   iii. minutes of community liaison group meetings;
   iv. newsletters every three months;
   v. contact names and phone numbers of the project communications staff; and
   vi. 24 hour toll-free complaints contact telephone number.
Updates of work progress and construction activities shall be provided more frequently where significant changes in the noise impacts are expected.

Community Liaison Group

18. The Proponent shall establish a Community Liaison Group (CLG), consistent with the Guidelines for the Establishment of Community Liaison Group (see Attachment 1) and shall:
   i. ensure that the first meeting is held prior to submission of the Construction Framework Environmental Management Plan;
   ii. nominate a chair to be approved by the Director-General;
   iii. allow the Group to make comments and recommendations about the implementation of the development and environmental management plans, monitor compliance with conditions of this approval and other matters relevant to the operation of the development during the term of the consent;
   iv. ensure that the Group has access to the necessary plans and information for such purposes; and provide appropriate facilities and information to assist the Group in carrying out its functions;
   v. consider the recommendations and comments of the Groups and provide a response to the Groups and Director-General;
   vi. ensure that the Group includes the Environmental Management Representative, representatives from the Proponent, the contractor(s), relevant local community and business groups including relevant Councils unless otherwise agreed by the Director-General; and
   vii. bear all costs associated with the establishment and ongoing function of the Groups.

Environmental Management

Environmental Management Representative


20. The EMR shall be available during construction activity at the site and be present on-site during any critical construction activities as defined in the Construction Framework Environmental Management Plan (EMP).

21. The EMR shall:
   i. have responsibility for considering and advising on matters specified in the conditions of approval and compliance with such;
   ii. review and approve induction and training program for all persons involved in the construction activities and monitor implementation;
   iii. periodically audit the environmental activities to evaluate the implementation, effectiveness and level of compliance of on-site construction activities with the EMP and associated plans and procedures, including carrying out site inspections at least fortnightly;
   iv. record and provide a written report of non-conformances with the EMP and require mitigation measures to avoid or minimise any adverse impacts on the environment or report required changes to the EMP;
   v. direct the contractor to stop work immediately where considered necessary, if in the view of the EMR an unacceptable impact on the environment is likely to occur, or require other reasonable steps to be taken to avoid or minimise any adverse impacts;
   vi. review corrective and preventative actions to ensure the implementation of recommendations made from the audits and site inspections;
   vii. report monthly;
   viii. review and approve minor revisions to the Construction Framework EMP and Sub Plans;
ix. provide information for community consultation, liaison with regulators, and respond to customer environmental complaints as required;
x. provide reports to DUAP on matters relevant to the carrying out of the EMP role as necessary including notifying DUAP of any stop work notices; and
xi. certify the Construction Framework EMP, Sub Plans, and the Operational EMP in accordance with Conditions of Approval Nos. 25, 28 and 34.

22. The EMP shall be approved by the Director-General prior to the commencement of construction.

Environmental Management System

23. The Proponent shall ensure the appointment of construction and/or operation head contractors that have an Environmental Management System prepared in accordance with the AS/NZS ISO 14000 series or BS7750-1994 certified by an accredited certifier and/or have a proven environmental management performance record.

Construction Framework Environmental Management Plan

24. Prior to the commencement of construction, a Construction Framework Environmental Management Plan (EMP) shall be prepared, following consultation with the NPWS, EPA, DLWC, NSW Fisheries, relevant Councils, and all relevant utility/service providers. The Construction Framework EMP shall be prepared in accordance with the conditions of this approval, all relevant Acts and Regulations and accepted best practice management Sub Plans.

25. The Construction Framework EMP shall be certified by the EMP as being in accordance with the Conditions of Approval and all undertakings made in the EIS and Representations Report prior to seeking approval of the Director-General.

26. The Construction Framework EMP shall be approved by the Director-General prior to the commencement of substantial construction.

27. The Construction Framework EMP shall:
   i. reference and propose timeframes for all the Sub Plans required under this Approval;
   ii. identify the role of the EMP;
   iii. provide details of the community consultation process;
   iv. define the role, responsibility, authority, accountability and reporting of personnel relevant to compliance with the Construction Framework EMP;
   v. include a matrix of Construction Method Statements (CMS) required to construct the project, including an assessment of the predicted level of risk and potential level of public interest posed by each CMS and indicative timeframes for completion; and,
   vi. propose a response time-frame for all CMS to be approved by the Director-General.

28. All Sub Plans require the approval of the Director-General following certification by the EMP.

29. The Construction Framework EMP shall be made publicly available after approval by the Director-General.

Construction Method Statements

30. The Proponent shall prepare in consultation with the relevant government agencies and the CLG, Construction Method Statements (CMS) for all construction methods and/or major construction work sites to be utilised during construction in accordance with the Construction Framework EMP required by Condition 24. The Director-General shall nominate the CMS that will require approval by the Director-General. Those CMSs not requiring the approval of the Director-General shall require the certification of the EMP as being in accordance with the Conditions of Approval and all undertakings.

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made in the EIS and Representations Report. Any CMS to be approved by the Director-General shall be submitted to the Department following certification by the EMR no less than one (1) month prior to the proposed commencement of the relevant construction activities.

Each CMS shall include, but not be limited to:

i. construction activities and processes associated with the relevant construction site(s), including staging and timing of the proposed works;

ii. specific hours of operation for all key elements including off-site movements;

iii. cover specific environmental management objectives and strategies for the environmental system elements and include, but not be limited to: noise and vibration; air quality; water quality; erosion and sedimentation; access and traffic; property acquisition and/or adjustments; heritage and archaeology; flora and fauna, groundwater; acid sulfate soils, spoil stockpiling and disposal; waste/resource management; weed management; flooding and stormwater control; geotechnical issues; visual screening, landscaping and rehabilitation; hazards and risks; energy use, resource use and recycling; and utilities; and

iv. address, but not be limited to:

a. identification of the statutory and other obligations which the Proponent is required to fulfil during project construction, including all approvals and consultations/agreements required from other authorities and stakeholders, and key legislation and policies which control the Proponent’s construction of the project;

b. measures to avoid and/or control the occurrence of environmental impacts;

c. measures (where practicable and cost effective) to provide positive environmental offsets to unavoidable environmental impacts;

d. definition of the role, responsibility, authority, accountability and reporting of personnel relevant to compliance with the CMS;

e. site specific environmental management techniques and processes for all construction processes which are important for the quality of the environment in respect of permanent and/or temporary works;

f. site specific monitoring, inspection and test plans for all activities and environmental qualities which are important to the environmental management of the project, including performance criteria, tests, and protocols (eg. frequency and location);

g. locational details of important elements such as temporary noise barriers; portable offices and amenities; truck, plant and materials storage; access locations; provision of site hoardings etc;

h. environmental management instructions for all complex environmental control processes which do not follow common practice or where the absence of such instructions could be potentially detrimental to the environment;

i. steps the Proponent intends to take to ensure that all Plans and Sub Plans are being complied with;

j. consultation requirements with relevant government agencies; and;

k. community consultation and notification strategy (including local community, businesses, relevant government agencies, and all relevant Councillors), and complaint handling procedures.

Specific requirements of the main environmental system elements referred to in (iii) shall be as required under the conditions of this approval and/or as required under any licence or approval. All CMS shall be made publicly available.

Environmental Monitoring Construction

31. The Proponent shall submit to the Director-General reports in respect of the environmental performance of the construction works and compliance with the Construction Framework EMP, all relevant CMSs and any other relevant conditions of this approval. The reports shall be prepared six months after the start of substantial construction and thereafter at six monthly intervals or at other such periods as requested by the Director-General to ensure adequate environmental performance.
over the duration of the construction works. The report(s) shall include, but not be limited to, information on:

i. applications for consents, licences and approvals, and responses from relevant authorities;

ii. implementation and effectiveness of environmental controls and conditions relating to the work undertaken;

iii. identification of construction impact predictions made in the EIS and any supplementary studies and details of the extent to which actual impacts reflected the predictions;

iv. details and analysis of results of environmental monitoring;

v. number and details of any complaints, including summary of main areas of complaint, action taken, response given and intended strategies to reduce complaints of a similar nature; and

vi. any other matter relating to the compliance by the Proponent with the conditions of this approval or as requested by the Director-General.

The report(s) shall be provided to the EPA, DLWC, NPWS, NSW Fisheries, and relevant Councils, and any other relevant government agency nominated by the Director-General. The report(s) shall also be made publicly available.

32. The Proponent shall ensure that it has an internal audit system and that internal audits are undertaken and certified by the EMR every three (3) months to ensure compliance with the EMP, the conditions of approval and all other relevant licences and approvals. Each audit must be completed within 6 weeks of the end of the 3 month period and be made available to the Director-General upon request.

Operational Environmental Management Plan

33. An Operational Environmental Management Plan shall be prepared prior to the commencement of operation. The Operational EMP shall be prepared in consultation with the EPA, DLWC, NPWS, relevant Councils, and any other relevant government agency nominated by the Director-General. The Operational EMP shall be prepared in accordance with the conditions of this approval, all relevant Acts and Regulations and accepted best practice management procedures.

34. The Operational EMP shall be certified as being in accordance with the conditions of approval by the EMR.

35. The Operational EMP, as certified by the EMR, shall be approved by the Director-General prior to commissioning.

36. The Operational EMP shall include but not be limited to:

i. identification of the statutory and other obligations which the Proponent is required to fulfill, including all licences/approvals and consultations/agreements required from authorities and other stakeholders, and key legislation and policies which control the Proponent's operation of the project;

ii. identification of environmental performance criteria;

iii. a description of the sampling strategies and monitoring protocols (eg. specific monitoring requirements, and sampling frequency and locations, including any requirements of the EPA, NPWS, and DLWC) proposed to be used to test the environmental performance criteria.

iv. steps the Proponent intends to take to ensure compliance with all plans and procedures;

v. description of the consultation requirements/arrangements with relevant government agencies, the local community, and relevant Councils including complaints handling procedures; and

vi. management strategies for the environmental system elements including but not limited to: noise; water; air quality; erosion and sedimentation; access and traffic; groundwater; waste/resource management/removal/disposal; flora and fauna; hydrology and flooding; visual screening, landscaping and rehabilitation; and hazards and risks.
Specific requirements for some of the main environmental system elements referred to in Condition of Approval No. 36 (vi) shall be as detailed under the conditions of this approval and/or as required under any licence or approval.

37. The Operational EMP shall be made publicly available after approval by the Director-General.

38. All sampling strategies and protocols undertaken as part of the Operational EMP shall include a quality assurance/quality control plan and shall be approved by the relevant regulatory agencies to ensure the effectiveness and quality of the monitoring program. Only National Association of Testing Authorities accredited laboratories can be used for laboratory analysis.

Environmental Impact Audit Report

39. An Environmental Impact Audit Report shall be prepared:
   i. by an independent person at the Proponent’s expense;
   ii. submitted to the Director-General, the EPA, NPWS, and, upon request by the Director-General, to any other relevant government authority;
   iii. within 2 months after the first 12 months of operation of the proposal and thereafter at 2 and 5 years after the start of operation, or at any time as requested by the Director-General within the first 10 years of operation.

40. The Environmental Impact Audit Report shall:
   i. assess the key impact predictions made in the EIS and any supplementary studies including, but not limited to, noise impacts at affected locations along the corridor, traffic projections both for the new road and roads where redistribution of traffic was assessed, and impacts on flora and fauna;
   ii. detail the extent to which actual impacts reflect the predictions;
   iii. provide details on actual versus predicted impact for all key impact issues identified in the EIS or as updated in the Representations Report;
   iv. assess the suitability of implemented mitigation measures and safeguards, and recommend any additional measures that are required to be taken as a result of i to iii above;
   v. discuss results of consultation with the local community in terms of feedback/complaints on the construction and operation phases of the project and any issues of concern raised; and
   vi. assess compliance with the Construction Framework EMP.

41. The Proponent shall comply with all reasonable requirements of the Director-General, EPA, NPWS, and other relevant authorities with respect to any reasonable measure arising from, or recommendations in, the report.

42. The Report shall be made publicly available.

Property and Land Use

43. The Proponent shall ensure that existing access to properties fronting the highway are maintained throughout the construction period. The Proponent shall ensure that any access way affected by the proposal is reinstated to an equivalent standard or that adequate compensation is negotiated with the relevant landowner(s).

44. The Proponent shall consult on a regular basis with all affected landowners regarding any practical and cost effective measures to minimise impacts which may be implemented prior to the commencement of construction or within such time as agreed with the relevant landowner.

Traffic and Access
45. The Proponent shall consult with all relevant Councils to develop management techniques for construction traffic on local roads, prior to commencement of construction.

46. The Proponent shall monitor the use of local roads by construction heavy vehicle traffic in consultation with all relevant Councils and shall consult with the Councils to develop measures to minimise and/or restrict the use of local roads by heavy vehicle traffic if so required.

47. A road dilapidation report shall be prepared for all non-arterial roads likely to be used by construction traffic prior to commencement of construction and after construction is complete. A copy of the report shall be provided to all relevant Councils. Any damage resulting from the construction of the project, aside from that resulting from normal wear and tear, shall be repaired at the cost of the Proponent.

Note: Nothing in Condition of Approval No. 45 or Condition of Approval No. 47 shall be taken as restricting the Proponent from negotiating an alternative payment for damage to local roads with all relevant Councils, subject to the agreement of the Council.

Flora and Fauna

NPWS Concurrence Report

48. The Proponent shall implement the conditions contained in Section 9 of the 'Concurrence Report for the Proposed F3 to Branxton Highway Link' (NPWS 2001).

Prior to Construction

49. The comprehensive compensation habitat package required by NPWS's Concurrence Condition No. 15 shall be finalised prior to commencement of construction, and be prepared to the satisfaction of the Director-General and the Director-General of National Parks and Wildlife.

50. The Proponent shall achieve at least a 2:1 ratio in its compensatory habitat package for the endangered Kurri Sand Swamp Woodland and at least a 2:1 ratio for all other vegetated areas affected by clearing and edge effects².

51. The Proponent shall prepare, in consultation with the Department and NPWS, a detailed Flora and Fauna Management Sub Plan. The Sub Plan shall be prepared prior to construction and shall be consistent with NPWS Concurrence Condition No. 15 regarding EMPs. The Sub Plan shall include but not be limited to:

i. all those matters identified in the NPWS’s Concurrence Condition No. 15;
ii. strategies for seed collection and revegetation;
iii. a fauna risk assessment to identify:
   a. which fauna species need to be targeted for measures to ensure safe transverse crossing of the roadway;
   b. mitigation measures to be implemented;
   c. the likely effectiveness of proposed mitigation measures in design and location; and
   d. further mitigation strategies.
iv. identification of measures proposed to be taken to protect vegetated areas outside the direct impact zone, control impacts due to spillage, spread of debris and refuse, and movement and storage of materials and equipment.

² 2 hectares of Kurri Sand Swamp Woodland re-created or reserved for every hectare directly and indirectly impacted (ie. cleared or degraded by edge effects respectively) as a result of the proposal.

² The allowance for edge effects shall be calculated in accordance with Ball, R (2000) Discussion paper – Compensating for Edge Effects prepared by Biosis Research for the RTA.

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52. The Proponent shall update the Additional Flora and Fauna Assessment Report (AFFAR) (Connell Wagner, May 2001) prior to construction and to the satisfaction of the Director-General and the NPWS. The updated report shall:
   i. document additional surveys undertaken for previously identified (i.e. the FIS and the AFFAR) and any newly listed threatened species, populations and ecological communities;
   ii. identify which of these listings and their habitat are likely to be affected by the proposal where this has not already been described; and
   iii. provide details of appropriate mitigation measures to be implemented.

53. In addressing NPWS’s Condition of Concurrence No. 3, the Proponent shall employ an independent road design specialist and independent qualified ecologist to review and report on the detailed design of the proposal prior to construction. The aim of the review is to establish whether additional measures can be incorporated in the detailed design, to reduce the direct and/or indirect impacts on threatened species, populations and ecological communities and their habitats, and to improve the effectiveness of proposed mitigation measures. The review and report shall include, but not be limited to:
   i. an investigation to demonstrate that the proposed multi-function fauna overpass is an effective and appropriate design; and
   ii. identification of measures to further reduce the amount of clearing of native vegetation.

The Proponent shall submit the report to the NPWS and the Director-General, and comply with all reasonable requirements of the Director-General and the NPWS and other relevant authorities with respect to any reasonable measure arising from, or recommendations in, the report.

54. The Proponent shall provide a dedicated fauna overpass unless the review and report referred to in Condition of Approval No. 53 identifies:
   i. that it is not possible to do this; or
   ii. the proposed multi-function fauna overpass is an effective and appropriate design.

55. The Proponent shall provide opportunities to facilitate the safe transverse crossing of Squirrel Gliders in the area of Allandale where a Squirrel Glider has been recorded.

56. Additional opportunities for the safe transverse crossing for Squirrel Gliders shall be provided at any new locations where Squirrel Gliders are found (see NPWS Concurrence Condition 6 and Condition of Approval No. 52) unless it can be demonstrated, to the satisfaction of the Director-General and NPWS, that these cannot be achieved.

57. The Proponent shall, prior to construction, employ a qualified ecologist approved by the NPWS, to identify and clearly mark all remnant patches of native vegetation, threatened flora species and communities adjacent to the areas proposed to be cleared in order to ensure minimal disturbance to native vegetation, and undertake pre-clearance surveys to search, trap, and release fauna that may be impacted by construction activities. In addition, the qualified ecologist shall be responsible for ensuring NPWS’s Conditions of Concurrence Nos. 8 & 9 are met.

58. Any tree hollow roosts for bats in the areas to be cleared are to be relocated. If this is not possible, then an artificial bat roost shall be provided in adjacent vegetation prior to clearing.

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4 This report accompanied the Representations Report and addressed threatened species, populations and ecological communities listed on the TSC Act since the preparation of the FIS.
5 Currently proposed to include a corridor for a gas pipeline, extension of Stockington Road over the proposal, and a fauna overpass.
6 Dedicated for the exclusive use of fauna crossing over the highway and not incorporating any other uses such as road access, or utility corridors (except where these do not require cleared easements).
59. Where possible, seeds of locally native species shall be collected prior to the commencement of construction to provide seed stock for revegetation purposes to the satisfaction of a qualified bushland regeneration officer acceptable to the NPWS. Topsoil and leaf mulch shall be stripped and stored for placement back in the vegetation zone from where it was removed subject to Condition of Approval No. 63.

Construction

60. The Proponent must not clear more than 168 hectares of native vegetation subject to any changes identified and accepted in Condition of Approval No. 53.

61. The Proponent must not clear more than 33.7 ha of Kurri Sand Swamp Woodland subject to any changes identified and accepted in Condition of Approval No. 53.

Revegetation and Rehabilitation

62. The Proponent shall monitor and maintain all proposed vegetation rehabilitation for a minimum of three years and undertake measures to control weeds.

63. Weed infested topsoil, as identified by a qualified ecologist, shall not be used in the rehabilitation works unless it is sterilised or treated in an appropriate manner.

64. Cleared vegetation must be reused or recycled to the greatest extent practicable. Reuse option including removing millable logs, recovering fence posts, mulching and chipping unusable vegetation waste for on-site use. All reasonable measures to use any surplus vegetation shall be undertaken including donation to community groups, distribution to the local community, etc.

65. If, during the course of construction, the Proponent becomes aware of the presence of any threatened species which are likely to be significantly affected and are not recognised in the flora and fauna studies presented in the EIS, FIS or Representations Report, then the Proponent shall immediately advise the Director-General of National Parks and Wildlife. No activity which places any of these species at risk shall be undertaken until advice has been received from the NPWS. All recommendations by the NPWS shall be complied with prior to any works likely to affect any threatened species.

66. All mitigation measures generally identified in Sections 2.4.3 through 2.4.14 of the Representations Report should be implemented.

Monitoring

67. The Proponent shall, as part of the Operational EMP referred to in Condition of Approval No. 33, prepare a fauna monitoring program to assess the effectiveness of all road crossing ameliorative measures. The monitoring program shall be carried out for a minimum of three years after operation and include a report on an assessment of the following matters:

i. the levels of fauna underpass use by native fauna;

ii. the extent of road kills and rehabilitation of injured fauna;

iii. the adequacy of exclusion fencing and glider crossing points, with particular reference to design and placement and need for additional measures; and

iv. degree and nature of wildlife utilisation of any contiguous roadside wildlife corridors established.

The Proponent shall submit the report to the NPWS and the Director-General, and comply with all reasonable requirements of the Director-General and the NPWS with respect to any reasonable measure arising from, or recommendations in, the report.
Bridge Design

68. The Proponent shall consult NSW Fisheries in relation to: the construction of temporary platforms for the construction of the piles and piers in the creeks; and the design and timing of bridge construction.

69. The Proponent shall ensure that no earthen platforms are constructed or fill material placed in the creeks unless prior approval is granted by NSW Fisheries and the Director-General.

Noise and Vibration

70. The Proponent shall where reasonable and feasible apply best practice innovative noise mitigation measures including:
   i. maximising the offset distance between noisy plant items and nearby noise sensitive receivers;
   ii. avoiding noisy plant working simultaneously close together and adjacent to sensitive receivers;
   iii. minimising consecutive night time works in the same locality;
   iv. orienting equipment away from sensitive areas;
   v. carrying out loading and unloading away from noise sensitive areas; and
   vi. selecting site access points and roads as far as possible away from sensitive receivers.

Construction Noise and Vibration Management Sub Plan

71. A detailed Construction Noise and Vibration Management Sub Plan (NV/SP Construction) shall be prepared. The Sub Plan shall include, but not be limited to:
   i. identification of all potentially affected noise sensitive receivers;
   ii. an assessment of current background noise levels at the identified noise sensitive receivers;
   iii. identification of appropriate construction noise objectives;
   iv. identification of all significant noise and vibration generating activities, duration and times of operation;
   v. potential noise and vibration impacts from each activity and any likely cumulative noise impacts from concurrent activities;
   vi. details of all reasonable and feasible noise mitigation measures that will be implemented to achieve the adopted construction noise objectives;
   vii. the need for respite periods;
   viii. construction timetabling to minimise noise impacts;
   ix. noise and vibration monitoring, reporting and response procedures;
   x. complaints handling and monitoring system;
   xi. a pro-active and reactive strategy for dealing with complaints;
   xii. site contact person to follow-up complaints;
   xiii. procedures for notifying residents of construction activities likely to affect their noise and vibration amenity;
   xiv. contingency plans to be implemented in the event of non-compliances and/or noise complaints.

The plan shall be submitted to the EPA when applying for an Environment Protection Licence for the construction phase.

Construction Hours

72. The Proponent shall ensure that rock breaking, rock hammering, sheet piling and any other activities which result in impulsive tonal noise generation are only scheduled between the following hours unless otherwise as agreed by the EPA through the Construction Noise and Vibration Management Sub Plan Process:
   i. 8 am to 12 pm, Monday to Saturday; and
ii. 2 pm to 5 pm Monday to Friday.

Where these activities are undertaken for a continuous three hour period and are audible to noise sensitive receptors, a minimum respite period of at least one hour shall be scheduled before activities re-commence.

73. All construction activities, including entry and departure of heavy vehicles are to be restricted to the hours of 7:00 am to 6:00 pm (Monday to Friday); 8:00 am to 1:00 pm (Saturday) and at no time on Sundays and public holidays.

74. Works outside these hours that may be permitted include:
   i. any works which do not cause noise emissions to be audible at any nearby residential property;
   ii. the delivery of materials which is required outside these hours as requested by police or other authorities for safety reasons;
   iii. dust suppression works;
   iv. emergency work to avoid the loss of lives, property and/or to prevent environmental harm; and
   v. any other work as agreed through negotiations between the Proponent and potentially affected noise receivers or as otherwise agreed by the EPA through the NVMSM (Construction) process.

Construction Noise Criteria

75. Construction noise levels shall be monitored to verify compliance with the requirements specified in the NVMSM (Construction). The Proponent shall implement any additional mitigation measures as required by the Director-General following consultation with the EPA should monitoring indicate exceedance.

76. In order to minimise noise impacts during construction, the Proponent shall erect noise mitigation measures prior to the commencement of construction.

Vibration and Blasting

77. Should blasting be required, the Proponent shall prepare a Blast Management Strategy in consultation with the EPA and incorporate this Strategy into the Construction Noise and Vibration Management Sub Plan. The Strategy shall be prepared with an aim to demonstrate that all blasting and associated activities will be undertaken in a manner that will not generate unacceptable noise and vibration impacts at residences or other noise sensitive receivers. Issues to be considered in the Strategy shall include, but not necessarily be limited to:
   i. details of blasting to be performed, including location, method and justification of the need to blast;
   ii. identification of any potentially affected noise and vibration sensitive sites including heritage buildings and utilities;
   iii. establishment of appropriate criteria for blast overpressure and ground vibration levels at each category of noise sensitive site;
   iv. determination of potential noise and vibration impacts from blasting and appropriate blast management practices;
   v. community consultation procedures.

Reference shall be made to the Guideline entitled “Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration” prepared by the Australian and New Zealand Environment and Conservation Council (ANZECC).
The plan shall be submitted to EPA when applying for an Environment Protection Licence for the construction phase.

78. Blasts shall be limited to one single detonation in any one day, unless otherwise agreed by the EPA through the Construction Noise and Vibration Management Sub Plan Process.

79. The Proponent shall ensure that vibration resulting from construction of the project is limited to:
   i. German Standard DIN 4150 and British Standard BS 7385: Part 2 – 1993 for structural damage vibration; and

Where there is an inconsistency between these standards, the more stringent standard shall apply.

80. Dilapidation surveys shall be undertaken for all buildings located within 200 metres of the road construction area prior to the commencement of blasting or major vibration inducing construction activities. The Proponent shall be responsible for rectifying any damages occurring as a result of the construction with the cost to be borne by the Proponent.

81. For any section of the project where blasting is proposed, the Proponent shall undertake a series of initial trials at reduced scale prior to commencement of the proposed blasting to determine site-specific blast response characteristics and to define allowable blast sizes to meet the Guideline entitled Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration prepared by the Australian and New Zealand Environment and Conservation Council (ANZECC).

82. The Proponent shall provide a minimum of 48 hours notice to occupants located within 500 metres of any blasting and provide a schedule of blasting times to affected residences.

83. Blasting shall only be undertaken between the hours of 10:00 am and 3 pm (Monday to Friday) and 10:00 am to 1:00 pm (Saturday).

Operational Noise Management Sub Plan

84. A detailed Operational Noise Management Sub Plan (NMSP Operation) shall be prepared in consultation with the EPA. The NMSP Operation shall include, but not be limited to:
   i. details of noise mitigation measures to be implemented for the operation stage sufficient to address the technical requirements of the NSW Government's guideline – Environmental Criteria for Road Traffic Noise;
   ii. location, type and timing of erection of any permanent noise barriers;
   iii. specific physical and managerial measures for controlling noise and vibration;
   iv. predicted road traffic noise levels immediately after opening and with all proposed noise mitigation measures in place, at the noise sensitive receiver locations identified in the Representations Report;
   v. a methodology and procedures for assessing compliance with the predicted road traffic noise levels immediately after opening; and
   vi. the urban design issues relating to noise control measures.

With respect to Condition of Approval No. 84 (iii) above, the Proponent shall consider the use of a range of structural and non-structural measures including speed controls and the use of open graded asphalt.

Operation Noise Management
85. Monitoring of operational noise shall be undertaken in accordance with the NMSP (Operation). The Proponent shall, in consultation with the EPA, assess the adequacy of the traffic noise mitigation measures after one year of operation with regard to the EPA guideline Environmental Criteria for Road Traffic Noise. Should the assessment indicate a clear trend in traffic noise levels which are higher than the predictions made and exceed EPA noise criteria, the Proponent shall consider further mitigation measures including but not limited to inclusion of noise barriers, insulation of buildings, and total acquisition of properties.

86. Notwithstanding the above, the Proponent shall, as a minimum, comply with the noise assessment criteria described in Section 9 of the Additional Environmental and Engineering Assessment report (Cornell Wagner, May 2001).

Soil and Water Management

Soil and Water Management Sub Plan

87. A detailed Soil and Water Management Sub Plan shall be prepared in consultation with the DLWC, NSW Fisheries, and relevant Councils. The Sub Plan shall be prepared in accordance with the Department of Housing's guideline Managing Urban Stormwater - Soils and Construction and where appropriate, DLWC's Constructed Wetlands Manual. The Sub Plan shall be prepared prior to construction or operation. The section of the Sub Plan dealing with construction impacts shall be submitted to the EPA when applying for an Environment Protection Licence for the construction phase.

88. The Soil and Water Management Sub Plan shall contain, but not be limited to:
   i. management of stormwater from the development on the quality of surface and groundwater;
   ii. details of short and long term measures to be employed to minimise soil erosion and the discharge of sediment to land and/or waters including the locations of suitably sized sedimentation basins;
   iii. management of the impacts of the development on watercourse crossings including Wallis/Surveyor's Creeks, South Maitland Railway/Swamp Creek, Bishops Creek, and Black Creek;
   iv. management of the impacts of Wallis/Surveyor's Creeks, South Maitland Railway/Swamp Creek, Bishops Creek, and Black Creek on the development;
   v. identification of all potential sources of water pollution and a detailed description of the remedial action to be taken or management systems to be implemented to minimise discharges of these pollutants from all sources within the subject site;
   vi. detailed description of water quality monitoring to be undertaken during the pre-construction, construction and operation stages of the proposal including identification of locations where monitoring would be carried out;
   vii. contingency plans for fuel and other spills; and
   viii. a program for reporting on the effectiveness of the sediment and erosion control system against performance goals.

Erosion and Sedimentation Control Works

89. The Soil and Water Management Sub Plan shall also incorporate detailed erosion and sedimentation controls including a strategy to manage the extent of exposed ground surface during construction and progressive site rehabilitation requirements (in accordance with Conditions of Approval Nos. 97 and 114). The Sub Plan shall be prepared to the satisfaction of DLWC and in consultation with the EPA and NSW Fisheries and sufficient to address the technical requirements for obtaining relevant EPA approvals/licences.

90. The DLWC, or other appropriately qualified soil conservationist, shall be consulted on a regular basis to undertake inspections of temporary and permanent erosion and sedimentation control devices to
ensure that the most appropriate controls are being implemented and that they are being maintained in an efficient condition at all times and meet the requirements of any relevant approval/licence condition(s).

91. All water collected during construction which is likely to be contaminated, shall be tested, treated, handled and disposed of so that it does not pollute waters.

92. Sediment basin(s) must be designed (stability, location, type, and size), constructed, operated and maintained in accordance with the guideline Managing Urban Stormwater - Soils and Construction, 3rd edition, 1998, or its latest edition, produced by the NSW Department of Housing unless otherwise approved by the EPA.

Hydrology and Flooding

93. The Soil and Water Management Sub Plan shall identify mitigation measures proposed to be taken to address any:
   i. afflux impacts from the roadway or structures associated with the proposal eg. the proposed Wallis/Surveyors Creek crossing and impacts upstream in the Buchanan area; and
   ii. adverse impacts from the proposal as a result of losses to the Hunter River floodplain storage areas for flood events above and including the 1% Annual Exceedence Probability Event eg. the Wentworth and Dagworth Swamps;

Operation Stage Control Measures

94. All stormwater drainage, erosion, sedimentation and water pollution control systems and facilities of the proposal shall be located, designed, constructed operated and maintained to meet the requirements of the relevant authorities including the EPA and the DLWC. All facilities including wetland filters, grass filter strips, gross pollutant traps and sedimentation basins shall be inspected regularly and maintained in a functional condition for the life of the project. Construction stage water quality structures shall be maintained for a minimum of six months after commissioning of the proposal or until revegetation has provided groundcover to at least 70% of the exposed surface.

95. The Proponent shall provide appropriate detention systems for containment of spills and materials arising from accidents that are consistent with the Proponent's Code of Practice for Water Management – Road Development and Management in consultation with the EPA.

Groundwater

96. The Proponent shall identify the most appropriate measures to safeguard and/or mitigate impacts on the groundwater, or impacts arising from any groundwater dewatering operations, in consultation with the DLWC, prior to the commencement of construction. Measures may include:
   i. evaluation of aquifer characteristics including conductivity and salinity;
   ii. identification of suitable sites for the disposal of saline groundwater from dewatering activities; and
   iii. installation of monitoring bores.

Landscaping

97. The Proponent shall prepare a detailed Landscape Sub Plan in consultation with the relevant Councils, all affected landowners and the Community Liaison Group. The Sub Plan shall include, but not be limited to the following:
   i. sections and perspective sketches;
   ii. methodology of landscaping works;
   iii. location and identification of existing and proposed vegetation including use of indigenous species;
iv. location of mounds, bunds, structures or other proposed treatments, finishes of exposed surfaces (including paved areas), measures to preserve bio-diversity, colours and specifications, staging of works, methodology of landscaping;

v. progressive landscape strategies incorporating other environmental controls such as erosion and sedimentation controls, dust mitigation, drainage, noise mitigation;

vi. lighting; and

vii. monitoring and maintenance procedures.

The Proponent shall also include landscape strategies incorporating other environmental controls such as erosion and sedimentation controls, noise mitigation measures, drainage structures and lighting.

98. All landscaping works shall be monitored and maintained by a suitably qualified landscape specialist at the Proponent’s expense for a period of not less than three years.

99. The Proponent shall implement any required remediation measure(s) to maintain landscaping works. Any landscaping within the road reserve shall be maintained by the Proponent for the life of the project.

Heritage and Archaeology

100. The Proponent shall, prior to the commencement of construction, undertake a program of test excavations at the recorded sites and the Potential Archaeological Deposits (PADs) identified along the route, and any other additional locations as determined by the NPWS and the Aboriginal community groups (ie. Mindaribba Local Aboriginal Land Council, Awabakal Local Aboriginal Land Council, Wonnarua Nation Aboriginal Corporation and the Lower Hunter Tribal Council) along the highway route in order to identify significant and sensitive sites. This shall include but not be restricted to an investigation of the following for each location:

i. the geomorphological context of the landscape being investigated;

ii. the landscape history and level of disturbance;

iii. the presence of intact archaeological material;

iv. the nature of and significance of intact archaeological material to include an assessment of the material recovered and its landscape and geomorphological context; and

v. appropriate management options and mitigation measures including requirements for more detailed salvage.

101. The Proponent shall prepare a detailed research program, which is to be undertaken 12 months prior to commencement of works, to support the work to be undertaken for the testing referred to in Condition of Approval No. 100 to the satisfaction of the NPWS.

102. The Proponent shall undertake a salvage program as required by the NPWS and the local Aboriginal community groups.

103. The Proponent shall identify, in consultation with the local Aboriginal community groups and the NPWS, management zones across the proposal for the ongoing management of sites along the route corridor. Each management zone shall:

i. incorporate a set of management objectives which is reflective of its relative importance for conserving Aboriginal heritage values identified through the testing process; and

ii. strategies for the avoidance of sites and areas of high sensitivity.

104. If during the course of construction the Proponent becomes aware of any heritage items or archaeological material, all work likely to affect the site(s) shall cease immediately and the relevant authorities, including NPWS, NSW Heritage Office and the local Aboriginal community groups shall be consulted to determine an appropriate course of action prior to the recommencement of work at
that site. Appropriate supporting documentation would need to accompany any application for
required permit/consent(s).

105. The Proponent shall prepare a cultural heritage strategy for the construction works to ensure that:
   i. all workers are aware of the Aboriginal heritage values within each construction area;
   ii. areas in sensitive management zones are appropriately fenced to avoid damage, particularly
       from inadvertent machinery movement; and
   iii. all works cease immediately upon the discovery of any 'unknown' Aboriginal site and NPWS
       and relevant local Aboriginal community groups are contacted.

106. The Proponent shall prepare a cultural heritage strategy for management, post construction, to
      include but not be limited to:
      i. the introduction of permanent fencing;
      ii. revegetation of areas of high archaeological significance; and
      iii. an assessment of the changes in accessibility to sites and strategies to reduce the impact of
          these changes, prepared in consultation with the local Aboriginal community groups and the
          NPWS.

107. The Proponent shall fully fund the proposed works and mitigation strategies outlined in the above
     conditions.

108. Documentation, in the form of Aboriginal Cultural Heritage Assessments, is required from each of the
     known Aboriginal community groups. The published NPWS Aboriginal Cultural Heritage Standards
     and Guidelines outlines the critical components for these assessments including the Aboriginal
     community's understanding of the proposed project and:
     i. the cultural heritage values they ascribe to the landscape and the significance to the
        community (sensitivity mapping);
     ii. the impact to their culture as a result of works associated with the proposal; and
     iii. management options and recommendations considered necessary by the community to
         mitigate against impacts or loss.

109. Documentation from local Aboriginal community groups detailing the significance of Sugarloaf
     Range, their understanding of the implications of the impact of the proposed Highway Link to
     Branxton and:
     i. the cultural heritage values they ascribe to the Sugarloaf Range landscape and its
        significance to the community (sensitivity mapping);
     ii. the impact to their culture as a result of works associated with the Sugarloaf Range
        landscape; and
     iii. management options and recommendations considered necessary by the community to
         mitigate against impacts or loss.
     The above may be included in the Aboriginal Cultural Heritage Assessments or documented
     separately in the form of a specific report or letter from each of the Aboriginal community groups.

110. Prior to the commencement of substantial construction, the Proponent shall prepare in consultation
     with the Aboriginal community groups, a Cultural Heritage Plan of Management for approval by the
     Director-General and in agreement with the Director-General of National Parks and Wildlife. The
     Plan shall encapsulate strategies, methods and outcomes for Aboriginal cultural heritage values.

111. The Cultural Heritage Plan of Management shall:
      i. identify the Aboriginal cultural and archaeological variables and criteria;
      ii. assess those areas already being considered for their compensatory habitat values, to
          determine their value for Aboriginal cultural heritage;
      iii. consider the issues raised by the Aboriginal communities during the consultation process; and
iv. identify areas (other than those identified in (ii) above) for consideration as off-sets, consistent with the outcomes of the Aboriginal Cultural Heritage Plan of Management.

112. The Proponent must notify the Director-General of National Parks and Wildlife in writing of any proposed variations to the alignment, design or construction of the activity not considered in the current proposal. The NPWS must be given the opportunity to inspect the final route and any variations can then only proceed if approval in writing is given by the Director-General of National Parks and Wildlife. The NPWS must be allowed a minimum of fifteen working days to consider any variation and to provide advice on the appropriate measures required to mitigate any impacts.

113. The Proponent shall implement the mitigation measures identified in Section 8.5 of the EIS in order to protect the non-indigenous cultural heritage items potentially affected by the proposal.

**Air Quality**

**Construction Air Quality Sub Plan**

114. A specific Construction Air Quality Sub Plan shall be prepared in consultation with the EPA. The Sub Plan shall provide details of all dust control measures to be implemented during the construction stage, sufficient to address the technical requirements for any EPA approvals/licences. The Sub Plan shall include, but not be limited to:

i. pro-active measures to reduce dust from stockpiles and cleared areas and other exposed surfaces; and

ii. progressive revegetation strategy for exposed surfaces in accordance with Conditions of Approval Nos. 89 and 97.

115. Where there is a risk of losing material, construction vehicles using public roads shall be maintained and covered to prevent any loss of load, whether in the form of dust, liquid, soils. Construction vehicles shall be maintained in such a manner that they would not track mud, dirt or other material onto any street which is opened and accessible to the public. In the event of any spillage, the Proponent is required to remove the spill material within 24 hours.

116. In accordance with the *Protection of Environment Operations (Control of Burning) Regulation 2000*, no open burning or incineration shall be permitted on site unless otherwise approved by the EPA.

**Hazards and Risk Management**

117. The Proponent shall prepare and implement a Hazards and Risk Management Sub Plan. This Sub Plan shall include, but not be limited to the following:

i. details of the hazards and risks associated with the proposal; and

ii. pro-active and reactive mitigation measures including contingency plans to be implemented in the event of a pollution incident.

**Dangerous Goods and Hazardous Materials**

118. The Proponent shall prepare and implement an On-Site Refuelling Protocol to manage on-site refuelling of vehicles during the construction. The Protocol shall include, but not necessarily be limited to:

i. a decision-making algorithm to determine whether on-site or off-site refuelling is appropriate in a given situation;

ii. arrangements for the transport of diesel to the refuelling site, including vehicle types, volumes, movement times and routes where relevant;

iii. procedures for refuelling to address the potential for spills, collisions with refuelling vehicles or other hazardous incidents; and
iv. procedures to be followed in the event of a diesel spill, including containment and clean-up measures.

The On-Site Refuelling Protocol shall be submitted for the approval of the Director-General prior to the commencement of any refuelling activity, or within such period otherwise agreed by the Director-General.

Should the Proponent decide not to undertake any on-site refuelling activity during construction, the Proponent may satisfy this condition by certifying in writing, to the Director-General, that such refuelling activities will not be conducted.

Construction Risk Management

119. The Proponent shall prepare and implement a Construction Safety Plan to manage hazardous incidents and public safety during the construction of the proposal. The Plan shall include, but not necessarily be limited to:

i. physical measures to be implemented to minimise the potential for public harm at and in the vicinity of construction areas;
ii. a program to ensure that safety measures implemented to minimise the potential for harm to the public remain in place and are adequately maintained while hazardous situations exist;
iii. procedures for the notification of residents in the vicinity of construction sites whose safety may be affected by construction activities;
iv. procedures to manage risk to construction workers;
v. identification of pipelines, cables and other utilities that may be affected by construction of the roadway and associated infrastructure, either directly or indirectly, and methods to minimise those impacts;
vi. procedures to be followed in the event that contaminated material is discovered during any excavation works; and
vii. measures to be implemented to ensure safe transport of construction materials, including transport routes, transport times, vehicle speeds and driver behavioural requirements.

The Construction Safety Plan shall be submitted for the approval of the Director-General prior to the commencement of any construction activity, or within such period otherwise agreed by the Director-General.

Operation Risk Management

120. The Proponent shall prepare and implement an Emergency Plan to manage emergency events that may arise. The Plan shall include, but not necessarily be limited to:

i. identification of emergencies that may arise in relation to the proposal and associated infrastructure;
ii. procedures to be followed to address potential emergencies and minimise the impacts of emergencies on surrounding land uses;
iii. monitoring and communication systems installed to indicate an emergency;
iv. details of fire safety measures where relevant;
v. procedures for the notification of relevant emergency services, authorities and affected receptors of an emergency situation; and
vi. a system to investigate and address the cause(s) of any emergency to prevent recurrence.

The Emergency Plan shall be submitted for the approval of the Director-General prior to the commencement of operation of the proposal, or within such period otherwise agreed by the Director-General.
121. The Proponent shall prepare and implement a Security and Crime Management Strategy to prevent unauthorised public ingress or access, and to minimise the potential for crime in the vicinity of the proposal (e.g. vandalism, loitering, illegal dumping etc). The Strategy shall be generally in accordance with the principles outlined in the joint Department and Police Service publication Crime Prevention and the Assessment of Development Applications, and be developed in consultation with the NSW Police Service and relevant councils. The Strategy shall include, but not necessarily be limited to:

i. details of security arrangements to prevent unauthorised access, including physical exclusion measures, detection devices and management mechanisms;

ii. procedures for addressing security issues, should they arise;

iii. specific design features intended to discourage the incidence of crime at and in the immediate vicinity of relevant components of the proposal and associated infrastructure (e.g. fencing on overpasses);

iv. lighting considerations, including light intensity, direction and hours of operation at and in the immediate vicinity of the proposal, with the aim of minimising areas that may encourage crime;

v. policies and procedures for the management and removal of graffiti, amelioration of vandalism, should it occur at or on any component of the of relevant components of the proposal; and

vi. policies and procedures for the management and removal of illegal or inappropriate bill-posting and illegally dumped materials, should it occur at or on any component of relevant components of the proposal.

The Security and Crime Management Strategy shall be submitted for the approval of the Director-General prior to the commencement of construction or within such period otherwise agreed by the Director-General.

This condition only applies to "relevant" components of the proposal. That is, this condition only applies to those components that may be subject to security or crime issues.

Spoil Disposal

Spoil Management Plan

122. The Proponent shall prepare a Spoil Management Sub Plan. The Sub Plan shall identify how spoil would be handled, stockpiled, reused and disposed. The Sub Plan shall be prepared:

i. in consultation with the EPA and the relevant Councils;

ii. prior to construction; and

iii. for all relevant sites.

123. All clean and/or treated spoil shall be reused or recycled where possible and cost effective to do so. The Proponent shall ensure that spoil generated from construction activities is maximised in preference to any import of fill.

Waste Management and Recycling

Waste Management and Reuse Sub Plan

124. A detailed Waste Management and Reuse Sub Plan shall be prepared. The Sub Plan shall address the management of wastes during the construction and operation stages respectively in accordance with Government's Waste Reduction and Purchasing Policy. It shall be prepared prior to construction, and shall identify requirements for:

i. waste avoidance;

ii. reduction;

iii. reuse; and

iv. recycling;
and details of requirements for:
v. handling;
vi. stockpiling;
vii. disposal of wastes: specifically contaminated soil or water, concrete, demolition material, cleared vegetation, oils, grease, lubricants, sanitary wastes, timber, glass, metal, etc.;
viii. implementation of energy conservation best practice; and
ix. identifying any site for final disposal of any material and any remedial works required at the disposal site before accepting the material.

125. Any waste material that is unable to be reused, reprocessed or recycled shall be disposed at a landfill licensed by the EPA to receive that type of waste. The Sub Plan shall be framed using the waste minimisation hierarchy principles of avoid-reduce-reuse-recycle-dispose. This shall also include the demand for water.

Utilities and Services

126. A detailed Utility Services Sub Plan shall be prepared in consultation with the relevant service providers (eg. Transgrid, Agility Services, Telstra). The Sub Plan shall identify the services potentially affected by construction activities and discuss requirements for diversion, protection and/or support. The Sub Plan shall be prepared in consultation with the relevant service provider(s).

127. Any alterations to utilities and services shall be carried out to the satisfaction of the relevant service provider(s), and unless otherwise agreed to by the service provider, at no cost to the service/utility provider(s).

128. The Proponent shall ensure that disruption to services resulting from the proposal are minimised and shall be responsible for advising local residents and businesses affected prior to any disruption of service.

Location of Construction Facilities

129. The Proponent shall construct concrete batching plants and construction compounds and any other ancillary infrastructure (including sedimentation basins) required for this proposal only in those locations that satisfy the following criteria:
i. sites are to be located within the road reserve wherever possible;
ii. sites are to be located with ready access to the local road network;
iii. sites on relatively level land;
iv. sites to be separated from nearest residences by at least 200 metres unless it can be demonstrated to the satisfaction of the Director-General that there will be no adverse impacts on noise, visual and air quality impacts;
v. sites are not to be located within 100 metres of waterways unless adequate erosion and sediment controls are implemented to protect water quality;
vi. sites above the 100 ARI flood level;
vii. sites are to have low conservation significance for flora, fauna or heritage and they are not to require any clearing of native vegetation beyond that which must be cleared for the proposal in any case;
viii. sites that do not contain areas shown as habitat for threatened species or communities; and(ix. sites are to be selected so that the operation of the plants does not impact on the land use of adjacent properties.

Note:
Any modification to the proposal that would be inconsistent with the conditions of approval shall only be carried out with the prior written approval of the Minister, in accordance with the relevant provisions of the EP&A Act.
Attachment 1

Guidelines for the Establishment of the Community Liaison Group

1. The Proponent shall consider the following when establishing a Community Liaison Group (CLG):
   i. the CLG shall comprise at least two (2) representatives of the Proponent (including the Environmental Management Representative), at least one (1) representative of the relevant Council, at least two (2) community representatives and one (1) business representative (where relevant);
   ii. at its first meeting, the CLG shall consider its interrelationship with any existing community liaison/consultative groups of adjoining or interrelated developments;
   iii. representatives from relevant government agencies or other individuals may be invited to attend meetings as required by the Chair; and
   iv. an independent note taker shall be provided by the Chair at the expense of the Proponent where determined necessary by the Chair.

2. The Proponent shall, at its own expense:
   i. nominate two (2) representatives to attend all meetings of the Committee;
   ii. provide to the CLG regular information on the progress of work and monitoring results;
   iii. promptly provide to the CLG such other information as the Chair may reasonably request concerning the environmental performance of the development;
   iv. provide access for site inspections by the CLG; and
   v. provide meeting facilities for the CLG, and take Minutes of CLG meetings. These Minutes, once endorsed by the Chair, shall be available for public inspection at the relevant Council within 14 days of the meeting.

The Proponent shall ensure that Minutes from CLG meetings are placed on the Internet within 14 days after they become available (refer Condition of Approval No. 17).
Roads and Traffic Authority -
Proposed F3 to Branxton
Highway Link

Director-General's Report
Section 115C of the
Environmental Planning
and Assessment Act

November, 2001
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FOREWORD

The NSW Roads and Traffic Authority is proposing to construct a new four lane dual carriageway highway to extend in a north-westerly direction for approximately 39.5 kilometres from the F3 Freeway near Seahampton to the New England Highway west of Branxton. The proposal, as described in an EIS, was publicly exhibited in August/September 1995 and is subject to Division 4 of Part 5 of the *Environmental Planning and Assessment Act*. It therefore requires the approval of the Minister for Urban Affairs and Planning.

This report has been prepared in accordance with Section 115C of the *Environmental Planning and Assessment Act* which requires that the Minister obtain a report from the Director-General of Urban Affairs and Planning prior to making a decision.

This report assesses: the environmental impact statement; the issues raised in the representations made in response to its exhibition; the submission from the Roads and Traffic Authority in response to the representations; the *Concurrence Report* for threatened species issues provided by the Director-General of National Parks and Wildlife; and other relevant matters pertaining to the potential environmental impacts of the proposal.

The report concludes that with proper management, the proposal would improve the efficiency of regional transport and the amenity of the local area. The proposal is recommended for approval subject to the recommended conditions.

Sue Holliday
Director-General
Department of Urban Affairs and Planning
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**APPENDIX A** Director-General of National Parks and Wildlife’s Concurrence, Conditions of Concurrence, and Concurrence Report

**APPENDIX B** Review of Traffic Modelling and Project Justification, (Masson, Wilson, Twiney, October 2001)
## GLOSSARY OF TERMS

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<td>Department of Urban Affairs and Planning</td>
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<td>Roads and Traffic Authority</td>
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<tr>
<td>TSC Act</td>
<td>Threatened Species Conservation Act 1995</td>
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Executive Summary

Background to the Proposal

In the early 1990s the Roads and Traffic Authority, at the request of the Federal Department of Transport (now the Federal Department of Transport and Regional Services), completed investigations for a new highway corridor between the F3 Freeway and the New England Highway west of Branxton. The Department of Transport and the Roads and Traffic Authority recognised that the road network in the Lower Hunter is of strategic importance for both national and regional transport efficiency, and economic development.

As a result of the investigations the Roads and Traffic Authority developed a proposal to construct a new 39.5 kilometre, four lane carriageway between the F3 Freeway near Seahampton and the New England Highway west of Branxton.

The proposal is subject to Part 5 of the Environmental Planning and Assessment Act (EP&A Act) and the Roads and Traffic Authority is the proponent and a determining authority.

The Minister, after considering the merits of an independent assessment by the Department of Urban Affairs and Planning, issued a direction under Section 115F(2) of the EP&A Act on 24 September 2001 that Division 4 of Part 5 of that Act applies to the proposed F3 to Branxton Highway Link. The proposal will therefore be determined by the Minister for Urban Affairs and Planning under Division 4 of Part 5 of the EP&A Act.

The Proposal

The planned route is largely within the Cessnock local government area (see Figure 1).

The proposal involves the construction of a new four lane dual carriageway highway, extending in a north-westerly direction for approximately 39.5 kilometres from the F3 Freeway near Seahampton to the New England Highway west of Branxton. It will provide a long-term road transport artery for travel through the Lower Hunter Valley.

The carriageway is proposed to be separated by a 15 metre median, except over the Sugarloaf Range where a concrete New Jersey median barrier would be used in order to lessen the footprint of the road through this environmentally sensitive area. The actual highway reserve is between 100-150 metres wide, which represents the construction "footprint" of the activity.

The design speed would be 100 kph with the vertical alignment of the main carriageway not to exceed 5%. The design life of the road pavement is proposed to be 20 years. Four new interchanges and one modified interchange are also proposed to connect to various existing roads. The route will cross approximately 55 watercourses and require the construction of 6 bridges.

The proposal also incorporates fauna underpasses and at least one fauna overpass, exclusion fencing, noise mitigation measures including sound barriers and berms, land acquisition over the whole of the route, and acquisition of compensatory habitat areas.

Approximately 168 hectares of vegetation would be directly cleared as a result of this proposal and a further 203 hectares impinged on by "edge effects". Ten threatened fauna species, three threatened flora species, and one endangered ecological community listed in Schedules to the Threatened Species Conservation Act (TSC Act) were identified as likely to be significantly affected by the proposal partly as a result of this clearing. Consequently the Roads and Traffic Authority was required to seek the concurrence of the Director-General of National Parks and Wildlife under that Act.

The Roads and Traffic Authority is seeking approval without any staging planned for the proposal.
Since the EIS was exhibited in 1995, there have been a number of changes to the proposal which are detailed in Table 7-1 of Section 7 of the Representations Report (ie. the Preferred Activity Report).

The estimated capital cost of the proposal is $382 million.

Need, Justification, and Benefits

The proposal as outlined above is consistent with many of the aims and objectives of current New South Wales strategic transport studies eg. “Action for Transport 2010 – The Integrated Transport Plan for NSW” (Department of Transport 1998). A range of strategic benefits were identified by the Roads and Traffic Authority in its EIS to justify the proposal. These include:

- improve the overall efficiency of the main road network of the Lower Hunter by reducing total travel time and distance and the number and severity of accidents;
- provide better connections between the urban centres of the Lower Hunter Valley including Cessnock, Kurri Kurri, Maitland, and the greater Lake Macquarie/Newcastle area, in order to facilitate stronger local businesses and social linkages;
- enhance the role and contribution of the Port of Newcastle to the national economy by improving transport links between the port/industrial area and locations in the Hunter Valley and beyond;
- meet the transport needs of existing and planned urban development areas in the Lower Hunter Valley including efficient connections between employment and residential areas;
- reduce the conflict between local and through traffic in the study area; and
- remove through-traffic (particularly heavy vehicles) from urban areas.

EIS and FIS Exhibition

The EIS was exhibited from 2 August 1995 to 29 September 1995. Seventy representations were received as a result of the exhibition of the proposal. There were various concerns raised with the proposal including:

- property impacts;
- issues relating to flora and fauna;
- adequacy of the EIS;
- corridor selection, project design, and justification; and
- operational noise impacts.

A Fauna Impact Statement (FIS) was prepared by the Roads and Traffic Authority in January 1997 in accordance with the provisions of Endangered Fauna (Intem Protection) Act (EF (IP) Act). (Note: At the time of the EIS preparation, the TSC Act 1995 had not been proclaimed. The Roads and Traffic Authority consulted with the Director-General of National Parks and Wildlife in February 1995 for the requirements of the FIS.) The FIS was publicly exhibited for 28 days from 17 February 1997.

The TSC Act was brought into force prior to this proposal being determined. Consequently, the FIS for this activity is deemed to be a Species Impact Statement (SIS) for the purposes of Part 5 of the EP&A Act. Therefore any critical habitats, species, populations or ecological communities listed in Schedules to that Act that are significantly affected by the proposal, required the concurrence of the Director-General of National Parks and Wildlife.

Route Changes

The Roads and Traffic Authority modified the proposed route in the section between Allandale and Illalong after the exhibition of the EIS. The changed route alignment was considered in a Review of Environmental Factors (REF) and addressed the concerns of landowners who had received development approval from Cessnock City Council for a tourist facility on land known as Greta Camp.

Since the completion of the REF, the Roads and Traffic Authority has identified a further option for the realignment of the proposal which avoids substantial severance of the tourist development and has less impact on the south Allandale community. This adopted second change to the route alignment between
Allandale and Illalong (identified as D14) was considered in a Supplementary REF and made possible by the acquisition of an affected property.

The Roads and Traffic Authority placed a Preferred Activity Report (PAR) on public exhibition for two weeks from 15 October 2001. The PAR identifies the current proposal for which the Roads and Traffic Authority is seeking the Minister’s approval.

Key Issues
Section 3 of this Report provides an overview of the main issues raised in the representations. The Director-General’s overall assessment of the proposal is provided in Sections 4 and 5 of this report.

The key findings and conclusions are that the Roads and Traffic Authority will need to:
- undertake additional mitigation measures to offset impacts on flora and fauna;
- incorporate measures to mitigate operational noise at certain sensitive receptors;
- prepare Construction Framework, and Operational Environmental Management Plans that address sediment and erosion controls, stability of batter and slopes, bushland rehabilitation, and water quality;
- undertake test excavations of identified and yet to be identified cultural heritage sites, conduct extensive consultation with relevant Aboriginal community groups, and prepare construction and operational cultural heritage protection strategies; and
- undertake post operational monitoring of traffic and noise to assess the key impact predictions made in the EIS.

Request for Approval
The Roads and Traffic Authority sought the approval of the Minister on 8 October 2001 after obtaining the conditional concurrence of the Director-General of National Parks and Wildlife for the deemed SIS on 3 October 2001.

Conclusion
The justification for the project has been substantiated on the basis of national, regional, and local road objectives. However, the project is likely to adversely impact flora and fauna identified in the Schedules to the TSC Act. Therefore a number of conditions have been recommended to be applied to any approval in order to achieve a balance between the key environmental impacts of the proposal and the identified benefits. These include:
- reservation of compensatory habitat areas;
- the provision of fauna underpasses and at least one dedicated fauna overpass;
- the preparation of a comprehensive construction environmental management plan(s); and
- close monitoring of the areal extent of clearing in certain sensitive areas.

It is concluded that the environmental impacts associated with the proposal could be managed to an acceptable level if the recommended conditions of approval are imposed on any approval.
1 INTRODUCTION

1.1 Purpose of the Report

The purpose of this report is to review the Roads and Traffic Authority's (RTA) environmental impact statement (EIS) for the proposed F3 to Branxton Highway Link, the issues raised in representations made in response to the exhibition of the EIS, and the RTA's consideration of these representations.

This report is prepared in accordance with Section 115C of the Environmental Planning and Assessment Act 1979 (EP&A Act) which requires the Director-General of the Department of Urban Affairs and Planning (Director-General) to assess and report to the Minister for Urban Affairs and Planning on the proposal. The assessment report, or Director-General's Report, together with the Minister's decision are to be made publicly available.

1.2 Environmental Impact Documentation

The environmental impact of the proposal has been described in the following documents:

- Environmental Impact Statement (EIS) (Connell Wagner June 1995);
- FIS (Connell Wagner January 1997) and accompanying documentation, Flora and Fauna Report (Mount King Ecological Surveys 1995), Fauna Survey Greta Deviation (Connell Wagner 1996) and Herptofauna Survey (Richard Wells 1995);
- Additional Flora and Fauna Assessment (AFFA) (Connell Wagner May 2001) to supplement the original FIS;
- Representations Report, Volumes 1, 2 and 3 (RTA, October 2001);
- Review of Environmental Factors (REF) for the Allandale to Illalong Section Comparison of Options D9 and D11 (Connell Wagner August 1998) and the subsequent Supplementary Review of Environmental Factors (SREF) for the Allandale to Illalong Section Comparison of Options (Connell Wagner August 2000);
- Kurri Swamp Woodland Recovery Assessment (Biosis Research), a report commissioned jointly by the RTA and NPWS in August 2001; and
- Additional Environmental and Engineering Assessment (Connell Wagner May 2001).

1.3 Statutory Provisions

1.3.1 Planning Approval

The proposal is subject to Part 5 of the EP&A Act and the RTA is the proponent and a determining authority. The proposal was not subject to Division 4 of Part 5 of the Act at the time of the exhibition of the EIS because, and in accordance with Section 115F of the EP&A Act, Division 4 does not apply to proposals where the Director-General's requirements for the EIS were issued prior to the commencement of that Division. (Note: Division 4 commenced in April 1994 and the requirements for the EIS were issued in March 1993.)

However, the Minister, after considering the merits of an independent assessment by the Department, issued a direction under Section 115F(2) of the EP&A Act on 24 September 2001 that Division 4 of Part 5 of that Act applies to the proposed F3 to Branxton Highway Link. The proposal will therefore be determined by the Minister for Urban Affairs and Planning under Division 4 of Part 5 of the EP&A Act. It should be noted that determining authorities are still required to make a determination on the proposal.

1.3.2 Threatened Species Concurrence

A Fauna Impact Statement (FIS) was prepared by the RTA in January 1997 in accordance with the provisions of Endangered Fauna (Interim Protection) Act. (Note: At the time of the EIS preparation, the Threatened Species Conservation Act 1995 (TSC Act) had not been proclaimed. The RTA consulted with the Director-General of National Parks and Wildlife in February 1995 for the requirements of a FIS.) The FIS was publicly exhibited for 28 days from 17 February 1997.
The TSC Act was brought into force prior to this proposal being determined. Consequently, under the Threatened Species Conservation (Savings and Transitional) Regulation 1996, the FIS for this activity is deemed to be a Species Impact Statement (SIS) for the purposes of Part 5 of the EP&A Act. Therefore any critical habitats, species, populations or ecological communities, listed in Schedules to that Act that are significantly affected by the proposal, require the concurrence of the Director-General of National Parks and Wildlife.

The RTA found that there would be a significant level of impact on the following ten threatened fauna species, three threatened flora species, and one endangered ecological community and consequently sought the concurrence of the Director-General of National Parks and Wildlife:
- Little Bent-wing Bat;
- Large Bent-wing Bat;
- Greater Broad-nosed Bat;
- Eastern Little Mastiff Bat;
- Yellow-bellied Sheath-tail Bat;
- Large-eared Pied Bat;
- Green & Golden Bell Frog;
- Squirrel Glider;
- Regent Honeyeater;
- Powerful Owl;
- Eucalyptus parramatiensis subsp decadens;
- Persoonia pauciflora;
- Grevillea pervillora; and
- Kurri Sand Swamp Woodland.

Concurrence was obtained on 3 October 2001. The Director-General of National Parks and Wildlife attached 15 conditions to his concurrence.

1.3.3 Matters Under the Environment Protection and Biodiversity Conservation Act (Commonwealth)

This proposal was specifically nominated as a matter that has been preserved under the Environment Protection (Impact of Proposals) Act under an agreement by the Commonwealth using the Environmental Reform (Consequential Provisions) Act 1999. Therefore an assessment on whether the proposal would have any significant impact on any matters of national environmental significance as identified under the Environment Protection and Biodiversity Conservation Act was not required.

1.4 Request for the Approval of the Minister for Urban Affairs and Planning

The RTA sought the approval of the Minister for Urban Affairs and Planning in a letter dated 8 October 2001, in accordance with Section 115B of the EP&A Act.

A Preferred Activity Report (PAR) was exhibited by the RTA between 12 October 2001 and 30 October 2001. This PAR describes to the community and other interested persons/agencies the current proposal for which the RTA is seeking the Minister’s approval.
2 THE CURRENT PROPOSAL

This section provides a background to the proposal and a description of the project as outlined in the EIS and supplementary information provided in the Representations Report. It also describes the current proposal for which the RTA is seeking the Minister’s approval.

2.1 Background to the Proposal

The Federal Department of Transport (now the Federal Department of Transport and Regional Services) and the RTA recognised the national and regional strategic importance that a transport link in the Lower Hunter Valley, between the F3 Freeway and the New England Highway west of Branxton, could have for the transport efficiency and economic development in this region. Two potential corridors were identified but only investigated after their economic and engineering feasibility was established in the early 1990s. These corridors were the Kurri Kurri Corridor and the Outer Maitland By-pass Corridor.

The outcome of the feasibility study provided the impetus for the RTA to commission an EIS, the subject of this current proposal, to further examine the broader range of environmental, social, and economic considerations for constructing the F3 Freeway to Branxton highway link.

2.2 Need, Benefit, and Project Justification

The EIS examined the prevailing traffic conditions in the study area within the defined road hierarchy taking into account the primary role of the F3 in the road network operation. In general, growth on routes in the study area, including the route from Freemans Waterhole to Branxton (MR 220) and New England Highway from Hexham to Maitland, were attributed to changed traffic patterns arising from the staged construction of the F3 Freeway. Growth on other routes was in parallel with general growth in urban centres throughout the study area.

The EIS concluded that the proposed F3 Freeway link to the New England Highway at Branxton would achieve the following benefits and functions:

- provide an efficient and high standard north-south National Highway link through the Lower Hunter Valley;
- provide a centrally located east-west link connecting the regional centre of Newcastle with the dispersed urban centres in the Lower Hunter;
- provide a more efficient link to the Port of Newcastle from the Upper Hunter and beyond via John Renshaw Drive which would be promoted and upgraded as a designated heavy vehicle route;
- provide an access controlled link in the arterial road network of the Lower Hunter which can provide a high level of service for road transport in the long term as land use change and economic growth occurs throughout the region;
- traverse close to the town of Kurri Kurri and therefore provide an opportunity for encouragement of employment generating industries in a location which is central to the Lower Hunter and which has land and infrastructure suited to industrial and urban growth;
- provide relief to the increasingly congested New England Highway between Branxton and Beresfield allowing a functional separation of inter-regional interstate traffic from intra-regional/local traffic. The shift in function of the New England Highway to an urban arterial function would have associated environmental and social benefits, especially with reduced heavy vehicle movements;
- provide greater longer term opportunities for the urban expansion of the Lower Hunter Sub-Region; and
- provide relief to MR 220/Vincent Street through the middle of Cessnock especially from the adverse effects of heavy vehicles.

2.3 Objectives

The objectives of the proposal are described in Section 3.4 of the EIS and take into account broader National Highway objectives. The project specific objectives identified by the RTA for this proposal include:
maintaining conformity with a dual carriageway road standard and provide an appropriate level of service;
providing a route which minimises the damage caused by inundation and flowing water;
reducing the number and severity of road accidents;
reducing the conflict between through and local traffic in the study area;
providing net economic benefits by reducing travel time and vehicle operation costs;
removing through traffic (in particular, heavy vehicles) from urban areas;
providing a high standard and highly efficient long term link between Sydney and Brisbane and more specifically between the F3 Freeway and the New England Highway west of Maitland; and
providing a high standard access to and from the port area at Newcastle.

The RTA, upon bringing forward the proposal approximately 6 years after its exhibition, updated expected traffic loadings on all links across the network using the same model, TRANPLAN. A comparison between the most recently published surveys presented in the Representations Report (Appendix E, "Additional Environmental Engineering and Assessment", Connell Wagner, May 2001) and the previous modelling undertaken in the EIS, showed a good correlation. This indicated that the assumptions and objectives originally developed for this proposal and presented in the 1995 EIS, were still valid.

2.4 Alternatives Considered

The RTA identified five corridor options which were selected for an evaluation of preliminary engineering feasibility, projected traffic patterns, an economic assessment, and a range of planning and environmental criteria. These options were:

- upgrade of the MR 220 with bypasses of Cessnock, North Rothbury, and Branxton (Option A);
- upgrade of the Southern MR 220, MR 195 bypassing Kurri Kurri then joining a new road corridor west of Branxton (Option B);
- the Kurri Kurri Corridor as previously identified by the RTA, but subject to modification (Option C);
- the Outer Maitland Bypass as previously identified by the RTA, but subject to modification (Option D); and
- upgrading of the existing New England Highway with bypasses of Lochinvar and West Maitland (Option E).

Each of the five options were examined for:

- **Preliminary Engineering Assessment** – which included definition of road design standards, road geometry, major intersection arrangements, pavement requirements, and property acquisition;
- **Projected Traffic Patterns** – an evaluation of likely future traffic patterns and volumes associated with each alternative;
- **Economic Assessment** – a benefit/cost analysis was undertaken based on estimated costs (construction and recurrent) and road user benefits (including savings in network travel time, travel distance, and accidents as determined in a model); and
- **Planning and Environmental Assessment** – a comparison against a diverse range of planning and environmental criteria including among others, social impact, property and land use, mineral resource, visual/landscape changes, and nature conservation values.

From a comparative assessment, the RTA concluded that the Kurri Kurri corridor, or Option C, best fulfilled the range of key strategic road functions and economic benefits. However, the selected route has the highest flora and fauna impacts compared with the other options.

2.5 The Proposal as Described in the EIS and Supplementary Documentation

Since the EIS was exhibited in 1995, there have been a number of changes to the proposed activity which were detailed in Table 7-1 of Section 7 in the Representations Report (ie. the Preferred Activity Report). These included an alternative horizontal alignment between Allandale and Illalong to accommodate a
tourist development at Greta Camp; three minor horizontal alignment changes, numerous minor adjustments to the vertical profile, provision for a cut and cover tunnel at Stockington Road, the reconfiguration of Buchanan Road to an overpass (instead of, as was originally intended, an underpass at its juncture with the proposal) and changes to batter slopes and berm configurations in order to lessen the footprint of the proposal and conserve vegetation.

The main features of the proposal for which approval is being sought include:

- a 39.5 km four lane dual carriageway highway providing two lanes of traffic in each direction separated by a depressed median in general 15 metres wide except over the Sugarloaf Range where the carriageway separation would be by a concrete median barrier (New Jersey barrier);
- land acquisition over the whole of the route as there is no existing reservation;
- major earthworks for the lower ridges of the Sugarloaf Range at the eastern end of the route resulting in cuttings up to 32 metres deep;
- a cut and cover tunnel in the Sugarloaf Range to provide a fauna overpass and continued access for Stockington Road and the Agility natural gas pipeline;
- a large bridge over Blue Gum Creek;
- bridges over Wallis/Surveyors Creeks, South Maitland Railway/Thermals Creek, Bishops Creek, the Main Northern Railway near Branxton, and Black Creek;
- modification of the existing grade-separated interchange at the intersection of the Link Road and the F3 Freeway to accommodate the connection of the proposed carriageway;
- new full interchanges at John Renshaw Drive and MR 218 (near Kurri Kurri Meatworks), and half interchanges at Hart Road and Allandale Road;
- overpasses and underpasses at Stockington Road, Avery Lane, McLeod Road near Kurri Kurri TAFE, Old Maitland Road, Camp Road, Tuckers Lane, and MR 220 near Branxton;
- an at-grade intersection at the western connection with the New England Highway near Black Creek; and
- acquisition of compensatory habitat.

2.5.1 Staging

The EIS identified two possible staging scenarios for the proposal. Each involved partial opening of highway sections as construction of the total 39.5 km was completed. The subsequent Additional Environmental and Engineering Assessment (May 2001) discussed a likely staging strategy in greater detail.

In response to a question raised by the Department, the RTA provided advice that it had decided to seek approval for the proposal without any staging. It reasoned that if the funding profile necessitated reconsideration of staging, a modification to the project would be sought. Therefore staging has not been considered in this assessment. Recommended Condition of Approval No. 2 prohibits any staging of the proposal, as the potential impacts have not been identified and assessed.

2.5.2 Project Cost

The RTA estimated the capital costs for the proposal at $332 million. This cost included concept development, management and project implementation, and land acquisition.

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The RTA completed a Review of Environmental Factors (REF) to compare and assess the preferred D9 alignment with an alternative D11 alignment in order to overcome interference with a council approval given to a tourist development at Greta Camp. The RTA identified a further option, D14, in a supplementary REF which avoided substantial severance of the subject development land and had a lesser impact on the south Allandale community. This is now the preferred option.
3 SUMMARY OF REPRESENTATIONS

3.1 Categories of Representations Received
A total of 70 representations were received in response to the exhibition of the EIS.

The source of the representations are categorised below:

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<td>Businesses</td>
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<tr>
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3.2 Overview of Issues Raised in Representations
The RTA forwarded copies of all the representations to the Department after the close of the EIS exhibition period in accordance with the requirements of the **EP&A Act**.

The key issues raised included:

- Property impacts – issues included severance of communities (Allandale, Buchanan); compensation, business impacts; impacts on specific properties including Allandale Quarry, Ceparl (now VAW) aluminium smelter, ICI (Oftce) site, Greta Camp tourist development proposal, Kurri Kurri TAFE college; and effects on lifestyles;
- Road design – issues included interchange design and location; the need for the route through the Sugarloaf Range to minimise impacts; design speeds;
- Noise – issues included adverse impacts of noise; noise mitigation measures;
- Flora and fauna – concerns were raised about the potential impacts on flora and fauna; mitigation/compensation needs to be addressed; further justification for this route needs to be provided;
- Road network and other traffic issues – this included issues raised on other roads in the region, such as the need to upgrade John Renshaw Drive and use of the Outer Maitland Bypass option; effects on other roads; traffic modelling/analysis.

The RTA included a summary of the matters raised in each of the representations in its Representations Report.

The department has examined the representations made to the exhibited EIS and the response provided by the RTA. The Department is satisfied that the matters originally raised as a result of the exhibition of the EIS in 1995 have been addressed by the RTA.
4 ASSESSMENT OF KEY ISSUES

This section outlines the Department's consideration of issues (other than those discussed in the next section) relating to the current proposal having regard to information presented in the EIS, representations received in response to its exhibition and other additional information obtained by the Department. The Roads and Traffic Authority has also provided the Department with its assessment of the issues raised in representations. This has been reviewed by the Department and, where required, further information has been sought and obtained.

Where considered appropriate, recommendations are made with regard to the manner in which a particular issue should be addressed during construction and/or operation.

4.1 Flora and Fauna

The proposal passes through cleared land and a substantial proportion of forest and woodland, particularly at the south-eastern end near Seafordham and the north-western end near Alandale. It also passes through the Kurri Sand Swamp Woodland located near Kurri Kurri. This is an endangered ecological community endemic to this area.

A Fauna Impact Statement (FIS) was prepared and exhibited in February/March 1997 as a significant effect on endangered fauna was considered likely. (Note: The FIS is now deemed to be a Species Impact Statement under the TSC Act. See Section 1.3.2 for an explanation.)

Additional threatened species, populations and ecological communities have been listed since the preparation of the FIS. The RTA has provided further documentation to the Department and the National Parks and Wildlife Service (NPWS) in order to assist in their assessment of the impacts of the proposal on these new listings. This additional information was provided by the RTA in its Representations Report. The FIS and additional documentation was reviewed by NPWS.

The RTA determined that ten threatened fauna species, three threatened flora species and one endangered ecological community are likely to be significantly impacted by the proposal. These are:

- Little Bent-wing Bat;
- Large Bent-wing Bat;
- Greater Broad-nosed Bat;
- Eastern Little Mastiff Bat;
- Yellow-bellied Sheath-tail Bat;
- Large-eared Pied Bat;
- Green & Golden Bell Frog;
- Squirrel Glider;
- Regent Honeyeater;
- Powerful Owl;
- Eucalyptus parramattensis subsp decadens;
- Persoonia pasciflora;
- Grevillea parviflora; and
- Kurri Sand Swamp Woodland.

The RTA sought the concurrence of the Director-General of National Parks and Wildlife in relation to the FIS in accordance with the provisions of the EP&A Act. On 3 October 2001, the Director-General of National Parks and Wildlife granted concurrence to the proposal subject to a number of conditions. The concurrence, conditions of concurrence, and concurrence report are contained in Appendix A.

The NPWS and the Department identified a number of deficiencies in the flora and fauna assessments provided by the RTA including inadequate detail on survey work, and unknown impacts from ancillary infrastructure. To address these, the NPWS has required further targeted survey work prior to clearing as a condition of concurrence. This will assist in verifying the extent of the impacts on threatened flora.
species and ecological communities, including two endangered ecological communities that have been
nominate for listings on the TSC Act i.e., Hunter Lowlands Red Gum Forest and the Alluvial Tall Moist
Forest. These surveys may also identify additional species or communities listed under the TSC Act that
would be significantly affected by the proposal.

Section 7 of the Representations Report described eleven changes that were made to the proposal
following the public exhibition of the concept design in the EIS. Each of the changes was assessed for its
environmental impact to determine if there was a need for additional mitigation measures and
commitments. Seven are of relevance to threatened species and the NPWS Concurrence Report:
1. Modification to Allendale to Illalong alignment;
2. Horizontal alignment south of John Benshaw Drive;
3. Horizontal alignment through Hart Road toward Sawyers Gully;
4. Alignment change north of Illalong toward Branxton;
5. Adjustments of vertical profile;
6. Provision of a cut and cover tunnel at Stockington Road; and
7. Changes to batter slopes and berm configurations.

The majority of these changes minimise impacts to flora and fauna by reducing the footprint of the
proposal thereby reducing the amount of vegetation and habitat clearing that would be required. The
provision for a cut and cover tunnel allows fauna movement across the traffic corridor by providing a multi-
purpose fauna overpass.

Only one of the changes, the re-alignment of the road through Allendale to Illalong, is considered to have
a negative impact on flora and fauna. The RTA prepared a Review of Environmental Factors for this
section which identified that the amount of vegetation clearing originally proposed in EIS would be
increased by 9 hectares. In addition, it is considered that this changed alignment of the road would cause
greater fragmentation and barrier effects to fauna species.

4.1.1 Assessment of SIS by NPWS

The EP&A Act requires that the RTA obtain the concurrence of the Director-General of National Parks and
Wildlife in relation to the FIS (deemed SIS) prior to requesting the approval of the Minister. The NPWS
undertook an assessment of the FIS and the additional information provided by the RTA. The Director-
General of National Parks and Wildlife concluded that the environmental impacts of the proposal were
unavoidable and some of the impacts, particularly those that affect the Kurri Sand Swamp Woodland and
the three threatened flora species significantly affected, potentially compromised their capacity for
recovery.

However the NPWS in giving its concurrence considers that the activity, after taking into account
amelioration by the mitigatory measures, changes made to the proposal since exhibition of the EIS, and
the conditions of its concurrence, is unlikely to significantly affect the local or regional viability of
threatened species, populations and endangered ecological communities. In reaching its decision, the
NPWS also considered the socio-economic issues presented by the RTA.

The key elements of the Director-General of National Parks and Wildlife's Concurrence Conditions include
(see Appendix A):
- the NPWS to review the final route and any variations;
- no clearing to occur for ancillary infrastructure or associated works without further environmental
assessment;
- further targeted surveys for threatened species will be required prior to construction and appropriate
mitigation measures implemented based on the results of these surveys;
- NPWS to review the final design, location and construction of mitigation measures;
- employment of a qualified rehabilitation ecologist to provide advice and assist in the design,
construction and monitoring of mitigation measures;
• negotiation of a comprehensive compensatory habitat package with NPWS at least 12 months prior to commencement; and
• contribution of $100,000 (in 2001 dollars) towards the costs of Recovery Plans for Kurri Sand Swamp Woodland and the three threatened flora species significantly affected.

Recommended Condition of Approval No. 48 requires the RTA to comply with all Concurrence Conditions issued by the Director-General of National Parks and Wildlife for the proposal.

4.1.2 Inadequate Consideration of Threatened Species Issues at the Route Selection Phase

The EIS was originally placed on exhibition in 1995. It is likely that the studies undertaken for the EIS were conducted between 1993 and 1994. Therefore the data sets used to select the preferred route option are up to 8 years old.

The Department, NPWS and EPA raised concerns regarding the selected route as it has the highest flora and fauna impacts compared with the other options that were examined in the EIS. The EIS acknowledges this by stating that Option C (the preferred option) has the greatest impacts on flora and fauna. However, the RTA selected this option after examining a range of environmental, planning and socio-economic factors, which included ecological impacts.

In the six years since the EIS exhibition there have been some significant changes to the legislation affecting the conservation of threatened plant and animal species, notably the enactment of the TSC Act. From a best practice environmental assessment point of view, the Department considers that it would have been better if the RTA had re-written and re-exhibited the EIS. This would have provided an opportunity to re-assess the route options and take into account the greater consideration afforded to the flora and fauna by these strengthened statutory provisions. However, the RTA (as a determining authority) decided not to do this.

The RTA has updated the flora and fauna assessment details but only to more fully describe the impacts on the threatened species affected by the preferred option.

It is unclear whether the outcome of the route selection process would have still identified Option C if the flora and fauna assessment details had been updated for all the options originally investigated.

Acknowledging this, the Department has recommended a comprehensive set of conditions designed to minimise impacts to currently listed threatened species, populations, ecological communities and their habitats affected by the preferred option, and made provision for any future listings under the TSC Act to be examined, prior to construction. These recommended conditions are detailed in Section 7 of this report.

4.1.3 Lack of Detailed Survey Work to Target Threatened Species and Assess Habitats

The Department, NPWS, Hunter Environment Lobby, Friends of the Earth and Buchanan residents raised a number of concerns regarding the lack of detailed survey work to target threatened and regionally significant species and assess their habitats. In response to these concerns, further flora and fauna surveys were conducted by the RTA, including surveys for threatened species and communities which have been listed on the TSC Act subsequent to the preparation of the EIS.

The NPWS has noted in the Concurrency Report that even with the additional surveys there are still deficiencies including:
• inadequate detail regarding the survey work that was undertaken; and
• a large component of the additional flora and fauna assessment was only a desktop assessment instead of targeted surveys.
The NPWS has therefore required that further targeted surveys for two threatened flora species and seven threatened fauna species be conducted prior to construction and the results provided to the NPWS for review and approval (Conditions of Concurrence No. 5 & 6).

The Department recognises that construction may not begin for a number of years after any approval. If this is the case, it is likely that a number of additional threatened species, populations and ecological communities may be listed on the TSC Act and could be impacted by the proposal.

To ensure that any new listings made in the interim between approval and the start of construction are addressed, and appropriate mitigation measures are identified, the Department recommends that the:
- "Additional Flora and Fauna Assessment" (a report prepared by Connell Wagner, May 2001) which accompanied the Representations Report, be updated prior to construction; and
- this updated report be provided to the NPWS and Department for their review and approval.

Recommended Condition of Approval No. 52 addresses this issue.

4.1.4 Clearing of Threatened Species and Ecological Community Habitat

The Department, NPWS, Association of Concerns Citizens of Newcastle, Friends of the Earth and a local resident all raised concerns regarding the amount of clearing of threatened species and ecological community habitats. The EIS identified the direct loss of approximately 165 hectares of vegetation with an additional 9 hectares of clearing from the re-aligned Allandale to Iliatong section ie. a total of approximately 174 hectares.

In response to these concerns, the RTA proposed a number of changes to reduce the footprint of the road corridor. These included minor adjustments to the horizontal and vertical profile of the road and changes to the batter slopes and berm configurations. Based on these modifications the proposal is now anticipated to result in the direct loss of about 168 ha of vegetation (Appendix K of Volume 3 of the Representations Report ("Compensatory Habitat and Candidate Areas – Stage 2").

The NPWS has raised concerns in its Concurrence Report that it was unable to assess the impacts from any clearing required for ancillary infrastructure (eg sedimentation basins, works areas, concrete and asphalt batching plants etc.) because no information has been provided by the RTA to identify the amount of clearing, locations, or anticipated impacts of these works on flora and fauna. Therefore, the NPWS has conditioned that no clearing for ancillary infrastructure or associated works shall be carried out or be allowed to be carried out within areas shown as habitat for endangered ecological communities or threatened species without further environmental assessment (Condition of Concurrence No.4).

The Department agrees that there is insufficient data to determine impacts from ancillary infrastructure on flora and fauna outside the road corridor. Conditions have therefore been recommended that the Construction Framework Environmental Management Plan identify the locations of the ancillary infrastructure works, and identify appropriate mitigation measures in order to minimise impacts to flora and fauna. The recommended conditions also prohibit these works within areas that are habitat for threatened species, populations or ecological communities (Recommended Condition of Approval No. 129).

The NPWS has required that the RTA give consideration to modifying or refining the design and alignment of the activity to further reduce the direct and/or indirect impacts of the proposal ie. to minimise the footprint of the activity (Concurrence Condition No. 3).

The Department believes that there is scope, at the detailed design stage, to further reduce the direct and indirect impacts on threatened species, populations and ecological communities and their habitats, in

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2 The "Additional Flora and Fauna Assessment" report presented with the Representations Report, provided additional environmental evaluation and covered all areas that required updating or re-assessment as a result of the passage of time since the original 1995 EIS.
order to improve the effectiveness of proposed mitigation measures. Conditions have been recommended that require the RTA to:

- employ an independent road design specialist to review and report on the detailed design in order to determine whether additional measures can be incorporated to improve the effectiveness of proposed mitigation measures. The review and report shall include, but not be limited to, an investigation into the feasibility of providing a dedicated fauna overpass at a location within the Sugarloaf Range, and measures to further reduce the amount of clearing of native vegetation (Recommended Condition of Approval No. 53);
- restrict native vegetation clearing to no more than 168 ha (Recommended Condition of Approval No. 60); and
- restrict the area to be cleared of the endangered Kurri Sand Swamp Woodland to no more than 33.7 ha (Recommended Condition of Approval No. 61).

4.1.5 Impacts to Biodiversity Corridors

The Department, Cessnock City Council, Association of Concerned Citizens of Newcastle, Friends of the Earth, and two individuals raised concerns regarding the impacts of the proposal to biodiversity corridors.

The RTA has proposed a number of fauna underpasses to facilitate safe movement of fauna species, including threatened species, across the road corridor. In addition, the Representation Report has proposed a cut and cover tunnel at Stockington Road within the Sugarloaf Range, which would provide a multi-purpose fauna overpass i.e. utility corridor, road passage, and fauna overpass.

The NPWS considered that the effectiveness of these measures was not assessed in detail but conceded that this would be difficult to predict in the absence of detailed design information. Consequently, the NPWS has imposed a range of concurrence conditions to ensure a more comprehensive assessment of these matters are considered at the detailed design stage and prior to construction (Conditions of Concurrence Nos. 2, 3, 4 & 15).

The Department supports this approach but considers that additional and improved fauna crossings measures should be investigated during the detailed design including:

- dedicating a fauna overpass in the Sugarloaf Range solely for a fauna overpass (see Recommended Conditions of Approval Nos. 53 and 54); and
- providing Squirrel Gliders crossing points near Aliandale as gliders are considered to be significantly affected by the proposal (see Recommended Conditions of Approval Nos. 55 and 56).

4.1.6 Significant Impacts to the Endangered Kurri Sand Swamp Woodland

The NPWS and Friends of the Earth raised concerns regarding the impacts of the proposal on the Kurri Sand Swamp Woodland. As this community was listed on the TSC Act as endangered in 2001, the FiS and EIS had not considered the impacts of the proposal on this community.

In response to the recent listing, the impacts of the proposal were assessed in the “Additional Flora and Fauna Assessment” report (Connell Wagner 2001) which determined that the proposal was likely to significantly affect this community. The RTA made a number of modifications to the proposal in response to these findings to minimise impacts, including reducing the road footprint and minor changes to the road alignment. Based on these refinements, the direct loss of Kurri Sand Swamp Woodland from the proposal is estimated to be 33.7 hectares with a further loss of 41.4 hectares from edge effects.

The RTA also proposed to provide compensatory habitat to offset the loss of the community at a ratio of 1:1. Through negotiations with the Department and the NPWS the RTA has now committed to a minimum of

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3 Dedicated for the exclusive use of fauna crossing over the highway and not incorporating any other uses such as road access, or utility corridors (except where these do not require cleared easements).

4 The proposed multi-purpose fauna overpass is likely to be of limited use to native fauna because the road and gas pipeline restrict the width and create open corridors that may attract predators.
2:1 compensatory habitat. However, the Department is concerned that the 2:1 compensatory habitat package proposed by the RTA is not specific to Kurri Sand Swamp Woodland but native vegetation as a whole.

Recommended Condition of Approval No. 50 has been provided to ensure that a minimum 2:1 ratio, specific to Kurri Sand Swamp Woodland, is achieved and that all other vegetated areas affected by clearing and edge effects are also compensated for to a minimum of a 2:1 ratio.

Despite these measures, the NPWS still has concerns regarding the impacts of the proposal on this community and as a result has required a number of conditions to minimise impacts and promote its recovery. These include requiring the RTA to provide a comprehensive compensatory habitat package (Condition of Concurrence No.13) and to financially contribute to a recovery plan for the community (Condition of Concurrence No.14).

The assessment of the impact on this significant community was made on the basis that the direct clearing would be restricted to 33.7 hectares. To ensure that no increased amount of clearing occurs during construction, the Department has recommended that the RTA be limited to clearing no more than 33.7 hectares of Kurri Sand Swamp Woodland (Recommended Condition of Approval No. 61) and that a qualified ecologist be employed to monitor the extent of clearing in this community (Recommended Condition of Approval No. 57).

4.1.7 Conclusion

The Department has assessed the likely impacts of the proposal on flora and fauna and their habitats including consideration of the matters raised in the concurrence report from the Director-General of National Parks and Wildlife. Conditions have been recommended by the Department which complement those provided by the NPWS and should further minimise impacts on all flora and fauna, including threatened species, ecological communities and their habitats.

Conditions have also been recommended that would require the RTA to update flora and fauna assessments to take into account any new listings under the TSC Act if construction, as a result of any approval, was delayed. The recommended conditions also recognise that there may be scope, at the detailed design stage of the proposal, to incorporate additional measures to reduce identified impacts.

4.2 Construction Noise

Potential construction noise and vibration impacts depend on the type of construction activity being undertaken. For this proposal these activities include: construction of culverts, bridges, earthworks for road sections on fill; and laying of pavement.

All these activities require the use of major equipment working up to 30 metres from the closest resident. However, the proposal is unlikely to produce intensive construction activity at a particular location for a long-term period. That is, as construction progresses along the proposal, intensive construction activity also progresses along the proposal, thereby limiting the period of noise exposure at any one location. It should be noted that there was no indication in the EIS as to how long sensitive receptors would be affected.

The EIS did not specifically address impacts associated with construction noise and although a number of concerns were raised in the representations about operational noise no one identified the potential of construction noise as a likely issue. However it is apparent that there could be sensitive noise receptors that may require mitigation.

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5 Base compensatory habitat area = area of direct vegetation impacted + 60% of edge effect (i.e. length along vegetation-community multiplied by 50 metres each side of the road).

New South Wales Department of Urban Affairs and Planning
November 2001
5 ASSESSMENT OF OTHER ISSUES

This section outlines the Department's consideration of issues (other than those discussed in the previous section) relating to the current proposal. Again, recommendations are made for conditions of approval, where appropriate, in order for particular issues to be satisfactorily addressed during construction and/or operation.

5.1 Erosion and Sedimentation

The proposed alignment crosses approximately 16 soil types ranging from loams over silty clay loams across the Mt Sugarloaf Range to alluvial soils on the floodplain at the base of the range and in swamps and wider stream valleys. The remainder of the route consists of podsols, generally with a clayey subsoil.

Surface and sub-surface conditions are not expected to cause any significant construction problems; however, the potential for soil erosion and sedimentation within creeks and watercourses should be addressed during the construction and operation of the proposal.

Recommended Conditions of Approval Nos. 87-92 addresses this issue and requires the RTA to prepare a detailed Soil and Water Management Sub Plan that includes:

- management of stormwater from the development on the quality of surface and groundwater;
- details of short and long term measures to be employed to minimise soil erosion and the discharge of sediment to land and/or waters including the locations of suitably sized sedimentation basins;
- management of the impacts of the development on watercourse crossings including Wallis/Surveyors Creeks, South Maitland Railway/Scamp Creek, Bishops Creek, and Black Creek;
- management of the impacts of Wallis/Surveyors Creeks, South Maitland Railway/Scamp Creek, Bishops Creek, and Black Creek on the development;
- identification of all potential sources of water pollution and a detailed description of the remedial action to be taken or management systems to be implemented to minimise discharges of these pollutants from all sources within the subject site;
- detailed description of water quality monitoring to be undertaken during the pre-construction, construction and operation stages of the proposal including identification of locations where monitoring would be carried out;
- contingency plans for fuel and other spills; and
- a program for reporting on the effectiveness of the sediment and erosion control system against performance goals.

5.2 Property and Land Use Impacts

A total of 47 properties would be affected by the construction of the link highway. Three residences would need to be removed and up to eight properties would need to be wholly acquired because of construction and noise impacts. Other properties would be severed and partial acquisitions would be required.

During the exhibition of the Preferred Activity Report, several residences raised objections regarding the realignment of the proposal between Allandale and Ullalong. Their objections concerned a view of being disadvantaged because they were unaware of the changed route alignment when they bought their property in the district. The Department is satisfied that proper public notification was undertaken by the RTA at the time the changed route was being considered.

5.3 Air Quality

The Department does not anticipate any significant operation stage air quality impacts. However, there is potential for air quality impacts during construction, principally through dust generation. Recommended Conditions of Approval Nos. 114-116 will require appropriate measures to be applied to minimise dust impacts.
5.4 **Utilities and Services**

The proposed route traverses a number of power line easements, a main natural gas pipeline and other utilities installations including underground telephone cables. It is important that the RTA identify and consult with the utility providers in order to negotiate a satisfactory arrangement for the construction of the link highway.

Recommendation of Approval No. 126 addresses this issue and requires the RTA to prepare a detailed Utility Services Sub Plan prior to construction and in consultation with the relevant service providers (e.g. Transgrid, Agility Services, Telstra). The purpose of the Sub Plan is to identify the services potentially affected by construction activities and discuss requirements for diversion, protection and/or support.
6 CONCLUSIONS AND RECOMMENDATIONS
The proposed link highway is consistent with the project objectives established during the EIS process. With proper management, the proposal would improve the efficiency of regional transport and the amenity of the local area.

It is recommended that the proposal as described in the EIS and as modified in the Representations Report proceed subject to a number of recommended conditions. These are specified in the following section and are based on the extent of issues raised in representations, by other State agencies, and by the Department. These conditions would ensure that the construction and operation of the proposed F3 to Branxton Highway Link would occur with a greater surety of environmental acceptability.

The recommended conditions relate to:

- environmental monitoring and reporting requirements (eg. flora and fauna impacts, noise, and traffic impacts) to verify predictions concerning environmental impacts made in the EIS with actual impacts;
- measures complementary to the Director-General of National Parks and Wildlife’s concurrence conditions to ensure a greater protection of all affected flora and fauna including: employing an independent road design specialist to review and report on the detailed design in order to determine whether additional measures can be incorporated to improve the effectiveness of proposed mitigation measures; providing additional fauna crossing mechanisms; strictly controlling the amount of vegetation that can be cleared; and updating flora and fauna assessments should any construction of the proposal be delayed;
- further investigations of the Aboriginal cultural heritage/archaeological impacts in order to identify appropriate mitigation measures prior to construction; and
- construction and operational procedures including the preparation of detailed management plans to cover soils, water (surface and groundwater), noise, air quality, and utility services.

These conditions will help to ensure that unavoidable adverse environmental impacts of the proposal would be mitigated within an appropriate environmental management framework.

It is considered that these impacts could be managed on the basis of the safeguards and mitigation measures identified in the EIS and the associated documentation, and the Recommended Conditions of Approval.
7 RECOMMENDED CONDITIONS OF APPROVAL

This section provides the Department's recommended conditions of approval for the project under Section 115B(2) of the EP&A Act. These are based on the Department's assessment of the EIS, the representations made to the Roads and Traffic Authority and supplementary information and advice provided.

It is noted that the EIS and Representations Report contains extensive information on procedures and mitigation strategies to be implemented to ameliorate impacts of the proposal. The recommended conditions should therefore be implemented in conjunction with those procedures and mitigation strategies specified in the EIS and Representations Report. Where there is an inconsistency with the recommendations in the EIS, the recommendations in this report would prevail. The precedence of documentation is: these Conditions of Approval, Representations Report, EIS.

The following acronyms and abbreviations are used in this section:

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>AFFAR</td>
<td>Additional Flora and Fauna Assessment Report</td>
</tr>
<tr>
<td>ARI</td>
<td>Average Recurrence Interval</td>
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<tr>
<td>CLG</td>
<td>Community Liaison Group</td>
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<tr>
<td>CMS</td>
<td>Construction Method Statement</td>
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<tr>
<td>Department, the</td>
<td>Department of Urban Affairs and Planning</td>
</tr>
<tr>
<td>Director-General, the</td>
<td>Director-General of the Department of Urban Affairs and Planning or delegate</td>
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<tr>
<td>DLWC</td>
<td>Department of Land and Water Conservation</td>
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<td>DUAP</td>
<td>Department of Urban Affairs and Planning</td>
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<tr>
<td>EIS</td>
<td>Environmental Impact Statement</td>
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<td>EMP</td>
<td>Environmental Management Plan</td>
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<td>EMR</td>
<td>Environmental Management Representative</td>
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<td>ENCM</td>
<td>Environmental Noise Control Manual</td>
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<tr>
<td>EP&amp;A Act</td>
<td>Environmental Planning and Assessment Act 1979</td>
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<td>EPA</td>
<td>Environment Protection Authority</td>
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<tr>
<td>FIS</td>
<td>Fauna Impact Statement</td>
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<tr>
<td>Minister, the</td>
<td>Minister for Urban Affairs and Planning</td>
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<tr>
<td>NPWS</td>
<td>National Parks and Wildlife Service</td>
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<tr>
<td>NPWS Concurrence</td>
<td>Concurrence given by the Director-General of National Parks and Wildlife under the TSC Act</td>
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<tr>
<td>Proponent</td>
<td>Roads and Traffic Authority</td>
</tr>
<tr>
<td>Relevant Councils</td>
<td>Cessnock City Council, Lake Macquarie City Council, Maitland City Council, and Singleton Shire Council</td>
</tr>
<tr>
<td>RTA</td>
<td>Roads and Traffic Authority</td>
</tr>
<tr>
<td>TSC Act</td>
<td>Threatened Species Conservation Act 1995</td>
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</table>

General

1. The proposal shall be carried out in accordance with:
   1. Proposed Highway Link – F3 Freeway to Branxton, Environmental Impact Statement (EIS) (Connell Wagner June 1995);
   3. Additional Flora and Fauna Assessment (AFFA) (Connell Wagner May 2001) to supplement the original FIS;
   4. Representations Report, Volumes 1, 2 and 3 (RTA, October 2001);
v. Supplementary Review of Environmental Factors (SREF) for the Allandale to llialong Section Comparison of Options (Connell Wagner August 2000);
vi. Kurri Sand Swamp Woodland Recovery Assessment (Biosis Research), a report commissioned jointly by the RYA and NPWS in August 2001;
vii. Additional Environmental and Engineering Assessment (Connell Wagner May 2001); and

2. This approval relates to the construction of the proposal in its entirety.

3. Despite the above, in the event of any inconsistency with the proposal as described in the EIS and/or Representations Report, the Conditions of Approval granted by the Minister shall prevail.

4. These conditions do not relieve the Proponent of the obligation to obtain all other approvals and licences from all relevant authorities required under any other Act. Without affecting the generality of the foregoing, the Proponent shall comply with the terms and conditions of such approvals and licences.

5. It shall be the ultimate responsibility of the Proponent to ensure compliance with all conditions of approval granted by the Minister.

Compliance

General

6. The Proponent shall comply with, or ensure compliance with, all requirements of the Director-General in respect of the implementation of any measures arising from the conditions of this approval.

7. The Proponent shall bring to the attention of the Director-General any matter that may require further investigation and the issuing of instructions from the Director-General. The Proponent shall ensure that these instructions are implemented to the satisfaction of the Director-General within such time that the Director-General may specify.

Pre-Construction Compliance Report

8. At least one month prior to commencement of substantial construction (or within such period as otherwise agreed by the Director-General), the Proponent shall submit for approval of the Director-General a compliance report detailing compliance with all relevant conditions that apply prior to commencement of substantial construction and shall address:
   i. the dates of submissions of the various studies and/or requirements of various relevant conditions, and their approval and terms of approval; and
   ii. action taken or proposed to implement the recommendations made in terms of approvals and/or studies.

Pre-Operation Compliance Report

9. At least one month prior to commissioning of the proposal (or discrete sections of the proposal as agreed by the Director-General), the Proponent shall submit for approval of the Director-General a compliance report detailing compliance with all relevant conditions that apply prior to commencement of operation and shall address:
   i. the dates of submissions of the various studies and/or requirements of various relevant conditions, and their approval and terms of approval; and

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*The environmental evaluation of staging the proposal has not been undertaken, and therefore any staging will require separate assessment in accordance with the EP&A Act.*
il. action taken or proposed to implement the recommendations made in terms of approvals and/or studies.

The Period of one month referred to in this condition may be altered as agreed by the Director-General.

Dispute Resolution

10. The Proponent shall endeavour, as far as possible, to resolve any dispute with relevant public authorities arising out of the implementation of the conditions of this approval. Should this not be possible, the matter shall be referred to the Director-General and, if the matter cannot be resolved, then to the Minister for resolution. The Minister’s determination of the disagreement shall be final and binding on all parties.

Contact Telephone Number

11. Prior to the commencement of construction, the Proponent shall institute, publicise and list with a telephone company a 24 hour toll-free complaints contact telephone number, which would enable any member of the general public to reach a person who can arrange appropriate response action to the complaint.

Complaints Register

12. The Proponent shall record details of all complaints received during construction and ensure that an initial response to the complaint is provided within 24 hours and a detailed response within 10 days. Information on all complaints received shall be made available on request to the Director-General and all relevant government agencies.

13. The Proponent shall nominate an appropriate person(s) to receive, log, track and respond to complaints within the specified timeframe. The name and contact details of this person(s) shall be provided to the relevant Council(s) and the Director-General upon appointment or upon any changes to that appointment.

Project Commencement

14. The Proponent shall notify the Director-General and all relevant authorities in writing of the project commencement both in terms of construction and operation (ie commissioning).

Advertisement of Activities

15. Prior to the commencement of construction and then at three-monthly intervals, the Proponent shall advertise in relevant local newspapers the nature of the works proposed for the forthcoming three months, the areas in which these works are proposed to occur, the hours of operation and a contact telephone number.

16. The Proponent shall ensure that the local community and businesses are kept informed (by appropriate means such as: local newsletters; leaflets; newspaper advertisements; and community noticeboards; etc.) of the progress of the project, including any traffic disruptions and controls, construction of temporary detours and work required outside the nominated working hours, prior to such works being undertaken.

17. The Proponent shall establish a project internet site prior to the commencement of construction and maintain the internet site until 6 months after commencement of operation of the project. The internet site shall contain monthly updates of work progress and consultation activities, including but not be limited to:

i. a description of relevant approval authorities and their areas of responsibility;
ii. a list of environmental management reports that are publicly available and the executive summaries of those reports;

iii. minutes of community liaison group meetings;

iv. newsletters every three months;

v. contact names and phone numbers of the project communications staff; and

vi. 24 hour toll-free complaints contact telephone number.

Updates of work progress and construction activities shall be provided more frequently where significant changes in the noise impacts are expected.

Community Liaison Group

18. The Proponent shall establish a Community Liaison Group (CLG), consistent with the Guidelines for the Establishment of Community Liaison Group (see Attachment 1) and shall:

i. ensure that the first meeting is held prior to submission of the Construction Framework Environmental Management Plan;

ii. nominate a chair to be approved by the Director-General;

iii. allow the Group to make comments and recommendations about the implementation of the development and environmental management plans, monitor compliance with conditions of this approval and other matters relevant to the operation of the development during the term of the consent;

iv. ensure that the Group has access to the necessary plans and information for such purposes; and provide appropriate facilities and information to assist the Group in carrying out its functions;

v. consider the recommendations and comments of the Groups and provide a response to the Groups and Director-General;

vi. ensure that the Group includes the Environmental Management Representative, representatives from the Proponent, the contractor(s), relevant local community and business groups including relevant Councils unless otherwise agreed by the Director-General; and

vii. bear all costs associated with the establishment and ongoing function of the Groups.

Environmental Management

Environmental Management Representative


20. The EMR shall be available during construction activity at the site and be present on-site during any critical construction activities as defined in the Construction Framework Environmental Management Plan (EMP).

21. The EMR shall:

i. have responsibility for considering and advising on matters specified in the conditions of approval and compliance with such;

ii. review and approve induction and training program for all persons involved in the construction activities and monitor implementation;

iii. periodically audit the environmental activities to evaluate the implementation, effectiveness and level of compliance of on-site construction activities with the EMP and associated plans and procedures, including carrying out site inspections at least fortnightly;

iv. record and provide a written report of non-conformances with the EMP and require mitigation measures to avoid or minimise any adverse impacts on the environment or report required changes to the EMP;
v. direct the contractor to stop work immediately where considered necessary, if in the view of the EMR an unacceptable impact on the environment is likely to occur, or require other reasonable steps to be taken to avoid or minimise any adverse impacts;

vi. review corrective and preventative actions to ensure the implementation of recommendations made from the audits and site inspections;

vii. report monthly;

viii. review and approve minor revisions to the Construction Framework EMP and Sub Plans;

ix. provide information for community consultation, liaison with regulators, and respond to customer environmental complaints as required;

x. provide reports to DUAP on matters relevant to the carrying out of the EMR role as necessary including notifying DUAP of any stop work notices; and

xi. certify the Construction Framework EMP, Sub Plans, and the Operational EMP in accordance with Conditions of Approval Nos. 25, 28 and 34.

22. The EMR shall be approved by the Director-General prior to the commencement of construction.

Environmental Management System

23. The Proponent shall ensure the appointment of construction and/or operation head contractors that have an Environmental Management System prepared in accordance with the AS/NZS ISO 14000 series or BS7750-1994 certified by an accredited certifier and/or have a proven environmental management performance record.

Construction Framework Environmental Management Plan

24. Prior to the commencement of construction, a Construction Framework Environmental Management Plan (EMP) shall be prepared, following consultation with the NPWS, EPA, DLWC, NSW Fisheries, relevant Councils, and all relevant utility/service providers. The Construction Framework EMP shall be prepared in accordance with the conditions of this approval, all relevant Acts and Regulations and accepted best practice management Sub Plans.

25. The Construction Framework EMP shall be certified by the EMR as being in accordance with the Conditions of Approval and all undertakings made in the EIS and Representations Report prior to seeking approval of the Director-General.

26. The Construction Framework EMP shall be approved by the Director-General prior to the commencement of substantial construction.

27. The Construction Framework EMP shall:

i. reference and propose timeframes for all the Sub Plans required under this Approval;

ii. identify the role of the EMR;

iii. provide details of the community consultation process;

iv. define the role, responsibility, authority, accountability and reporting of personnel relevant to compliance with the Construction Framework EMP;

v. include a matrix of Construction Method Statements (CMS) required to construct the project, including an assessment of the predicted level of risk and potential level of public interest posed by each CMS and indicative timeframes for completion; and,

vi. propose a response time-frame for all CMS to be approved by the Director-General.

28. All Sub Plans require the approval of the Director-General following certification by the EMR.

29. The Construction Framework EMP shall be made publicly available after approval by the Director-General.

Construction Method Statements
30. The Proponent shall prepare in consultation with the relevant government agencies and the CLG, Construction Method Statements (CMS) for all construction methods and/or major construction work sites to be utilised during construction in accordance with the Construction Framework EMP required by Condition 24. The Director-General shall nominate the CMSes that will require approval by the Director-General. Those CMSes not requiring the approval of the Director-General shall require the certification of the EMR as being in accordance with the Conditions of Approval and all undertakings made in the EIS and Representations Report. Any CMS to be approved by the Director-General shall be submitted to the Department following certification by the EMR no less than one (1) month prior to the proposed commencement of the relevant construction activities.

Each CMS shall include, but not be limited to:

i. construction activities and processes associated with the relevant construction site(s), including staging and timing of the proposed works;

ii. specific hours of operation for all key elements including off-site movements;

iii. cover specific environmental management objectives and strategies for the environmental system elements and include, but not be limited to: noise and vibration; air quality; water quality; erosion and sedimentation; access and traffic; property acquisition and/or adjustments; heritage and archaeology; flora and fauna; groundwater; acid sulfate soils; spoil stockpiling and disposal; waste/resource management; weed management; flooding and stormwater control; geotechnical issues; visual screening; landscaping and rehabilitation; hazards and risks; energy use, resource use and recycling; and utilities; and

iv. address, but not be limited to:

a. identification of the statutory and other obligations which the Proponent is required to fulfill during project construction, including all approvals and consultations/agreements required from other authorities and stakeholders, and key legislation and policies which control the Proponent’s construction of the project;

b. measures to avoid and/or control the occurrence of environmental impacts;

c. measures (where practicable and cost effective) to provide positive environmental offsets to unavoidable environmental impacts;

d. definition of the role, responsibility, authority, accountability and reporting of personnel relevant to compliance with the CMS;

e. site specific environmental management techniques and processes for all construction processes which are important for the quality of the environment in respect of permanent and/or temporary works;

f. site specific monitoring, inspection and test plans for all activities and environmental qualities which are important to the environmental management of the project, including performance criteria, tests, and protocols (eg. frequency and location);

g. location details of important elements such as temporary noise barriers; portable offices and amenities; truck, plant and materials storage; access locations; provision of site hoardings etc;

h. environmental management instructions for all complex environmental control processes which do not follow common practice or where the absence of such instructions could be potentially detrimental to the environment;

i. steps the Proponent intends to take to ensure that all Plans and Sub Plans are being complied with;

j. consultation requirements with relevant government agencies; and

k. community consultation and notification strategy (including local community, businesses, relevant government agencies, and all relevant Councils), and complaint handling procedures.

Specific requirements of the main environmental system elements referred to in (ii) shall be as required under the conditions of this approval and/or as required under any licence or approval. All CMS shall be made publicly available.

Environmental Monitoring Construction

New South Wales Department of Urban Affairs and Planning
November 2001
31. The Proponent shall submit to the Director-General reports in respect of the environmental performance of the construction works and compliance with the Construction Framework EMP, all relevant CMSs and any other relevant conditions of this approval. The reports shall be prepared six months after the start of substantial construction and thereafter at six monthly intervals or at other such periods as requested by the Director-General to ensure adequate environmental performance over the duration of the construction works. The report(s) shall include, but not be limited to, information on:

i. applications for consents, licences and approvals, and responses from relevant authorities;

ii. implementation and effectiveness of environmental controls and conditions relating to the work undertaken;

iii. identification of construction impact predictions made in the EIS and any supplementary studies and details of the extent to which actual impacts reflected the predictions;

iv. details and analysis of results of environmental monitoring;

v. number and details of any complaints, including summary of main areas of complaint, action taken, response given and intended strategies to reduce complaints of a similar nature; and

vi. any other matter relating to the compliance by the Proponent with the conditions of this approval or as requested by the Director-General.

The report(s) shall be provided to the EPA, DLWC, NPWS, NSW Fisheries, and relevant Councils, and any other relevant government agency nominated by the Director-General. The report(s) shall also be made publicly available.

32. The Proponent shall ensure that it has an internal audit system and that internal audits are undertaken and certified by the EMR every three (3) months to ensure compliance with the EMP, the conditions of approval and all other relevant licences and approvals. Each audit must be completed within 6 weeks of the end of the 3 month period and be made available to the Director-General upon request.

Operational Environmental Management Plan

33. An Operational Environmental Management Plan shall be prepared prior to the commencement of operation. The Operational EMP shall be prepared in consultation with the EPA, DLWC, NPWS, relevant Councils, and any other relevant government agency nominated by the Director-General. The Operational EMP shall be prepared in accordance with the conditions of this approval, all relevant Acts and Regulations and accepted best practice management procedures.

34. The Operational EMP shall be certified as being in accordance with the conditions of approval by the EMR.

35. The Operational EMP, as certified by the EMR, shall be approved by the Director-General prior to commissioning.

36. The Operational EMP shall include but not be limited to:

i. identification of the statutory and other obligations which the Proponent is required to fulfil, including all licences/approvals and consultations/agreements required from authorities and other stakeholders, and key legislation and policies which control the Proponent’s operation of the project;

ii. identification of environmental performance criteria;

iii. a description of the sampling strategies and monitoring protocols (e.g. specific monitoring requirements, and sampling frequency and locations, including any requirements of the EPA, NPWS, and DLWC) proposed to be used to test the environmental performance criteria.

iv. steps the Proponent intends to take to ensure compliance with all plans and procedures.
v. description of the consultation requirements/arrangements with relevant government agencies, the local community, and relevant Councils including complaints handling procedures; and
vi. management strategies for the environmental system elements including but not limited to: noise; water; air quality; erosion and sedimentation; access and traffic; groundwater; waste/resource management/ removal/disposal; flora and fauna; hydrology and flooding; visual screening, landscaping and rehabilitation; and hazards and risks.

Specific requirements for some of the main environmental system elements referred to in Condition of Approval No. 36 (vi) shall be as detailed under the conditions of this approval and/or as required under any licence or approval.

37. The Operational EMP shall be made publicly available after approval by the Director-General.

38. All sampling strategies and protocols undertaken as part of the Operational EMP shall include a quality assurance/quality control plan and shall be approved by the relevant regulatory agencies to ensure the effectiveness and quality of the monitoring program. Only National Association of Testing Authorities accredited laboratories can be used for laboratory analysis.

Environmental Impact Audit Report

39. An Environmental Impact Audit Report shall be prepared:
   i. by an independent person at the Proponent’s expense;
   ii. submitted to the Director-General, the EPA, NPWS, and, upon request by the Director-General, to any other relevant government authority;
   iii. within 2 months after the first 12 months of operation of the proposal and thereafter at 2 and 5 years after the start of operation, or at any time as requested by the Director-General within the first 10 years of operation.

40. The Environmental Impact Audit Report shall:
   i. assess the key impact predictions made in the EIS and any supplementary studies including, but not limited to, noise impacts at affected locations along the corridor, traffic projections both for the new road and roads where redistribution of traffic was assessed, and impacts on flora and fauna;
   ii. detail the extent to which actual impacts reflect the predictions;
   iii. provide details on actual versus predicted impact for all key impact issues identified in the EIS or as updated in the Representations Report;
   iv. assess the suitability of implemented mitigation measures and safeguards, and recommend any additional measures that are required to be taken as a result of i) to iii) above;
   v. discuss results of consultation with the local community in terms of feedback/complaints on the construction and operation phases of the project and any issues of concern raised; and
   vi. assess compliance with the Construction Framework EMP.

41. The Proponent shall comply with all reasonable requirements of the Director-General, EPA, NPWS, and other relevant authorities with respect to any reasonable measure arising from, or recommendations in, the report.

42. The Report shall be made publicly available.

Property and Land Use

43. The Proponent shall ensure that existing access to properties fronting the highway are maintained throughout the construction period. The Proponent shall ensure that any access way affected by the proposal is reinstated to an equivalent standard or that adequate compensation is negotiated with the relevant landowner(s).
44. The Proponent shall consult on a regular basis with all affected landowners regarding any practical and cost effective measures to minimise impacts which may be implemented prior to the commencement of construction or within such time as agreed with the relevant landowner.

Traffic and Access

45. The Proponent shall consult with all relevant Councils to develop management techniques for construction traffic on local roads, prior to commencement of construction.

46. The Proponent shall monitor the use of local roads by construction heavy vehicle traffic in consultation with all relevant Councils and shall consult with the Councils to develop measures to minimise and/or restrict the use of local roads by heavy vehicle traffic if so required.

47. A road dilapidation report shall be prepared for all non-arterial roads likely to be used by construction traffic prior to commencement of construction and after construction is complete. A copy of the report shall be provided to all relevant Councils. Any damage resulting from the construction of the project, aside from that resulting from normal wear and tear, shall be repaired at the cost of the Proponent.

Note: Nothing in Condition of Approval No. 45 or Condition of Approval No. 47 shall be taken as restricting the Proponent from negotiating an alternative payment for damage to local roads with all relevant Councils, subject to the agreement of the Council.

Flora and Fauna

NPWS Concurrence Report


Prior to Construction

49. The comprehensive compensation habitat package required by NPWS’s Concurrence Condition No. 13 shall be finalised prior to commencement of construction, and be prepared to the satisfaction of the Director-General and the Director-General of National Parks and Wildlife.

50. The Proponent shall achieve at least a 2:1 ratio in its compensatory habitat package for the endangered Kurri Sand Swamp Woodland and at least a 2:1 ratio for all other vegetated areas affected by clearing and edge effects.

51. The Proponent shall prepare, in consultation with the Department and NPWS, a detailed Flora and Fauna Management Sub Plan. The Sub Plan shall be prepared prior to construction and shall be consistent with NPWS Concurrence Condition No. 15 regarding EMPs. The Sub Plan shall include but not be limited to:

i. all those matters identified in the NPWS’s Concurrence Condition No. 15;

ii. strategies for seed collection and revegetation;

iii. a fauna risk assessment to identify:

a. which fauna species need to be targeted for measures to ensure safe transverse crossing of the roadway;

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9 2 hectares of Kurri Sand Swamp Woodland re-created or reserved for every hectare directly and indirectly impacted (ie. cleared or degraded by edge effects respectively) as a result of the proposal.

10 The allowance for edge effects shall be calculated in accordance with Ball, R (2000) Discussion paper – Compensating for Edge Effects prepared by Biosis Research for the RTA.
b. mitigation measures to be implemented;
c. the likely effectiveness of proposed mitigation measures i.e. design and location; and
d. further mitigation strategies.

iv. Identification of measures proposed to be taken to protect vegetated areas outside the direct impact zone, control impacts due to spillage, spread of debris and refuse, and movement and storage of materials and equipment.

52. The Proponent shall update the Additional Flora and Fauna Assessment Report (AFFAR) (Connell Wagner, May 2001) prior to construction and to the satisfaction of the Director-General and the NPWS\(^{11}\). The updated report shall:
   i. document additional surveys undertaken for previously identified (i.e. the FIS and the AFFAR) and any newly listed threatened species, populations and ecological communities;
   ii. identify which of these listings and their habitat are likely to be affected by the proposal where this has not already been described; and
   iii. provide details of appropriate mitigation measures to be implemented.

53. In addressing NPWS's Condition of Concurrence No. 3, the Proponent shall employ an independent road design specialist and independent qualified ecologist to review and report on the detailed design of the proposal prior to construction. The aim of the review is to establish whether additional measures can be incorporated in the detailed design, to reduce the direct and/or indirect impacts on threatened species, populations and ecological communities and their habitats, and to improve the effectiveness of proposed mitigation measures. The review and report shall include, but not be limited to:
   i. an investigation to demonstrate that the proposed multi-function fauna overpass\(^{12}\) is an effective and appropriate design; and
   ii. identification of measures to further reduce the amount of clearing of native vegetation.

The Proponent shall submit the report to the NPWS and the Director-General, and comply with all reasonable requirements of the Director-General and the NPWS and other relevant authorities with respect to any reasonable measure arising from, or recommendations in, the report.

54. The Proponent shall provide a dedicated fauna overpass\(^{13}\) unless the review and report referred to in Condition of Approval No. 53 identifies:
   i. that it is not possible to do this; or
   ii. the proposed multi-function fauna overpass is an effective and appropriate design.

55. The Proponent shall provide opportunities to facilitate the safe transverse crossing of Squirrel Gliders in the area of Allandale where a Squirrel Glider has been recorded.

56. Additional opportunities for the safe transverse crossing for Squirrel Gliders shall be provided at any new locations where Squirrel Gliders are found (see NPWS Concurrence Condition 6 and Condition of Approval No. 62) unless it can be demonstrated, to the satisfaction of the Director-General and NPWS, that these cannot be achieved.

57. The Proponent shall, prior to construction, employ a qualified ecologist approved by the NPWS, to identify and clearly mark all remnant patches of native vegetation, threatened flora species and communities adjacent to the areas proposed to be cleared in order to ensure minimal disturbance to native vegetation, and undertake pre-clearance surveys to search, trap, and release fauna that may

\(^{11}\) This report accompanied the Representations Report and addressed threatened species, populations and ecological communities listed on the TSC Act since the preparation of the FIS.

\(^{12}\) Currently proposed to include a corridor for a gas pipeline, extension of Stockington Road over the proposal, and a fauna overpass.

\(^{13}\) Dedicated for the exclusive use of fauna crossing over the highway and not incorporating any other uses such as road access, or utility corridors (except where these do not require cleared easements).
be impacted by construction activities. In addition, the qualified ecologist shall be responsible for ensuring NPWS’s Conditions of Concurrence Nos. 8 & 9 are met.

58. Any tree hollow roosts for bats in the areas to be cleared are to be relocated. If this is not possible, then an artificial bat roost shall be provided in adjacent vegetation prior to clearing.

59. Where possible, seeds of locally native species shall be collected prior to the commencement of construction to provide seed stock for revegetation purposes to the satisfaction of a qualified bushland regeneration officer acceptable to the NPWS. Topsoil and leaf mulch shall be stripped and stored for placement back in the vegetation zone from where it was removed subject to Condition of Approval No. 63.

Construction

60. The Proponent must not clear more than 168 hectares of native vegetation subject to any changes identified and accepted in Condition of Approval No. 53.

61. The Proponent must not clear more than 33.7 ha of Kurri Sand Swamp Woodland subject to any changes identified and accepted in Condition of Approval No. 53.

Revegetation and Rehabilitation

62. The Proponent shall monitor and maintain all proposed vegetation rehabilitation for a minimum of three years and undertake measures to control weeds.

63. Weed infested topsoil, as identified by a qualified ecologist, shall not be used in the rehabilitation works unless it is sterilised or treated in an appropriate manner.

64. Cleared vegetation must be reused or recycled to the greatest extent practicable. Reuse option including removing millable logs, recovering fence posts, mulching and chipping unusable vegetation waste for on-site use. All reasonable measures to use any surplus vegetation shall be undertaken including donation to community groups, distribution to the local community, etc.

65. If, during the course of construction, the Proponent becomes aware of the presence of any threatened species which are likely to be significantly affected and are not recognised in the flora and fauna studies presented in the EIS, FIS or Representations Report, then the Proponent shall immediately advise the Director-General of National Parks and Wildlife. No activity which places any of these species at risk shall be undertaken until advice has been received from the NPWS. All recommendations by the NPWS shall be complied with prior to any works likely to affect any threatened species.

66. All mitigation measures generally identified in Sections 2.4.3 through 2.4.14 of the Representations Report should be implemented.

Monitoring

67. The Proponent shall, as part of the Operational EMP referred to in Condition of Approval No. 33, prepare a fauna monitoring program to assess the effectiveness of all road crossing ameliorative measures. The monitoring program shall be carried out for a minimum of three years after operation and include a report on an assessment of the following matters:

i. the levels of fauna underpass use by native fauna;
ii. the extent of road kills and rehabilitation of injured fauna;
iii. the adequacy of exclusion fencing and glider crossing points, with particular reference to design and placement and need for additional measures; and
iv. the degree and nature of wildlife utilisation of any contiguous roadside wildlife corridors established.

The Proponent shall submit the report to the NPWS and the Director-General, and comply with all reasonable requirements of the Director-General and the NPWS with respect to any reasonable measure arising from, or recommendations in, the report.

**Bridge Design**

68. The Proponent shall consult NSW Fisheries in relation to: the construction of temporary platforms for the construction of the piles and piers in the creeks; and the design and timing of bridge construction.

69. The Proponent shall ensure that no earthen platforms are constructed or fill material placed in the creeks unless prior approval is granted by NSW Fisheries and the Director-General.

**Noise and Vibration**

70. The Proponent shall where reasonable and feasible apply best practice innovative noise mitigation measures including:
   i. maximising the offset distance between noisy plant items and nearby noise sensitive receivers;
   ii. avoiding noisy plant working simultaneously close together and adjacent to sensitive receivers;
   iii. minimising consecutive night time works in the same locality;
   iv. orienting equipment away from sensitive areas;
   v. carrying out loading and unloading away from noise sensitive areas; and
   vi. selecting site access points and roads as far as possible away from sensitive receivers.

**Construction Noise and Vibration Management Sub Plan**

71. A detailed Construction Noise and Vibration Management Sub Plan (NVMP Construction) shall be prepared. The Sub Plan shall include, but not be limited to:
   i. identification of all potentially affected noise sensitive receivers;
   ii. an assessment of current background noise levels at the identified noise sensitive receivers;
   iii. identification of appropriate construction noise objectives;
   iv. identification of all significant noise and vibration generating activities, duration and times of operation;
   v. potential noise and vibration impacts from each activity and any likely cumulative noise impacts from concurrent activities;
   vi. details of all reasonable and feasible noise mitigation measures that will be implemented to achieve the adopted construction noise objectives;
   vii. the need for respite periods;
   viii. construction timetabling to minimise noise impacts;
   ix. noise and vibration monitoring, reporting and response procedures;
   x. complaints handling and monitoring system;
   xi. a pro-active and reactive strategy for dealing with complaints;
   xii. site contact person to follow-up complaints;
   xiii. procedures for notifying residents of construction activities likely to affect their noise and vibration amenity;
   xiv. contingency plans to be implemented in the event of non-compliances and/or noise complaints.

The plan shall be submitted to the EPA when applying for an Environment Protection Licence for the construction phase.
Construction Hours

72. The Proponent shall ensure that rock breaking, rock hammering, sheet piling and any other activities which result in impulsive tonal noise generation are only scheduled between the following hours unless otherwise as agreed by the EPA through the Construction Noise and Vibration Management Sub Plan Process:
   i. 8 am to 12 pm, Monday to Saturday; and
   ii. 2 pm to 5 pm Monday to Friday.

Where these activities are undertaken for a continuous three hour period and are audible to noise sensitive receptors, a minimum respite period of at least one hour shall be scheduled before activities re-commence.

73. All construction activities, including entry and departure of heavy vehicles are to be restricted to the hours of 7:00 am to 6:00 pm (Monday to Friday); 8:00 am to 1:00 pm (Saturday) and at no time on Sundays and public holidays.

74. Works outside these hours that may be permitted include:
   i. any works which do not cause noise emissions to be audible at any nearby residential property;
   ii. the delivery of materials which is required outside these hours as requested by police or other authorities for safety reasons;
   iii. dust suppression works;
   iv. emergency work to avoid the loss of lives, property and/or to prevent environmental harm; and
   v. any other work as agreed through negotiations between the Proponent and potentially affected noise receivers or as otherwise agreed by the EPA through the NVMSP (Construction) process.

Construction Noise Criteria

75. Construction noise levels shall be monitored to verify compliance with the requirements specified in the NVMSP (Construction). The Proponent shall implement any additional mitigation measures as required by the Director-General following consultation with the EPA should monitoring indicate exceedance.

76. In order to minimise noise impacts during construction, the Proponent shall erect noise mitigation measures prior to the commencement of construction.

Vibration and Blasting

77. Should blasting be required, the Proponent shall prepare a Blast Management Strategy in consultation with the EPA and incorporate this Strategy into the Construction Noise and Vibration Management Sub Plan. The Strategy shall be prepared with an aim to demonstrate that all blasting and associated activities will be undertaken in a manner that will not generate unacceptable noise and vibration impacts at residences or other noise sensitive receivers. Issues to be considered in the Strategy shall include, but not necessarily be limited to:
   i. details of blasting to be performed, including location, method and justification of the need to blast;
   ii. identification of any potentially affected noise and vibration sensitive sites including heritage buildings and utilities;
   iii. establishment of appropriate criteria for blast overpressure and ground vibration levels at each category of noise sensitive site;
   iv. determination of potential noise and vibration impacts from blasting and appropriate best management practices;
v. community consultation procedures.

Reference shall be made to the Guideline entitled "Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration" prepared by the Australian and New Zealand Environment and Conservation Council (ANZECC).

The plan shall be submitted to EPA when applying for an Environment Protection Licence for the construction phase.

78. Blasts shall be limited to one single detonation in any one day, unless otherwise agreed by the EPA through the Construction Noise and Vibration Management Sub Plan Process.

79. The Proponent shall ensure that vibration resulting from construction of the project is limited to:

i. German Standard DIN 4150 and British Standard BS 7385: Part 2 - 1993 for structural damage vibration; and

Where there is an inconsistency between these standards, the more stringent standard shall apply.

80. Dilapidation surveys shall be undertaken for all buildings located within 200 metres of the road construction area prior to the commencement of blasting or major vibration inducing construction activities. The Proponent shall be responsible for rectifying any damages occurring as a result of the construction with the cost to be borne by the Proponent.

81. For any section of the project where blasting is proposed, the Proponent shall undertake a series of initial trials at reduced scale prior to commencement of the proposed blasting to determine site-specific blast response characteristics and to define allowable blast sizes to meet the Guideline entitled Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration prepared by the Australian and New Zealand Environment and Conservation Council (ANZECC).

82. The Proponent shall provide a minimum of 48 hours notice to occupants located within 500 metres of any blasting and provide a schedule of blasting times to affected residences.

83. Blasting shall only be undertaken between the hours of 10:00 am and 3 pm (Monday to Friday) and 10:00 am to 1:00 pm (Saturday).

**Operational Noise Management Sub Plan**

84. A detailed Operational Noise Management Sub Plan (NMSP Operation) shall be prepared in consultation with the EPA. The NMSP Operation shall include, but not be limited to:

i. details of noise mitigation measures to be implemented for the operation stage sufficient to address the technical requirements of the NSW Government's guideline – Environmental Criteria for Road Traffic Noise;
ii. location, type and timing of erection of any permanent noise barriers;
iii. specific physical and managerial measures for controlling noise and vibration;
iv. predicted road traffic noise levels immediately after opening and with all proposed noise mitigation measures in place, at the noise sensitive receiver locations identified in the Representations Report;
v. a methodology and procedures for assessing compliance with the predicted road traffic noise levels immediately after opening; and
vi. the urban design issues relating to noise control measures.
With respect to Condition of Approval No. 84 (iii) above, the Proponent shall consider the use of a range of structural and non-structural measures including speed controls and the use of open graded asphalt.

Operation Noise Management

85. Monitoring of operational noise shall be undertaken in accordance with the NMS (Operation). The Proponent shall, in consultation with the EPA, assess the adequacy of the traffic noise mitigation measures after one year of operation with regard to the EPA guideline Environmental Criteria for Road Traffic Noise. Should the assessment indicate a clear trend in traffic noise levels which are higher than the predictions made and exceed EPA noise criteria, the Proponent shall consider further mitigation measures including but not limited to inclusion of noise barriers, insulation of buildings, and total acquisition of properties.

86. Notwithstanding the above, the Proponent shall, as a minimum, comply with the noise assessment criteria described in Section 9 of the Additional Environmental and Engineering Assessment report (Connell Wagner, May 2001).

Soil and Water Management

Soil and Water Management Sub Plan

87. A detailed Soil and Water Management Sub Plan shall be prepared in consultation with the DLWC, NSW Fisheries, and relevant Councils. The Sub Plan shall be prepared in accordance with the Department of Housing's guideline Managing Urban Stormwater - Soils and Construction and where appropriate, DLWC's Constructed Wetlands Manual. The Sub Plan shall be prepared prior to construction or operation. The section of the Sub Plan dealing with construction impacts shall be submitted to the EPA when applying for an Environment Protection Licence for the construction phase.

88. The Soil and Water Management Sub Plan shall contain, but not be limited to:
   i. management of stormwater from the development on the quality of surface and groundwater;
   ii. details of short and long term measures to be employed to minimise soil erosion and the discharge of sediment to land and/or waters including the locations of suitably sized sedimentation basins;
   iii. management of the impacts of the development on watercourse crossings including Wallis/Surveyors Creeks, South Maitland Railway/Swamp Creek, Bishops Creek, and Black Creek;
   iv. management of the impacts of Wallis/Surveyors Creeks, South Maitland Railway/Swamp Creek, Bishops Creek, and Black Creek on the development;
   v. identification of all potential sources of water pollution and a detailed description of the remedial action to be taken or management systems to be implemented to minimise discharges of these pollutants from all sources within the subject site;
   vi. detailed description of water quality monitoring to be undertaken during the pre-construction, construction and operation phases of the proposal including identification of locations where monitoring would be carried out;
   vii. contingency plans for fuel and other spills; and
   viii. a program for reporting on the effectiveness of the sediment and erosion control system against performance goals.

Erosion and Sediment Control Works

89. The Soil and Water Management Sub Plan shall also incorporate detailed erosion and sedimentation controls including a strategy to manage the extent of exposed ground surface during construction and progressive site rehabilitation requirements (in accordance with Conditions of Approval Nos. 97...
and 114). The Sub Plan shall be prepared to the satisfaction of DLWC and in consultation with the EPA and NSW Fisheries and sufficient to address the technical requirements for obtaining relevant EPA approvals/licences.

90. The DLWC, or other appropriately qualified soil conservationist, shall be consulted on a regular basis to undertake inspections of temporary and permanent erosion and sedimentation control devices to ensure that the most appropriate controls are being implemented and that they are being maintained in an efficient condition at all times and meet the requirements of any relevant approval/licence condition(s).

91. All water collected during construction which is likely to be contaminated, shall be tested, treated, handled and disposed of so that it does not pollute waters.

92. Sediment basin(s) must be designed (stability, location, type, and size), constructed, operated and maintained in accordance with the guideline Managing Urban Stormwater - Soils and Construction, 3rd edition, 1998 or its latest edition, produced by the NSW Department of Housing unless otherwise approved by the EPA.

Hydrology and Flooding

93. The Soil and Water Management Sub Plan shall identify mitigation measures proposed to be taken to address any:
   i. afflux impacts from the roadway or structures associated with the proposal eg. the proposed Wallis/Surveyors Creek crossing and impacts upstream in the Buchanan area; and
   ii. adverse impacts from the proposal as a result of losses to the Hunter River floodplain storage areas for flood events above and including the 1% Annual Exceedence Probability Event eg. the Wentworth and Dagworth Swamps;

Operation Stage Control Measures

94. All stormwater drainage, erosion, sedimentation and water pollution control systems and facilities of the proposal shall be located, designed, constructed operated and maintained to meet the requirements of the relevant authorities including the EPA and the DLWC. All facilities including wetland filters, grass filter strips, gross pollutant traps and sedimentation basins shall be inspected regularly and maintained in a functional condition for the life of the project. Construction stage water quality structures shall be maintained for a minimum of six months after commissioning of the proposal or until revegetation has provided ground cover to at least 70% of the exposed surface.

95. The Proponent shall provide appropriate detention systems for containment of spills and materials arising from accidents that are consistent with the Proponent's Code of Practice for Water Management – Road Development and Management in consultation with the EPA.

Groundwater

96. The Proponent shall identify the most appropriate measures to safeguard and/or mitigate impacts on the groundwater, or impacts arising from any groundwater dewatering operations, in consultation with the DLWC, prior to the commencement of construction. Measures may include:
   i. evaluation of aquifer characteristics including conductivity and salinity;
   ii. identification of suitable sites for the disposal of saline groundwater from dewatering activities; and
   iii. installation of monitoring bores.

Landscaping
97. The Proponent shall prepare a detailed Landscape Sub Plan in consultation with the relevant
Councils, all affected landowners and the Community Liaison Group. The Sub Plan shall include, but
not be limited to the following:

i. sections and perspective sketches;
ii. methodology of landscaping works;
iii. location and identification of existing and proposed vegetation including use of indigenous
species;
iv. location of mounds, bunds, structures or other proposed treatments, finishes of exposed
surfaces (including paved areas), measures to preserve bio-diversity, colours and
specifications, staging of works, methodology of landscaping;
v. progressive landscape strategies incorporating other environmental controls such as erosion
and sedimentation controls, dust mitigation, drainage, noise mitigation;
vi. lighting; and
vii. monitoring and maintenance procedures.

The Proponent shall also include landscape strategies incorporating other environmental
controls such as erosion and sedimentation controls, noise mitigation measures, drainage
structures and lighting.

98. All landscaping works shall be monitored and maintained by a suitably qualified landscape specialist
at the Proponent’s expense for a period of not less than three years.

99. The Proponent shall implement any required remediation measure(s) to maintain landscaping works.
Any landscaping within the road reserve shall be maintained by the Proponent for the life of the
project.

Heritage and Archaeology

100. The Proponent shall, prior to the commencement of construction, undertake a program of test
excavations at the recorded sites and the Potential Archaeological Deposits (PADs) identified along
the route, and any other additional locations as determined by the NPWS and the Aboriginal
community groups (i.e. Minyakwa Local Aboriginal Land Council, Awabakal Local Aboriginal Land
Council, Wonnarua Nation Aboriginal Corporation and the Lower Hunter Tribal Council) along the
highway route in order to identify significant and sensitive sites. This shall include but not be
restricted to an investigation of the following for each location:

i. the geomorphological context of the landscape being investigated;
ii. the landscape history and level of disturbance;
iii. the presence of intact archaeological material;
iv. the nature of and significance of intact archaeological material to include an assessment of
the material recovered and its landscape and geomorphological context; and
v. appropriate management options and mitigation measures including requirements for more
detailed salvage.

101. The Proponent shall prepare a detailed research program, which is to be undertaken 12 months prior
to commencement of works, to support the work to be undertaken for the testing referred to in
Condition of Approval No. 100 to the satisfaction of the NPWS.

102. The Proponent shall undertake a salvage program as required by the NPWS and the local Aboriginal
community groups.

103. The Proponent shall identify, in consultation with the local Aboriginal community groups and the
NPWS, management zones across the proposal for the ongoing management of sites along the
route corridor. Each management zone shall:

i. incorporate a set of management objectives which is reflective of its relative importance for
conserving Aboriginal heritage values identified through the testing process; and
ii. strategies for the avoidance of sites and areas of high sensitivity.

104. If during the course of construction the proponent becomes aware of any heritage items or archaeological material, all work likely to affect the site(s) shall cease immediately and the relevant authorities, including NPWS, NSW Heritage Office and the local Aboriginal community groups shall be consulted to determine an appropriate course of action prior to the recommencement of work at that site. Appropriate supporting documentation would need to accompany any application for required permit/consent(s).

105. The proponent shall prepare a cultural heritage strategy for the construction works to ensure that:
   i. all workers are aware of the Aboriginal heritage values within each construction area;
   ii. areas in sensitive management zones are appropriately fenced to avoid damage, particularly from inadvertent machinery movement; and
   iii. all works cease immediately upon the discovery of any ‘unknown’ Aboriginal site and NPWS and relevant local Aboriginal community groups are contacted.

106. The proponent shall prepare a cultural heritage strategy for management, post construction, to include but not be limited to:
   i. the introduction of permanent fencing;
   ii. revegetation of areas of high archaeological significance; and
   iii. an assessment of the changes in accessibility to sites and strategies to reduce the impact of these changes, prepared in consultation with the local Aboriginal community groups and the NPWS.

107. The proponent shall fully fund the proposed works and mitigation strategies outlined in the above conditions.

108. Documentation, in the form of Aboriginal Cultural Heritage Assessments, is required from each of the known Aboriginal community groups. The published NPWS Aboriginal Cultural Heritage Standards and Guidelines outlines the critical components for these assessments including the Aboriginal community’s understanding of the proposed project and:
   i. the cultural heritage values they ascribe to the landscape and the significance to the community (sensitivity mapping);
   ii. the impact to their culture as a result of works associated with the proposal; and
   iii. management options and recommendations considered necessary by the community to mitigate against impacts or loss.

109. Documentation from local Aboriginal community groups detailing the significance of Sugarloaf Range, their understanding of the implications of the impact of the proposed Highway Link to Braxton and:
   i. the cultural heritage values they ascribe to the Sugarloaf Range landscape and its significance to the community (sensitivity mapping);
   ii. the impact to their culture as a result of works associated with the Sugarloaf Range landscape; and
   iii. management options and recommendations considered necessary by the community to mitigate against impacts or loss.

The above may be included in the Aboriginal Cultural Heritage Assessments or documented separately in the form of a specific report or letter from each of the Aboriginal community groups.

110. The proponent shall negotiate a Plan of Management in consultation with Aboriginal community groups which encapsulates strategies, methods and outcomes for Aboriginal cultural heritage values resulting from these conditions.
111. The Proponent shall negotiate with the Director-General of National Parks and Wildlife and all relevant Aboriginal community groups an Aboriginal heritage offset package. This shall include, but not be restricted to:

i. the identification of Aboriginal cultural and archaeological variables and criteria to form the basis for this purpose;

ii. assessment of areas already being considered for their compensatory habitat values if such areas are identified in terms of their heritage values;

iii. identification of other areas (than those identified above) for consideration as off-sets; and

iv. effectively addressing Aboriginal community concerns arising from the consultation process.

112. The Proponent must notify the Director-General of National Parks and Wildlife in writing of any proposed variations to the alignment, design or construction of the activity not considered in the current proposal. The NPWS must be given the opportunity to inspect the final route and any variations can then only proceed if approval in writing is given by the Director-General of National Parks and Wildlife. The NPWS must be allowed a minimum of fifteen working days to consider any variation and to provide advice on the appropriate measures required to mitigate any impacts.

113. The Proponent shall implement the mitigation measures identified in Section 8.5 of the EIS in order to protect the non-indigenous cultural heritage items potentially affected by the proposal.

Air Quality

Construction Air Quality Sub Plan

114. A specific Construction Air Quality Sub Plan shall be prepared in consultation with the EPA. The Sub Plan shall provide details of all dust control measures to be implemented during the construction stage, sufficient to address the technical requirements for any EPA approvals/licences. The Sub Plan shall include, but not be limited to:

i. pro-active measures to reduce dust from stockpiles and cleared areas and other exposed surfaces; and

ii. progressive revegetation strategy for exposed surfaces in accordance with Conditions of Approval Nos. 88 and 97.

115. Where there is a risk of losing material, construction vehicles using public roads shall be maintained and covered to prevent any loss of load, whether in the form of dust, liquid, soils. Construction vehicles shall be maintained in such a manner that they would not track mud, dirt or other material onto any street which is opened and accessible to the public. In the event of any spillage, the Proponent is required to remove the spilt material within 24 hours.

116. In accordance with the Protection of Environment Operations (Control of Burning) Regulation 2000, no open burning or incineration shall be permitted on site unless otherwise approved by the EPA.

Hazards and Risk Management

117. The Proponent shall prepare and implement a Hazards and Risk Management Sub Plan. This Sub Plan shall include, but not be limited to the following:

i. details of the hazards and risks associated with the proposal; and

ii. pro-active and reactive mitigation measures including contingency plans to be implemented in the event of a pollution incident.

Dangerous Goods and Hazardous Materials
118. The Proponent shall prepare and implement an On-Site Refuelling Protocol to manage on-site refuelling of vehicles during the construction. The Protocol shall include, but not necessarily be limited to:

i. a decision-making algorithm to determine whether on-site or off-site refuelling is appropriate in a given situation;

ii. arrangements for the transport of diesel to the refuelling site, including vehicle types, volumes, movement times and routes where relevant;

iii. procedures for refuelling to address the potential for spills, collisions with refuelling vehicles or other hazardous incidents; and

iv. procedures to be followed in the event of a diesel spill, including containment and clean-up measures.

The On-Site Refuelling Protocol shall be submitted for the approval of the Director-General prior to the commencement of any refuelling activity, or within such period otherwise agreed by the Director-General.

Should the Proponent decide not to undertake any on-site refuelling activity during construction, the Proponent may satisfy this condition by certifying in writing, to the Director-General, that such refuelling activities will not be conducted.

Construction Risk Management

119. The Proponent shall prepare and implement a Construction Safety Plan to manage hazardous incidents and public safety during the construction of the proposal. The Plan shall include, but not necessarily be limited to:

i. physical measures to be implemented to minimise the potential for public harm at and in the vicinity of construction areas;

ii. a program to ensure that safety measures implemented to minimise the potential for harm to the public remain in place and are adequately maintained while hazardous situations exist;

iii. procedures for the notification of residents in the vicinity of construction sites whose safety may be affected by construction activities;

iv. procedures to manage risk to construction workers;

v. identification of pipelines, cables and other utilities that may be affected by construction of the roadway and associated infrastructure, either directly or indirectly, and methods to minimise those impacts;

vi. procedures to be followed in the event that contaminated material is discovered during any excavation works; and

vii. measures to be implemented to ensure safe transport of construction materials, including transport routes, transport times, vehicle speeds and driver behavioural requirements.

The Construction Safety Plan shall be submitted for the approval of the Director-General prior to the commencement of any construction activity, or within such period otherwise agreed by the Director-General.

Operation Risk Management

120. The Proponent shall prepare and implement an Emergency Plan to manage emergency events that may arise. The Plan shall include, but not necessarily be limited to:

i. identification of emergencies that may arise in relation to the proposal and associated infrastructure;

ii. procedures to be followed to address potential emergencies and minimise the impacts of emergencies on surrounding land uses;

iii. monitoring and communication systems installed to indicate an emergency;
iv. details of fire safety measures where relevant;

v. procedures for the notification of relevant emergency services, authorities and affected receptors of an emergency situation; and

vi. a system to investigate and address the cause(s) of any emergency to prevent recurrence.

The Emergency Plan shall be submitted for the approval of the Director-General prior to the commencement of operation of the proposal, or within such period otherwise agreed by the Director-General.

121. The Proponent shall prepare and implement a Security and Crime Management Strategy to prevent unauthorised public ingress or access, and to minimise the potential for crime in the vicinity of the proposal (eg vandalism, littering, illegal dumping etc). The Strategy shall be generally in accordance with the principles outlined in the joint Department and Police Service publication Crime Prevention and the Assessment of Development Applications, and be developed in consultation with the NSW Police Service and relevant councils. The Strategy shall include, but not necessarily be limited to:

i. details of security arrangements to prevent unauthorised access, including physical exclusion measures, detection devices and management mechanisms;

ii. procedures for addressing security issues, should they arise;

iii. specific design features intended to discourage the incidence of crime at and in the immediate vicinity of relevant components of the proposal and associated infrastructure (eg. fencing on overpasses);

iv. lighting considerations, including light intensity, direction and hours of operation at and in the immediate vicinity of the proposal, with the aim of minimising areas that may encourage crime;

v. policies and procedures for the management and removal of graffiti, amelioration of vandalism, should it occur at or on any component of the of relevant components of the proposal; and

vi. policies and procedures for the management and removal of illegal or inappropriate bill-posting and illegally dumped materials, should it occur at or on any component of relevant components of the proposal.

The Security and Crime Management Strategy shall be submitted for the approval of the Director-General prior to the commencement of construction or within such period otherwise agreed by the Director-General.

This condition only applies to "relevant" components of the proposal. That is, this condition only applies to those components that may be subject to security or crime issues.

Spoil Disposal

Spoil Management Plan

122. The Proponent shall prepare a Spoil Management Sub Plan. The Sub Plan shall identify how spoil would be handled, stockpiled, reused and disposed. The Sub Plan shall be prepared:

i. in consultation with the EPA and the relevant Councils;

ii. prior to construction; and

iii. for all relevant sites.

123. All clean and/or treated spoil shall be reused or recycled where possible and cost effective to do so. The Proponent shall ensure that spoil generated from construction activities is maximised in preference to any import of fill.

Waste Management and Recycling

Waste Management and Reuse Sub Plan
124. A detailed Waste Management and Reuse Sub Plan shall be prepared. The Sub Plan shall address the management of wastes during the construction and operation stages respectively in accordance with Government’s Waste Reduction and Purchasing Policy. It shall be prepared prior to construction, and shall identify requirements for:

i. waste avoidance;
ii. reduction;
iii. reuse; and
iv. recycling;

and details of requirements for:

v. handling;
vi. stockpiling;
vii. disposal of wastes: specifically contaminated soil or water, concrete, demolition material, cleared vegetation, oils, grease, lubricants, sanitary wastes, timber, glass, metal, etc.;
viii. implementation of energy conservation best practice; and
ix. identifying any site for final disposal of any material and any remedial works required at the disposal site before accepting the material.

125. Any waste material that is unable to be reused, reprocessed or recycled shall be disposed at a landfill licensed by the EPA to receive that type of waste. The Sub Plan shall be framed using the waste minimisation hierarchy principles of avoid-reduce-reuse-recycle-dispose. This shall also include the demand for water.

Utilities and Services

126. A detailed Utility Services Sub Plan shall be prepared in consultation with the relevant service providers (e.g. Transgrid, Agility Services, Telstra). The Sub Plan shall identify the services potentially affected by construction activities and discuss requirements for diversion, protection and/or support. The Sub Plan shall be prepared in consultation with the relevant service provider(s).

127. Any alterations to utilities and services shall be carried out to the satisfaction of the relevant service provider(s), and unless otherwise agreed to by the service provider, at no cost to the service/utility provider(s).

128. The Proponent shall ensure that disruption to services resulting from the proposal are minimised and shall be responsible for advising local residents and businesses affected prior to any disruption of service.

Location of Construction Facilities

129. The Proponent shall construct concrete batching plants and construction compounds and any other ancillary infrastructure (including sedimentation basins) required for this proposal only in those locations that satisfy the following criteria:

i. sites are to be located within the road reserve wherever possible;
ii. sites are to be located with ready access to the local road network;
iii. sites on relatively level land;
iv. sites to be separated from nearest residences by at least 200 metres unless it can be demonstrated to the satisfaction of the Director-General that there will be no adverse impacts on noise, visual and air quality impacts;
v. sites are not to be located within 100 metres of waterways unless adequate erosion and sediment controls are implemented to protect water quality;
vi. sites above the 100 ARI flood level;
vii. sites are to have low conservation significance for flora, fauna or heritage and they are not to require any clearing of native vegetation beyond that which must be cleared for the proposal in any case;

viii. sites that do not contain areas shown as habitat for threatened species or communities; and

ix. sites are to be selected so that the operation of the plants does not impact on the land use of adjacent properties.

**Note:**

Any modification to the proposal that would be inconsistent with the conditions of approval shall only be carried out with the prior written approval of the Minister, in accordance with the relevant provisions of the *EP&A Act.*
Attachment 2

PAD and Site Descriptions
PAD Descriptions

The following PAD descriptions are presented in numerical order. The PADs are shown on Figures 2.3 to 2.10 in the main text. For the purpose of this report the term ‘PAD’ relates to an area where there was a high likelihood of Aboriginal artefactual material in a subsurface context. Very few of the PADs identified, however, were thought to maintain archaeological integrity due to prior disturbance.

The inclusion of areas for subsurface testing that are not thought likely to have archaeological integrity came about as both DEC and RTA had indicated that there was a ‘no monitoring’ policy for the construction phase of the F3 to Branxton project. With this in mind the Aboriginal groups requested to be able to undertake subsurface investigations in areas they believed had the potential for substantial numbers of artefacts in a subsurface context. The Aboriginal groups, as representatives of the wider Aboriginal community, felt a responsibility to ensure that areas such as these are tested to ensure that if substantial numbers of artefacts occur, they can be subject to further salvage as part of an Aboriginal cultural heritage salvage program. RTA has agreed to the subsurface testing for cultural heritage purposes on the condition that there will be no monitoring of ground disturbance works during highway link construction.

Please note that the areas initially recorded as PAD 10 and PAD 19 during the Umwelt (in prep.) inspection were not assessed as PADs following inspection by a geomorphologist (Pam Dean-Jones). All of the areas identified as PADs during the Umwelt inspection are within the proposed route alignment and all will be destroyed by works associated with the project.

<table>
<thead>
<tr>
<th>PAD Number:</th>
<th>PAD 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>361056E 6366940N</td>
</tr>
<tr>
<td>Location:</td>
<td>The PAD is located 600 metres north of John Renshaw Drive, 300 metres east of Averys Lane and 600 metres west of the present channel of Wallis Creek and within the route alignment.</td>
</tr>
<tr>
<td>Description:</td>
<td>The PAD is located on a creek terrace on the western side of a tributary of Wallis Creek. Visibility in this area was restricted due to grasscover. The PAD is within a bend on the tributary and is located at the base of a sandstone outcrop that rises steeply to a bench that marks the base of the lower slope. PAD 1 is adjacent to a spring that landholders report flows throughout prolonged drought periods. The terrace has approximately 45 cm of sandy loam derived from alluvial and colluvial deposition. The present terrace is raised above the floodplain and would have provided a well drained campsites for Aboriginal people. The terrace was inspected by a geomorphologist (Pam Dean-Jones) who was uncertain of the antiquity of the terrace and suggested subsurface testing to gain an understanding of its geomorphic history. The Aboriginal groups felt that the terrace would have provided an excellent campsite in a resource rich area and that subsurface artefacts would be highly likely in this area. Discussions with the landholder also revealed that what they believed to be Aboriginal artefacts had been collected from the general area when it was first cleared. The artefacts, however, were not available for inspection. The terrace has been cleared and probably subject to cultivation and is presently grazed by cattle and disturbance of the ground surface from these factors is evident. The depth of the topsoil, however, indicates that it may be possible to locate artefacts/features in a subsurface context below the disturbance zone. Furthermore, an Aboriginal camp site located in a resource rich area may contain evidence from multiple occupation events or occupation events of a prolonged nature, which may led to the discard of a complex artefact assemblage by people undertaking a multiplicity of tasks. Earlier geomorphic inspection of geotechnical test trenches on the floodplain on the eastern side of Wallis Creek indicate that it has infilled recently and that it was formerly a broad shallow swamp. If this was the case then the areas raised above the floodplain, like this terrace, would have provided suitable camp sites.</td>
</tr>
</tbody>
</table>
Management Recommendation and Justification: The PAD is within the route alignment and will be destroyed by works associated with the project. The Wallis Creek area has landforms (broad floodplain, billabongs, swamps, creek terraces) not located in other areas crossed by the route alignment or by other areas where Aboriginal or archaeological values are presently being conserved in a local or regional context. The location of the PAD in a resource rich area and in a landform commonly used by Aboriginal people for camping is seen to indicate that this area is likely to have subsurface artefactual material that may be complex in nature and which could add significantly to our knowledge of the use of this landscape by Aboriginal people. Therefore, it is recommended that the area be subsurface tested under a Section 87 PRP to establish:

- its geomorphic history;
- if there are subsurface artefacts/features, the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Wallis Creek landscape; and
- requirements for any further salvage/investigation.

PAD Number: PAD 2

AMG: 361490E 6366776N

Location: The PAD is located 500 metres north of John Renshaw Drive and 100 metres east of a road into a homestead at Buchanan. The PAD is 300 metres west of Wallis Creek and within the route alignment.

Description: The PAD is located on the eastern side of a spur (bedrock controlled) which runs along the centre of the Wallis Creek floodplain and on the western side of the present channel of Wallis Creek. Visibility was generally poor in this area due to grass cover. The spur has been cleared and disturbed by grazing. Cattle wallows in the area indicate a good depth of sandy loam (>35 cm). The sand unit was interpreted by a geomorphologist (Pam Dean-Jones) as likely to be alluvial in nature, however, subsurface testing was suggested to assess its geomorphic history.

The spur provides a suitable camp site above what it appears was a very swampy area with rich Aboriginal resources prior to European land clearance and the deposition of several metres of sand over the Wallis Creek floodplain. Earlier archaeological survey in the area by Brayshaw (1994) also identified this spur as highly likely to have been used as an Aboriginal camp site. Furthermore, an Aboriginal camp site located in a resource rich area may contain evidence from multiple occupation events or occupation events of a prolonged nature, which may led to the discard of a complex artefact assemblage by people undertaking a multiplicity of tasks.

The Aboriginal groups also felt that the spur would have provided an excellent camps site in a resource rich area and that subsurface artefacts would be highly likely in this area.

Management Recommendation and Justification: The PAD is within the route alignment and will be destroyed by works associated with the project. The Wallis Creek area has landforms (broad floodplain, billabongs, swamps, creek terraces) not located in other areas crossed by the route alignment or by other areas where Aboriginal or archaeological values are presently being conserved in a local or regional context. The location of the PAD in a resource rich area and in a landform commonly used by Aboriginal people for camping is seen to indicate that this area is likely to have subsurface artefactual material that may be complex in nature and which could add significantly to our knowledge of the use of this landscape by Aboriginal people. Therefore, it is recommended that the area be subsurface tested under a Section 87 PRP to establish:

- its geomorphic history;
- if there are subsurface artefacts/features the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Wallis Creek landscape; and
- requirements for any further salvage/investigation.
**PAD Number:** PAD 3  
**AMG:**  363136E  6365755N

**Location:** The PAD is located 1300 metres east of George Booth Drive and 1000 metres south of John Renshaw Drive. It is 200 metres east of Surveyors Creek.

**Description:** The PAD is located on a broad, low spur crest. The spur slopes gently to the south-west and down to Surveyors Creek. Visibility in this area was restricted by vegetation. There is a small, broad, tributary running either side of the spur. These tributaries would not hold water for long after rain, however, Surveyors Creek most likely had permanent water. The spur crest would have provided a well drained camp site, however, it is thought more likely that the main camp site would have been located closer to Surveyors Creek. The area has been disturbed by bulldozing to clear trees and then scrubby regrowth, limiting its potential for intact archaeological deposits, however, a few areas remain that retain topsoil and the Aboriginal group representatives assessed that these areas warranted subsurface testing to ensure that there are not large numbers of artefacts in a subsurface context that may require a cultural heritage salvage.

**Management Recommendation and Justification:** The PAD is within the route alignment and will be destroyed by works associated with the project. The location of the PAD in a resource rich area and in a landform commonly used by Aboriginal people for camping is seen by the Aboriginal groups to indicate that this area is likely to have subsurface artefactual material. Therefore, they have recommended that the area be subsurface tested under a Section 87 PRP to establish:

- if there are subsurface artefacts/features the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Surveyors Creek landscape; and
- requirements for any further salvage/investigation.

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**PAD Number:** PAD 4  
**AMG:**  363578E  6364579N

**Location:** The PAD is located 1800 metres east of George Booth Drive and 2300 metres south of John Renshaw Drive. It is 400 metres east of Surveyors Creek and 1250 metres south-east of PAD 3 and within the route alignment.

**Description:** The PAD is located on a broad, low spur crest. The spur slopes gently to the south-west and down to Surveyors Creek. Visibility in this area was restricted by vegetation. There is a small, broad, tributary running either side of the spur. These tributaries would not hold water for long after rain, however, Surveyors Creek most likely had permanent water. The spur crest would have provided a well drained camp site, however, as in PAD 3, it is thought more likely that the main camp site would have been located closer to Surveyors Creek. The area has been disturbed by bulldozing to clear trees and then scrubby regrowth limiting its potential for intact archaeological deposits, however, a few areas remain that retain topsoil and the Aboriginal groups assessed that these areas warranted subsurface testing to ensure that there were not large numbers of artefacts in a subsurface context that may require a cultural heritage salvage.

**Management Recommendation and Justification:** The PAD is within the route alignment and will be destroyed by works associated with the project. The location of the PAD in a resource rich area and in a landform commonly used by Aboriginal people for camping is seen by the Aboriginal groups to indicate that this area is likely to have subsurface artefactual material. Therefore, they have recommended that the area be subsurface tested under a Section 87 PRP to establish:

- if there are subsurface artefacts/features the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Surveyors Creek landscape; and
- requirements for any further salvage/investigation.
PAD Number: PAD 5
AMG: 364946E 6362924N

Location: The PAD is located 1000 metres west of George Booth Drive and 100 metres north of a four wheel drive track. The PAD is within the route alignment.

Description: The PAD is located on a footslope/floodplain boundary on the southern side of Surveyors Creek. Visibility in the area was zero due to grass cover. The area is subject to the deposition of colluvium from the slope above and alluvium from flood events. The gradient is suitable for camping and there are numerous plant food resources available locally. Water is available from the creek on a semi-permanent basis. There has been considerable disturbance to the area from logging and it is assessed as unlikely to have retained any archaeological integrity.

The Aboriginal groups assessed that the PAD would have provided an excellent campsite in a resource rich area and that subsurface testing was warranted to see if there are significant numbers of artefacts in a subsurface context that would require an Aboriginal cultural heritage salvage.

Management Recommendation and Justification: The PAD is within the route alignment and will be destroyed by works associated with the project. The location of the PAD in a resource rich area and in a landform commonly used by Aboriginal people for camping is seen by the Aboriginal groups to indicate that this area is likely to have subsurface artefactual material. Therefore, they have recommended that the area be subsurface tested under a Section 87 PRP to establish:

- if there are subsurface artefacts/features, the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Surveyors Creek landscape; and
- requirements for any further salvage/investigation.

PAD Number: PAD 6
AMG: 365509E 6362290N

Location: The PAD is located 600 metres west of George Booth Drive and 100 metres east of a four wheel drive track. The PAD is within the route alignment.

Description: The PAD is on the lower slope/footslope 5 metres west of a northerly flowing tributary of Surveyors Creek and 70 metres south of the confluence of two tributaries. There are limited alluvial deposits along the bank of the creek and colluvial deposits at the toe of the slope. Visibility in the area was zero due to vegetation cover. The area has a gentle gradient (<1°) and is surrounded by plant food resources. Water is available from the creek on a semi-permanent basis. There has been some disturbance to the area from logging, however, it is relatively undisturbed in comparison with much of the Surveyors Creek area. Soil depth is estimated to be around 10 cm on the footslope to 30 cm near the creek (based on the stratigraphic profile of the creek bank and other areas of ground surface disturbance in the area).

The Aboriginal groups assessed that the area would have provided an excellent campsite in a resource rich area and that subsurface artefacts would be highly likely in this area. From an archaeological perspective this area provided the greatest potential for archaeological deposit within the areas of higher gradient associated with the Surveyors Creek drainage system. It was further assessed that this area may provide important information in relation to the Aboriginal use of this area about which very little is known. Therefore subsurface testing was thought warranted from both an Aboriginal and archaeological perspective.
Management Recommendation and Justification: The PAD is within the route alignment and will be destroyed by works associated with the project. The location of the PAD in an area of soil aggradation, in a resource rich area and in a landform commonly used by Aboriginal people for camping is seen to indicate that this area is likely to have subsurface artefactual material, the analysis of which could add substantially to present knowledge of the Aboriginal use of this landscape. Therefore, it is recommended that the area be subsurface tested under a Section 87 PRP to establish:

- if there are subsurface artefacts/features, the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Surveyors Creek landscape; and
- requirements for any further salvage/investigation.

PAD Number: PAD 7
AMG: 360946E 6366984N
Location: The PAD is located 750 metres north of John Renshaw Drive, 20 metres east of Averys Lane and 800 metres west of the present channel of Wallis Creek.
Description: The PAD is located on a bench at the base of the lower slope and above a short, steep sandstone cliff that drops away to the area of PAD 1. Visibility in the area was limited due to grass cover. The sandy loam on the bench is likely to be relatively shallow (approximately 10 cm), however, the soil in the area appears to be stable (the soil is generally contained behind the outcropping sandstone to the east). The bench provides an excellent outlook across the Wallis Creek floodplain and it is assessed as highly likely that this area was used as a camp site by Aboriginal people exploiting the rich resources of the Wallis Creek floodplain area. The PAD 7 area has been cleared and grazed and is lightly disturbed. Discussions with the landholder revealed that what they believed to be Aboriginal artefacts had been collected from the general area when it was first cleared. The artefacts, however, were not available for inspection.

The Aboriginal groups assessed the area as highly likely to retain subsurface artefacts and requested subsurface testing. From an archaeological perspective it is also likely that the area will retain artefacts in a subsurface context. An Aboriginal camp site located in such a resource rich area may contain evidence from multiple occupation events providing a complex artefact assemblage discarded by people undertaking a multiplicity of tasks. The analysis of such an assemblage will add considerably to the knowledge of the Aboriginal use of the Wallis Creek landscape area, even if the site is disturbed and lacks archaeological integrity.

Management Recommendation and Justification: The PAD is within the route alignment and will be destroyed by works associated with the project. The location of the PAD in an area of soil stability, in a resource rich area and in a landform commonly used by Aboriginal people for camping, is seen to indicate that this area is likely to have subsurface artefactual material. Therefore, it is recommended that the area be subsurface tested under a Section 87 PRP to establish:

- if there are subsurface artefacts/features, the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Wallis Creek landscape; and
- requirements for any further salvage/investigation.
### PAD Number: PAD 8

**AMG:** 360622E 6366967N

**Location:** The PAD is located 750 metres north of John Renshaw Drive and 400 metres west of Averys Lane. The majority of the PAD is located to the south of an Energy Australia easement and to the north of a tributary of Wallis Creek. A section of the PAD is within the route alignment and a section is in an area to be impacted by the construction of a sediment retention dam.

**Description:** The PAD extends across the lower, mid and upper slope and ridge crest. The PAD is associated with the Wallis Creek RTA 2 site which is exposed by the access track for the power easement. The area identified as PAD is mainly within an area of open woodland that remains uncleared between the power easement and the tributary. Grinding grooves are located adjacent to the PAD on sandstone outcropping in the tributary. The soil in some sections of the PAD was disturbed from works associated with powerline clearance and subsequent erosion, whilst within some sections of the woodland the soil was relatively undisturbed and intact. It is proposed to conserve the areas that are relatively undisturbed which fall outside the route alignment and outside area targeted for the sediment dam, however, it was thought appropriate by the Aboriginal groups, from an Aboriginal cultural heritage salvage perspective, to subsurface test the area of ridge crest that will be crossed by the route alignment (where visibility was highly restricted and where the route alignment swings away from the power easement) and the area upslope of the grinding grooves targeted for a sediment pond (also an area of very low visibility). The sediment pond is necessary to avoid sediment entering the tributary and impacting on the grinding groove site during highway link construction.

**Management Recommendation and Justification:** Parts of the PAD are within the route alignment or within an area which will be destroyed by works associated with the project. The location of the PAD in association with an extensive artefact scatter and a set of grinding grooves gave it high Aboriginal cultural heritage significance. Overall the Aboriginal groups requested the PAD be conserved with subsurface testing of those areas within the route alignment or to be impacted by sediment dam construction. Therefore, it is recommended that the areas of PAD to be impacted are subsurface tested under a Section 87 PRP to establish:

- if there are sufficient subsurface artefacts to require further subsurface salvage as part of an Aboriginal cultural heritage salvage.

### PAD Number: PAD 9

**AMG:** 367630E 6369700N

**Location:** The PAD is located 600 metres southeast of Hart Road and immediately to the southeast of Horton Road at Kurri Kurri and within the route alignment.

**Description:** The PAD is on flat/high terrace on the western side of Swamp Creek. The area has been cleared and is presently used for grazing. Visibility in the area was limited due to vegetation. The PAD appears to have a substantial depth of sandy loam and is in a resource rich area associated with Swamp Creek which would have been well drained and suitable for an Aboriginal camp site. It is not clear how the sandy deposit was formed, the fineness of the sand suggests it may be aeolian in origin (Pam Dean-Jones pers. comm. 2004) and stable in nature.

The Aboriginal groups believed this area to be an excellent campsite location and recommended subsurface testing to ascertain if there were artefacts in a subsurface context. From an archaeological perspective the area was also ascertained to be a likely campsite that may have been used on multiple occasions or for prolonged visits, thus having the capacity to retain an artefact assemblage of a complex nature.
**Management Recommendation and Justification:** The PAD is within the route alignment and will be destroyed by works associated with the project. The location of the PAD in an area of soil stability, in a resource rich area and in a landform commonly used by Aboriginal people for camping, is seen to indicate that this area is likely to have subsurface artefactual material. Therefore, it is recommended that the area be subsurface tested under a Section 87 PRP to establish:

- if there are subsurface artefacts/features the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Swamp Creek landscape; and
- requirements for any further salvage/investigation.

<table>
<thead>
<tr>
<th>PAD Number: PAD 11</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AMG:</strong> 356091E 6371356N</td>
</tr>
<tr>
<td><strong>Location:</strong> The PAD is located 900 metres northeast of Sawyers Gully Road, 400 metres northwest of Grahams Lane in an area between Heddon Greta and Sawyers Gully and within the route alignment.</td>
</tr>
<tr>
<td><strong>Description:</strong> The PAD is located on a creek terrace and adjacent lower slope on the western side of Black Waterholes Creek. Visibility in the area was limited due to vegetation. There were many useful resources recorded at the time of the investigation including freshwater mussels, Typha, common reed, Dianella, Lomandra and paper-bark and in this area the creek has substantial waterholes that hold water through extended dry periods. The area has been subject to logging and some loss of topsoil from the slopes and build-up of colluvium at the toe of the slope. There is also a substantial depth of alluvial deposit on the creek terrace (&gt;20 cm). The Aboriginal groups believed this area to be an excellent campsite location and recommended subsurface testing to ascertain if there were artefacts in a subsurface context. From an archaeological perspective the area was also assessed to be a likely campsite that may have been used on multiple occasions or for prolonged visits, thus having the capacity to retain an artefact assemblage of a complex nature that could provide information in relation to the Aboriginal use of the Black Waterholes Creek area about which very little is known. Therefore subsurface testing was thought warranted from both an Aboriginal and archaeological perspective.</td>
</tr>
</tbody>
</table>

**Management Recommendation and Justification:** The PAD is within the route alignment and will be destroyed by works associated with the project. The location of the PAD in an area of soil aggradation, in a resource rich area and in a landform commonly used by Aboriginal people for camping, is seen to indicate that this area is likely to have subsurface artefactual material that could provide information in relation to the Aboriginal use of the Black waterholes Creek area about which very little is known. Therefore, it is recommended that the area be subsurface tested under a Section 87 PRP to establish:

- if there are subsurface artefacts/features the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Black Waterholes Creek landscape; and
- requirements for any further salvage/investigation.
**PAD Number:** PAD 12  
**AMG:** 354542E 6373239N  

**Location:** The PAD is located 1000 metres east of Old Maitland Road and 100 metres southeast of Bakers Lane in the Sawyers Gully area and within the route alignment.  

**Description:** The PAD is located within the confluence of two tributaries of Sawyers Gully. The PAD incorporates an area of gentle footslope and a narrow alluvial terrace. The footslope has been subject to colluvial deposition and the creek to alluvial deposition (>30 cm in depth). The area has been disturbed by tree clearance (probably by bull dozing which is common practice in the area) and grazing. Visibility in the area was zero due to vegetation, however, two roads constructed upslope to the north and northwest (approximately 100 to 175 metres from the PAD) have artefacts exposed on their surfaces (Sawyers Gully 1 site). The area identified as PAD would have provided a well drained camp site with ready access to drinking water at most times of the year. Due to the generally cleared nature of the environs it is difficult to establish former resource availability, however, the rich alluvial soil, which gives way to poorer sandy soils upslope indicates access to two resource zones and to resource diversity.  

The Aboriginal groups believed this area to be an excellent campsite location and recommended subsurface testing to ascertain if there were artefacts in a subsurface context. From an archaeological perspective, areas at the confluence of creeks are often found to contain sites which are often found to be large and complex sites. The artefacts exposed along the roads (100 to 175 metres upslope) are seen to indicate the extent of a major camp site and the area is seen to have the potential to provide a large and complex assemblage which could provide information about the Aboriginal use of the Sawyers Gully area, for which extremely little information presently exists. The deposits themselves, however, are seen to retain little archaeological integrity.  

**Management Recommendation and Justification:** The PAD is within the route alignment and will be destroyed by works associated with the project. The location of the PAD in an area of soil aggradation, in a potentially resource rich area and in a landform commonly used by Aboriginal people for camping, is seen to indicate that this area is likely to have subsurface artefactual material that could provide information in relation to the Aboriginal use of the Sawyers Gully area about which very little is known. Therefore, it is recommended that the area be subsurface tested under a Section 87 PRP to establish:  

- if there are subsurface artefacts/features the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Swayers Gully landscape; and  
- requirements for any further salvage/investigation.

**PAD Number:** PAD 13  
**AMG:** 353293E 6374118N  

**Location:** The PAD is located 700 metres west of Old Maitland Road and 600 metres north of Majors Lane in the Sawyers Gully area. and within the route alignment.  

**Description:** The PAD is located on the footslope/lower slope on the western side of a tributary of Sawyers Gully and just upstream of its confluence with a second tributary. The creek terrace in this area has been subject to considerable disturbance (bull dozing), however, the lower slope and footslope is far less disturbed. Past disturbance in the area is from logging activities. Visibility on the creek terrace was up to 30% in patches, however, visibility on the slopes was highly restricted due to vegetation. The soil on the lower slope/footslope is likely to be shallow (~5 cm).  

Sawyers Gully provides semi-permanent water in chains of ponds and many aquatic plant and animal species in this area. Eighty-two artefacts were recorded as Site Anvil Creek RTA 3, to the west and south of the PAD in disturbance caused by an EnergyAustralia easement and on a dirt track. The Aboriginal groups believed the area to be an excellent campsite and requested subsurface testing. From an archaeological perspective the area is assessed as likely to have
subsurface artefacts, but in limited numbers and widely dispersed within the shallow soil, thus subsurface testing is unlikely to be productive.

Management Recommendation and Justification: The PAD is within the route alignment and will be destroyed by works associated with the project. The location of the PAD in a resource rich area and in a landform commonly used by Aboriginal people for camping is seen by the Aboriginal groups to indicate that this area is likely to have subsurface artefactual material. Therefore, they have recommended that the area be subsurface tested under a Section 87 PRP to establish:

- if there are subsurface artefacts/features, the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Sawyers Gully landscape; and
- requirements for any further salvage/investigation.

PAD Number: PAD 14

AMG: 352746E 6375294N

Location: The PAD is located approximately 2000 metres northwest of the intersection of Majors Lane and Old Maitland Road, 13 kilometres west of Maitland and within the route alignment.

Description: The PAD is located within a tight meander bend on an alluvial terrace on the northern bank of a tributary of Sawyers Gully. The terrace has approximately 2 metres of alluvial deposit. Sawyers Gully contains semi-permanent water in this area and meander cut-offs directly to the north provide semi-permanent water in billabongs. There are many aquatic plants and animals associated with the creek and billabong. At the time of recording the area was covered with vegetation and visibility was zero. At the time of the inspection of the area the PAD was recorded as a much larger area encompassing the whole of the creek terrace. After the recording of the PAD the landowner bulldozed the area to clear Casuarina growing along the creek and on the associated slopes. The area on the narrow peninsula in the meander of the creek sustained only very shallow and limited disturbance at this time. Following bulldozing the area was extremely dusty once again reducing visibility to zero.

The Aboriginal groups believed the entire terrace area to be an excellent campsite and requested subsurface testing. From an archaeological perspective the area was also initially assessed as likely to have subsurface artefacts and perhaps a large and complex assemblage related to prolonged or repeated use of this resource rich area. Following the bulldozing of the terrace area, only the peninsula within the meander bend was assessed as likely to retain sufficient archaeological integrity to warrant subsurface testing. Due to the depth of the alluvial deposit it is possible that artefactual material may be located within this area that is below the disturbance zone and which may be of some antiquity. This was not thought likely for the remainder of the terrace where the clay has been brought to the surface during bull dozing, suggesting very deep levels of disturbance.

Management Recommendation and Justification: The PAD is within the route alignment and will be destroyed by works associated with the project. The location of the PAD in an area of soil aggradation, in a potentially resource rich area and in a landform commonly used by Aboriginal people for camping, is seen to indicate that this area is likely to have subsurface artefactual material that could provide information in relation to the Aboriginal use of the Sawyers Gully area about which very little is known. Therefore, it is recommended that the area be subsurface tested under a Section 87 PRP to establish:

- its geomorphic history;
- if there are subsurface artefacts/features, the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Sawyers Gully landscape; and
- requirements for any further salvage/investigation.
PAD Number: PAD 15
AMG: 352549E  6376170N

Location: The PAD is located approximately 3.5 kilometres east-southeast of the intersection of Lovedale Road and Camp Road, approximately 4 kilometres southeast of the township of Lochinvar and 13 kilometres west of Maitland and within the route alignment.

Description: The PAD is located on a flat and footslope on the northern bank of Bishops Creek. Visibility in the area was extremely poor due to leaf litter. The soil is stable and soil depth is uncertain but estimated to be at least 15 cm. In this area Bishops Creek has a bedrock base and conglomerate and sandstone outcrop along its length. The creek was running at the time of the inspection (during a prolonged drought) and contains many deep rock waterholes. The area is rich in resources suitable for Aboriginal use including box trees, wombat berry vine, Dianella, Lomandra, geebung, amulla and kangaroo grass. There are also aquatic plant and animal species associated with the creek. Sandstone suitable for sharpening stone axes was available in the creek and pebbles from the conglomerate would have been suitable for manufacturing stone tools. The area has been disturbed by logging and sections of the PAD may have been bulldozed in the past.

Shell fossils (ammonites and bivalves) were noted in the sandstone outcropping in the creek next to the PAD. These very obvious fossils may have given the area special importance to Aboriginal people. The PAD area would have provided an excellent camp site close to permanent water and numerous resources.

The Aboriginal groups believed the area to be an excellent campsite and its association with the fossil bed indicated it may have been a site of special importance. The Aboriginal groups requested subsurface testing of the PAD area. From an archaeological perspective the area is also assessed as likely to have subsurface artefacts and it cannot be discounted that the area was of some social importance and thus may provide an artefact assemblage that differs from the general camp site. The level of disturbance in the area suggests a low likelihood of archaeological integrity.

Management Recommendation and Justification: The PAD is within the route alignment and will be destroyed by works associated with the project. The location of the PAD in an area of soil stability, in a resource rich area and in a landform commonly used by Aboriginal people for camping, is seen to indicate that this area is likely to have subsurface artefactual material that could provide information in relation to the Aboriginal use of the Bishops Creek area about which very little is known. The location of the PAD adjacent to a rich fossil bed suggests that area may have had social importance to the Aboriginal people and that it may contain artefactual evidence of a different nature to general campsites. Therefore, it is recommended that the area be subsurface tested under a Section 87 PRP to establish:

- its geomorphic history;
- if there are subsurface artefacts/features, the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Bishops Creek landscape; and
- requirements for any further salvage/investigation.

PAD Number: PAD 16
AMG: 349330E  6378614N

Location: The PAD is located 600 metres east of Camp Road, 1 kilometre north of the intersection of Lovedale Road and Camp Road, approximately 4 kilometres south of the township of Greta and 6.5 kilometres west of Lochinvar and within the route alignment.

Description: The PAD is located on the footslope on either side of a tributary of Anvil Creek. Visibility in the area identified as PAD was extremely poor due thick vegetation, however, large numbers (>200) of artefacts were located in adjacent gullies and within the creek channel (Anvil Creek RTA 3 site). Artefacts were also located upslope on a graded road.
Along the creek there is between 20 cm and 1.5 metres of recent colluvium visible in the profile of the eroded creek bank. The thickness of this layer generally increases downstream. In one area a layer of grey clay is visible beneath the recent colluvial fill suggesting that the area may have been a swamp prior to infilling following European land clearance (European debris (roofing tiles) eroding from 1.5 metres below the present ground surface indicates the very recent age of the deposit). The PAD has been disturbed by land clearance activities and partially destroyed by creek channel erosion and migration and gullyling initiated by land clearance. The area is presently grazed which is exacerbating erosion problems along the creek, however, the aggrading nature of the soil on the footslope suggests that artefactual material may be buried in this area.

The Aboriginal groups believed the area to be an excellent campsite and that the artefacts exposed in the creek channel and upslope indicate that further artefacts will be buried within the colluvium/alluvium that has aggraded in recent times on the footslope. Therefore the Aboriginal groups requested subsurface testing of the PAD area. From an archaeological perspective the area is also assessed as likely to have subsurface artefacts derived from discard events related to repeated use of the area or prolonged use of the area which could provide information in relation to the Aboriginal use of the Anvil Creek area about which little is known. It is unlikely, however, that the PAD area retains archaeological integrity, due to the impact of initial ground clearance, prior to the area infilling.

**Management Recommendation and Justification:** The PAD is within the route alignment and will be destroyed by works associated with the project. The location of the PAD in an area of soil aggradation, in a potentially resource rich area and in a landform commonly used by Aboriginal people for camping, is seen to indicate that this area is likely to have subsurface artefactual material that could provide information in relation to the Aboriginal use of the Anvil Creek landscape; and

- its geomorphic history;
- if there are subsurface artefacts/features, the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Anvil Creek landscape; and
- requirements for any further salvage/investigation.

**PAD Number:** PAD 17

**AMG:** 347968E 6382047N

**Location:** The PAD is located 500 metres west of the Main Northern Railway, 600 metres north of Tuckers Lane, and 1000 metres west of Greta and within the route alignment.

**Description:** The PAD is located adjacent to an easterly flowing tributary of Anvil Creek. Visibility within the area identified as PAD was zero due to vegetation. The PAD extends to the creek terrace and foot slope on both sides of the creek. Anvil Creek provides semi-permanent water in this area and numerous plant and animal resources were recorded during the inspection. A set of grinding grooves (Anvil Creek RTA 16 Grinding Grooves) and an extensive artefact scatter (Anvil Creek RTA 15) were located upstream (350 and 500 metres respectively).

The Aboriginal groups believed the areas both sides of the creek identified as PAD to be excellent campsites and requested subsurface testing of both areas. From an archaeological perspective both areas are also assessed as likely to have subsurface artefacts, however, inspection by a geomorphologist (Pam Dean-Jones) indicates that the first creek terrace on the northern side of the creek would be the best location for subsurface investigation. Disturbance related to tree clearance and grazing is indicated by the hummocky nature of the ground surface in this area, however, the depth of deposit (derived from both alluvial and colluvial sources) suggests that artefacts could remain in this area in an undisturbed context.

**Management Recommendation and Justification:** The PAD is within the route alignment and will be destroyed by works associated with the project. The location of the PAD in an area of soil aggradation, in a potentially resource rich area and in a landform commonly used by Aboriginal people for camping, is seen to indicate that this area is likely to have subsurface
artefactual material that could provide information in relation to the Aboriginal use of the Anvil Creek area about which little is known. Therefore, it is recommended that the area be subsurface tested under a Section 87 PRP to establish:

- its geomorphic history;
- if there are subsurface artefacts/features, the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Anvil Creek landscape; and
- requirements for any further salvage/investigation.

### PAD Number: PAD 18

**AMG:** 347289E 6383607N

**Location:** The PAD is located 150 metres west of the Main Northern Railway, 700 metres southwest of the New England Highway and 1000 metres west of Greta and is within the route alignment.

**Description:** The PAD is located on the footslope on the western side of a northerly flowing ephemeral tributary of Anvil Creek. Visibility within the PAD was zero due to grass and leaf cover. The area has been impacted by tree clearance and grazing but is in relatively good condition. The soil in the area appears stable and soil depth was estimated at 5 to 10 cm.

The Aboriginal groups believed the area to be an excellent campsite and requested subsurface testing. From an archaeological perspective the area is also assessed as likely to have subsurface artefacts, but in limited numbers and widely dispersed within the shallow soil, thus subsurface testing is unlikely to be overly productive.

**Management Recommendation and Justification:** The PAD is within the route alignment and will be destroyed by works associated with the project. The location of the PAD in a landform commonly used by Aboriginal people for camping is seen by the Aboriginal groups to indicate that this area is likely to have subsurface artefactual material. Therefore, they have recommended that the area be subsurface tested under a Section 87 PRP to establish:

- if there are subsurface artefacts/features, the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Anvil Creek landscape; and

### PAD Number: PAD 20

**AMG:** 343052E 6385455N

**Location:** The PAD is located directly to the west of the Black Creek Bridge 1800 metres west of Branxton. The PAD is on the western side of Black Creek and on the southern side of the New England Highway and is within an area to be impacted by the route alignment and the construction of an additional bridge over Black Creek.

**Description:** The PAD extends across the first, second and third creek terraces on the western side of Black Creek (approximately 500 metres). Visibility within the area identified as PAD (within the farmland south of the New England Highway) was zero due to grass cover, however, to the north of this area there is a drain that has been excavated into the creek terraces and that runs parallel to the New England Highway. More than 50 artefacts (Black Creek RTA 2) were located eroding from the section of the drain that cut through the second creek terrace. The artefacts are eroding out of the A2 soil horizon and have washed into the base of the drain. There is >50 cm of A horizon exposed on the second terrace, however, visibility was too restricted to assess the depth of the A horizon within the first and third creek terraces. The area identified as PAD has been cleared and cultivated, however, the depth of the soil profile suggests that artefactual material may be located beneath the plough zone on all three terraces.

Black Creek is deeply incised into its channel (up to 15 metres) and retains a permanent supply of water in deep pools during prolonged drought periods. The area is rich in aquatic plant and animal species and there are numerous wombat burrows adjacent to the creek (under the existing Black Creek Bridge). The fertile alluvial creek terraces are flanked by typical Hunter Valley...
duplex soils and together these would have provided a very rich resource area capable of sustaining repeated visits or prolonged visits even by relatively large groups of people.

The Aboriginal community believed that the area would have been an important camp site and requested that all three creek terraces be subsurface tested. The second creek terrace is limited in extent to the area between the New England Highway and the Main Northern Railway (an area approximately 400 metres x 200 metres) and therefore, from an archaeological perspective, the landform is seen as being highly significant from a rarity and representativeness perspective. The three creek terraces are also seen as rare as they have the potential to provide information related to chronological change in Aboriginal use of the landscape due to their varying ages and depth of deposit.

Management Recommendation and Justification: The PAD is within the route alignment and will be destroyed by works associated with the project. The Black Creek terraces provide landforms of varying ages that have the potential to provide information in relation to the antiquity of Aboriginal use of the area and chronological change in patterns of land-use. The location of the PAD in a resource rich area and across landforms commonly used by Aboriginal people for camping is seen to indicate that this area is likely to have subsurface artefactual material that may be complex in nature and which could add significantly to our knowledge of the use of the Black Creek landscape by Aboriginal people. Therefore, it is recommended that the area be subsurface tested under a Section 87 PRP to establish:

- its geomorphic history;
- if there are subsurface artefacts/features, the analysis of which could assist in gaining a greater understanding of the Aboriginal use of the Black Creek landscape; and
- requirements for any further salvage/investigation.
Site Descriptions

The following site descriptions are presented in alphabetical order. The sites are shown on Figures 2.3 to 2.10 in the main text.

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Anvil Creek RTA 1 (Brayshaw's Allandale 2 NPWS #37-6-0683)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>351925E 6376897N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Artefact scatter</td>
</tr>
</tbody>
</table>

**Location:** The site is situated 1 kilometre east of the intersection of Lovedale Road and Camp Road, approximately 4 kilometres southeast of the township of Lochinvar and 13 kilometres west of Maitland (1.7 kilometres northwest of Bishops Creek RTA 3). The site extends for approximately 450 metres x 100 metres on a northeast-southwest axis and the centre of the site crosses the centreline of the route alignment.

**Description:** More than 50 artefacts were located in six loci (a, b, c, d and e) both sides of a channel of a first order tributary of Anvil Creek, 350 metres south of Lovedale Road, in an area of 140 metres x 90 metres. The area is adjacent to a quarry and is subject to heavy traffic and the site is very disturbed.

The AMG coordinates and number of artefacts for each loci are:

- **Loci a.** AMG 350660E 6377815N to 350661E 6377858N extends for 30 metres along an overgrown vehicle track (2.5 metres wide), starting 60 metres south of the creek line. A total of 36 artefacts were noted. Visibility was <5% due to grass cover. The area was disturbed from the construction of dams, cultivation, tree clearing and a vehicular traffic. Artefacts have been displaced and possibly washed down slope.

- **Loci b.** AMG 350500E 6377909N to 35062 6E 6277895N extends along a graded road north of watercourse, opposite Loci “a” for 20 metre length and 6 metre width. The road has been graded and soil piled to one side of the road. Scouring has occurred along the creek and on the road. Rubbish has been dumped alongside the road. Visibility on the road averaged 80%. Artefacts were sitting on the surface and appear to have been washed down slope.

- **Loci c.** AMG 350525E 6377849N to 350536E 6377824N was located on a graded road, north of the watercourse. Two artefacts were found eroding out of scours approximately 10 metres north of the watercourse. Visibility in scours (10 metres x 8 metres) averaged 70%.

- **Loci d.** AMG 350364E 6377748N. Three mudstone cores and five mudstone flakes were located in scours north of the watercourse and southwest of Loci c. Visibility within the exposure (50 metres x 3 metres) averaged 40% due to loose sediment and vegetation. The artefacts have washed downslope and into the scours.

- **Loci e.** AMG 350266E 6377804N. One mudstone flake was located in scouring (5 metres x 2 metres) west of the quarry access road and northeast of Loci c. Visibility was limited to 5% due to vegetation cover and loose sediment.

**PAD:** The area is assessed as being too highly disturbed from tree clearing, cultivation, construction of roads and dams and from cattle grazing to contain archaeological deposits in a stratified context.

**Management Recommendation and Justification:** The site is within the proposed route alignment and will be destroyed by works highway link construction. Due to the level of disturbance subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts in the area be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.
Site Name: Anvil Creek RTA 2 IF
AMG: 350474E 6378069N
Site Type: Isolated artefact

Location: The site is 1.3 kilometres east of the Lovedale Road and Camp Road intersection, approximately 4 kilometres southeast of the township of Lochinvar and 13 kilometres west of Maitland (approximately 250 metres northwest of Anvil Creek RTA 1). The site is within of the route alignment and within 50 metres of a proposed Interchange on/off ramp.

Description: One artefact (a silcrete flake) was located on the midslope below a spur crest on a graded road at the gateway to a homestead, 50 metres southeast of the entrance to Allandale Quarry and 30 metres south of Lovedale Road. Visibility on the 3 metre wide road was 30% due to loose sandy sediments and gravel road base washing along the road and was <5% away from the road. The area is adjacent to a quarry and is subject to heavy vehicle traffic and regular road maintenance which has left it highly disturbed. The site is 300 metres away from a first order tributary of Anvil Creek.

PAD: The area is assessed as too highly disturbed by road works and use to contain archaeological deposits in a stratified context.

Management Recommendation and Justification: The site is within the proposed route alignment and will be destroyed by works associated with highway link construction. Due to the level of disturbance subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

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Site Name: Anvil Creek RTA 3
AMG: 349330E 6378614N
Site Type: Artefact scatter

Location: The site is located 600 metres east of the Camp Road, approximately 1 kilometre north of the intersection of Lovedale Road and Camp Road, approximately 4 kilometres south of the township of Greta and 6.5 kilometres west of Lochinvar (approximately 1300 metres northwest of Anvil Creek RTA 2 IF). The site extends in an irregular shape on a north-south axis which crosses the centreline of the route alignment.

Description: The site extends over an area of 350 metres x 100 metres which crosses a major tributary of Anvil Creek and extends onto the lower slopes and foot slopes both sides of the tributary channel. The tributary channel is incised to width of 5 to 10 metres and a depth of 3 metres. Water was found ponding in the channel at the time of survey and sandstone was outcropping in sections (uncovered by recent erosion). A total of 200+ artefacts were located in the site. The dominant raw material was mudstone followed by silcrete with a low number of quartz artefacts. The dominant artefact types were broken flakes, flakes and cores. Several primary flakes and large artefacts were noted.

The artefacts were found on a graded road and within gullies and the creek channel. The artefacts on the road have suffered breakage from vehicular traffic. The site has been disturbed by land clearance activities and partially destroyed by creek channel erosion and migration and gullying initiated by land clearance. The area is presently grazed which is exacerbating erosion problems.

The site is bounded by the following AMG coordinates:

- North-eastern boundary - 349320E 6378614N - eastern bank of tributary channel. Two artefacts were located in this area, one mudstone broken flake and one mudstone flaked piece. The banks of the channel were severely eroded.
- South-eastern boundary - 349376E 6378408N - Twenty-four artefacts were located on the lower slope/footslope on a graded road in scours eroded to between 5 and 15 cm in depth. The artefacts were spread over an area 30 metres x 2.5 metres. No artefacts were found away from the scours despite the presence of exposed areas with 50 to 80% visibility, both on and off the road. It appears the artefacts are eroding from the base of the A2 horizon.
South-western boundary - 349283E 637841N - on bank and in gullies within the creek channel. Highest concentration of artefacts (>50) on slumps, scours on western bank, centre of channel and across to the eastern creek bank over an area of 50 metres x 20 metres. Visibility within the area averaged 50%.

Northern boundary - 349285E 6378645N - on a graded road on the footslope extending from the south-western boundary of the site to the fence line west of the channel. Over 50 artefacts were noted on the road in an area 100 metres x 2.5 metres within 10 to 15 metres of the creek bank. Visibility on the road averaged 40%.

Soil in the area consisted of 10 to 20 cm of topsoil (mainly A2) over a yellow/brown clay on slopes with areas of deeper alluvial/colluvial deposits at the footslope/floodplain boundary. A layer of grey clay is visible beneath the recent colluvial fill upstream of the site suggesting that the area may have been swampy prior to infilling following European land clearance. If this is the case this area would have been an attractive area for resources for Aboriginal people.

PAD: It is highly likely that further artefacts will be located in a subsurface context within and below the aggrading deposits at the floodplain/footslope boundary. The depth of deposit in this area suggests that older alluvial/colluvial deposit may exist below the more recent deposits of colluvium from the slopes above.

Management Recommendation and Justification: The site is within the proposed route alignment and will be destroyed by works associated with highway link construction. Levels of disturbance suggest that the majority of the site may not have archaeological integrity, however, in an area where so little is known about Aboriginal use of the landscape it is assessed that subsurface testing is warranted under a Section 87 PRP in the less disturbed areas to indicate if the site can provide a complex assemblage or features that could assist with gaining a greater understanding of the Aboriginal use of the Anvil Creek area. A complex assemblage is predicted for this area where it appears a swamp existed in the past that would have provided Aboriginal inhabitants of the area with aquatic food plants and acted as a locus for prey animals. The subsurface testing should concentrate on the floodplain/footslope boundary on both sides of the creek and to the northeast of PAD16.

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Anvil Creek RTA 4 IF</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>348676E  6379207N</td>
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<tr>
<td>Site Type:</td>
<td>Isolated find</td>
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<tr>
<td>Location:</td>
<td>The site is located 1.7 kilometres north of the intersection of Lovedale and Camp Roads, 250 metres east of Camp Road, 3.5 kilometres south of the township of Greta and 7 kilometres west of Lochinvar (approximately 900 metres northwest of Anvil Creek RTA 3). The site is located on the northern boundary of the route alignment.</td>
</tr>
<tr>
<td>Description:</td>
<td>The site is located on a lower slope 50 metres north of an ephemeral tributary of Anvil Creek. One mudstone flake was located in a rut on an unformed road. The width of the track was 2.5 metres and visibility was 40% due to loose sediment, vegetation cover and leaf litter. The area has been disturbed by vegetation clearance (at least two episodes of bulldozing) and is currently used for cattle grazing. Along the road the A soil horizon has been lost and the clay is exposed. The artefact appears to have washed down the road from upslope.</td>
</tr>
<tr>
<td>PAD:</td>
<td>Due to disturbance and the loss of topsoil from the site and its environs, there is an extremely low likelihood of PAD.</td>
</tr>
<tr>
<td>Management Recommendation and Justification:</td>
<td>The site is within the proposed route alignment and will be destroyed by work associated with highway link construction. Due to the level of disturbance subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.</td>
</tr>
</tbody>
</table>
Site Name: Anvil Creek RTA 5  
AMG: 348555E 6379373N  
Site Type: Artefact scatter  
Location: The site is located approximately 1.9 kilometres north of the intersection of Lovedale and Camp Roads, 100 metres east of Camp Road, 3.3 kilometres south of the township of Greta and 7 kilometres west of Lochinvar (approximately 200 metres northwest of Anvil Creek RTA 4 IF). It is located within the route alignment.  
Description: Ten artefacts were located in three exposures along the bank of an ephemeral tributary of Anvil Creek. The exposures were over an area 100 metres x 15 metres. At the time of the survey, water was ponding in the ephemeral tributary. The area had been disturbed by land clearance and cattle grazing. Grazing is exacerbating the erosion of the creek banks.  
Details of the artefact locations are listed below.  
- Loci a. AMG 348555E 6379373N both sides of the tributary – four artefacts were found in scouring down the eastern bank of the channel in an area of 50 metres x 50 metres with an average of 30% visibility. One artefact was found sitting on the clay, one metre from the western bank.  
- Loci b. AMG 348542E 6379315N - one artefact was located sitting on a contour bank that had been bulldozed to a length of 20 metres and a width of 5 metres, 30 metres to the south west of Loca a. Visibility on the contour was 90%.  
- Loci c. AMG 348544E 6379477N – four artefacts were located along an animal track 20 metres north of a second tributary, to the north of Loci a. The area of Loci c was 1.5 metres x 1.5 metres. The 0.5 metres wide animal track had 80% visibility. Visibility away from the animal track averaged 10%. The artefacts were sitting on exposed A2 horizon 5 cm above the red clay.  
PAD: Whilst it is possible that small numbers of artefacts may exist in this area in a subsurface context there is very little likelihood of the deposits retaining any archaeological integrity.  
Management Recommendation and Justification: The site is within the proposed route alignment and will be destroyed by works associated with highway link construction. Due to the level of disturbance subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

Site Name: Anvil Creek RTA 6  
AMG: 348261E 6380155N  
Site Type: Artefact scatter  
Location: The site is located approximately 3 kilometres north of the intersection of Lovedale and Camp Roads, 400 metres west of the Camp Road, 2.5 kilometres south of the township of Greta and 7 kilometres west of Lochinvar (approximately 850 metres north-northwest of Anvil Creek RTA 5). It is located within the route alignment and on a proposed access track.  
Description: The site is located on the lower slope of a spur. Six artefacts were recorded on a deeply eroded road within an EnergyAustralia easement. The artefacts were distributed over an area of 25 metres x 5 metres, 120 metres north of a tributary of Anvil Creek. Artefacts were in an area of exposure 100 metres x 30 metres with 80% visibility. Soil on the road consisted of loose, bleached sandy loam (A 2 horizon) which was washing downslope and aggrading along with a pebble lag (from local conglomerate and ironstone nodules) over the exposed clay in areas of lower gradient. Sandstone was observed outcropping on the adjacent slopes and the soil away from the road is skeletal.  
The area of the site has been highly disturbed by easement clearance using a bulldozer, road construction, vehicular traffic and slope wash.  
PAD: The area is assessed as having no likelihood of PAD due to the general levels of disturbance and skeletal nature of the soil.
Management Recommendation and Justification: The site is within the proposed route alignment and will be destroyed by works associated with highway link construction. Due to the level of disturbance subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Anvil Creek RTA 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>348234E 6380400N</td>
</tr>
<tr>
<td>Site Type</td>
<td>Artefact scatter</td>
</tr>
<tr>
<td>Location:</td>
<td>The site is located approximately 1 kilometre south of Tucker’s Lane, 400 metres west of the Camp Road and 1.8 kilometres south of the township of Greta (approximately 250 metres north of Anvil Creek RTA 6). It is located within the route alignment.</td>
</tr>
<tr>
<td>Description:</td>
<td>The site comprises 10 artefacts which were in three loci (a-c) on the lower slope in areas of exposure associated with an EnergyAustralia easement. The artefacts were exposed on both sides of an easterly flowing first order tributary of Anvil Creek. The main channel of Anvil Creek is 1.3 kilometres to the east. At the time of the survey water was ponding in the tributary. The area of exposure extended approximately 100 metres x 10 metres. The area was highly disturbed by bulldozing of the easement, road grading, vehicular traffic and slope wash. Visibility was not the determining factor for defining the area of the artefact scatter as large areas of exposure did not contain artefacts. The artefacts were located sitting on the clay which has been exposed over a wide area due to slope wash following land clearance. The soil depth outside the easement was noted to be skeletal with sandstone outcropping in many places.</td>
</tr>
</tbody>
</table>

The AMG coordinates and details for loci a – c are as follows:

- Loci a – AMG 348175E 6380957N. Two mudstone flakes were located 20 metres south of a tributary of Anvil Creek, 10 metres apart in an area of exposure 50 metres x 3 metres with 80% visibility.
- Loci b – AMG 348223E 6380531N. Five mudstone artefacts were located 30 metres north of the tributary. The artefacts were sitting on the road and to the west of the road in an area 10 metres x 2 metres. The artefacts consisted of 1 flake, 2 broken flakes, 2 flaked pieces and 1 core.
- Loci c – AMG 348235E 6380560N. One mudstone flake, 1 broken mudstone flake and 1 silcrete broken flake were located on the road, further upslope, 30 metres north of Loci b. The artefacts extended over an area of 15 metres x 1 metre.

PAD: The area is assessed as having no likelihood of PAD due to the general levels of disturbance and skeletal nature of the soil.

Management Recommendation and Justification: The site is within the proposed route alignment and will be destroyed by works associated with highway link construction. Due to the level of disturbance subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Anvil Creek RTA 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>348175E 6380957N</td>
</tr>
<tr>
<td>Site Type</td>
<td>Artefact scatter</td>
</tr>
<tr>
<td>Location:</td>
<td>The site is located 550 metres south of Tucker’s Lane, 1.1 kilometres west of the Main Northern Railway and 1.4 kilometres southwest of the township of Greta (approximately 575 metres north of Anvil Creek RTA 7). The site is on the eastern boundary of the route alignment.</td>
</tr>
<tr>
<td>Description:</td>
<td>The site is located on an upper slope and spur crest, 50 metres north of a grassy drainage depression which is a tributary of Anvil Creek (Anvil Creek is 1 kilometre to the east). Four artefacts were found in the site. Three artefacts were located on a graded road within an</td>
</tr>
</tbody>
</table>
EnergyAustralia easement. The artefacts were located in a lag deposit in an area 0.5 metres x 0.5 metres (loci a AMG 348175E 6380957N). One artefact was located on an animal track, also within a lag deposit on the crest of the spur (50 metres to the northwest of Loci a at AMG 348135E 6381008N).

The site area has been bulldozed to clear vegetation for the EnergyAustralia easement and the road is graded and subject to vehicular traffic. The A soil horizon has been eroded by slope wash leaving a lag deposit of pebbles over light brown clay.

**PAD**: The area is assessed as having no likelihood of PAD due to the general levels of disturbance and skeletal nature of the soil.

**Management Recommendation and Justification**: The site is within the proposed route alignment and will be destroyed by works associated with highway link construction. Due to the level of disturbance subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

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**Site Name**: Anvil Creek RTA 9  
**AMG**: 348157E 6381182N  
**Site Type**: Artefact scatter  
**Location**: The site is located 250 metres south of Tucker’s Lane, 1 kilometre west of the Main Northern Railway and 1.2 kilometres southwest of the township of Greta (approximately 300 metres north of Anvil Creek RTA 8). The site is on the eastern boundary of the route alignment and on a proposed access track.  
**Description**: The site is located on the lower slope of a spur 100 metres south of an easterly flowing tributary of Anvil Creek. Six artefacts were located along a graded road within an EnergyAustralia easement. The slope has a north-northeast aspect with a gentle gradient of 1°. Artefacts were found within a lag deposit of pebbles and ironstone nodules over an area of 8 metres x 2 metres within a larger area of exposure, 50 metres x 50 metres. Visibility averaged 5% due to background rubble. The artefacts consisted of 2 flakes, 2 broken flakes, 1 flaked piece and 1 core (all manufactured from mudstone).  

The site area has been bulldozed to clear vegetation for the EnergyAustralia easement and the road is graded and subject to vehicular traffic. The A soil horizon has been eroded by slope wash leaving a lag deposit of pebbles over clay.  
**PAD**: The area is assessed as having no likelihood of PAD due to the general levels of disturbance and skeletal nature of the soil.

**Management Recommendation and Justification**: The site is within the proposed route alignment and will be destroyed by works associated with highway link construction. Due to the level of disturbance subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

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**Site Name**: Anvil Creek RTA 10  
**AMG**: 346876E 6383693N  
**Site Type**: Artefact scatter  
**Location**: The site is 300 metres south of the Main Northern Railway, 1.5 kilometres southeast of the township of Branxton and 1.4 kilometres east of the township of Greta (approximately 200 metres southeast of PAD 19). The site is on a proposed access track.  
**Description**: The site is located on a graded road, at the base of the lower slope, 10 metres west of an easterly flowing tributary of Anvil Creek. The road crosses the creek to the south at this point. Two artefacts appear to have washed onto the road and are now sitting 1 metre apart on the clay. The artefacts consist of one broken mudstone flake and one mudstone flaked piece.
Visibility on the road was 5% due to loose sandy sediment, pebbles and vegetation and 0% away from the road due to thick vegetation and leaf litter. The area is very disturbed from prior tree clearance grading of the road and dozer work associated with an adjacent dam in the creek bed. Water was ponding in the creek at the time of survey and sandstone is outcropping both in the creek bed and on the bank. The creek has suffered from incision following land clearance and it is probable that the sandstone was not exposed prior to this time. The slopes have suffered from loss of topsoil following land clearance. Erosion along the road has caused scouring in some areas and sediment accumulation in others. There is approximately 20 cm of topsoil (mainly recent colluvial deposits) in some areas along the creek bank, however, it is clear from the mounds of soil pushed up in this area that disturbance of the topsoil has been severe.

**PAD:** The area is assessed as having little likelihood of PAD due to the general levels of disturbance.

**Management Recommendation and Justification:** The site is on an access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present road area. Due to the level of disturbance and the limited impact proposed by RTA, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

| Site Name: | Anvil Creek RTA 11 IF |
| AMG:      | 345965E  6384253N     |
| Site Type:| Isolated find         |
| Location: | 100 metres south of the Main Northern Railway, 700 metres east of Allandale Road and 500 metres southeast of the township of Branxton (approximately 1.1 kilometres northwest of Anvil Creek RTA 10). The site is located within the proposed northern arm of an on/off ramp at an interchange on the route alignment. |
| Description: | The isolated find (a broken mudstone flake) was located in a wheel rut on a bench on a lower slope approximately 700 metres south of Anvil Creek. This area is within an EnergyAustralia easement. Exposure on the 3 metres wide road averaged 50%. Visibility away from the road was 0% due to leaf litter and thick vegetation. The artefact was sitting on the surface, 3.5 metres east of a fence line. The area is has been disturbed by recent tree clearance (with a bulldozer), vehicular traffic and fencing activities. Soils in the area consist of a shallow remnant A2 over clay. |
| PAD: | Due to the disturbed nature of the area and the general lack of artefacts despite relatively good ground surface visibility it is assessed that the area is unlikely to have PAD. |
| Management Recommendation and Justification: | The site is within the proposed route alignment and will be destroyed by works associated with highway link construction. Due to the isolated nature of the artefact and the level of disturbance subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage. |

| Site Name: | Anvil Creek RTA 12 IF |
| AMG:      | 345100E  6384384N     |
| Site Type:| Isolated find         |
| Location: | The site is 250 metres southwest of the point where Allandale Road and the Main Northern Railway intersect to the south of Branxton. The site is 100 metres southwest of a brick house and 200 metres west of Allandale Road (approximately 900 metres west-northwest of Anvil Creek RTA 11 IF). The site is on the southern edge of the route alignment. |
**Description:** The isolated find (a broken mudstone flake) was located in an area of exposure on the crest of a spur line, approximately and 50 metres north of an easterly flowing tributary of Anvil Creek. The area of exposure was approximately 50 metres x 3 metres with an average of 80% visibility. Visibility away from the exposure averaged <5% due to leaf litter and thick vegetation cover. The artefact was located within a lag deposit on the edge of the woodland. The topsoil in this area has been eroded by slope wash following bulldozing activities associated with tree clearance.

The area has been highly disturbed. Topsoil has been bulldozed into mounds and a vehicle track runs past the site.

**PAD:** It was assessed that the area did not have potential to contain archaeological deposits due to the skeletal soils and disturbed nature of the site.

**Management Recommendation and Justification:** The site is on the edge of the proposed route alignment and may be destroyed by highway link construction. Due to the level of disturbance subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Anvil Creek RTA 13 IF</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>344320E 63849836N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Isolated find</td>
</tr>
</tbody>
</table>

**Location:** The site is located 300 metres west of the Branxton Railway Station and 650 metres south of the New England Highway (approximately 900 metres northwest of Anvil Creek RTA 12 IF). The site is situated on the south western edge of the route alignment.

**Description:** An isolated find (a broken mudstone flake) was located on a gentle lower slope on an access track for an EnergyAustralia easement just south of the Main Northern Railway. The site is 200 metres southwest of the headwater of a northwest flowing tributary of Anvil Creek. The slope has a northeast aspect with a gradient of less than 1°. The artefact was sitting on the southern side of the road in light brown, loose, sandy sediment that has washed onto the road. Visibility on the two metre width of road averaged 20% due to loose sediment and grass cover. The area is very disturbed from bulldozing activities associated with the clearance of the easement, road grading, vehicular traffic and slope wash.

**PAD:** It was assessed that the area did not have potential to contain archaeological deposits due to the skeletal soils and disturbed nature of the site.

**Management Recommendation and Justification:** The site is on the edge of the proposed route alignment and may be destroyed by highway link construction. Due to the level of disturbance subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Anvil Creek RTA 14 IF</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>347523E 6381821N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Isolated find</td>
</tr>
</tbody>
</table>

**Location:** The site is located 400 metres north of Tucker’s Lane, 1 kilometre west of the Main Northern Railway and 20 metres east of an EnergyAustralia powerline (approximately 250 metres southwest of Anvil Creek RTA 16 grinding grooves). It is on a proposed access track.

**Description:** An isolated find (a mudstone flake) was located on a lower slope on a grassed road, south of two dams, approximately 30 metres southwest of an ephemeral easterly flowing tributary of Anvil Creek. The area sloped to the northeast with a gentle gradient of <1°. Visibility was <5% due to grass cover on the road and 0% away from the road. The artefact was sitting in sandy sediment that had aggraded on the deflated vehicle track. The area is disturbed
from past farming activities including the use of bulldozers to clear the vegetation.

**PAD**: Due to the disturbed nature of the area it was assessed as unlikely to have PAD.

**Management Recommendation and Justification**: The site is on an access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present road area. Due to the level of disturbance and the limited impact proposed by RTA, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Anvil Creek RTA 15</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AMG:</strong></td>
<td>347497E 6381914N</td>
</tr>
<tr>
<td><strong>Site Type:</strong></td>
<td>Artefact scatter</td>
</tr>
<tr>
<td><strong>Location:</strong></td>
<td>The site is located 450 metres north of Tucker’s Lane, 1 kilometre west of the Main Northern Railway and 1.4 kilometres west-southwest of the township of Greta (approximately 150 metres northwest of Anvill Creek RTA 14 IF). The site is on a proposed access track.</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>Over 300 artefacts were located on both sides of an easterly flowing tributary of Anvil Creek. The site extended over an area of 200 metres from north to south and 180 metres from east to west with concentrations of artefacts at 10 loci (a-j). The creek line was deeply scoured with the southern bank deeply eroded to leave an almost vertical bank approximately 10 metres above the creek bed, while the northern bank gently slope to that height at some distance from the creek bed.</td>
</tr>
</tbody>
</table>

The loci are as follows:

- **Loci a** – AMG 347471E 6381913. Over 50 artefacts were concentrated in an area 5 metres x 5 metres, on the southern bank, eroding from the A2 horizon and washing down scours in the bank. The locus included a knapping floor of over 20 red silcrete flakes.
- **Loci b** – AMG 347483E 6381930N. Over 100 artefacts were eroding out of the A2 soil horizon and washing down scours on the southern bank of the tributary, in an area 10 metres x 5 metres, 20 metres northeast of Loci a. Several blade cores and flakes were located and a high percentage displayed heat affect.
- **Loci c** – AMG 347475E 6381930N. Over 50 artefacts were eroding out of the A2 soil horizon and washing down scours south of the tributary and east of Loci a in an area 5 metres x 5 metres. The artefacts consisted predominantly of flakes and broken flakes. Silcrete and mudstone were the dominant raw materials.
- **Loci d** – AMG 347497E 6381914N. Over 50 artefacts were sitting on the A2 soil horizon on the southern bank, approximately 10 metres east of Loci a. There were a high percentage of broken flakes in this concentration.
- **Loci e** – AMG 347471E 6381907N. Over 60 artefacts were sitting on a road that ran along the southern bank of the tributary and down to cross the tributary, extending over an area of 60 metres x 2 metres. The road was graded 5 cm below the surrounding soil horizon. No artefacts were found in areas of exposure adjacent to the road. The artefact types included flakes, broken flakes, flaked pieces, retouched flakes and cores. The dominant raw material was silcrete followed by mudstone. A high percentage of artefacts were broken.
- **Loci f** – 347470E 6381995N. One mudstone flake was sitting on the road, 20 metres north of the creek and 5 metres south of the fence line. Visibility was restricted to <5% due to grass cover.
- **Loci g** – 347573E 6382029N. Two silcrete broken flakes and 1 silcrete flake were sitting on an eroded vehicle track, 5 metres from the southern bank of the creek, east of a fence line and 100 metres north east of Loci a.
- **Loci h** – 347581E 6381965N. One burnt mudstone flake was recorded in an area of slope wash, south of the creek, 5 metres west of a fence and 80 metres east-north-east of Loci a. Visibility averaged 30%. |
Loci i – 347500E 6382046N. Five artefacts (flakes and broken flakes) were located on a road under a power line north of the creek, in an area of exposure (50 metres x 2 metres) with 40% visibility.

Loci j – 347500E 6380084N. Two artefacts (1 red silcrete flake and 1 broken mudstone flake) were found on the road under the power line, marking the northern extent of the site. The artefacts were in an area of severe scouring, 20 metres apart.

The major concentration of artefactual material is located on the southern side of the tributary. This part of the site has been partially destroyed by the severe erosion of the creek bank. The artefacts exposed on the road between the eroded creek bank and the fence line indicates that the site does extend further to the south and that there are likely to be substantial numbers of artefacts in a subsurface context. Further downstream the creek banks remain intact and it is highly likely that the site extends into less disturbed areas downstream.

Resources in the area of the site are poor now due to European clearing and cultivation. However, there was an abundant supply of resources recorded along the creek line, 300 metres to the west of the site. Sandstone was outcropping in the creek bed and on the adjacent slopes and water was ponding in the creek.

**PAD:** The area to be impacted by the RTA access road is a highly disturbed existing road that has been graded almost to the clay and is highly unlikely to retain PAD. It is highly likely, however, that subsurface artefacts exist in areas to the south and east of the present visible artefact scatter and that these would retain far greater archaeological integrity than the area to be impacted by the proposed RTA access road.

**Management Recommendation and Justification:** The site is on an access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present road area. Due to the level of disturbance and the limited impact proposed by RTA, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts along the road be collected under a partial Section 90 Consent as part of an Aboriginal cultural heritage salvage to prevent further breakage from vehicular traffic. The artefacts outside the area of impact are to be left for future teaching purposes. Furthermore, the roadway is to be temporarily fenced during the period RTA is using it as an access road to ensure no accidental damage away from the road.

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**Site Name:** Anvil Creek RTA 16 GG  
**AMG:** 347603E 6381993N  
**Site Type:** Grinding grooves

**Location:** The site is located 550 metres north of Tucker’s Lane, 800 metres west of the Main Northern Railway and 1.2 kilometres west-southwest of the township of Greta (approximately 200 metres north-northeast of Anvil Creek RTA 14 IF). The site is 350 metres west of the centreline of the route alignment and will not be directly impacted by works associated with highway link construction.

**Description:** Three grinding grooves were located on a sandstone bench outcropping in an easterly flowing tributary of Anvil Creek, 300 metres east of Site Anvil Creek RTA 15 (>300 artefacts). At the time of the inspection water was ponding in the tributary. Further downstream there was an abundance of plant resources, including: large mature red gums, Angophora, Melaleuca, bracken fern, Acacia, lilies, kangaroos, Geebung, Hakea, mistletoe and wild raspberry. The grinding grooves were in good condition.

**PAD:** It is possible that PAD exists in the general area of the grinding grooves.

**Management Recommendation and Justification:** The grinding groove site will not be directly impacted by highway link construction or geotechnical testing and should be conserved. RTA, should undertake to prevent additional sediment entering the creekline from any of their works in this area.
<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Anvil Creek RTA 17</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>347555E  6382486N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Artefact scatter</td>
</tr>
<tr>
<td>Location:</td>
<td>The site is located 800 metres north of Tucker’s Lane, 900 metres west of the Main Northern Railway and 1.2 kilometres west of the township of Greta (approximately 300 metres north-northwest of Anvil Creek RTA 16 GG). The site is 350 metres west of the route alignment and on a proposed access track.</td>
</tr>
<tr>
<td>Description:</td>
<td>The site is located on an upper slope and crest, with a northerly aspect and a gradient of less than 1°. There is an ephemeral easterly flowing tributary of Anvil Creek 100 metres south of the site. Two artefacts were located 30 metres apart, on an access road within an EnergyAustralia easement. Visibility on the road (3 metres width) was 80% and 10% away from the road. The area has been disturbed by bulldozing to clear the easement, road construction, vehicular traffic and slope wash. The artefacts have washed onto the road from the adjacent slope. The artefacts were sitting in a lag deposit over a yellow/brown coloured clay.</td>
</tr>
<tr>
<td>PAD:</td>
<td>Due to the disturbance in the area and the loss of topsoil it is assessed as having a very low likelihood of PAD.</td>
</tr>
<tr>
<td>Management Recommendation and Justification:</td>
<td>The site is on an access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present road area. Due to the level of disturbance and the limited impact proposed by RTA, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts along the road be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to prevent further breakage from vehicular traffic.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Anvil Creek RTA 18 IF</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>347514E  6383070N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Isolated find</td>
</tr>
<tr>
<td>Location:</td>
<td>The site is located 1.7 kilometres north of Tucker’s Lane and 500 metres west of the Main Northern Railway (approximately 700 metres north of site Anvil Creek RTA 17). The site is 100 metres southwest of the centreline of the route alignment and on a proposed access track.</td>
</tr>
<tr>
<td>Description:</td>
<td>An isolated find (a silcrete flake) was located on a midslope with a gentle gradient of 1° and a northwest aspect. The artefact was located on an access road for an EnergyAustralia easement. Visibility on the 4 metres width of road was restricted to 30% due to loose sediment and a pebble lag deposit. The road was scoured to the clay in most places. Visibility away from the road was 10% due to thick grass cover. The area has been disturbed by vegetation clearance associated with the power easement, road grading, vehicular traffic and slope wash.</td>
</tr>
<tr>
<td>PAD:</td>
<td>Due to the disturbed nature of the area and the loss of topsoil it is assessed as highly unlikely that the area retains PAD.</td>
</tr>
<tr>
<td>Management Recommendation and Justification:</td>
<td>The site is on an access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present road area. Due to the level of disturbance and the limited impact proposed by RTA, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact on the road be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to prevent further breakage from vehicular traffic.</td>
</tr>
</tbody>
</table>
Site Name: Anvil Creek RTA 19  
AMG: 347320E 6383275N  
Site Type: Artefact scatter

**Location:** The site is located approximately 2 kilometres from Tucker’s Lane, 350 metres southwest of the Main Northern Railway and 50 metres north of a tributary of Anvil Creek (approximately 275 metres northwest of Anvil Creek RTA 18 IF). The site is 150 metres southwest of the centreline of the route alignment and on a proposed access track.

**Description:** Three artefacts were located on the midslope, 50 metres north of a drainage depression. The slope had a gentle gradient of 1 degree with a northeast aspect. The artefacts were sitting on an access road within an EnergyAustralia easement. They were located within loose, sandy sediment, which had washed down the slope. The artefacts were in an area 5 metres x 3 metres with 20% visibility. Visibility away from the road was <5% due to vegetation cover. The area has been disturbed by vegetation clearance associated with the EnergyAustralia easement, vehicular traffic and dam construction. The topsoil has been eroded by slope wash leaving a pebble lag deposit over red clay.

**PAD:** Due to disturbance of the area and loss of topsoil it is assessed as having low likelihood of PAD.

**Management Recommendation and Justification:** The site is on an access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present road area. Due to the level of disturbance and the limited impact proposed by RTA, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts along the road be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to prevent further breakage from vehicular traffic.

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Site Name: Anvil Creek RTA 20 IF  
AMG: 346377E 6383908N  
Site Type: Isolated find

**Location:** The site is located approximately 3.3 kilometres along the EnergyAustralia easement from Tucker’s Lane and 300 metres southwest of the Main Northern Railway (approximately 1.2 kilometres northwest of Anvil Creek RTA 19). The site is 150 metres southwest of the centreline of the route alignment and on a proposed access track.

**Description:** An isolated find (a silcrete flake) was located on the lower slope of a spur. The slope had a northwest aspect and a gradient of 1°. The artefact was located on an access road within an EnergyAustralia easement. Visibility on the road was 10% due to loose sandy sediment and a pebble lag. Visibility away from the road was less than 10% owing to grass cover. The area was highly disturbed by vegetation clearance associated with the EnergyAustralia easement, road grading, vehicular traffic and slope wash.

**PAD:** Due to the disturbed nature of the area and the general loss of topsoil it is assessed as highly unlikely to have PAD.

**Management Recommendation and Justification:** The site is on an access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present road area. Due to the level of disturbance and the limited impact proposed by RTA, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact on the road be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to prevent further breakage from vehicular traffic.
<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Anvil Creek RTA 21</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>346233E 6383950N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Artefact scatter</td>
</tr>
</tbody>
</table>

**Location:** The site is located approximately 3.5 kilometres from Tucker’s Lane and 300 metres southwest of the Main Northern Railway (approximately 150 metres northwest of Anvil Creek RTA 20 IF). The site is 175 metres southwest of the centreline of the route alignment and on an access track.

**Description:** The site is located on the upper slope of a low spur and on the spur crest. Two artefacts were located on an access road for an EnergyAustralia easement. The artefacts were 30 metres apart. One artefact was 15 metres west of an ephemeral tributary of Anvil Creek, the second artefact was 30 metres to the west on the crest of the spur. The slope has a northeast aspect with a one degree gradient. Soils consisted of loose sandy sediments that are washing downslope to reveal a pebble lag. The artefacts were found in an area of exposure on the road, 50 metres x 5 metres with 10% visibility. Visibility was limited due to the loose sandy sediments and vegetation. The area was highly disturbed by vegetation clearance associated with the EnergyAustralia easement, vehicular traffic and slope wash.

**PAD:** Due to the disturbed nature of the area and the general loss of topsoil it is assessed as highly unlikely to have PAD.

**Management Recommendation and Justification:** The site is on an access track that will be subject to limited use for access for geotechnical testing. Some limited access will also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present road area. Due to the level of disturbance and the limited impact proposed by RTA, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts along the road be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Anvil Creek RTA 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>345784E 6384373N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Artefact scatter</td>
</tr>
</tbody>
</table>

**Location:** The site is located approximately 20 metres south of the Main Northern Railway and 600 metres east of the intersection of Allandale Road and the Main Northern Railway (approximately 650 metres northwest of Anvil Creek RTA 21). The site is 100 metres north of the centreline of the route alignment and on a proposed access track.

**Description:** Two artefacts were located 50 metres apart on the floodplain east of a northerly flowing tributary of Anvil Creek. The artefacts were located on an access road for an EnergyAustralia easement. One artefact was 150 metres east of the watercourse, the second artefact was 50 metres to the west of the first artefact at AMG 345705E 6384389N. The site has a northerly aspect with a gradient of <1°. Soils consisted of a brown sandy loam that has recently been bulldozed to clear vegetation beneath the powerline. Visibility in the bulldozed area (200 metres x 50 metres) averaged 20%.

The area has been highly disturbed by vegetation clearance within the power easement, road grading, vehicular traffic and slope wash.

**PAD:** The area is assessed as unlikely to contain large numbers of artefacts in a subsurface context. The soil in the area has been highly disturbed leaving little potential for archaeological integrity.

**Management Recommendation and Justification:** The site is on an access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction. Due to the level of disturbance subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to prevent further breakage from vehicular traffic.
**Site Name:** Anvil Creek RTA 23 IF  
**AMG:** 350297E 6377491N  
**Site Type:** Isolated find  

**Location:** The site is situated 1 kilometre east-southeast of the intersection of Lovedale Road and Camp Road, approximately 4.2 kilometres southeast of the township of Lochinvar and 13.5 kilometres west of Maitland (approximately 550 metres southwest of Anvil Creek RTA 1). The site is located on a proposed access track.  

**Description:** One silcrete flake was located on the crest of spur, 200 metres south of Anvil Creek on an unformed road, 50 metres east of a sealed road within Allandale Quarry. The artefact was sitting on remnant A2 horizon, in an area of patchy exposure 15 metres x 10 metres. Grass restricted visibility within the exposure to 20%. Visibility was 0% away from the exposure. The area has been disturbed by tree clearing, vehicular traffic, cattle grazing and slope wash.  

**PAD:** Due to the disturbed nature of the area and loss of topsoil it is assessed as highly unlikely to retain PAD.  

**Management Recommendation and Justification:** The site is on an access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present road area. Due to the level of disturbance and the limited impact proposed by RTA, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact on the road be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to prevent further damage from vehicular traffic.

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**Site Name:** Anvil Creek RTA 24  
**AMG:** 350421E 6377570N  
**Site Type:** Artefact scatter  

**Location:** The site is situated 1.2 kilometres east of the intersection of Lovedale Road and Camp Road, approximately 4.3 kilometres southeast of the township of Lochinvar and 13 kilometres west of Maitland (approximately 400 metres southwest of Anvil Creek RTA 1). The site is located on a proposed access track.  

**Description:** The site is located on the crest of a spur on an unformed track between two rows of spotted gum, 350 metres northeast of a sealed road within Allandale Quarry. Five artefacts were recorded including two silcrete flakes, two silcrete cores and one silcrete flaked piece. Artefacts were located in an area of exposure 10 metres x 80 metres. Visibility within the exposure was limited to 30% due to grass cover. The artefacts were located in an area affected by slope wash and were confined to an area of 5 metres x 3 metres. The area has been disturbed by bulldozing to clear vegetation, vehicular traffic and slope wash. The soil along the spur crest is shallow with remnant A2 horizon exposed.  

**PAD:** Due to the disturbed nature of the area and loss of topsoil it is assessed as highly unlikely to retain PAD.  

**Management Recommendation and Justification:** The site is on an access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present road area. Due to the level of disturbance and the limited impact proposed by RTA, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts along the road be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to prevent further damage from vehicular traffic.
Site Name: Anvil Creek RTA 25
AMG: 348427E 6379148N
Site Type: Artefact scatter

Location: The site is located approximately 1.85 kilometres north of the intersection of Lovedale and Camp Roads, 15 metres on the west side of Camp Road, 3.5 kilometres south of the township of Greta and 7 kilometres west of Lochinvar (approximately 250 metres west-southwest of Anvil Creek RTA 4 IF). The site is at the base of Mount Molly Morgan. The site is located within an area to be subject to a modification of the route alignment. The modification will mean the site will be within the route alignment.

Description: Fifteen artefacts were located on the lower slope of a spur. The site is 50 metres to the southeast of a first order tributary of Anvil Creek. The artefacts were concentrated in an area of 20 metres x 10 metres in an area of exposure 50 metres x 40 metres caused by recent bulldozing, slope wash and scouring. The area had 40% visibility. Away from the recently disturbed area visibility was 0% due to grass cover and aggrading sediments derived from slope wash. Artefacts included three mudstone cores, three silcrete flakes, one mudstone flake, three mudstone flaked pieces, one broken mudstone flake, one broken silcrete flake and three pieces of mudstone heat shatter. Soil on the slopes and spur crest consisted of remnant A2 horizon and where this was missing, a pebble lag remained over red clay. The site has been highly disturbed by recent bulldozing and erosion.

PAD: Due to the disturbed nature of the area and the lack of topsoil it is assessed as highly unlikely to retain PAD.

Management Recommendation and Justification: The site is located in an area to be impacted by highway link construction and will be destroyed by works associated with this development. Due to the level of disturbance and loss of topsoil, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts in the area be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

Site Name: Anvil Creek RTA 26
AMG: 348405E 6379419N
Site Type: Artefact scatter

Location: The site is located approximately 2.1 kilometres north of the intersection of Lovedale and Camp Roads, 20 metres on the west side of Camp Road, 3.3 kilometres south of the township of Greta and 7 kilometres west of Lochinvar (approximately 150 metres northwest of Anvil Creek RTA 5). The site is located within an area to be subject to a modification of the route alignment. The modification will mean the site will be within the route alignment.

Description: Two artefacts were located on a gentle lower slope, with an easterly aspect and a gradient of 1 to 2°, at the base of Mount Molly Morgan. The site is 120 metres north of an easterly flowing first order tributary of Anvil Creek. The tributary did not contain water at the time of the inspection. The artefacts were 10 metres apart and were located in a graded drain. The drain ran across the slope providing an area of exposure 3 metres x 40 metres. The site is situated 20 metres west of Camp Road. Visibility within the exposure provided by the drain averaged 50% due to loose sediments and vegetation cover. The drain had been graded into the clay. One retouched flake (mudstone) and one silcrete core were recorded. The area of the site has been highly disturbed by recent grading, prior land clearance and loss of topsoil.

PAD: Due to the disturbed nature of the area and loss of topsoil it is assessed as highly unlikely to retain PAD.

Management Recommendation and Justification: The site is located in an area to be impacted by highway link construction and will be destroyed by works associated with this development. Due to the level of disturbance and loss of topsoil, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts in the area be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.
Site Name: Bishops Creek RTA 1
AMG: 352613E 6375973N
Site Type: Artefact scatter

Location: The site is approximately 3.6 kilometres east-southeast of the intersection of Lovedale Road and Camp Road on the New England Highway, approximately 4 kilometres southeast of the township of Lochinvar and 13 kilometres west of Maitland (approximately 550 metres north of Sawyers Gully RTA 7). The site is located on the centreline of the route alignment.

Description: Three artefacts were located on the lower slope on a graded road 200 metres north of Bishops Creek. The artefacts were spread over an area of 50 metres x 6 metres. Visibility on the 6 metres width of graded road averaged 80%. Visibility away from the road was 0% due to vegetation cover and leaf litter. The area has been disturbed by tree clearance, road grading, vehicular traffic and subsequent erosion. Soils in the area are skeletal.

PAD: Due to the disturbed nature of the area and the lack of topsoil it is assessed as highly unlikely to retain PAD.

Management Recommendation and Justification: The site is located in an area to be impacted by highway link construction and will be destroyed by works associated with this development. Due to the level of disturbance and loss of topsoil, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts in the area be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

Site Name: Bishops Creek RTA 2
AMG: 352562E 6376287N
Site Type: Artefact scatter

Location: The site is approximately 3.5 kilometres east-southeast of the intersection of Lovedale Road and Camp Road on the New England Highway, approximately 4 kilometres southeast of the township of Lochinvar and 13 kilometres west of Maitland (approximately 550 metres north of Bishops Creek RTA 1). The site is 100 metres northeast of the centreline of the route alignment.

Description: 10 artefacts were recorded on a creek flat 200 metres from Bishops Creek. The site extended over an approximate area of 100 metres x 50 metres between AMG coordinates: 352562E 6376287N, 352530E, 6376324N and 352594E 6376214N. One large volcanic cobble with flakes removed from one end was located on the western bank on the confluence of a tributary and Bishops Creek. Approximately 80 metres to the east, a further nine artefacts extended to the south for 50 metres on a vehicle 80 metres northeast of Bishops Creek. Visibility on the vehicle track was 50% over a width of 3 metres. The artefacts included 4 silcrete flakes, 3 broken silcrete flakes and 2 silcrete flaked pieces. The area has been disturbed by logging and sections of the site area have been bulldozed recently.

PAD: Due to the disturbed nature of the area it is assessed as highly unlikely to retain PAD.

Management Recommendation and Justification: The site is located in an area on the edge of the route alignment which may be impacted by works associated with highway link construction. Due to the level of disturbance, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts in the area be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.
### Site Name: Bishops Creek RTA 3
### AMG: 351925E 6376897N
### Site Type: Artefact scatter

**Location:** The site is approximately 2 kilometres east-southeast of the intersection of Lovedale Road and Camp Road, 4 kilometres southeast of the township of Lochinvar and 13 kilometres west of Maitland (approximately 900 metres northwest of Bishops Creek RTA 2). The site is situated on the centreline of the route alignment.

**Description:** Two artefacts were located 20 metres apart on the crest of a spur 400 metres east of Bishops Creek. One artefact (chalcedony flake) was located on a graded road. The road was scoured and visibility on the 3 metre wide road averaged 80%. The second artefact (red silcrete flake) was 20 metres to the north on an unformed vehicle track in an area of exposure related to an excavated area 6 metres x 2 metres with 40% visibility. Visibility was 0% away from the exposure and road due to grass cover. The general area has been cleared with a bull dozer and erosion caused by slope wash following vegetation clearance has left only remnant A2 soil horizon and/or clay exposed on the surface.

**PAD:** Due to the disturbed nature of the area and the lack of topsoil it is assessed as highly unlikely to retain PAD.

**Management Recommendation and Justification:** The site is located in an area to be impacted by highway link construction and will be destroyed by works associated with this development. Due to the level of disturbance and loss of topsoil, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts in the area be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

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### Site Name: Bishops Creek RTA 4
### AMG: 351627E 6376696N
### Site Type: Artefact scatter

**Location:** The site is located 3.6 kilometres southwest of the Lochinvar Railway Station, 3.7 kilometres northwest of the Majors Lane –Maitland Road Intersection and 50 metres north of Bishops Creek (approximately 500 metres northwest of the Bishops Creek RTA 5 IF site). The site is located on a proposed access track.

**Description:** A total of 14 artefacts were recorded in three loci (loci a – c) on a 3 metre wide graded road over a distance of approximately 150 metres. The site is situated on a creek terrace, north of Bishops Creek, within 50 metres of the watercourse.

Details of each loci are listed below:

- **Loci a.** AMG 351627E 6376696N. Three artefacts extended over 20 metres on a graded road, north of Bishops Creek just northwest of an intersection with a second road from the south. The artefacts consisted of two broken mudstone flakes and a broken silcrete flake.

- **Loci b.** AMG 351725E 6376666N. Five artefacts extended over 15 metres on a graded road from 50 metres east of loci a. One artefact was sitting on the windrow and the remaining four were sitting on loose, sandy sediments on the road. The artefacts consisted of three broken silcrete flakes, one broken mudstone flake and a retouched silcrete flake (flake used as a core).

- **Loci c:** AMG 351792E 6376662N. Six artefacts extended over 20 metres along the graded road from 60 metres east of loci b. The artefacts consisted of two broken mudstone flakes, three mudstone flaked pieces and one quartzite core.

The artefacts exhibited a high percentage of breakage (from vehicular traffic). The soil in the surrounding area has eroded down to the A2 horizon and in some areas the road has been graded up to 10 cm into the clay. The soil adjacent to the site consists of light brown bleached sandy loam over orange clay. The watercourse is incised to 1 metre depth and 2 metre width. Sandstone is outcropping in the creek. The area has been very disturbed by clearing of...
vegetation, road grading, cultivation, bush fires, slope wash, vehicle traffic and vehicle bogging. The road has recently been graded (the road is regularly graded). In addition, rocks have been dumped in the creek bed at the road crossing.

**PAD:** Due to the disturbed nature of the area and loss of topsoil it is assessed as highly unlikely to retain PAD.

**Management Recommendation and Justification:** The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present disturbed area. Due to the level of disturbance and the limited impact proposed by RTA, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts along the road be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to avoid further damage from vehicular traffic.

<table>
<thead>
<tr>
<th>Site Name: Bishops Creek RTA 5 IF</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AMG:</strong> 352100E 6376485N</td>
</tr>
<tr>
<td><strong>Site Type:</strong> Isolated find</td>
</tr>
<tr>
<td><strong>Location:</strong> The site is located 3.25 kilometres southwest of the Lochinvar Railway Station, 3.3 kilometres northwest of the Majors Lane–Maitland Road Intersection and 150 metres north of Bishops Creek (approximately 100 metres southeast of Bishops Creek RTA 5 IF). The site is located 150 metres southwest of the centreline of the route alignment on a proposed access track.</td>
</tr>
<tr>
<td><strong>Description:</strong> The isolated find (a mudstone flaked piece) was situated on a grassed vehicle track on a footslope with a southeast aspect and a gentle gradient of 1°, 200 metres northeast of Bishops Creek and 150 metres south of an easterly flowing tributary of Bishops Creek. Visibility on the track averaged 5% and visibility away from the track 0% due to thick grass cover. The site has been disturbed by clearing with a bull dozer, road grading, vehicular traffic and slope wash. Soil in the consisted of a shallow depth of A2 horizon over clay.</td>
</tr>
<tr>
<td><strong>PAD:</strong> Due to the disturbed nature of the area and loss of topsoil it is assessed as highly unlikely to retain PAD.</td>
</tr>
<tr>
<td><strong>Management Recommendation and Justification:</strong> The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present disturbed area. Due to the level of disturbance and the limited impact proposed by RTA, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts along the road be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to avoid further damage from vehicular traffic.</td>
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<table>
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<tr>
<th>Site Name: Bishops Creek RTA 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AMG:</strong> 352203E 6376414N</td>
</tr>
<tr>
<td><strong>Site Type:</strong> Artefact scatter</td>
</tr>
<tr>
<td><strong>Location:</strong> The site is located 3.2 kilometres southwest of the Lochinvar Railway Station, 3.4 kilometres northwest of the Majors Lane–Maitland Road Intersection and 200 metres north of Bishops Creek (approximately 500 metres southeast of the Bishops Creek RTA 4 site). The site is located 250 metres southwest of the centreline of the route alignment on a proposed access track.</td>
</tr>
<tr>
<td><strong>Description:</strong> The site is situated on a footslope, 100 metres north of Bishops Creek and 50 metres south of an ephemeral tributary of Bishops Creek. Artefacts were located on an ants’ nest and a vehicle track, extending from AMG 352210E 6376485N for approximately 150 metres to AMG 352361E 6376331N. A total of 11 artefacts were recorded, consisting of 3</td>
</tr>
</tbody>
</table>
broken mudstone flakes, 4 mudstone flakes, 1 mudstone flaked piece, 1 silcrete flaked piece and 2 silcrete flakes. A high percentage of the artefacts had been broken by vehicular traffic. Visibility on the 3 metre wide road averaged 80% and <5% away from the road due to vegetation cover. Sandstone outcrops in Bishops Creek and water was ponding in the creek at the time of the inspection. The area of the site has been disturbed by tree clearance, road grading, vehicular traffic and slope wash.

**PAD**: Due to the disturbed nature of the area and the low number of artefacts exposed it is assessed as highly unlikely to have PAD.

**Management Recommendation and Justification**: The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present disturbed area. Due to the level of disturbance and the limited impact proposed by RTA, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts along the road be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to avoid further damage by vehicular traffic.

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**Site Name**: Bishops Creek RTA 7  
**AMG**: 352438 E  6376163 N  
**Site Type**: Artefact scatter  
**Location**: The site is located 3.15 kilometres southwest of the Lochinvar Railway Station, 3 kilometres northwest of the Majors Lane–Maitland Road Intersection and 200 metres north of Bishops Creek (approximately 150 metres southwest of the Bishops Creek RTA 2 site). The site is 75 metres southwest of the route alignment centreline and on a proposed access track.  
**Description**: Four artefacts were located on a graded road on a lower slope/flat south of Bishops Creek. The artefact scatter extended 30 metres along the road with the closest artefact 70 metres from the creek bank. The artefacts included two broken silcrete flakes, one broken mudstone flake and one piece of mudstone heat shatter. A high percentage of breakage was exhibited on the artefacts. Visibility on the road was restricted to 30% due to aggraded sand, leaf litter and vegetation. Visibility away from the road was 0%. The site area has been disturbed by tree clearance, road grading, vehicular traffic and slope wash. The soil consisted of a light brown sandy loam.  
**PAD**: Due to the disturbed nature of the area and the low number of artefacts exposed the area is assessed as unlikely to retain PAD.

**Management Recommendation and Justification**: The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction. The site is also within an area that may be impacted during highway link construction due to its proximity to the route alignment. Due to the level of prior disturbance, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts along the road be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to avoid further damage by vehicular traffic and/or highway link construction.

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**Site Name**: Bishops Creek RTA 8  
**AMG**: 352065 E  6377092N  
**Site Type**: Artefact scatter  
**Location**: The site is located 2.9 kilometres west-southwest of the Lochinvar Railway Station, 4.1 kilometres northwest of the Majors Lane–Maitland Road Intersection and 200 metres north of a tributary of Bishops Creek (approximately 250 metres southwest of the Bishops Creek RTA 3 site). The site is 250 metres northeast of the route alignment centreline and on a proposed access track.
Description: The site is located on a graded road on the crest of a spur, 120 metres north of a southeast flowing tributary of Bishops Creek. Three artefacts were located within an area 5 metres x 3 metres at AMG 352065E 6377092N and one artefact was 40 metres to the north at a T-intersection with a second road and just south of a fence line. Visibility on the track was restricted to 30% due to loose sand, leaf litter and vegetation. Visibility away from the road was 0%. The road surface was graded to 10 cm below the surrounding ground surface exposing the base of the A2 soil horizon or the clay B horizon. The site area has been disturbed by prior tree clearance, logging, grading of the road, vehicular traffic and slope wash.

PAD: Due to the disturbed nature of the area, the low number of artefacts exposed and the skeletal nature of the soil it is assessed as highly unlikely to retain PAD.

Management Recommendation and Justification: The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present disturbed road area. Due to the level of disturbance and the limited impact proposed by RTA, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts along the road be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to avoid further damage from vehicular traffic.
**Description:** The site is located on the lower slope approximately 100 metres east of Black Creek. Brayshaw recorded 11 artefacts in this area in 1994, in erosion caused by slope wash following land clearance and grazing. Only two artefacts were located during the current RTA inspection. One artefact was sitting on the A2 soil horizon in an area of exposure caused by slope wash (5 metres x 2 metres with 50% visibility) and the second was sitting on the grass several metres downslope. Visibility away from the exposure was less than 5% due to grass cover. The slope has a westerly aspect with a gradient of 2°.

The site has been disturbed by tree clearance, cultivation and grazing and has suffered a general loss of soil through slope wash.

**PAD:** Though it is likely that there may be small numbers of artefacts in a subsurface context in this area the soil is so shallow and disturbed that it is highly unlikely the area retains any archaeological integrity.

**Management Recommendation and Justification:** The site is outside the area of impact related to highway link construction and RTA has agreed to its conservation. If construction works approach within 30 metres of this site it should be temporarily fenced to ensure it is not accidentally impacted.

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**Site Name:** Black Creek RTA 2  
**AMG:** 343100E 6385460N  
**Site Type:** Artefact scatter  
**Location:** The site is located on the southern side of the New England Highway and 50 metres west of Black Creek (approximately 200 metres northwest of Black Creek RTA 1). The site is located on the route alignment and within an area to be impacted by bridge construction.

**Description:** Over 50 artefacts were located eroding from a drain that cut across the second creek terrace. The artefacts extended from AMG 343100E 6385460N for 50 metres to the west to AMG 343052E 6385455N. The trench runs parallel with the New England for a length of 500 metres with a width of 10 metres and a depth of 2 metres. The sides of the trench slope down to a cement strip in the centre. The trench extends across the first, second and part of the third creek terrace. Artefacts were only noted eroding from the second creek terrace, however, visibility in the trench and its surrounds was hampered by vegetation.

The dominant artefact types were flakes, broken flakes and cores with a small number of retouched flakes. The dominant raw materials were silcrete and mudstone. The artefacts were eroding out of the A2 soil horizon and washing into the trench. There is at least 50 cm of A horizon on the second creek terrace. Visibility was too restricted to assess the depth of the A horizon within the first and third creek terraces. The area of artefact exposure has been very disturbed by tree clearing, construction of the New England Highway, bridge construction and the construction of the drainage trench, however, to the south and within the adjacent farmland there are areas where disturbance has been far less severe (eg vegetation clearance and cultivation) and may not extend below the plough zone.

**PAD:** The trench area itself and the area between the fence line and the New England Highway is too disturbed to retain any archaeological integrity, however, the adjacent second creek terrace to the south has the potential for containing archaeological deposits in a stratified context below the plough zone (refer to PAD 20).

**Management Recommendation and Justification:** The second creek terrace is limited in extent to the area between the New England Highway and the Main Northern Railway (an area approximately 400 metres x 200 metres) and therefore, the landmark and its site are seen as being highly significant from a rarity and representativeness perspective. The works proposed by RTA in this area will be kept as close as possible to those areas already disturbed by the construction of the Black Creek Bridge and the New England Highway. It will not be possible, however, for RTA not to impact on the Black Creek 2 site or the immediate environs to its south. Therefore, from an archaeological and Aboriginal cultural heritage perspective it is proposed that the Black Creek 2 site be subsurface tested under a Section 87 PRP to ascertain its potential to retain an assemblage that may retain archaeological integrity, or at least sufficient complexity to be useful.
in answering questions of importance to the Aboriginal and archaeological community about the Aboriginal use of the Black Creek/Branxton area (see also PAD 20). Following the analysis of the results of the Section 87 subsurface testing, RTA will be required to apply for a Section 90 Consent to collect the surface artefacts from the Black Creek 2 site and to undertake any further salvage deemed necessary.

### Site Name: Black Creek RTA 3
### AMG: 342812E 6385305N
### Site Type: Artefact scatter

**Location:** The site is located on a driveway to a farm house, 250 metres north of the Main Northern Railway, 150 metres south of the New England Highway and 350 metres west of Black Creek (approximately 300 metres west of Black Creek RTA 2). The site is located 150 metres south of the centreline of the route alignment and on a proposed access track.

**Description:** The site is situated on a third creek terrace 300 metres west of Black Creek. Three artefacts were located in an area 5 metres x 2 metres on a gravelled driveway between two fence lines. The artefacts consisted of one broken retouched flake, one flaked piece and one flake (broken in three). All artefacts were manufactured from mudstone. Exposure on the vehicle track was limited to an area 50 metres x 2 metres with 20% visibility due to grass cover and gravel. It is extremely likely that the artefacts have been brought in to the area with the gravel used on the road. The area has been highly disturbed by land clearance, road grading, vehicular traffic, cultivation and grazing.

**PAD:** In view of the likelihood that artefacts were brought to the area with the gravel used on the road and the highly disturbed nature of this specific area, it is assessed that this section of the third creek terrace is unlikely to retain PAD. However, the area to the north of the site and to the west of Black Creek Site 2 is assessed as highly likely to have PAD and will be investigated as part of PAD 20 which incorporates the first, second and third creek terraces.

**Management Recommendation and Justification:** The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present disturbed road area. Due to the likely imported nature of the artefacts and the disturbed nature of the area in which they were located it is assessed that subsurface investigation is not warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts in the area be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to avoid further damage from vehicular traffic.

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### Site Name: Black Waterholes Creek RTA 1 IF
### AMG: 355826E 6371730N
### Site Type: Isolated find

**Location:** The site is situated 900 metres west of Bishops Bridge Road and approximately 4 kilometres north of the township of Kurri Kurri (approximately 1300 metres northwest of Swamp Creek RTA 4). The site is on the centreline of the route alignment.

**Description:** An isolated find (a broken mudstone flake) was located on the midslope in a clearing (10 metres x 10 metres), 300 metres north of Black Waterholes Creek and 30 metres north of an EnergyAustralia easement. Visibility was 50% within the clearing and 0% away from the clearing. The artefact had been burnt. Soil in the area is skeletal (remnant A2) due to slope wash initiated by tree clearance and more recently following a bushfire.

**PAD:** Due to the disturbed nature of the area, the small number of artefacts and the general lack of topsoil it is assessed as highly unlikely to retain PAD.

**Management Recommendation and Justification:** The site is located in an area to be impacted by highway link construction and will be destroyed by works associated with this development. Due to the low number of artefacts, level of disturbance and loss of topsoil, subsurface testing
was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

<table>
<thead>
<tr>
<th>Site Name: Black Waterholes Creek RTA 2 IF</th>
<th>Site Type: Isolated find</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG: 355388E 6372208N</td>
<td></td>
</tr>
<tr>
<td><strong>Location:</strong> This site is 1.8 kilometres northwest of Bishops Bridge Road, approximately 4 kilometres north of the township of Kurri Kurri (approximately 650 metres northwest of Black Waterholes Creek RTA 1 IF). The site is on the centreline of the route alignment.</td>
<td></td>
</tr>
<tr>
<td><strong>Description:</strong> An isolated broken, retouched silcrete flake was located on an upper slope on an unformed road, 1 metre north of a fence line. The road was 3 metres wide with visibility averaging 30%, visibility reduced to 0% to 5% away from the road due to vegetation and leaf litter. The site is 50 metres north of an EnergyAustralia easement. The northern arm of Black Waterholes Creek was 150 metres to the east and water was ponding in the creek at time of survey. The upper slope area has been highly disturbed by vegetation clearance, road and fence construction and loss of topsoil due to slope wash.</td>
<td></td>
</tr>
<tr>
<td>PAD: Due to the disturbed nature of the area, the small number of artefacts and the general lack of topsoil it is assessed as highly unlikely to retain PAD.</td>
<td></td>
</tr>
<tr>
<td>Management Recommendation and Justification: The site is located in an area to be impacted by highway link construction and will be destroyed by works associated with this development. Due to the low number of artefacts, level of disturbance and loss of topsoil, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Name: Black Waterholes Creek RTA 3 IF</th>
<th>Site Type: Isolated find</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG: 356293E 6371108N</td>
<td></td>
</tr>
<tr>
<td><strong>Location:</strong> The site is located 350 metres west of the intersection of Bishops Bridge Road and Graham’s Lane, north of the township of Kurri Kurri. The site is 100 metres northwest of Graham’s Lane and is 300 metres southeast of Black Waterholes Creek (approximately 800 metres southeast of Black Waterholes Creek RTA 1 IF). This site is located within the route alignment.</td>
<td></td>
</tr>
<tr>
<td><strong>Description:</strong> An isolated silcrete flake was located on a midslope with a northerly aspect and a gradient of 1°. It was located 50 metres from an ephemeral tributary of Black Waterholes Creek. The artefact was found within a pebble lag on an access road within an EnergyAustralia easement. Visibility on the 2 metres wide road averaged 10% due to loose sediments, pebble lag and vegetation. Away from the road, visibility averaged less than 5%. The area of the site has been severely disturbed by bulldozing associated with clearance of the power easement, road construction, vehicular traffic and slope wash.</td>
<td></td>
</tr>
<tr>
<td>PAD: Due to the disturbed nature of the area, the small number of artefacts and the general lack of topsoil it is assessed as highly unlikely to retain PAD.</td>
<td></td>
</tr>
<tr>
<td>Management Recommendation and Justification: The site is located in an area to be impacted by highway link construction and will be destroyed by works associated with this development. Due to the low number of artefacts, level of disturbance and loss of topsoil, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.</td>
<td></td>
</tr>
</tbody>
</table>
Site Name: Black Waterholes Creek RTA 4 IF  
AMG: 355416E 6372102N  
Site Type: Isolated find  

Location: The site is located 950 metres east of the intersection of Frame Drive and Sawyer’s Gully Road north of the township Kurri Kurri and 450 metres north of a tributary of Black Waterholes Creek (approximately 125 metres southeast of the site Black Waterholes Creek RTA 2 IF). This site is located within the route alignment and on a proposed access track.

Description: An isolated silcrete flake was located on a bench on a midslope with a northeast aspect and a gradient of 1°. The artefact was sitting in aggraded sandy sediments on an access track for an EnergyAustralia easement. It is likely that the artefact has washed down the slope with the sediments and come to rest on the bench. Visibility on the 2.5 metre width of road averaged 10% due to loose sandy sediments, gravel lag and grass cover. Away from the road, visibility averaged less than 5%. The site area has been highly disturbed by bulldozing associated with the clearance of the EnergyAustralia easement, road grading, vehicular traffic and slope wash.

PAD: Due to the disturbed nature of the area, the small number of artefacts and the general lack of topsoil it is assessed as highly unlikely to retain PAD.

Management Recommendation and Justification: The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction. The site is also within an area that may be impacted during highway link construction due to its proximity to the route alignment. Due to the low number of artefacts, level of disturbance and loss of topsoil, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

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Site Name: Blue Gum Creek 1  
AMG: 366987E 6360938N  
Site Type: Artefact Scatter  

Location: From Seahampton drive to the north and then west along George Booth Drive approximately 2.6 kilometres. Approximately 100 metres upslope of the crossing over Blue Gum Creek turn to east and follow major dirt track for 1.75 kilometres. The site is within the route alignment.

Description: Artefacts are located on the road on the midslope approximately 50 metres upslope of the Blue Gum Creek crossing. The artefacts are not thought to be in-situ and it is highly likely that they have washed from the level area at the top of the slope, 125 metres upslope. Two flakes that appear to have washed down the access road from a site further upslope. The road is extremely eroded and the B-horizon and in some areas the sandstone is exposed. A major tributary of Blue Gum Creek is 50 metres, downslope and to the east. A minor tributary of Blue Gum Creek runs 10 metres to the south.

PAD: The lack of A1 and A2 horizon indicates no likelihood of PAD.

Management Recommendation and Justification: Due to the low number of artefacts, the level of disturbance and loss of topsoil, subsurface testing was not thought warranted from an archaeological perspective, however, ALALC requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage. The artefacts from the site were collected on 19 July 2004 under NPWS Section 90 Consent #1940.
### Site Name: Blue Gum Creek 2

**AMG:** 366834E  6360928N  

**Site Type:** Artefact Scatter  

**Location:** From Seahampton drive to the north and then west along George Booth Drive approximately 2.6 kilometres. Approximately 100 metres upslope of the crossing over Blue Gum Creek turn to east and follow major dirt track for 1.6 kilometres to where road branches 5 ways (just east of the Richmond Vale railway cutting). The site extends along three converging tracks in this area and is within the route alignment.  

**Description:** Four artefacts were located spread over an area 40 metres along a formed road that runs northeast-southwest and on the eastern side of the Richmond Vale Railway cutting and tunnel. A further 20 artefacts were recorded along a similar length of road that runs parallel and to the west of the railway cutting. The tracks are extremely eroded (down to clay in many areas) and highly disturbed from works associated with the tracks and the railway. Off road the soil is skeletal and very rocky.  

The artefacts are associated with two almost level benches on the midslope above Blue Gum Creek. The artefacts have been subject to heat fracturing (bush fire) and breakage (vehicular traffic).  

**PAD:** The highly disturbed nature of this area and the disturbed and skeletal soils suggest that PAD is highly unlikely.  

**Management Recommendation and Justification:** Due to the level of disturbance and loss of topsoil, subsurface testing was not thought warranted from an archaeological perspective, however, the ALALC requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage. The artefacts from the site were collected on 19 July 2004 under NPWS Section 90 Consent #1940.

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### Site Name: Blue Gum Creek 3IF  

**AMG:** 365827E  6361018N  

**Site Type:** Isolated Find  

**Location:** From Seahampton drive to the north and then west along George Booth Drive approximately 2.6 kilometres. Approximately 100 metres upslope of the crossing over Blue Gum Creek turn to east and follow major dirt track for 300 metres to where road branches to north and downslope towards Blue Gum Creek and the old track followed by the Richmond Vale Railway. The site is on an access track.  

**Description:** One Nobbys tuff flake, broken in two pieces (also has a piece missing) was located on the lower slope on the eastern side of a dirt track that leads down to the Richmond Vale Railway cutting and Blue Gum Creek. The broken artefact was located on a slope with a gradient of 4 degrees approximately 30 metres upslope of Blue Gum Creek. The general area has been highly disturbed by works associated with levelling and building up the ground surface for the railway, pit-propping activities and by road grading.  

**PAD:** It is highly unlikely that there are further artefacts in a subsurface context in the area of the broken flake as the road is excavated almost down to the B-horizon and the surrounding soils are skeletal and have been subject to slopewash caused by prior heavy land clearance.  

**Management Recommendation and Justification:** Due to the level of disturbance and loss of topsoil, subsurface testing was not thought warranted from an archaeological perspective, however, the ALALC requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage. The artefacts from the site were collected on 20 July 2004 under NPWS Section 90 Consent #1940.
Site Name: Blue Gum Creek  4

AMG: 366320E 6361101N

Site Type: Artefact Scatter

Location: From Seahampton drive to the north and then west along George Booth Drive approximately 2.6 kilometres. Approximately 100 metres upslope of the crossing over Blue Gum Creek turn to east and follow major dirt track for 300 metres to where road branches to north and downslope towards Blue Gum Creek and the old Richmond Vale Railway cutting. Turn east and drive along the railway cutting for 850 metres then turn down road that leads to the north. Head due north for 350 metres along this road crossing Blue Gum Creek. Road then swings to east for around 200 metres then to the north-east for a further 225 metres. At this point (AMG 366276E 636117N) turn to south-east and follow narrow foot track that leads downslope to Blue Gum Creek. From 40 metres to 60 metres down the track there are three tuff artefacts located on the track. The site is within the route alignment and on an access track.

Description: Three Nobbys tuff flakes were located washing down a narrow foot track that leads down to Blue Gum Creek. A level bench was located adjacent to one of the artefacts and above two of the artefacts. An area of PAD was identified on this bench which is to the east of the foot track. A small tributary of Blue Gum Creek flows parallel to the walking track and approx 75 metres to the east.

The track leading down to Blue Gum Creek crosses the lower slope in this area and gradient at the point where the artefacts are located is 2 degrees. The gradient increases substantially below this point before levelling out onto a conglomerate bench above the creek. Below this point Blue Gum Creek has a cavernous overhang suitable for Aboriginal occupation, a waterfall, deep plunge pool and rock waterholes. The large cave below the artefact scatter does not have deposit and no evidence of Aboriginal occupation was observed, although the area would have been extremely attractive for occupation. The walls of the cave were not suitable for art (pebbly conglomerate).

The area was identified as highly sensitive by the Awabakal representatives present for the inspection. This opinion was later confirmed by Land Council executive.

PAD: Likely on bench on midslope to east of track.

Management Recommendation and Justification: Subsurface investigation of the PAD was recommended from an Aboriginal perspective due to the perceived sensitivity of the area. From an archaeological perspective areas of PAD were seen to be rare in the steeper Blue Gum Creek landscape and as so little was known about the Aboriginal use of this area that subsurface investigation was warranted. The artefacts from the site were collected and the PAD subject to excavation on 21-22 July 2004 under NPWS Section 90 Consent #1940.

Site Name: Blue Gum Creek 5 Grinding Grooves

AMG: 365898E 6361380N

Site Type: Grinding Grooves

Location: From Seahampton drive to the north and then west along George Booth Drive approximately 2.6 kilometres. Approximately 100 metres upslope of the crossing over Blue Gum Creek turn to east and follow major dirt track for 300 metres to where road branches to north and downslope towards Blue Gum Creek and the Richmond Vale Railway cutting. Turn east and drive along the railway cutting for 850 metres then turn down road that leads to the north. Head due north for 350 metres along this road crossing Blue Gum Creek. Turn to west at crossroads after crossing the creek. Follow 4WD track to west and then north-west for 1.5 kilometres to where track crosses a tributary of Blue Gum Creek. The grinding grooves are located on the sandstone outcropping in the crossing. The site was located on a proposed access track. The proposed access track was changed following the discovery of the site.
**Description:** The site contains 17 axe grinding grooves located on a sandstone platform in a tributary of Blue Gum Creek. There is a small rock pool 100 cm by 30 cm on the rock platform. Eleven of the grinding grooves are located at the downstream (northern) end of the rock pool and six are located on the eastern side of the rock pool. Three of these are on the edge of the rock pool.

The grinding grooves are presently in relatively good condition, however, they are subject to impact by 4WDs and motorbikes and thus are in danger of damage. Scuff marks and rubber are clearly visible on the area of the rock outcrop that contains the grinding grooves. The grooves are still in good condition however, continued impact by vehicles will be detrimental to their preservation.

**PAD:** The general area of the grinding grooves has been impacted by road construction, tree clearance and slope wash. It is possible that artefacts may exist in a subsurface context in highly disturbed deposits on the eastern side of the tributary.

**Management Recommendation and Justification:** The grooves are approx 60 metres north and upstream of centreline and will not be directly impacted by highway link construction. No vehicular traffic will be permitted to cross the site and the site is to be fenced during the construction period to avoid accidental damage. The fenced area should incorporate an area 5 metres upslope and downslope of the rock platform and on either side of the Blue Gum Creek tributary.

Coal and Allied to be informed of site location. On the advice of ALALC and DEC, Coal and Allied to be requested to undertake works to close the track in this area to prevent 4WD vehicles from driving over the grinding grooves. Coal and Allied to discuss matter with DEC and ALALC to assess manner in which road should be closed and any requirements for DEC/AHIMS Permits to undertake this work.

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**Site Name:** Blue Gum Creek Grinding Grooves (#38-4-0236—previously recorded)

**AMG:** 366040E 6361050N

**Site Type:** Grinding Grooves

**Location:** From Seahampton drive to the north and then west along George Booth Drive approximately 2.6 kilometres. Approximately 100 metres upslope of the crossing over Blue Gum Creek turn to east and follow major dirt track for 300 metres to where road branches to north and downslope towards Blue Gum Creek and the Richmond Vale Railway cutting. Turn east and drive along the railway cutting for 150 metres then on foot walk in a northerly direction until you intersect with a tributary of Blue Gum Creek. The grinding grooves are reportedly located at this point. The site is located 100 metres to the south of the centreline of the highway link route alignment and 50 metres south of a proposed sediment basin and 75 metres west and upstream of an access track and 75 metres downslope of an access track.

**Description:** According to the NPWS site card three grinding grooves were located on a sandstone outcrop in the bed of Blue Gum Creek (the site was not located during the current inspection). The site will not be directly impacted by the development and it is recognised that the sediment basin to be constructed upslope of it will assist with reducing sediment load in the creek and indirect impact on the grinding grooves.

**PAD:** Unknown

**Management Recommendation and Justification:** The site will not be directly impacted by highway link construction.
**Site Name:** Blue Gum Creek Grinding Grooves (#38-4-0236—previously recorded)

**AMG:** 365990E  6361050N

**Site Type:** Grinding Grooves

**Location:** From Seahampton drive to the north and then west along George Booth Drive approximately 2.6 kilometres. Approximately 100 metres up slope of the crossing over Blue Gum Creek turn to east and follow major dirt track for 300 metres to where road branches to north and downhill towards Blue Gum Creek and the Richmond Vale Railway cutting. Turn east and drive along the railway cutting for 175 metres then on foot walk in a northerly direction until you intersect with a tributary of Blue Gum Creek. The grinding grooves are reportedly located at this point. The site is located 125 metres to the south of the centreline of the highway link route alignment and 75 metres southwest of a proposed sediment basin and 130 metres west and upstream of an access track and 120 metres downslope of an access track.

**Description:** According to the NPWS site card six grinding were grooves located on a sandstone outcrop in the bed of Blue Gum Creek (site not located during the current inspection).

**PAD:** Unknown

**Management Recommendation and Justification:** The site will not be directly impacted by the development and it is recognised that the sediment basin will assist with reducing sediment load in the creek and indirect impact on the grinding grooves.

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**Site Name:** Isolated Find 5 (Brayshaw 1994)

**AMG:** 368420E  6360120N

**Site Type:** Isolated Find

**Location:** Turn to north-east along Stockrington Road from western end of Seahampton. Continue approximately 1100 metres along the road then turn left onto major dirt road. This road crosses the gas pipeline. Continue in a south-easterly and downslope direction for approx. 2.25 kilometres. At first intersection take left road at second intersection take right road and continue for approximately 325 metres. The isolated find is located 6 metres to the north of Minmi Creek. Due to modifications to the route alignment in this area the site will not be impacted by works associated with the highway link.

**Description:** An isolated quartzite flake was recorded on a slope 6 metres above Minmi Creek by Brayshaw (1994:28) during her initial survey.

**PAD:** Unknown

**Management Recommendation and Justification:** The site is now well outside the area of impact and will not require any management.

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**Site Name:** Minmi Creek Stone Arrangements

**AMG:** Minmi Creek Stone Arrangements (1) 368850E  6360262N
Minmi Creek Stone Arrangements (2 and 3) 368853E  6360294N

**Site Type:** Stone Arrangements

**Location:** Turn to north-east along Stockrington Road from western end of Seahampton. Continue approximately 1100 metres along the road then turn left onto major dirt road. This road crosses the gas pipeline. Continue in a south-easterly and downslope direction for approx. 2.25 kilometres. At first intersection take left road at second intersection take right road and continue to where track ends. Walk down narrow motorbike track to Minmi Creek (there are grinding grooves in the creek at this point #38-4-0393). Follow Minmi Creek downstream for approximately 50 metres.
Description: The stone arrangements are located within a 30 metre section of the creek bank and are in an area associated with an historical stone retaining wall, a brick weir and a sandstone and brick weir on the creek.

The stone arrangements are roughly circular with an opening on the western, downslope side and are located from 2 to 5 metres to the east of Minmi Creek. The arrangements are located at the lower slope/creek terrace interface with the back wall of the arrangement built onto the slope and having less rows of stone than the sections of walls on the terrace.

The arrangements are approximately 3 metres (north-south) by 5 metres (east-west) and are up to 1.4 metres in height. They are constructed from sandstone boulders gathered from the local environment (probably slope and creek bed). The stone arrangements are similar in nature to the North Arm Cove Stone Arrangements which are believed by Worimi Elders to be related to scarification of male initiates.

The Awabakal oral history mentions stone arrangements on Mount Sugarloaf. In the oral history the stone arrangements are described as "stone nests" in which "the boys, accompanied by an Elder, would stay for the period of the particular rite through which he was passing". Thus, the stone arrangements are believed by the Awabakal to be of a ceremonial nature (Ron Gordon pers. comm. 2004).

The upstream arrangement is clearly humanly constructed and in good condition, though there has been a slight collapse of the eastern (upslope) wall, and it is overgrown to some degree by vegetation. To the south and directly adjacent to the stone arrangement is what appears to be a partial stone arrangement. A further 10 metres to the south there is a partial stone retaining wall. It is possible that stone for the retaining wall was removed from this stone arrangement. The retaining wall has been interpreted by an historical archaeologist as having been constructed to hold back the base of the slope after it was cut back to form a pathway to enable building materials to be brought in for construction of the weirs. If this is the case the stone arrangements must predate the weirs and the stone wall.

The remaining two arrangements of stone (20 metres downstream 368746E 6360119N) are completely overgrown and difficult to discern. They have been affected by tree growth which has collapsed their walls. Due to the thickness of the vegetation it is not possible to photograph or draw a plan of these arrangements and therefore their construction by Aboriginal people is not as clear. Awabakal LALC representatives believe all three accumulations of stone to be related to ceremonial matters, from an archaeological perspective, whilst this is possible, it is also possible that they are European in derivation and associated with the other European relics in the area.

PAD: The soils are very thin in this area and unlikely to retain PAD.

Management Recommendation and Justification: Due to the perceived significance of the stone arrangements to the ALALC their conservation is warranted. Even if the arrangements are of European heritage derivation there conservation would still be warranted. Therefore it is recommended that the area containing the stone arrangements is to be fenced during the highway link construction period and the area is spanned by a bridge and not impacted by construction works. The fenced area should allow at least a 25 metre buffer zone either side of Minmi Creek in the vicinity of the stone arrangements and a buffer 25 metres upstream and 30 metres downstream of the site area. This area will also incorporate the three European heritage sites in the area. No geotechnical testing will be permitted within the fenced area.

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Sawyers Gully RTA 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>354438E 6373476N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Artefact scatter</td>
</tr>
<tr>
<td>Location:</td>
<td>The site is located about 1.2 kilometres north of Sawyers Gully Road and 700 metres southeast of Old Maitland Road, 5 kilometres north of the township of Kurri Kurri (approximately 1.5 kilometres northwest of Black Waterholes Creek RTA 2 IF). The site is within 100 metres of the centreline of the route alignment, and on a proposed access road.</td>
</tr>
</tbody>
</table>
**Description:** Four artefacts were located on a footslope at the eastern end of a spur line, 200 metres northeast of Sawyers Gully. The artefacts were spread along an area 30 metres x 5 metres on an access track for an EnergyAustralia easement. Visibility averaged 50% on the 3 metres wide road, and 0% away from the road due to grass cover. The road is partially covered with aggraded sand that has washed down the slope and the artefacts may have been washed down from further up the slope. The general area has been disturbed by bulldozing associated with the EnergyAustralia easement, road grading, vehicular traffic and slope wash.

**PAD:** Due to the disturbed nature of the area, the small number of artefacts and the general lack of topsoil it is assessed as highly unlikely to retain PAD.

**Management Recommendation and Justification:** The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction. The site is also within an area that may be impacted during highway link construction due to its proximity to the route alignment. Due to the low number of artefacts, level of disturbance and loss of topsoil, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage. An area 150 metres to the southwest (PAD12) also to be impacted by highway link construction was assessed as more suitable for subsurface testing due to its deeper and less disturbed soil profile.

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Sawyers Gully RTA 2 IF</th>
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</thead>
<tbody>
<tr>
<td><strong>AMG:</strong></td>
<td>354033E 6373623N</td>
</tr>
<tr>
<td><strong>Site Type:</strong></td>
<td>Isolated find</td>
</tr>
</tbody>
</table>

**Location:** The site is approximately 250 metres southeast of Old Maitland Road, approximately 5 kilometres north of the township of Kurri Kurri (approximately 550 metres northwest of Sawyers Gully RTA 1). The site is on the southern border of the route alignment.

**Description:** A mudstone core rejuvenation flake was located on an upper slope, 250 metres north of a tributary of Sawyers Gully, on a gravelled section of an access road for an EnergyAustralia easement. The artefact was 10 metres north of a fence line and under the most southerly set of power transmission lines. The artefact was in an area of erosion 5 metres x 5 metres. Visibility was only 10% on the 3 metres wide road due to gravel and was reduced to <5% away from the road due to grass cover. The road is partially covered with loose sandy sediments washed from the slope above and the artefact may have washed down from further up the slope. The general area has been disturbed by bulldozing associated with the EnergyAustralia easement, road grading, vehicular traffic and slope wash. Slope wash has become so advanced EnergyAustralia has had to gravel the road.

**PAD:** Due to the disturbed nature of the area, the small number of artefacts and the general lack of topsoil it is assessed as highly unlikely to retain PAD.

**Management Recommendation and Justification:** The site is located in an area to be impacted by highway link construction and will be destroyed by works associated with this development. Due to the low number of artefacts, level of disturbance and loss of topsoil, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Sawyers Gully RTA 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AMG:</strong></td>
<td>353372E 6374064N</td>
</tr>
<tr>
<td><strong>Site Type:</strong></td>
<td>Artefact scatter</td>
</tr>
</tbody>
</table>

**Location:** This site is located approximately 500 metres northwest of Maitland Road and 400 metres north of Majors Lane approximately 6 kilometres north of the township of Kurri Kurri and 10 kilometres west of Maitland (approximately 800 metres northwest of Sawyers Gully RTA 2 IF). The site crosses the route alignment and extends in an irregular shape.
approximately 250 metres on a north-south axis and 200 metres on an east-west axis.

**Description:** 86 artefacts were located in four areas associated with scours on the lower slopes on both sides of Sawyers Gully. This area has been disturbed by bulldozing associated with clearing of an EnergyAustralia easement and two access roads, one of which services the easement. The artefacts were spread over an area approximately 150 metres x 175 metres. Areas of exposure included:

- **Area A** – 50 metres x 3 metres on a road east of watercourse, 5 metres north of a fence line in the woodland. Gradient on the eastern slope varied between 3 and 8 degrees with a gravel lag deposit over red clay visibility was 80% on the road and 0% off road due to vegetation and leaf litter.

- **Area B** – 50 metres x 2 metres on a road west of watercourse, north of a fence line in the woodland on a gentler slope of <1. Visibility on the road was 60% due to aggrading soils washed down from slopes above and vegetation cover.

- **Area C** – 30 metres x 5 metres on road east of watercourse within EnergyAustralia easement. Deeply scoured above the creek line and along the road. Visibility averaged 10% due to background rubble and loose sandy sediments. The vegetation under the powerlines has been regularly slashed and vehicular traffic has exacerbated erosion.

- **Area D** – 20 metres x 10 metres on road west of watercourse within EnergyAustralia easement. Visibility averaged 10% due to background pebbles and aggraded soil. The vegetation under the powerlines has been regularly slashed and vehicular traffic has exacerbated erosion.

The AMG coordinates:

- North east – 353372E 6374064N
- North west – 353293E 6374118N
- South east – 353311E 6373992N
- South west – 353242E 6374031N

**PAD:** Due to the disturbed nature of the general area and the general lack of topsoil it is assessed as unlikely to retain PAD.

**Management Recommendation and Justification:** The site is located in an area to be impacted by highway link construction and will be destroyed by works associated with this development. Due to the level of disturbance and loss of topsoil, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage. An area to the east of the site, however, within the route alignment and within remnant woodland was recorded as having PAD. This area is targeted for sub-surface investigation (refer PAD 13).

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Sawyers Gully RTA 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG</td>
<td>353072E 6374476N</td>
</tr>
<tr>
<td>Site Type</td>
<td>Artefact scatter</td>
</tr>
<tr>
<td>Location</td>
<td>The site is 1 kilometre north of Majors Lane, 500 metres north of the homestead at 'Marooka', approximately 6 kilometres north of the township of Kurri Kurri and 10 kilometres west of Maitland (approximately 500 metres northwest of Sawyers Gully RTA 3).The site is within the route alignment.</td>
</tr>
<tr>
<td>Description</td>
<td>Four silcrete artefacts were located on a lower slope 500 metres west of Sawyers Gully in a grassy clearing amidst regrowth Hunter Lowland Redgum Forest. Three artefacts were within an area of 1 metre x 0.5 metre within an erosion patch caused by slope wash (patch was 50 metres x 50 metres with 50% visibility) and a fourth was 20 metres to the north. Visibility away from the erosion averaged 5% due to grass cover. The area had been disturbed by tree clearance (with a bulldozer) and subsequent loss of topsoil due to erosion.</td>
</tr>
<tr>
<td>PAD</td>
<td>Due to the disturbed nature of the area, the small number of artefacts and the general lack of topsoil it is assessed as highly unlikely to retain PAD.</td>
</tr>
</tbody>
</table>
### Management Recommendation and Justification

The site is located in an area to be impacted by highway link construction and will be destroyed by works associated with this development. Due to the low number of artefacts, level of disturbance and loss of topsoil, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

### Site Name: Sawyers Gully RTA 5

<table>
<thead>
<tr>
<th>AMG:</th>
<th>352946E 6374761N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Type:</td>
<td>Artefact scatter</td>
</tr>
</tbody>
</table>

**Location:** Approximately 1 kilometre north of Majors Lane, 700 metres north of the homestead at 'Marooka' approximately 7 kilometres north of the township of Kurri Kurri and 10 kilometres west of Maitland (approximately 300 metres north-northwest of Sawyers Gully RTA 4). The site is located within the route alignment.

**Description:** Eight artefacts were located on the banks of two dams constructed along a grassy drainage depression on a lower slope. Three silcrete flakes, two silcrete broken flakes, and 2 silcrete flaked pieces were recorded eroding out of the dam bank (not from the wall) on the first dam and a single quartzite flake was recorded on a second dam wall to the east at AMG coordinates 353019E 6374795N. The area of exposure on the first dam was approximately 50 metres x 3 metres with a limited visibility of 10%. Exposure on the second dam wall was 30 metres x 5 metres with 60% visibility. Visibility away from the exposure was 0% due to grass cover.

There was an ephemeral tributary of Sawyers Gully within 200 metres of the site. The area has been disturbed by tree clearance (with a bulldozer) followed by slope wash, the construction of the dams, was possibly cultivated and is presently used for cattle grazing.

**PAD:** Due to the disturbed nature of the area and the small number of artefacts it is assessed as highly unlikely to retain PAD.

### Site Name: Sawyers Gully RTA 6

<table>
<thead>
<tr>
<th>AMG:</th>
<th>352785E 6375244N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Type:</td>
<td>Artefact scatter</td>
</tr>
</tbody>
</table>

**Location:** This site is located 2 kilometres northwest of the intersection of Majors Lane and Old Maitland Road, 13 kilometres west of Maitland (approximately 500 metres north-northwest of Sawyers Gully RTA 5). It is located on the centreline of the route alignment.

**Description:** Artefacts were located in four loci along the western bank of a tributary of Sawyers Gully within an area approximately 100 metres x 80 metres. The AMG coordinates and details of the loci are as follows:

- **Loci a.** 352785E 6375244N – two artefacts (1 silcrete flake and 1 chalcedony core), one metre apart and eroding from 5 cm below the surface of the creek bank onto an animal track. Chalcedony is found locally;
- **Loci b.** 352746E 6375294N – three artefacts (one chalcedony broken flake, 1 silcrete flake and 1 mudstone broken flake) found 50 metres north west of loci a, on the lower slope in an area of erosion, 5 metres x 8 metres with 40% visibility;
- **Loci c.** 352814E 6375371N – two artefacts (one silcrete flake <1 metre from the western edge of a swampy area 80 metres north east of loci a, and one mudstone broken flake inside
the swampy area. The second artefact has most likely washed in from the bank); and

- Loci d. 352777E 6375403N – three artefacts (2 silcrete flake and 1 broken silcrete flake) were located in a scour (10 cm deep), west of the swampy area and 100 metres north (upslope) of loci a.

The site area has been impacted by vegetation clearance (using a bulldozer) and is presently used as cattle pasture. The soil on the creek terrace consisted of a sandy loam that was assessed as having the potential to contain archaeological deposits albeit in a disturbed context. Following the recording of the site the landholder cleared the vegetation once again using a bulldozer destroying any archaeological potential it may have had.

**PAD:** Due to recent disturbance by bulldozing the area is assessed as having an extremely low likelihood of retaining PAD.

**Management Recommendation and Justification:** The site is located in an area to be impacted by highway link construction and will be destroyed by works associated with this development. Due to the level of recent disturbance subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected (if they can be located) under a Section 90 Consent as part of an Aboriginal cultural heritage salvage. Subsurface testing, however, will be suggested for PAD 14 in a similar landform to the north-west.

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**Site Name:** Sawyers Gully RTA 7

**AMG:** 352670E 6375451N

**Site Type:** Artefact scatter

**Location:** The site is approximately 2.2 kilometres northwest of the intersection of Majors Lane and Old Maitland Road and 13 kilometres west of Maitland (approximately 500 metres north-northwest of Sawyers Gully RTA 5). The site is within 100 metres of the centreline of the route alignment.

**Description:** Two artefacts were located on a lower slope on the wall of a dam on a south easterly draining tributary of Sawyers Gully, 30 metres apart. The artefacts, a mudstone and a chalcedony flake, were found in an area of exposure 100 metres x 2 metres with 30% visibility. Visibility away from the exposure was limited to <5% because of grass cover and leaf litter. The area has been highly disturbed by prior bulldozing of vegetation, dam construction, cattle grazing and vehicular traffic. Scouring had also occurred along the banks of the ephemeral tributary which is 700 metres away from the main channel of Sawyers Gully. Following the recording of the site the landholder cleared the vegetation once again using a bulldozer destroying any archaeological potential it may have had.

**PAD:** Due to recent disturbance by bulldozing the area is assessed as having an extremely low likelihood of retaining PAD.

**Management Recommendation and Justification:** The site is located in an area that may be impacted by highway link construction and could be destroyed by works associated with this development. Due to the level of recent disturbance, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected (if they can be located) under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

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**Site Name:** Sawyers Gully RTA 8

**AMG:** 352730E 6375070N

**Site Type:** Artefact scatter

**Location:** The site is located 1.9 kilometres northwest of the intersection of Majors Lane and Maitland Road, 900 metres north of a homestead called ‘Marooka’ and 100 metres southeast of a tributary of Sawyers Gully (approximately 200 metres south-southwest of the site Sawyers Gully RTA 6). The site is within 100 metres of the centreline of the route alignment.
**Description:** The site is located on a lower slope with a northeast aspect and a varying gradient ranging from 1 to 3°, 100 metres southeast of Sawyers Gully. Four artefacts were located in an area of 30 metres x 5 metres. One artefact was on an unformed road and three artefacts were sitting on the bank of a dam in an area 5 metres x 1 metre, 30 metres to the east. The area had been disturbed by clearing of vegetation with a bull dozer, slope wash, the construction of the dam and vehicle traffic. The soils in the area are skeletal and consisted of a pebble lag over light brown clay. The artefacts consisted of two flakes and two flaked pieces (all mudstone). None of the artefacts retained cortex and all exhibited weathering. Visibility on the unformed road was limited to 5% due to grass cover. Visibility in an area of exposure on the dam bank measuring 30 metres x 3 metres averaged 60%. Following the recording of the site the landholder once again bulldozed the vegetation and constructed a much larger dam destroying any archaeological potential the area may have had.

**PAD:** Due to high level of recent disturbance by bulldozing the area is assessed as having no likelihood of retaining PAD.

**Management Recommendation and Justification:** The site is located in an area likely to be impacted by highway link construction and may be destroyed by works associated with this development. Due to the level of recent disturbance, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected (if they can be located) under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Sawyers Gully RTA 9</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AMG:</strong></td>
<td>352603E 6375040N</td>
</tr>
<tr>
<td><strong>Site Type:</strong></td>
<td>Artefact scatter</td>
</tr>
</tbody>
</table>

**Location:** The site is located 1.9 kilometres northwest of the Majors Lane and Maitland Road intersection, 850 metres north of a homestead called ‘Marooka’ and 100 metres southeast of a tributary of Sawyers Gully (approximately 275 metres southwest of the site Sawyers Gully RTA 6). The site is 225 metres west of the route alignment and on a proposed access track.

**Description:** The site is situated on a bench on a lower slope with a northwest aspect and a gradient of 2°, 80 metres southeast of Sawyers Gully. Four artefacts were located in an area 20 metres x 5 metres on an unformed road, which was becoming overgrown with grass and Acacia. Visibility was approximately 40% on the unformed road and <5% away from the road. The artefacts consisted of two mudstone broken flakes, one mudstone flake and one quartz core. The soil was skeletal. The area has previously been disturbed by clearing of vegetation with a bulldozer, vehicular traffic and slope wash. Following the recording of the site the landholder once again bulldozed the vegetation destroying any archaeological potential the area may have had.

**PAD:** Due to high level of recent disturbance by bulldozing the area is assessed as having no likelihood of retaining PAD.

**Management Recommendation and Justification:** The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present disturbed road area. Due to the limited impact and in view of the level of recent disturbance, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected (if they can be located) under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.
**Site Name:** Sawyers Gully RTA 10  
**AMG:** 352465E 6375080N  
**Site Type:** Artefact scatter  
**Location:** The site is located 2.1 kilometres northwest of the Majors Lane and Maitland Road intersection, 900 metres north-northwest of a homestead called ‘Marooka’ and on a tributary of Sawyers Gully (approximately 400 metres west of the site Sawyers Gully RTA 6). The site is 375 metres west of the route alignment centreline and on a proposed access track.  
**Description:** Eight artefacts were located in an area 20 metres x 5 metres, on a road on a creek flat 10 metres north of Sawyers Gully. A further 6 artefacts were located in an area 30 metres x 3 metres on the lower slope starting 15 metres south of the creek. Visibility on the road averaged 80% on both sides of the creek. Visibility on the 3 metres width of road averaged 80% on both sides of the creek. Away from the road, visibility was limited to 5% due to the grass cover. The artefacts consisted of 5 broken mudstone flakes, 4 broken silcrete flakes, 2 mudstone flaked pieces, 1 silcrete flake, 1 quartzite core and 1 silcrete retouched flake. The soil consisted of a pebble lag over light brown clay on the slope to the south of the creek and alluvium on the creek flat north of the creek. Sawyers Gully is incised to 1 metre depth and 2 metre width. Sandstone is outcropping in the creek and water ponding. The area has been disturbed by clearing of vegetation, cultivation, slope wash and vehicle traffic. In addition, rocks have been dumped in the creek bed at the road crossing. Following the recording of the site the landholder once again bulldozed the area destroying any archaeological potential it may have had.  
**PAD:** Due to high level of recent disturbance by bulldozing the area is assessed as having no likelihood of retaining PAD.  
**Management Recommendation and Justification:** The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present disturbed road area. Due to the limited impact by RTA and in view of the level of recent disturbance, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected (if they can be located) under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

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**Site Name:** Seahampton 1 Grinding Groove Site (#38-4-0394)  
**AMG:** 368470E 6359680N  
**Site Type:** Grinding Grooves  
**Location:** Turn to north-east along Stockrington Road from western end of Seahampton. Continue approximately 1100 metres along the road then turn left onto major dirt road. This road crosses the gas pipeline. Continue in a south-easterly and downslope direction for approx. 2.25 kilometres. At first intersection take left road at second intersection take right road and continue to where track ends. Walk down narrow motorbike track to Minmi Creek. Follow the creek upstream for approximately 400 metres.  
**Description:** The site contains 17 grinding grooves adjacent to a pothole (a hole enlarged by Aboriginal people in the sandstone) on a large sandstone outcrop in the base of a tributary of Minmi Creek. The grooves are in excellent condition.  
**PAD:** The creek banks on either side of the grinding grooves have only skeletal soils and PAD is unlikely.
### Management Recommendation and Justification

This site will not be impacted by construction of the F3 Interchange or highway link construction providing the off ramp for the highway link is kept to the east of the existing off ramp. This site and its surrounds are in excellent condition and all efforts should be made to avoid the area. Fencing of this site will not be required unless any works are planned west of the existing off ramp. If works are required in this area the site should be temporarily fenced with a buffer zone extending 30 metres either side of Minmi Creek and upstream and downstream of the site.

### Site Name: Seahampton 2 Grinding Groove Site (#38-4-0393)

<table>
<thead>
<tr>
<th>AMG:</th>
<th>368680E 6359980N</th>
</tr>
</thead>
</table>

| Site Type: | Grinding Grooves |

**Location:** Turn to north-east along Stockrington Road from western end of Seahampton. Continue approximately 1100 metres along the road then turn left onto major dirt road. This road crosses the gas pipeline. Continue in a south-easterly and downslope direction for approx. 2.25 kilometres. At first intersection take left road at second intersection take right road and continue to where track ends. Walk down narrow motorbike track to Minmi Creek. The grinding grooves are at the point where the motorbike track crosses the creek.

**Description:** Six grinding grooves were observed on a sandstone outcrop in the base of the creek. Immediately downstream of the grooves the sandstone base of the creek has been excavated to form a canal approximately 3 metres wide and 20 metres long. A fire trail from Stockrington Road leads to within 10 metres of the site.

**PAD:** The creek bank on either side of the grinding grooves is steep heavily eroded. PAD is highly unlikely.

### Management Recommendation and Justification

This site is outside the area of direct impact from construction of the F3 Interchange or highway link. In order to prevent accidental damage it is recommended that the site area is fenced during the construction period. The fenced area should incorporate a buffer zone incorporating an area 5 metres either side of Minmi Creek and 5 metres upstream and downstream of the site.

### Site Name: Seahampton 3 Grinding Groove Site (#38-4-0393)

<table>
<thead>
<tr>
<th>AMG:</th>
<th>368320E 6360090N</th>
</tr>
</thead>
</table>

| Site Type: | Grinding Grooves |

**Location:** Turn to north-east along Stockrington Road from western end of Seahampton. Continue approximately 1100 metres along the road then turn left onto major dirt road. This road crosses the gas pipeline. Continue in a south-easterly and downslope direction for approx. 2.25 kilometres. At first intersection take left road at second intersection take right road and continue for approximately 275 metres until the track crosses a tributary of Minmi Creek. The grinding groove site was recorded at this location. The site is approximately 100 metres upstream of centreline and is on an access track that will be used during geotechnical testing and highway link construction.

**Description:** This site was recorded by Mindaribba LALC in October 1995. MLALC had been informed that the site was located where the main graded track from Stockrington Road to Minmi Creek crossed Minmi Creek. At the time of the MLALC inspection the sandstone outcropping in the creek was covered by sediment and no grooves were detected, however, the site was recorded for the DEC/AHIMS site register. At the request of ALALC the sediment over the rock outcrop was swept away during the inspection (18-2-04) to reveal the grinding grooves. No grinding grooves were located on the rock outcrop, however, it was noted that the outcrop has been considerably damaged by road grading and vehicular traffic.

**PAD:** N/A
**Management Recommendation and Justification:** As it appears that there is not a grinding groove site at this point RTA, in consultation with ALALC (and with their written support), applied to have the site removed from the DEC/AHIMS site register. Until the site is removed from the DEC/AHIMS site register no road repair works will be allowed in this area.

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**Site Name:** Sugarloaf Range 1  
**AMG:** 368369E 6360333N  
**Site Type:** Artefact Scatter  
**Location:** Turn to north-east along Stockrington Road from western end of Seahampton. Continue approximately 1100 metres along the road then turn left onto major dirt road. This road crosses the gas pipeline. Continue in a south-easterly and downslope direction for approx. 400 metres then turn down track that runs to the north-east. The site is located 200 metres down this track on a level bench on the midslope. The site is within the route alignment.  
**Description:** Three artefacts are exposed on two intersecting roads on a bench on the midslope. The roads are highly eroded and the B-horizon clay is exposed. A restricted area (approximately 20 metres x 30 metres) of shallow colluvial deposit was observed to the northeast below the two roads. This area has the potential to contain low numbers of artefacts, however, it has been impacted by prior tree clearance. The site is located on the midslope of a spur that separates two tributaries of Minmi Creek. The site is approximately 50 metres and 300 metres upslope of the tributaries.  
**Site Area (artefacts and PAD) = 30 metres x 30 m**  
**PAD:** Low numbers of subsurface artefacts are likely in areas of gentle gradient on a bench to north of the road intersection, however, this area is not likely to have stratigraphic integrity due to prior disturbance.  
**Management Recommendation and Justification:** The site is within the route alignment and will be destroyed by works associated with this development. As so little is known of the Aboriginal sue of the Minmi Creek landscape it was thought appropriate to undertake subsurface salvage under a section 90 consent within the area identified as PAD. The area was excavated on 19-20 July 2004 under DEC Consent #1940.

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**Site Name:** Surveyors Creek RTA 1 IF  
**AMG:** 363260E 6365500N  
**Site Type:** Isolated find  
**Location:** The site is located approximately 1.5 kilometres southeast of the intersection of George Booth Drive and John Renshaw Drive. It is situated on a road, 200 metres east of Surveyors Creek and 5 metres east of a gate and is within the route alignment.  
**Description:** The isolated find was located on a footslope, on road in a gateway, 200 metres east of Surveyors Creek. The slope had a west-southwest aspect and a gradient of <1°. The general area is currently used for grazing cattle and has been cleared of vegetation (by bulldozing). The road is incised from 5 to 10 cm and there is also disturbance from fencing activities. The gateway area has been subject to disturbance from vehicle bogging and cattle trampling. The artefact, a mudstone flake, was found in an area (10 metres x 3 metres) of loose sandy loam with visibility reduced to 50% due to the dusty nature of the sediments. The roads that led away from the gateway were inspected and though they provided excellent visibility, no further artefacts were located.  
**PAD:** Due to high level of disturbance in the area and the low number of artefacts it is assessed that the specific area has a low likelihood of PAD.
### Management Recommendation and Justification

The site is located in an area to be impacted by highway link construction and will be destroyed by works associated with this development. Due to the level of disturbance, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

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**Site Name:** Surveyors Creek RTA 2  
**AMG:** 363592E 6364893N  
**Site Type:** Artefact scatter  
**Location:** The site is approximately 2 kilometres southeast of the intersection of George Booth Drive and John Renshaw Drive. It is located 200 metres east of a road that follows a fence line across the lower slope. It is within close proximity to the eastern boundary of the route alignment.  
**Description:** Two artefacts were located 5 metres apart on a lower slope in an area of exposure (50 metres x 15 metres with 80% visibility) within a minor watercourse, 15 metres north of a dam. The channel of the tributary had been subject to bulldozer activity and the artefacts were exposed on the clay at the base of the bank. The artefacts (1 broken mudstone flake and 1 mudstone flaked piece) have clearly washed into the watercourse from the adjoining slope which has also been affected by bulldozing. The site is located 500 metres from Surveyors Creek.  
**PAD:** Due to the level of disturbance it is assessed that the area of the site has no likelihood of PAD.  

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**Site Name:** Surveyors Creek RTA 3 IF  
**AMG:** 365299E 6362568N  
**Site Type:** Isolated find  
**Location:** The site is located in the Stockrington area, 500 metres north of George Booth Drive and 150 metres southwest of Surveyors Creek. The site is located on the southern border of the route alignment.  
**Description:** The isolated find (a broken silcrete flake) was located in an area of exposure (0.5 metre x 0.5 metre with 90% visibility) beside survey peg (TM64) on the lower slope 150 metres southwest of Surveyors Creek. Visibility in the surrounding area was restricted due to vegetation cover and leaf litter. The artefact may have been excavated when the hole for the survey peg was dug. Vegetation consisted of regrowth Eucalypt forest with a grassy understorey. The area of the site had been logged for pit props and the ground surface had been disturbed by tracks associated with log removal. Where the ground surface was visible it was eroded to the base of the A2 with pebbles from the local conglomerate and ironstone nodules forming a lag deposit on the surface.  
**PAD:** Due to the level of disturbance and the skeletal nature of the soil it is assessed that the area of the site has low likelihood of PAD.  

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**Site Name:** Surveyors Creek RTA 3 IF  
**AMG:** 365299E 6362568N  
**Site Type:** Isolated find  
**Location:** The site is located in the Stockrington area, 500 metres north of George Booth Drive and 150 metres southwest of Surveyors Creek. The site is located on the southern border of the route alignment.  
**Description:** The isolated find (a broken silcrete flake) was located in an area of exposure (0.5 metre x 0.5 metre with 90% visibility) beside survey peg (TM64) on the lower slope 150 metres southwest of Surveyors Creek. Visibility in the surrounding area was restricted due to vegetation cover and leaf litter. The artefact may have been excavated when the hole for the survey peg was dug. Vegetation consisted of regrowth Eucalypt forest with a grassy understorey. The area of the site had been logged for pit props and the ground surface had been disturbed by tracks associated with log removal. Where the ground surface was visible it was eroded to the base of the A2 with pebbles from the local conglomerate and ironstone nodules forming a lag deposit on the surface.  
**PAD:** Due to the level of disturbance and the skeletal nature of the soil it is assessed that the area of the site has low likelihood of PAD.  

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**Management Recommendation and Justification:** The site is located in an area that will be impacted by highway link construction and will be destroyed by works associated with this development. Due to the level of disturbance, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.
### Surveyors Creek RTA 4

**AMG:** 365435E 6362520N  
**Site Type:** Artefact scatter  
**Location:** The site is located on a track approximately 3.5 kilometres northwest of the township of Seahampton and 650 metres northwest of George Booth Drive (approximately 1.2 kilometres southeast of Surveyors Creek RTA 9 IF). The site is within the route alignment and on a proposed access track.  
**Description:** Five artefacts were located on an extremely eroded road, on both sides of a tributary of Surveyors Creek, 50 metres west of the main channel of Surveyors Creek. The artefacts were in an area 5 metres x 2 metres, 20 metres west of the watercourse. One artefact was located sitting on the loose sandy deposits, 20 metres east of the watercourse (AMG 365560E 6362470N), and it appeared to have washed down from further upslope. Four of the artefacts had eroded from the creek bank. The artefacts consisted of 2 silcrete flaked pieces, 1 silcrete flake, 1 mudstone broken flake and 1 piece of mudstone heat shatter. Visibility on the road varied from 60% to 80% for a width of three metres.  
Vegetation consisted mainly of regrowth Eucalypt woodland interspersed with a few mature ironbark, spotted gum and Angophora. The mid-storey, where present, was Acacia. Vegetation was denser along the watercourse. The lower slope areas have been severely disturbed by tree clearance and subsequent erosion of the topsoil. The road is deeply scoured with the clay B-horizon visible on the surface.  
**PAD:** It is possible that there may be artefacts in a subsurface context on the slope on the western side of the tributary. The small number of artefacts exposed by the road, however, suggests that the number would be small. The degree of downslope movement of topsoil and the depth of erosion indicate that the area in unlikely to retain archaeological integrity.  
**Management Recommendation and Justification:** The site is located in an area that will be impacted by highway link construction and will be destroyed by works associated with this development. Due to the low number of artefacts, the level of disturbance and the skeletal nature of the soils, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

### Surveyors Creek RTA 5

**AMG:** 364572E 6363160N  
**Site Type:** Artefact scatter  
**Location:** The site is located on a road, 4.5 kilometres northwest of the township of Seahampton approximately 750 metres northwest of George Booth Drive (approximately 1.1 kilometres northwest of Surveyors Creek RTA 4). The site is within the route alignment and on a proposed access track.  
**Description:** Two artefacts were located 2 metres apart on a lower slope in an area of exposure (40 metres x 30 metres) on a graded road, 50 metres north of Surveyors Creek. The artefacts were located within loose sandy soil that had aggraded on the lower slope. The artefacts consisted of 1 silcrete flaked piece and 1 silcrete broken flake. Visibility on the road averaged 20% due to loose sandy sediment and pebbles from the local conglomerates. The vegetation consisted of regrowth Eucalypt woodland with a few mature ironbark, spotted gum and Angophora in the upper storey and predominantly Acacia in the mid storey. The vegetation was denser along the watercourse. The lower slope areas have been severely disturbed by tree clearance and subsequent erosion of the topsoil. The road is deeply scoured with the clay B-horizon visible on the surface.
**PAD:** It is possible that there may be artefacts in a subsurface context on the slope on the northern side of the tributary. The small number of artefacts exposed by the road, however, suggests that the number would be small. The degree of downslope movement of topsoil and the depth of erosion indicate that the area is unlikely to retain archaeological integrity.

**Management Recommendation and Justification:** The site is located in an area that will be impacted by highway link construction and will be destroyed by works associated with this development. Due to the low number of artefacts, the level of disturbance and the skeletal nature of the soils, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Surveyors Creek RTA 6 IF</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>362938E 6366536N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Isolated find</td>
</tr>
</tbody>
</table>

**Location:** The site is located on a road 100 metres southeast of John Renshaw Drive, 900 metres east-northeast of the George Booth Drive and John Renshaw Drive intersection (approximately 1.1 kilometres north-northwest of Surveyors Creek RTA 1 IF). The site is on a proposed access track and will be 150 metres south of the proposed on/off ramp at the Buchanan Interchange.

**Description:** One artefact (silcrete broken flake) was located on a spur crest on an access road within an EnergyAustralia easement. The site is 100 metres southwest of the headwaters of a tributary of Surveyors Creek. The artefact was located within a pebble lag at the side of the highly eroded road. Visibility on the road was limited to 20% (width of 2 metres) due to vegetation and the pebble lag. The spur crest has been cleared by bulldozing and has subsequently been adversely affected by road grading, vehicular traffic and slope wash.

**PAD:** It is possible that there may be further artefacts in a subsurface context on the spur crest, however, the number of artefacts exposed by the road (1) suggests that the number would be small. The degree of disturbance of the topsoil and the depth of erosion indicate that the area is unlikely to retain archaeological integrity.

**Management Recommendation and Justification:** The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present disturbed road area. Due to the limited impact by RTA and in view of the level of recent disturbance, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to avoid further damage by vehicular traffic.

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Surveyors Creek RTA 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>362770E 6366329N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Artefact scatter</td>
</tr>
</tbody>
</table>

**Location:** This site is located on a road 700 metres south-southeast of the intersection of George Booth Drive and John Renshaw Drive and approximately 300 metres south of John Renshaw Drive (approximately 250 metres southwest of Surveyors Creek RTA 6 IF). The site is on a proposed access track.

**Description:** Two artefacts were located 50 metres apart on a vehicle track on the upper slope. The artefacts were located in an ironstone nodule and pebble lag on the centre of a graded and badly eroded road Visibility on the road was limited to 5% (width of 2 metres) due to the ironstone and pebble lag, loose sand and vegetation. The artefacts consisted of an edge-ground (volcanic) axe and a broken mudstone flake. The road has been highly disturbed by grading, vehicular traffic and slope wash and is generally scoured to the B-horizon. The slopes are covered in regrowth Eucalypt woodland and have only skeletal soil. The headwaters of a tributary of Surveyors Creek is 50 metres south of the site.
**PAD:** It is assessed that the general site area has very little likelihood of PAD due to the degree of erosion of the slopes, prior disturbance and the skeletal nature of the remaining soil.

**Management Recommendation and Justification:** The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present disturbed road area. Due to the limited impact by RTA and in view of the level of disturbance, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to avoid further damage by vehicular traffic.

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Surveyors Creek RTA 8 IF</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>362933E 6365956N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Isolated find</td>
</tr>
<tr>
<td><strong>Location:</strong></td>
<td>The site is located 950 metres southeast of the intersection of George Booth Drive and John Renshaw Drive (approximately 400 metres south-southeast of Surveyors Creek RTA 7 site). The site is within the route alignment and is on a proposed access track.</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>One artefact (a mudstone flake) was located on a road, on the edge of a shallow drainage depression that crossed the lower slope, 300 metres northeast of Surveyors Creek. The artefact was located within aggraded sandy sediment at the base of the slope 5 metres south of the drainage depression. A small swampy area has formed north of the site where aggrading sediments from the slope above have partially blocked the flow of the tributary. Visibility on the road was limited to 10% for a width of 2 metres and a length of 50 metres, due to aggrading sand and vegetation. The site area has been disturbed by road grading, vehicular traffic and slope wash which has scoured the road in many places to the B-horizon. The only area of soil aggradation is in the low lying area associated with the drainage depression</td>
</tr>
<tr>
<td><strong>PAD:</strong></td>
<td>The general site area is assessed as unlikely to retain PAD due to the low number of surface artefacts exposed along the road and the loss of topsoil from the slope and the skeletal nature of the soils that remain.</td>
</tr>
<tr>
<td><strong>Management Recommendation and Justification:</strong></td>
<td>The site is located in an area that will be impacted by highway link construction and will be destroyed by works associated with the development. Due to the low number of artefacts, prior disturbance and the loss of topsoil from the area subsurface investigation is not warranted, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Surveyors Creek RTA 9 IF (Brayshaw’s BQ2 #38-4-0412)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>364586E 6363348N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Isolated find</td>
</tr>
<tr>
<td><strong>Location:</strong></td>
<td>The site is located approximately 2 kilometres east of the point where the EnergyAustralia easement crosses George Booth Drive, 4.7 kilometres northwest of the township of Seahampton and 200 metres north of Surveyors Creek (approximately 1.9 kilometres southeast of Surveyors Creek RTA 2). The site is on a proposed access track.</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>One silcrete core was located on the lower slope at the intersection of two roads, 150 metres north of Surveyors Creek. Two artefacts were previously recorded in this area by Brayshaw, however, only one could be located at the time of the inspection. Aboriginal resources available in the vicinity included: red ochre, grass trees, geebung, Dianella, Lomandra, Melaleuca and sandstone outcrops. The general area of the site was badly disturbed. The area had been cleared, roads had been graded and there had been a general loss of topsoil from slope wash.</td>
</tr>
</tbody>
</table>
**PAD:** The general site area is assessed as unlikely to retain PAD due to the low number of surface artefacts exposed along the roads and the loss of topsoil from the slope and the skeletal nature of the soils that remain.

**Management Recommendation and Justification:** The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present disturbed road area. Due to the limited impact by RTA and in view of the level of recent disturbance, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to avoid further damage by vehicular traffic.

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**Site Name:** Swamp Creek RTA 1  
**AMG:** 363615E  6366879N  
**Site Type:** Artefact scatter

**Location:** The site was located 220 metres east of Stanford Road, 900 metres south of Lang Street and east of the township of Kurri Kurri. The site is within the route alignment and on a proposed access track.

**Description:** 23 artefacts were located on a low, broad spur crest, on a graded access road within an EnergyAustralia easement, 400 metres east of Swamp Creek. The easement is flanked by Kurri Sand Swamp Woodland. The road was approximately 3 metres wide with visibility reduced to 30% due to a pebble lag (pebbles from the conglomerate and ironstone nodules). Artefacts were scattered over an area of 30 metres x 2 metres with the highest density of artefacts concentrated on the northern side of the road, at the westerly end of the site. The artefacts were sitting on the road surface which had lost approximately 5 cm of topsoil (relative to the area to the side of the road). The dominant artefact types were flaked pieces, broken flakes and cores. The dominant raw material was silcrete with a smaller number of mudstone artefacts.

The general spur crest area has been disturbed by bulldozing of the easement, road grading, vehicular traffic and slope wash, causing scouring along the road. Rubbish had been dumped in the surrounding area.

**PAD:** The site area is assessed as likely to retain further artefacts in a subsurface context, away from the road, however, due to the degree of prior disturbance it is unlikely that the deposits retain any archaeological integrity. The Aboriginal community has requested, however, that subsurface testing be undertaken in areas off the side of the road so that they can assess if the site requires further cultural heritage subsurface salvage.

**Management Recommendation and Justification:** The site is located in an area that will be impacted by highway link construction and will be destroyed by works associated with the development. This was an area identified by the Aboriginal community as an area they would normally wish to monitor during initial ground disturbing works. As there is a “no monitoring” policy on this project the Aboriginal community has requested that subsurface testing be undertaken beside the road under a Section 87 Permit so that they can identify if the site requires further cultural heritage subsurface salvage under a Section 90 Consent. Subsurface testing is also deemed warranted from an archaeological perspective as so little is known about the Aboriginal use of the Kurri Sand Swamp Woodland landscape. The recovery of a larger assemblage from this site may assist with providing valuable information in this regard.
### Swamp Creek RTA 2

**Site Name:** Swamp Creek RTA 2  
**AMG:** 359614E 6368267N  
**Site Type:** Artefact scatter

**Location:** This site was located 500 metres east of the township of Kurri Kurri and is 30 metres north of Stanford Road. The site is situated within the route alignment.

**Description:** The site was located on the midslope of a low spur, on an access road for an EnergyAustralia easement. Swamp Creek, an ephemeral tributary is 250 metres to the west. Six artefacts were located on the road over an area of 80 metres x 2 metres. The artefacts consisted of 2 silcrete flakes, 2 broken silcrete flakes, 1 mudstone flaked piece and 1 silcrete core. The road was eroded from 5 to 10 cm below the surrounding ground surface. The road averaged 2 metres in width with visibility reduced to 10% by loose sandy sediment and pebble lag derived from the local conglomerates and ironstone nodules. The most northerly artefact was located at AMG coordinates 359591E 6368329N. There is cleared grassland within the power easement and Kurri Sand Swamp Woodland either side. Soil in the area is skeletal with clay exposed in some areas along the road. The area has been disturbed by bulldozing of the easement, grading of the road, vehicular traffic and slope wash.

**PAD:** The site area is assessed as likely to retain a small number of artefacts in a subsurface context, however, due to the degree of prior disturbance it is unlikely that the deposits retain any archaeological integrity.

**Management Recommendation and Justification:** The site is located in an area that will be impacted by highway link construction and will be destroyed by works associated with the development. Due to prior disturbance and the low number of artefacts exposed, subsurface testing is not warranted from an archaeological perspective. The Aboriginal groups, however, have requested that the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage prior to development commencing in this area.

### Swamp Creek RTA 3

**Site Name:** Swamp Creek RTA 3  
**AMG:** 359052E 6369135N  
**Site Type:** Artefact scatter

**Location:** The site is located approximately 150 metres north of Northcote Street and 650 metres east of McLeod Road, northeast of Kurri Kurri. The site is within the route alignment and on a proposed access track.

**Description:** Ten artefacts were spread over an area of 100 metres x 2 metres on the lower slope, on an access road in an EnergyAustralia easement. The most easterly artefact was located at AMG coordinates 359084E 6369144N and the most northerly at 359000E and 6369168N. The artefacts consisted of 3 silcrete flaked pieces, 2 broken silcrete flakes, 2 broken mudstone flakes, 1 mudstone flaked piece, 1 silcrete flake and 1 silcrete core. The site was located approximately 100 metres northwest of a swampy area on an ephemeral tributary of Swamp Creek. The main channel of Swamp Creek is 1200 metres to the northwest.

The breakage on the artefacts was recent and most likely related to the clearance of the area with a bulldozer, the grading of the road and vehicular traffic. The artefacts have been exposed by erosion of the access road. Clay is exposed in many places along the road and visibility was reduced to 50% by conglomerate pebbles and ironstone nodules in these scoured areas. Visibility along the centre of the road was as high as 80%.

**PAD:** The site area is assessed as likely to retain a small number of artefacts in a subsurface context away from the road, however, due to the degree of prior disturbance it is unlikely that the remaining deposits in this area retain any archaeological integrity.
**Management Recommendation and Justification:** The site is located in an area that will be impacted by highway link construction and will be destroyed by works associated with the development. Due to prior disturbance and the low number of artefacts exposed, subsurface testing is not warranted from an archaeological perspective. The Aboriginal groups, however, have requested that the artefacts be collected under Section 90 consent as part of an Aboriginal cultural heritage salvage prior to development commencing in this area.

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Swamp Creek RTA 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>356557E 6370688N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Artefact scatter</td>
</tr>
<tr>
<td>Location:</td>
<td>The site is located on Bishops Bridge Road, approximately 3 kilometres north of the township of Kurri Kurri. The site is within the route alignment.</td>
</tr>
<tr>
<td>Description:</td>
<td>Four artefacts were located on an upper slope both sides of Bishops Bridge Road, between the road and the fence lines (in the road reserves). One artefact was found at AMG 356557E 6370688N, 5 metres east of Bishops Bridge Road and 2 metres west of the fence line. Three artefacts were located 50 metres to the north of the first artefact, west of Bishops Bridge Road and in a driveway (area 5 metres x 2 metres). The four artefacts were found in badly scoured areas. The artefacts included 1 silcrete flake, 1 silcrete core, 1 mudstone core and 1 broken silcrete flake. There is an ephemeral tributary 600 metres to the east of the site, and Swamp Creek is located 1200 metres to the east. The area is highly disturbed from construction of the road, the fence and clearing for an EnergyAustralia easement. Visibility along the road averaged only 50% due to loose sediments, conglomerate gravel and ironstone nodules. The soil consists of a thin layer of remnant A2 over clay. The clay is exposed in some areas.</td>
</tr>
<tr>
<td>PAD:</td>
<td>The site area is assessed as highly unlikely to retain PAD due to the degree of prior disturbance and the skeletal nature of the soil.</td>
</tr>
</tbody>
</table>

**Management Recommendation and Justification:** The site is located in an area that will be impacted by highway link construction and will be destroyed by works associated with the development. Due to prior disturbance and the low number of artefacts exposed no further investigation is warranted from an archaeological perspective. The Aboriginal groups, however, have requested that the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage prior to development commencing in this area.

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Swamp Creek RTA 5 IF</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>358943E 6368993N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Isolated find</td>
</tr>
<tr>
<td>Location:</td>
<td>The site 350 metres north-northeast of the intersection of McLeod and Northcote Street in Kurri Kurri, 50 metres south of Northcote Street, 520 metres northwest of Cessnock Road and directly west of the abattoirs at Kurri Kurri (approximately 300 metres west-southwest of Swamp Creek RTA 6). The site is on a proposed access track.</td>
</tr>
<tr>
<td>Description:</td>
<td>The isolated find (mudstone core) was located on the lower slope (northeast aspect and a gradient of &lt;1°), 300 metres southwest of a swamp associated with a tributary of Swamp Creek. The artefact was found on the shoulder of a graded road within an EnergyAustralia easement. The artefact was within a conglomerate pebble and ironstone nodule lag, in an area of exposure 3 metres south of the road. This exposure measured 50 metres x 10 metres with a visibility of 40%. Clay was exposed along much of the road and within exposures beside the road. Where soil remained it was skeletal. The site area is highly disturbed from bulldozing of the EnergyAustralia easement, grading of the road, vehicular traffic and slope wash.</td>
</tr>
<tr>
<td>PAD:</td>
<td>The general site area is assessed as unlikely to retain PAD due to the low number of surface artefacts exposed along the road and the loss of topsoil from the slope and the skeletal nature of the soils that remain.</td>
</tr>
</tbody>
</table>
**Management Recommendation and Justification:** The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present disturbed road area. Due to the limited impact by RTA and in view of the level of recent disturbance, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to avoid further damage from future EnergyAustralia road upgrades.

**Site Name:** Swamp Creek RTA 6 IF  
**AMG:** 359229E  6369057N  
**Site Type:** Isolated find  
**Location:** The site 520 metres northeast of the intersection of McLeod and Northcote Streets in Kurri Kurri, 75 metres north of Northcote Street and 300 metres west of an EnergyAustralia Substation (approximately 200 metres southeast of Swamp Creek RTA 3). The site within the route alignment.  
**Description:** The isolated find (a mudstone flake) was located 10 metres east of a swamp that has formed on a tributary of Swamp Creek, west of the abattoirs at Kurri Kurri. The artefact was located on an access road within an EnergyAustralia easement in an area of variable exposure 50 metres x 50 metres. Visibility ranged from 0 to 90% due to loose sandy sediments washing into the area from upslope. It is likely that the swamp has formed recently as a result of the build up of colluvium at the base of the slope which partially blocks the watercourse. The area has been highly disturbed by bulldozing of the easement, the construction of two roads, vehicular traffic and slope wash.  
**PAD:** It is assessed that the area is unlikely to retain PAD due to the low number of artefacts exposed (1) and prior disturbance.  
**Management Recommendation and Justification:** The site is located in an area that will be impacted by highway link construction and will be destroyed by works associated with the development. Due to prior disturbance and the low number of artefacts exposed no further investigation is warranted from an archaeological perspective. The Aboriginal groups, however, have requested that the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage prior to development commencing in this area.

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Swamp Creek RTA 7 IF</th>
<th>AMG:</th>
<th>358425E  6369259N</th>
<th>Site Type: Isolated find</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location:</strong></td>
<td>The site is located 50 metres north of the intersection of McLeod and Northcote Streets in Kurri Kurri, and 5 metres east of McLeod Road, in a roadside reserve (approximately 600 metres northwest of Swamp Creek RTA 5 IF). It is on a proposed access track.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>The isolated find (a mudstone flake) was located on the lower slope (northwest aspect and a gradient of &lt;1 degree), 650 metres east of Swamp Creek, 50 metres south of the TAFE entrance and 1 metre west of a fence line. Visibility was afforded by a graded road 3 metres wide that ran parallel to the fence. Visibility was only 10% due to background pebbles and loose sandy sediments. The artefact was sitting in a pebble lag and appears to have eroded from an in-situ soil profile on the other side of the fence. The area has been disturbed by road grading and slope wash.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PAD:</strong></td>
<td>Due to prior disturbance and the loss of topsoil the road where the artefact was located is assessed as highly unlikely to retain PAD. It is possible that further artefacts may remain within a subsurface context to the east of the fence and outside the area of proposed impact. This area, however, has also been subject to disturbance and it is unlikely that areas of archaeological integrity have survived.</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Management Recommendation and Justification: The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present disturbed road area. Due to the limited impact by RTA and in view of the level of disturbance, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to avoid further damage from vehicular traffic.

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Swamp Creek RTA 8 IF</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>357269E 6370282N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Isolated find</td>
</tr>
<tr>
<td>Location:</td>
<td>The site is located in an EnergyAustralia easement 220 metres northwest of the intersection of the easement and Hart Road and 200 metres southwest of the aluminium smelter (approximately 850 metres southeast of Swamp Creek RTA 4). The site is on a proposed access track.</td>
</tr>
<tr>
<td>Description:</td>
<td>The isolated find (a silcrete flake) was located on an upper slope (northwest aspect and a gradient of 1 to 2°), 50 metres west of Swamp Creek, on an access road within an EnergyAustralia easement. Visibility on the road (for a width of 3 metres) was limited to 50% due a background of conglomerate pebbles, ironstone nodules and grass cover. Off road, visibility was &lt;5%. The artefact was located within a pebble lag deposit and is unlikely to be in situ. The general area is highly disturbed from bulldozing of the power easement, the grading of the road, vehicular traffic and slope wash.</td>
</tr>
<tr>
<td>PAD:</td>
<td>It is possible that a small number of artefacts may remain within a subsurface context off the side of the road. This area, however, has also been subject to disturbance and it is unlikely that areas of archaeological integrity have survived.</td>
</tr>
<tr>
<td>Management Recommendation and Justification:</td>
<td>The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present disturbed road area. Due to the limited impact by RTA and in view of the level of disturbance, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to avoid further damage from vehicular traffic and future road upgrades associated with the EnergyAustralia easement.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Swamp Creek RTA 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>357005E 6370549N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Artefact scatter</td>
</tr>
<tr>
<td>Location:</td>
<td>The site is located within an EnergyAustralia easement, 550 metres northwest of the intersection of the easement and Hart Road and 100 metres west of the aluminium smelter boundary (approximately 350 metres northwest of Swamp Creek RTA 8 IF). The site is on a proposed access track.</td>
</tr>
<tr>
<td>Description:</td>
<td>The site is located to the northeast and northwest of a swamp, within an exposure 50 metres x 15 metres with 70% visibility, Seven artefacts were located across the exposure and in smaller exposures within the adjoining grassland (total area of scatter 50 metres x 30 metres). The artefacts included 4 silcrete flakes, 2 mudstone flakes and 1 broken mudstone flake. The artefacts were located within the area bulldozed for the EnergyAustralia easement in aggrading sandy deposit at the base of the slope and adjacent to the swamp. Vegetation in the area consisted of grassland within the easement, Kurri Sand Swamp Woodland on both sides of the easement and aquatic plants associated with the swamp adjacent to the site. The site is 150 metres west of an ephemeral tributary of Swamp Creek. The site is located within a resource</td>
</tr>
</tbody>
</table>
rich landscape with a variety of useable native plants, conglomerate pebbles for manufacturing stone tools and sandstone for sharpening stone tools. The general area has been highly disturbed by bulldozing of the EnergyAustralia easement (two of which intersect at this spot), road grading, vehicular traffic and slope wash.

**PAD:** It is likely that there are a small number of artefacts in a subsurface context in this area, however, due to the high level of disturbance and the downslope movement of sediments and the artefacts they contain the deposits will not retain archaeological integrity.

**Management Recommendation and Justification:** The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present disturbed road area. Due to the limited impact by RTA and in view of the level of disturbance, subsurface testing was not thought warranted from an archaeological perspective, however, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to avoid further damage from vehicular traffic and future road upgrades associated with the EnergyAustralia easement.

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Swamp Creek RTA 10 IF</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>356447E  6370271N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Isolated find</td>
</tr>
<tr>
<td>Location:</td>
<td>The site is located 800 metres north of the intersection of Gingers Lane and Bishops Bridge Road, 3 metres east of Bishops Bridge Road, beside a fence (approximately 800 metres west of the site Swamp Creek RTA 8 IF). This site is located within the route alignment and on a proposed access track.</td>
</tr>
<tr>
<td>Description:</td>
<td>The isolated find (a silcrete flake) was located on the mid slope (northeast aspect and a gradient of &lt;1°), within the road reserve 3 metres east of Bishops Bridge Road. The artefact was within an exposure 4 metres x 60 metres with an average visibility of 50%. It is 600 metres south of a tributary of Swamp Creek. The area has been highly disturbed by grading/bulldozing of the road, the roadside reserve and the other side of the fence line. The majority of the topsoil has been pushed into windrows and the remaining soil lost to erosion leaving areas of aggraded sediments and/or a gravel lag over the clay.</td>
</tr>
<tr>
<td>PAD:</td>
<td>Due to the general lack of soil and the degree of disturbance it is assessed that the area has no likelihood of PAD.</td>
</tr>
<tr>
<td>Management Recommendation and Justification:</td>
<td>The site is located in an area that will be impacted by highway link construction and will be destroyed by works associated with the development. Due to prior disturbance, lack of soil and the low number of artefacts exposed no further investigation is warranted from an archaeological perspective. The Aboriginal groups, however, have requested that the artefact be collected under A Section 90 Consent as part of an Aboriginal cultural heritage salvage prior to development commencing in this area.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Wallis Creek RTA 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>360886E  6367033N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Artefact scatter</td>
</tr>
<tr>
<td>Location:</td>
<td>The site was located 800 metres north of John Renshaw Drive, 5 metres east of Avery’s Lane and is on a proposed access track.</td>
</tr>
<tr>
<td>Description:</td>
<td>Three artefacts were located on the edge of Averys Lane, in a pebble lag deposit (3 metres x 2 metres with 40% visibility) beside a windrow of soil removed from the road. This area is on a bench at the base of the lower slope and above the Wallis Creek floodplain. The area is 150 metres north of a tributary of Wallis Creek. Visibility away from the exposure was 0% due to grass cover and gravel. Visibility along the adjacent road was 40%. The artefacts have most likely eroded from the windrow and may have been derived from anywhere in the general area crossed by the road. The area is highly disturbed from road grading and vehicular traffic.</td>
</tr>
</tbody>
</table>
**PAD:** Due to the level of disturbance the area surrounding the artefacts has no likelihood of retaining PAD. A PAD (PAD 7) was, however, identified to the south-east and closer to the Wallis Creek floodplain in an area to be impacted by highway link construction.

**Management Recommendation and Justification:** The site is on a proposed access track that will be subject to limited use for access for geotechnical testing. Some limited access may also be required during highway link construction, however, there will be no road upgrades required and there will be no impact outside the present disturbed road area. Due to the limited impact by RTA and in view of the level of disturbance, subsurface testing was not thought warranted from an archaeological perspective. However, the Aboriginal groups requested the artefacts be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to avoid further damage from vehicular traffic and future road upgrades associated with Averys Lane.

---

**Site Name:** Wallis Creek RTA 2  
**AMG:** 360662E 6366967N  
**Site Type:** Artefact scatter  
**Location:** The site is located 250 metres east of Averys Lane and 800 metres north of John Renshaw Drive. The site extends from the southern side of the route alignment across the centreline to approximately 150 metres northwest of the route alignment (100 metres northwest from the centreline).

**Description:** 40 artefacts were located in four concentrations in areas of cleared grassland within an EnergyAustralia easement on the lower, mid and upper slopes of a spur which is on the northern side of a tributary of Wallis Creek. The artefacts were located in scoured areas where 5 to 10 cm of topsoil had been lost due to slope wash following clearance of the vegetation for the easement. Some of the artefacts were located in an area of exposure approximately 100 metres x 60 metres with 60% visibility provided by the access road for the easement. Overall the artefacts extend over an area approximately 450 metres north to south and 100 metres east to west.

**AMG boundaries for the site are as follows:**
- East - 360622E 6366967N
- South - 360691E 6366865N
- West - 360562E 6367070N
- North - 360619E 6366991N

There is an area of bushland between the artefact scatter and the tributary to the south. This area retains patches of bushland not previously impacted by works associated with the EnergyAustralia easement and which are likely to retain further artefacts. The tributary has several rock pools containing water at the time of the recording and a permanent spring is located some 300 metres downstream. A set of grinding grooves were located adjacent to two of the rock pools (refer Wallis Creek 3 Axe Grinding Grooves below) and 50 metres west of the southern tip of the visible artefact scatter. Plant resources in the bushland included bracken fern, box trees, stringybark, Melaleuca, geebung and Dianella.

**PAD:** Due to disturbance and loss of topsoil it is unlikely that there will be PAD in the main area to be impacted by highway link construction (ie. in the EnergyAustralia easement). However, it is highly likely that further artefacts exist within the area between the EnergyAustralia easement and the tributary to the south where a sediment basin will be required to prevent sediment entering the tributary and adversely impacting the grinding groove site and associated rock pools.

**Management Recommendation and Justification:** The site is located in an area that will be impacted by highway link construction and parts of the site will be destroyed by works associated with the development. Due to prior disturbance and the lack of topsoil no subsurface testing of the site area within the route alignment is warranted from an archaeological perspective. The area to be impacted by the sediment basin should, however, be subject to subsurface testing under a Section 87 Permit. The Aboriginal groups also identified the general
area as an area they would normally request monitoring during initial ground disturbance and they wished to undertake subsurface testing to assure themselves that this area did not have substantial numbers of artefacts in a subsurface context and requested that this should form part of the broader landform testing program. Following the results of the Section 87 testing the groups agreed to the surface artefacts within the route alignment being collected under a partial Section 90 consent that allowed the remainder of the site outside areas of impact to remain undisturbed. These areas are to be fenced during highway link construction works.

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Wallis Creek RTA 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>363615E  6366879N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Grinding grooves</td>
</tr>
</tbody>
</table>

**Location:** Wallis Creek RTA 3 is located 250 metres east of Avery’s Lane and 700 metres north of John Renshaw Drive. This site was located 50 metres west of the southern portion of an extensive artefact scatter (Wallis Creek RTA 2). The grinding groove site is located 100 metres southwest of the centreline of the route alignment and will not be directly impacted.

**Description:** Several axe grinding grooves were located on a sandstone bench outcropping in the channel of a tributary of Wallis Creek, 50 metres west of an extensive artefact scatter (WC RTA 2). Water was ponding in rock pools above and below the rock bench at the time the site was recorded and local residents report that when they were children the waterhole at this point was called the Kurri swimming hole and that it was much deeper and longer at the time. It has been infilled by sediment entering the tributary from cleared farmlands upstream and upslope. Plant resources in the area include bracken fern, box trees, stringybark, Melaleuca, geebung and Dianella.

The area local to the grinding grooves is in relatively good condition, however, the area upslope is highly disturbed due to land clearing activities associated with an EnergyAustralia easement.

**PAD:** The soil in the area surrounding the grinding grooves is shallow with sandstone outcropping and is unlikely to retain PAD.

**Management Recommendation and Justification:** The site is to be conserved. There will be no direct impact from highway link construction and it will be separated from work areas by a fence to avoid accidental impact. A sediment basin will be constructed upslope to prevent sediment entering the tributary that would cause abrasion of the grinding grooves and that would act to further infill the rock pools in the area. This sediment basin will have to be constructed within the area identified as PAD 8 (refer to PAD 8 for details).

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Wallis Creek RTA 4 IF</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMG:</td>
<td>361437E  6366577N</td>
</tr>
<tr>
<td>Site Type:</td>
<td>Isolated find</td>
</tr>
</tbody>
</table>

**Location:** This site is located 700 metres northwest of the intersection of George Booth Drive and John Renshaw Drive, 320 metres north of John Renshaw Drive and 50 metres west of a dam. The site is located in an area initially proposed for an access track. This proposal has subsequently been withdrawn.

**Description:** The site is located on a high creek terrace, 400 metres west of Wallis Creek. One mudstone flake was located in erosion related to a road and gateway in an area of scouring, 5 metres x 2 metres with 10% visibility. Visibility on the road was limited due to loose sandy sediment and away from the road to 0% due to grass cover. The area has been disturbed by vegetation clearance, cultivation, grazing and vehicular traffic.

**PAD:** The surrounding terrace has potential to contain archaeological deposits in a stratified context below the level of the plough zone.
Management Recommendation and Justification: Management Recommendation and Justification: The site is not in an area that will be impacted by the project, however, the Aboriginal groups requested the artefact be collected under a Section 90 Consent as part of an Aboriginal cultural heritage salvage to avoid further damage from vehicular traffic related to farm vehicles. Subsurface testing is not warranted as the site will not be impacted, however, refer to PAD 2 for details of subsurface testing in a similar landform that will be impacted by highway link construction.
APPENDIX 2

Correspondence from Aboriginal Interest Groups
Pro Forma for the Proposed National Highway Link F3 to Branxton - Stage 3 Research Design and Methodology to Accompany a DEC Section 90 Consent Application

Ann-Marie Hickey (name) of Barkuma Neighbourhood Centre (group name) have the authority to comment on the report in relation to the proposed national highway Link F3 to Branxton - Stage 3 Research Design and Methodology to accompany a DEC Section 90 Consent Application.

☐ We agree with the recommendations and the research design and methodology of the report.

☐ We agree with the recommendations and the research design and methodology of the report but also require our comments below to be considered.

☐ We do not agree with the recommendations and research design and methodology (please explain why you do not agree. Please use back of page if more space required)

Comments: 

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

Signed: Ann Marie Date: 6-4-2006 Position: Disciple
Care and Control of Artefactual Material from the Salvage Program for the proposed National Highway Link F3 to Branxton

In the boxes provided, please number each option from 1 to 6 in order of preference (1 being your first choice, 6 being your least preferable option).

Option 1 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then reburied within the road reserve on RTA land in an area that is to be conserved and not impacted during the construction of the F3. The artefacts would be placed in a closed container and the location of the reburied artefacts would be recorded with the information forwarded to the DEC.

Option 2 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then placed in the RTA's care until such time that a Wonnarua keeping place is established or agreement is reached between all of the Aboriginal stakeholder groups for this project. If no agreement is not reached within 2 years then the artefacts would be reburied in the same manner as outlined in Option 1.

Option 3 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then with the assistance of the RTA be placed in storage facilities at an individual group's office location. A group may nominate another group to care for the artefactual material if they do not wish to do so or do not have the room to house a storage facility.

Option 4 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then responsibility for the care and control of the artefacts would be divided between appropriate local museums and the Mindaribba Local Aboriginal Land Council.

Option 5 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then responsibility for the care and control of the artefacts would be placed with Mindaribba Local Aboriginal Land Council.

Option 6 No further salvage for this project would take place.

Comments: After community consultations, we have all agreed the other options are culturally in appropriate and don't sustain our heritage for future generations. Members of the community that were consulted agree of the opinion to their knowledge the artefactual material is within the tribal boundary of Awabaekal Land as opposed to the reference of Wonnarua Land. Oldest member being 88 years of age and a third generation to inhabit theLand known as Group Barkuma Neighbourhood Centre.

Signed: [Signature]
Position: [Position]
Date: 4/5/06

Please fax completed form to Umwelt (Australia) Pty Limited on 4950 5737 by Friday 5 May 2006.
Tracey White (name) of Black Creek Aboriginal Corporation (group name) have the authority to comment on the report in relation to the proposed national highway Link F3 to Branxton – Stage 3 Research Design and Methodology to accompany a DEC Section 90 Consent Application.

☑️ We agree with the recommendations and the research design and methodology of the report.

☐ We agree with the recommendations and the research design and methodology of the report but also require our comments below to be considered.

☐ We do not agree with the recommendations and research design and methodology (please explain why you do not agree. Please use back of page if more space required)

Comments:

__________________________

Signed: [signature]  Date: 11/5/2006  Position: Secretary
Care and Control of Artefactual Material from the Salvage Program for the proposed National Highway Link F3 to Branxton

In the boxes provided, please number each option from 1 to 6 in order of preference (1 being your first choice, 6 being your least preferable option).

Option 1 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then reburied within the road reserve on RTA land in an area that is to be conserved and not impacted during the construction of the F3. The artefacts would be placed in a closed container and the location of the reburied artefacts would be recorded with the information forwarded to the DEC.

Option 2 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then placed in the RTA's care until such time that a Wonnarua Keeping place is established or agreement is reached between all of the Aboriginal stakeholder groups for this project. If an agreement is not reached within 2 years then the artefacts would be reburied in the same manner as outlined in Option 1.

Option 3 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then with the assistance of the RTA be placed in storage facilities at an individual group's office location. A group may nominate another group to care for the artefactual material if they do not wish to do so or do not have the room to house a storage facility.

Option 4 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then responsibility for the care and control of the artefacts would be divided between appropriate local museums and the Mindaribba Local Aboriginal Land Council.

Option 5 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then responsibility for the care and control of the artefacts would be placed with Mindaribba Local Aboriginal Land Council.

Option 6 No further salvage for this project would take place.

Comments

__________________________

__________________________

__________________________

__________________________

Group: Black Creek Aboriginal Corporation

Signed ____________________

Date 05/05/06

Position Secretary

Please fax completed form to Umwelt (Australia) Pty Limited on 4950 5737 by Friday 5 May 2006.
Lower Wonnarua Tribal

Consultancy Pty Ltd

156 The Inlet Road
Buiga NSW 2330
Telephone (02) 65745303
Mobile 0417 403 153

19th May 2006

Ms Jan Wilson
Manager Cultural Heritage
Umwelt (Australia) Pty Ltd
2/20 The Boulevards
PO Box 838
Toronto NSW 2283

Re: Proposed National Highway Link F3 to Branxton - Stage 3 Research Design and Methodology to Accompany DEC Section 90 Consent Application March 2006.

Dear Jan,
I have read the above draft document dated March 2006, WE THE LWTC AGREE with the proposed Research Design and Methodology 4.0, 4.1, 4.2, 4.2.1, 4.2.2, 4.2.3 Research and 5.0, 5.1, 5.2 Methodology.
And the same with the Table 3.1 - Sites / Areas to be Conserved / Protected / Impact Minimised.

Re: Draft Preliminary Report Stage 2 Section 90 Salvage and Section 87 Subsurface Investigation March 2006 Section 2.1.4 Aboriginal Cultural Heritage Offsets

The LWTC AND THE RTA HAVE NOT YET SAT DOWN AND TALKED ABOUT ABORIGINAL CULTURAL HERITAGE OFFSETS ALL MEETINGS HAVE BEEN WITH UMWELT AND THE ABORIGINAL GROUPS.

Section 3.1 ABORIGINAL CULTURAL HERITAGE ASSESSMENTS

It was the LWTC that put forward in there report appendix 5.1 dot point 2 page 15 and stand by the statement in appendix 5.4

Regards

Barry Anderson
Wonnarua Decedent
Care and Control of Artefactual Material from the Salvage Program for the proposed National Highway Link F3 to Branxton

In the boxes provided, please number each option from 1 to 6 in order of preference (1 being your first choice, 6 being your least preferable option).

2. Option 1 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then reburied within the road reserve on RTA land in an area that is to be conserved and not impacted during the construction of the F3. The artefacts would be placed in a closed container and the location of the reburied artefacts would be recorded with the information forwarded to the DEC.

1. Option 2 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then placed in the RTA's care until such time that a Wonnarua keeping place is established or agreement is reached between all of the Aboriginal stakeholder groups for this project. If an agreement is not reached within 2 years then the artefacts would be reburied in the same manner as outlined in Option 1.

3. Option 3 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then with the assistance of the RTA be placed in storage facilities at an individual group's office location. A group may nominate another group to care for the artefactual material if they do not wish to do so or do not have the room to house a storage facility.

6. Option 4 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then responsibility for the care and control of the artefacts would be divided between appropriate local museums and the Mindaribba Local Aboriginal Land Council.

5. Option 5 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then responsibility for the care and control of the artefacts would be placed with Mindaribba Local Aboriginal Land Council.

4. Option 6 No further salvage for this project would take place.

Comments: We, the LWTC would like to have care and control of the artefacts collected for the proposed keeping place that we have asked for in the Aboriginal Cultural Heritage Assessment by LWTC for the RTA, Sept. 02, Appendix 5-1, Dot 2, page 15 as part of our recommendations.

Group: Lower Wonnarua Tribal Consultancy

Signed: [Signature]  
Position: [Position]

Date: 19-5-06

Please fax completed form to Umwelt (Australia) Pty Limited on 4950 5737 by Friday 5 May 2006.
Care and Control of Artefactual Material from the Salvage Program for the proposed National Highway Link F3 to Branxton

In the boxes provided, please number each option from 1 to 6 in order of preference (1 being your first choice, 6 being your least preferable option).

☐ Option 1 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then reburied within the road reserve on RTA land in an area that is to be conserved and not impacted during the construction of the F3. The artefacts would be placed in a closed container and the location of the reburied artefacts would be recorded with the information forwarded to the DEC.

☐ Option 2 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then placed in the RTA's care until such time that a Wonnarua keeping place is established or agreement is reached between all of the Aboriginal stakeholder groups for this project. If an agreement is not reached within 2 years then the artefacts would be reburied in the same manner as outlined in Option 1.

☐ Option 3 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then with the assistance of the RTA be placed in storage facilities at an individual group's office location. A group may nominate another group to care for the artefactual material if they do not wish to do so or do not have the room to house a storage facility.

☐ Option 4 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then responsibility for the care and control of the artefacts would be divided between appropriate local museums and the Mindaribba Local Aboriginal Land Council.

☐ Option 5 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then responsibility for the care and control of the artefacts would be placed with Mindaribba Local Aboriginal Land Council.

☐ Option 6 No further salvage for this project would take place.

Comments: *please see comments on the attached page for further detail.*

Group: Mindaribba Local Aboriginal Land Council

Rick Johnstone

Signed

Date

Please fax completed form to Umwelt (Australia) Pty Limited on 4950 5737 by Friday 5 May 2006.
PRO FORMA FOR THE PROPOSED NATIONAL HIGHWAY LINK F3 TO BRANKTON – STAGE 3
RESEARCH DESIGN AND METHODOLOGY TO ACCOMPANY A DEC SECTION 90 CONSENT
APPLICATION

Robert Lester (name) of WKLAC (group name)
have the authority to comment on the report in relation to the proposed national highway Link F3 to Brankton – Stage 3 Research Design and Methodology to accompany a DEC Section 90 Consent Application.

☐ We agree with the recommendations and the research design and methodology of the report.

☐ We agree with the recommendations and the research design and methodology of the report but also require our comments below to be considered.

☐ We do not agree with the recommendations and research design and methodology (please explain why you do not agree. Please use back of page if more space required)

Comments:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

5 May 2006

Umwelt Environmental Consultants
2/20 The Boulevards
Toronto NSW 2283
Fax No: 0249 505737

Attention: Ms. Kym McNamara, Archaeologist.
Subject: Care & Control of artefactual material re: F3 Branxton.

Dear Ms. McNamara,

After receiving advice from Umwelt recently, that DEC has stated, the Australian Museum are no longer receiving artefactual materials, I placed a call to the Australian Museum and spoke with Val Attenborough. Ms. Attenborough informed me that she was not aware of any refusal by the museum to accept materials, she did say that there was a delay while the museum was undergoing some internal restructuring. However, the two people that would have the facts were on leave for two weeks and when they returned to work she would have them contact me.

At this point in time WNAC came make no informed response to your letter of the 3 May 06, until we receive confirmation from the Australian Museum why they appear to be abrogating their legal responsibility to receive these materials.

As we have stated in the past our heritage materials must stop being treated in an ad hoc manner, where materials are scattered all over the place, with what appears, no formal monitoring of those materials after being given to individuals and or organisations with the accesion of Aboriginal organisations established and resourced to store those materials such as those that have a function to protect our cultural heritage materials/matters and have been authorised by the relevant language group of people to do so through the rules of such organisations.

As an example, I am a descendant of the Traditional custodians of Wonnarua Lands. As a descendant I have a birth right and a duty to my forefathers to take up my responsibility and be accountable to future generations of Wonnarua People by doing my best to preserve their cultural heritage in all its aspects as a custodian of Wonnarua Lands, which I am authorised to do so by Wonnarua people in the interests of the whole.

If you require any further comment, please give me a call on the number below or 0434 610024.

Yours sincerely

Robert J. Lester
Chairperson.

WONNARUA NATION ABORIGINAL CORPORATION
Office address: 44 George Street Singleton NSW
PO Box 3066 Singleton Delivery Centre NSW 2330
Ph: 02 6572 1077 Fax: 02 6571 4364 Email: wnac@bigpond.com
Care and Control of Artefactual Material from the Salvage Program for the proposed National Highway Link F3 to Branxton

In the boxes provided, please number each option from 1 to 6 in order of preference (1 being your first choice, 6 being your least preferable option).

Option 1 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then reburied within the road reserve on RTA land in an area that is to be conserved and not impacted during the construction of the F3. The artefacts would be placed in a closed container and the location of the reburied artefacts would be recorded with the information forwarded to the DEC.

Option 2 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then placed in the RTA's care until such time that a Wonnarua keeping place is established or agreement is reached between all of the Aboriginal stakeholder groups for this project. If an agreement is not reached within 2 years then the artefacts would be reburied in the same manner as outlined in Option 1.

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Option 5 The artefactual material would be collected/salvaged and analysed, interpreted and catalogued, then responsibility for the care and control of the artefacts would be placed with Mindaribba Local Aboriginal Land Council.

Option 6 No further salvage for this project would take place.

Comments: No advice forthcoming re are awaiting advice from the Australian Museum on the object of these objects, they are not improving and the possibility to reuse has been ruled out and are therefore from site.

Group: Wonnarua Nation Aboriginal Corp

Signed: [Signature]

Position: [Position]

Date: 19/5/06

Please fax completed form to Umwelt (Australia) Pty Limited on 4850 5737 by Friday 6 May 2006.
For further information

✉️ Allan Bowditch, project manager
Roads and Traffic Authority
Locked Bag 30 Newcastle NSW 2300

☎️ Allan_Bowditch@rta.nsw.gov.au

📞 131 RTA (131 782)

🌐 www.rta.nsw.gov.au