AUSTRALIAN ZIRCONIA LTD

(A wholly owned subsidiary of Alkane Resources Ltd)

Dubbo Zirconia Project

Aboriginal Heritage Assessment

Prepared by

OzArk Environmental & Heritage Management Pty Ltd

August 2013

Specialist Consultant Studies Compendium
Volume 3, Part 8

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Aboriginal Heritage Assessment

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August 2013

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THE ENVIRONS OF THE DUBBO ZIRCONIA PROJECT, AT THE "KARINGLE" PROPERTY.

PART 8: ABORIGINAL HERITAGE ASSESSMENT

Dubbo Zirconia Project

August 2013

Report Prepared by

OzArk Environmental & Heritage Management Pty Ltd

for R.W. Corkery & Co. Pty Ltd

on behalf of

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FOREWORD

It is noted that following the completion of field survey for the Dubbo Zirconia Project (DZP), the DZP Site boundary was modified to account for a larger mining lease application area. OzArk can confirm that the additional area of the modified DZP Site boundary (357ha) does not include any disturbance and that field survey includes all areas where disturbance is proposed.

The alignment of the Macquarie River Water Pipeline was also modified slightly following the completion of field survey to accommodate a possible future centre pivot for irrigation on the "Mia Mia" property. OzArk can confirm that the realignment would not require any disturbance to remnant native vegetation.

Appendix 6 provides figures comparing the modified DZP Site boundary and Macquarie River Water Pipeline alignment against the boundary and alignment provide at the time of field survey.

As the modification to the DZP Site boundary and Macquarie River Water Pipeline followed the completion of field survey, **Figures 6, 8**, **10**, **11**, **39**, **52** and **53** retain the DZP Site boundary as nominated at the time of field survey. OzArk confirm, however, that the assessment and conclusions of this report incorporate the DZP Site Boundary and Macquarie River Water Pipeline as presented on **Figures 2** and **3**.

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EXECUTIVE SUMMARY

The Dubbo Zirconia Project (DZP; the Proposal) comprises the development, mining and processing of zirconium, niobium and rare earth element resources located near Toongi, approximately 25km south of the town of Dubbo (**Figure 1**).

The Proposal would comprise a small scale, open cut mine supplying approximately 1Mt of ore containing rare metals (zirconium and niobium) and rare earth elements (REE's) to a processing plant annually. The Proposal also incorporates the following four component areas which are collectively referred to as 'The Application Area'.

- The DZP Site.
- Toongi-Dubbo Rail Line and Natural Gas Pipeline Corridor.
- Macquarie River Water Pipeline.
- Public road network (Toongi Road and Obley Road).

The term 'DZP Site assessed area' reflects a very recent change to the DZP Site and Macquarie River Water Pipeline. The DZP Site assessed area includes an area of 2,507 hectares and reflects the DZP Site boundary prior to an enlargement by the Applicant to account for a larger mining lease application area. The DZP Site has been enlarged by an additional 357 hectares (refer to **Figures 1** and **2**), however, it is noted that the DZP Site assessed area includes all areas of proposed disturbance. The alignment of the Macquarie River Water Pipeline has also been modified slightly following the completion of field survey, however, it is noted that the realigned section occurs entirely on previously cleared paddocks (see **Figure 3**). **Appendix 6** (**Figures 54** and **55**) show the relationship between the DZP Site assessed area and the DZP Site.

Australian Zirconia Ltd (Alkane; the Applicant) has commissioned R.W. Corkery & Co Pty Ltd (RWC) to assemble a team of specialists to provide an assessment that will assist in the design of the Proposal and to undertake an assessment of the environmental impacts of the Proposal. OzArk Environmental & Heritage Management Pty Ltd (OzArk) has been commissioned by RWC to provide an assessment of the Proposal's impacts to Aboriginal heritage.

Surveys were conducted by OzArk accompanied by representatives from Dubbo Local Aboriginal Land Council, Wirrimbah Direct Descendants and Binjang Wellington Wiradjuri Heritage Survey on multiple occasions between May 2012 and February 2013.

A total of 52 Aboriginal sites have been recorded in the Study Area. 33 of these sites have been recorded as part of this study and 19 were recorded by a previous investigation of the proposed site of the DZP (**Figure 10**; **Table 8**). The newly recorded sites include a Potential Archaeological Deposit (PAD 12) that has been designated in an area where no artefacts were recorded.

Fourteen (14) sites are likely to be totally or partially impacted by the Proposal and 11 sites are adjacent to the impact footprint and may be indirectly impacted. Two sites with associated PADs are within the impact footprint and were investigated through test excavation (OzArk 2013). No intact or substantial archaeological deposits were found at these sites and no other PADs are to be impacted by the Proposal. One site, outside the proposed impact footprint, would require monitoring to ensure that it is not harmed by the Proposal. Twenty six (26) sites would be avoided by the Proposal. Impacts associated with the Proposal must be considered as permanent. The recommendation for management of these sites falls under three management groups (**Section 6.3**; **Table 13**).

- Management Group 1: 26 sites (including one PAD) are currently located outside of the impact footprint. For these sites and for any additional sites where avoidance of harm be the chosen management, the following is recommended:
    - Inductions should be provided to workers as to the location and legislative protection of these sites. These inductions should be documented.
    - Appropriate measures should be in place to protect the site such as marking sure that all future activities avoid impacts to a site's location.
- Management Group 2a: Nine sites are currently under threat of harm from the proposed impacts that were assessed as being unlikely to yield further significant data about Aboriginal heritage. As these sites were determined to hold low scientific/archaeological values, the management recommendations are as follows.
    - An *Aboriginal Cultural Heritage Management Plan* (ACHMP), including a Statement of Commitments (SoC), documenting how each site is to be managed should be prepared following consultation undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRs).
    - The ACHMP and SoC should include measures for the collection / salvage of surface artefacts from sites prior to works commencing.
    - A Care Agreement covering any artefacts from the salvage would be included in the ACHMP.
- Management Group 2b: Five sites (all culturally modified trees) are currently under threat of harm from the proposed impacts. Specific management of these sites include are as follows.
    - There are no archaeological deposits associated with these sites so further archaeological investigation is not warranted.
    - The scars should be recorded to archival quality prior to removal.
    - Salvage of these sites is not an archaeological recommendation, however it is the desire of the RAPs to retain the scar-bearing portions of the trunks. Should the Applicant and RAPs agree to salvage one or more of the scar-bearing portions of the trees, the methodology and Care Agreement would form part of the ACHMP.
- Management Group 2c: Eleven (11) sites are located closely adjacent to the proposed impact footprint and specific recommendations are applied to them to ensure that these sites are not impacted by the proposed works (**Section 6.2**).
- Management Group 2d: One site is located outside the proposed impact footprint but there remains the potential that the site could be indirectly impacted. Specific recommendations are applied to this site to ensure that these sites are not impacted by the proposed works (**Section 6.2**).
- Management Group 3: This group is now redundant (as test excavation is now complete) and no further sites are subject to Group 3 management.
- Proposed works should remain limited to the Application Area as assessed in the current report so as to eliminate the chance of encountering Aboriginal objects in unassessed areas.
- Should any other objects or Aboriginal sites be identified during the course of construction *The Unanticipated Finds Protocol* in **Appendix 5** should be followed.

- As this Proposal falls under Part 4 Division 4.1 of the EP&A Act, an AHIP is not required for the salvage of heritage sites if development consent is issued. Rather, approval for the undertakings should be sought though a Statement of Commitments and eventually incorporated into an *Aboriginal Cultural Heritage Management Plan*.
- One copy of this report should be sent to:
    - Binjang Wellington Wiradjuri Heritage Survey
    - Dubbo Local Aboriginal Land Council
    - Diane Stewart
    - Wirrimbah Direct Descendants
- Two copies of this report should be sent to:
    - Office of Environment and Heritage, AHIMS Registrar, Attention: Cheryl Brown, PO Box 1967, Hurstville, NSW, 1481.

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1 INTRODUCTION

1.1 BRIEF DESCRIPTION OF THE PROPOSAL

The Dubbo Zirconia Project (DZP; the Proposal) comprises the development, mining and processing of ore containing rare metals, zirconium and niobium, and rare earth elements (REEs) near Toongi, approximately 25km south of Dubbo (**Figure 1**).

The Proposal would comprise a small scale, open cut mine supplying approximately 1Mt of ore containing rare metals (zirconium and niobium) and rare earth elements (REE's) to a processing plant annually. The Proposal also incorporates the following four component areas which are collectively referred to as 'The Application Area'.

- The DZP Site.
- Toongi-Dubbo Rail Line and Natural Gas Pipeline Corridor.
- Macquarie River Water Pipeline.
- Public road network (Toongi Road and Obley Road).

The term 'DZP Site assessed area' reflects a very recent change to the Project Site boundary post OEH adequacy assessment. The DZP Site assessed area contains the preceding project site area of 2,507 hectares. This area was entirely assessed. The Application Area is now 2,864 hectares, reflecting the inclusion of an additional 357 hectares. This extended Application Area is shown in **Figure 54** (**Appendix 6**) and **Figure 2**. The additional 357 hectares remain unassessed and will not be affected by the Proposal'.

Australian Zirconia Ltd (AZL; the Applicant) has commissioned R.W. Corkery & Co Pty Ltd (RWC) to assemble a team of specialists to provide an assessment that will assist in the design of the Proposal and to undertake an assessment of the environmental impacts of the Proposal. OzArk Environmental & Heritage Management Pty Ltd (OzArk) has been commissioned by RWC to provide an assessment of the Proposal's impacts to Aboriginal heritage.

Associated with the Proposal would be the construction of a 132kV Electricity Transmission Line (ETL) from the Geurie – Dubbo 132kV power line. This 132kV ETL Corridor is to be assessed separately to the Proposal under Part 5 of the *Environmental Planning & Assessment Act 1979* (EP&A Act) and is not considered as part of this Aboriginal Heritage Assessment.

1.2 TERMINOLOGY

The following terminology is used in this report to classify the Proposal:

- **Application Area**: The area which encompasses all aspects of the Proposal, including land that is owned by AZL but is not within the current design of the impact footprint.
- **Study Area**: The area which was studied for this assessment. This includes the impact footprint and some areas that are outside the Application Area which were surveyed before the current Application Area was finalised.
- Specific components of the Application Area are referred to as follows (refer to **Figures 1** to **5**).
    - The land on which the proposed mining, processing, waste management and associated operations would occur is referred to as the DZP Site (**Figure 2**).

- A proposed water pipeline between the processing plant of the DZP Site and Macquarie River is referred to as the Macquarie River Water Pipeline (**Figure 3**).
- The Dubbo East Junction to Toongi section of the Dubbo-Molong Rail Line to be re-instated is referred to as the Toongi-Dubbo Rail Line. A Compressed Natural Gas (CNG) pipeline is proposed for installation within this rail corridor, extending beyond Dubbo East Junction to Purvis Lane where the APA Group owned Central Wes Pipeline crosses the Merrygoen Rail Line. Combined this component of the Application area is referred to as the Toongi-Dubbo Rail Line and Gas Pipeline Corridor (**Figure 4**).
- The proposed realignment of portions of Obley Rd between the DZP Site and Dubbo are referred to as the Obley Road Alignment (**Figure 5**).

- **Survey Unit**: Discrete areas subject to physical inspection, with boundaries delineated by any combination of natural (topography, for example) and artificial (fences, for example) features, as well as arbitrary positions (impact zones).

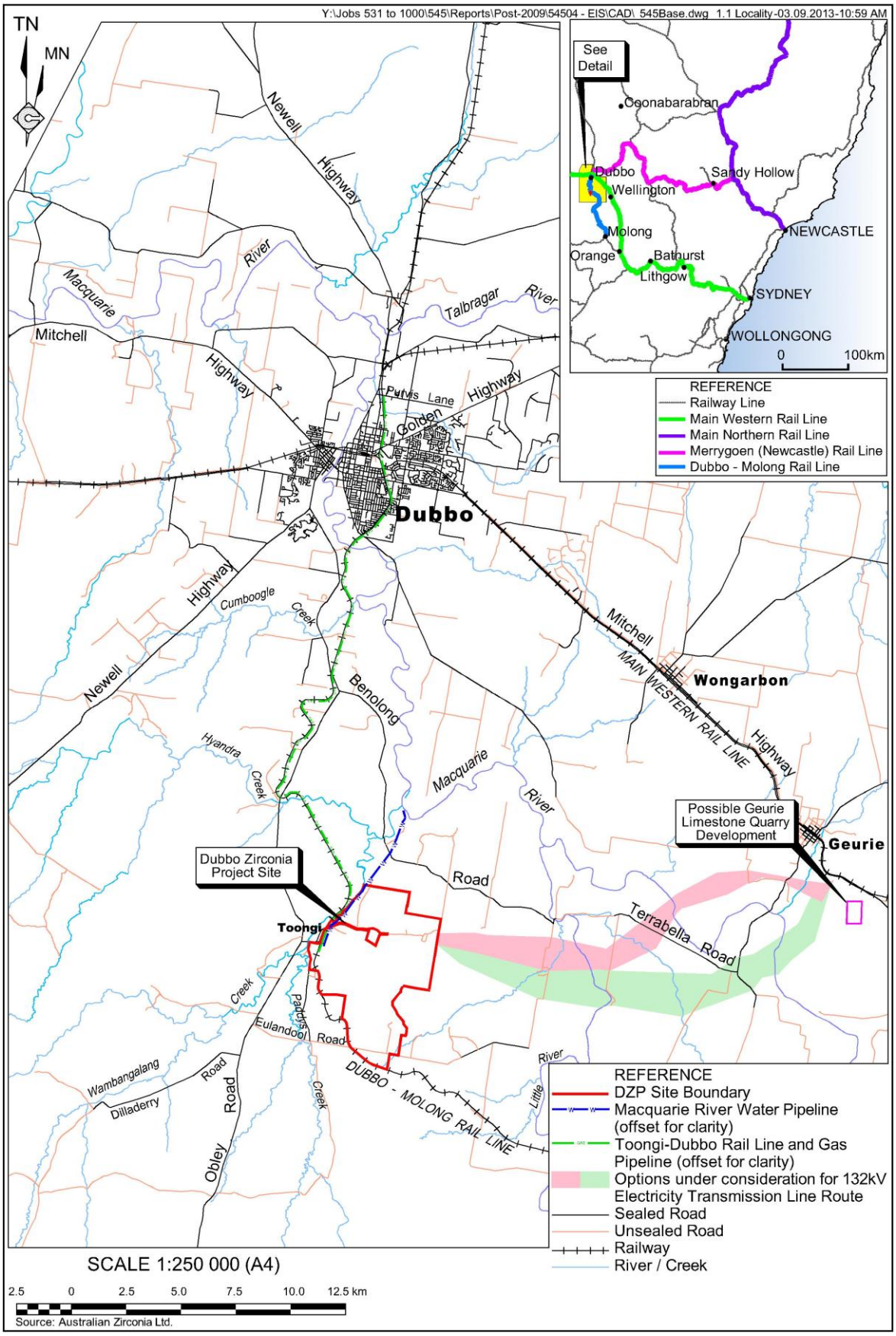
1.2.1 Location

The Proposal is located within the Dubbo Local Government Area (Dubbo LGA), in the Orana Region of New South Wales (**Figure 1**). The DZP Site extends over portions of seven farming properties to the north, east and south of the Village of Toongi (**Table 1**). The Macquarie River Water Pipeline traverses two farming properties on and to the north of the DZP Site (**Figure 3**). The Toongi-Dubbo Rail Line and Gas Pipeline Corridor would remain within the relevant rail easements (**Figure 4**). The Obley Road Realignment would occur wholly within the road reserve (**Figure 5**), i.e. no resumption of freehold land would be required and the properties include privately owned land and Crown land.

Table 1: Application Area Land Titles

DZP Site		**Macquarie River Water Pipeline**	**Toongi–Dubbo Rail and Gas Pipeline Corridor**
Part Lot 311 DP595631	Lot 271 DP593668	Lot 311 DP595631	Toongi – Dubbo Rail Reserve
Part Lot 35 DP753220	Part Lot 1 DP133581	Lot 27 DP753220*	Purvis Lane Reserve
Part Lot 18 DP753252	Lot A & B DP439352	Lot 62-63 DP753220*	**Public Road Network**
Lot 19 DP 753252	Part Lot A DP391069	Lot 30 DP753220*	Toongi Road Reserve
Lot 55 DP 753252	Lot B DP 391069	Lot 1-4 DP753226*	Obley Road Reserve
Lot X DP 405495	Lot 211 DP595631	Various public / crown road reserves	
Lot 1 DP818802	Lot 50 DP 753252		
Lot 7300 DP1149010 (Licensed for grazing)			
Unformed 'Paper' Road (Crown Land) separating Lot 311 DP55631 and Lots A & B DP439352			
Unformed 'Paper' Road (Dubbo City Council) separating Lot 1 DP818802 and Lot 7300 DP 1149010			
* By negotiation with landowner			

Figure 1: Locality Plan



1.3 PROPOSED WORKS

1.3.1 Objectives

The principal objectives of the Proposal are to:

- maximise the recovery of the rare metals and REE's contained within the Toongi ore body through efficient of mining and processing operations;
- minimise the consumption of water, power and chemical reagents required by the processing operations;
- minimise the disturbance footprint associated with the proposed activities;
- ensure that all waste by-products are managed to minimise the risk of pollution (short-term impact) or contamination (long-term impact);
- establish, re-establish and/or upgrade local/regional infrastructure for the purposes of the Proposal but which could also have beneficial uses for other industry/activities;
- undertake all activities in an environmentally responsible manner to ensure compliance with relevant criteria/goals or reasonable community expectations; and
- work cooperatively with the surrounding community, including the Aboriginal stakeholder groups and traditional owners, to build socio-economic capacity within communities affected by the Proposal.

1.3.2 Description of the Proposed Activities

As noted in **Section 1.1**, the Application Area for the Proposal incorporates four distinct areas, namely:

- the DZP Site;
- Toongi-Dubbo Rail Line and Natural Gas Pipeline Corridor;
- Macquarie River Water Pipeline; and
- Obley Road realignment.

The following provides an overview of the activities to be undertaken within each of these areas.

DZP Site Operations

The following provides an overview of principal components and activities to be undertaken on the DZP Site (and illustrated on **Figure 2**).

- Extraction of approximately 19.5Mt of ore at a maximum rate of 1.1Mt per year from a shallow open cut developed to a maximum depth of 32m (355m AHD) (remaining above the groundwater table). At the proposed rate of mining, the open cut design proposed would provide for a mine life of 20 to 22 years.
- Extraction and placement of approximately 3.5Mt of waste rock (weathered material or rock containing insufficient grades of rare metals or REEs for processing) within a small waste rock emplacement (WRE) to the southwest of the open cut.
- Haulage of ore to a Run-of-Mine (ROM) Pad for crushing and grinding.

- Processing of the crushed and ground ore by:
  - Sulphation roast of ore and leaching to dissolve sulphated metals.
  - Solvent extraction, precipitation, thickening, washing and drying of the various rare metal and REE products.

  The sulphuric acid required as part of the sulphation process would be manufactured within the DZP processing plant from imported raw sulphur.
- Construction and operation of a rail siding from the Toongi-Dubbo Rail Line and a Rail Container Laydown and Storage Area for the unloading and temporary storage of reagents and loading of products for despatch.
- Other reagents would be transported to the DZP Site via the public road network, with sections of Obley Road and Toongi Road to be upgraded to accommodate the proposed increase in heavy vehicle traffic.
- Mixing of solid residues produced by the processing of the ore with crushed and washed limestone and transportation via conveyor to a Solid Residue Storage Facility (SRSF).
- Pumping of water used in the processing operations, which cannot be recycled, to a Liquid Residue Storage Facility (LRSF), comprising a series of terraced and lined crystallisation cells.
- Recovery and disposal of an estimated 6.7Mt of salt which would accumulate within the LSRF within a series of Salt Encapsulation Cells adjoining the WRE and SRSF.
- Other ancillary activities including equipment maintenance, clearing and stripping of the areas to be disturbed and rehabilitation activities.

The maximum development footprint on the DZP Site would be approximately 808ha (within the DZP Site of 2 864ha; see **Figure 2**). Component areas of disturbance are as follows:

- Open Cut Mine – 40.3ha.
- Waste Rock Emplacement Area – 20.4ha.
- ROM Pad – 4.2ha.
- Processing Plant and DZP Site Administration Area (incorporating the processing plant and associated reagent storage areas, rail siding and container laydown areas and site offices and administration complex) – 43.3ha.
- Solid Residue Storage Facility – 102.8ha.
- Liquid Residue Storage Facilities (Evaporation Ponds) – 425.4ha.
- Salt Encapsulation Cell – up to 34.6ha.
- Soil Stockpile Areas – up to 129.4ha.
- Internal Haul Roads – 7.3ha

The ore body to be mined is a roughly elliptical stock in shape with outcrop dimension of 600m x 400m. Exploration completed by AZL has identified the ore body extends below a thin veneer of soil and recent sediments to be approximately 900m (east-west) x 500m (north-south) (surface area of 36ha) and appears to be a near vertical body of indeterminate depth.

While there is limited scope to modify the area of impact associated with the open cut, in order to minimise the impact of the mining operations, the Applicant has designed the mining sequence such that the initial 10 year mine plan develops the western half of the open cut with the eastern half developed and mined during the second 10 year mining period (see **Figure 2**).

The size and location of the other components of the DZP Site have been the subject of more detailed review, with impact minimisation a key consideration.

Macquarie River Water Pipeline

Processing operations would require up to 4.05GL of water annually which would be sourced (partially or completely) from the Macquarie River (under licence) and transferred to the DZP Site by water pipeline.

Figures 3 and **55** (**Appendix 6**) provide details of the proposed alignment of the Macquarie River Water Pipeline. The proposed alignment of the northern section of the pipeline has been recently altered so that is now up to 150m east of its previous position (**Section 4.5**). The key features of this are as follows.

- A pumping station which incorporates a dual water inlet, wet well and vertical mounted axial flow pump configuration.
- A 400mm to 450mm diameter HDPE pipeline within an embedded trench.

The easement to be created for the Macquarie River Water Pipeline Corridor would be approximately 15.2ha (20m x 7.6km), although the actual area of disturbance within this corridor would be much less. An area not exceeding 2 500m^2 would be disturbed on the river frontage of the “Mia Mia” property to allow for the construction of the pumping station for water from the Macquarie River.

Toongi-Dubbo Rail Line and Gas Pipeline Corridor

The processing operations require significant volumes of chemical reagents and other raw materials. While significant volumes of these reagents and materials would be delivered by road, the Applicant has identified the upgrade and use of the Toongi to Dubbo section of the currently disused Dubbo-Molong Rail Line as an opportunity to reduce the volume of traffic on the public road network.

Figure 4 provides the proposed alignment of the Toongi-Dubbo Rail Line, the key features of which are as follows.

- Upgrade of the Toongi to Dubbo section of the Dubbo-Molong Rail Line to a Class 1 track (92t gross/67t pay load capacity).
- Replacement or upgrade of steel bridges, culvert structures, and timber bridges.
- Reinstatement, civil works and installation back to the required standard at each of the 26 level crossings. Of these, seven are major crossings (of local roads), four of which occur in Dubbo (Wingewarra Street, Cobra Street, Boundary Road and Macquarie Street) and three (Cumboogle, Glengerra and Toongi) between the Macquarie River and the proposed DZP Rail Siding.

Figure 4 also identifies the proposed natural gas pipeline between the Central West Pipeline (of APA Group) at Purvis Lane, Dubbo, and the DZP Site which would deliver up to 970TJ/year of natural gas for the heating of various circuits within the processing plant.

Proposed Road Upgrades

Significant quantities of the processing reagents and other raw materials would be delivered by road, via the Newell Highway, Obley Road and Toongi Road. To accommodate the proposed heavy vehicle traffic associated with this transport, the alignment and pavement depth of the

two roads would be improved in several locations, with a number of creek crossings, rail level crossings and intersections to be upgraded. **Figure 5** provides the locations of these works.

A more detailed description of the Proposal is provided by Section 2 of the EIS, of which this assessment forms Part 8 of the accompanying Specialist Consultant Studies Compendium.

1.4 STUDY AREA

The Study Area measures approximately 3 171ha. It encompasses those areas of the Application Area to be impacted, as well as areas that are outside but nearby to the current Application Area. The Study Area is divided into Survey Units (**Table 2**; **Figures 6** and **7**). Most of the Survey Units are named after the properties on which they occur. The Survey Units fall within four components of the proposal: DZP Site, Toongi-Dubbo Rail Line and Gas Pipeline Corridor, Macquarie River Water Pipeline, and proposed road upgrades.

Figure 2: DZP Site Layout

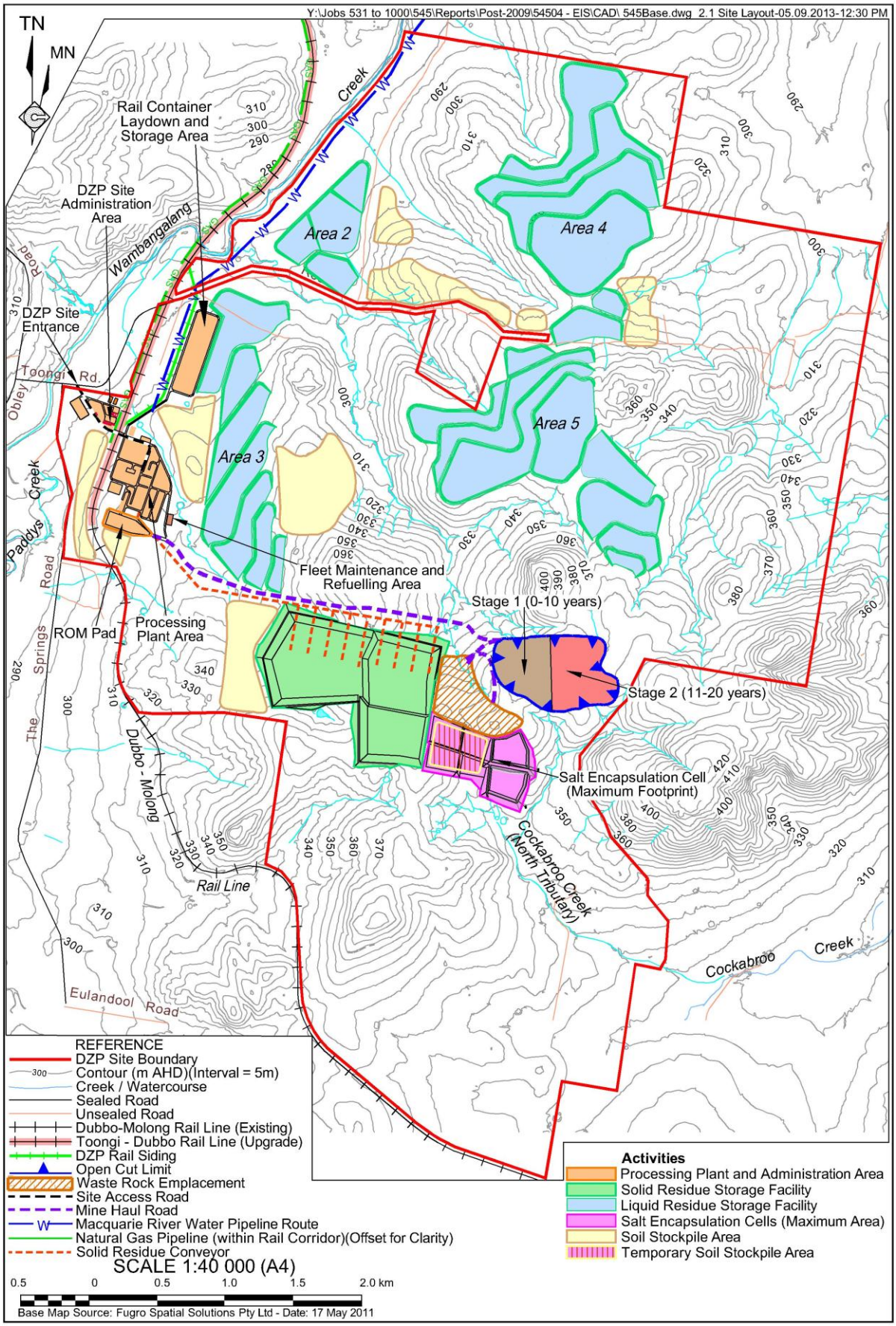
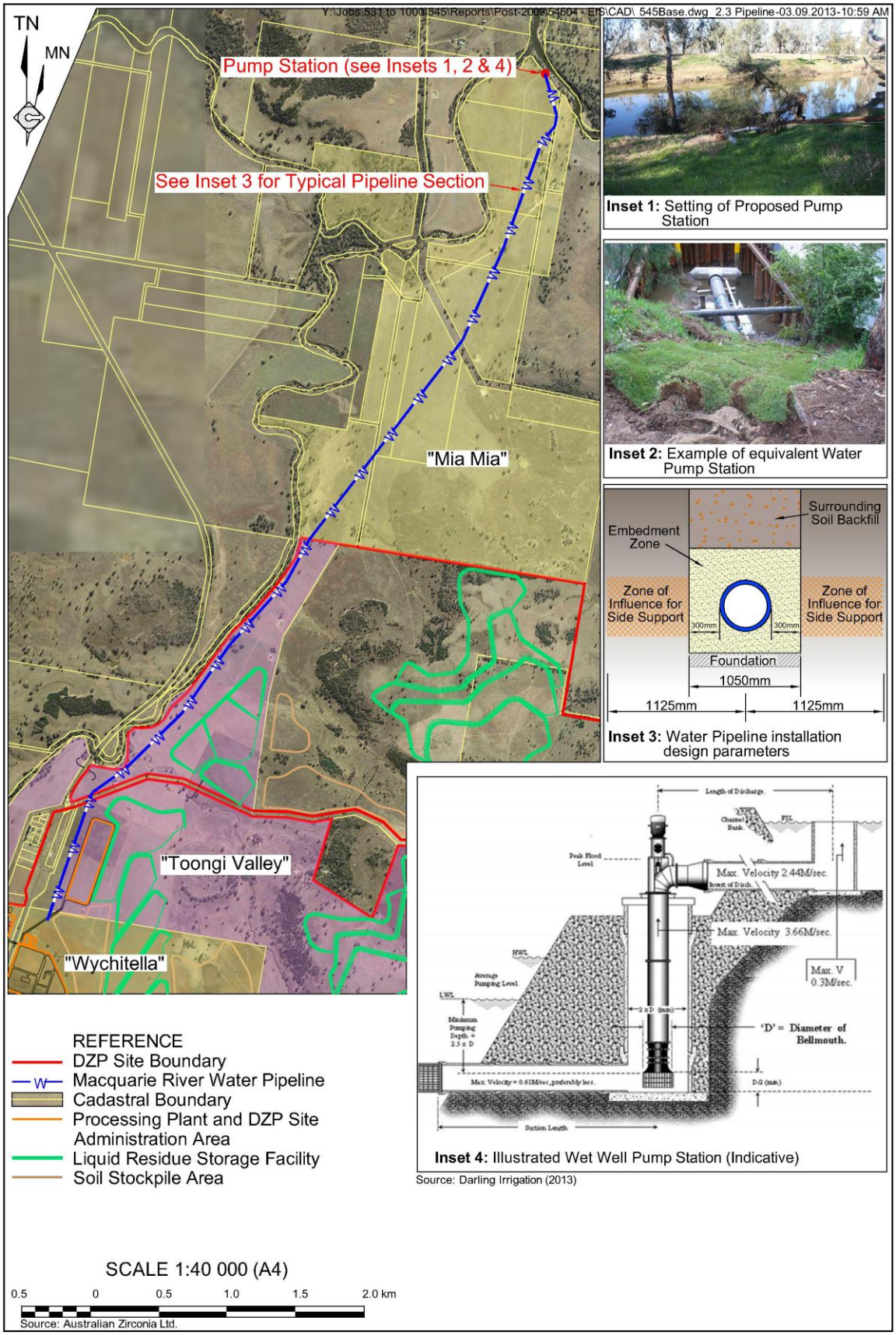


Figure 3: Macquarie River Water Pipeline and Pump Station North of the DZP Site Boundary



Source: Darling Irrigation (2013)

Source: Australian Zirconia Ltd.

Figure 4: Toongi – Dubbo Rail Line and Gas Pipeline Corridor

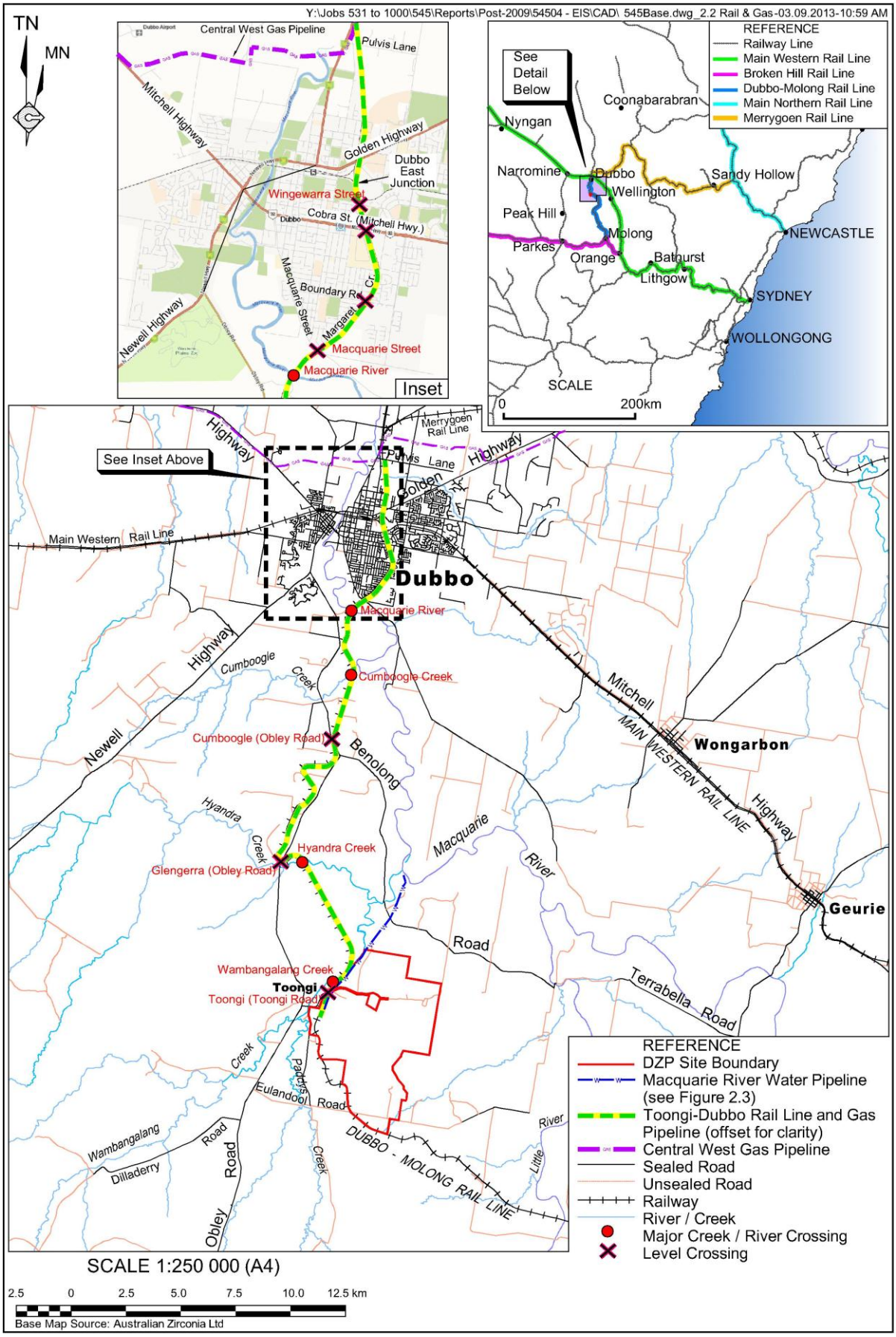


Figure 5: Public Road Network Upgrades

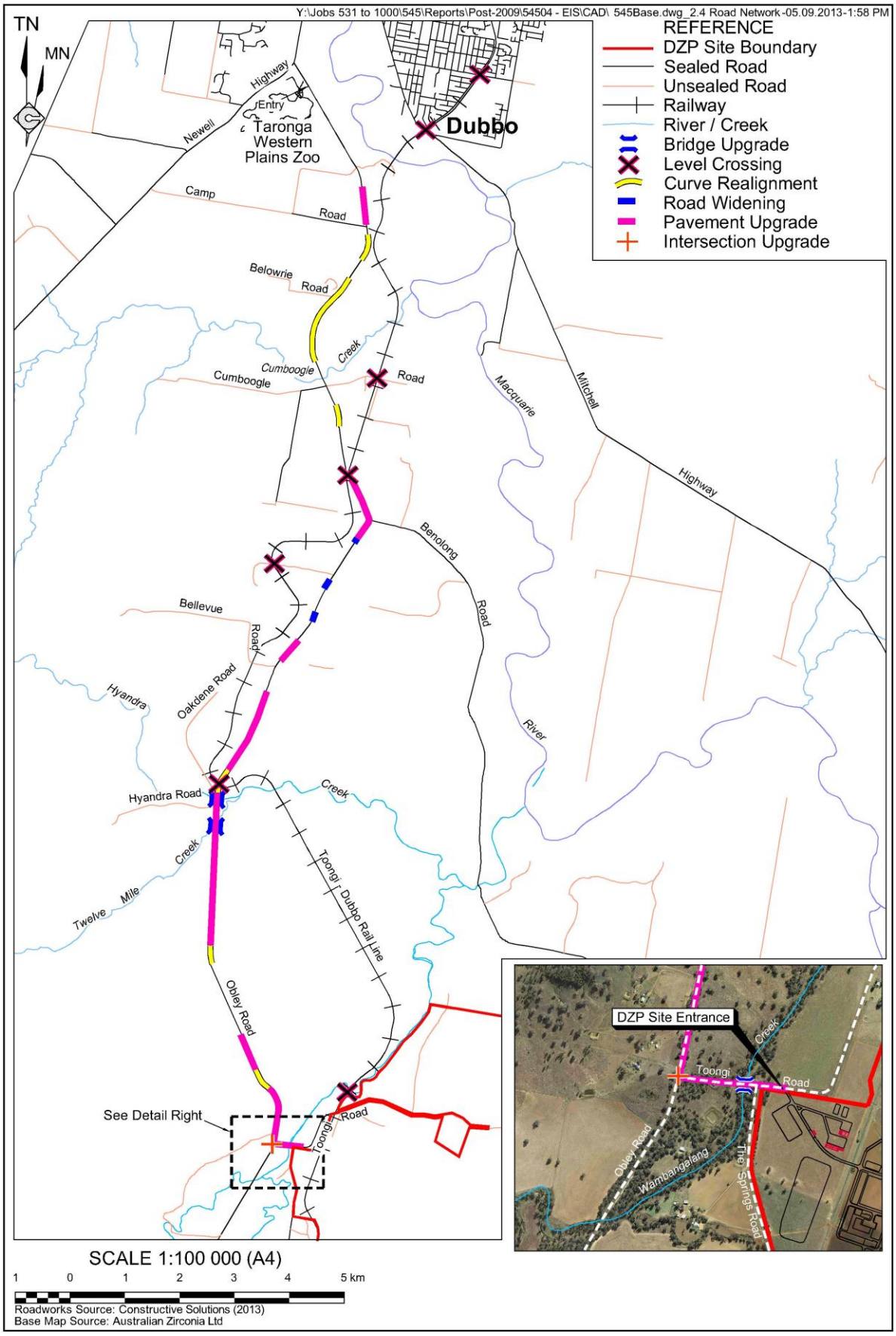


Table 2: Survey Units[1]

Survey Unit	Size (ha)	Plate		Survey Unit	Size (ha)	Plate
DZP Site				**DZP Site (cont'd)**		
UG-1	116.7	-		TV-5	24.5	-
UG-2[2]	247	1		G-1	41.3	-
K-1	76.4	-		G-2	186.7	-
K-2	40.3	-		G-3	29.8	-
K-3	33.5	-		G-4	70.1	-
K-4	146.8	-		G-5	23.57	-
K-5	77.5	-		G-6	11.9	-
K-6	18.6	-		G-7	6.1	-
K-7[3]	48.6	2		G-8	5.9	7
K-8[4]	48.4	-		**Toongi-Dubbo Rail Line and Gas Pipeline Corridor**		
K-9	6.2	-		Dundullimal RB	NA: Area spot checked to confirm disturbance from existing rail line.	8
K-10	11.8	-		Cumboogle RB		-
W-1	19.3	-		Hyandra RB		9
W-2	18.8	3		**Macquarie River Water Pipeline: Surveyed with a 20m buffer from centreline.**		
W-3	3.0	-		MM-1	2.8 (703m L)	-
W-4	29.4	-		MM-2	1.2 (290m L)	10
W-4a	9.4	-		MM-3	1.6 (394m L)	-
W-5	23.5	-		MM-4	2.7 (668m L)	-
W-5a	8.2	-		MM-5	5.1 (1287m L)	-
W-6	26.5	-		MM-6	2.0 (496m L)	-
W-7	23.2	-		MM-7	3.5 (865m L)	-
W-8	18.9	-		MM-8	1.7 (422m L)	-
W-9	55.4	-		TV-H2O	2.3 (587m L)	11
W-10	37.5	-		**Obley Road Alignment: Surveyed with a 20m buffer from centreline.**		
GI	45.6	4		OR-1	2.3 (586m L)	12
PH-1	11.9	-		OR-2	7.5 (1874m L)	-
PH-2	41.6	-		OR-3	2.4 (602m L)	-
PH-3/4	26.6	-		OR-4	1.1 (266m L)	-
PH-5	2.6	5		OR-5	0.9 (230m L)	-
PH-6	31.5	-		OR-6	1.5 (364m L)	-
TV-1	56.5	6		OR-7	2.6 (645m L)	-
TV-2	85.0	-		OR-8	1.8 (449m L)	-
TV-3	86.1	-		OR-9	2.4 (603m L)	-
TV-4	47.5	-				

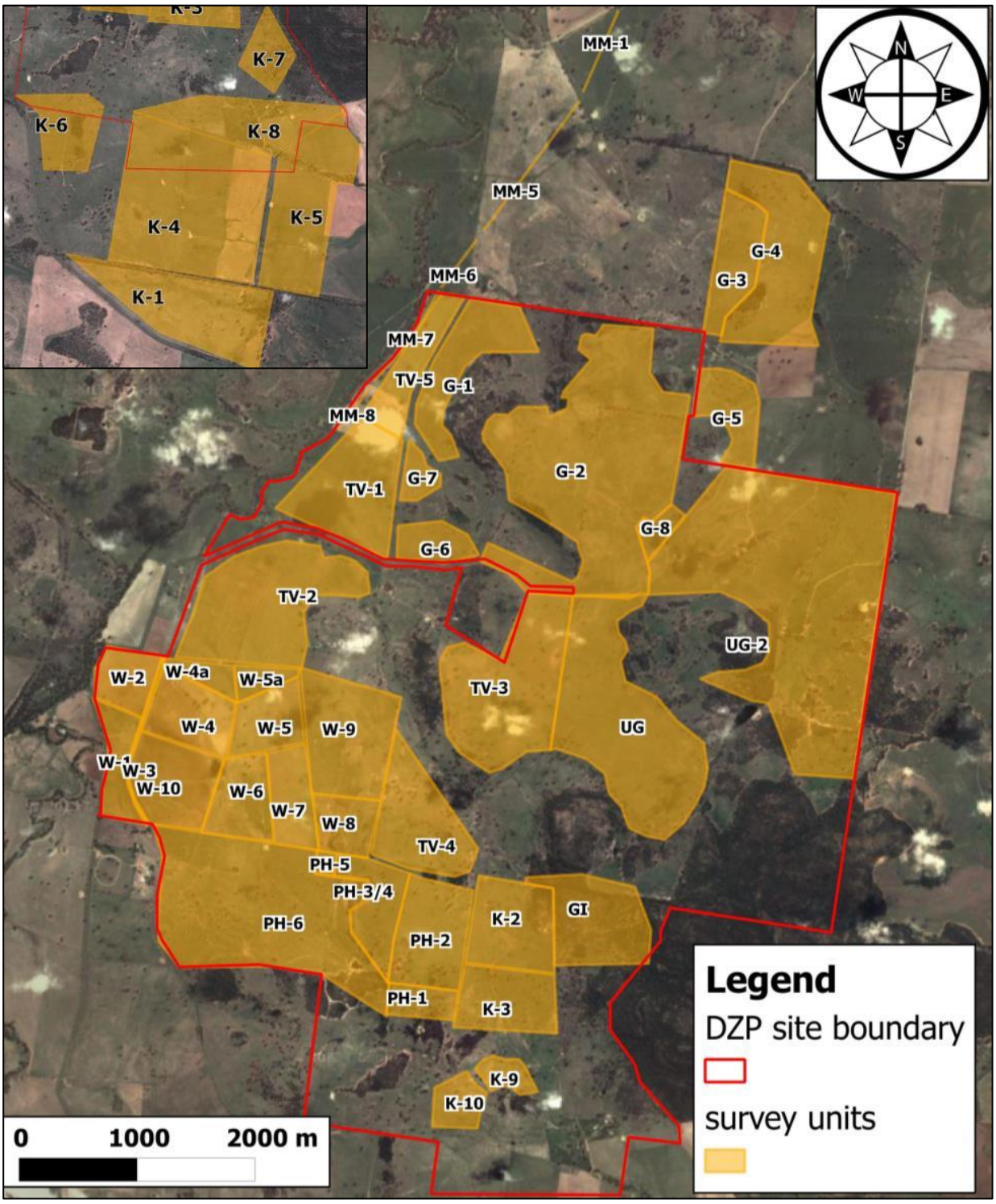
1 G = "Grandale", GI = "Glen Idol", K = "Karingle", PH = "Pacific Hill", TV = "Toongi Valley", UG = "Ugothery", W = Wychitella, RB = Rail Bridge, MM = "Mia Mia", OR = Obley Road.

2 Survey Unit includes land on "Ugothery" and "Grandale" properties.

3 Incomplete survey.

4 Incomplete survey.

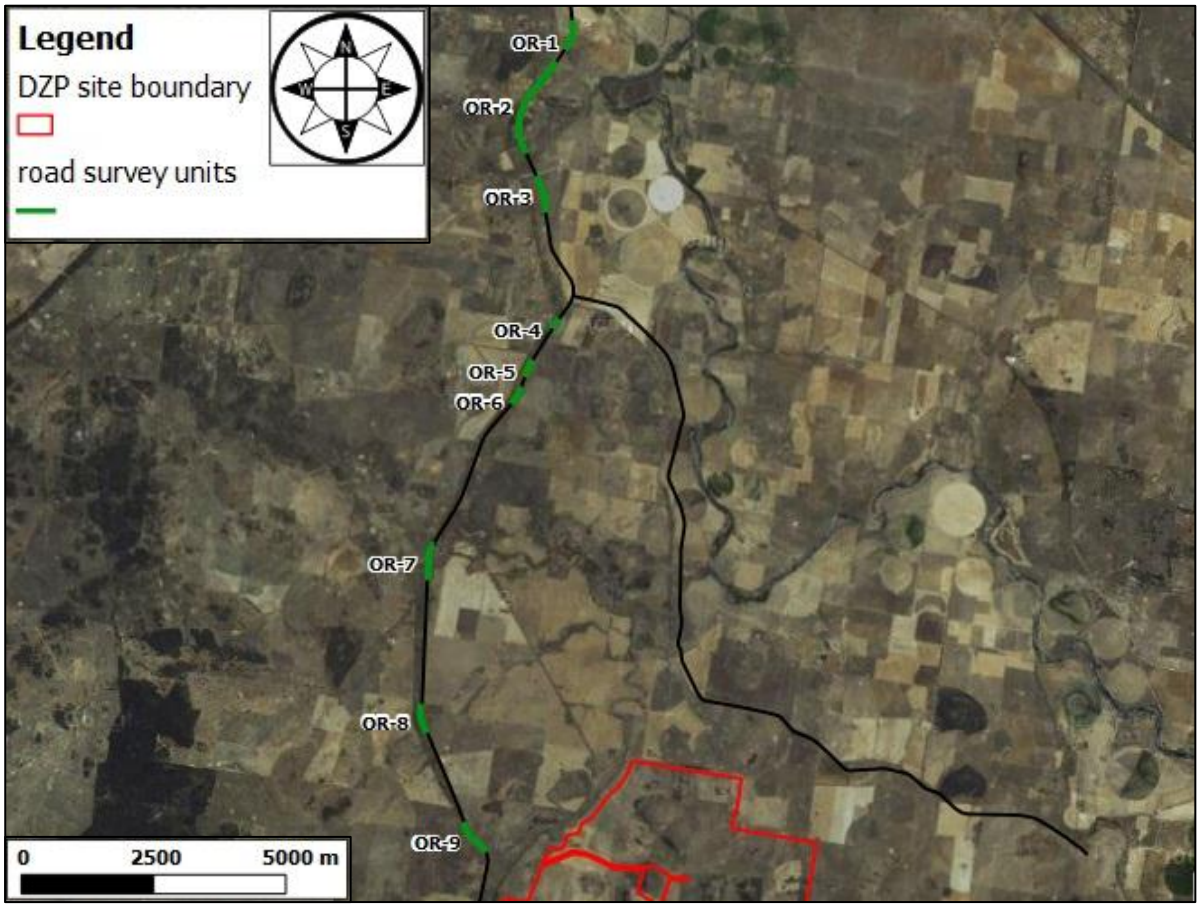
Figure 6: Survey Units of the DZP Site and Macquarie River Water Pipeline[5]



Note: Image presents the DZP Site assessed area.

[5] The inset indicates the configuration of survey units in the south of the DZP Site, prior to the survey of K-9 and K-10, which corresponded to previous impacts.

Figure 7: Public Road Network Field Survey



Note: Image presents the DZP Site assessed area.

2 THE STUDY

2.1 PURPOSE AND OBJECTIVES OF THE ARCHAEOLOGICAL INVESTIGATION

The purpose of the current study is to:

1. identify and assess Aboriginal resources within the Proposal's impact zones in order to mitigate effects to them by the Proposal; and
2. incrementally add to our understanding of archaeological and cultural resources of the area.

The objectives of the current study are to:

- **Objective One**: Identify archaeological resources in the impact zones of the Application Area and assess the significance of identified resources.
- **Objective Two**: Engage local Aboriginal stakeholders to gain their input on the investigation and their knowledge pertaining to the Aboriginal cultural values in the area.
- **Objective Three**: Recommend methods to mitigate or eliminate impacts to cultural resources through responsible management, or alternatively, determine the requirement for further study and salvage prior to construction.

2.2 ABORIGINAL COMMUNITY INVOLVEMENT

Consultation for the purpose of the DZP Aboriginal Heritage Assessment has and continues to be is being undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements* (ACHCRs), Department of Environment, Climate Change and Water (DECCW 2010).

An expression of interest (EOI) advertisement was placed in the Daily Liberal to appear in the publication on the 7th January, 2012. To establish a broad base of Aboriginal people or organisations who may hold cultural knowledge relevant to the Application Area, contact details were sought from the Office of Environment & Heritage (OEH), Dubbo City Council, Native Title Services Corporation Limited (NTSCORP), Central West Catchment Management Authority (CMA), National Native Title Tribunal (NNTT), Dubbo LALC and the Register of Aboriginal Owners. In addition letters were sent to known Aboriginal Stakeholders associated with previous projects in the vicinity of the Study Area, so that these individuals / organisations could to be advised of the proposed Proposal and invited to register interest. A log of all Stage 1 consultation is presented in **Appendix 1**.

A second round of letters was sent to additional groups identified as a consequence of the agency contact. At the conclusion of the Stage 1 notification phase of this process, three Aboriginal groups or organisations registered an interest, Binjang Wellington Wiradjuri Heritage Survey, Wirrimbah Direct Descendants and Diane Stewart. It is noted that in early September 2012, Mr Charlie Trindall registered interest on behalf of Dubbo LALC.

The Registered Aboriginal Parties (RAP's) for the DZP are as follows.

- Binjang Wellington Wiradjuri Heritage Survey (BWWHS);
- Wirrimbah Direct Descendants (WDD);
- Diane Stewart; and
- Dubbo LALC

It is noteworthy that the Wellington Valley Wiradjuri Aboriginal Corporation (WVWAC) withdrew their initial registration of interest as they ascertained the Study Area was outside their traditional boundaries.

The Stage 2 / 3 letters, presenting information about the proposed Proposal and describing the proposed heritage assessment methodology, were sent to the RAPs with a request for input on the methodology proposed. Included with this correspondence was an invitation to attend an inception meeting to introduce the Proposal and discuss the proposed methodology. Subsequently this meeting was held Tuesday 24th April, 2012 and attended by Diane Stewart and Dot Stewart (BWWHS). Steve Ryan (WDD) was unable to be present at the meeting due to a last minute commitment. A log of consultation and a copy of the minutes from the April 2012 meeting are provided in **Appendix 1**.

Feedback from the consultation meeting and Stage 2 / 3 letters were incorporated into the methodology prior to fieldwork being initiated. Several positions were made available for Aboriginal community to allow all stakeholders to be represented during the assessment period. It is noteworthy that the non-provision of relevant insurances excluded Diane Stewart from participating in the physical component of the heritage assessment. Irrespective of which representatives participated in the field survey, all RAPs have been kept informed of the results, invited to attend meetings and to comment on draft documents prepared for the Proposal.

The initial fieldwork was undertaken over two days, Monday 21st May and Tuesday 22nd May, 2012. Representatives Ashley Hill (WDD), Jamie Gray and Eric Fernando (BWWHS), took part in the survey with archaeologists Dr Jodie Benton and Jenni Streatfield (OzArk).

The same organisations were formally invited to participate in two subsequent rounds of field survey. Ashley Hill and Gary Riley (WDD), Brett Hill and Jamie Gray (BWWHS) participated in the assessment on 24th and 25th July, 2012 accompanied by Josh Noyer and Emily McCuistion (OzArk). The second deployment, 7th and 8th August, involved Emily McCuistion and Morgan Wilcox (OzArk), assisted by Brett Hill and Jamie Gray (BWWHS) and Robert Hill and Ashley Hill (WDD).

A meeting was held on 10th August 2012, to which all RAPs were invited, to discuss the management of sites and obtain any cultural knowledge that may be associated with the Project Site. This meeting was attended by Binjang representatives Dot Stewart and Jamie Gray, in addition to OzArk and Australian Zirconia Ltd (AZL) staff. Dot discussed the high cultural significance of The Springs site, and her association with this area. Although it was agreed that the avoidance of sites is the preferred option, should this not be feasible it is important that RAPs are involved in the management process.

As a consequence of late registration, an informal meeting was held between representatives from Australian Zirconia Ltd, OzArk and Dubbo LALC in September 2012. The aim of this meeting was to familiarise DLALC with the Proposal and provide up-to-date information about the assessment process thus far.

Additional fieldwork to assess all Proposal impact areas was undertaken by OzArk and RAP representatives on the following dates:

- 11th September – 13th September
    - Wirrimbah Direct Descendants / Mr Ashley Hill
    - Binjang Wellington Wiradjuri Heritage Survey / Mr Brett Hill
    - Dubbo LALC / Mr Michael Toomey

- 18th October – 19th October
  - Wirrimbah Direct Descendants / Mr Robert Hill
  - Binjang Wellington Wiradjuri Heritage Survey / Mr Brett Hill
  - Dubbo LALC / Mr Michael Toomey
- 17th – 19th December
  - Dubbo LALC / Mr Edward Ryan
  - Dubbo LALC / Mr Terry Toomey
  - Dubbo LALC / Mr Ray Smith
  - Binjang Wellington Wiradjuri Heritage Survey / Mr Jamie Gray
  - Binjang Wellington Wiradjuri Heritage Survey / Mr Fonua Havili
  - Binjang Wellington Wiradjuri Heritage Survey / Mr Tim Stewart
  - Wirrimbah Direct Descendants / Mr Ashley Hill
  - Wirrimbah Direct Descendants / Mr Robert Hill
- 5th February, 2013
  - Binjang Wellington Wiradjuri Heritage Survey / Mr Brett Hill
  - Wirrimbah Direct Descendants / Mr Malcolm Burns

Following the February 2013 fieldwork, WDD submitted a brief report which documented the result of this one day assessment. Over the course of the entire fieldwork program, discussions were held on-site each day regarding the findings of the field survey. The topics covered included cultural significance, management options and recommendations.

Discussion was held with Coral Peckham regarding her wish to hold a meeting on site with OzArk and Alkane to talk about the cultural heritage values and proposed management. The idea was favourably received by OzArk and AZL, but this meeting did not happen until the Aboriginal Focus Group Meeting (AFGM) on Tuesday 13th August 2013. It was considered by OzArk that a management meeting should wait for the results of the test excavation and the finalisation of the impact footprint, such that impacts were appropriately understood. By this time Coral was unable to attend the meeting, but other representatives of WDD were able to be present (see below).

An invitation to attend the AFGM to discuss the test excavation of two sites of sites (TS-OS3 with PAD and TS-OS5 with PAD) was sent to all RAPs on 13th May 2013 with the research design document being sent through separately on 20th May 2013.The AFGM was held on 29th May 2013 at the OzArk office in Dubbo with Jodie Benton and Sheridan Baker representing OzArk. Although all RAPs were invited, Darren Toomey was the only one able to attend. Minutes were distributed from the AFGM to all RAPs and no further feedback was received.

The test excavation was scheduled for 25th and 26th June 2013. An invitation to supply a site officer was sent to all RAPs on 12th June 2013. Terry Toomey (DLALC) and Mal Burns (Wirrimbah) attended both days.

Phone calls were made and correspondence was sent out to all RAPs for a further AFGM to be held on 13th August 2013. This was to discuss the cultural values and management of sites that will be affected by the Project. The AFGM was held on 13 August 2013 and was attended by:

- OzArk Jodie Benton, Nick Harrop, Sheridan Baker
- DLALC Darren Toomey, Willie Carr
- WDD Ray Smith, Geoff Ryan
- Alkane Michael Sutherland

Apology was received from Dianne Stewart. Jamie Gray and Dot Stewart (Binjang) were also unable to attend. A tour of selected sites within the proposed impact area was conducted to help participants contextualise the sites, how they will be affected by the Project and to inform site management discussions. This included a visit to a site within the Biodiversity Offset Area which will be protected. Cultural Values (**Section 5.8.2.3**) and management of sites (**Section 6**) were discussed with clear outcomes. The prospect for local employment resulting from the proposed works, specifically the employment of Aboriginal people, was also discussed with Mike Sutherland of AZL.

Discussion and comments as noted in the minutes were incorporated into a draft document which was distributed both by mail and email to the RAPs on 19th August 2013. Follow up for any further feedback or comments was conducted, along with the issue of the draft report and minutes.

Feedback was received from all RAPs between 20th August and 22nd August 2013. Geoff Ryan of WDD and Darren Toomey of Dubbo LALC both approved of the report and the minutes of the recent AFGM. Feedback was also received from Dorothy Stewart of Binjang WWHS and Diane Stewart. The latter two RAPs expressed their wish to be included in the formation of the Care Agreement and to be involved in determining the ultimate fate of the objects salvaged from the sites to be impacted. They also proposed a management option of relocating the salvaged items to Wiradjuri Park and marking them on site with a plaque and aerial photograph. OzArk responded by suggesting that these options would be further discussed with the other RAPs during the development of the *Aboriginal Cultural Heritage Management Plan* (ACHMP) that would be required should approval for the DZP be granted. Other issues included concern that they had not been able to access photos of the sites, and OzArk undertook to distribute these photos to them (note, copies were available at the AFGM). Further concern was raised regarding possible impacts to creeks/springs near the project, and as a result OzArk undertook to obtain information from the Environmental Impact Statement regarding groundwater-surface water interactions and impacts to be forwarded to both RAPs.

A log and copies of correspondence with Aboriginal community stakeholders is presented in **Appendix 1**.

2.3 OZARK EHM INVOLVEMENT

2.3.1 Field assessment

The fieldwork component of the current study was undertaken over several fieldwork sessions by the following:

- Fieldwork director: Dr Jodie Benton (BA[Hons] & PhD- University of Sydney);
- Fieldwork director: Jenni Streatfield (BA[Hons]- Australia's National University);
- Fieldwork director: Emily McCuistion (BA- University of Texas at Austin);
- Fieldwork director Nick Harrop (BA[Hons]- University of Sydney);

- Archaeologist: Joshua Noyer (BA- University of California, Santa Cruz);
- Archaeologist: Morgan Wilcox (BArch [Hons] - La Trobe University, Melbourne); and
- Operations Manager: Jenn McGhee.

As documented in **Section 2.2**, fieldwork was undertaken over 15 days between May 2012 and February 2013 (**Table 3**).

Table 3: Survey and test excavation dates

Survey Date(s)	Archaeologist(s)	RAPs	Survey Area
22 May 2012	Benton and Streatfield	Ashley Hill, Eric Fernando, Jamie Gray	DZP Site: Wychitella
23 May 2012	Streatfield	Ashley Hill, Eric Fernando, Jamie Gray	DZP Site: "Karingle"
24 and 25 July 2012	McCuistion and Noyer	Ashley Hill, Brett Hill, Gary Riley, James Gray	DZP Site: "Grandale" and "Toongi Valley"
7 and 8 August 2012	McCuistion and Wilcox	Ashley Hill, Brett Hill, James Gray, Robert Hill	DZP Site: "Glen Idol", "Toongi Valley", and "Ugothery"
11 to 13 September 2012	McCuistion	Ashley Hill, Brett Hill, Michael Toomey	DZP Site: "Pacific Hill" MRWP:, "Mia Mia" / Waterline, and Wychitella
18 and 19 October 2012	McCuistion	Brett Hill, Michael Toomey, Robert Hill	ORA: Obley Road, Rail Bridges, and Wychitella
17 to19 December 2012	McCuistion and Harrop	Robert Hill, Ashley Hill, Jamie Gray, Edward Ryan, Terry Toomey, Fonua Havili, Tim Stewart, Ray Smith	DZP Site: "Grandale", "Karingle", "Pacific Hill", "Toongi Valley", and "Ugothery"
5 February 2013	Harrop	Brett Hill and Malcolm Burns	DZP Site: "Karingle" and "Grandale"
25 and 26 June 2013	Harrop, Wilcox, and McGhee	Malcolm Burns and Terry Toomey	Macquarie River Water Pipeline sites: TS-OS3 and TS-OS5 ("Mia Mia")

MRWP = Macquarie River Water Pipeline ORA = Obley Road Alignment

2.3.2 Reporting

The reporting component of the current study was undertaken by:

- Report authors: Emily McCuistion (BA – University of Texas at Austin); Nicholas Harrop (BA[Hons]- University of Sydney);
- Reviewer: Mr Kim Tuovinen (BA[Hons] – University of Sydney, Grad Dip Ed– Charles Sturt University, Grad Dip Arch – Flinders University); and
- Reviewer: Ben Churcher (BA[Hons] – University of Queensland, Dip Ed- University of Sydney).
- Reviewer: Jodie Benton (PhD – University of Sydney).

2.4 BACKGROUND RESEARCH

Background research consisted of the desktop database search, a review of reports for previous survey in the Study Area (**Section 4.3**) and resources relating to heritage in the greater Dubbo area (**Sections 4.2**).

A desktop search was conducted on the following databases to identify any potential issues. The results of this search are summarised here in **Table 4** and presented in detail in **Appendix 2**.

Table 4: Desktop-database search results

Name of database searched	Date of search	Type of search	Comment
Australian Heritage Database http://www.environment.gov.au/heritage/ahdb/	29 October 2012	Dubbo LGA	No Aboriginal sites are listed within the Application Area. Two sites are located within 5km of the Study Area: 'Indigenous Place'; 'The Springs Homestead and Outbuildings.'
NSW Heritage Office State Heritage Register and State Heritage Inventory http://www.heritage.nsw.gov.au/	29 October 2012	Dubbo LGA	No Aboriginal sites are listed within the Application Area. Three sites listed by Local Government are within 5km of Application Area: Cockleshell; Meadows (The) Homestead and Outbuildings; Springs (The) – Group Item.
National Native Title Claims Search http://www.nntt.gov.au/Applications-And-Determinations/Search-Applications/Pages/Search.aspx	29 October 2012	NSW	No Native Title Claims cover the Study Area.
Department of Sustainability, Environment, Water, Populations and Communities (SEWPaC) Protected Matters (EPBC Act) Database; http://www.environment.gov.au/erin/ert/epbc/index.html	30 October 2012	Map search	None of the Aboriginal places on the RNE occur near the Study Area.
Office of Environment & Heritage (OEH) Aboriginal Heritage Information Management System (AHIMS);	29 October 2012	UTMS covering Study Area with buffer	131 sites are within the search area.
Local Environment Plan	29 October 2012	Dubbo LEP of 2000	No Aboriginal sites are listed within the Application Area. Three sites are within 5km of the Application Area: "The Meadows"; "The Springs"; Carved tree (indigenous item).
S170 RMS Heritage and Conservation Register http://www.rta.nsw.gov.au/environment/heritage/heritageconservreg/index.html?elid=2	29 October 2012	Western Region	No Aboriginal places on the search are within the Study Area.

2.5 STUDY CONSTRAINTS

Ground surface visibility, terrain, weather conditions, and property access commonly have an impact on the effectiveness of a survey.

Constraints to this study include vegetation cover and the presence of naturally occurring rock (cobbles and gravels), which obscure the ground surface and may distract from artefacts (referred to as background noise in this document). As a result, some survey units, e.g. Survey Unit K-3, were not inspected closely as it was found to have 0% ground surface visibility due to high grasses. **Section 5.1** discusses the ground surface visibility in greater detail. Weather did not hinder survey significantly, though fieldwork was cut short due to rainy and cold conditions on 13 September 2012.

Access restrictions constrained this survey, as the survey crew was asked not to enter cropped paddocks. As a consequence, three Survey Units (PH-5 and MM-5[6] and W-10[7]) were not

[6] Under crop at the time of survey.
[7] Recently ploughed in preparation for cropping.

closely inspected. A small area at the northwest of TV-3 Survey Unit was also not closely inspected as it was cropped. None of these areas are likely to have intact archaeological deposits due to impacts from agriculture, i.e. clearing of native vegetation, ploughing and grazing.

A small area within the impact footprint of the Soil Stockpile Area was not surveyed. The area was designated as a soil stockpiling area following the completion of the last phase of survey and is between survey areas G-6 and TV-3. It was decided that survey was not necessary for several reasons. Firstly, the landform is marginal in terms of suitability for occupation. The landscape in this area is undulating and there are no stable water sources nearby. Also, disturbance was high here from agricultural impacts. Finally, no sites were located within 1km of the unsurveyed area.

The realignment of the northern section of the proposed Macquarie River Water Pipeline was also not surveyed (See **Figure 3** and **Appendix 6**, **Figure 55**). The realignment is mostly within close proximity of the survey area, but deviates by 150m to the east at one point. It is within the same landform as the survey area, which is an alluvial plain with little potential. Furthermore, there were no sites recorded elsewhere on the same landform and there are substantial agricultural land-use disturbances such as ploughing and vehicle tracks. For these reasons it was deemed unnecessary to survey the realignment.

While ground surface visibility, weather, and access affected the study, none of these constraints prevented an appropriate level of assessment from being carried out. These constraints are further detailed in **Section 4.5**.

3 LANDSCAPE CONTEXT

3.1 REGIONAL SETTING

An understanding of the environmental contexts of a Study Area is important in the development and implementation of survey strategies for the detection of archaeological sites. Environmental characteristics influence the nature of material culture that is distributed across a landscape by Aboriginal people in the past. These include the availability of water, the abundance and type of plant and animal food resources, the nature of stone and ochre resources, and the access and the availability of shade and shelter. In addition, natural geomorphic processes of erosion and/or deposition, as well as human-activated landscape processes, especially those associated with European occupation of Australia, influence the degree to which these material cultural remains are retained in the landscape as archaeological sites and the degree to which they are preserved, revealed and/or conserved.

The Study Area lies within three bioregions, which is comprised of many soil landscapes. The NSW South West Slopes Bioregion, Brigalow Belt South Bioregion, and Darling Riverine Plains Bioregion are represented in the Study Area. Four soil landscapes are represented within these bioregions: the Nangar Ranges, Dubbo Basalts, Goonoo Slopes, and Macquarie Alluvial Plains (as defined in *Mitchell landscapes;* **Figure 8**).

<u>Nangar Slopes and Ranges</u>

Steep structurally controlled ridges and peaks with low cliffs on Devonian and Silurian lithic sandstones, shales and occasional conglomerates. Small areas of granitic intrusions. Strong dendritic drainage pattern, General elevation 500m to 770m, local relief to 300m. Shallow stony soils on steep slopes with rubbly debris in gully lines, yellow texture contrast soils on lesser slopes. Grey box woodlands with red stringybark, red ironbark and tumbledown gum. Black cypress pine common on stony sites with white cypress pine in lower positions on better soils. Numerous acacia and shrubs.

<u>Dubbo Basalts</u>

Slightly elevated plains and low hills on flat lying Tertiary basalt and trachyte flows, roughly parallel to the present course of the Talbragar and Macquarie Rivers. General elevation 300m to 330m, local relief 10m. Shallow stony red-brown clay loam and clay, self-mulching and with moderate fertility. Open white box, yellow box and rough-barked apple with diverse grasses.

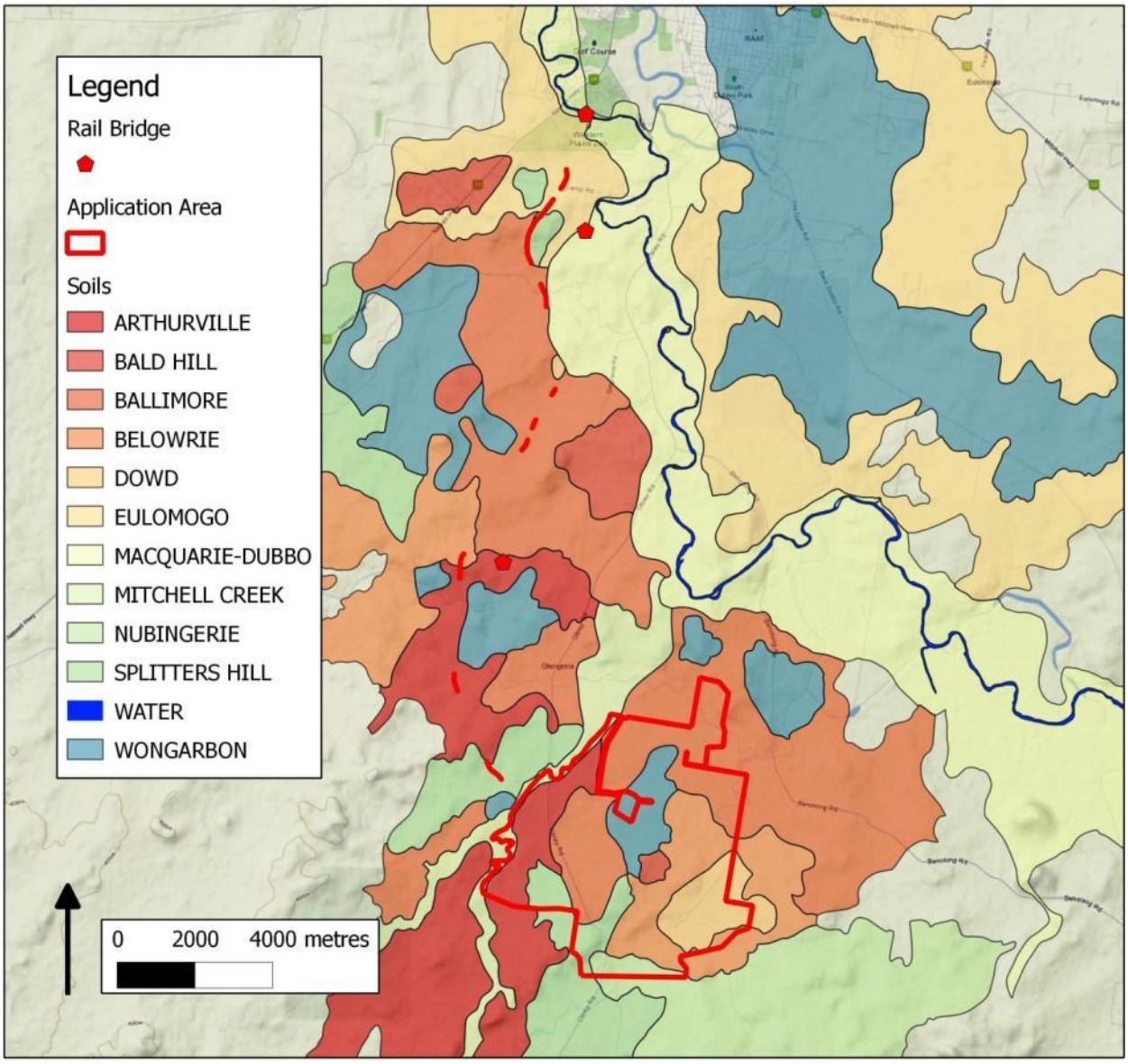
<u>Goonoo Slopes</u>

Extensive undulating to stepped low hills with long slopes on sub-horizontal Triassic/Jurassic quartz sandstone, conglomerates, siltstone, shale and some coal. General elevation 300m to 500m with overall westerly slope, poorly defined drainage network, local relief to 30m. Stony yellow earths with sandstone outcrop on ridgelines to yellow harsh texture-contrast soils in shallow valleys. Broad-leaved ironbark and black cypress pine on ridges, broad-leaved ironbark, narrow-leaved ironbark, mugga, fringe myrtle, spur-wing wattle, dainty phebalium, daphne heath on slopes with patches of green mallee, Dwyer's mallee gum and broombush. Grey box, mugga, red stringybark, fuzzy box and Blakely's red gum with knob sedge, and tall sedge along streams.

<u>Macquarie Alluvial Plains</u>

Holocene fluvial sediments of backplain facies of the Marra Creek Formation associated with the Macquarie River main alluvial fan and distributary stream system, relief 1 to 3m. Dark yellow-brown silty clay with patches of sand and carbonate nodules deposited from suspended sediments in floodwater, often with gilgai. Slightly elevated areas with red-brown texture-contrast soils. Open grasslands with scattered coolibah, black box, river cooba, bimble box, belah, lignum and myall.

Figure 8: Soil Landscapes of the Study Area



3.2 TOPOGRAPHY

The topography of the Study Area ranges in elevation from 260m Australian Height Datum (AHD) at the Macquarie River to 400m AHD over the proposed open cut on the ""Glen Idol"" property. The highest point in the Application Area is 440m AHD at Dowds Hill. The topography of the Study Area is characterised by flat alluvial terraces and gently rolling hills, with a relief of between approximately 5m and 50m.

3.3 GEOLOGY AND SOILS

3.3.1 Soils

Eleven soil landscapes representing six soil groups are present in the Study Area (**Figure 8**, **Table 5**).

Table 5: Soil Groups, Landscapes (and Geology)

Soil Landscape	Geological Origin	Soil Group8
Eulomogo		Red Earths: "Massive, reddish sandy profiles with a gradual increase in clay content with depth over a diffuse to gradual boundary."
Splitters Hill	Silurian shale	Red Podzolic Soils: "Soils with B horizons dominated by the accumulation of compounds of organic matter, aluminium and/or iron."
Belowrie	trachyte rocks	
Arthurville	Silurian felsic rocks	Red-Brown Earths: "The characteristic features of these soils are grey-brown to red-brown loamy A horizons, weakly structured to massive, an abrupt to clear boundary between A and B horizons, and brighter brown to red clay B horizons with well-developed medium prismatic to blocky structure."
Ballimore	Napperby Formation	
Macquarie-Dubbo		Alluvial Soils: "Soils developed from recently deposited alluvium, normally characterise little or no modification of the deposited material by soil forming processes, particularly with respect to soil horizon development."
Mitchell Creek		
Dowd	trachyte rocks	Shallow Soils
Bald Hill	basaltic rocks	Euchrozems: "Red, strongly structured clay soils with a somewhat lower clay content near the surface."
Nubingerie	Silurian felsic rocks	
Wongarbon	basaltic rocks	

3.3.2 Geology

The geological origin of the soil landscapes identified in **Figure 8** and **Table 5** is as follows.

- Felsic rocks in the oldest Silurian geology supported the Arthurville landscape, while less felsic geology of the same age supported the more clayey and productive Nubingerie landscape. Shale in the Silurian geology supported Splitters Hill landscape.
- Napperby Formation supported Ballimore landscape.
- Basaltic rocks supported well drained Bald Hill and clayey Wongarbon landscapes.
- Trachyte rocks supported shallow, unstable soil of the Belowrie landscape, and the rocky Dowd landscape.
- While there is large variation in soil properties of the DZP Site, a general pattern of light textured topsoil over clayey subsoil is displayed, mostly developed from sedimentary rocks (with some volcanic intrusions). Generally a sharp boundary between the topsoil and subsoil can be defined and as such the soils are considered as duplex soil.
- The duplex profiles can be separated into soil orders of Chromosols, Sodosols and Kurosols. Chromosols have relatively stable topsoil and nearly neutral soil pH. Red and Brown Chromosols develop on well drained sites, while Yellow and Grey Chromosols develop on sites with poorer drainage. Sodosols are generally unstable because of a high sodium content. The sodium generally comes either from parent material, or has been leached from higher parts of the landscape.

[8] Definitions verbatim from: agriculture.science-dictionary.org (science-dictionary.org 2008).

Kurosols develop where rapid drainage has leached many minerals from the soil, and have low pH.

- Igneous rocks (of volcanic intrusion origin) have weathered to form a separate range of profiles. Some profiles with relatively low topsoil clay content were classified as Ferrosols. Ferrosols are rich in iron, and generally have very stable physical properties. Profiles with structured, clayey subsoil but limited shrink-swell capacity were classified as Dermosols, while strongly shrinking and swelling soil were classified as Vertosols.

3.4 HYDROLOGY

3.4.1 Creeks and Catchments

The Application Area is situated within the Central West CMA across two subregions (Upper Slopes and Talbragar). Several creeks traverse the area (**Figure 9**), the most relevant of which are as follows.

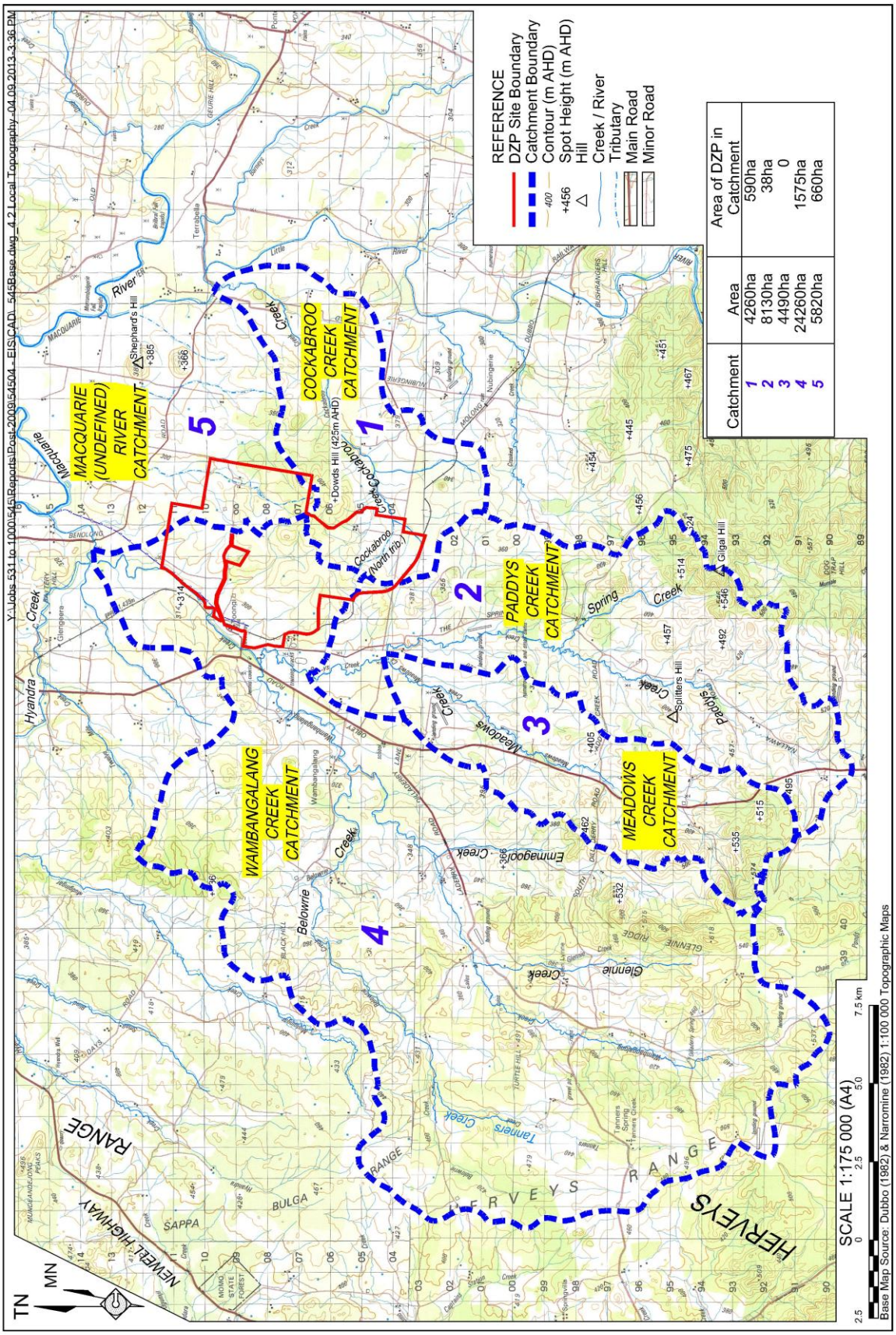
- Wambangalang Creek: is an ephemeral but relatively regularly flowing creek which forms the western boundary of the DZP Site to the north of Toongi Road. Wambangalang Creek flows into the Macquarie River approximately 4.5km north of the DZP Site. The Toongi Road crossing of Wambangalang Creek is proposed to be upgraded as part of the Proposal.
- Macquarie River: is a major river of the Murray Darling basin, emanating in the western slopes of the Great Dividing Range before flowing into the Darling River. The Applicant proposes to source up to 4.05GL of water annually from a point on the Macquarie River approximately 7.6km northwest of the processing plant.
- Cockabroo Creek: is an ephemeral creek which is located immediately south of the DZP Site and flows into the Little River to the east of the DZP Site.
- Little River: a perennial river which flows through Yeoval to the south of the DZP Site and joins the Macquarie River approximately 8km to the northeast of the DZP Site.
- Paddys Creek: is an ephemeral tributary of Wambangalang Creek which is located immediately west and south of the DZP Site.
- Hyandra Creek: is an ephemeral tributary of the Macquarie River which is traversed by Obley Road (see **Figure 1**).
- Twelve Mile Creek: is an ephemeral tributary of the Macquarie River which is traversed by Obley Road.

The DZP Site is located within three main local catchments (see **Figure 9**):

1. Wambangalang Creek catchment that flows into the Macquarie River;
2. Cockabroo Creek catchment that flows into the Little River immediately upstream of the confluence of the Little and Macquarie Rivers.
3. A catchment of poorly defined drainage channels flowing into the Macquarie River.

The following sections provide an overview of these three catchments, however, for further detail on the local hydrological setting, please refer to the Surface Water Assessment completed as Part 4 of the Specialist Consultant Studies Compendium (SEEC, 2013).

Figure 9: Hydrology of the DZP Site



3.4.2 Wambangalang Creek Catchment

The Wambangalang Creek catchment (including Paddys Creek and Meadows Creek catchments) drains north-northeast before joining the Macquarie River approximately 7km north of the DZP Site. The catchment drains an area of approximately 36,880ha and the DZP Site is located in the lower 10% of the catchment (near the confluence point with the Macquarie River).

Major Creeks draining into Wambangalang Creek (also identified on **Figure 9**) include the Belowrie, Glennie and Tanners Creeks from the upper western side of the catchment. The Emmagool and Meadows Creeks drain the upper central section of the catchment and Paddys and Spring Creeks drain the upper south-eastern area of the catchment. All flows are ephemeral but may have some degree of subsurface flow through unconsolidated alluvium.

3.4.3 Cockabroo Creek Catchment

The Cockabroo Creek catchment drains to east before joining the Little River approximately 4km east of the DZP Site. This small catchment of 4,240ha drains surface flows off a local high point, Dowds Hill, and other rockier, densely vegetated areas of the local setting.

3.4.4 Macquarie River (Undefined) Catchment

Water from a small section of the DZP Site, predominantly on the “Ugothery” property, flows via several ephemeral channels directly into the Macquarie River (approximately 7km to the north). While the catchment is bound by several isolated hills up to 385m AHD, the elevation is generally below 320m AHD.

3.5 VEGETATION

3.5.1 Introduction

The DZP Site can be generally described as supporting a mosaic of Box-Gum Woodland, Fuzzy Box Woodland, Inland Grey Box Woodland, derived native grasslands and cleared / cropped land. In areas of remnant vegetation or / and reasonable quality grassland. Grassy White Box Woodland is known to occur which is a component of the state and federally listed Box Gum Woodland.

River Red Gum along with scattered River Oak with Rough Barked Apple and Apple Box occurs along Wambangalang Creek with Yellow and Inland Grey Box found on outer edges of the floodplain.

Derived native grasslands, grazing country with scattered trees and tree clumps is the main vegetation community to be affected by the activity.

3.5.2 Vegetation Recorded

Seven *BioMetric* vegetation types and an additional five mapped communities occur within the DZP Site and on adjacent lands. Previous mapping of the DZP Site undertaken by Geoff Cunningham, Natural Resource Consultants (GCNRC) has been converted to ‘best fit’ *Biometric* communities and included in the mapping for the DZP Site. Communities include;

1. CW 138. Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201).
2. CW 202. Tumbledown Red Gum - Black Cypress Pine - Red Box low woodland of hills of the South Western Slopes.

3. CW 112 Blakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion (Benson 277).
4. CW 121 Bulloak - White Cypress Pine woodland mainly in the NSW South Western Slopes Bioregion (Benson 54).
5. CW 212. White Box - Tumbledown Gum woodland on fine-grained sediments on the NSW central western slopes (Benson 270).
6. CW 213. White Box - White Cypress Pine - Inland Grey Box woodland on the western slopes of NSW (Benson 267).
7. CW143. Heathy shrublands on rocky outcrops of the western slopes
8. Derived Grassland, Grazing Country with Scattered Tress and Tree Clumps.
9. White Cypress Pine Monocultures.
10. Farm Dams / Water bodies.
11. Cleared land.
12. Buildings and Infrastructure.

Spot checks of the decommissioned rail corridor of the Dubbo-Molong Rail Line between Dubbo and Toongi undertaken in 2012 revealed that isolated eucalypts and shrubs (consistent with surrounding vegetation communities) have regrown in some areas in the corridor since this time. A Biometric BVT community could not be correlated to the vegetation in the corridor as it has been heavily invaded by introduced plant species (leased to adjoining landholder's for grazing purposes). Species recorded are consistent with those recorded by GCNRC (2002b) and a further list was not compiled.

Vegetation within the water pipeline easement between the DZP Site and the Macquarie River is predominantly cropped and grazed paddocks. The vegetation communities are highly altered from the native vegetation communities that originally covered the route and no attempt was made by GCNRC (2002c) or OzArk to identify and map remnant vegetation communities. A Biometric community could not be correlated to the vegetation in the easement, however, tree clumps and scattered trees indicate that this area was once Fuzzy Box, Yellow Box, Inland Grey Box associated communities.

Vegetation within the Obley Road reserve generally contains White Box, Yellow Box, Fuzzy Box Woodland or Inland Grey Box Communities that form part of the state and/or national listed Endangered Ecological Communities (EECs). Nine portions of road were identified as requiring realignment.

3.5.3 Flora Species Recorded

244 plant species were recorded by GCNRC during the 2001 and 2002 surveys within the DZP Site[9], including 67 (27%) introduced species (GCNRC 2002a).

234 species of vascular flora were recorded during the 2012 survey, conducted as a series of BioBanking plots (in accordance with the BBAM) over the DZP Site, including 67 (28%) introduced species. The median number of plants recorded per BioBanking plot was 27, with the lowest number 9 (Plot 6) and highest 44 (Plot 26). The Medium percentage of weeds within the BioBanking plots was 61%. This is reflects the effect of a long history of grazing and ploughing in some areas within the DZP Site.

[9] It should be noted that the boundary of the GCNRC field survey differs from the DZP Site.

Flora survey was conducted along the decommissioned Toongi-Dubbo Rail Line in November, 2001 (GCNRC, 2002b) with additional survey for threatened species and regrowth completed in 2012. During the 2001 survey 260 plant species recorded within the corridor including 115 (44%) introduced species (GCNRC, 2002b). These introduced species account for the bulk of the ground cover and biomass present.

Flora survey was conducted along the Macquarie River Water Pipeline in May 2002[10] with additional survey of access points completed in 2012 (GCNRC, 2002b). The abundance of weeds reflects the clearing, grazing and cultivation that have occurred along the route over the past 150 (plus) years. 94 plant species recorded were recorded within the corridor including 49 (52%) introduced species.

Additional species were not recorded along the Toongi-Dubbo Rail Line or Macquarie River Water Pipeline routes during the 2012 surveys conducted by OzArk.

3.6 CLIMATE

The Dubbo area experiences a sub-humid climate characterised by hot summers and lacking a dry season. The average rainfall of 585.2mm predominately occurs in the summer months. The Bureau of Meteorology reports that the average maximum summer temperature is 33ºC and maximum winter temperature 15.2ºC (BOM 2012).

3.7 LAND USE HISTORY

Aboriginal people in prehistory are known to have used fire-stick farming, or controlled burns, to alter vegetation ecosystems to promote the growth of desirable plants. Though it cannot be said at this time whether fire-stick farming was undertaken within the Study Area, it is becoming increasingly believed that Aboriginal fire regimes were widespread (Gammage 2011) and therefore should be considered as a possible early land-use practice.

Since settlers came to the area in the mid-1800s the landscape has been altered significantly. Homesteads, including habitation and farm structures, have been built, as have community buildings such as a school and a church. Perhaps the land-use with the greatest impacts, however, comes from grazing and cropping the land. Native vegetation has been cleared from the land, with some ring-barked trees still present in the landscape. Fences have been built and rocks removed from the soil and piled up to ease ploughing. Waterways have been modified and earth dams built. Crops have been planted, and livestock such as sheep and cows have been run on the land for generations.

Roads and rail lines have been installed to aid transportation of people and goods to the area. What is now known as Obley Rd was formerly a Travelling Stock Reserve (TSR) (notified 26 May 1894). It remained a TSR until before 1909 when the TSR was supplemented by a road. (Parish Maps 1884, 1899, 1909). Though the earliest map found which is labelled with 'Obley Rd' dates to the 1960s, 'Obley Rd' is mentioned by name in a 1905 advertisement seeking workers to install fence at The Meadows (The Dubbo Liberal 1905). In 1925 the Molong-Dubbo Railway was completed, which consisted of the railway line itself, several rail bridges, and associated small-scale infrastructure. The portion of the Molong-Dubbo Railway which extends into the Study Area ceased operation in 1987. In modern times roads and residences continue to be built. Cropping and grazing continues across most of the Study Area.

[10] There has been some modification to the alignment of the Macquarie River Water Pipeline since November, 2001, however, the vegetation communities traversed remain equivalent.

3.8 EXISTING LEVELS OF DISTURBANCE

Review of the past and present land use patterns within the Study Area demonstrates that substantial parts of the landscape, especially along flats and low slopes (particularly associated with creek lines) have undergone significant physical modification as a result agricultural activities, particularly cropping, grazing and alteration of pre-European fire regimes. These activities have disturbed or destroyed ecological niches that may have been located in the resource rich creek areas in prehistory. Other processes have also been responsible for the modification/destruction of the environment, including increased erosion and soil movement as a result of white and black cypress pine monocultures and tree removal as well as the altered hydrological impacts of flooding, both of which may have contributed to the disturbance and/or redistribution of topsoils.

Much of the ground layer within the Study Area is invaded by weeds with some evidence of feral animals in more disturbed areas. Despite this, the abundance of native tussock grasses (in most areas) and scattered trees associated with Box-Gum Woodland EEC (White Box, Kurrajong, Yellow Box) mean that these areas are often consistent with the Threatened Species Conservation Act 1995 (TSC Act) listed White Box Yellow Box Blakely's Red Gum Woodland.

3.9 CONCLUSION

The environmental characteristics of the Study Area provide context for the archaeological findings, influencing the density and types of sites present as well as the conditions that sites are found in.

The Study Area is characterized by overall low local topographical relief comprising river flats (floodplains), gently undulating landscapes, and low hills. Soils vary throughout the area from alluvial river deposits to shallow soils on higher hills. Three hydrological catchments are present on the DZP Site alone. Vegetation consists of various gum and box tree species, shrubs, and grasses.

The proximity of water to the Study Area, the lack of an annual dry season, and the diversity of landscapes (and thus resources) together create conditions that would have attracted and sustained Aboriginal populations. These resources made the land attractive to European settlers as well, whose agricultural practices, roads, and railways have significantly altered the landscape.

The relationship between the landscapes and identified archaeological sites is discussed further in **Section 4.4**.

4 ABORIGINAL HERITAGE ASSESSMENT: BACKGROUND

4.1 ETHNO-HISTORIC SOURCES OF REGIONAL ABORIGINAL CULTURE

According to Tindale's map of tribal boundaries (1974), the Dubbo area falls within the northern limits of Wiradjuri country, as defined by the limits of the Wiradjuri language group. Bordering to the west is Wongarbon country, and to the north Kawanbarai country. According to Horton (1980), the boundary of the Wiradjuri extends somewhat further to the north and west to encompass Gilgandra, Nyngan and most of the Bogan River. Lloyd Nolan (2000) acknowledges the controversy surrounding delineating traditional boundaries, but states that the current Study Area 'is within the Dundullimal territory, a sub group of the Tubba Gah-Wiradjuri nation'.

It is important to note that the designation of lines on a map as 'tribal boundaries' has been a controversial issue (Bowdler 1983: 22). There is no doubt that there were distinctive groups that can be defined by their linguistic traits, but the designation of lines on a map as boundaries, although useful, must also be accepted as problematic. In contrast to Tindale's map, the map (from NSW NPWS) reproduced in Bowdler (1983: 17) shows a more general relationship of the language groups known to exist in NSW.

Early accounts of first contact between Europeans and Aboriginals in the Macquarie River area can be found in Oxley (1820) and Sturt (1828 and 1833). Although interesting, these sources provide only a small window into the lifestyle and customs of the Aboriginal people of the Dubbo area. Northwest of the current study area, near Whylandra Creek / Tanners Springs, one of the first encounters John Oxley had with the Indigenous inhabitants of the area was on August 13th 1817. It appears that this was the first time these Aborigines had seen white men, however they may have had knowledge of steel tomahawks as when they were presented with one as a gift they clutched it to their breast and demonstrated pleasure. At the time of the meeting the Aborigines were obviously hunting, having with them dead possums and snakes, which they offered to the white men. Markings on the skin of the young Aboriginal men were described as longitudinal scars over the back and body with barely any space between them (Oxley 1820: 171-2). Oxley noted that near Arthurville the animation of the whole scenery was increased by the smoke of the natives fires arising in every quarter, marking that they were in a country which afforded ample means of subsistence, which was far different from the low deserts and morasses to the south.

The following day a group of nine male aborigines came to Oxley's camp. One of the men possessed a stone-hatchet and Oxley presumed the women and children were in hiding nearby. He suspected that they were not the first white men they had seen or, alternatively, had heard about, as they were neither alarmed nor astonished at what they saw. Not all of the men had a missing upper front tooth, but all had a stick or bone protruding from the cartilage in the nose. Mr Evans drew a picture of a fish and the men pointed to the east. Oxley concluded that they appeared a harmless people, extremely cautious of giving offence, and never touching anything until they had first by sign obtained permission.

It is thought that prior to contact with Oxley and Sturt Aboriginal people were exposed to the European disease smallpox, causing an estimated 90% reduction in population due to death from the disease, and described by Sturt in 1829 (Lambert 2012).

With the increase in European settlement of New South Wales in the mid-1800s tensions between indigenous people and settlers intensified, resulting in conflict and massacre, though there is no record of such a conflict occurring in the vicinity of the Study Area. Post-contact Aboriginal people often worked 'as stockmen, at shearing and mustering, and in domestic services' (Heritage Office 1996: 80), likely maintaining some of their traditional lifeways. In 1898 an Aboriginal Reserve was officially created at the confluence of the Macquarie and Talbragar Rivers. Some families lived there, others moved to Dubbo (Koettig 1985: 19), and others lived in the rural communities.

Indeed, The Springs property (Heritage listed with local significance), just south of the Study Area, is a location of early contact between Aboriginal and European people in the Dubbo region. According to Koettig (1985), John Oxley made the first sighting of Aboriginal people in the district in 1817 at Whylandra Creek and on the 15th of August he camped on Paddys Creek near The Springs, where archaeological evidence of Aboriginal occupation remains. Records are scarce, but it is likely that Aboriginal people remained active in the vicinity of Toongi into the historical period. Many were employed by the Baird's (landowners at The Springs) as station-hands and/or helpers. At least three local Aboriginal men are named in the *Dubbo Liberal and Macquarie Advocate* as working on the neighbouring 'Meadows' property, viz. William Carr, William (King) Carr and Michael Mickey (DLMA 31 October 1916: 4). Michael Mickey, a prominent Dubbo boxer of the early twentieth century, is also mentioned in relation to 'The Springs' in the NSW Department of Mines (Dubbo Division) Annual Report of 1915 (Berry 2006: 4).

One of the most informative written sources available about the life of Aboriginal people in the Dubbo area after European settlement is that of Edward Garnsey, who was born in Dubbo in 1874. His interest in Aboriginal culture of the Dubbo area led him to record information he had gathered both from his father and from old Aborigines he knew in the Dubbo region.

The most relevant historical resource is the oral history passed down through the local Indigenous inhabitants, from parent to child. When such information becomes readily available it will likely replace Garnsey as the most valuable written resource on Aboriginal cultural practices at the time of European settlement. Until then Garnsey remains as a useful account covering many topics relating to both everyday life and religious/ceremonial practices, but must be taken as an eclectic, interpretative account rather than a true anthropological review. What follows is a brief summary of some of the information he presents.

<u>The Dubba-Ga</u> (Dubbo mob)

The Dubba-ga (Thubba-ga) group were part of the broader Wirruh-Jah-Mine tribe (Wiradjuri – Possum men territory). Such groups were thought to have comprised about 30 to 40 people, although various sized groups have been reported (Koettig 1985: 21-22).

The territory said to have been traversed by this group generally lies to the east of the Macquarie River, south of the Talbragar River and north of Eulomogo creek. The Indigenous community as represented by the Wirrimbah Direct Descendants (WDD) do not agree with Garnsey's division into tribes of the Aboriginal group that occupied the Dubbo area. According to Will Burns (previous Chairperson WDD), the Thubba-ga mob inhabited both sides of the Macquarie River.

According again to Garnsey, the Dubba-ga mob was named after a pigment called Dub-bo, which refers to the red or blood pigment found within their territory. This was a valuable and prized commodity, bartered widely and found at a place called Dub-am-bil (place of pigment) located about three kilometres up the Macquarie River, on its right bank.

Resources

The area of the Dubba-Ga is described as being rich in both flora and fauna resources with the following exploited for food (Garnsey 1942 and Pearson 1981 as quoted in Koettig 1985):

- Animal resources: possums, native bears (koala), wallabies, wombats (highly prized), bandicoots, kangaroos, rats, platypus, lizards and snakes. Bird species included emu, plain turkeys, water fowl, and many other bird species (Talbragar meaning plenty birds to eat). From the rivers and lagoons came fish (cod, perch and cat fish) as well as yabbies, shrimp and turtles. Grubs from the Casuarinas and Kurrajongs were also exploited; and

- Plant resources: Kurrajong seeds, growing tips and berries, honey, roots, acacia gum, bulrush, pulp, nuts (quandong) and yams.

Camp life

According to Garnsey (1942: 6) camp life was communal, with individuals working together for the benefit of the mob. The mob was presided over by a chief or 'Eulomogo' (which means 'big man belonga stone spirit'), who was the dispenser of ancestral tribal rites and ceremonies and through whom the ancestral traditions were handed down. The 'Billum' or king was next in terms of power, and generally acted in a civil capacity.

Each mob had its own camp site or 'whurlie' which consisted of a series of bark or bush 'gunyahs' (huts). These were placed in a semi-circle opening to the east, and in the centre was the spirit fire 'Wengel-go'. The gunyahs were said to house between eight and ten people, although other references note smaller shelters, and the relationship between these different shelter types is difficult to ascertain (Koettig 1985: 22). Men were said to occupy gunyahs to the north of the circle, women in the central ones and children in the southern gunyahs.

According to Pearson (as referenced in Koettig 1985: 23), camps were moved frequently, sometimes only a short distance, or up to several kilometres away. Reasons for such relocations are numerous, including changing social relations, weather factors, hygiene or just the desire for change. More large scale movement was usually determined by the need for a large scale gathering (ceremonial or warfare) or changing resource availability. An excerpt from a letter written in 1899 also indicates that the death of a king may precipitate a movement of camp and thereby prevent the group from camping in that location for the subsequent twelve months (Koettig 1985: 23).

All ages and sexes contributed to the procurement of food, with the men generally hunting large game and women and children hunting smaller game, such as goanna, and foraging for grubs, seeds and yams.

Ceremonial Life

By as early as the 1890s, Garnsey notes that the 'mob' structure had disintegrated to the degree that only the older men still had the tribal markings and memories of some of the ceremonies. As a result, his descriptions of some of the ceremonies are a composite of various accounts, the authenticity of which is unknown (Garnsey 1942: 14).

The rituals and ceremonies tended to relate to the changes in social status that occurred with the progression from infancy to adulthood. Prior to initiation at puberty several smaller rites of passage must have already been undertaken. These were known as the 'Co-Pi Rah' (whitemake) ceremonies, which involved air, water and fire. During these ceremonies children were instructed of the rules by which they must live. At puberty both male and female children underwent a series of ceremonies which issued them into adulthood. The male ceremonies are known as the 'Bo-rah' (red/bloodmake) and the 'Co-bo-rah' (bloodmake). Detailed descriptions of these ceremonies can be found in Garnsey (1942: 16-23).

Several references to a great corroboree held at Dundullimal in 1839 are cited in Koettig (1985: 24). These describe a ceremony attended by between 600 and 800 individuals, which involved dancing and yelling and the presentation of a 2m by 1m piece of bark which had been painted with red and white pigment.

Burial Practices

According to Garnsey (1942: 23ff), human burial was undertaken after sundown but before dark. The body was placed in a squatting position, with the elbows placed on the knees and the head between the hands. In this position, the body was placed at the foot of a Coolabah tree (Box) facing east. In the burial of an important individual, a strip of bark about five foot long and two foot wide was stripped from the eastern side of the tree and placed in a slanting position over the corpse, with some saying that the man's tribal markings were painted onto the bark in red pigment. The blaze on the tree was also carved in tribal markings to show the man's status. These carved trees were apparently only associated with the graves of the spiritual leaders (the Eulomogo) and kings or Eulas. For the period of mourning, the body

remained out of the ground, and there are several stories as to the manner in which the decomposing juices of his body were used (Garnsey 1942: 24). A carved tree of the eulomogo is said to have been surrounded by other carved trees known as Cobba-da 'blood brother trees' in a particular pattern, and one such group of seven trees was remembered by Garnsey as standing 'just outside the town' [of Dubbo], with several more being located within the township.

Another account of an Aboriginal burial from Dubbo, dating to 1845, sees the body placed in the same position as described above, but with the body wrapped in a skin cloak that was tied together by the belts of people attending the ceremony. The body was then placed in a sandy deposit about a mile from the river, a mound of sand built up over the grave and several trees subsequently carved. Possum skin cloaks were also noted in burials recorded at Wellington and Bathurst (Pearson 1981: 535 as quoted in Koettig 1985: 25).

Material Culture

The majority of material remains relating to past Aboriginal culture no longer exist, as most of them were made from organic materials that have not survived the ravages of time. Some objects were collected by early settlers and have since passed into museum collections, while descriptions of others can be found in early historic accounts. Archaeological evidence is limited to objects of stone and occasionally bone or wood. Koettig (1985: Table 2) provides a fairly comprehensive list of objects reported to have been used by the Aborigines of the Dubbo region, and can be briefly summarised as follows:

- Throwing stick or spear – some long (2.4m to 3.6m) for war or hunting; others short (20cm to 36cm) for hunting only.
- Spear thrower – c. 76cm to 91cm long, 8cm wide, triangular in cross-section and notched at one end to hold a spear.
- Clubs – around 76cm long and of varying shapes, made for hand to hand combat.
- Boomerang – 90cm long and axe shaped at one end, made for ceremonial, throwing or utilitarian uses.
- Digging stick – a pointed stick about 1.2m to 1.5m long used by women for digging up yams.
- Skin cloaks – from kangaroo, possum, koala, rat etc., sewn together with kangaroo tail sinews, scraped soft, applied with emu fat and ash to the flesh and then kneaded. These were of varying sizes and were used for warmth and the lining of shelters.
- Wooden spades – used for digging.
- Belts – used for tying up skins and for burials.
- Nose bones or reeds – for ornamentation, noted at Toongi.
- Axes – stone, steel (after European settlement), for hunting and other purposes (bark removal).
- Stone knife – a chip of quartz inserted into a cleft of a stick and bound with sinew from a kangaroo tail was said to have been used for wood-working.

Other items not recorded in the historical accounts but likely to have been used include shields, wooden dishes, bags and baskets made of grass, bark or skin, nets, bull-roarers for ceremonies and items of personal adornment including headbands, necklaces and cloaks. The only record of artistic expression comes from the decoration of utilitarian or ceremonial objects. Designs were incised onto skin cloaks and bark paintings were recorded lining shelters and in ceremonial contexts. The designs carved into the trees as burial markers provide the most obvious remaining artistic expression (Koettig 1985: 43).

4.2 REGIONAL ARCHAEOLOGICAL CONTEXT

Prior to 1985 no systematic, regional based archaeological studies had been undertaken in the Dubbo area. There were, nonetheless, many sites recorded, generally by interested locals or amateurs. In the late nineteenth and early twentieth century, individuals such as Milne, Gresser and to a lesser extent Garnsey, recorded site data and made collections of artefacts, thereby contributing to the body of archaeological data now available to the researcher. In the last 30 years many archaeological studies have been undertaken in the Dubbo area, usually as part of an environmental impact assessment. A handful of the hundreds of sites recorded in and around Dubbo have been listed on local heritage databases.

Site types present in the region, listed from most frequent to least frequent, are: artefact scatters, scarred trees, grinding grooves, burials, stone quarries, ochre quarries, ceremonial rings, stone arrangements, shell middens, hearths, ceremonial/dreaming site, and a waterhole (OzArk 2006).

Relevant to a scientific understanding of the archaeology of the Dubbo region are five studies undertaken over the past thirty years. These are Pearson (1981), Koettig (1985), Balme (1986), the NPWS WRA Brigalow Belt South Bioregion Assessment (NPWS 2000), and a study commissioned by the Dubbo City Council (OzArk 2006). Many smaller assessments have been undertaken in recent years in the Dubbo area, including some that fall near the Obley Road Alignment, such as those by Kelton (1997) and Nolan (2000). Together these provide baseline data for placing past Aboriginal sites within a regional landscape context. Following is a summary of the salient points learned from these studies:

Pearson: Pearson (1981) worked primarily in the Upper Macquarie region, the western boundary of his study area being Wellington. The proximity of this area to the current study area and the general topographic similarities make the findings of this work relevant. According to Pearson archaeological sites could be divided into two main categories, occupation sites and non-occupation sites (which included grinding grooves, scarred or carved trees, ceremonial and burial sites etc.). An analysis of the location of these sites led him to build a model for site prediction which saw occupation sites occurring in places that had access to water, good drainage, level ground, adequate fuel and appropriate localised weather patterns for summer or winter occupation. Such places were most frequently found on low ridge tops, creek banks, gently undulating hills and river flats and usually in open woodland vegetation (Pearson 1981: 101 as quoted in Koettig 1985: 47). He notes that this pattern may differ somewhat as you head west (towards Dubbo and beyond) into the drier plains where there was a greater dependence on the larger, more permanent water supplies.

The location of non-occupation sites were dependent on various factors relating to site function. For example, grinding grooves only occur where there is appropriate outcropping sandstone, but as close to the occupation site as possible. Scarred trees were variably located with no obvious patterning, other than proximity to watercourses, where camps were more frequently located, hence these provided a focus of human activity.

Although a useful study, Koettig (1985: 49-50) considers Pearson's findings as preliminary, mainly due to the unsystematic nature of the recording of most sites used in the analysis. In her view, this would have skewed both site type (obvious manifestations) and location (areas of disturbance), therefore biasing the sample. Further the sample size of both the Wellington and other areas were considered too small to yield significant results.

Koettig: More relevant to the current study's scope is Koettig (1985), who undertook a comprehensive study of evidence relating to Aboriginal occupation within the Dubbo City area, including an area approximately 4km south of the current Study Area. Koettig determined there was need for systematic survey to ensure that all topographic landform units and different stream order associations were explored in terms of site type and location. This field work included detailed recording of various site types, ensuring the presence of comparative, quantifiable data. The field survey was undertaken by dividing the broader Dubbo study area

into five sample Survey areas covering the three major physiographic zones, but was constrained by time and an inability to access privately owned land.

As a result of this study, Koettig (1985: 81-82) concluded that:

- Aboriginal sites may be expected throughout all the landscape units surveyed.
- The most frequently occurring site types were open artefact scatters, scarred trees and grinding grooves. Less common but present were hearths, shell lenses, and carved trees.
- The location of sites and their relative size were determined by various factors, predominantly environmental and social. Although social factors cannot be explained through archaeological research, some of the environmental issues may be. These are:
    - Proximity to water: the largest campsites were located close to permanent water, nonetheless, sites were found all over the landscape including hills and ridges away from obvious water.
    - Geological formation: Certain sites require specific conditions, e.g. grinding grooves occur where appropriate sandstone outcrops, quarries are found where suitable stone resources are accessible, burials tend to be found in sandy sediments such as alluvial flats etc.
    - Availability of food resources: The widest range of potential foods was found along the main water courses due to the supply of permanent water. Some foods would have been seasonal and required foraging away from water courses.

In predicting intensity of occupation, Koettig suggests that larger and more constantly occupied sites are likely to occur along permanent watercourses, while less intense and sporadic occupation evidence is seen along ridge tops or temporary water sources e.g. creek headwaters.

Upon conducting survey in the vicinity of The Springs, a homestead just south of the current Study Area, Koettig recorded 17 sites, including artefact scatters, carved and scarred trees, and a hearth. Sites were generally found to be extensive in this area, with high densities of artefacts in localised areas, though artefacts were being displaced via erosion (1985: 128). The landforms of this area were described by Koettig as ‘gentle slopes and small hills, narrow river flats and in places bedrock was outcropping along the ridges’ (Koettig 1985: 111). Impacts noted consist of ploughing and sheet wash erosion.

Balme: The North-Central Rivers study undertaken by Balme (1986), contributed to our knowledge of the archaeology of the region by looking at site location with reference to preservation, both in the face of natural and incursive processes. Findings concluded that apart from the effect of historic impacts on sites, the greatest influence on the distribution of sites is that of geomorphic processes affecting site preservation and subsequent processes leading to site exposure (Balme 1986: 182 as quoted in Jo McDonald CHM: 1998: 17). Balme also found there was little scope for the assessment of the chronology of prehistoric sites as so few datable contexts have been located. Finally, and relevant to the current study, was Balme’s finding that a number of sites recorded on the Aboriginal Site Register from ethnographic accounts (e.g. Etheridge 1918) are no longer likely to be found.

NPWS WRA Brigalow Belt South Bioregion Aboriginal Cultural Heritage Assessment: The Brigalow Belt South Bioregion Aboriginal Cultural Heritage Assessment (Stage 1) focussed on assessment of the Pilliga and Goonoo State Forests, in an attempt to determine areas of Aboriginal sensitivity. Results of this assessment for the Goonoo State Forest, which is located within the Dubbo LGA, showed that of the twelve landforms present across the LGA only seven are present within the Goonoo forest. 106 Aboriginal sites were recorded and were found to be more frequent within alluvium landforms, which include creeks, swamps and

chains of ponds surrounded by floodplains and terraces (NPWS 2000: 1). The results were interpreted as providing a representative picture of Aboriginal site distribution for the area, indicating that sites did occur within all mapped landforms, but in varied frequencies. The results of this study allowed the tabulation of data relating to site location with reference to distance from water, showing that 90% of sites were recorded within 200m and 300m of water (Purcell 2000: 31).

OzArk: In 2006 OzArk reported on Indigenous heritage resources in the Dubbo LGA with the aims of consolidating previous surveys and assessments of Indigenous heritage across the LGA so as to set a baseline for further study and undertake field survey primarily of areas zoned 1I (future expansion) to assist the Dubbo City Council (DCC) in planning. A total of c.1,120ha of land was surveyed. Twenty-six new Aboriginal sites were recorded and eight of twelve previously recorded sites were located as a result of the 2006 field investigation, giving a total of 34 Aboriginal sites documented during the assessment.

The study found that the ratio of newly located sites by type follows previous studies reasonably closely. More scarred trees may have been expected, but can be explained by the study area's land-use history. Intensive agriculture has probably resulted in a higher tree clearance in the study area than the average for the Dubbo LGA. The absence of grinding groove sites is explained by the fact that this site type comprises just 3.61% of previously located sites in the Dubbo LGA. Scarred tree distribution adhered to the predictive model in that they exclusively followed waterways and fence-lines, which is more a reflection of land clearing practises than any true Indigenous site patterning. Isolated finds and open sites followed a similar pattern and were largely limited to watercourse edges and elevated terraces within 500m of the Macquarie River or other permanent to semi-permanent waterway. No real pattern emerged in terms of site size or quality, as surface manifestations of sites are not always a true reflection of their size or complexity.

The study met some but not all of it aims. Namely, the sampled survey areas did not cover enough different landforms to make firm correlations between site types and landform sensitivity. The main findings about site type distribution are as follows:

- Lower / intermediate terraces, floodplains, and hill crests were not represented well enough in terms of Estimated Survey Coverage (ESC) to make a good assessment of archaeological potential.
- Despite poor ESC, elevated terraces provided relatively high site numbers. This landform only occurred in areas that included a segment of the Macquarie River.
- Creek / river banks and edges ranked highly as well. This is consistent with the predictive models.
- All sites were located within 500m of a permanent water source or 100m of an ephemeral water source. However, around 25% of the study area falls within this zone, and generally has a much higher ESC than portions of land further away from water. Nonetheless, water sources seem to be the primary influence behind site location.
- Despite good ESC, hill slopes / sloping plain and flat plain yielded low artefact numbers.
- The majority of all site types recorded (63.2%) were on Quaternary alluvium, the soils once supported the more complex ecological communities in the region. This geological unit in the region occurs near major waterways such as Macquarie and Castlereagh Rivers and the major creek lines and as such water is found within close proximity and consequently, the likelihood of associated Aboriginal sites increases.

Obley Rd Assessments: Many smaller assessments have been undertaken over the years on Obley Rd, primarily for environmental impact assessments for road alignment projects. Kelton (1997), Nolan (2000), OzArk (2003) as well as amateur archaeologist Warren Bluff,

among others, contributed to the recorded total of 33 AHIMS-listed sites on the edges of Obley Rd between the DZP Site and town of Dubbo. The overwhelming majority of these sites are scarred trees.

Sites listed on Heritage Databases: No Aboriginal sites are listed on any national, state or local heritage databases within the Study Area prior to the current investigation. However, there are several listed sites nearby. These consist of:

- Indigenous Place at Brocklehurst – bora ground (Australian Heritage Database/ Register of the National Estate)
- Indigenous Place at "Toongi Valley" – carved tree (Australian Heritage Database/ Register of the National Estate)
- The Springs at Toongi – while the significance of this Australian Heritage Database listing is based primarily on historic occupation, it is noted that the place is also important for its relationship to Aboriginal and early settler contact (NSW Heritage 2012).
- Dundullimal at Dubbo – while the significance of this Australian Heritage Database listing is based on historic occupation and not Aboriginal occupation, it is included here as there is a known extensive Aboriginal site located on the property, Aboriginal people were employed there in the 1891 (NSW Heritage 2012b), and there is an ethnographic report of a corroboree held there is the 1840s, attended by 600 to 800 people (OzArk 2006: 33). The Aboriginal site located on the Dundullimal property, while not listed on any heritage register, is reported to have had Aboriginal ceremony and dreaming components, a ceremonial ring, a hearth, grinding grooves, and artefacts associated with an open camp site/ artefact scatter (AHIMS site #36-1-0021).

4.3 LOCAL ARCHAEOLOGICAL CONTEXT

As the Study Area is large, the local context is discussed separately for the DZP Site and Macquarie River Water Pipeline, the Obley Road Alignment, and the Toongi - Dubbo Rail Line and Gas Pipeline Corridor.

DZP Site and Macquarie River Water Pipeline

Two previous Aboriginal heritage assessments have been undertaken in the DZP Site component of the Study Area, both by Lloyd Nolan. Another important assessment was undertaken by Margrit Koettig in 1985 which included portions of Paddys and Spring Creeks, approximately 4km to 5km south of the current Study Area. Koettig's findings are discussed in **Section 4.2**.

In 2000, Lloyd Nolan undertook a survey of 6ha which overlaps the impact footprint of the proposed open cut. Two Aboriginal sites were recorded during this assessment, TS-IF-01 and TS-GG-01, an isolated artefact and a grinding groove site, respectively.

The most extensive assessment undertaken within the DZP Site of the current Study Area was Lloyd Nolan's 2002 assessment for an earlier version of the DZP. As a result of his assessment, 22 Aboriginal sites were recorded (11 scarred trees, six open artefact scatters, three grinding groove sites and two isolated artefacts).

Obley Road Alignment

Three assessments have been previously undertaken in the vicinity of the Obley Road Alignment. M. Koettig (1985) reported on the earliest of these for an *Assessment of the Distribution of Archaeological Sites in the Dubbo City Area*. One of her sites is located near the current Study Area, a moderate-sized artefact scatter and a scarred tree on the banks of Hyandra Creek.

Four scarred tree sites (all named 'Obley Rd') were recorded by Warren Bluff along Obley Road in 1991, near the impact footprint. There is no report to accompany the recordings. They do not plot within the impact footprint for the Obley Road Alignment, however, due to the early date of recording it is likely that the sites are not plotting correctly and that they could be closer to the road corridor than they appear on a map. None of these sites were identified during the course of field survey as part of the current assessment.

OzArk conducted the most recent assessments (both in 2003) that fall within the impact footprint, the *Obley Rd Water Mains* project and the *Obley Road, Toongi* indigenous heritage study. Two scarred trees near the Study Area were recorded during each assessment, however, neither fall within the current impact footprint.

Toongi - Dubbo Rail Line and Gas Pipeline Corridor

No previous assessments have been undertaken within the impact footprint of the Toongi - Dubbo Rail Line, however, three assessments are close to the Study Area.

As part of Koettig's 1985 assessment for the Dubbo City Council (discussed in **Section 4.2**) two sites were recorded north of the Cumboogle Rail Bridge, near the confluence of Cumboogle Creek and the Macquarie River. These sites are camp sites with shell middens, one of which has a scarred tree onsite as well. In the same vicinity as Koettig's assessment two modified (carved or scarred) trees were recorded by Kelton, though a report is not associated with them in the AHIMS database.

Several scarred tree sites were recorded by Warren Bluff, an amateur archaeologist, near the intersection of Benolong Rd and Obley Rd. No report accompanied the recordings, and it has been found that other sites recorded by Warren do not plot correctly (due in part to the fact that reliable GPSs were not widely available in the early 1990s), and that some of his scarred tree recordings do not meet established criteria for Aboriginal scarred trees. For these reasons there is little scientific reliability to his site recordings.

Additional sites were recorded near the Toongi - Dubbo Rail Line, north of the Macquarie River, by OzArk (2006). These consist of open artefact scatters, one of which is adjacent to the rail line. This low density artefact scatter (two artefacts within 10m of each other) is thought to have possibly once extended across the rail easement, however, the rail easement has significantly disturbed the area and no artefacts are present within its bounds (the fences).

4.4 PREDICTIVE MODEL FOR SITE LOCATION

Predictive modelling aims to establish a theoretical model for site location and distribution within a given area. This model provides a comparative situation against which the results of the investigation can be discussed, taking into account the effects of post formation processes such as visibility and land use.

Proximity to a permanent water supply is generally considered the primary factor determining the location of Aboriginal camp sites. Stream ordering has been used to predict the potential for site occurrence, and the possible complexity of these sites. Results of an integrated series of studies including serious excavation components (Jo McDonald 1997), suggests a high correlation between the permanence of a water source and the permanence and/or complexity of the areas' Aboriginal occupation. This was further reflected in the lithic assemblages from sites close to permanent water which suggested that a greater range of activities were represented (e.g. tool use, manufacture and maintenance, food processing and quarrying). Sites near ephemeral water sources had evidence for one-off occupation (e.g. isolated knapping floors or tool discard), and creek junctions were also proven to be centres for site activity.

Using the concept of stream ordering, previous research within the general area, and the knowledge gained from a review of the local context, the following general predictions can be made regarding the nature of sites and their location in the current Study Area:

- On major creek lines and rivers archaeological evidence will tend to indicate more permanent or repeated occupation. Sites may be complex, with a range of lithic activities represented, and may be stratified from repeated occupation. Proximity to resource rich zones also indicates a higher likelihood of the presence of complex occupation sites.
    - Several second order creeks and the Macquarie River traverse the Study Area. The close proximity of water increases the likelihood of finding large or complex sites on the elevated knolls, spurs and terraces near the major creeks.
- Further from water, sites are likely to be smaller, less complex and more likely to be the result of one-off occupation episodes.
    - The components of the Study Area that are more distant from water have lower potential for site occurrence, which is compounded by the fact that the majority of the ground not immediately adjacent to creek lines has been impacted by vegetation removal and agricultural activities.

In terms of the local and regional archaeological contexts, scarred trees and grinding grooves could be expected to be well-represented. An abundance of scarred trees have been identified locally and regionally (**Sections 4.2** and **4.3**). While grinding grooves constitute what could be considered to be a typical proportion of site types regionally, they are much more common locally. Both site types are more frequent at a local level than is typical of most regions in NSW.

Based on this archaeological context and the landform potential as detailed above, it is possible to say that the likelihood of encountering different site types in the Study Area are as follows.

- Open sites may be found on elevated terraces and low spurs close to water; such as Wambangalang Creek. These sites may be complex and/or extensive.
- Scarred trees are frequently found close to creeks and rivers but also found further afield. Most of the old-growth woodlands have been removed from the landscape, although some isolated old-growth trees which may bear scars occur in the cleared paddocks and along the creek lines, as well as along the road corridor of Obley Rd.
- Natural mythological or cultural/ceremonial sites may occur anywhere.
- Shelter sites with art and/or deposit may occur wherever there are appropriate sandstone overhangs. The Study Area does not contain escarpments, and the only locality within the Study Area with potential for suitable rocky overhangs is on the “Glen Idol” property (proposed Open Cut).
- Grinding groove sites will only occur where there are appropriate outcropping sandstone formations, usually near water, and therefore may be found near any of the waterways in the Study Area.
- Isolated finds may occur anywhere, especially in disturbed locations near water sources or in areas close to ephemeral water – i.e. headwaters.

For the purposes of the current study, site type definitions can be found in **Appendix 3**.

4.5 SAMPLING STRATEGY

The Study Area was surveyed with a combination of pedestrian transects and spot checks. Areas with high potential for archaeological sites were targeted by undertaking more closely spaced transects. Areas that have very low potential to yield intact sites or had no visibility were not closely examined (Survey Units K-3, W-10, PH-5, and MM-5).

Areas that were more closely examined consist of terraces adjacent to creeks and the creeks themselves, and areas of exposure, such as road cuts and areas of erosion. All trees old enough to bear scars were inspected. Rocky outcrops were examined for grinding grooves.

Cleared paddocks are not landforms with a high probability to contain intact open sites, as disturbance levels to archaeological deposits in these areas are generally high. Additionally, ground visibility in these areas is often poor due to dense vegetation growth. These areas were therefore surveyed with wider transects. When ground visibility was zero, pedestrian transects were abandoned in favour of vehicle transects with spot checks at exposures and old-growth trees capable of bearing scars.

Areas not examined consist of paddocks which were cropped at the time of survey as the survey crew was asked to stay out of them. Cropped paddocks have a negligible likelihood of revealing open sites, as the sites would be obscured by the crop. The following Survey Units were not entered due to these restrictions:

- W-10 Survey Unit was not surveyed because it was recently ploughed.
- PH-5 Survey Unit was not surveyed because it was cropped.
- MM-5 Survey Unit was not surveyed because it was cropped.
- K-3 Survey Unit was not surveyed because it had zero ground visibility due to high grasses.
- The realignment portion of the proposed Macquarie River Water Pipeline was not surveyed (**Section 2.5**). Several factors such as low landform sensitivity, an absence of nearby sites and high prior land use disturbance contributed to the decision not to survey.

4.6 FIELD METHODS

Transects were walked at variously spaced intervals, dependent on ground visibility and archaeological potential (**Section 4.5**). These intervals ranged from 5m distance in areas with narrow impact zones (such as the Obley Road Alignment), to approximately 20m intervals in areas with moderate potential for site occurrence. As noted in the previous section, areas with zero ground visibility were traversed in vehicles, with inspection at areas of exposure and old-growth trees. Obley Road Alignment and Macquarie River Water Pipeline impact footprints were inspected to approximately 20m from the centreline of the proposed pipeline and road respectively, although this was constrained occasionally by private property boundary fences.

Representatives of the RAPs assisted the archaeologists by placing flags at artefacts and/or alerting the archaeologists that an artefact had been found. A located site was then more closely examined and all artefacts observed on the surface were flagged. For newly recorded sites, all artefacts and features were located with a GPS and tallied. For previously recorded sites GPS points were taken on boundary artefacts to help identify the surface extent of the scatter, although the sites were not re-recorded in full.

Sites were recorded with digital photography and by Ashtec GPS units loaded with Mobile Mapper software and were described on field recording sheets. General notes pertaining to the survey and ground covered by the archaeologists were kept as well.

5 RESULTS OF ABORIGINAL HERITAGE ASSESSMENT

5.1 EFFECTIVE SURVEY COVERAGE

Two of the key factors influencing the effectiveness of archaeological survey are ground surface visibility (GSV) and exposure (**Table 6** and **Table 7**). These factors are quantified in order to ensure that the survey data provides adequate evidence for the evaluation of the archaeological materials across the landscape. For the purposes of the current study, these terms are used in accordance with the definitions provided in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*: Part 6 National Parks and Wildlife Act 1974 (DECCW 2010).

Ground surface visibility is defined as:

> … the amount of bare ground (or visibility) on the exposures which might reveal artefacts or other archaeological materials. It is important to note that visibility, on its own, is not a reliable indicator of the detectability of buried archaeological material. Things like vegetation, plant or leaf litter, loose sand, stony ground or introduced materials will affect the visibility. Put another way, visibility refers to 'what conceals' (DECCW 2010: 39).

Exposure is defined as:

> … different to visibility because it estimates the area with a likelihood of revealing buried artefacts or deposits rather than just being an observation of the amount of bare ground. It is the age of land for which erosion and exposure was sufficient to reveal archaeological evidence on the surface of the ground. Put another way, exposure refers to 'what reveals' (DECCW 2010: 37).

Four generalised landform types are present in the Study Area:

- Hilly landforms are those with relatively high local relief. Most of the areas in the Nangar Slopes and Ranges *Mitchell landscape*, as well as some of the areas in the Dubbo Basalts *Mitchell Landscape*, which has a local relief of 300m, are characterised as 'hilly'.
- Gently undulating landforms are those with moderate local relief. Most of the areas in the Goonoo Slopes *Mitchell Landscape* as well as some of the areas in the Dubbo Basalts *Mitchell Landscape*, which have local reliefs of between 10m and 30m, are characterised as 'gently undulating'.
- Floodplain landforms are the flat areas near major creeks and rivers. The Macquarie Alluvial Flats Mitchell landscape, which has a local relief of 1m to 3m, is characterised as 'floodplain'.
- Creeks or waterways may occur within any of the above landforms.

As can be seen from **Tables 6** and **7**, effective coverage was generally low, a result of vegetation obscuring the ground surface. Those areas inspected during summer months generally had better visibility due to die-back of grasses and harvesting of cropped land. W-3 and MM-2 Survey Units stand out as exceptions, as they were exposed as a result of ploughing in the winter months. Four areas were not inspected due to agricultural constraints (cropping and ploughing).

Exposures in the Study Area are the result of both natural processes and human impacts. Sheet washing erosion was common, revealing the ground surface. Human-caused exposures include dirt roads and tracks and agricultural activities such as ploughing and grazing. Some exposures were the result of natural processes exacerbated by human activities, such as sheet washing in areas in which top soils have been trampled by cattle as a result of intensive grazing.

Table 6: Survey Coverage Data

Survey Unit[11]	Landform	Survey Unit Area (sq m)	Visibility (%)	Exposure (%)	Effective Coverage Area (sq m) (= Survey Unit Area x Visibility % x Exposure %)	Effective Coverage (%) (= Effective Coverage Area / Survey Unit Area x 100)
DZP Site Survey Units[1]						
UG-1	gently undulating to hilly	1167000	10	5	5835	0.5
UG-2	gently undulating to hilly	2470000	72	8	142272	0.6
K-1	gently undulating	764000	5	5	1910	0.25
K-2	gently undulating	403000	5	15	3022.5	0.75
K-3	gently undulating	335000	NA	NA	NA	Not surveyed-zero ground surface visibility due to high grasses.
K-4	gently undulating	1468000	1	5	734	0.05
K-5	gently undulating	775000	5	10	3875	0.5
K-9	floodplain and gently undulating	62000	80	10	4960	8
K-10	hilly	118000	80	5	4720	4
W-1	floodplain	193000	15	5	1447.5	0.75
W-2	floodplain	188000	95	100	178600	95
W-3	floodplain	30000	20	50	3000	10
W-4	floodplain and gently undulating	294000	15	5	2205	0.75
W-4a	floodplain and gently undulating	94000	1	5	47	0.05
W-5	gently undulating	235000	15	5	1762.5	0.75
W-5a	gently undulating	82000	1	5	41	0.05
W-6	gently undulating	265000	90	95	226575	85.5
W-7	gently undulating	232000	20	5	2320	1
W-8	gently undulating to hilly	189000	5	10	945	0.5
W-9	gently undulating to hilly	554000	5	5	1385	0.25
W-10	Floodplain and gently undulating	375000	NA	NA	NA	Not surveyed- recently ploughed paddock
GI	hilly	456000	5	15	3420	0.75
PH-1	hilly	119000	5	5	297.5	0.25
PH-2	hilly	416000	5	10	2080	0.5
PH-3/4	gently undulating	266000	10	10	2660	1
PH-5	gently undulating	26000	NA	NA	NA	Not surveyed- cropped paddock
PH-6	hilly	315000	15	15	7087.5	2.25
TV-1	floodplain	565000	5	5	1412.5	0.25

[11] Note that K-6, K-7, and K-8 have been omitted. Survey was incomplete in these areas due to alterations to the Proposal's impact footprint.

Survey Unit[11]	Landform	Survey Unit Area (sq m)	Visibility (%)	Exposure (%)	Effective Coverage Area (sq m) (= Survey Unit Area x Visibility % x Exposure %)	Effective Coverage (%) (= Effective Coverage Area / Survey Unit Area x 100)
TV-2	floodplain to gently undulating	850000	5	5	2125	0.25
TV-3	gently undulating to hilly	861000	5	5	2152.5	0.25
TV-4	hilly	475000	10	5	2375	0.5
TV-5	floodplain	245000	10	5	1225	0.5
G-1	hilly	413000	5	8	1652	0.4
G-2	hilly	1867000	5	5	4667.5	0.25
G-3	hilly	298000	5	5	745	0.25
G-4	hilly	701000	20	10	14020	2.0
G-5	hilly	235700	10	5	1178.5	0.5
G-6	hilly	484000	70	1	3388	0.7
G-7	hilly	62000	90	1	558	0.9
G-8	gentle slope	118000	50	15	8850	7.5
Dubbo-Toongi Rail Line and Gas Pipeline Survey Units						
Macquarie RB	creek bank	NA: spot checked	NA	NA	NA	NA
Cumboogle RB	creek bank	NA: spot checked	NA	NA	NA	NA
Hyandra RB	creek bank	NA: spot checked	NA	NA	NA	NA
Macquarie River Water Pipeline Survey Units[2]						
MM-1	floodplain	28000	5	5	70	0.25
MM-2	floodplain	12000	5	10	60	0.5
MM-3	floodplain	16000	90	100	14400	90
MM-4	floodplain	27000	10	15	405	1.5
MM-5	floodplain	51000	NA	NA	NA	Not surveyed- cropped paddock
MM-6	floodplain	20000	1	10	20	0.1
MM-7	floodplain	35000	15	5	262.5	0.75
MM-8	floodplain	17000	5	5	42.5	0.25
Obley Road Alignment[3]						
OR-1	hilly	23000	5	20	230	1
OR-2	floodplain to hilly	75000	5	10	375	0.5
OR-3	floodplain to hilly	24000	1	10	24	0.1
OR-4	hilly	11000	5	5	27.5	0.25
OR-5	hilly	9000	5	10	45	0.5
OR-6	hilly	15000	5	20	150	1
OR-7	floodplain to hilly	26000	5	10	130	0.5
OR-8	hilly	18000	10	15	270	1.5
OR-9	gently undulating	24000	5	5	60	0.25

Note 1: refer to Figures 6 and 7 for location of noted Survey Units
Note 2: refer to Figures 6 and 8 for location of noted Survey Units
Note 3: refer to Figure 8 for location of noted Survey Units

Table 7: Landform Summary — Sampled Areas

Landform	Landform area (sq m)	Area Effectively Surveyed (sq m) (= Effective Coverage Area)	Percent of Landform Effectively Surveyed (= Area Effectively Surveyed / Landform x 100)
floodplain	2071000	203773	9.8
gently undulating	7227000	252517.25	3.5
hilly	6308700	32551.75	0.5

Hilly areas had the lowest effective survey coverage, due in part to it being less suitable land for agriculture than floodplains and gently undulating terrain, and thus having more vegetation cover. Gently undulating landscapes comprised the majority of the Study Area. This landscape had low effective survey coverage due largely to high grasses in paddocks. Some of these areas were grazed but not ploughed, contributing to lower ground surface visibility than the ploughed areas. The floodplain was the least represented of the three major landform types. It has the highest effective survey coverage, due in part to good ground exposure in some of the ploughed paddocks.

5.2 ABORIGINAL SITES OF THE STUDY AREA

A total of 52 Aboriginal sites have been recorded in the Study Area. 33 of these sites have been recorded as part of this study and nineteen (19) are previously recorded (**Figure 10**; **Figure 11**; **Figure 39**; **Figure 40**; **Table 8**; **Table 9**). One newly recorded site is a potential archaeological deposit (PAD 12) has been designated in an area where no artefacts were recorded. All coordinates given in the main body of this report are in GDA94 Zone 55. Tables summarising the coordinates of the sites and the PADs in both GDA and AGD are presented in **Appendix 4**.

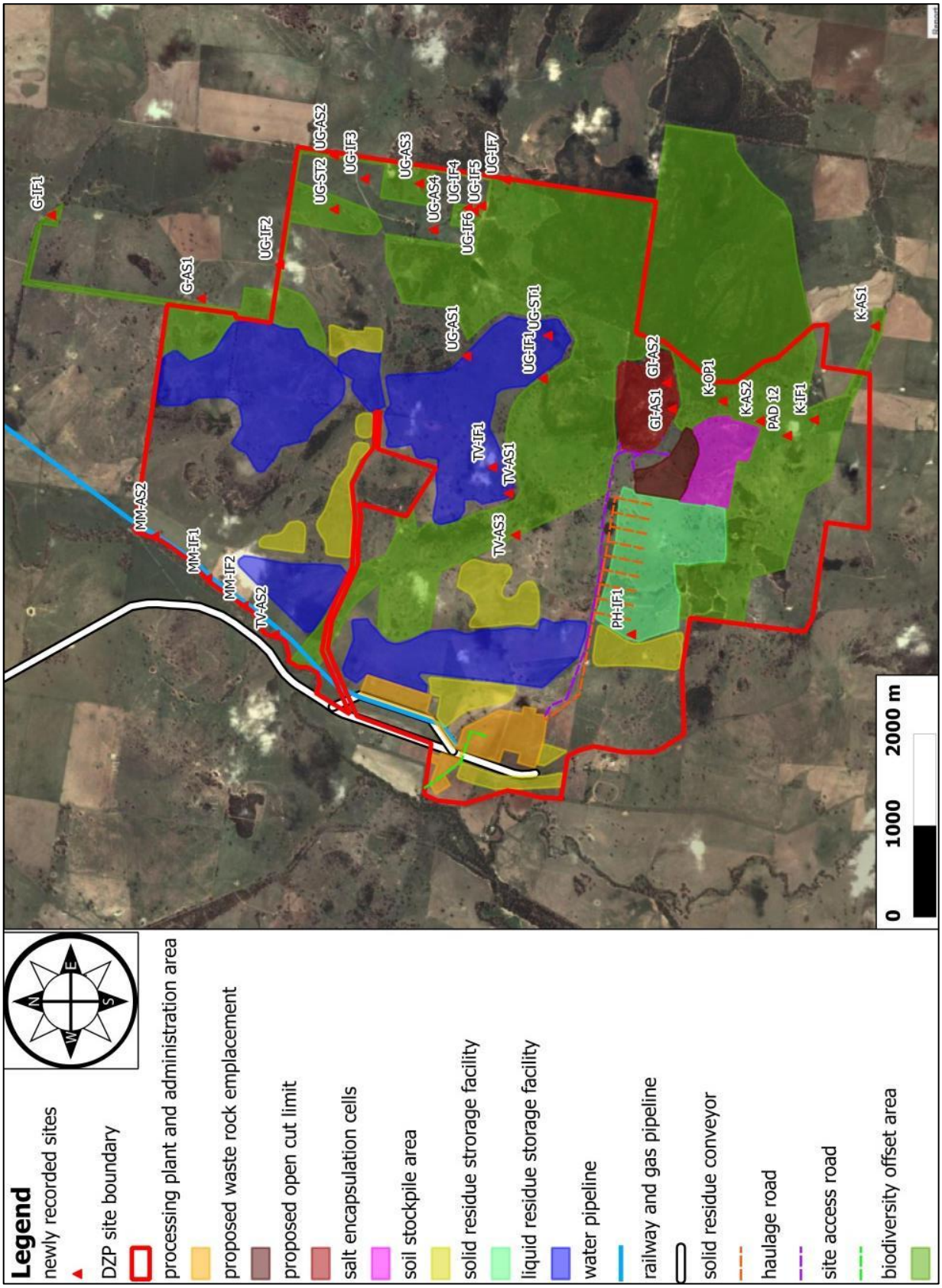
Five further locations (possible scarred trees) were initially recorded in the field but on review these possible scarred trees were deemed to not have met the relevant criteria (**Appendix 3**) to be registered as an Aboriginal site.

Table 8: Aboriginal Sites and associated PADs newly documented

Site Number	Feature(s)	Survey Unit	Landform
DZP Site			
UG-AS1	lithic scatter	UG-1	gently undulating
UG-AS2	lithic scatter	UG-2	floodplain
UG-AS3	lithic scatter	UG-2	gently undulating
UG-AS4	lithic scatter	UG-2	gently undulating
UG-ST1	scarred tree	UG-1	gently undulating
UG-ST2	scarred tree	UG-2	gently undulating
UG-IF1	isolated lithic artefact	UG-1	floodplain within gently undulating
UG-IF2	isolated lithic artefact	UG-2	gently undulating
UG-IF3	isolated lithic artefact	UG-2	floodplain
UG-IF4	isolated lithic artefact	UG-2	gently undulating
UG-IF5	isolated lithic artefact	UG-2	gently undulating
UG-IF6	isolated lithic artefact	UG-2	gently undulating
UG-IF7	isolated lithic artefact	UG-2	gently undulating
K-AS1 with PAD	lithic scatter	K-5	gently undulating
K-AS2 with PAD	lithic scatter	K-7	floodplain and creek
K-OP1	ochre processing area[12]	K-7	floodplain within gently undulating
K-IF1	isolated lithic artefact.	K-7	floodplain within gently undulating
PAD 12	potential archaeological deposit	K-9	floodplain
GI-AS1	lithic scatter	GI	gently undulating
GI-AS2	lithic scatter	GI	gently undulating
PH-IF1	isolated lithic artefact	PH-6	gently undulating
TV-AS1	lithic scatter	TV-3	gently undulating
TV-AS2 with PAD	lithic scatter	TV-1	floodplain
TV-AS3 with PAD	lithic scatter	TV-4	floodplain within gently undulating
TV-IF1	isolated lithic artefact	TV-3	gently undulating
G-AS1	lithic scatter	G-5	gently undulating
G-IF1	isolated lithic artefact	G-4	gently undulating
Toongi-Dubbo Rail Line and Gas Pipeline Corridor			
No Aboriginal sites have been recorded in the impact zone for the Toongi-Dubbo Rail Line in the areas assessed.			
Macquarie River Water Pipeline			
MM-AS1	lithic scatter	MM-3	floodplain
MM-AS2	lithic scatter	MM-7	floodplain
MM-IF1	isolated lithic artefact	MM-7	floodplain
MM-IF2	isolated lithic artefact	MM-8	floodplain
Obley Road Alignment			
OR-AS1 with PAD	lithic scatter	OR-7	floodplain
OR-ST1	scarred tree	OR-2	floodplain

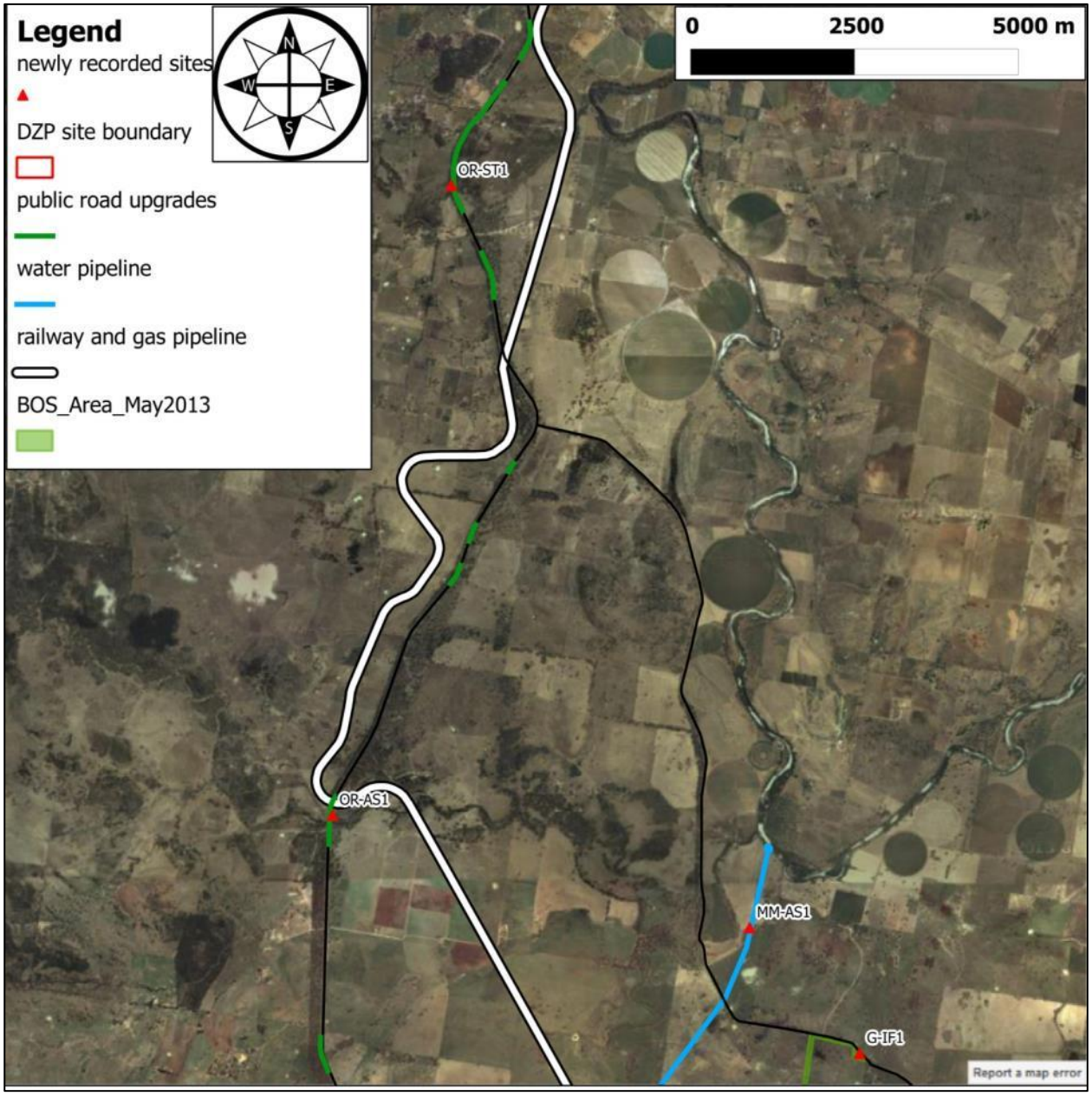
[12] Further confirmation required.

Figure 10: Aboriginal Sites Recorded in and Nearby to the DZP Site Boundary



Note: Image presents the DZP Site assessed area.

Figure 11: Aboriginal Sites Recorded North of the DZP Site Boundary



Note: Image presents the DZP Site assessed area.

5.3 ABORIGINAL SITES RECORDED (THIS STUDY)

5.3.1 "Ugothery" Aboriginal Site 1 (UG-AS1)

Site type: Open artefact scatter.

GPS Coordinates: (GDA94 Zone 55) 653276E / 6408524N.

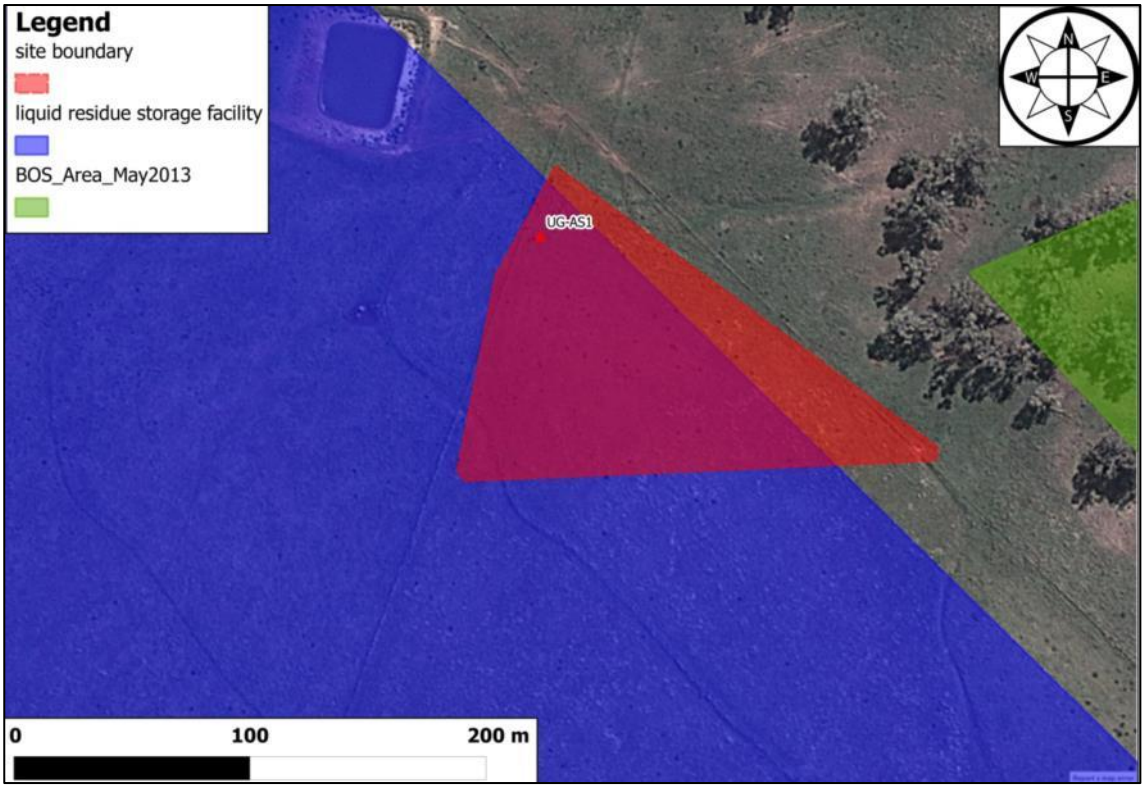
Location of site: Located on the ""Ugothery"" property just south of an earthen dam, approximately 1km south-southwest of the ""Ugothery"" house complex (UG-1 Survey Unit; **Figure 10**).

Description of site: The site consists of a sparse artefact scatter in a ploughed field at an elevation of 380m AHD (**Figure 12**; **Plates 1** to **2**). Markings on some boulders within the site

were interpreted as possible grinding grooves (**Plate 3**). However, these were deemed to be a result of ploughing or a rock-rake after subsequent survey and analysis. The site is dissected by fences on the northern and eastern ends. Soils are dark brown and loamy with gravels. Artefacts consist of:

- A cobble of heavy dark material (possibly ironstone) flaked at one end: 95 x 74 x 50mm
- Tan coarse grained cobble flaked at one end: 175 x 55 x 75mm, one end of this elongated artefact has numerous flakes removed to form a point and the opposite end has only two flakes removed.
- Chalcedony flake shatter with 25% cortex (50% of one side)
- Tan chert test cobble/flaked piece with cortex
- Possible grinding grooves are located on boulders in a small draining to the south-east end of the lithic scatter. Lichen grows thickly on the boulders, covering the grooves.

Figure 12: UG-AS1 plan view map



Ground surface visibility is approximately 10% to 20% on-site. Impacts to the site consist of ploughing, fencing, and displacing boulders (possible grinding grooves) to form a small dam in a first order drainage to the east of the site. The boulders are affected by heavy lichen growth.

Due to disturbance to the soils from extensive ploughing at this site, it is assessed that intact sub-surface deposits are unlikely.

5.3.2 "Ugothery" Aboriginal Site 2 (UG-AS2)

Site type: Open artefact scatter.

GPS Coordinates: (GDA94 Zone 55) 655142E / 6409706N.

Location of site: Located along a dirt road extending north from "Ugothery" house complex. From the north end of the house complex drive approximately 0.98km north along the dirt track, bearing left when the road splits (UG-2 Survey Unit; **Figure 10**).

Description of site: Site is a small artefact scatter located in a dirt track at an elevation of 327m AHD (**Figure 13**; **Plates 4** to **5**). The artefacts cover an area of 50m by 5m. Soils onsite are sandy clays with inclusions of ironstone, sandstone, and quartz. The closest water source is a 2nd order drainage located 10m away. Native vegetation has mostly been cleared for agriculture and low grasses dominate. Remnant box and other eucalypt trees are in the area.

Figure 13: UG-AS2 plan view map

Artefacts consist of four artefacts: a chalcedony flake, mudstone flake, and two rhyolite flakes**.**

The artefacts are located in a vehicle track exposure measuring 5m width. Visibility on the exposure is 95% with very low background noise and visibility off the exposure is 10%, with low background noise. Impacts to the site include vehicle use on the dirt track and grazing.

While other artefacts are likely to be located off of the track, it is unlikely that intact archaeological deposits are present due to impacts to the area.

5.3.3 "Ugothery" Aboriginal Site 3 (UG-AS3)

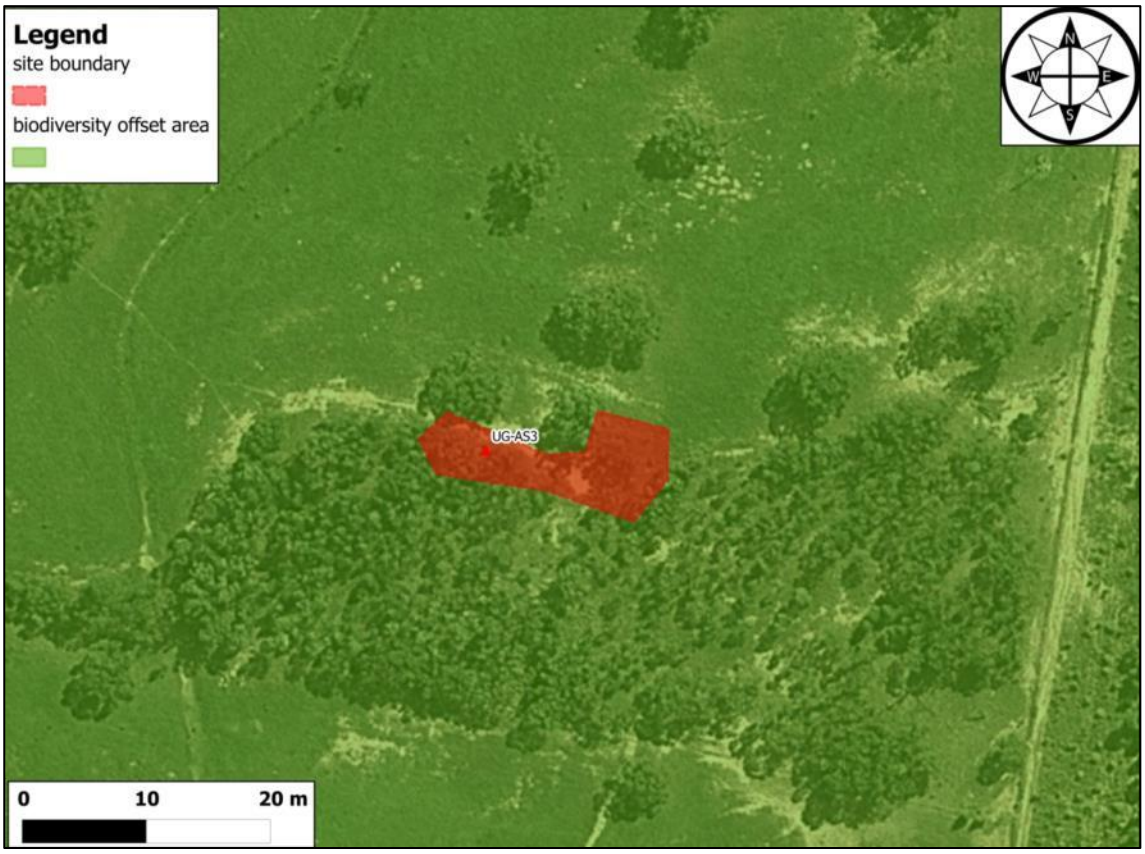
Site type: Open artefact scatter.

GPS Coordinates: (GDA94 Zone 55) 654868E / 6408931N.

Location of site: Located 400m east-southeast of the "Ugothery" house complex (UG-2 Survey Unit; **Figure 10**).

Description of site: Site is a small lithic artefact scatter on a mid-slope at an elevation of 357m AHD (**Figure 14**; **Plates 6** to **7**). Soils in the area are sandy clays with sandstone. The nearest water source is a 2nd order ephemeral creek 470m west. Native vegetation has largely been cleared for agriculture and grasses dominate, though remnant eucalypts and pines are present in the landscape as well.

Figure 14: UG-AS3 plan view map (sketch map not to scale)



Artefacts consist of a broken axe head, a hammerstone, a quartz flake, and two flakes of unknown material. Primary, secondary, and tertiary flakes are represented in this assemblage.

Artefacts are located in an exposure 80m x 5-10m with 70% visibility on the exposure and 10 to 20% off of the exposure. Background noise is low across the landscape. Disturbances to the site consist of agricultural land use and erosion. It is unlikely that subsurface archaeological deposits are present as the artefacts appear to have arrived at their current location via erosion and agricultural impacts.

5.3.4 "Ugothery" Aboriginal Site 4 (UG-AS4) with PAD

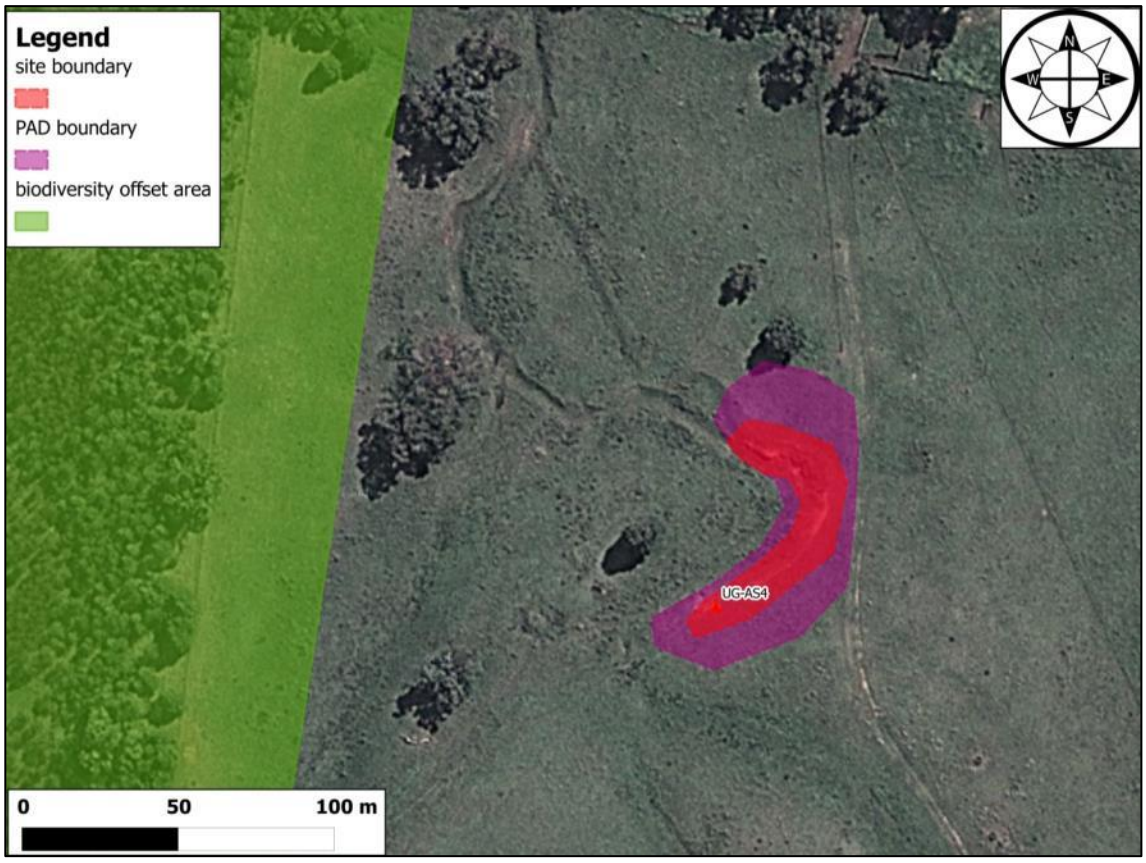
Site type: Open artefact scatter with PAD.

GPS Coordinates: (GDA94 Zone 55) 654444E / 6408809N.

Location of site: Located 300m south of the "Ugothery" house complex, on the east bank of an ephemeral drainage (UG-2 Survey Unit; **Figure 10**).

Description of site: Site is a small lithic scatter located on the bank of a 2nd order creek at an elevation of 341m AHD (**Figure 15**; **Plates 8** to **9**). The site measures 45m by 10m. The soils onsite are red-brown sandy clays with sandstone. Native vegetation has largely been cleared for agriculture. Grasses dominate, though remnant eucalypts and pines are present in the landscape as well.

Figure 15: UG-AS4 plan view map (sketch map not to scale)



Artefacts consist of a basalt core, two mudstone flakes (one is backed and exhibits use-wear), and at least five quartz flakes. Four other quartz pieces were identified, but did not have sufficient flake anatomy to be definitely identified as cultural in origin. Flakes identified include primary, secondary, and tertiary types.

The Aboriginal representatives present wished to include possible grinding grooves within the site. It is the opinion of Ozark that these markings were created by ploughing or a rock rake (**Plate 66**).

The artefacts are located in three erosion exposures, each measuring approximately 5m x 10m. Visibility on the exposures is 90% and off the exposures is 20%. Background noise is generally low. Impacts to the site include erosion, grazing, and agriculture.

Although impacts are present, the site maintains well-defined areas of activity suggesting some integrity. Adjacent areas are likely to contain shallow archaeological deposits with no stratigraphy, but the horizontal distribution of artefacts is likely to be relatively intact and therefore warrants the assignment of a PAD. The edges of the PAD are uncertain as the landform extends some distance away from the artefacts and the waterway, and visibility is lower to the east. The extent of the PAD is determined to be in close proximity to the site because although the constituent artefact scatter may be larger, there will be limited value in extensive excavation based on the disturbances in the area.

5.3.5 "Ugothery" Scarred Tree 1 (UG-ST1)

Site type: Scarred tree.

GPS Coordinates: (GDA94 Zone 55) 653454E / 6407774N.

Location of site: Located more than 500m southeast of site UG-AS1 in a cleared paddock (UG-1 Survey Unit; **Figure 10**).

Description of site: Site is comprised of a single box eucalypt tree in a cleared paddock (**Figure 16**; **Plate 10**). A small creek is located >100m east of the tree, at an elevation of 394m AHD.

The tree.

- Box Eucalypt, alive, with several trunks.
- Approximately 15m tall.
- Approximately 1.5m wide at height of scar.

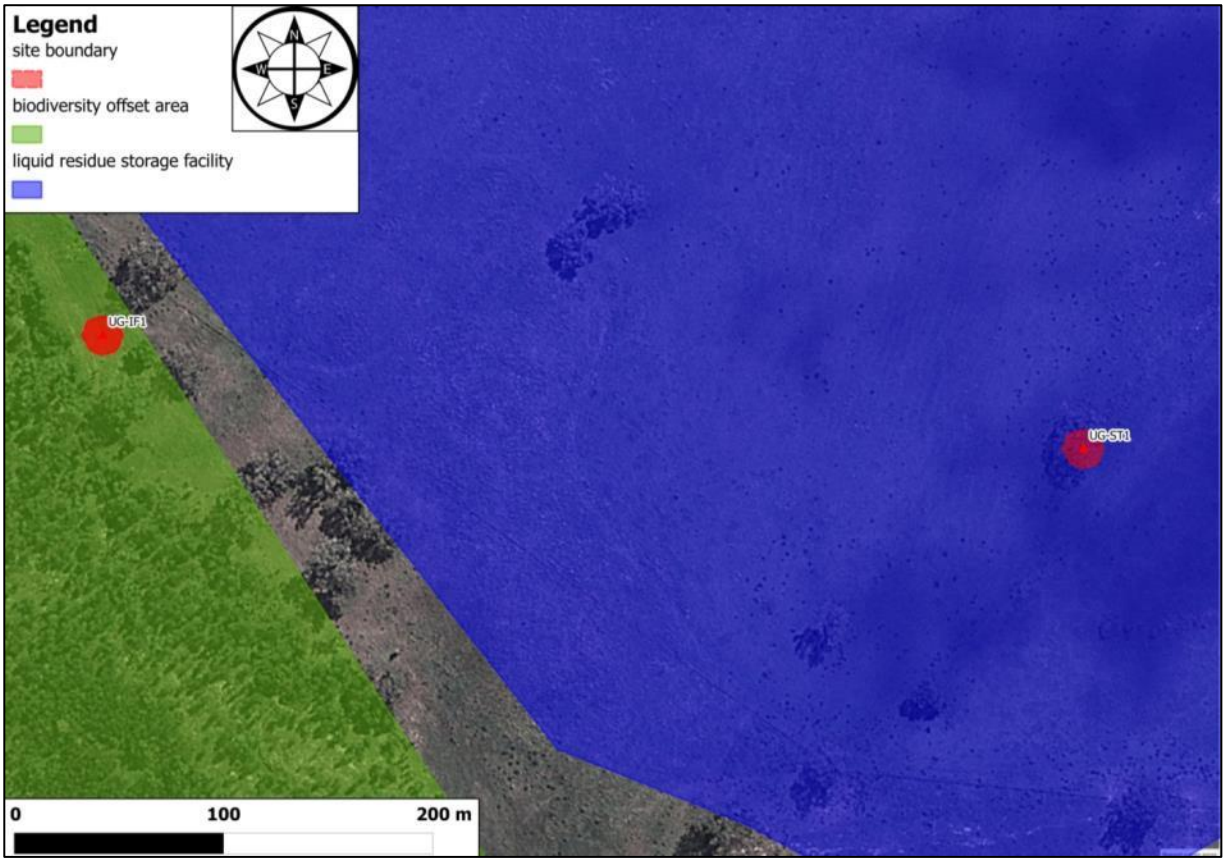
The scar.

- 80cm max height by 13cm max width.
- Oblong shape.
- Approximately 30cm from base of tree on largest trunk.
- Oriented to the southwest.
- No axe marks or grub holes present.

The scar is consistent with most of the criteria set out in **Appendix 3**. This includes:

1. The scar is above ground.
3. The scar is roughly symmetrical, but this is obscured by the heavy regrowth.
4. The length of the scar was on the same axis as the length of the tree.
5. The tree was sufficiently old.
6. There were no obvious signs of other causes for the scar.
7. The tree was a box.

Figure 16: UG-ST1 and UG-IF1 plan view map



It is difficult to determine the authenticity of this scar due to extreme regrowth. However, the obvious age of the scar, its consistency with the criteria (**Appendix 3**), and the absence of features that disprove its status as a scar, all support the authenticity of the scar.

Disturbances to the site include land clearing and grazing. No artefacts are associated with the site, and it is unlikely that intact sub-surface deposits are present.

5.3.6 "Ugothery" Scarred Tree 2 (UG-ST2)

Site type: Scarred tree.

GPS Coordinates: (GDA94 Zone 55) 654645E / 6409715N

Location of site: Located 300m north-northeast of a dam situated to the north of the "Ugothery" house complex (UG-2 Survey Unit; **Figure 10**).

Description of site: Site is comprised of a single Aboriginal scarred box tree located at an elevation of 335m AHD (**Figure 17**; **Plate 11**). A large ephemeral 2nd order drainage is located 50m away from the tree. Native vegetation has largely been removed from the landscape, though trees remain along the creek line.

The tree.

- 20m height.
- 1.3m diameter.
- The tree is alive and in good condition.

The scar.

- Oriented to the north.
- Elongated shape.
- Length with regrowth: 105cm.
- Interior length: 75cm.
- Width with regrowth: 50cm.
- Interior width: 35cm.
- Maximum width of regrowth: 30cm.
- Maximum depth of regrowth: 30cm.
- Height of base of scar above the ground: 105cm.
- 1-2 axe marks.

Figure 17: UG-ST2 plan view map

The scar is consistent with most of the criteria set out in **Appendix 3**. This includes:

1. The scar is above ground.
3. The scar is roughly symmetrical, but this is obscured by the heavy regrowth.
4. The length of the scar was on the same axis as the length of the tree.
5. The tree was sufficiently old.

6. There were no obvious signs of other causes for the scar.
7. The tree was a box.

The terminations at the top and bottom of the scar were different, but both were regularly shaped. It was almost certainly artificial as there were axe-marks within the scar (**Plate 12**). The cut was quite clean and so it is possible that this was made by a steel axe. The scar is very old though, and the shape of the scar is consistent with bark removal for traditional Aboriginal uses.

Potential for intact sub-surface deposit is low as the landform is degrading and has been impacted by clearing for agriculture, and as no surface artefacts are located in the vicinity of the tree.

5.3.7 "Ugothery" Isolated Find 1 (UG-IF1)

Site type: Isolated find.

GPS Coordinates: (GDA94 Zone 55) 653058E / 6407827N.

Location of site: Located on the "Ugothery" property, to the northeast of a prominent unnamed hill (UG-1 Survey Unit; **Figure 10**). The hill is also bordered by "Toongi Valley" property to the west and "Glen Idol" property to the south. The site is not on the hill, but rather across a small drainage from the hill.

Description of site: The site consists of an isolated utilised flake in open eucalypt woodland on a terrace approximately 10m from a creek (**Figure 16**; **Plates 13** to **14**).

- Tertiary flake with edge wear on one edge: 97 x 54 x 21mm, has tan coloured repatination with a grey interior, possibly a rhyolite.

Ground surface visibility is 15%. Impacts to the site consist of grazing. The area does not appear to have been ploughed, however, it is assessed that intact sub-surface deposits are unlikely, due to the scarcity of artefacts in conjunction with the moderate ground exposure.

5.3.8 "Ugothery" Isolated Find 2 (UG-IF2)

Site type: Isolated find.

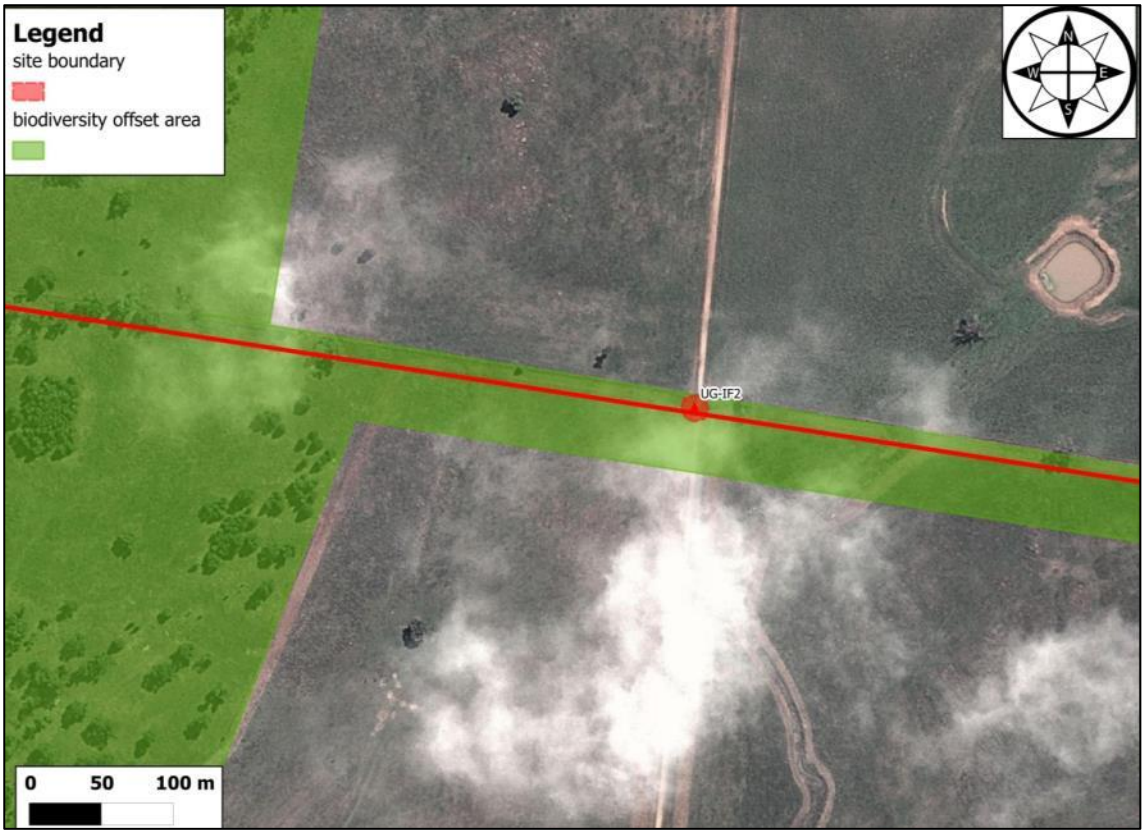
GPS Coordinates: (GDA94 Zone 55) 654142E / 6410222N.

Location of site: Located 2.6km south from Benolong Rd on the dirt access track for the "Grandale" property, approximately 6m south of a cattle guard and 3m west of the dirt road (north end of UG-2 Survey Unit; **Figure 10**).

Description of site: The isolated retouched flake (of uncertain material, possibly rhyolite), is located on a low slope at an elevation of 329m AHD (**Figure 18**; **Plates 15** to **16**). Vegetation in the area consists of short grasses, as the area falls within a paddock. The nearest water source, an ephemeral drainage, is approximately 100m away.

The artefact is located in a vehicle track with erosion, measuring 15m by 8m. Soils are sandy clays. Visibility on the exposure is 60% and off the exposure is 20%. Impacts to the area include agricultural activities, such as clearing of native vegetation and grazing, and vehicle movement. It is unlikely that subsurface deposits are present, as the area has been impacted and no other artefacts were revealed in the large exposure.

Figure 18: UG-IF2 plan view map



5.3.9 "Ugothery" Isolated Find 3 (UG-IF3)

Site type: Isolated find.

GPS Coordinates: (GDA94 Zone 55) 654921E / 6409431N.

Location of site: From the north edge of the "Ugothery" house complex go 0.58km up a dirt road. The site is 80m south of the dirt road (UG-2 Survey Unit; **Figure 10**).

Description of site: Site consists of a single hammerstone, a grey river cobble with bashing evident on one end (**Figure 19**; **Plates 17** to **18**). It is situated on a low slope at an elevation of 334m AHD. The nearest water source is 100m away, a 2nd order stream. Vegetation onsite consists of grasses, and native vegetation has been cleared.

The artefact was found in an area with no exposure. It is unlikely that intact sub-surface deposits are present, as the area has been impacted by agriculture.

5.3.10 "Ugothery" Isolated Find 4 (UG-IF4)

Site type: Isolated find.

GPS Coordinates: (GDA94 Zone 55) 654636E / 6408490N.

Location of site: Site is located 600m south-southeast of the "Ugothery" house complex, east of a small stand of trees (UG-2 Survey Unit; **Figure 10**).

Figure 19: UG-IF3 plan view map

Description of site: Site consists of a large basalt flake with flaking (possible retouch) on the dorsal side (**Figure 20**; **Plates 19** to **20**). The artefact is located on a 20 degree hill slope at an elevation of 362m AHD. Soils are sandy clay soils of a light reddish-brown colour. Vegetation on-site consists of grasses, new growth after land clearing and remnant mature trees (a grey box tree is located nearby). The nearest water source, a 2nd order ephemeral stream, is located approximately 500m away.

Figure 20: UG-IF4, UG-IF5 and UG-IF6 plan view map

The artefact was found within an erosion exposure measuring approximately 10m x 5m, with 60% ground visibility. Given the moderate ground visibility and the lack of other surface artefacts, coupled with disturbances from land clearing activities and grazing, it is unlikely that the site has intact sub-surface deposits.

5.3.11 "Ugothery" Isolated Find 5 (UG-IF5)

Site type: Isolated find.

GPS Coordinates: (GDA94 Zone 55) 654611E / 6408432N.

Location of site: Site is located 650m southeast of the "Ugothery" house complex, east of a small stand of trees (UG-2 Survey Unit; **Figure 10**).

Description of site: Site consists of a quartz flaked piece with one negative flake scar on the small cobble. The remainder of the artefact is cortex. The artefact is located on the slope of a low hill at an elevation of 364m AHD (**Figure 20**; **Plates 21** to **22**). Soils are a light red-brown sandy clay. Vegetation consists of grasses, remnant mature eucalypt trees and a stand of new growth trees is located to the west. The nearest water source is a 2nd order waterway located 360m west.

The artefact is located in a 3m by 3m erosion exposure with 90% ground surface visibility and low levels of background noise. Visibility is 5-30% off the exposure. Disturbances consist of land clearing activities and grazing.

5.3.12 "Ugothery" Isolated Find 6 (UG-IF6)

Site type: Isolated find.

GPS Coordinates: (GDA94 Zone 55) 651651E / 6408365N.

Location of site: Site is located 700m southeast of the "Ugothery" house complex, east of a small stand of trees (UG-2 Survey Unit; **Figure 10**).

Description of site: Site consists of a tertiary mudstone flake with use-wear and backing (thumbnail scraper). Site is situated on the upper slope of a low hill at an elevation of 369m AHD (**Figure 20**, **Plates 23** to **24**). The landscape is degrading with frequent sandstone and light red-brown coloured sandy clays. Vegetation consists of grasses, remnant mature eucalypt trees and a stand of new growth trees is located to the west. The nearest water source is a 2nd order waterway located 400m northwest.

The artefact is located in a 10m by 5m exposure with 50% ground surface visibility with high background noise. Visibility off the exposure is 5%. Agricultural disturbances are present in the area.

5.3.13 "Ugothery" Isolated Find 7 (UG-IF7)

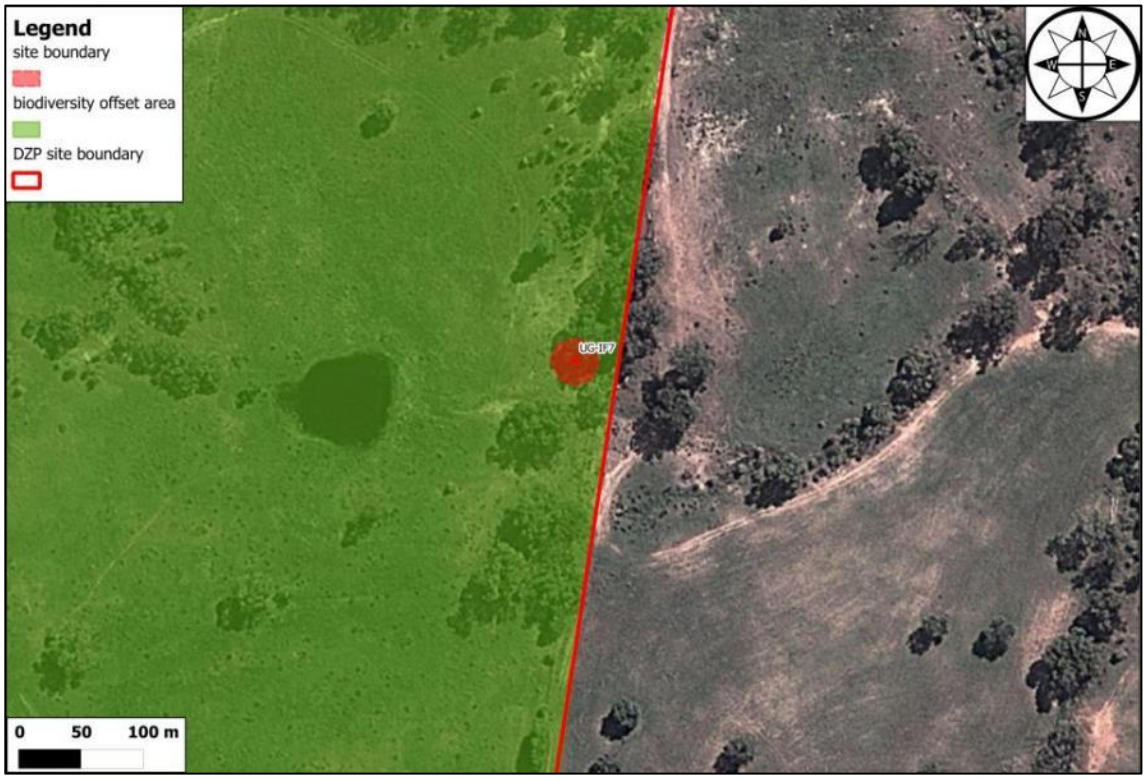
Site type: Isolated find.

GPS Coordinates: (GDA94 Zone 55) 654892E / 6408139N.

Location of site: Site is located 950m southeast of the "Ugothery" house complex, on the eastern edge of the application area (UG-2 Survey Area; **Figure 10**).

Description of site: Site consists of a quartz tertiary flake located on a low slope at an elevation of 366m AHD (**Figure 21**; **Plates 25** to **26**). Soils are a grey-brown sandy clay. Geology of the area is evidenced in sandstone and ironstone materials. Vegetation has largely been cleared for agriculture, though nearby is a clearing with mature eucalypts, regrowth and tussocks. The nearest water source is a 1st order drainage 10m from the artefact.

Figure 21: UG-IF7 plan view map



The artefact is located on an erosion exposure and vehicle track, measuring 40m by 5m. Visibility on the exposure is 70% with moderate background noise. Off the exposure is 10% ground surface visibility with low background noise. The landform is degrading. It is possible that other artefacts are present in the area but obscured are by background noise and vegetation. However, intact sub-surface deposits are unlikely as due to impacts to the land.

5.3.14 "Karingle" Artefact Scatter 1 with PAD (K-AS1 with PAD)

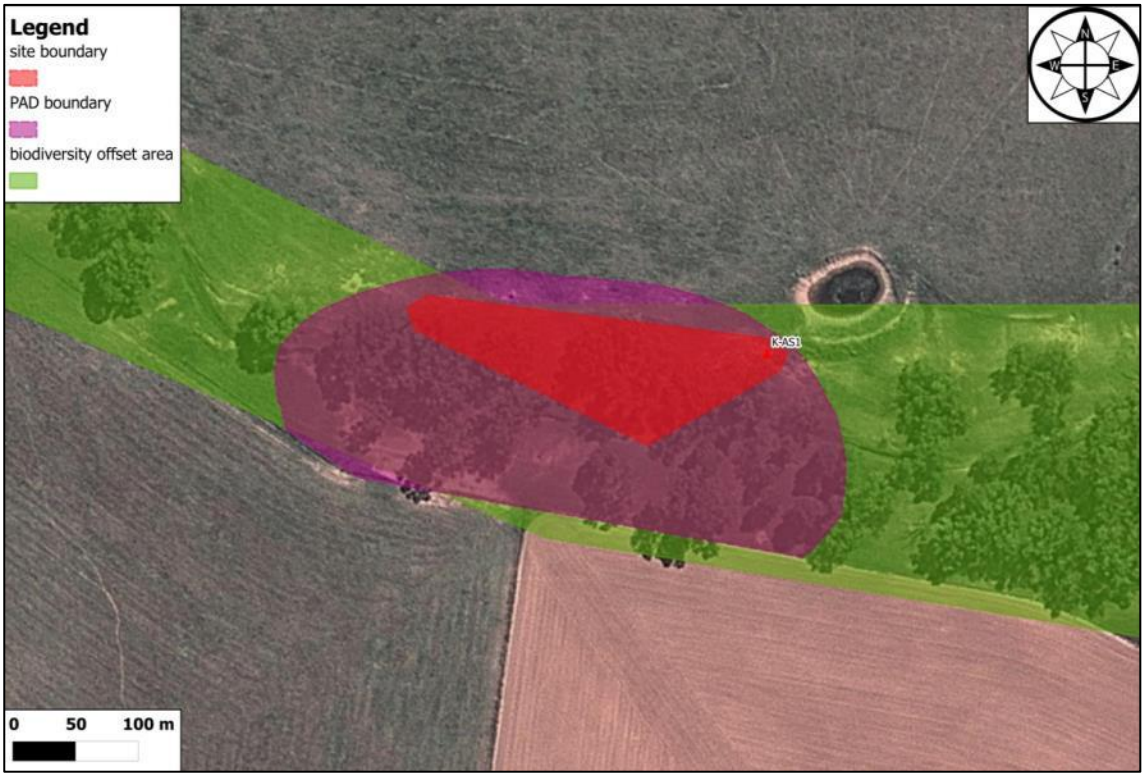
Site type: Open artefact scatter with PAD.

GPS Coordinates: (GDA94 Zone 55) 653494E / 6404781N.

Location of site: Site is located south of Dowds Hill and north of Eulandool Road, on the "Karingle" property, on the banks of a tributary of the Cockabroo Creek which drains from Dowds Hill (K-5 Survey Unit; **Figure10**).

Description of site: Site is a small artefact scatter comprised of ten lithic artefacts on an elevated terrace 20m from a creek on the north side (**Figure 22**; **Plates 27** to **28**). Box trees grow on the creek line and the area is grassy. The artefacts cover an area approximately 15m x 10m.

Figure 22: K-AS1 with PAD plan view map



Visibility on the exposure is 80% and off the exposure it is <10%. There are grazing impacts the site. The PAD at this site is likely to extend out of the exposure into the grassy areas adjacent. It was recommended by RAPs that K-AS1 with PAD be further investigated along with a tree noted as a possible scarred tree (temporarily called "ST-2" in the field on the 23 May 2012). However, due to subsequent changes to the mine's design, excludes K-AS1 from the impact footprint, this site was not revisited.

5.3.15 "Karingle" Artefact Scatter 2 with PAD (K-AS2 with PAD)

Site type: Open artefact scatter with PAD.

GPS Coordinates: (GDA94 Zone 55) 652632E / 6405846N.

Location of site: K-AS2 and its associated PAD are roughly 500m north of the "Karingle" homestead and are situated along a creek line that runs through DP 753252 lot 55 (K-7 Survey Unit; **Figure 10**). The PAD is c. 400m long and c.70m wide. The width is somewhat arbitrary due to low visibility to the southeast of the creek.

Description of site: Several flakes of various materials were recorded within and adjacent to the bank of a dry creek (**Figure 23**; **Plate 29**). The Aboriginal representatives accompanying the survey wished for furrows in outcropping rock to be recorded as grinding grooves although no definitive attributes typically seen in grinding grooves were noted in a preliminary investigation by the OzArk archaeologist (**Plate 67**).

Figure 23: K-AS2 with PAD and K-OP1 plan view map

A likely scarred tree was also identified in close proximity to the site (**Plate 29**). It exhibits axe marks and several attributes that are consistent with the DEC Western region criteria given in **Appendix 3** (DEC & Long 2005).

1. The scar is above ground.
2. The ends of the scar are evenly tapered.
3. The scar is roughly symmetrical.
4. The length of the scar is on the same axis as the length of the tree.

5. The tree was sufficiently old.
7. The tree was a box.

The axe mark was somewhat clean, suggesting the possibility that it was made by a steel-axe. Also, an offshoot-trunk from the base of the scar is known to occur in some authentic scarring.

The ground rises steeply to the northwest from the creek line and it is unlikely that this area was extensively occupied. Level ground stretched to the southeast of the creek line though. This area has been intensively farmed but the presence of the site and suitable landscape features make this area a likely campsite. Testing would be needed to establish if there were intact soil levels that have avoided agricultural impacts, but there is a reasonable likelihood of archaeological deposits with some degree of reasonable integrity.

5.3.16 "Karingle" Ochre Processing (K-OP1)

Site type: Ochre processing area.

GPS Coordinates: (GDA94 Zone 55) 652826E / 6406187N.

Location of site: The site is c. 50m north-northeast of the PAD associated with K-AS2 (K-6 Survey Unit; **Figure 10**). It is between the northwest bank of the creek line in this area and a dirt track which crosses the creek to the south of K-OP1 and passes to the south of the PAD where it continues toward "Karingle" homestead.

Description of site: The site is a small mound of multi-coloured pigmented clay, measuring roughly 1m by 1m in area (**Figure 23**; **Plates 30** to **31**). It is uncertain if this was locally extracted or if it was the result of activity such as drilling. However, the high variation in colour and separation of these colours indicates it is not a natural occurrence. More investigation is required to assess provenance of the ochre. This area is outside of the impact footprint.

5.3.17 "Karingle" Isolated Find 1 (K-IF1)

Site type: Isolated find.

GPS Coordinates: (GDA94 Zone 55) 652642E / 6405350N.

Location of site: The site is c. 200m west of the entrance driveway to the "Karingle" property which extends to Eulandool Road to the south (K-6 Survey Unit; **Figure 10**). It is directly west of the Karingal homestead.

Description of site: A single artefact was recorded on the edge of a dry creek at an elevation of 356m AHD (**Figure 24**; **Plates 32** to **33**). The artefact is a silcrete secondary flake. It is possible that there are more artefacts nearby, but there was no time for an extensive search on the day it was identified. It was subsequently decided that the area would not be subject to impacts and so the site was not revisited.

Figure 24: PAD 12 and K-IF1 plan view map

5.3.18 Potential Archaeological Deposit 12 (PAD 12)

Site type: Potential Archaeological Deposit.

GPS Coordinates: (GDA94 Zone 55) 652500E / 6405600N.

Location of site: This PAD is c. 250m northwest of the "Karingle" homestead. It partly overlaps with survey unit K-9 (**Figure 10** and **Figure 43**). It roughly follows a creek line and one of its branches, with a 50m buffer from the waterways where there are suitable landforms.

Description of site: PAD 12 is set on a floodplain adjacent to a creek line and one of its branches (**Figure 24**; **Volume 2**: **Plates 34** to **35**). No sites were identified in the PAD, but visibility was poor in this area and a PAD had been designated in the general area on three separate surveys, each by a different surveyor. The creeks were largely dry at the time of survey, with some water pooling remnant. Despite this, water could be expected in these waterways in wetter periods, and they stand out in the local area as relatively prominent streams.

5.3.19 "Glen Idol" Aboriginal Site 1 (GI-AS1)

Site type: Open artefact scatter.

GPS Coordinates: (GDA94 Zone 55) 652761E / 6406650N.

Location of site: Located northwest of Dowds Hill and south of a smaller but prominent hill. The area can be accessed by driving through the "Karingle" property to the west of "Glen Idol" and continuing on a dirt track that bends to the east, just south of the aforementioned smaller prominent hill until one has entered the "Glen Idol" property (Survey Unit GI; **Figure 10**).

Description of site: The site consists of two artefacts 10m apart. They are situated on a rise above a third order waterway, which is small and dry with a rocky outcrop at its head (**Figure 25**; **Plates 36** to **37**). To the south of the site the rise drops to a flat area. Vegetation

onsite is open eucalypt woodland, at an elevation of 408m AHD. Soils are brown silt with low levels of cobbles and gravel. Shallow soils are likely as bedrock is exposed on portions of the site. Artefacts are:

- Grey mudstone tertiary flake; Banded dark grey FGS flake shatter. There is also some rhyolite in the area, though it does not exhibit flake anatomy.

Ground surface visibility within the exposure (sheet wash erosion) is 20%. Off the exposure there is nil ground surface visibility. The site is affected by erosion, vegetation growth, and bioturbation (termites and animal digging). A borehole is located near the site. There is moderate potential for sub-surface deposit in the flat area to the south of the artefacts.

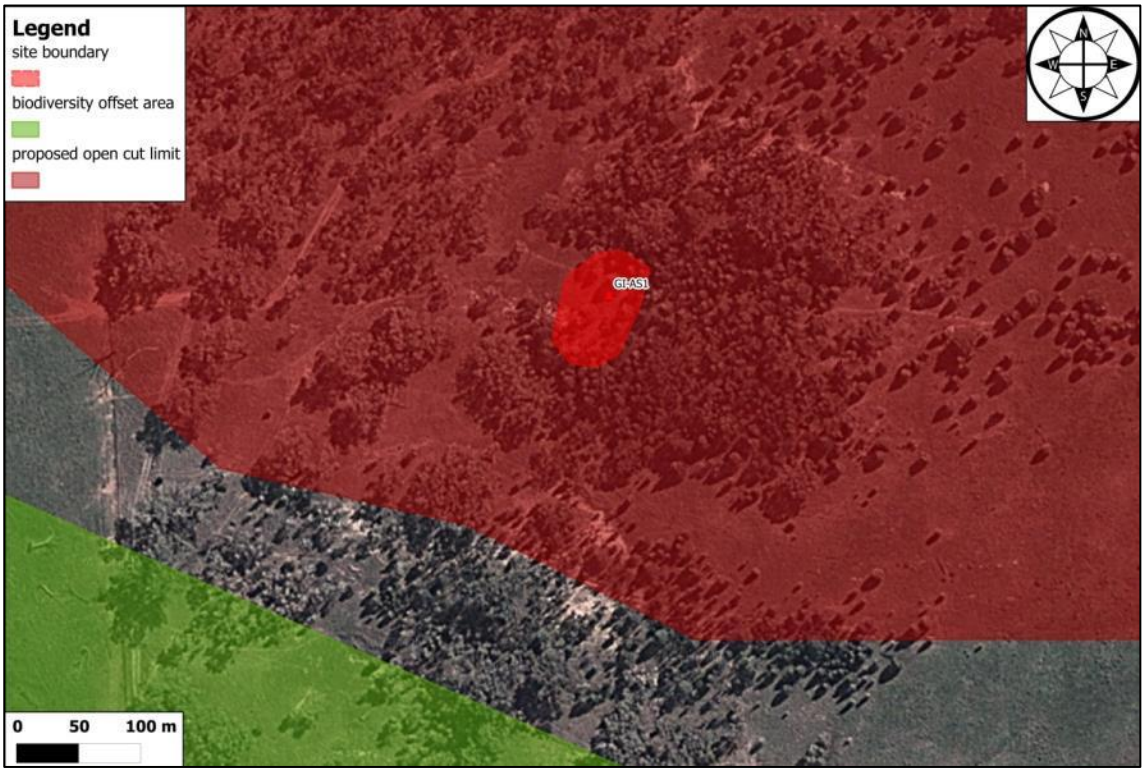
5.3.20 "Glen Idol" Aboriginal Site 2 (GI-AS2)

Site type: Open artefact scatter.

GPS Coordinates: (GDA94 Zone 55) 653003E / 6406694N.

Location of site: Located northwest of Dowds Hill and south of a smaller but prominent hill. The area can be accessed by driving through the "Karingle" property to the west of "Glen Idol" and continuing on a dirt track that bends to the east, just south of the aforementioned smaller prominent hill until one has entered the "Glen Idol" property (Survey Unit GI; **Figure 10**).

Figure 25: GI-AS1 and plan view map



Description of site: Site consists of two lithic artefacts on a small rise of partially exposed bedrock at an elevation of 410m AHD (**Figure 26**; **Plates 38** to **39**). Vegetation consists of open woodland of young pine (regrowth), grasses, and sparse eucalypt. Soils are brown silt. Artefacts are:

- Flake shatter of coarse red-brown material.
- Small quartz cobble with flake scars on the tip, creating a sharp edge.
- Other quartz in the area does not exhibit flake anatomy.
- Visibility on the exposure (sheet wash) is 50% and off the exposure is 10%. Soils are too thin to make subsurface deposits likely. Impacts include erosion and recreation (a campfire ring was observed).

5.3.21 "Pacific Hill" Isolated Find 1 (PH-IF1)

Site type: Isolated find.

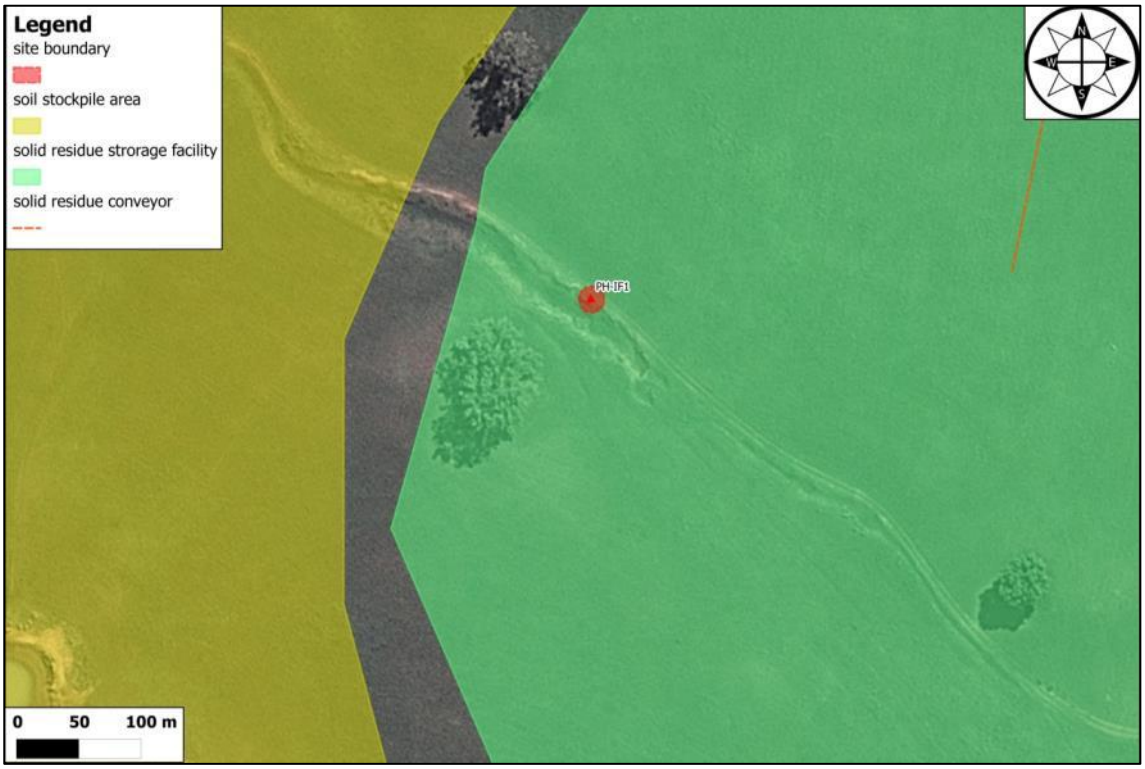
GPS Coordinates: (GDA94 Zone 55) 650695E / 6407055N.

Location of site: The site is located in the second paddock east of the railway on the "Pacific Hill" property (PH-6 Survey Unit; **Figure 10**). It can be accessed by dirt tracks which extend east from the house complex at "Pacific Hill".

Figure 26: GI-AS2 plan view map

Description of site: Site consists of an isolated piece of beige chert flake shatter in a dirt road exposure on the north bank of an ephemeral creek at an elevation of 351m AHD (**Figure 27**; **Plates 40** to **41**). Vegetation in the area is grassy crop land with occasional remnant trees.

Figure 27: PH-IF1 plan view map



Impacts to the site include the dirt vehicle track, vegetation removal, cropping and grazing, and erosion. Visibility on the dirt exposure is 80% and 10% off the exposure. The road and erosion-caused exposure measures approximately 4m wide. The A-horizon at this site likely has been destroyed by these impacts.

5.3.22 "Toongi Valley" Aboriginal Site 1 (TV-AS1)

Site type: Open artefact scatter.

GPS Coordinates: (GDA94 Zone 55) 652009E / 6408159N.

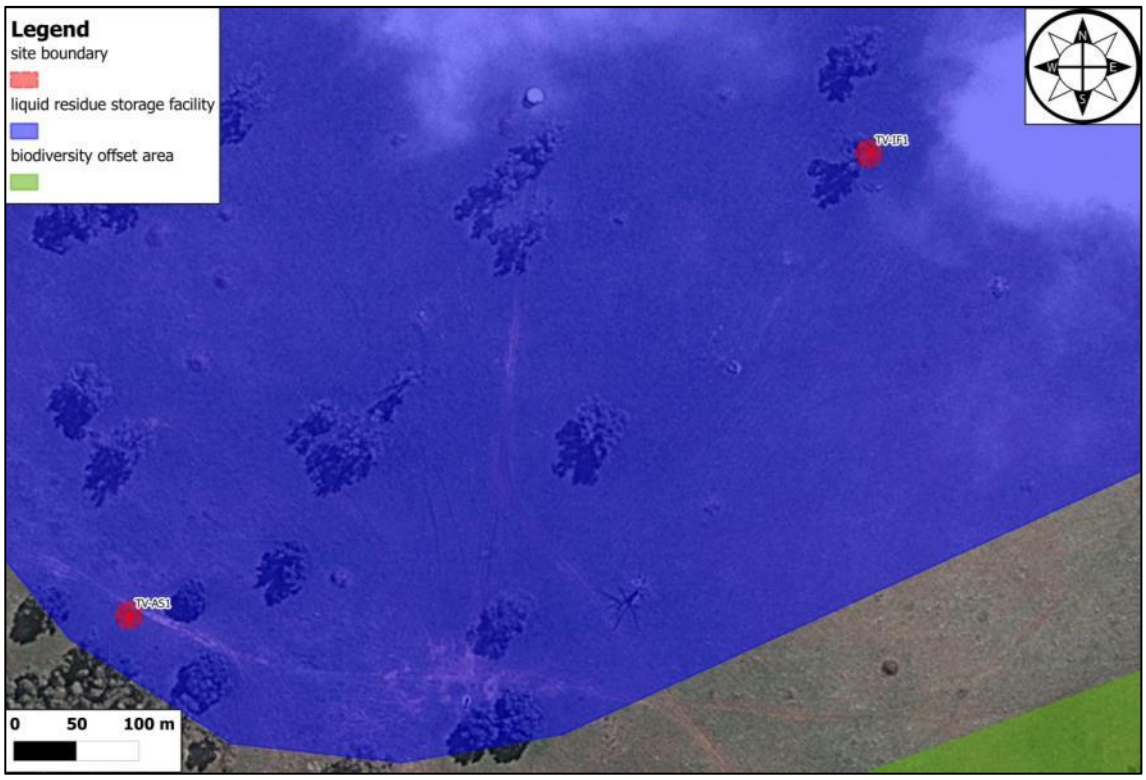
Location of site: Located in the eastern portion of the "Toongi Valley" property, northeast approximately 100m of an unnamed but sizable tributary of Wambangalang Creek (TV-3 Survey Unit; **Figure 10**).

Description of site: Site consists of two artefacts within a metre of each other at 380m AHD (**Figure 28**; **Plates 42** to **43**). Soil is dark brown and loamy. A stand of young-growth pines is nearby. Vegetation consists of grasses, clover, and sparse low shrub. The site is located 1m from a barbed wire fence with the identified artefacts as follows.

- Quartz core: 40 x 52 x 40mm, cortex is present on one side. Flakes are removed multi-directionally, but none are removed from the side with cortex, which was clearly used as a platform.

- Quartz shatter, without diagnostic features but quartz is unusual in the area and proximity to the core makes it likely to be associated. It cannot be ruled out that the shatter was broken off the core by animal trampling or other non-cultural means however.

Figure 28: TV-AS1 and TV-IF1 plan view map



The artefacts were not found in an exposure and ground surface visibility was almost nil. A road exposure nearby did not contain artefacts. Impacts to the site include grazing and fence construction. Due to the disturbance to the soils from grazing, coupled with the scarcity of artefacts at this site, it is assessed that intact sub-surface deposits are unlikely.

5.3.23 "Toongi Valley" Aboriginal Site 2 with PAD (TV-AS2 with PAD)

Site type: Open artefact scatter with PAD.

GPS Coordinates: (GDA94 Zone 55) 650740E / 6410316N.

Location of site: Site is located on the east bank of Wambangalang Creek, north of the "Toongi Valley" house complex, which itself is located on Toongi Rd (Site is located on the edge of TV-1 Survey Unit and the Macquarie Water Pipeline, but is not inside the impact footprint for either; **Figure 13**).

Description of site: Site is a sparse lithic scatter in a dirt track on the banks of Wambangalang Creek (**Figure 29**; **Plates 44** to **45**). Vegetation along the creek consists of eucalypt woodland and has been cleared for grazing and cropping. Six artefacts were recorded of quartz, mudstone, and chert. The most notable artefact is a scraper described as follows.

- Grey mudstone secondary flake with edge modification, measuring 21 x 24 x 10mm.

Figure 29: TV-AS2 with PAD plan view map

Ground surface visibility on the track exposure is 40% and off the exposure is almost nil. Impacts to the site consist of clearing the land of native vegetation and grazing. It is not known whether the area has been ploughed. The PAD at this site is likely to extend to the west of the site, as the eastern side has certainly been impacted by ploughing.

5.3.24 "Toongi Valley" Aboriginal Site 3 with PAD (TV-AS3 with PAD)

Site type: Open artefact scatter with PAD.

GPS Coordinates: (GDA94 Zone 55) 651625E / 6408100N.

Location of site: Site is located on the banks of an unnamed drainage which flows westerly into Wambangalang Creek. Dowd Hill is located 1km southeast of the site (site extends into northern portion of the TV-4 Survey Unit; **Figure 10**).

Description of site: Site is an extensive open lithic artefact scatter on the southern bank of a second order waterway at an elevation of 340m AHD (**Figure 30**, **31**, and **44; Plates 46** to **47**). At the time of recording water was present in the creek despite the overall dry conditions, which indicates that it is likely the site of a reliable spring. Several first order waterways dissect the site as well. Soils are red and silty. Vegetation consists of grasses and remnant woodland. Artefacts consist of lithic debitage, modified flakes, and ground stone. Lithic materials include silcrete, chert, quartz, quartzite, sandstone, fine-grained silica (FGS), and mudstone. Maximum artefact density is four per square metre.

A sample of artefacts present was recorded:

- Green FGS: 3 secondary flakes, 2 tertiary flakes, 1 flake shatter;
- Beige chert multidirectional core: 47 x 37 x 23mm;

- Beige chert: 2 flake shatter;
- Mudstone modified flake;
- Quartz: several quartz fragments are present in the area, some with flake anatomy but only one (tertiary flake) that is undeniably cultural in origin;
- Quartzite: 1 tertiary flake with edge wear;
- Sandstone grinding stone: a flat cobble with a couple of flakes removed, ground unifacially, measuring 105 x 78 x 22mm; and
- Silcrete: 1 secondary flake, 4 tertiary flakes and 3 flake shatter.
    - Located on the east side of a barbed wire fence are:
- Green FGS: 1 secondary flake;
- Mottled reddish FGS: 1 tertiary flake with possible edge wear; and
- Silcrete: 1 tertiary flake and 1 flake shatter.

Soils are loose along the banks of the creek but highly compacted elsewhere onsite. Visibility on the exposures is approximately 50%, with 10% visibility off the exposures. Impacts to the site include grazing/ cattle trampling, clearing of native vegetation, dirt access tracks, and erosion.

Despite impacts to the land it is likely that undisturbed deposits are present as well. This PAD encompasses two other previously recorded sites (#36-1-0361 and #36-1-0357, a grinding groove site and artefact scatter – refer to **Section 5.4** and **Figure 47**), and is considered a Sensitive Archaeological Landform (SAL). The SAL encompasses all artefacts recorded and extends onto the northern side of the creek, though no artefacts were identified on the northern side. The SAL extends to the southeast for 670m.

Figure 30: TV-AS3 with PAD plan view sketch map (not to scale)

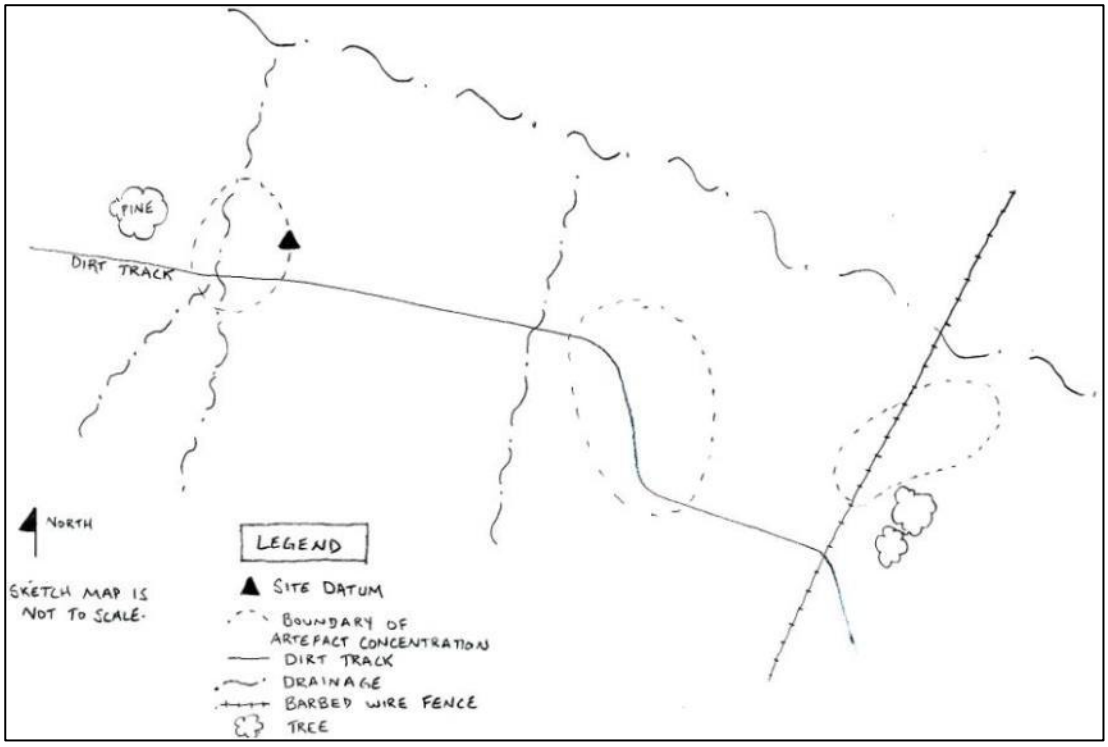
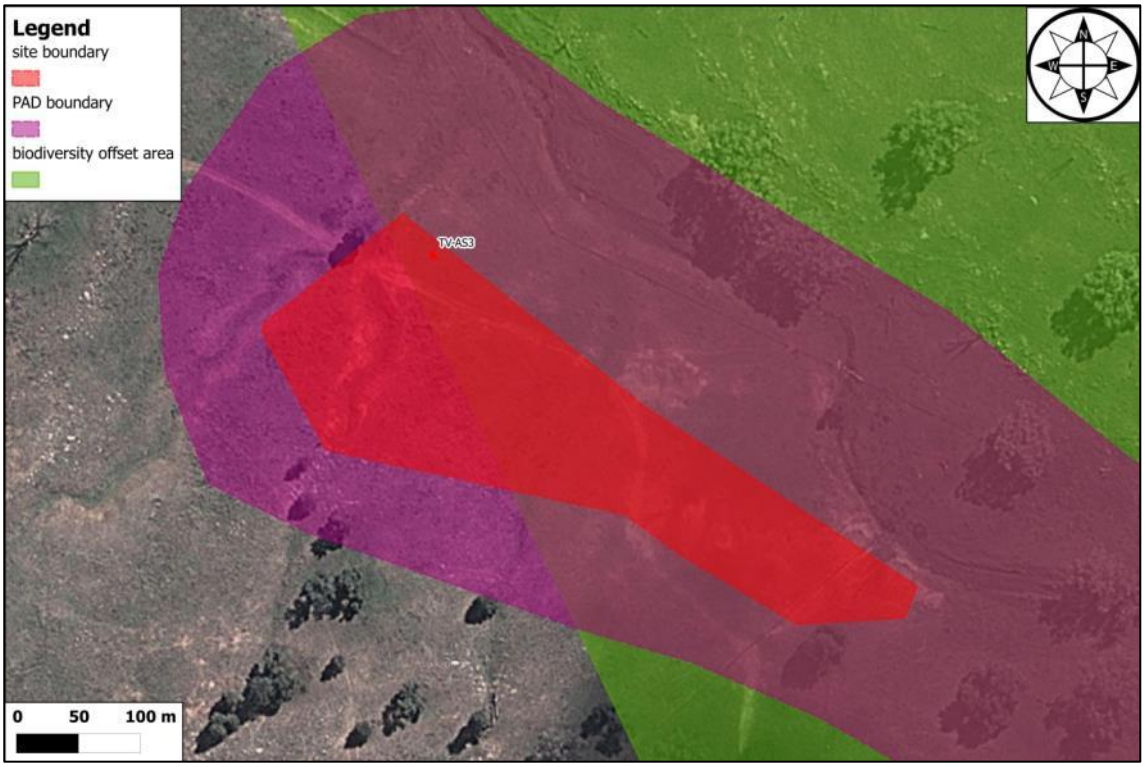


Figure 31: TV-AS3 with PAD plan view map



5.3.25 "Toongi Valley" Isolated Find 1 (TV-IF1)

Site type: isolated find.

GPS Coordinates: (GDA94 Zone 55) 652253E / 6408305N.

Location of site: Located in the eastern portion of the "Toongi Valley" property, north approximately 300m of an unnamed but sizable tributary of Wambangalang Creek (TV-3 Survey Unit; **Figure 10**).

Description of site: The site consists of a single large flake on a low hill, at 380m AHD (**Figure 28**; **Plates 48** to **49**). Native vegetation has largely been cleared from the paddock, but several isolated eucalypts dot the landscape, as well as stinging nettle. The artefact was found at the base of a eucalypt. Soils are dark brown and silty. A rock pile associated with land clearing lies nearby.

- Grey FGS tertiary flake measuring 87 x 74 x 20mm, with 4 flakes removed from ventral side of the artefact and a portion of the bottom edge exhibiting use wear.

Ground surface visibility in the area is approximately 15%, with patchy exposures. Impacts to the site consist of grazing and ploughing. Due to the disturbance to the soils from ploughing at this site it is assessed that intact sub-surface deposits are unlikely.

5.3.26 "Grandale" Artefact Scatter 1 (G-AS1)

Site type: Open artefact scatter.

GPS Coordinates: (GDA94 Zone 55) 653841E / 6410946N

Location of site: To access the site go 1.5km south from Benolong Rd on the access road for "Grandale". From the earth dam located north of the road, travel 200m south-southwest to the site (G-5 Survey Unit; **Figure 10**).

Description of site: The site consists of a two artefacts located on a low slope at an elevation of 328m elevation (**Figure 32**; **Plates 50** to **51**). Artefacts have been identified across a 9m by 1m area. Soils are red-brown sandy clay with sandstone. Native vegetation has largely been cleared, with patchy low and high grasses and some new growth pines and mature box trees. The nearest water source is a 1st order waterway approximately 20m from the site.

Artefacts consist of a cobble with flakes removed along one edge and an angular rock with flakes removed along one edge**.**

The artefacts are located in an area of moderate erosion, with 10-20% ground surface visibility on the exposure and 5% ground surface visibility off the exposure. Background noise is low across the area. The exposure measures 20m by 10m. Impacts to the site from agriculture make it unlikely that intact sub-surface deposits are present.

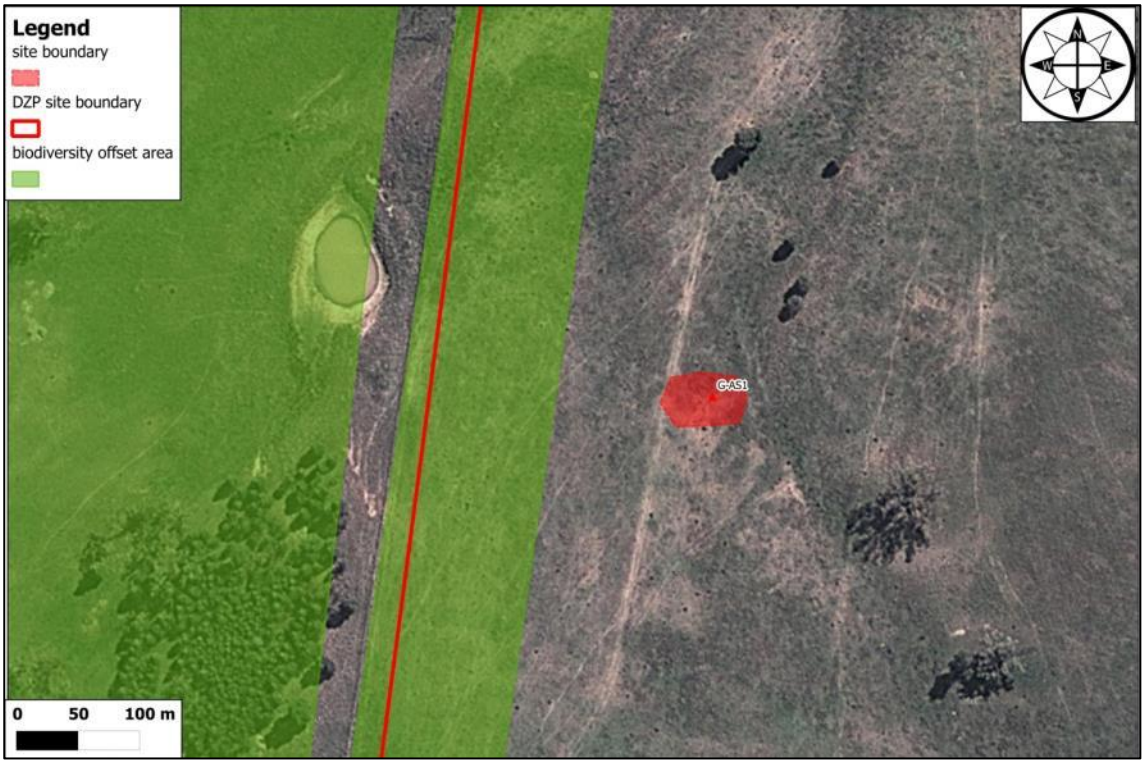
5.3.27 "Grandale" Isolated Find 1 (G-IF1)

Site type: isolated find.

GPS Coordinates: (GDA94 Zone 55) 654630E / 6412306N.

Location of site: Site is located on the south side of Benolong Road, approximately 3m south of the barbed wire fence which separates the survey unit from the road corridor (UG-4 Survey Unit; **Figure 10**).

Figure 32: G-AS1 plan view map (sketch map is not to scale)



Description of site: The site consists of a single quartz flake on a low slope at 308m elevation, in a dirt vehicle track (**Figure 33**; **Plates 52** to **53**). Vegetation consists of grasses and remnant mature trees on cleared land. The nearest water source is located 100m away in an ephemeral drainage.

Figure 33: G-IF1 plan view map

Soils are a red-brown sandy clay with sandstone outcrops in the vicinity. Visibility on the exposure is 80% and off the exposure is 20%. Impacts to the site include vehicle movement and agricultural activities such as land clearing and grazing. It is unlikely that there are intact sub-surface deposits at this site, given that the exposure is extensive and has good visibility and that more artefacts would have been revealed if they were present.

5.3.28 "Mia Mia" Aboriginal Site 1 (MM-AS1)

Site type: Open artefact scatter.

GPS Coordinates: (GDA94 Zone 55) 653239E / 6413941N.

Location of site: Located northwest of the dirt track heading north from Benolong Road onto the "Mia Mia" property. The site is approximately 40m east of Wambangalang Creek and southwest of the house complex (MM-3 Survey Unit; **Figure 11**).

Description of site: The site is a moderate density lithic scatter located in a fallow, previously ploughed paddock at 300m AHD (**Figure 34**; **Plates 54** to **55**). Soils are light brown and silty. Eleven (11) artefacts were recorded representing four material types:

- Grey mudstone: 1 secondary flake and 2 pieces of flake shatter; Mottled chert: 1 tertiary flake and 1 piece of flake shatter; Grey FGS: 1 piece flake shatter; and Quartz: 3 tertiary flakes and 2 pieces of flake shatter.

Ground surface visibility is 90%. The most significant impact to the site is ploughing, though wind deflation of the soils is also likely as the fallow paddock has little vegetation to stabilise the soils.

Figure 34: MM-AS1 plan view map

5.3.29 "Mia Mia" Aboriginal Site 2 (MM-AS2)

Site type: Open artefact scatter.

GPS Coordinates: (GDA94 Zone 55) 651663E / 6411405N.

Location of site: Located on the banks of Wambangalang Creek, on the east side of a fence line that separates a paddock from the creek, on the "Mia Mia" property south of Benolong Road (MM-7 Survey Unit; **Figure 10**).

Description of site: The site is comprised of four artefacts on the edge of a ploughed paddock, 20m from a creek, at 306m AHD (**Figure 35**; **Plates 56** to **57**). The artefacts are approximately 40m distance from each other.

- Grey chert tertiary flake found in animal track 1m inside fence; Grey FGS core: 65 x 70 x 45mm, multidirectional with some weathered surfaces and cortex; Grey-blue FGS secondary flake; Indurated mudstone core: 35 x 39 x 22, multidirectional with cortex.

Soils are light brown silty sand. Ground surface visibility is 10%. Impacts to the site consist of fence construction, ploughing, and animal trails. Due to these impacts to the soil it is assessed that intact sub-surface deposits are unlikely.

Figure 35: MM-AS2 plan view map

5.3.30 "Mia Mia" Isolated Find 1 (MM-IF1)

Site type: Isolated find.

GPS Coordinates: (GDA94 Zone 55) 651266E / 6410925N.

Location of site: Located on the banks of Wambangalang Creek, on the east side of a fence line that separates a paddock from the creek, on the "Mia Mia" property south of Benolong Road (MM-7 Survey Unit; **Figure 10**).

Description of site: This site is comprised of an isolated artefact located in a ploughed paddock at an elevation of 308m AHD (**Figure 36**; **Plates 58** to **59**). It lies approximately 20m from the creek and 10m from the fence line.

- Grey-green FGS test cobble or lightly used core with approximately 50% of cortex remaining. Flakes are removed multi-directionally. The artefact measures: 70 x 55 x 50mm.

Ground surface visibility is less than 10% due to grass cover. Impacts to the area consist of ploughing. Due to disturbances to the soil as a result of ploughing it is assessed that intact sub-surface deposits are unlikely.

Figure 36: MM-IF1 and MM-IF2 plan view map

5.3.31 "Mia Mia" Isolated Find 2 (MM-IF2)

Site type: Isolated find.

GPS Coordinates: (GDA94 Zone 55) 651012E / 6410597N.

Location of site: Located on the banks of Wambangalang Creek, on the east side of a fence line that separates a paddock from the creek, on the "Mia Mia" property south of Benolong Road (MM-8 Survey Unit; **Figure 10**).

Description of site: This site is comprised of an isolated artefact located in a ploughed paddock at 304m AHD, on a terrace 20m from a creek (**Figure 36**; **Plates 60** to **61**). Soils are brown silt.

- Grey FGS core: 45 x 55 x 33mm, with flakes removed in one direction from only one side of the artefact.

Ground surface visibility is approximately 10% on site. Impacts to the area consist of ploughing. Due to disturbances to the soil as a result of ploughing it is assessed that intact sub-surface deposits are unlikely.

5.3.32 Obley Road Aboriginal Site 1 with PAD (OR-AS1 with PAD)

Site type: Open artefact scatter with PAD.

GPS Coordinates: (GDA94 Zone 55) 647874E / 6415464N.

Location of site: Located approximately 15m east of Obley Road, north of Hyandra Creek 40m to 50m, in a dirt road exposure (OR-7 Survey Unit; **Figure 11**).

Description of site: Site is a sparse lithic scatter comprised of three artefacts within one metre of each other (**Figure 37**; **Plates 62** to **63**). Adjacent to the dirt road exposure is an open grassy area with eucalypts nearby. The site is situated on a flat terrace above Hyandra Creek. Soil is light brown silt.

Artefacts include**:**

- Brown mudstone multidirectional core with some cortex: 40 x 25 x 27mm; Grey chert utilised secondary flake: 60 x 45 x 20mm; Grey FGS tertiary flake.
- There is also quartz in the area that exhibits some flake anatomy, but not to an extent to positively identify the items as cultural in origin.

Figure 37: OR-AS1 with PAD and 36-1-120 with PAD plan view map

Ground surface visibility is 70% on the exposure and 5% off the exposure due to vegetation and imported gravels. Impacts to the site include clearing of native vegetation, and most significantly, a dirt access road with imported gravels.

The PAD at this site is likely to extend out of the exposure, and more intact deposits may be present in those undisturbed areas. The exposed areas, including those covered with imported road gravels, are less likely to have intact deposits as the A-horizons have been disturbed. Additionally, the construction of Obley Road would have impacted PAD adjacent to it.

5.3.33 Obley Road Scarred Tree 1 (OR-ST1)

Site type: Scarred tree.

GPS Coordinates: (GDA94 Zone 55) 649529E / 6423523N.

Location of site: Located approximately 12m west of Obley Road and approximately 0.7km north of Belmont Road (**Figure 11**).

Description of site: The site consists of a single scarred tree in an Inland Grey Box (*Eucalypt macrocarpa*) community at 301m AHD (**Figure 38**; **Plates 64** to **65**). The scar is very large and may have been created for canoe construction. There are no associated artefacts. Soils are a dark brown silty loam. Nearest water is an unnamed second order watercourse 120m east.

Figure 38: OR-ST1 plan view map

The tree.

- Inland Grey Box (*Eucalypt macrocarpa*), alive.
- Approximately 13m height, 1.4m width of trunk.

The scar.

- Oriented to the south-southeast.
- Height of base above ground: 34cm.
- Scar length is 172cm, width is 70cm.
- Maximum depth of regrowth is 20cm.

It is unlikely that the site has PAD as no artefacts were located in the vicinity.

5.4 ABORIGINAL SITES RELOCATED (FROM AHIMS RECORDS)

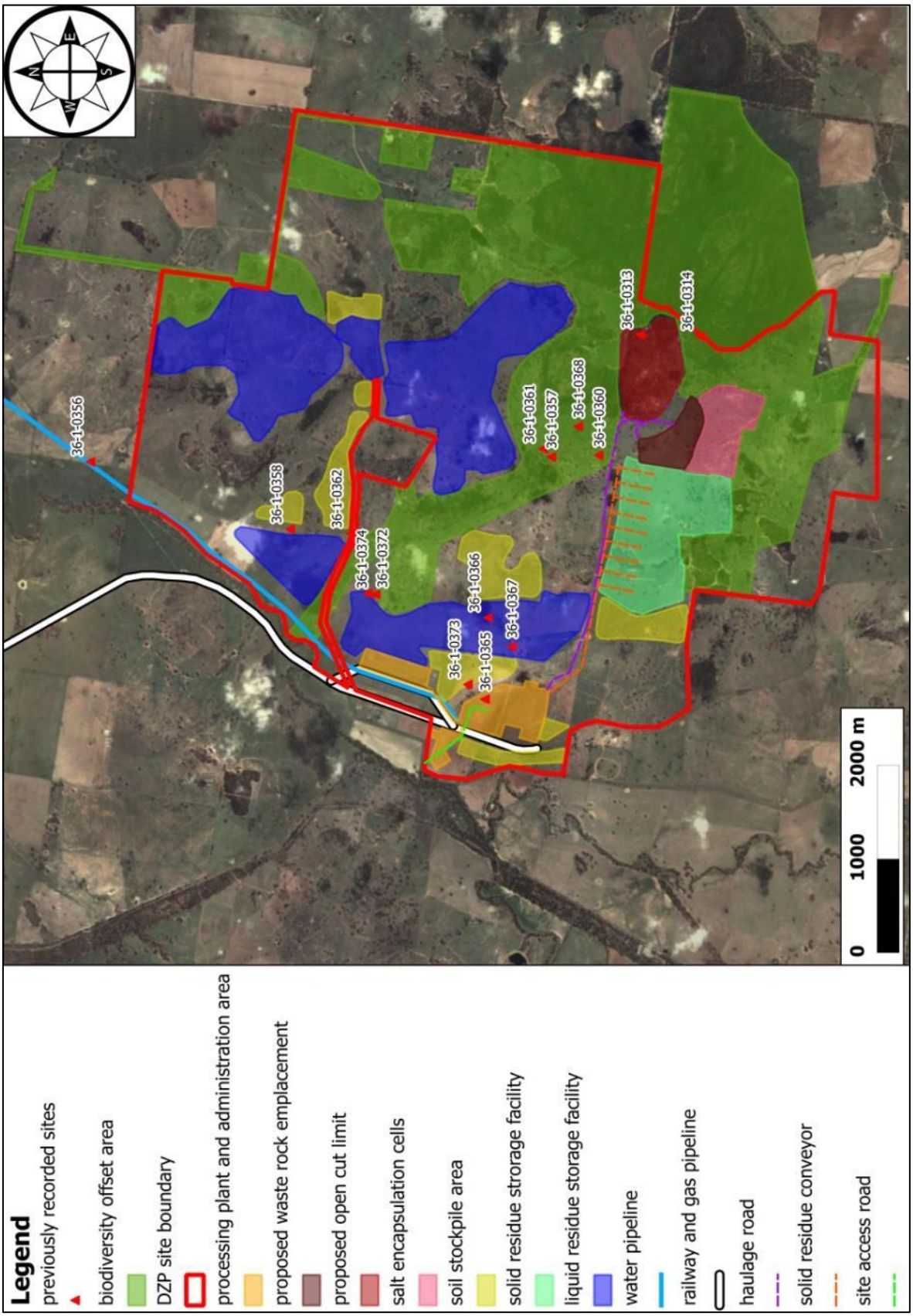
5.4.1 Sites within the Application Area

Nineteen (19) previously recorded Aboriginal sites are within the Study Area (**Table 9**). Fourteen (14) are located within the DZP Site, two (2) are located in the Macquarie River Water Pipeline Corridor, and three (3) are located in the Obley Road Alignment (**Figures 39** and **40**). No sites have been previously recorded in the impact footprint of the Toongi - Dubbo Rail Line and Gas Pipeline Corridor.

Table 9: Previously Recorded Aboriginal Sites

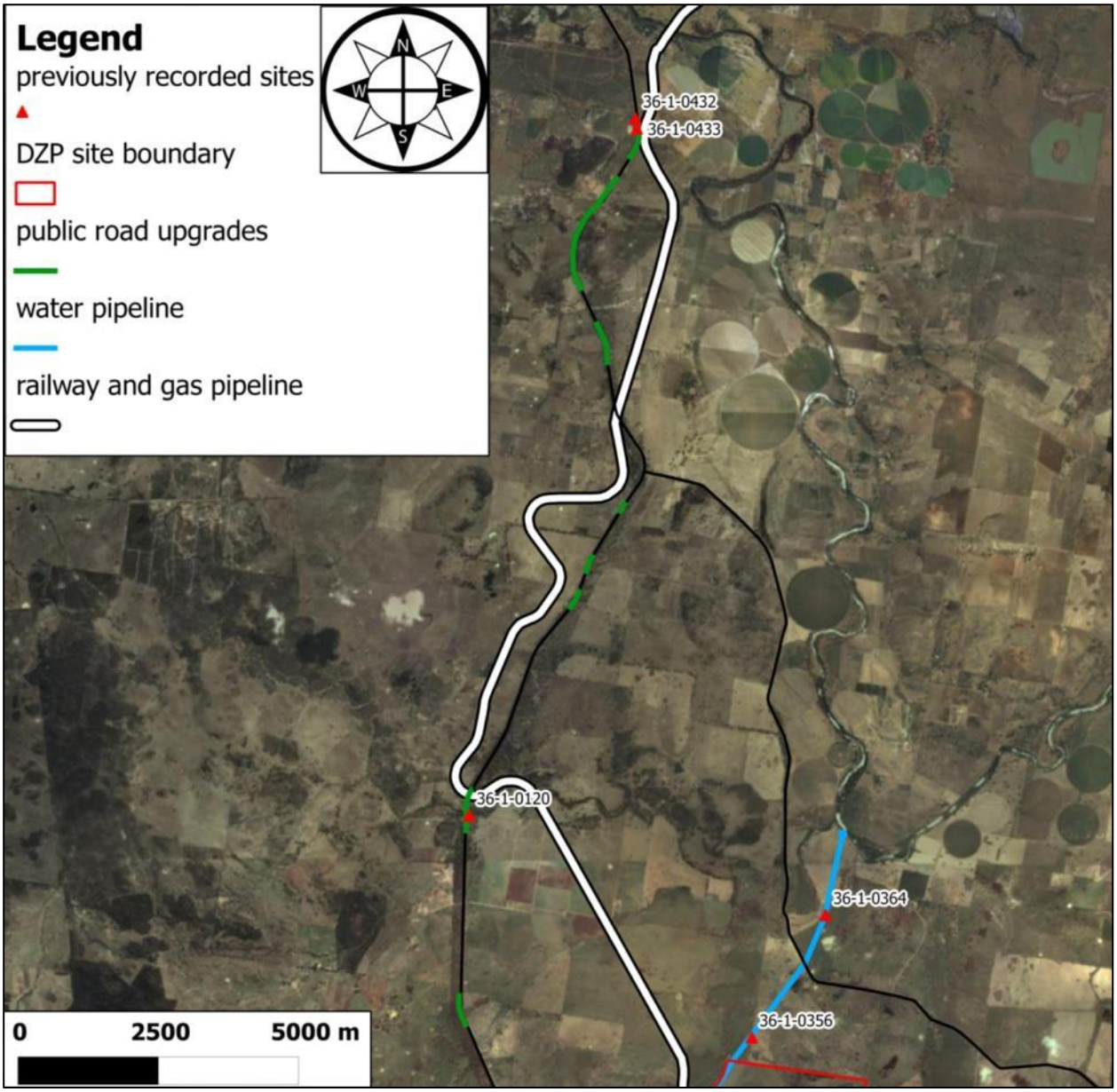
Site Number	Feature(s)	Survey Unit	Landform
DZP Site			
#36-1-0373 (TS-ST-03)	Aboriginal scarred tree	W-4	gently undulating
#36-1-0365 (TS-ST-04)	Aboriginal scarred tree	W-4	gently undulating
#36-1-0366 (TS-ST-05)	Aboriginal scarred tree	W-5	gently undulating
#36-1-0367 (TS-ST-06)	Aboriginal scarred tree	W-5	gently undulating
#36-1-0368 (TS-ST-07)	Aboriginal scarred tree	N/A	gently undulating
#36-1-0313 (TS-IF-01)	Isolated artefact	GI	gently undulating
#36-1-0314 (TS-GG-01)	Grinding grooves	NA	Creek
#36-1-0374 (TS-ST-01)	Aboriginal scarred tree	TV-2	gently undulating
#36-1-0372 (TS-ST-02)	Aboriginal scarred tree	TV-2	gently undulating
#36-1-0357 (TS-OS-01 with PAD)	Artefact scatter	NA	floodplain
#36-1-0361 (TS-GG-02 with PAD)	Grinding grooves	NA	creek/ floodplain
#36-1-0360 (TS-GG-03)	Grinding grooves	NA	floodplain
#36-1-0358 (TS-OS-02)	Artefact scatter	TV-1	gently undulating
#36-1-0362 (TS-IF-02)	Isolated artefact	TV-1	gently undulating
Toongi - Dubbo Rail Line and Gas Pipeline Corridor			
No Aboriginal sites have been recorded in the impact zone for the Toongi - Dubbo Rail Line in the areas assessed.			
Macquarie River Water Pipeline			
#36-1-0356 (TS-OS-03 with PAD)	Artefact scatter	MM-6	floodplain
#36-1-0364 (TS-OS-05 with PAD)	Artefact scatter	MM-2	floodplain
Obley Road Alignment			
#36-1-0432 (ORWM-ST1)	Aboriginal scarred tree	N/A	gently undulating
#36-1-0433 (ORWM-ST2)	Aboriginal scarred tree	N/A	gently undulating
#36-1-0120 (H2 with PAD)	Aboriginal scarred tree and artefact scatter	OR-7	floodplain

Figure 39: AHIMS-listed sites in and adjacent to the DZP Site



Note: Image presents the DZP Site assessed area.

Figure 40: AHIMS-listed Sites to the north of the DZP Site Boundary



5.4.2 AHIMS Sites of the DZP Site

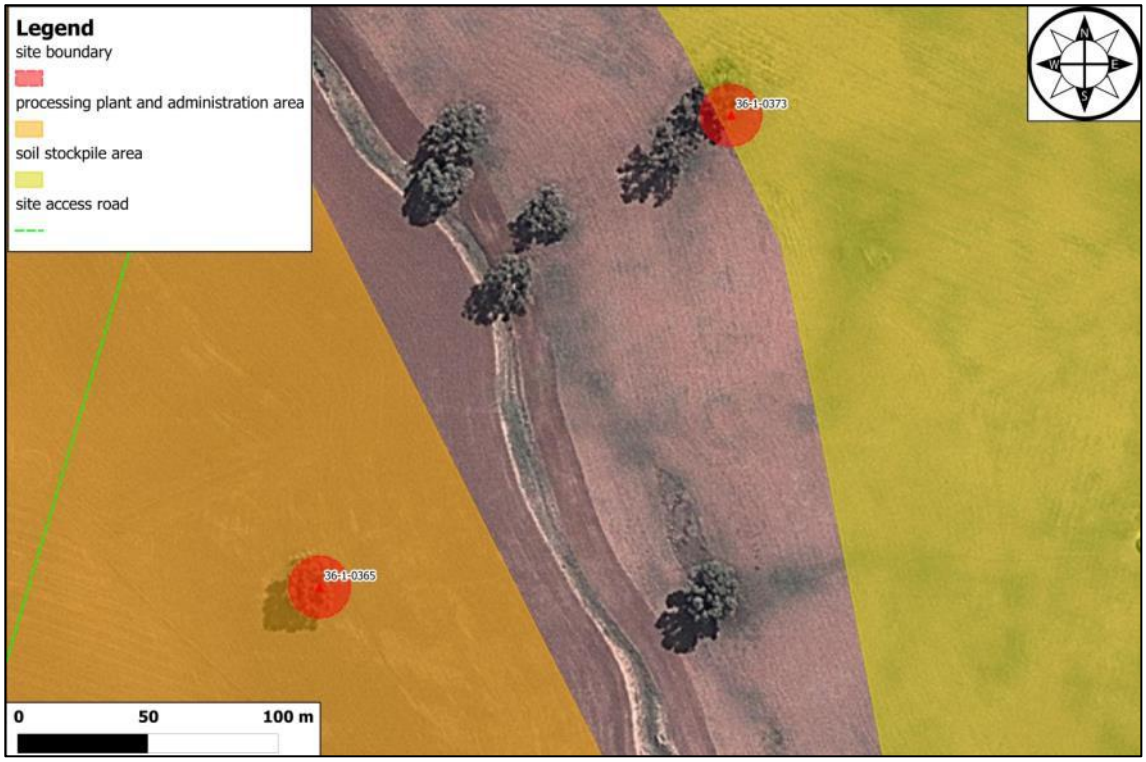
5.4.2.1 36-1-0373 (TS-ST-03)

This site is located at: (GDA94 Zone 55) 650019E / 6408565N (**Figure 39** and **41**). This is a possible Aboriginal scarred tree with no associated artefacts, located in Survey Unit W-4. The scar on this tree has closed up since its initial recording by Nolan in 2002.

5.4.2.2 36-1-0365 (TS-ST-04)

This site is located at: (GDA94 Zone 55) 649883E / 6408413N (**Figures 39** and **41**). This is an Aboriginal scarred tree with no associated artefacts, located in Survey Unit W-4.

Figure 41: 36-1-0365 and 36-1-0373 plan view map



5.4.2.3 36-1-0366 (TS-ST-05)

This site is located at: (GDA94 Zone 55) 650619E / 6408376N (**Figures 39** and **42**). This is an Aboriginal scarred tree with no associated artefacts, located in Survey Unit W-5. The scar on this tree has closed slightly since its original recording by Nolan in 2002. The tree is alive but rotting.

5.4.2.4 36-1-0367 (TS-ST-06)

The site is located at: (GDA94 Zone 55) 650355E / 6408167N (**Figures 39** and **42**). This is an Aboriginal scarred tree with no associated artefacts, located on the border of Survey Units W-5 and W-6.

5.4.2.5 36-1-0368 (TS-ST-07)

The site is located at: (GDA94 Zone 55) 652331E / 6407540N (**Figures 39** and **43**). This is an Aboriginal scarred tree with no associated artefacts, located outside the impact footprint for the Proposal, approximately 200m west of the base of Dowds Hill. The tree was found in the same condition as described originally by Nolan in 2002.

Figure 42: 36-1-0366 and 36-1-0367 plan view map

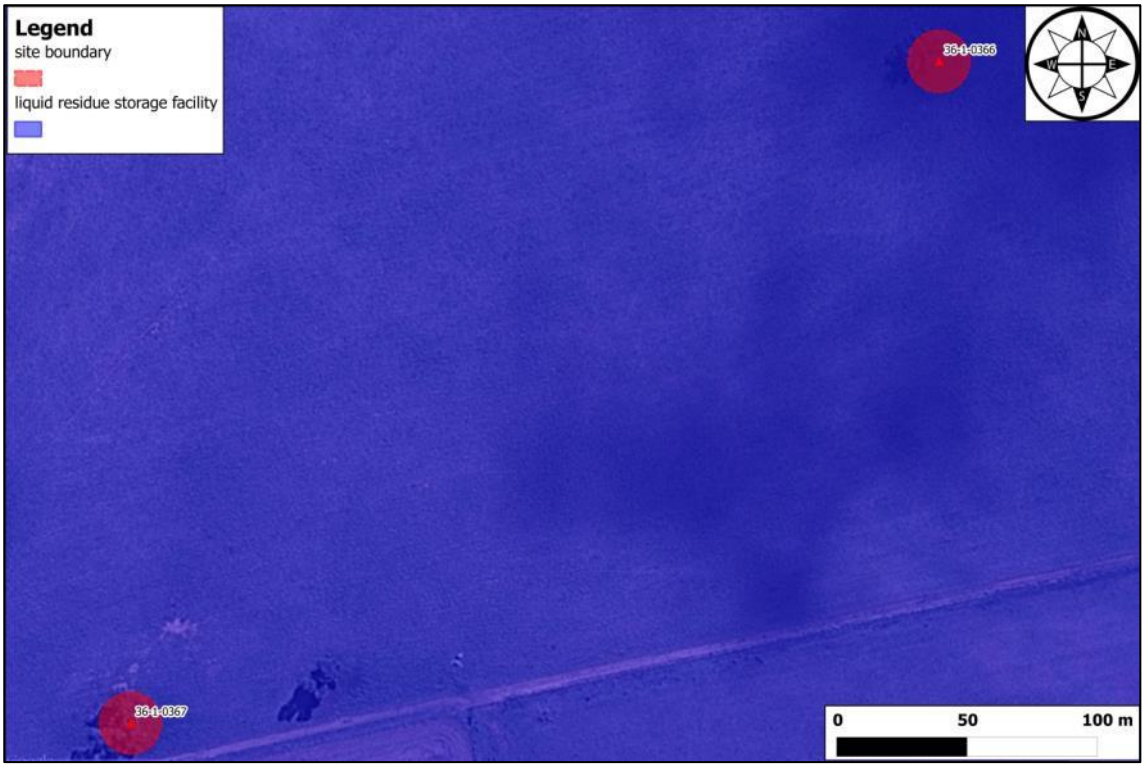
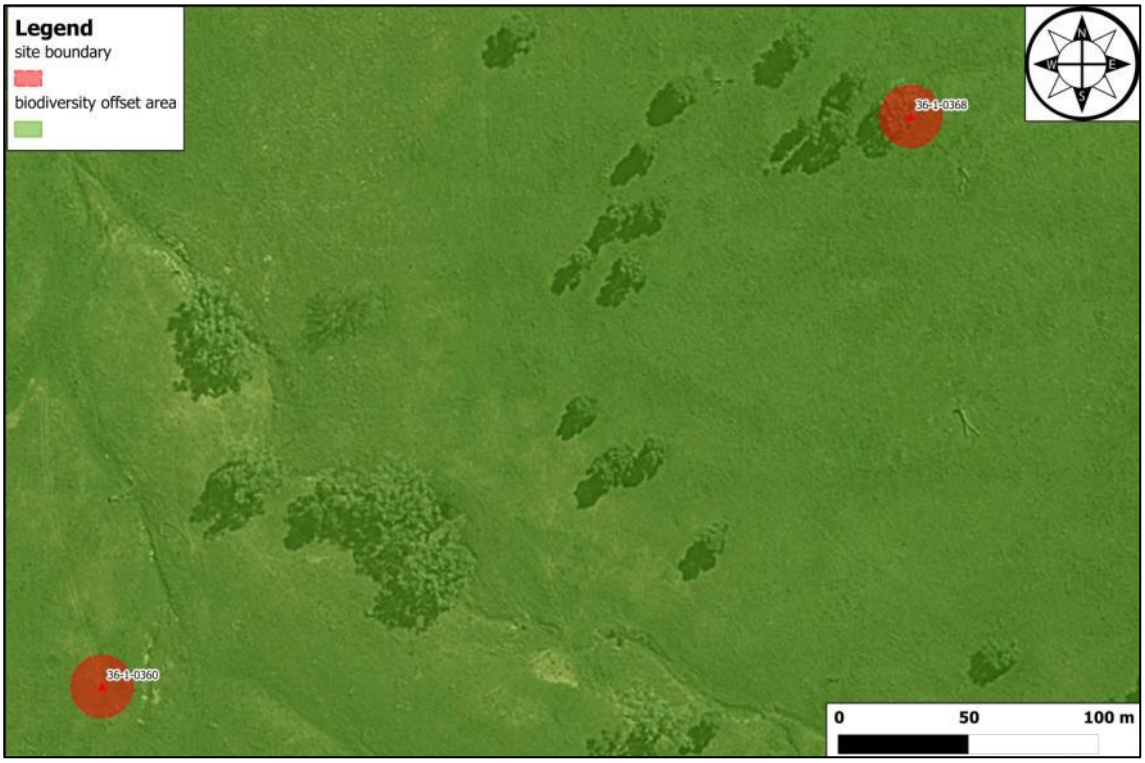


Figure 43: 36-1-0360 and 36-1-0368 plan view map



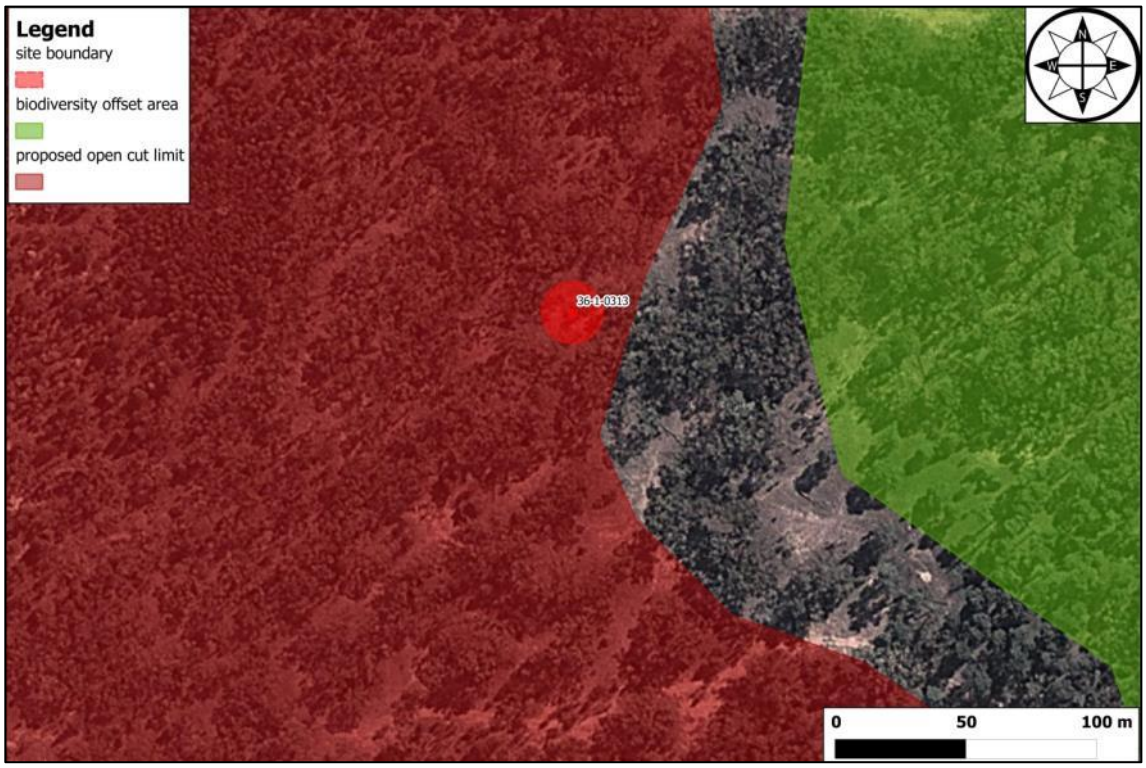
5.4.2.6 36-1-0313 (TS-IF-01)

The isolated artefact originally recorded at this site could not be located, though the general vicinity was located by GPS and description. A newly identified artefact was noted, however. The newly recorded artefact is located at (GDA94 Zone 55) 653149E / 6406967N (GI Survey Unit; **Figure 39**). The original artefact recorded was a tan chert 'flake tool.' The new artefact recorded is a pinkish chert piece of flake shatter. Impacts to the site consist of erosion, clearing of vegetation, and a borehole. It is not believed that this site has PAD as the site is very sparse despite the ground surface visibility being high, and is impacted by erosion to an extent that it is unlikely to have an intact A-horizon. Nolan (2000) believes the artefact he identified was likely to be the result of a drop/discard.

5.4.2.7 36-1-0314 (TS-GG-01)

The site is located at: (GDA94 Zone 55) 653127E / 6406427N (**Figures 39** and **44**). It has a number of grinding grooves, with five originally recorded (by Nolan) and six more identified during this assessment, bringing the total to 11 (**Plate 68**). The site plots next to the impact footprint for the proposed open cut, but was found to be outside the impact footprint by several hundred metres. Nolan (2000) indicates that the site may be at risk from incidental impacts from the mine.

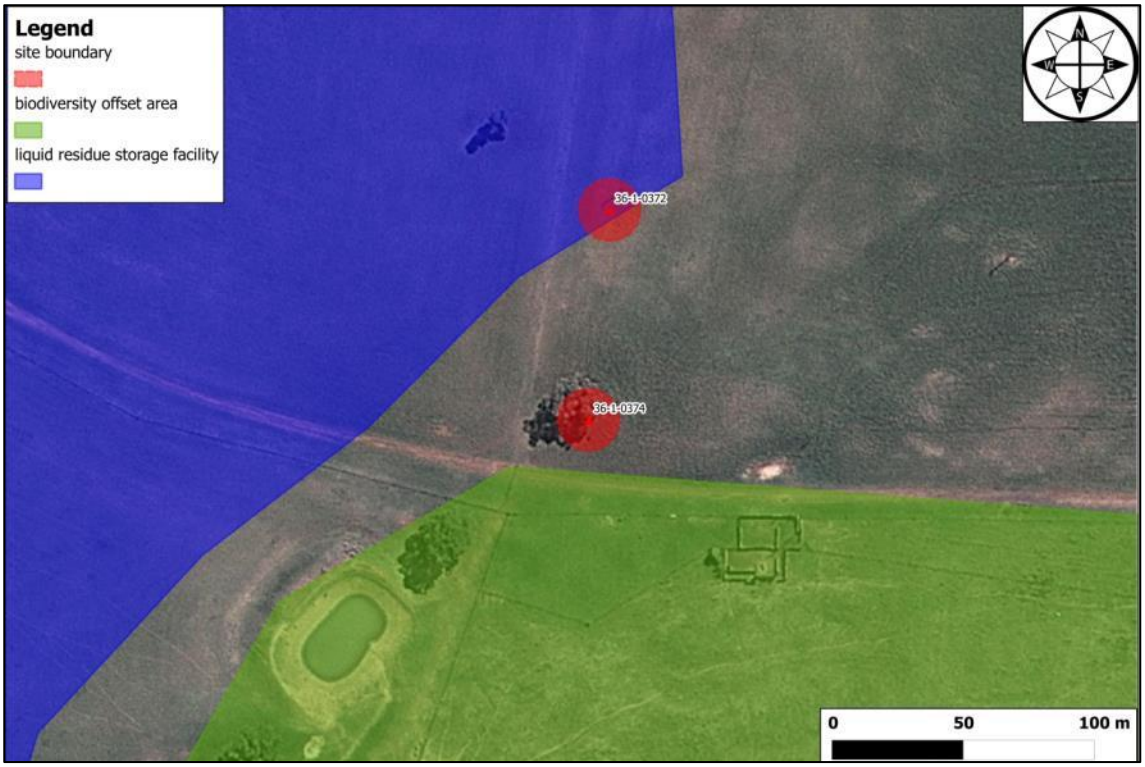
Figure 44: 36-1-0313 plan view map



5.4.2.8 36-1-0374 (TS-ST-01)

Site is located at: (GDA94 Zone 55) 650844E / 6409385N, 324m AHD (TV-2 Survey Unit; **Figures 39** and **45**). This scarred tree was recorded by Nolan (2002). Since then the scar has almost completely grown together, and the survey crew thought it unlikely that the scar is Aboriginal in origin as it is very low to the ground. A metal wire encircles the tree.

Figure 45: 36-1-0372 and 36-1-0374 plan view map



5.4.2.9 36-1-0372 (TS-ST-02)

Site is located at: (GDA94 Zone 55) 650739E / 6409277N (TV-2 Survey Unit; **Figures 39** and **45**). This scarred tree was recorded by Nolan (2002). Since then the scar has almost completely grown together, and the survey crew thought it unlikely that the scar is Aboriginal in origin, as it is teardrop-shaped (not uniform in shape) and is very low to the ground.

5.4.2.10 36-1-0357 (TS-OS-01 with PAD)

Site is located at: (GDA94 Zone 55) 652057E / 6407786N (south of TV-3 Survey Unit; **Figure 39**). This artefact scatter was relocated and found in similar condition as originally described. More artefacts than originally described were noted, and the boundaries of the site were extended slightly (**Figures 39**, **46** and **47**). A set of possible grinding grooves were noted on the east bank of the creek on which the site is located. This site is encompassed by the PAD shared with 36-1-0361 and TV-AS3.

5.4.2.11 36-1-0358 (TS-OS-02)

The artefacts at this site could not be located, though the location at which they were recorded was identified by the original photos at: 651443E / 6410142N (TV-1 Survey Unit; **Figure 39**). The site may have been destroyed by vehicle movement. In 2002 Nolan indicates that the land uses have almost completely destroyed the fabric of the site'.

Figure 46: 36-1-0357 and 36-1-0361 plan view map

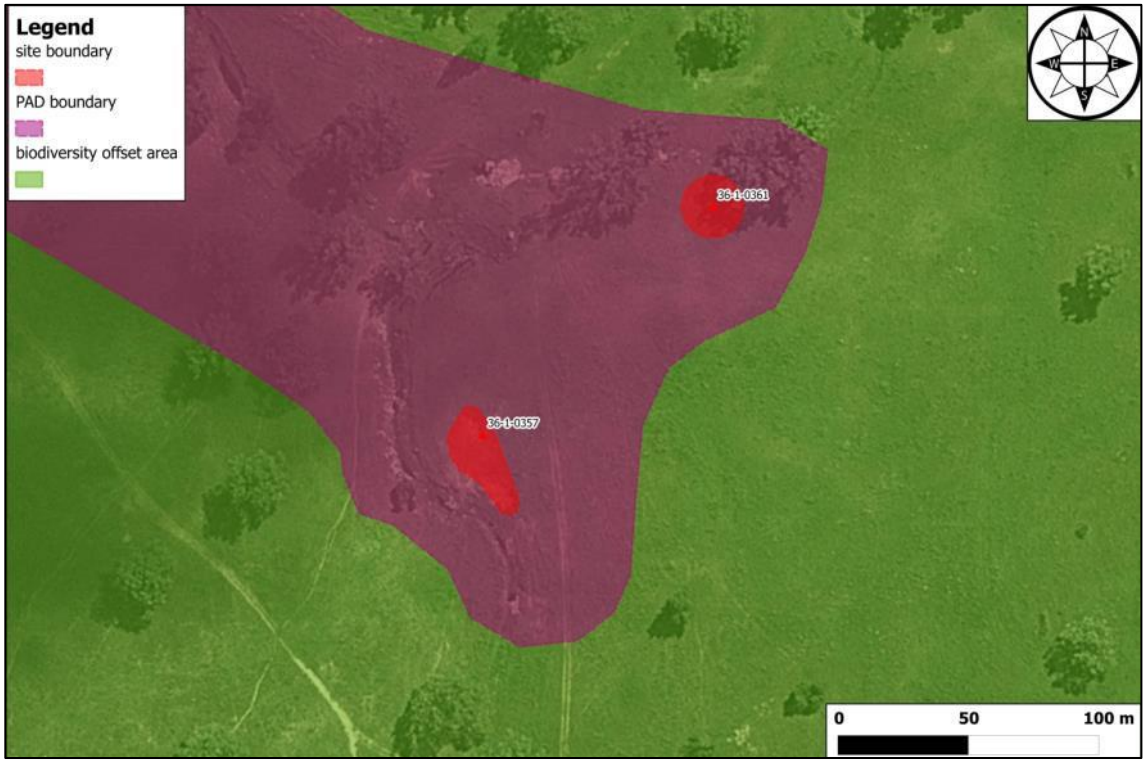
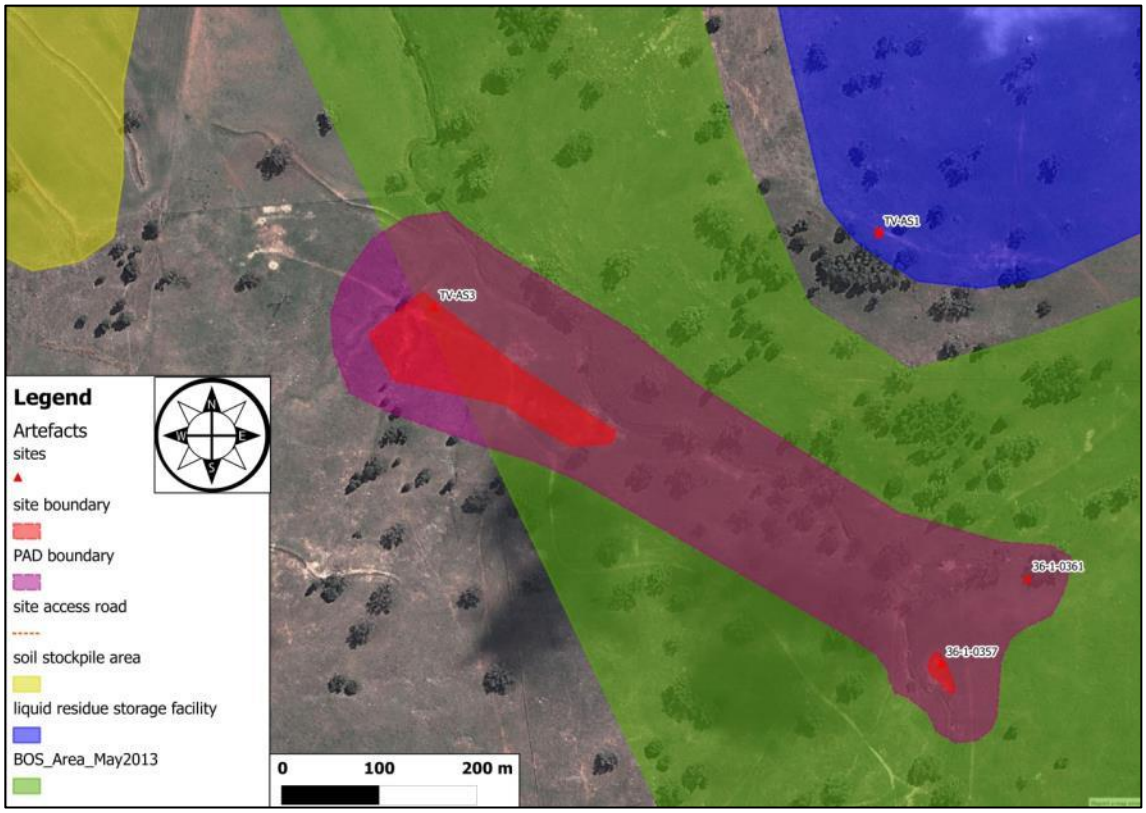


Figure 47: New Boundary of PAD Associated with 36-1-0357 Adjoining the PAD of TV-AS3



5.4.2.12 36-1-0361 (TS-GG-02 with PAD)

This site is located at: (GDA94 Zone 55) 652133E / 6407859N (south of TV-3 Survey Unit; **Figures 39**, **46** and **47**). All previously recorded grinding grooves were identified, as well as several new slabs with grinding grooves (**Plates 69** to **71**). Two faint grooves were found on a rock between TS-OS-01 and this site. The rock had to be upturned to identify the grooves, and was returned to its resting position. The new grooves are:

- Six vertical grooves on a partially buried rock measuring: 60 x 50 x 14cm (exposed).
- Two straight vertical grooves, two distinctive bent grooves, and a possible squiggly horizontal groove on a broken rock overlooking the drainage. The two halves were measured separately: 75 x 50 x 40cm and 50 x 50 x 17cm. An orange chalcedony flake fragment is located nearby.

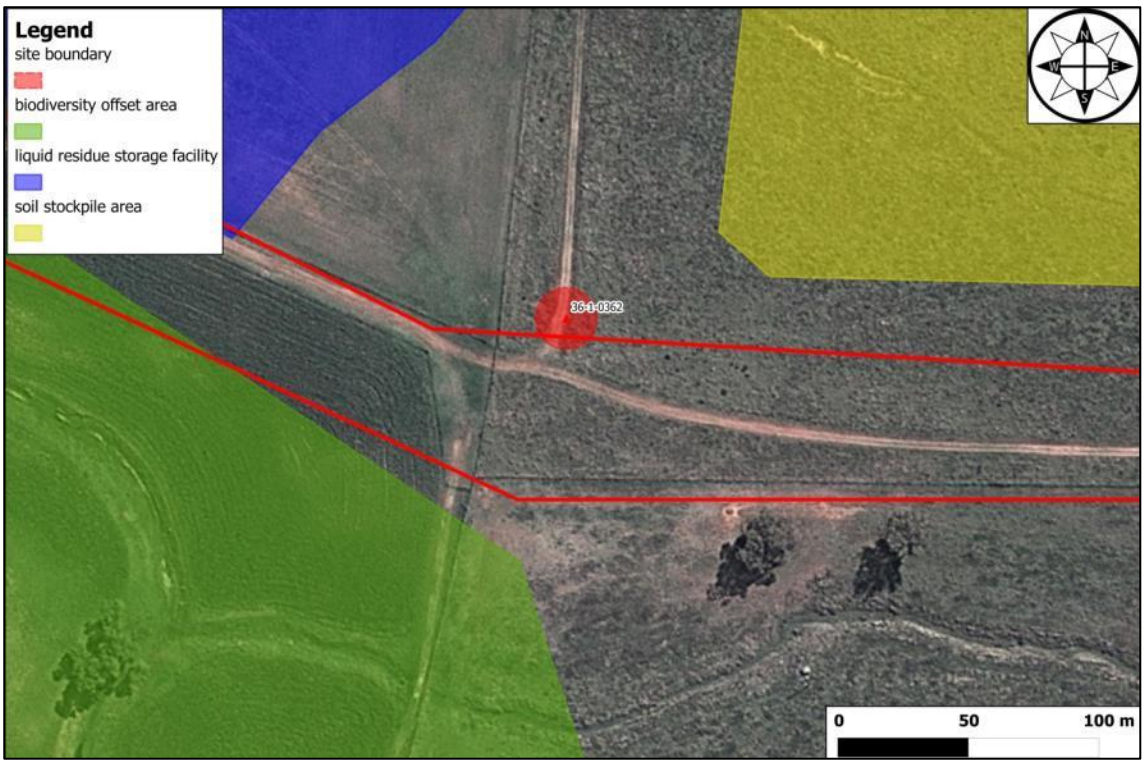
5.4.2.13 36-1-0360 (TS-GG-03)

This site is located at: (GDA94 Zone 55) 652066E / 6407360N (south of TV-3 Survey Unit; **Figures 39** and **43**). This portable slab with grinding grooves was found as originally described.

5.4.2.14 36-1-0362 (TS-IF-02)

The original artefact described as this isolated find could not be relocated, however, a newly identified artefact, an orange chalcedony flake, was found in the vicinity of the original, at: 651393E / 6409601N (just east of TV-1 Survey Unit; **Figures 39** and **48**). This site is located in the same track as site #36-1-0358 (TS-OS-02), which is deemed as being destroyed by vehicle movement in addition to agricultural land uses.

Figure 48: 36-1-0362 plan view map



5.4.3 Macquarie River Water Pipeline

5.4.3.1 36-1-0356 (TS-OS-03 with PAD)

The site is located at: (GDA94 Zone 55) 652078E / 6411926N (MM-6 Survey Unit; **Figure 49**). This is a medium-sized artefact scatter with a relatively high artefact density, of a diversity of flakes and cores. The site is located in an eroded gully and dirt track. A cropped paddock (which the survey crew was asked to remain out of) is located to the east of the site. The Wambangalang Creek is located well over 100m to the west. There is nil ground surface visibility off the exposures.

Figure 49: 36-1-0356 with PAD plan view map

The PAD was investigated through test excavation within the pipeline corridor (OzArk 2013). Eleven pits were excavated along the pipeline alignment, generally at 10m intervals and concentrated around the surface artefacts. The pits were 50cm by 50cm in area and were up to 30cm deep at which point culturally sterile soils were reached.

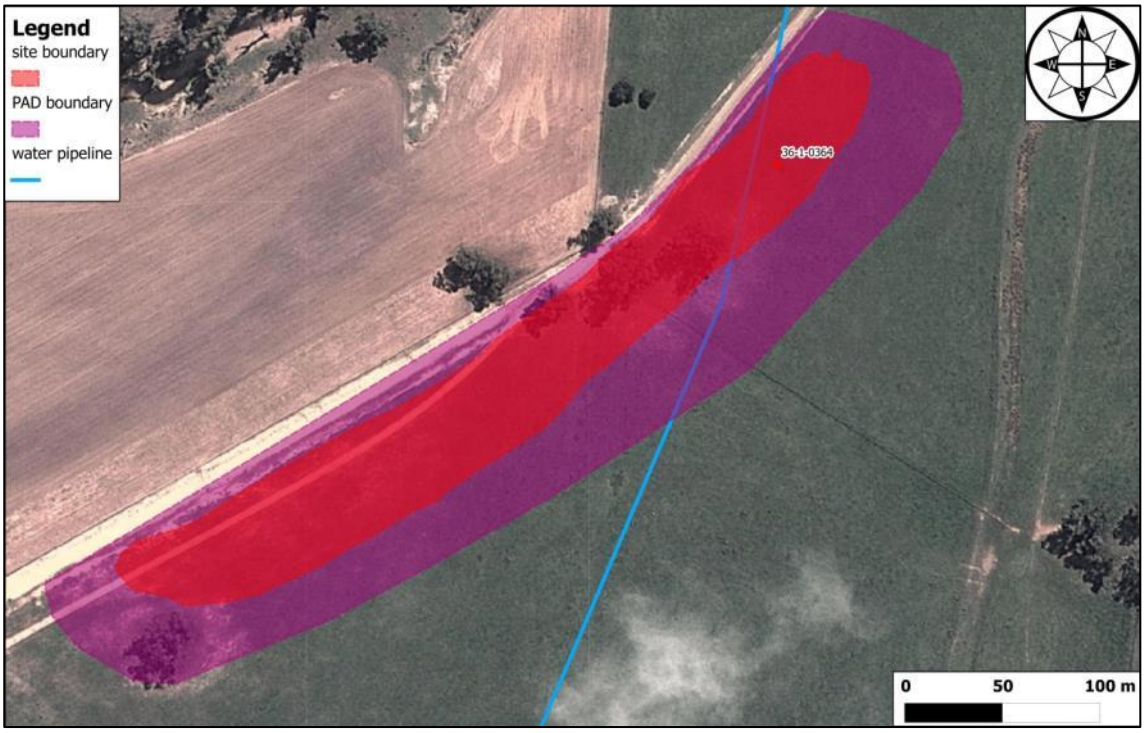
Five artefacts were retrieved from the test excavation, a markedly low density in comparison to the surface assemblage. Soils were found to have a low level of intactness, and in the unlikely possibility that there are sub-surface concentrations of artefacts elsewhere within the PAD they would almost certainly have low integrity. No further investigation is warranted at TS-OS3 with PAD.

5.4.3.2 36-1-0364 (TS-OS-05 with PAD)

This site would be crossed by the proposed pipeline near (GDA94 Zone 55) 653217E / 6413743N (MM-2 Survey Unit; **Figure 40**). This is a large lithic scatter site, measuring well over 100m in length. The boundaries of the site were expanded in the current assessment, as more artefacts were identified to the north of the original site extent (**Figure 50**). Artefacts were identified in two dirt tracks running parallel to each other from Benolong Road up to the “Mia

Mia" house complex. South of the gate (the original extent of the site) artefacts are sparse, with the majority of them identified in the eastern road. North of the gate (the newly noted extent) artefact density is greater, with most of the artefacts concentrated on the east side of the road. The northern extent of the surface scatter was not determined as it is not in the impact footprint and therefore not in the scope of the study.

Figure 50: 36-1-0364 with PAD plan view map



The PAD was investigated through test-excavation within the pipeline corridor (OzArk 2013). Seven pits were excavated along the pipeline alignment, generally at 20m intervals. The pits were 50cm by 50cm in area and were up to 40cm deep at which point culturally sterile soils were reached.

No artefacts were retrieved from the excavation. There was some degree of intactness in the soils at depth (i.e. 25 – 40cm), but it is not anticipated that any sub-surface deposits are elsewhere within the PAD, and certainly not at this depth. No further investigation is warranted at TS-OS3 with PAD.

5.4.4 Obley Road Alignment

5.4.4.1 36-1-0432 (ORWM-ST1)

This site is located at (GDA94 Zone 55) 650552E / 6425580N (**Figures 40** and **51**). The site is in the same condition as originally described by OzArk in 2003. The tree is healthy and the scar is well defined. No stone artefacts were identified in the vicinity of the tree at the time of recording and none were noted in the relocation of the site.

Figure 51: 36-1-0432 and 36-1-0433 plan view map

5.4.4.2 36-1-0433 (ORWM-ST2)

This site is located at (GDA94 Zone 55) 650533E / 6425729N (**Figures 40** and **51**). The site is in the same condition as originally described by OzArk in 2003. The host tree is alive and the scar remains clear. No stone artefacts were identified in the vicinity of the tree at the time of recording and none were noted in the relocation of the site.

5.4.4.3 36-1-0120 (H2 with PAD)

This site is located at (GDA94 Zone 55) 647872E / 6415317N (**Figure 40**). The location of the site was confidently relocated during this assessment, though the artefacts and features recorded in 1985 could not be found. The vicinity of the artefact scatter has poor ground visibility due to vegetation growth. It is believed that the artefacts are likely to still be present subsurface. Several trees in the area in which the scarred tree was mapped meet the description and it is possible that the scar is on a fork of trunk which has died and fallen, though no scar was visible on the exposed sides. It is also possible that the scarred tree has been removed. The PAD associated with this site has been joined with that of OR-AS1 (**Figure 37**).

5.5 RESULTS OF TEST EXCAVATION

The alignment of the proposed water pipeline overlaps with Potential Archaeological Deposits (PADs) associated with sites TS-OS-03 with PAD and TS-OS-05 with PAD (**Figures 49** and **50**). A test-excavation was carried out along the pipeline alignment within these PADs. Excavations were undertaken in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (OzArk 2013).

All excavation squares at TS-OS-03 with PAD and TS-OS-05 with PAD are 50cm by 50cm and all were hand excavated. At TS-OS-03 with PAD, 11 squares were excavated during the test excavation programme, and 7 squares at TS-OS-05 with PAD. All 18 squares within both archaeological areas were excavated down to culturally sterile clays.

Five artefacts were found below the surface at TS-OS-03 and no artefacts at TS-OS-05. This contrasts with the numerous surface artefacts (see **Sections 5.4.3.1** and **5.4.3.2** as well as Nolan 2002). Pits were generally dug to 30cm – 40cm. Disturbances included ploughing, flooding and stock/vehicle movements and are likely to have affected the integrity of the sites, but would not have removed sub-surface artefacts. This suggests that the landforms are degrading and therefore artefacts are not being buried by natural deposition of soils. Disturbances are likely to be the only reason why any artefacts were found at depth, and as such, the artefacts retrieved in the test excavation were almost certainly not *in situ*. It appears that the sites TS-OS-03 with PAD and TS-OS-05 with PAD are surface sites only without any associated subsurface archaeological deposits.

5.6 ABORIGINAL COMMUNITY INPUT

Consultation has been undertaken in accordance with clause 80C of the *National Parks and Wildlife Act 1974* (NPW Act). Three Registered Aboriginal Parties (RAPs) were represented during the field survey: Binjang Wellington Wiradjuri Heritage Survey, Dubbo Local Aboriginal Land Council, and Wirrimbah Direct Descendants. Details of the input received from the RAPs can be found in **Sections 2.2**, **5.8.2.3** and **6.3**.

Copies of fieldwork participation sheets and a log of correspondence are in **Appendix 1**.

5.7 DISCUSSION

5.7.1 Introduction

In total 52 Aboriginal sites are located in the Study Area. Site distribution, site type, and what this can tell us about Aboriginal settlement history is discussed in the following sections.

5.7.2 Site Distribution

The archaeological sensitivity and site distribution of the Study Area can be understood when compared to the four basic landform units present (**Figure 52**; **Table 10**).

- Creeks/rivers are areas that are frequently inundated with water and experience erosion as a result. They may be ephemeral or permanent.
- Floodplains or alluvial flats are those areas that are adjacent to creeks and rivers and subject to infrequent flooding, relative to the creeks/rivers. This landform includes terraces.
- Gently undulating landforms are higher landforms characterised by low rises which are often more stable surfaces that are rarely or never flooded.
- Hills can be broken down into three parts, the ‘toe’ or lower portion of the hill, generally having a small slope angle, the mid hill slope, which is generally steeper, and the ridge crest which can be flat or pointed.

The locations and artefact/feature assemblages of the 52 identified sites are consistent with the regional and local settlement patterns previously formulated for the Dubbo area.

Sites within creek lines consist of grinding grooves and a scarred tree (on the margin of the creek). Artefacts were only identified within the bounds of the creeks in one instance (K-AS2

with PAD), as in most instances they presumably would have been washed away. The high number of features associated with the sites are individual grinding grooves, which are clustered across two of the three creek line sites in the Study Area, evidence that either a group of people were using the same area for sharpening tools and/or that an area was used repeatedly for sharpening.

Table 10: Correlation between Archaeological sensitivity and landform

Landform		Landform Area (m^2)	Site Occurrence	Number of Artefacts or Features	Impacts	Archaeological Sensitivity
Ephemeral and perennial creeks and rivers		NA	2	42	High: stream erosion	Low
Floodplains		2071000	19	120 (approximate)	High: agricultural activities and flooding	Low-Moderate
Gently Undulating		7227000	30	60	Moderate: agricultural activities	Moderate
Hills	Toe slope	6308700	0	1	Moderate: agricultural activities	Low
	mid slope		0			
	ridge crest		0			

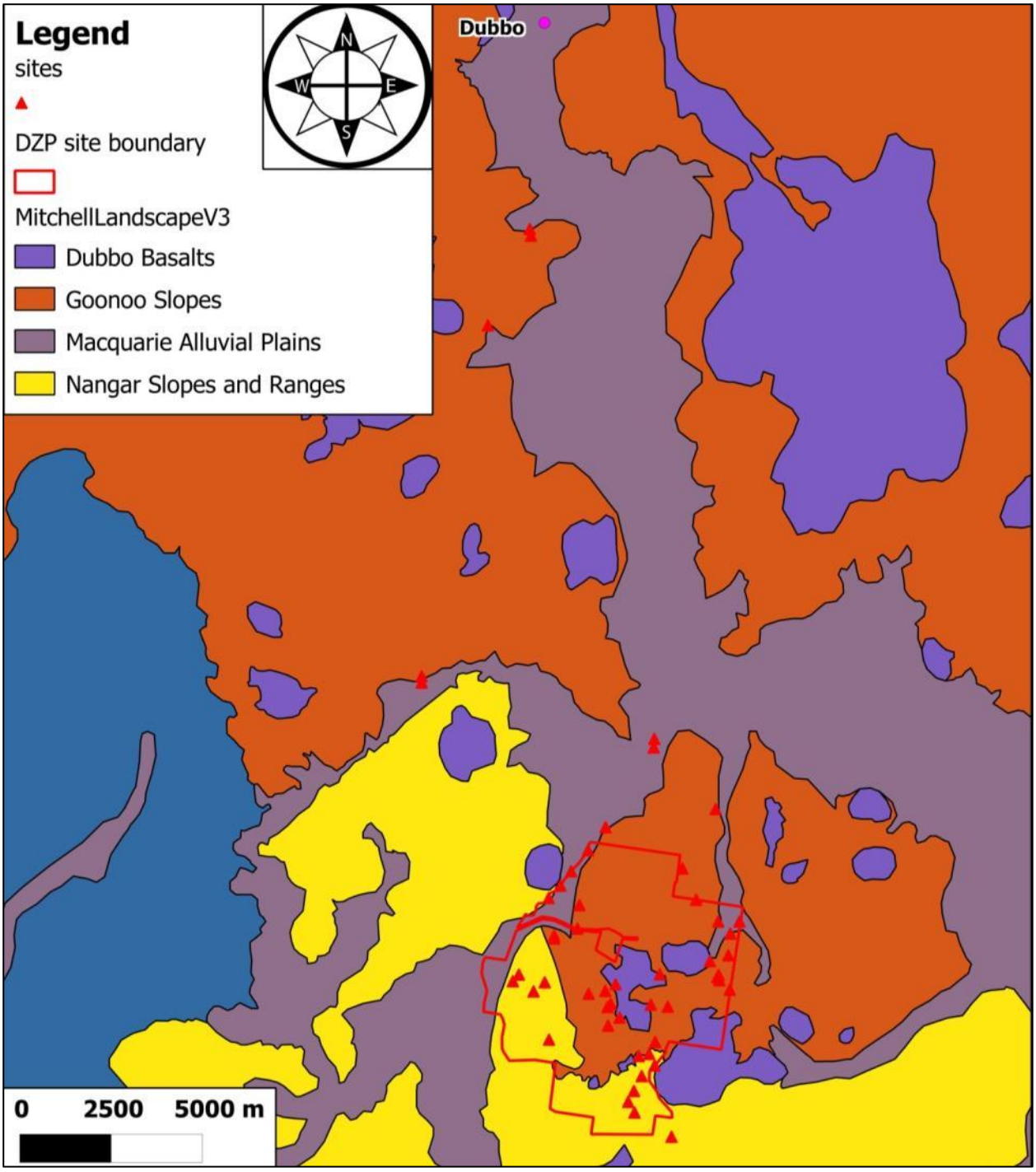
Sites within creek lines consist of grinding grooves and a scarred tree (on the margin of the creek). Artefacts were only identified within the bounds of the creeks in one instance (K-AS2 with PAD), as in most instances they presumably would have been washed away. The high number of features associated with the sites are individual grinding grooves, which are clustered across two of the three creek line sites in the Study Area, evidence that either a group of people were using the same area for sharpening tools and/or that an area was used repeatedly for sharpening.

Floodplains are a very broad landform type, and include elevated terraces, which are not to be confused with gently undulating landscapes and typically have higher archaeological sensitivity. Sites in floodplains are largely artefact scatters and isolated lithic artefacts. Scarred trees and one set of grinding grooves were also found on floodplain landforms. These landforms had the proportionally highest number of sites and artefacts, which supports the previously discussed settlement pattern of Aboriginal people camping near water (**Section 4.4**). Floodplain areas in the Study Area are generally highly disturbed by agriculture.

Gently undulating landforms comprised the majority of the Study Area. Most of the Aboriginal scarred trees are located in these areas, as well as smaller artefact scatters. The low number of artefacts/features in comparison to the number of sites recorded is accounted for by the domination of isolated artefact sites and scarred trees over open artefact scatters. It is clear from the results that Aboriginal people were using these areas which are more distant from water, but were not frequently making them the site of camps. Gently undulating landscapes in the Study Area, like floodplains, are disturbed by agriculture. However, when compared to floodplains some gently undulating areas are rocky, making them more likely to be used for grazing than growing crops.

No sites were identified in hilly landforms. Most of the hilly areas in the Study Area are distant from major waterways, with headwaters, i.e. 1st order drainages, more common hydrologic features. The lack of sites in hilly areas can be understood in terms of the predictive model for site location, which states that with increased distance from water site density decreases. Though the only site identified on a hill landform is in a paddock, hilly regions of the Application Area are frequently less disturbed than the flatter areas and may be forested.

Figure 52: Landform types and Aboriginal archaeological sites[13]



Note: Image presents the DZP Site assessed area.

[13] Does not include sites OR-ST1, 36-1-0432, 36-1-0433 to north.

5.7.3 Artefacts

Artefacts identified in the course of this study are mostly flakes, some waste flakes from creating stone tools and others modified and/or used as tools themselves. Many cores, a stone axe, and a hand-held grinding stone were also identified in the area.

Lithic materials identified consist of cherts and other FGS, quartz, mudstone, rhyolite, and sandstone, as well as several unidentified materials.

5.7.4 Chronology

Ethnographic accounts from Aboriginal people living in the region today, in addition to early accounts of interactions between settlers and Aboriginal people clearly evidence that Aboriginal people were inhabiting the area in recent history, however, it is unknown when Aboriginal people first came to the region or how continuously the area has been occupied.

Archaeological sites may be dated by a variety of means, including relative dating via stratigraphy, laboratory analysis such as radiocarbon dating, and cross-dating of artefact types. It is difficult to cross-date artefacts identified during this project as there is currently no widely agreed upon chronology of stone tool development in Australia (Mulvaney 1999: 47). The Aboriginal scarred trees identified may be able to yield dates via dendrochronology, however, these dates may be of little use beyond reinforcing their authenticity as being culturally modified. It is already known that Aboriginal people have been in the area longer than the surviving trees. Test excavation at sites with intact subsurface deposits may yet yield relative dates, or material suitable for laboratory analysis.

5.7.5 Potential Archaeological Deposits

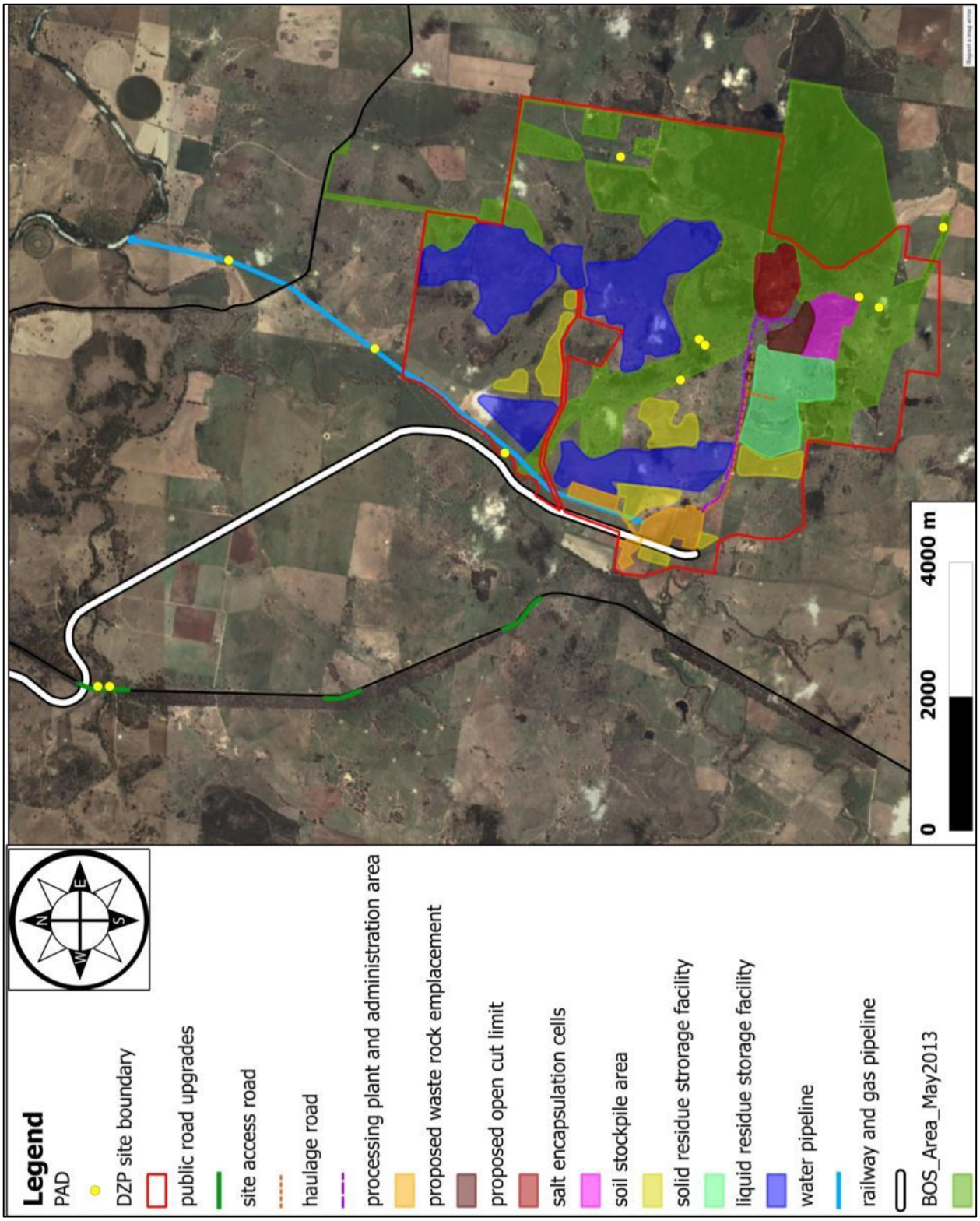
Twelve (12) of the sites have associated PADs (**Figure 53**). These are newly recorded sites UG-AS4 with PAD, K-AS1 with PAD, K-AS2 with PAD, TV-AS2 with PAD, TV-AS3 with PAD, OR-AS1 with PAD, and PAD 12, and previously recorded sites: #36-1-0357, #36-1-0361, #36-1-0356, #36-1-0364, #36-1-0120.

The site at UG-AS4 with PAD is disturbed, being situated on an eroded creek bank (**Figure 15**). The area designated as PAD to the east has been subject to agricultural impacts. It has been cleared and grazed, and likely ploughed but perhaps not regularly. Although these disturbances diminish the possibility of intact archaeological deposits, sub-surface artefacts are very likely and testing would be needed to establish the presence or absence of intact deposits. Additionally, there is likely to be an area between the edge of the creek line and the track that has escaped ploughing. Artefacts witnessed on the surface were grouped according to material types, indicating some intactness.

The PAD at K-AS1 with PAD is likely to extend out of the exposure into the grassy areas adjacent (**Figure 22**). It is bounded by the ploughed paddock to the south and the earth dam to the northeast.

K-AS2 was only partially investigated as it was identified at the end of the day and subsequently the impacts associated with the Proposal were altered, leaving KAS2 with PAD outside of the impact footprint (**Figure 23**). It was immediately apparent that a variety of activities took place along the associated creek line, with stone artefacts, a possible scarred tree, probable grinding groove, and possible ochre processing (K-OP1) all occurring within 20m of the creek. The most suitable area for occupation at K-AS2 was to the southeast of the creek line as steep ground was to the northwest. This area to the southeast was designated as a PAD, with activity most likely closer to the creek bank. The south-eastern boundary is somewhat arbitrary as there is no change in landform or disturbance levels. The area of the PAD has been subject to agricultural impacts, but these impacts may have only partially compromised integrity and archaeological deposits may exist below the plough zone.

Figure 53: Potential Archaeological Deposits (PAD)



Note: Image presents the DZP Site assessed area.

PAD 12 was assessed to have potential archaeological deposits without being associated with a particular site. As there is no associated site, the PAD's boundaries are difficult to determine. A large basis for the designation of the PAD is the landform, and it is the alluvial plains adjacent to the creek lines that effectively form the PAD (**Figure 24**). The potential for sub-surface deposits can generally be expected to diminish with distance from the creek lines. There is no prominent localised terracing that would make one particular spot within the general area more suitable for intensive activity over another. The PAD has been subject to agricultural impacts such as clearing and grazing, but has perhaps not been ploughed.

The PAD at TV-AS2 with PAD is bounded by ploughed paddocks to the east of the site and the Wambangalang creek to the west (**Figure 29**). It is unknown how far north or south the sub-surface component extends, so an area approximately 30m to the south and 60m to the north (where the creek bank juts out to the west) are recommended for testing.

The PAD at OR-AS1 with PAD (**Figure 37**) is shared with site #36-1-0120 (H2 with PAD). It is bounded by the impacted road shoulder of Obley Road to the west, and an arbitrary distance of approximately 20m distance east of site OR-AS1 with PAD. It is likely that if testing is necessary it will only be required within the impact footprint of the Proposal and so will not be undertaken to even that distance. The northern boundary was of the PAD is approximately 150m from Hyandra Creek, a distance from water at which Aboriginal occupation is demonstrated to be less intensive. The southern boundary of the PAD is 100m south of Hyandra Creek, a distance which encompasses and exceeds the previously recorded extent of artefacts at site #36-1-0120.

The PAD at TV-AS3 with PAD (**Figure 47**) is shared with sites #36-1-0357 (TS-OS-01 with PAD) and #36-1-0361 (TS-GG-02 with PAD). The AHIMS sites are on the eastern side of a confluence of drainages, and site TV-AS3 with PAD is on the southern side of the main drainage, northwest of the AHIMS sites. Though the sites do not connect on the surface, the density of artefacts and features present demonstrate repeated occupation, and it is possible that artefacts are present subsurface on either side of the creek, thus the area is designated a Sensitive Archaeological Landform (SAL). Despite impacts to the land it is likely that undisturbed deposits are present. The SAL runs along the creek in a northwest-southeast direction for 670m, with a width of 120-175m, which takes into consideration landform and artefact/ feature extent.

The PAD at #36-1-0356 (TS-OS-03 with PAD; **Figure 49**) is bounded on the east by a cropped paddock mere metres from the artefacts. PAD extends to all other sides by approximately 25m, a modest arbitrary buffer as it is very possible that this area has been cropped in the past, though plough marks are no longer evident. This PAD was investigated through test excavation (see **Section 5.4.3.1**).

The PAD at #36-1-0364 (TS-OS-05 with PAD; **Figure 50**) follows the road in which the artefacts were observed. To either side of the road evidence of cropping is present, with more intensive cropping evident to the north-western side than the south-eastern. For this reason PAD is not likely to be present far from the road in either direction, but more so to the southeast. A moderate ten metre buffer to the northwest and a more generous 40m buffer to the southeast are recommended. The north-eastern and south-western extent of the PAD is dictated by the extent of artefacts observed in the exposure, approximately 40m to the south. The north-eastern extent of the site is unknown, as it extends outside the current Study Area, and the 40m buffer from the last artefact observed is thus arbitrary. This PAD was investigated through test excavation (see **Section 5.4.3.2**).

5.8 ASSESSMENT OF HERITAGE SIGNIFICANCE

5.8.1 Introduction

The appropriate management of cultural heritage items is usually determined on the basis of their assessed significance and value, as well as the likely impacts of any proposed development.

Aesthetic, historic, scientific, and social value are baseline elements of the significance assessment, and it is through the combination of these elements that the overall heritage values of a site, place or area is determined.

The following values from the Burra Charter are outlined in the Australia ICOMOS Guidelines: Cultural Significance and is quoted verbatim below:

Aesthetic value

> *Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria may include consideration of the form, scale, colour, texture and material of the fabric; the smells and sounds associated with the place and its use.*

Historic value

> *Historic value encompasses the history of aesthetics, science and society, and therefore to a large extent underlies all of the terms set out in this section. A place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase or activity. It may also have historic value as the site of an important event. For any given place the significance will be greater where evidence of the association or event survives in situ, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment.*

Scientific value

> *The scientific or research value of a place will depend on the importance of the data involved, on its rarity, quality or representativeness, and on the degree to which the place may contribute further substantial information.*

Social value

> *Social value embraces the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a majority or minority group.*

Other approaches

> *The categorisation into aesthetic, historic, scientific and social values is one approach to understanding the concept of cultural significance. However, more precise categories may be developed as understanding of a particular place increases.*

All values of the *Burra Charter* are considered when evaluating the significance of sites in the Study Area. Significance assessment of open sites is extremely variable and dependent upon several factors relating to:

- Preservation: Whether the site has the potential for the presence of intact, sub-surface deposit, or whether disturbance (human: land surface impacts, or environmental: erosion, deflation) has reduced its integrity and thus its potential;

- Representativeness: Is this the type of site one may expect in this landscape? (relates back to the predictive model), i.e. do many such sites occur nearby?;
- Artefacts: Are there artefacts present (material, types or combinations thereof) that are rare in the area or unusual for that type of site?; and
- Potential Archaeological Deposits (PAD): It is impossible to determine the scientific significance of PADs that do not have visible surface artefacts, as there is no site material or soil data to assess. Consequently, test excavation is recommended for such areas to investigate the presence, extent, nature and integrity of any possible site material such that their significance can be assessed and appropriate management recommendations devised.

5.8.2 Assessed Significance of the Recorded Sites

5.8.2.1 Aesthetic Value

None of the Aboriginal sites recorded have significant aesthetic value as the integrity of the sensory landscape has been altered in historic and modern times. Additionally, the artefacts themselves are generally not remarkable. As such, they have been preliminarily assessed as holding **low aesthetic value**.

5.8.2.2 Historic Value

None of the Aboriginal sites recorded have an apparent direct relationship to known historical Aboriginal sites (such as missions or massacre sites). It is likely that the area saw some of the earliest contact between Aboriginals and non-Aboriginal settlers, however, none of the recorded Aboriginal sites display evidence that they constitute 'Contact' or 'Post-Contact' Aboriginal sites. To that end, all are assessed as holding **low historic value**.

5.8.2.3 Social or Cultural Value

Cultural values were discussed throughout the project, including during informal on-site conversations and in official forums such as AFGMs. Most of the values presented below were captured during the AFGM held on Tuesday 13 August 2013.

The sites recorded in the DZP Project Area are reflective of the widespread use of the land by Aboriginal people over time. The sites provide a tangible, continued cultural connection with the land, and have elevated importance due to the diminishing knowledge of Aboriginal culture since white settlement. In this way, all sites have some level of cultural value.

Not only do the sites demonstrate the widespread nature of the use of the land in terms of area, but also in terms of types of use. It was noted by the RAPs that the variety of site types present reflect the range of ways the landscape was used by Aboriginal people. This range of uses can also be demonstrated within a site type. For example, scarred trees could act as markers for boundaries or burials, or could represent the use of the bark itself as a functional item such as a coolamon.

The sites have been generally assessed as holding **moderate social/cultural value**.

5.8.2.4 Archaeological/Scientific Value

16 sites have been assigned low-moderate, moderate or moderate-high scientific values. Of these, five are preliminary assessments as further test excavation would be required to fully determine their scientific values. Eleven of these sites have PADs which may yield further data about occupation of the site and prehistoric technologies should they be subject to test-

excavation. One site (K-OP1) requires further assessment to determine significance, but this is not necessary at present as it is located outside of the impact footprint.

36 sites have low scientific significance. These sites are highly disturbed and /or are unlikely to yield further data. These sites are not assessed as having PAD, but are representative of regional archaeological sites and collectively have a moderate diversity of artefacts.

Scientific value of all 52 sites is summarised in **Table 11**.

Table 11: Scientific Significance of the Recorded Sites

Site	Research potential	Represent-ativeness	Rarity	Scientific significance
UG-AS1	low - moderate	moderate	moderate	**Low - Moderate**: This site has a diversity of artefacts that are somewhat unusual; however, it is unlikely that the site can yield further archaeological data as the soil stratigraphy has been compromised.
UG-AS2	low	moderate	low	**Low**: site is sparse and is situated on a landform with disturbed soils, making intact subsurface deposits unlikely.
UG-AS3	low	moderate	low	**Low**: site is sparse and is situated on a landform with disturbed soils, making intact subsurface deposits unlikely.
UG-AS4 with PAD	low - moderate	moderate	low	**Low - Moderate**: site is sparse and is situated on a landform with disturbed soils to an unknown depth, making intact subsurface deposits unlikely.
UG-ST1	low	moderate	low	**Low**: site is well preserved and is a fair representation of a scarred tree, but is unlikely to yield further data.
UG-ST2	low	moderate	low	**Low**: site is well preserved and is a fair representation of a scarred tree, but is unlikely to yield further data.
UG-IF1	low	low	low	**Low**: the site is at too low a density, given the moderate ground visibility, for a more extensive site to be likely to be present at this location, and the artefact itself can yield no further data.
UG-IF2	low	low	low	**Low**: the site is at too low a density, given the moderate ground visibility, for a more extensive site to be likely to be present at this location, and the artefact itself can yield no further data.
UG-IF3	low	moderate	low	**Low**: This sit is on a landform not conducive to settlement. Although surrounding visibility is poor, isolated finds of this type are common in the broader area.
UG-IF4	low	moderate	low	**Low**: this isolated find is typical of this landform in the region. Along with UG-IF6 and UG-IF5 nearby, these artefacts display specific usage but do not indicate extensive settlement or activity in the immediate vicinity. They have some scientific collectively, but this is derivable from the information already obtained in the survey.
UG-IF5	low	moderate	low	**Low**: this isolated find is typical of this landform in the region. Along with UG-IF4 and UG-IF6 nearby, these artefacts display specific usage but do not indicate extensive settlement or activity in the immediate vicinity. They have some scientific collectively, but this is derivable from the information already obtained in the survey.
UG-IF6	low	moderate	moderate	**Low**: this isolated find is typical of this landform in the region. Along with UG-IF4 and UG-IF5 nearby, these artefacts display specific usage but do not indicate extensive settlement or activity in the immediate vicinity. They have some scientific collectively, but this is derivable from the information already obtained in the survey. Of the three sites nearby, this is the most rare.
UG-IF7	low	low	low	**Low**: the site is at too low a density, given the moderate ground visibility, for a more extensive site to be likely to be present at this location, and the artefact itself can yield no further data.

Site	Research potential	Represent-ativeness	Rarity	Scientific significance
K-AS1 with PAD	moderate – high	moderate	low	**Moderate:** This site has a diversity of stone artefacts. It is possible that there are intact subsurface deposits in the grass-covered areas adjacent, which may yield further data about Aboriginal occupation.
K-AS2 with PAD	moderate – high	moderate	moderate	**Moderate:** There is potentially a great diversity of artefacts at this site and PAD. While intactness is unlikely, it is possible that sub-surface deposits have some integrity and if so would possibly have excellent scientific value. Even if integrity was moderate or low, some scientific value is likely.
K-IF1	low	moderate	low	**Low**: this isolated find is typical of this landform in the region.
K-OP1	low	moderate	moderate	**Low-Moderate**: If the site is an ochre processing place then this is a rare site although the landform did not have likely potential for associated intact deposits.
PAD 12	moderate	uncertain	uncertain	**Moderate (preliminary):** Scientific significance is particularly difficult to assess given there are no artefacts. The research potential is based on landscape features and nearby sites.
GI-AS1	low	moderate	low	**Low**: site is sparse and is situated on a landform with skeletal soils, making the likelihood of subsurface deposits unlikely.
GI-AS2	low	moderate	low	**Low**: site is sparse and is situated on a landform with skeletal soils, making the likelihood of subsurface deposits unlikely.
PH-IF1	low	low	low	**Low**: site is sparse and is situated on a landform with disturbed soils, making the likelihood of subsurface deposits unlikely. Exposures nearby did not contain artefacts.
TV-AS1	low	low	low	**Low**: site is sparse and is situated on a landform with disturbed soils, making the likelihood of subsurface deposits unlikely. An exposure nearby did not contain artefacts.
TV-AS2 with PAD	moderate-high	moderate	moderate	**Moderate**: This site has a diversity of stone artefacts. It is possible that there are intact subsurface deposits in the grass-covered areas adjacent, which may yield further data about Aboriginal occupation.
TV-AS3 with PAD	moderate-high	moderate	moderate	**Moderate**: This site has a diversity of stone artefacts. It is possible that there are intact subsurface deposits in the grass-covered areas adjacent, which may yield further data about Aboriginal occupation.
TV-IF1	low	low	moderate	**Low**: The artefact itself is of interest, as it is a tool, however, the site has been too modified by farming activities to have intact deposits, and therefore is not likely to yield further data about Aboriginal occupation.
G-AS1	low	low	low	**Low**: site is sparse and is situated on a landform with disturbed soils, making intact subsurface deposits unlikely.
G-IF1	low	low	low	**Low**: site is sparse and is situated on a landform with disturbed soils, making the likelihood of subsurface deposits unlikely. The large exposures in which the isolate was found did not contain artefacts.
36-1-0373 (TS-ST-03)	low	low	low	**Low**: site is well preserved but is a poor representation of a scarred tree, and it is unlikely to yield further data.
36-1-0365 (TS-ST-04)	low	low	low	**Low**: site is well preserved and is a fair representation of a scarred tree, but is unlikely to yield further data.
36-1-0366 (TS-ST-05)	low	low	low	**Low**: site is in fair condition and is a fair representation of a scarred tree, but is unlikely to yield further data.
36-1-0367 (TS-ST-06)	low	low	low	**Low**: site is well preserved and is a fair representation of a scarred tree, but is unlikely to yield further data.
36-1-0368 (TS-ST-07)	low	low	low	**Low**: site is well preserved and is a fair representation of a scarred tree, but is unlikely to yield further data.
36-1-0313 (TS-IF-01)	low	low	low	**Low**: The integrity of the site has been impacted by erosion and it is unlikely that the site can yield further archaeological data as the soil stratigraphy has been compromised.

Site	Research potential	Represent-ativeness	Rarity	Scientific significance
36-1-0314 (TS-GG-01)	moderate	moderate	low	**Moderate:** site exhibits extensive use and it is possible that subsurface artefacts are present along the banks of the site, which may yield further data about Aboriginal occupation.
36-1-0374 (TS-ST-01)	low	low	low	**Low**: the site is a poor example of an Aboriginal scarred tree and is unlikely to yield further data.
36-1-0372 (TS-ST-02)	low	low	low	**Low**: the site is a poor example of an Aboriginal scarred tree and is unlikely to yield further data.
36-1-0357 (TS-OS-01 with PAD)	moderate-high (preliminary)	moderate	moderate	**Moderate-high (preliminary)**: the site has a diversity of grinding groove types. Though there is disturbance due to grazing, the extent of grazing's impact on subsurface deposits is unknown and the site may yield further data about Aboriginal occupation.
36-1-0358 (TS-OS-02)	low	low	low	**Low**: this site is in poor condition and no artefacts could be located at the site. It is not likely to yield further data.
36-1-0361 (TS-GG-02 with PAD)	moderate-high	moderate	moderate	**Moderate-high**: the site has a diversity of artefacts and features (several grinding groove sites are nearby). Though there is disturbance due to grazing, the extent of grazing's impact on subsurface deposits is unknown, and the site may yield further data about Aboriginal occupation.
36-1-0360 (TS-GG-03)	low	moderate	moderate	**Moderate**: this grinding groove on a portable slab is unusual for the area in that it is not on bedrock, and in itself has some scientific value. However, further investigation is not likely in the vicinity to yield any further data about Aboriginal occupation.
36-1-0362 (TS-IF-02)	low	low	low	**Low**: The integrity of the site has been reduced by agricultural land uses and road use, and it is unlikely that the site can yield further archaeological data as the soil stratigraphy has been compromised.
Toongi - Dubbo Rail Line and Gas Pipeline Corridor				
No Aboriginal sites have been identified within the fenced corridor of the rail line at the areas checked (the creek crossings), and no previously recorded sites fall within the rail easement.				
Macquarie River Water Pipeline				
MM-AS1	low	moderate	low	**Low**: The integrity of the site has been greatly reduced by ploughing and it is unlikely that the site can yield further archaeological data as the soil stratigraphy has been compromised.
MM-AS2	low	moderate	low	**Low**: The integrity of the site has been greatly reduced by ploughing and it is unlikely that the site can yield further archaeological data as the soil stratigraphy has been compromised.
MM-IF1	low	low	low	**Low**: The integrity of the site has been greatly reduced by ploughing and it is unlikely that the site can yield further archaeological data as the soil stratigraphy has been compromised.
MM-IF2	low	low	low	**Low**: The integrity of the site has been greatly reduced by ploughing and it is unlikely that the site can yield further archaeological data as the soil stratigraphy has been compromised.
36-1-0356 (TS-OS-03 with PAD)	low	moderate	low	**Low-moderate:** This site was initially assigned a moderate level of significance, but test excavations revealed a very low possibility of yielding further data about Aboriginal occupation. It retains some scientific significance on the basis of the diversity of stone artefacts.
36-1-0364 (TS-OS-05 with PAD)	low	moderate	low	**Low-moderate**: This site was initially assigned a moderate level of significance, but test excavations revealed a very low possibility of yielding further data about Aboriginal occupation. It retains some scientific significance on the basis of the diversity of stone artefacts.

Site	Research potential	Represent-ativeness	Rarity	Scientific significance
Obley Road Alignment				
OR-AS1 with PAD	moderate-high	moderate	low	**Moderate**: Surface manifestation of the site is sparse, but proximity to a water way makes the site likely to have been repeatedly occupied. Subsurface deposits may be present and intact, and able to yield further data about Aboriginal occupation.
OR-ST1	low	moderate	low	**Low**: site is well preserved and a good representation of a scarred tree, but is unlikely to yield further data.
36-1-0432 (ORWM-ST1)	low	moderate	low	**Low**: site is well preserved and a fair representation of a scarred tree, but is unlikely to yield further data.
36-1-0433 (ORWM-ST2)	low	moderate	low	**Low**: site is well preserved and a fair representation of a scarred tree, but is unlikely to yield further data.
36-1-0120 (H2 with PAD)	moderate-high (preliminary)	moderate	low	**Moderate (preliminary)**: Surface manifestation of the site is sparse, but proximity to a water way makes the site likely to have been repeatedly occupied. Subsurface deposits may be present and intact, and able to yield further data about Aboriginal occupation.

5.9 LIKELY IMPACTS TO ABORIGINAL HERITAGE FROM THE PROPOSAL

Not all of the sites recorded in the Study Area are at risk of harm from the Proposal, and the degree of harm to sites is variable. For example, some sites only fall partially inside the impact footprint.

- 26 sites are outside the impact footprint of the Proposal.
- 12 sites are outside the impact footprint of the Proposal but are likely to suffer indirect impacts from the proposal unless managed appropriately; and
- 14 sites would be impacted to some degree by the Proposal.

Generally, sites or portions of sites within the proposed impact footprint will lose their cultural, archaeological and aesthetic values to some degree. The type, degree and consequence of harm to the sites are discussed in **Table 12**. This harm applies to the various types and levels of significance described in **Section 5.8**. In the case of cultural significance, the values supplied by the RAPs were common to all sites. As the sites offer a connection to heritage and country, their removal from their current location breaks this link and this key aspect to cultural value is lost. Some cultural and scientific value could be retained through salvage.

Table 12: Impact Assessment

Site Number	Type of Harm (Direct/Indirect/None)	Degree of Harm (Total/Partial/None)	Consequence of Harm (Total/Partial/No loss of value)
DZP Site			
UG-AS1	Direct	**Partial**	**Total loss of value**: A portion of this site remains outside of the impact area, although salvage for the entire site is recommended.
UG-AS2	None	None	**No loss of value**: This site is currently outside of the impact footprint.
UG-AS3	None	None	**No loss of value**: This site is currently outside of the impact footprint.
UG-AS4	None	None	**No loss of value**: This site is currently outside of the impact footprint.

Site Number	Type of Harm (Direct/Indirect/None)	Degree of Harm (Total/Partial/None)	Consequence of Harm (Total/Partial/No loss of value)
UG-ST1	Direct	**Total**	**Total loss of value**: The site falls within the LRSF impact footprint.
UG-ST2	None	None	**No loss of value**: This site is currently outside of the impact footprint.
UG-IF1	None	None	**No loss of value**: This site is currently outside of the impact footprint.
UG-IF2	None	None	**No loss of value**: This site is currently outside of the impact footprint.
UG-IF3	None	None	**No loss of value**: This site is currently outside of the impact footprint.
UG-IF4	None	None	**No loss of value**: This site is currently outside of the impact footprint.
UG-IF5	None	None	**No loss of value**: This site is currently outside of the impact footprint.
UG-IF6	None	None	**No loss of value**: This site is currently outside of the impact footprint.
UG-IF7	None	None	**No loss of value**: This site is currently outside of the impact footprint.
K-AS1 with PAD	None	None	**No loss of value**: This site is currently outside of the impact footprint.
K-AS2 with PAD	None	None	**No loss of value**: This site is currently outside of the impact footprint.
K-OP1	None	None	**No loss of value**: This site is currently outside of the impact footprint.
K-IF1	None	None	**No loss of value**: This site is currently outside of the impact footprint.
PAD 12	None	None	**No loss of value**: This site is currently outside of the impact footprint.
GI-AS1	Direct	**Total**	**Total loss of value**: The site falls within the open cut impact footprint.
GI-AS2	Direct	**Total**	**Total loss of value**: The site falls within the open cut impact footprint.
PH-IF1	Direct	**Total**	**Total loss of value**: The site falls within the Solid Residue Storage Facility.
TV-AS1	Direct	**Total**	**Total loss of value**: The site falls within the LRSF impact footprint.
TV-AS2 with PAD	None	None	**No loss of value**: This site is currently outside of the impact footprint.
TV-AS3 with PAD	None	None	**No loss of value**: This site is currently outside of the impact footprint.
TV-IF1	Direct	**Total**	**Total loss of value**: The site falls within the LRSF impact footprint.
G-AS1	None	None	**No loss of value**: This site is currently outside of the impact footprint.
G-IF1	None	None	**No loss of value**: This site is currently outside of the impact footprint.
36-1-0373 (TS-ST-03)	Indirect	None (with management)	**No loss of value**: This site is currently outside of the impact footprint. Potential for indirect impact arising from the Proposal due to the site's close proximity to the proposed works. Specific management recommendations will avoid harm. It is just 30m from the soil stockpile impact footprint and will require marking and protection to avoid incidental felling.
36-1-0365 (TS-ST-04)	Direct	**Total**	**Total loss of value**: The site falls within the processing plant and Administration Area impact footprint.

Site Number	Type of Harm (Direct/Indirect/None)	Degree of Harm (Total/Partial/None)	Consequence of Harm (Total/Partial/No loss of value)
36-1-0366 (TS-ST-05)	Direct	**Total**	**Total loss of value**: The site falls within the LRSF impact footprint.
36-1-0367 (TS-ST-06)	Direct	**Total**	**Total loss of value**: The site falls within the LRSF impact footprint.
36-1-0368 (TS-ST-07)	None	None	**No loss of value**: This site is currently outside of the impact footprint.
36-1-0313 (TS-IF-01)	Direct	**Total**	**Total loss of value**: The site falls within the open cut impact footprint.
36-1-0314 (TS-GG-01)	None	None (with monitoring)	**No loss of value**: This site is currently outside of the impact footprint. Specific management recommendations are applied to this site to ensure that no harm arises from the Proposal.
36-1-0374 (TS-ST-01)	None	None	**No loss of value**: This site is currently outside of the impact footprint.
36-1-0372 (TS-ST-02)	Direct	**Total**	**Total loss of value**: The site falls within the LRSF impact footprint.
36-1-0357 (TS-OS-01 with PAD)	None	None	**No loss of value**: This site is currently outside of the impact footprint.
36-1-0358 (TS-OS-02)	Indirect	None (with management)	**No loss of value**: This site is currently outside of the impact footprint. Specific management recommendations are applied to this site to ensure that no harm arises from the Proposal.
36-1-0361 (TS-GG-02 with PAD)	None	None	**No loss of value**: This site is currently outside of the impact footprint.
36-1-0360 (TS-GG-03)	None	None	**No loss of value**: This site is currently outside of the impact footprint.
36-1-0362 (TS-IF-02)	Indirect	None (with management)	**No loss of value**: This site is currently outside of the impact footprint. Potential for indirect impact arising from the Proposal due to the site's close proximity to the proposed works. Specific management recommendations will avoid harm.
Toongi-Dubbo Rail Line			
No Aboriginal sites have been identified within the fenced corridor of the rail line at the areas checked (the creek crossings), and no previously recorded sites fall within the rail easement.			
Macquarie Water Pipeline			
MM-AS1	Indirect	None (with management)	**No loss of value**: This site is currently outside of the impact footprint. Potential for indirect impact arising from the Proposal due to the site's close proximity to the proposed works. Specific management recommendations will avoid harm.
MM-AS2	Indirect	None (with management)	**No loss of value**: This site is currently outside of the impact footprint. Potential for indirect impact arising from the Proposal due to the site's close proximity to the proposed works. Specific management recommendations will avoid harm.
MM-IF1	Indirect	None (with management)	**No loss of value**: This site is currently outside of the impact footprint. Potential for indirect impact arising from the Proposal due to the site's close proximity to the proposed works. Specific management recommendations will avoid harm.
MM-IF2	Indirect	None (with management)	**No loss of value**: This site is currently outside of the impact footprint. Potential for indirect impact arising from the Proposal due to the site's close proximity to the proposed works. Specific management recommendations will avoid harm.

Site Number	Type of Harm (Direct/Indirect/None)	Degree of Harm (Total/Partial/None)	Consequence of Harm (Total/Partial/No loss of value)
36-1-0356 (TS-OS-03 with PAD)	Direct	**Partial**	**Partial loss of value**: The Macquarie Water pipeline goes through the site.
36-1-0364 (TS-OS-05 with PAD)	Direct	**Partial**	**Partial loss of value**: The Macquarie Water pipeline goes through the site.
Obley Road Alignment			
OR-AS1 with PAD	Indirect	None (with management)	**No loss of value**: This site is currently outside of the impact footprint. Potential for indirect impact arising from the Proposal due to the site's close proximity to the proposed works. Specific management recommendations will avoid harm.
OR-ST1	Indirect	None (with management)	**No loss of value**: This site is currently outside of the impact footprint. Potential for indirect impact arising from the Proposal due to the site's close proximity to the proposed works. Specific management recommendations will avoid harm.
36-1-0432 (ORWM-ST1)	None	None	**No loss of value**: The site is more than 100m from the impact footprint of the Obley Road Alignment and no impacts are expected.
36-1-0433 (ORWM-ST2)	Indirect	None (with management)	**No loss of value**: This site is currently outside of the impact footprint. Potential for indirect impact arising from the Proposal due to the site's close proximity to the proposed works. Specific management recommendations will avoid harm.
36-1-0120 (H2 with PAD)	Indirect	None (with management)	**No loss of value**: This site is currently outside of the impact footprint. Potential for indirect impact arising from the Proposal due to the site's close proximity to the proposed works. Specific management recommendations will avoid harm.

6 MANAGEMENT AND MITIGATION: ABORIGINAL HERITAGE

6.1 GENERAL PRINCIPLES FOR THE MANAGEMENT OF ABORIGINAL SITES

Appropriate management of cultural heritage items is primarily determined on the basis of their assessed significance, as well as the likely impacts of the proposed development. **Section 5.7** provides a definition of significance of sites from a cultural, scientific and public-interest perspective, all of which are taken into account in assessing significance. **Section 5.8** provides a description of the assessed significance of each of these aspects for the recorded sites. **Section 5.9** provides a summary of the sites that would be impacted by the Proposal. The following management options are based on general principles, in terms of best practice and desired outcomes. Specific management options for the identified Aboriginal sites based on known site impacts are presented in **Section 6.2**.

The following management options are general principles, in terms of best practice and desired outcomes, rather than measures to mitigate individual site disturbance.

1. Avoid impact by altering the development proposal. A suitable buffer around a site should be established to ensure the site's protection both during the short term construction phase of development and in the long term use of the area. If plans are altered, care must be taken to ensure that sites previously assessed as not impacted, remain so.
2. If impact is unavoidable: An Aboriginal Heritage Impact Permit (AHIP) that are normally required for impacts to Aboriginal heritage under the NPW Act are not necessary as the Proposal is being assessed under Part 4 Division 4.1 of the EP&A Act (State Significant Development). This notwithstanding, the spirit of site protection and management in the face of impacts remains the same. In place of a permit under the NPW Act, a Statement of Commitments (SoC) in terms of heritage management is prepared. This SoC forms the basis for the Minister's approval which would usually contain one or more conditions, including a requirement for the preparation of an *Aboriginal Cultural Heritage Management Plan* (ACHMP), with which the Applicant would be required to operate in accordance with.

The ACHMP will include measures for site conservation, as well as detailing methods for the management of sites to be impacted. The management will depend on many factors including the assessed significance of the sites. Sites of moderate to high significance in any of the categories (cultural, scientific and public-interest) may require salvage excavation, or more detailed recording, as part of the ACHMP. In certain instances, a site may have low archaeological, aesthetic, and historic values but moderate or high cultural value. In these cases, management can be applied that takes this into account.

Sites of low significance may be removed / destroyed with no further archaeological assessment being required, or with an approved salvage / monitoring programme. The local Aboriginal communities may wish to collect or relocate artefacts, whether temporarily or permanently, and such issues are also required to be covered in the ACHMP. The ACHMP is to be developed in consultation between the Applicant and the RAPs.

The recommended management specific to each site is detailed in **Section 6.3**.

6.2 GENERAL PRINCIPLES (AVOID, MINIMISE, MITIGATE)

Recognising the relatively large impact footprint of the Proposal, the Applicant has followed the principles of 'avoid, minimise, mitigate' to reduce the impact of the Proposal on local heritage values. The following provides a summary of the approach taken. A biodiversity offset area of 1021ha will also be set up as a mitigation strategy through a *Conservation Property Vegetation Plan* registered on title under the Native Vegetation Act 2003.

Avoid Impact

The site of the proposed processing operations and related infrastructure has been located over land which has been regularly cultivated over many years. The areas targeted for the positioning of disturbance associated with the management of waste materials and residues generated by the mining and processing operations considered local environmental considerations and heritage values with efforts made to exclude the following areas.

- The remnant vegetation of Dowds Hill.
- Larger and intact remnants of native woodland vegetation.
- Major drainage lines.
- Higher quality agricultural land.

In developing the initial impact footprint, the Applicant noted the locations of previously-identified Aboriginal sites and attempted to avoid these where practical. Nine sites including 36-1-0358, 36-1-0362, 36-1-0374, 36-1-0372, 36-1-0360, 36-1-0357, 36-1-0357, 36-1-0361 and 36-1-0314 were specifically identified and the relevant impact area modified as required to avoid.

The survey of the initially-designed impact footprint yielded a number of new sites, including those of historic heritage. Following considerations of these sites and environmental factors, sixteen of the newly-recorded sites were excluded in the re-design of the impact footprint including UG-AS2, UG-AS3, UG-AS4, UG-ST2, UG-IF2, UG-IF3, UG-IF4, UG-IF5, UG-IF6, UG-IF7, K-OP1, K-IF1, PAD 12, MM-AS1, MM-AS2, and OR-AS1. Furthermore, the re-design also avoided previously-recorded sites 36-1-0120 and 36-1-0433.

The following efforts to minimise and mitigate the impacts are largely pertinent to environmental considerations. However, the commitments made to offsetting environmental impacts guarantee the long-term conservation of those heritage sites that fall within the biodiversity offset area. Furthermore, in designing environmental impact minimisation and mitigation, the locations of Aboriginal heritage sites were taken into account.

It should also be recognised that Aboriginal heritage values are strongly linked to the natural environment. Not only does a largely-unmodified landscape provide a setting that enhances the value of a site, but it has value in itself to Aboriginal heritage.

Minimise Impact

Noting the largest area of impact would be associated with the Liquid Residue Storage Facility (LRSF), the Applicant has, at significant cost, continued to modify the processing operations to improve water efficiency. Through this process optimisation, the water required has been reduced by approximately 20%, in turn reducing the area required for the LRSF.

When determining which of the LRSF Areas to exclude from the disturbance footprint, the occurrence of heritage sites was considered. The density of Aboriginal sites on the “Ugothery” property where LRSF Area 7 was originally located is far higher than on those sections of the “Grandale”, “Ugothery” and “Toongi Valley” properties on which LRSF Areas 4 and 5 are located. As such, greater heritage benefit was derived from excluding LRSF Area 7.

Mitigate Impacts

Noting that some impact on heritage sites is unavoidable should the Proposal be approved in its present form, the Applicant aims to mitigate this impact by:

- undertaking appropriate archival recording of Aboriginal cultural heritage sites prior to disturbance; and

- updating OEH AHIMS with the results of this assessment and any subsequent changes to sites within the Study Area.
- Sites within the Biodiversity Offset Area will generally have better protection than they currently have. Not only will they no longer be subject to agricultural impacts, land management practises will attempt to limit the erosion which currently affects sites.
- The DZP mine will generate employment opportunities in the Dubbo area. The Applicant has a history of high employment rates from local areas in nearby mines, for example the Peak Hill Gold Mine and Tomingley Gold Operations.

6.3 MANAGEMENT AND MITIGATION OF RECORDED ABORIGINAL SITES

Within the parameters of the proposed works, complete avoidance of all sites recorded within the Study Area is unlikely given that the sites lie within the limits of the proposed impact zones. However, it is generally recommended that changes be made to the proposed works as far as possible so as to avoid archaeological sites. It is acknowledged that the design of the impact footprint has been altered substantially since the inception of the project, and this has resulted in the exclusion of many sites from the proposed impact footprint.

Where recommendations for the management of these sites indicate that salvage or monitoring is necessary, these mitigations need to be expressed in the SoC, which should be prepared in consultation with the RAPs. This must be completed prior to the commencement of any archaeological monitoring or salvage activity and before there can be any impact by the proposed works.

As documented in **Section 5.9**, 14 sites are completely or partially within the proposed impact footprint. Impacts associated with the Proposal must be considered as permanent. The recommendation for management of these sites falls under three management recommendation groups (**Table 13**).

Group 1: Avoidance.

26 sites are outside the current impact footprint and are at no direct risk of harm from the Proposal.

Sites to be avoided should be clearly marked on mine plans and the areas avoided by all activities associated with the construction and operation of the mine and related infrastructure. These sites are to be taken into consideration in further land use/management practises such as agriculture and biodiversity offset.

Group 2: Sites requiring management

This category includes sites directly within or adjacent to the impact footprint where cultural material was identified but where sub-surface archaeological deposits are considered unlikely.

Group 2a: Surface collection of artefacts

Detailed recording and collection of surface artefacts would be the primary management approach for sites in this category. All but one site in this group (UG-AS1) have been assigned a low scientific value and only limited further investigation is considered necessary. Nine sites fall into this group: UG-AS1, GI-AS1, GI-AS2, PH-IF1, TV-AS1, TV-IF1, and 36-1-0313. The former Group 3 sites, 36-1-0356 and 36-1-0364, will now be managed as Group 2a sites as the test excavation program demonstrated that these sites are surface manifestations only and that further sub-surface salvage is not warranted.

In the cases where sites partially overlap with the impact footprint, surface collection should be confined to the impact footprint with a five metre buffer. The remainder of the site should be fenced off during construction to avoid incidental impacts. UG-AS1 is the exception to this, as it

is almost entirely within the impact footprint and the section of the site not directly in the impact area will be nearby to the impacts for the life of the proposal. There would be little value in fencing off and conserving the small section of the site outside of the impact footprint and so total salvage is recommended.

RAP Consultation

Following discussions with the RAPs in an AFGM, it was determined that the collected surface artefacts be transferred to the custody of the RAPs via a Care Agreement. This agreement is to be drafted and included in a forthcoming ACHMP. Potential management options were discussed such as reburial, holding the artefacts in a keeping place for educational purposes, reserving some artefacts for public display, or a combination of any of these options. The formalisation of this management is an ongoing requirement of the project.

Group 2b: Relocation of cultural heritage items

As the proposed works will impact five Aboriginal scarred trees (UG-ST1, TS-ST-04 [36-1-0365], TS-ST-05 [36-1-0366], TS-ST-06 [36-1-0367] and TS-ST-02 [36-1-0372]), the Applicant has commenced consultation with the RAPs to determine the best management and fate of these the scarred portions of these trees. All scars are deemed to be of low scientific significance and the preservation of the scarred trunk portions is not an archaeological recommendation. This is due to the low level of archaeological/scientific significance of these scarred trees on the basis that they are not outstanding examples of this site type and in many cases are doubtful in origin.

RAP Consultation

It is the desire of the RAPs that the scar-bearing portions of the scarred trees to be impacted be removed and transferred to their custody via a Care Agreement. Further management is to be formalised and included in a forthcoming ACHMP. Potential management options discussed include storing the scars in a keeping place such as in a shelter in the Biodiversity Offset Area and/or public display of selected scars, perhaps involving plaster casting.

Should the Applicant wish to agree to this path of management, the details are to be formalised in conjunction with the RAPs through the ACHMP development. In the case of only select scars being salvaged and / or displayed, it is recommended that site 36-1-0366 (TS-ST-05) be utilised as the best example from an archaeological perspective. It should also be noted that 36-1-0372 (TS-ST-02) was deemed unlikely to be cultural in origin by the team of archaeologists and RAP representatives during OzArk's reassessment of this previously recorded scarred tree.

Group 3: **Avoidance with management**

Eleven sites are located adjacent to component disturbance areas and face possible indirect impacts. These specific sites (TS-ST-03 [36-1-0373], TS-IF2 [36-1-0362], TSA-OS-02 [36-1-0358], MM-AS1, MM-AS2, MM-IF1, MM-IF2, OR AS1 with PAD, OR-ST1, ORWM-ST2 [36-1-0433] and H2 with PAD [36-1-0120]) should be managed separately by:

- Sites should be revisited by a suitably qualified archaeologist before construction and the sites located so that their extent can be temporarily fenced
- DZP personnel should be alerted to their location and the location of the sites should be shown on mine plans;
- Work crews in the vicinity of any of these sites should be informed by way of an induction as to the site's location and its legislative protection under the NPW Act. All work crews should be informed that the fenced area remains a no-go area for the duration of the works; and

- If at the time of construction it becomes obvious that a site in this category will be harmed by the proposed works, the site should be managed as a Group 3 site (in all likelihood, given their low scientific significance, as Group 3a sites). Specific management recommendations for the site could be formulated following the site visit by a suitably qualified archaeologist (point 'a' above).

Group 2d: **Avoidance with monitoring**

One site (TS-GG-01; 36-1-0314) could suffer over time from modification of the drainage coming from the proposed Open Cut. Once the eastern half of the Open Cut has begun, a condition assessment schedule is recommended to ensure that the site is not being harmed.

Group 3: Sites requiring further investigation

Two sites once fell into this group: 36-1-0356 with PAD and 36-1-0364 with PAD. These sites have been moved to Group 2a following the results of the test excavation that took place at each site. These sites are mentioned here to indicate their previous management category.

No sites are now assigned to Group 3 as this group is now redundant following the completion of test excavation.

Table 13 provides an overview of the appropriate management for each site. **Section 7** details recommendations for next steps, based on these management options.

Table 13: Aboriginal Site Management Recommendations

AHIMS Site ID	Site Name	PAD	Management Group	Recommended Management
DZP Site				
	UG-AS1	No	2a	**Salvage**: This site is to be harmed by the Proposal. Detailed recording and collection of artefacts is recommended.
	UG-AS2	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	UG-AS3	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	UG-AS4	PAD	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	UG-ST1	No	2b	**Salvage**: This site is to be harmed by the Proposal. Detailed recording and consultation with Aboriginal community about possible relocation and storage of the tree is recommended.
	UG-ST2	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	UG-IF1	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	UG-IF2	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	UG-IF3	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	UG-IF4	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	UG-IF5	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact

AHIMS Site ID	Site Name	PAD	Management Group	Recommended Management
				from mine-related works.
	UG-IF6	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	UG-IF7	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	K-AS1 with PAD	PAD	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	K-AS2 with PAD	PAD	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	K-IF1	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	K-OP1	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	PAD 12	PAD	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	GI-AS1	No	2a	**Salvag**e: This site is within the impact footprint of the open cut by 50m. Detailed recording and collection of artefacts is recommended.
	GI-AS2	No	2a	**Salvage:** This site is within the impact footprint of the open cut by over 50m. Detailed recording and collection of artefacts is recommended.
	PH-IF1	No	2a	**Salvage**: This site is to be harmed by the Proposal. Detailed recording and collection of artefact is recommended.
	TV-AS1	No	2a	**Salvage**: This site is to be harmed by the Proposal. Detailed recording and collection of artefacts is recommended.
	TV-AS2 with PAD	PAD	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	TV-AS3 with PAD	PAD	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	TV-IF1	No	2a	**Salvage**: This site is to be harmed by the Proposal. Detailed recording and collection of artefact is recommended.
	G-AS1	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
	G-IF1	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
36-1-0373	TS-ST-03	No	2c	**Avoidance/Management**:: This site is 25m outside the impact footprint. However, the site should be marked to avoid inadvertent impacts.
36-1-0365	TS-ST-04	No	2b	**Salvage**: This site is to be harmed by the Proposal. Detailed recording and consultation with Aboriginal community about possible relocation and storage of the tree is recommended.
36-1-0366	TS-ST-05	No	2b	**Salvage**: This site is to be harmed by the Proposal. Detailed recording and consultation with Aboriginal community about possible relocation and storage of the tree is recommended.
36-1-0367	TS-ST-06	No	2b	**Salvage**: This site is to be harmed by the Proposal. Detailed recording and consultation with Aboriginal community about possible relocation and storage of the tree is recommended.

AHIMS Site ID	Site Name	PAD	Management Group	Recommended Management
36-1-0368	TS-ST-07	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
36-1-0313	TS-IF-01	No	2a	**Salvage**: This site is within the impact footprint of the open cut by 15m. Detailed recording and collection of the artefact is recommended.
36-1-0314	TS-GG-01	PAD	2d	**Avoidance/Inspect**: This site is outside the impact footprint, but could suffer over time from modification of the drainage coming from the proposed Open Cut. Once the eastern half of the Open Cut has begun a condition assessment schedule is recommended to ensure that the site is not being harmed.
36-1-0374	TS-ST-01	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
36-1-0372	TS-ST-02	No	2b	**Salvage**: This site is to be harmed by the Proposal. Detailed recording and consultation with Aboriginal community about possible relocation and storage of the tree is recommended.
36-1-0357	TS-OS-01 with PAD	PAD	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
36-1-0358	TS-OS-02	No	2c	**Avoidance/Management**:: This site is outside the impact footprint of the open cut by only 15m. It is recommended that the location be marked to avoid inadvertent impacts to the site. If avoidance is not possible then salvage is recommended (Management Group 2a).
36-1-0361	TS-GG-02 with PAD	PAD	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
36-1-0360	TS-GG-03	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
36-1-0362	TS-IF-02	No	2c	**Avoidance/Management**: This site is outside the impact footprint of the open cut by only 30m. It is recommended that the location be marked to avoid inadvertent impacts to the site. If avoidance is not possible then salvage is recommended (Management Group 2a).
Toongi - Dubbo Rail Line and Gas Pipeline Corridor				
No Aboriginal sites have been identified within the fenced corridor of the rail line at the areas checked (the creek crossings), and no previously recorded sites fall within the rail easement.				
Macquarie River Water Pipeline				
	MM-AS1	No	2c	**Avoidance/Management**:: this site is located nearby to the Macquarie Water Pipeline, but will not be impacted by the pipeline. However, the site should be marked to avoid inadvertent impacts.
	MM-AS2	No	2c	**Avoidance/Management**:: this site is located within 20m of the Macquarie Water Pipeline, but will not be impacted by the pipeline. However, the site should be marked to avoid inadvertent impacts.
	MM-IF1	No	2c	**Avoidance/Management:**: this site is located within 20m of the Macquarie Water Pipeline, but will not be impacted by the pipeline. However, the site should be marked to avoid inadvertent impacts.
	MM-IF2	No	2c	**Avoidance/Management**:: this site is located within 30m of the Macquarie Water Pipeline, but will not be impacted by the pipeline. However, the site should be marked to avoid inadvertent impacts.
36-1-0356	TS-OS-03 with PAD	PAD	2a	**Salvage**: This site is to be harmed by the Proposal. Detailed recording and collection of artefacts within the pipeline corridor is recommended. Fencing along pipeline corridor where it intersects with the site is recommended.
36-1-0364	TS-OS-05 with PAD	PAD	2a	**Salvage**: This site is to be harmed by the Proposal. Detailed recording and collection of artefacts within the pipeline corridor is recommended. Fencing along pipeline corridor where it intersects with the site is recommended.

AHIMS Site ID	Site Name	PAD	Management Group	Recommended Management
Obley Road Alignment				
	OR-AS1 with PAD	PAD	2c	**Avoidance/Management**: This site falls near the proposed Obley Road Alignment, but may be avoidable, in which case it should be marked off to avoid inadvertent impacts. If it is not avoidable limited test excavation (management option 3) within the impact footprint is recommended to determine the significance of the site.
	OR-ST1	No	2c	**Avoidance/Management**:: The site should be marked off to avoid inadvertent impacts as it falls close to the impact footprint for the Obley Road Alignment.
36-1-0432	ORWM-ST1	No	1	**Avoidance**: This site is outside the impact footprints for the Proposal. Site should be marked on mine plans to prevent accidental impact from mine-related works.
36-1-0433	ORWM-ST2	No	2c	**Avoidance/Management**:: The site should be marked off to avoid inadvertent impacts as it falls close to the impact footprint for the Obley Road Alignment.
36-1-0120	H2 with PAD	PAD	2c	**Avoidance/Management**:: This site falls near the proposed Obley Road Alignment, but may be avoidable, in which case it should be marked off to avoid inadvertent impacts. If it is not avoidable limited test excavation (management Group 3) within the impact footprint is recommended to determine the significance of the site.

6.3.1 Management Discussion

There has been general accordance between the management proposed by OzArk and the views of RAPs on management. However, it should be noted that the desired management measures expressed by the RAPs for the scarred trees to be impacted is perhaps beyond what would be expected given the sites' archaeological significance as assessed in this report.

There has been some level of doubt applied to the origin of the scars by Nolan (2002) and/or OzArk (this report). Of the scars, 36-1-0366 is most likely to have a cultural origin. Should the Applicant and RAPs agree to salvage an example of the site type, 36-1-0366 would be the preferred scar to salvage. However, it is recognised that the RAPs have assigned value to all scars and that it is their wish to salvage all five sites.

While not an archaeological requirement, the Applicant should discuss management options with the RAPs prior to the removal of the scars. In order to justify such an action, RAPs would need to be able to ensure the long-term curation and preservation of the scar-bearing portion of the tree. Alternatively, should no suitable permanent site be available, the Applicant and RAPs could discuss a suitable place within the Project Area for the scar-bearing portions of the trees to be placed so that they are preserved, at least in the short-term. If this option were followed, a simple shelter and supports to keep the tree off the ground away from termites and under shelter would aid the preservation of the scar-bearing portion of the trees.

6.4 RELEVANT LEGISLATION

Cultural heritage is managed by a number of NSW and Commonwealth Acts. Baseline principles for the conservation of heritage places and relics can be found in the Burra Charter[14], which recognises that there are places worth keeping because they can enrich our

[14] The Burra Charter defines the basic principles and procedures to be followed in the conservation of all kinds of places such as monuments, buildings, Aboriginal sites, roads, archaeological sites, whole districts or even regions. It was first adopted in 1979, based on the Australian ICOMOS (International Council on Monuments and Sites) review (1977) of the 1966 Venice Charter (Australian ICOMOS Inc. 1998).

lives on many levels. The significance of such places may be embodied in fabric (physical material), environmental setting, contents, use or meaning to people, and should be assessed through methodical data collection. Since its adoption in 1979, The Burra Charter has become the standard of best practice in the conservation of heritage places in Australia, and heritage organisations and local government authorities have incorporated the inherent principles and logic into guidelines and other conservation planning documents. The Burra Charter generally advocates a cautious approach to changing places of heritage significance. This conservative notion embodies the basic premise behind legislation designed to protect our heritage, which operates primarily at a State level.

A number of Acts of parliament provide for the protection of Aboriginal heritage at various levels of government[15]. The three most important statutes in New South Wales are the:

- *Environmental Planning and Assessment Act 1979* (EP&A Act), amended by the *Environmental Planning and Assessment Amendment (Infrastructure and Other Planning Reform) Act 2005* (EP&AA Act).
- *National Parks and Wildlife Act 1974* (NPW Act).
- *Heritage Act 1977* (Heritage Act)

While at Commonwealth level, the following statute is relevant:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) amended by the *Environment and Heritage Legislation Amendment Act (no. 1) 2003*.

6.4.1 NSW legislation

6.4.1.1 Environmental Planning and Assessment Act 1979 (EP&A Act)

The EP&A Act established requirements relating to land use and planning. The main areas controlled by the Act pertaining to heritage are:

- Part 4: local government development assessments, including heritage. May include schedules of heritage items.
    - Division 4.1: approvals process for State Significant Development (not infrastructure related).
- Part 5: environmental impact assessment requirements (for those developments not requiring consent under Part 4). State owned heritage items listed on LEPs are governed by Part 5.
    - Division 5.1: approvals process for State Significant Development (infrastructure related).

6.4.1.2 National Parks and Wildlife Act 1974 (NPW Act)

Amended during 2010, the NPW Act provides for the protection of Aboriginal objects (sites, objects and cultural material) and Aboriginal places. Under the Act (S.5), an Aboriginal object is defined as: any deposit, object or material evidence (not being a handicraft for sale) relating to Aboriginal and non-European habitation of the area that comprises New South Wales, being habitation both prior to and concurrent with the occupation of that area by persons of European extraction, and includes Aboriginal remains.

[15] NSW Heritage Office 1998: *Living with Aboriginal Culture*, p. 3.

An Aboriginal place is defined under the NPW Act as an area which has been declared by the Minister administering the Act as a place of special significance for Aboriginal culture. It may or may not contain physical Aboriginal objects.

As of 1 October 2010, it is an offence under Section 86 of the NPW Act to 'harm or desecrate an object the person knows is an Aboriginal object'. It is also a strict liability offence to 'harm an Aboriginal object' or to 'harm or desecrate an Aboriginal place', whether knowingly or unknowingly. Section 87 of the Act provides a series of defences against the offences listed in Section 86:

- The harm was authorised by and conducted in accordance with the requirements of an Aboriginal Heritage Impact Permit (AHIP) under Section 90 of the Act.
- The defendant exercised 'due diligence' to determine whether the action would harm an Aboriginal object.
- The harm to the Aboriginal object occurred during the undertaking of a 'low impact activity' (as defined in the regulations).

Under Section 89A of the Act, it is a requirement to notify the OEH Director-General of the location of an Aboriginal object. Identified Aboriginal items and sites are registered with the OEH on AHIMS.

6.4.2 Commonwealth Legislation

6.4.2.1 Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)

Amendments in 2003 established the National Heritage List and the Commonwealth Heritage List, both administered by Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC). Ministerial approval is required for proposals involving significant impacts to National/Commonwealth heritage places.

6.4.3 Applicability to the Application Area

The following provides a summary of the applicability of the legislation identified in the preceding sections.

- There are no Aboriginal items listed on the National or Commonwealth heritage registers (see **Table 1**) within the Study Area. Therefore the EPBC Act is not applicable.
- The Proposal is being assessed under Part 4.1 of the EP&A Act.
- The Aboriginal sites recorded here have legislative protection under the NPW Act.

7 RECOMMENDATIONS

The following recommendations are made on the basis of:

- NPW Act whereby it is illegal to harm or desecrate an Aboriginal object or place without the prior written consent of the Director of the OEH;
- The findings of the current investigations undertaken within the Application Area; and
- The interests of the RAPs identified for this Proposal.
- EP&A Act Part 4 Division 4.1, for assessment of State Significant Development.

Details of the management measures recommended for each site are given in **Section 6.3** and **Table 13**. In general, on the basis of the findings of the current assessment it is concluded that management of the identified sites should be as follows.

- Management Group 1: 26 sites (including one PAD) are currently located outside of the impact footprint. For these sites and for any additional sites where avoidance of harm be the chosen management, the following is recommended:
    - Inductions should be provided to workers as to the location and legislative protection of these sites. These inductions should be documented.
    - Appropriate measures should be in place to protect the site such as marking sure that all future activities avoid impacts to a site's location.
- Management Group 2a: Nine sites are currently under threat of harm from the proposed impacts that were assessed as being unlikely to yield further significant data about Aboriginal heritage. As these sites were determined to hold low scientific/archaeological values, the management recommendations are as follows.
    - An *Aboriginal Cultural Heritage Management Plan* (ACHMP), including a Statement of Commitments (SoC), documenting how each site is to be managed should be prepared following consultation undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRs).
    - The ACHMP and SoC should include measures for the collection / salvage of surface artefacts from sites prior to works commencing.
    - A Care Agreement covering any artefacts from the salvage would be included in the ACHMP.
- Management Group 2b: Five sites (all culturally modified trees) are currently under threat of harm from the proposed impacts. Specific management of these sites include are as follows.
    - There are no archaeological deposits associated with these sites so further archaeological investigation is not warranted.
    - The scars should be recorded to archival quality prior to removal.
    - Salvage of these sites is not an archaeological recommendation, however it is the desire of the RAPs to retain the scar-bearing portions of the trunks. Should the Applicant and RAPs agree to salvage one or more of the scar-bearing portions of the trees, the methodology and Care Agreement would form part of the ACHMP.
- Management Group 2c: Eleven (11) sites are located closely adjacent to the proposed impact footprint and specific recommendations are applied to them to ensure that these sites are not impacted by the proposed works (**Section 6.2**).

- Management Group 2d: One site is located outside the proposed impact footprint but there remains the potential that the site could be indirectly impacted. Specific recommendations are applied to this site to ensure that these sites are not impacted by the proposed works (**Section 6.2**).

- Management Group 3: This group is now redundant (as test excavation is now complete) and no further sites are subject to Group 3 management.

- Proposed works should remain limited to the Application Area as assessed in the current report so as to eliminate the chance of encountering Aboriginal objects in unassessed areas.

- Should any other objects or Aboriginal sites be identified during the course of construction *The Unanticipated Finds Protocol* in **Appendix 5** should be followed.

- As this Proposal falls under Part 4 Division 4.1 of the EP&A Act, an AHIP is not required for the salvage of heritage sites if development consent is issued. Rather, approval for the undertakings should be sought though a Statement of Commitments and eventually incorporated into an *Aboriginal Cultural Heritage Management Plan*.

- One copy of this report should be sent to:
    - Binjang Wellington Wiradjuri Heritage Survey
    - Dubbo Local Aboriginal Land Council
    - Diane Stewart
    - Wirrimbah Direct Descendants
- Two copies of this report should be sent to:
    - Office of Environment and Heritage, AHIMS Registrar, Attention: Cheryl Brown, PO Box 1967, Hurstville, NSW, 1481.

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PLATES

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Plate 1: Typical view of survey unit UG-2 from a hill crest.

Plate 2: K-7 Survey Unit overview

Plate 3: W-2 Survey Unit overview

Plate 4: GI Survey Unit overview

Plate 5: PH-5 Survey Unit overview

Plate 6: TV-1 Survey Unit overview

Plate 7: Southeast-facing view of survey unit G-8 along a strip of ploughing

Plate 8: Dundullimal RB Survey Unit overview, west side of Macquarie River

Plate 9: Hyandra RB Survey Unit overview, north side of creek

Plate 10: MM-2 Survey Unit overview

Plate 11: TV-H2O Survey Unit overview

Plate 12: OR-1 Survey Unit overview

APPENDIX 1: RAP PARTICIPATION

Note: This Appendix can be viewed on the Project CD

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Community Consultation Log

Date	Organisation	Contact Name	Comment
DUBBO ZIRCONIA PROJECT - COMMUNITY CONSULTATION			
22.12.11	Daily Liberal (weekend edition)	Classifieds - 'classifieds.liberal@ruralpress.com	placed advert to appear in weekend Liberal **Saturday 7th January. EOI** closes 23 January 2012
Aboriginal Community Consultation Stage 1			
22.12.11	Office of The Registrar, ALRA	Attn: Ms Tabitha Dantoine Office of the Registrar, ALRA (PO Box 112) 11 - 13 Mansfield Street Glebe NSW 2037	mailed letter advising of project and requesting knowledge of known Indigenous groups/individuals who may have an interest in the project. **EOI DATE 23 January 2012.**
22.12.11	NTSCORP	Peter Schultz PO box 2105 Strawberry Hills 2012 e: <pschultz@ntscorp.com.au	emailed & mailed letter advising of project and requesting knowledge of known Indigenous groups/individuals who may have an interest in the project. **EOI DATE 23 January 2012.** Mr Schultz emailed requesting that hard copies of correspondence be sent in the future as 'notices might not be processed within given time frame', advised hard copy was also posted. Requested extension to **30 January 2012.**
22.12.11	Office of Environment & Heritage	Attn: Mr Paul Houston Office of Environment & Heritage PO Box 2111 Dubbo NSW 2830 e:paul.houston@environment.nsw.gov.au	emailed & mailed letter advising of project and requesting knowledge of known Indigenous groups/individuals who may have an interest in the project. **EOI DATE 23 January 2012.**
22.12.11	National Native Title Tribunal	Admin/Kailah Longbottom Level 25, 25 Bligh Street, Sydney, New South Wales 2000 e:Kailah.Longbottom@nntt.gov.au	emailed & mailed letter advising of project and requesting knowledge of known Indigenous groups/individuals who may have an interest in the project. **EOI DATE 23 January 2012.**
22.12.11	Aboriginal Reference Group Central West CMA	Members – Aboriginal Reference Group Central West CMA c/- Aboriginal liaison officer PO Box 2105 Dubbo NSW 2830	mailed letter advising of project and requesting knowledge of known Indigenous groups/individuals who may have an interest in the project. **EOI DATE 23 January 2012.**
22.12.11	Dubbo City Council	Mark Riley- General Manager Dubbo City Council PO Box 81 Dubbo NSW 2830	mailed letter advising of project and requesting knowledge of known Indigenous groups/individuals who may have an interest in the project. **EOI DATE 23 January 2012.**
22.12.11	Dubbo LALC	Ms Uppannia Sullivan Cnr Wingewarra & Darling sts PO Box 1565 DUBBO NSW 283	emailed & mailed letter advising of project and requesting knowledge of known Indigenous groups/individuals who may have an interest in the project. and inviting DLALC to register interest **EOI DATE 23 January 2012.**
22.12.11	Wirrimbah Direct Descendants	Mr S Ryan PO Box 2070 Dubbo 2830 e: stephen.ryan@alc.org.au	emailed & mailed letter advising of project and inviting WDD to register interest **EOI DATE 23 January 2012.**
22.12.11	Binjang Wellington Wiradjuri Heritage Survey	Mrs Dorothy Stewart 260 Myall St Dubbo 2830	emailed & mailed letter advising of project and inviting BWWHS to register interest **EOI DATE 23 January 2012.**
22.12.11	Binjang Wellington Wiradjuri Heritage Survey	Mrs Diane Stewart 3 Flinders Close Dubbo 2830	emailed & mailed letter advising of project and inviting BWWHS to register interest **EOI DATE 23 January 2012.**
Aboriginal Community Consultation Stage 1			
24.12.11	Wirrimbah Direct Descendants	Steve Ryan e: stephen.ryan@alc.org.au	received email response from Steve advising WDD would like to register interest in this project.

Date	Organisation	Contact Name	Comment
05.01.12	Wirrimbah Direct Descendants	Steve Ryan e: stephen.ryan@alc.org.au	received email from Steve checking that he had registered interest in the project on behalf of WDD, responded & confirmed that WDD are a registered party in the DZP project.
09.01.12	National Native Title Tribunal	Kailah Longbottom e <Kailah.Longbottom@nntt.gov.au	received search results back over Dubbo LGA, listed claims NC09/2 & NC09/4 1. Wiradjuri Traditional Owners Central West Corp.* 2. Wellington Valley Wiradjuri People * map indicates this claim is not within the Project Area, WTOCWC not notified in accordance with Applicant discretion. Note that NNTT searches are based on LGA and this claim is within the Lithgow LGA - an area MLA324 7km east northeast of Portland.
09.01.12	NTSCORP	Peter Schultz e: <pschultz@ntscorp.com.au	Mr Schultz emailed advising that a hard copy had not been received, subsequently a hard copy was re-posted.
18.01.12	Office of Environment & Heritage	Mr Paul Houston Office of Environment & Heritage PO Box 2111 Dubbo NSW 2830 e: paul.houston@environment.nsw.gov.au	received response dated 16/1/2012 from OEH - advised we should notify *Binjang Wellington Wiradjuri Heritage Survey * *Dubbo LALC* *Mooka TOC* *Peter Peckham* *Wellington Valley Wiradjuri Aboriginal Corporation* *Wiradjuri Council of Elders* *Wirrimbah Direct Descendants* *Central West Catchment Management Authority*
18.01.12	Office of the Registrar, ALRA	Ms Tabitha Dantoine Office of the Registrar, ALRA (PO Box 112) 11 - 13 Mansfield Street Glebe NSW 2037	Received response dated 10/01/2012 from the Office of the Registrar, ALRA- advised we should notify *Dubbo LALC*
Aboriginal Consultation Stage 1 Round 2			
11.01.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart e: <jamiegray66@gmail.com 0435843324 260 Myall St Dubbo NSW 2830	EMAIL RECEIVED Dear Cheryl In regards letter proposed Dubbo Zirconia project Toongi. I wish to register as a stake holder and would like the methodology report email sent to me. Cheers Dorothy Stewart / C.E.O Binjang Wellington Wiradjuri Heritage Survey
18.01.12	Binjang Wellington Wiradjuri Heritage Survey	Mrs Diane Stewart ph: 6882 4528	phoned the office and expressed her interest in the project
18.01.12	Mooka TOC	Mr Neville Williams Mooka TOC Po Box 70 Cowra NSW 2794	mailed letter advising of project and inviting Mooka TOC to register interest EOI DATE Mon 6th of Feb 2012.
18.01.12	Peter Peckham	Mr Peter Peckham 27 Jennings St Geurie NSW 2831	mailed letter advising of project and inviting Peter to register interest EOI DATE Mon 6th of Feb 2012.
18.01.12	Wiradjuri Council of Elders	Mr Robert Clegg 3 Loretta Place Glendenning NSW 2761	mailed letter advising of project and inviting WCE to register interest EOI DATE Mon 6th of Feb 2012.
18.01.12	Wellington Valley Wiradjuri Aboriginal Corporation	Mr Stephen Parkes PO Box 508 Wellington NSW 2820	mailed letter advising of project and inviting WVWAC to register interest EOI DATE Mon 6th of Feb 2012.

Date	Organisation	Contact Name	Comment
23.01.12	Dubbo City Council	Steven Jennings Planning Services Supervisor Building and Development Services Dubbo City Council PO Box 81 Dubbo NSW 2830 P (02) 6801 4000	Received email from DCC recommending we contact the following groups: Hi Cheryl, In relation to your correspondence to Council dated 22 December 2011, the two Aboriginal groups likely to have an interest in the project will be the following: Wirrimbah Direct Descendants Wirrimbah Direct Descendants Aboriginal Corporation PO Box 2070 Dubbo NSW 2830 Dubbo Local Aboriginal Land Council Dubbo Cnr Wingewarra & Darling Sts DUBBO 2830 PO Box 1565 DUBBO NSW 2830 dlalc@bigpond.com 02 6884 5276 02 6884 3441
04.02.12	Wellington Valley Wiradjuri Aboriginal Corporation	Mr Bradley Bliss PO Box 508 Wellington NSW 2820	Received email from WVWAC who wish to register interest in the project. Hi Cheryl, In regards to the Aboriginal Heritage Assessment for the proposed Dubbo Zirconia Project at Toongi, please find attached Wellington Valley Wiradjuri Aboriginal Corporation's Stakeholder letter in reply to your letter on this matter. Regards, Bradley R. Bliss J.P. WVWAC - Director
07.02.12	Dubbo LALC	Uppannia Sullivan dlalc1@optusnet.com.au	emailed copy of original correspondence - Please find attached correspondence in relation to the upcoming Dubbo Zirconia project. This information was sent over the Christmas period, however as reminder should the DLALC wish to be consulted in relation to this project contact our office and we will note you as a registered stakeholder.
27.03.12	Wellington Valley Wiradjuri Aboriginal Corporation	Mr Bradley Bliss PO Box 508 Wellington NSW 2820	spoke to Bradley and emailed a map of the project area. Bradley wished to ascertain as to whether the study area was in actual fact within the claim area of WVWAC. Via email - Hi Cheryl, From the map you sent, it appears that the Zirconia Mine at Toongi is outside of our Traditional Area as defined by the NNTT Claim and we will withdraw as a Registered Stakeholder. Please let me know if you require a formal letter to that affect. Regards, Bradley Bliss WVWAC - Director
17.04.12	Wirrimbah Direct Descendants	Steve Ryan e: stephen.ryan@alc.org.au	emailed copy of project overview and information about DZP, methodology, invitation to meeting to be held Tuesday 24th April 2012.
17.04.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart e: <jamiegray66@gmail.com 0435843324 260 Myall St Dubbo NSW 2830	emailed & mailed copy of project overview and information about DZP, methodology, invitation to meeting to be held Tuesday 24th April 2012.
17.04.12	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528	mailed copy of project overview and information about DZP, methodology, invitation to meeting to be held Tuesday 24th April 2012.
17.04.12	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528	Called Diane inviting and seeing is she was able to attend the meeting next Tuesday the 24th in which she will be attending.
17.04.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart e: <jamiegray66@gmail.com 0435843324 260 Myall St Dubbo NSW 2830	Called Dorothy inviting and seeing is she was able to attend the meeting next Tuesday the 24th in which she will be attending.

Date	Organisation	Contact Name	Comment
	Wirrimbah Direct Descendants	Steve Ryan e: stephen.ryan@alc.org.au	received email response indicating Steve should be able to attend the meeting, or a rep on behalf of WDD.
24.04.12	MEETING HELD @ ALKANE OFFICE, ATTENDEES DOROTHY STEWART, DIANE STEWART, MKE SUTHERLAND, JODIE BENTON, CHERYL BURKE Steve Ryan WDD sent apologies.		
17.05.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart e: <jamiegray66@gmail.com 0435843324 260 Myall St Dubbo NSW 2830	Dorothy came in the office wanting to know how many officers for how long and how many workers
17.05.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart e: <jamiegray66@gmail.com 0435843324 260 Myall St Dubbo NSW 2830	After speaking with Cheryl I called Dot back informing her the survey is on Tuesday and the Cheryl will contact her tomorrow morning with all the other information
21.05.12	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528	spoke to a gentleman who advised Diane was not home and would not be back until late this afternoon, asked if you could let Diane know that OzArk phoned in relation to survey work.
21.05.12	Binjang Wellington Wiradjuri Heritage Survey	Dot Stewart	Dot called into the office and advised she would be able to provide 2 site officers for the initial survey phase Tuesday/Wednesday this week. Let her know it was an 8am start & reminded of PPE gear etc.
21.05.12	Mrs Diane Stewart (individual)	Diane Stewart ph: 6882 4528	phoned Diane who advised that she is sending someone out under Binjang - Eric Fernando. General discussion about further FW which we will have a better idea of after the initial two survey days tomorrow, confirmed meeting time as 8am at the OzArk offices.
21.05.12	Binjang Wellington Wiradjuri Heritage Survey	Dot Stewart	spoke to Dot again and confirmed that the plan was as noted earlier in the day.
10.07.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	Dot phoned to ask about the upcoming survey dates and also advised that Mike had said he would send her a map although she had not received it as yet. She also queried the 'Springs' asking if this area was to be impacted by the project? I told Dot I would email Mike to remind him about the map and the query.
17.07.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart e: <jamiegray66@gmail.com 0435 843 324 260 Myall St Dubbo NSW 2830	spoke to Dot & advised her of the upcoming dates and that we will invite a site officer from BWWHS, Dot stressed repeatedly that Diane was an individual stakeholder and not associated with Binjang as such, however Jamie Gray is able to be contacted (email) should we not be able to contact Dot. In relation to the site officer positions it was necessary to confirm with Dot who was covered and who represented Binjang as previously Diane had advised she was sending a site officer to the survey when in actual fact it was Dot who had arranged the site officer and Binjang who invoiced for the work. EMAILED & MAILED fieldwork advise and invited two reps to participate from Binjang
17.07.12	Wirrimbah Direct Descendants	Steve Ryan e: stephen.ryan@alc.org.au	emailed Steve Ryan information about the survey dates next week and also invited two reps from WDD to participate. Steve had the WDD book-keeper forward relevant insurances and confirmed that WDD would have two site officers available for the survey days next Tuesday/Wednesday.

Date	Organisation	Contact Name	Comment
17.07.12	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528	mailed Diane information about the days next week and advised should she wish to participate in the physical component of the survey we require relevant insurances. As part of the consultation process however we welcome feedback about the cultural values and invite this from all stakeholders during the course of the project.
31.07.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	Emily spoke with Dot about cultural/family history on DZP project area. We will set up a meeting about it down the road.
2.08.2012	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	Emily called Dot about an informal consultation meeting to be held 9am on 10 Aug 2012. Dot said she could be there.
2.08.2012	Mrs Diane Stewart (individual)	Diane Stewart ph: 6882 4528	Emily called Diane about an informal consultation meeting to be held 9am on 10 Aug 2012, and left a message with Eric as Diane was not in.
2.08.2012	Wirrimbah Direct Descendants	Steve Ryan e: stephen.ryan@alc.org.au	Emily emailed Steve about informal meeting to be held 9am on 10 Aug 2012. Same day received an email back saying he could attend.
9.08.2012	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	Emily called Dot to inform her of rescheduled meeting. Dot can still attend.
9.08.2012	Mrs Diane Stewart (individual)	Diane Stewart ph: 6882 4528	Emily called Diane to inform her of rescheduled meeting. As Diane was out, she spoke with Eric (spouse). Diane called back that afternoon. Diane cannot attend. Emily said she will be informed of the next meeting, when it is scheduled.
9.08.2012	Wirrimbah Direct Descendants	Steve Ryan e: stephen.ryan@alc.org.au	Phil emailed Steve to inform him of rescheduled meeting. Steve cannot attend.
10.08.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart and Jamie ph: 6882 4528	Meeting (10:15 to 11:15) held at Mike Sutherland's office regarding archaeological sites recorded thus far and cultural sites. See meeting notes.
17.08.12	Wirrimbah Direct Descendants	Steve Ryan e: stephen.ryan@alc.org.au	Meeting (12:30 to 13:00) held at Mike Sutherland's office regarding archaeological sites recorded thus far and cultural sites. See meeting notes in Phil's email.
22.08.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	Emily called Dot to set up meeting for ethnography of DZP area. Meeting set for Tuesday 28th Aug. at 10:00.
27.08.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	Emily called Dot to confirm meeting for ethnography of DZP area. Meeting rescheduled for Thursday 30th Aug. at 10:00.
29.08.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	Emily called Dot to confirm meeting for ethnography of DZP area. Left message.
30.08.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	Emily called Dot to confirm meeting for ethnography of DZP area. Rescheduled for Thursday Sept 6th.
03.09.12	WDD / DLALC / BINJANG emailed details of the upcoming 3 days of survey next week. Tuesday 11th - Thursday 13th September, each group has been invited to send one site officer each day.		

Date	Organisation	Contact Name	Comment
04.09.12	Dubbo LALC	Charlie Trindall dlalc1@optusnet.com.au	VIA EMAIL Thanks Cheryl, Dubbo LALC will arrange for a participant to be present for the below dates with agreeance on the fee offered. Steve and I have discussed the Zirconia Project and when prior field work were done Dubbo LALC was going through a management change so I was playing catch up and unfortunately previous CEO did not formally acknowledge our interest. Fortunately Steve Ryan had registered on our behalf as NSW Aboriginal Land Council and Dubbo LALC will be included from here on in. If you require anything further please advise Regards Charlie Trindall
04.09.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	Dot called and spoke to Cheryl about the upcoming survey dates next week, in response to the email. Dot is quite certain that it was supposed to be a team of 6 reps, 3 from Binjang, per day. Advised Dot that this is not the case and she may have it mixed up? Dot did not confirm if Binjang had a rep available or not.
05.09.12	Dubbo LALC	Charlie Trindall dlalc1@optusnet.com.au	informal meeting held at WPCC with Mike Sutherland, Phil Cameron, Charlie Trindall and Cheryl Burke to discuss the project and the input DLALC wish to make.
06.09.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	Emily called Dot to confirm meeting set for today. Meeting rescheduled.
07.09.12	Wirrimbah Direct Descendants	Steve Ryan e: stephen.ryan@alc.org.au	received email from Steve querying the one rep position as he thought it was two, clarified via return email that including Dubbo LALC three site officer positions were being offered, one to each stakeholder group.
6.09.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 260 Myall St Dubbo NSW 2830	Dot returned Emily's phone call regarding meeting up to talk about family history near DZP. Plans made for Dot to call/drop by this week if she has time.
11.09.12	Dubbo LALC	Charlie Trindall dlalc1@optusnet.com.au	tried to phone the DLALC office to see if they would be sending a site officer tomorrow as their rep did not turn up this morning for the survey, left message & emailed. VIA EMAIL Hi Cheryl, So sorry for the mix up I was away yesterday and only just ducked in today for an hour today, I had Michael (Field Officer) ready for 8am start from tomorrows date but from your call and the below email, I had my days mixed up. He will definitely be at your office tomorrow at 8am to pick up from where it was left off today and I will advise him of the mix up. I apologise if this has caused any inconvenience Regards Charlie Trindall Dubbo LALC
09.10.12	WDD / DLALC / BINJANG emailed details of the upcoming 2 days of survey Thursday 18 & Friday 19th October, Each group has been invited to send one site officer each day.		
09.10.12	Wirrimbah Direct Descendants	Steve Ryan e: stephen.ryan@alc.org.au	received return email from Steve acknowledging receipt of fieldwork notification.
12.10.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	Dot phoned to advise she would have a site officer available.
17.10.12	Dubbo LALC	Charlie Trindall dlalc1@optusnet.com.au	Charlie emailed to advise Dubbo LALC will have a rep for the survey tomorrow.

Date	Organisation	Contact Name	Comment
04.12.12		WDD / DLALC emailed details of the upcoming 2 days of survey Monday 18 & Tuesday 19th December, 2012. Each group has been invited to send two site officers each day.	
04.12.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	phoned and posted correspondence to Dot advising of upcoming survey. Dot advised she would have site officers available for the dates.
13.12.12	Dubbo LALC WDD	Charlie Trindall dlalc1@optusnet.com.au Steve Ryan e: stephen.ryan@alc.org.au	emailed Steve & Charlie again asking if their respective organisations had site officers available for the upcoming dates.
14.12.12	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	received email from Darren advising Ray Smith and Terry Toomey would be attending the survey.
17.12.12	Dubbo LALC WDD	Charlie Trindall dlalc1@optusnet.com.au Steve Ryan e: stephen.ryan@alc.org.au	due to an additional area to be survey emailed both Charlie & Steve asking if their site officers could participate for one additional day
17.12.12	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	phoned Dot to check if Binjang site officers were available for one additional day in the field, Dot said she would have reps to participate the extra day.
	THREE DAYS OF SURVEY 18-20TH DECEMBER, 2012		
03.01.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	DLALC emailed details of the upcoming 1 day of survey Tuesday 15 January 2013. Each group has been invited to send one site officer.
03.01.13	Wirrimbah Direct Descendants	Steve Ryan e: stephen.ryan@alc.org.au	WDD emailed details of the upcoming 1 day of survey Tuesday 15 January 2013. Each group has been invited to send one site officer.
03.01.13	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	Binjang mailed details of the upcoming 1 day of survey Tuesday 15 January 2013. Each group has been invited to send one site officer.
06.01.13	Wirrimbah Direct Descendants	Steve Ryan e: stephen.ryan@alc.org.au	RECEIVED RETURN EMAIL Cheryl I am no longer the contact try Ray Smith (i don't have his contact).
07.01.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	Darren phoned the office to advise that Terry Toomey would be available for the survey on the 15th Jan.
07.01.13	Wirrimbah Direct Descendants	Ray Smith 6882 2356	Ray was in the office relating to an issue he had raised with the DLALC. Confirmed with Ray that he was contact for WDD and he confirmed that he would be participating in the survey on the 15th, it would either be himself or Terry Toomey, a rep will be at the office at the designated time.
10.01.13	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324	phoned Dot who confirmed that Fonau Havili will participate in the survey on behalf of Binjang.
14.01.13	survey cancelled, Nick Harrop contacted all stakeholders to advise, will be re-scheduled in the near future.		
30.01.13	SURVEY RESCHEDULED FOR TUESDAY 5TH FEBRUARY, STAKEHOLDERS NOTIFIED AND REQUESTED TO ARRANGE A SITE OFFICER TO PARTICIPATE.		
30.01.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	emailed notification information regarding upcoming survey, requested response by 1/2/13.
30.01.13	Wirrimbah Direct Descendants	Steven Keed (Secretary) stevekeed@hotmail.com lewis@lewisburns.com Lewis Burns (Treasurer)	emailed notification information regarding upcoming survey, requested response by 1/2/13.

Date	Organisation	Contact Name	Comment
30.01.13	Wirrimbah Direct Descendants	Steven Keed (Secretary)	VIA EMAIL Hello Cheryl, thank you for the information and I would like you to mail the hard copy to our PO Box 2070, Dubbo. I have been contacted and directed to direct any persons and organisations communications to directed to myself and the chairperson (Coral Peckham) simultaneously. I have contacted the Chairperson regarding this e-mail and she wants you to contact her immediately, to discuss the availability of a site worker but more importantly the procedure of our liaisons in this regard. The chairperson has requested a meeting to establish a more mutual beneficial standing with your organisation, we have not been notified of any such meeting (this meeting was requested a month ago). I appreciate that our relationship is new but we must establish a solid platform to then continue into the future with other projects. The chairpersons e-mail is Chair@Tubba-gah.org , the mobile number is 0408576682 (and the Chairperson is awaiting your call) my number is 0405400134, ring me if there is any confusion or unavailable communications with the Chairperson. Kind Regards, Steve Keed Secretary
			Chairperson is awaiting your call) my number is 0405400134, ring me if there is any confusion or unavailable communications with the Chairperson.
31.01.13	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	spoke to Dot who advised she would have a site officer to represent Binjang for the survey.
31.01.13	Wirrimbah Direct Descendants	Coral Peckham	SPOKE to Coral in relation to the survey and she advised that Malcolm Burns would participate on behalf of Tubbah-gah/WDD. Coral also advised of the upcoming meeting for WDD and invited Mike and Jodie to attend and discuss the project. The meeting is on the Easter Long weekend on Saturday 30th March from 4pm-6pm. Advised both Jodie and Mike of the invitation via email. Although Coral discussed future communications in general, ideally during the meeting the Dubbo Zirconium Project would be discussed with attendees to get the message to the members, not just one member.
	Wirrimbah Direct Descendants	Malcolm Burns	Malcolm phoned the office to introduce himself and advise he would be participating in the survey next week. Malcolm checked details and will meet at the office on scheduled date.
04.02.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	phoned and left a message on the answer machine requesting confirmation of a site officer attending the FW tomorrow.
5TH FEBRUARY, 2013 SURVEY : OzArk Binjang WDD/Tubbah-gah			
12.02.13	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	Dot phoned to check on payment for the survey on 5 Feb. She said Annabelle will be sending the invoice tomorrow and they would appreciate quick payment as it is Jamie's birthday on Friday.
19.02.13	Wirrimbah Direct Descendants	Coral Peckham (chair@tubba-gah.org); Malcolm Burns (mac@talbragardubbo.com)	Nick sent e-mail to groups attending survey on 05.02.2013 providing GPS coordinates of areas surveyed on that day.

Date	Organisation	Contact Name	Comment
19.02.13	Binjang Wellington Wiradjuri Heritage Survey	Dorothy Stewart (mamma2830@hotmail.com); Jamie Gray (jamiegray66@gmail.com) 0435 843 324 260 Myall St Dubbo NSW 2830	Nick sent e-mail to groups attending survey on 05.02.2013 providing GPS coordinates of areas surveyed on that day.
19.02.13	Wirrimbah Direct Descendants	Coral Peckham (chair@tubba-gah.org)	Received an e-mail from Coral expressing a wish to hold a site meeting to have a meeting on site with OzArk and Alkane to discuss the cultural heritage values on site and proposed management.
20.02.13 7.5.13	Wirrimbah Direct Descendants Binjang Wellington Wiradjuri Heritage Survey	Coral Peckham (chair@tubba-gah.org) Dorothy Stewart 0435 843 324 260 Myall St Dubbo NSW 2830	Nick replied to Coral saying a meeting would be appropriate and it will be organised. SB: Dot phoned to check if anything happening, JB said paperwork coming out soon and she will be supplied an invite
13.5.13	Members: Wirrimbah Direct Descendants Aboriginal Corporation	Members: Wirrimbah Direct Descendants Aboriginal Corporation c/- Mrs Coral Peckham / Chairperson PO Box 2070 Dubbo NSW 2830 Phone 0408 576 682 Chair@Tubba-gah.org	SB: Invite issued to attend AFGM on 29.5.13
13.5.13	Members: BWWHS	Members: BWWHS c/ - Ms Dorothy Stewart e: <jamiegray66@gmail.com e: <mamma2830@hotmail.com 0435 843 324 260 Myall St Dubbo NSW 2830	SB: Invite issued to attend AFGM on 29.5.13
13.5.13	Mrs Diane Stewart	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528	SB Invite issued to attend AFGM on 29.5.13
13.5.13	Dubbo LALC	Dubbo LALC C/- Mr Darren Toomey PO Box 1565 Dubbo NSW 2830 dlalc1@optusnet.com.au ph: 6884 5276	SB Invite issued to attend AFGM on 29.5.13
13.5.13	Alex Ryan	Alex - aryan@tzmi.com Tony Wright - twright@alkane.com.au	SB sent a copy of invite letter issued to RAP's S for the AFGM, to Alex and copied Tony in
15.5.13	Alex Irwin	Alex Irwin - alex@rwcorkery.com	SB resent email as previously issued to Alex Ryan (was meant for both)
15.5.13	Mrs Diane Stewart	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528	SB Dianne called confirming her attendance on the 29.5.13 at the AFGM. Also confirmed that her sister - Marion Toomey and brother - Chris Stewart would also be with her
20.5.13 & 21.5.13	Wirrimbah Direct Descendants	Members: Wirrimbah Direct Descendants Aboriginal Corporation c/- Mrs Coral Peckham / Chairperson PO Box 2070 Dubbo NSW 2830 Phone 0408 576 682 Chair@Tubba-gah.org	Research design sent through
20.5.13 & 21.5.13	Binjang Wellington Wiradjuri Heritage Survey	Members: BWWHS c/ - Ms Dorothy Stewart e: <jamiegray66@gmail.com e: <mamma2830@hotmail.com 0435 843 324 260 Myall St Dubbo NSW 2830	Research design sent through
20.5.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528 0409 046 588	Research design sent through

Date	Organisation	Contact Name	Comment
20.5.13 & 21.5.13	Dubbo LALC	Dubbo LALC C/- Mr Darren Toomey PO Box 1565 Dubbo NSW 2830 dlalc1@optusnet.com.au ph: 6884 5276	Research design sent through
24.5.13	Wirrimbah Direct Descendants	Members: Wirrimbah Direct Descendants Aboriginal Corporation c/- Mrs Coral Peckham / Chairperson PO Box 2070 Dubbo NSW 2830 Phone 0408 576 682 Chair@Tubba-gah.org	SB phoned and left a message regarding rsvp for the AFGM
24.5.13	Binjang Wellington Wiradjuri Heritage Survey	Members: BWWHS c/ - Ms Dorothy Stewart e: <jamiegray66@gmail.com e: <mamma2830@hotmail.com 0435 843 324 260 Myall St Dubbo NSW 2830	SB rang and spoke to Dorothy, Dorothy confirmed she would be in attendance
24.5.13	Dubbo LALC	Dubbo LALC C/- Mr Darren Toomey PO Box 1565 Dubbo NSW 2830 dlalc1@optusnet.com.au ph: 6884 5276	SB rang and spoke to Darren, Darren confirmed he would be in attendance
29.5.13 AFGM, held OzArk Office - Dubbo 10am In attendance - Darren Toomey, Sheridan Baker, Jodie Benton			
29.5.13	Binjang Wellington Wiradjuri Heritage Survey	Members: BWWHS c/ - Ms Dorothy Stewart e: <jamiegray66@gmail.com e: <mamma2830@hotmail.com 0435 843 324 260 Myall St Dubbo NSW 2830	No attendance - SB rang Dorothy - she was unable to attend due to renovations
29.5.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528 0409 046 588	No attendance - SB rang spoke to a gentle man, He was unable to contact her but was confident that she had forgotten and would have been unable to attend anyway due to renovations
29.5.13	Wirrimbah Direct Descendants	Members: Wirrimbah Direct Descendants Aboriginal Corporation c/- Mrs Coral Peckham / Chairperson PO Box 2070 Dubbo NSW 2830 Phone 0408 576 682 Chair@Tubba-gah.org	no attendance - SB rang and left a message.
3.6.13	Binjang Wellington Wiradjuri Heritage Survey	Members: BWWHS c/ - Ms Dorothy Stewart e: <jamiegray66@gmail.com e: <mamma2830@hotmail.com 0435 843 324 260 Myall St Dubbo NSW 2830	minutes sent from AFGM
3.6.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528 0409 046 588	minutes sent from AFGM
3.6.13	Wirrimbah Direct Descendants	Members: Wirrimbah Direct Descendants Aboriginal Corporation Chairperson PO Box 2070 Dubbo NSW 2830 Phone 0408 576 682 Chair@Tubba-gah.org	minutes sent from AFGM
3.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	minutes sent from AFGM

Date	Organisation	Contact Name	Comment
3.6.13	Alex Irwin, Michael Sunderland		minutes sent from AFGM
12.6.13	Binjang Wellington Wiradjuri Heritage Survey	Members: BWWHS c/ - Ms Dorothy Stewart e: <jamiegray66@gmail.com e: <mamma2830@hotmail.com 0435 843 324 260 Myall St Dubbo NSW 2830	invite to participate in field work sent
12.6.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528 0409 046 588	invite to participate in field work sent
12.6.13	Wirrimbah Direct Descendants	Members: Wirrimbah Direct Descendants Aboriginal Corporation Arna Kerkland PO Box 2070 Dubbo NSW 2830 Phone 0408 576 682 Chair@Tubba-gah.org	invite to participate in field work sent
12.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	invite to participate in field work sent
18.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	Darren called SB - he will have a site officer in attendance , and will confirm who in email over next couple of days. Darren will also send through updated insurances by email
19.6.13	Binjang Wellington Wiradjuri Heritage Survey	Members: BWWHS c/ - Ms Dorothy Stewart e: <jamiegray66@gmail.com e: <mamma2830@hotmail.com 0435 843 324 260 Myall St Dubbo NSW 2830	Rang mobile - 'service is temporarily not available, please try again later'
19.6.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528 0409 046 588	Rang landline - number disconnected Rang mobile: spoke to Dianne confirming site officer attendance. Dianne will call back tomorrow with confirmation. Discussed that Dianne will need to organise a copy of the appropriate insurance for us before the site officer can go on site
19.6.13	Wirrimbah Direct Descendants	Members: Wirrimbah Direct Descendants Aboriginal Corporation Arna Kerkland PO Box 2070 Dubbo NSW 2830 Phone 0408 576 682 Chair@Tubba-gah.org	SB rang and left a message to return call
21.6.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528 0409 046 588	Dianne rang and spoke to Jodie Benton. Dianne said she was interested in have a representative there however had not yet organised insurances. Jodie discuss that without current workers comp workers are not able to go on site
20.6.13	Wirrimbah Direct Descendants	Members: Wirrimbah Direct Descendants Aboriginal Corporation Arna Kerkland PO Box 2070 Dubbo NSW 2830 Phone 0408 576 682 Chair@Tubba-gah.org	SB rang and spoke to Lewis Burns - Lewis will call back in 1/2 hour. Lewis is seeing whether his brother Malcolm Burns will be able to attend
20.6.13	Wirrimbah Direct Descendants	Members: Wirrimbah Direct Descendants Aboriginal Corporation Arna Kerkland PO Box 2070 Dubbo NSW 2830 Phone 0408 576 682 Chair@Tubba-gah.org	Lewis Burns rang back and spoke to SB. Malcolm Burns will meet OzArk on Tuesday morning for the field work

Date	Organisation	Contact Name	Comment
21.6.13	BWWHS	Dorothy Stewart 260 Myall St Dubbo NSW 2830 e: jamiegray66@gmail.com m: 0435843324	SB rang mobile; 'Service is temporarily not available, please try again later'
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	SB received email nominating Terry Toomey as site officer for Tuesday Wednesday
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	SB sent email requesting Workers Comp insurance urgently
24.6.13	BWWHS	Dorothy Stewart 260 Myall St Dubbo NSW 2830 e: jamiegray66@gmail.com m: 0435843324	Dot rang SB and confirmed that Brett Hill will be in attendance tomorrow and Wednesday. Discussed that the insurance expired 3.6.12. Dot will chase it up today and get it through to SB. Dot was informed that officers would not be going on site without it
24.6.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528 0409 046 588	SB rang. House phone could not be connected Rang mobile - left a message to call back
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	SB rang Dubbo LALC and spoke to Fallon, they do not know where to find the insurances requested that I ring Darren's Mobile as he is at the NSWALC conference 0426121912
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	SB rang and left a message on Darren's mobile
24.6.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528 0409 046 588	SB rang and spoke to Dianne, Dianne will not be supplying a representative for this project
24.6.13	BWWHS	Dorothy Stewart 260 Myall St Dubbo NSW 2830 e: jamiegray66@gmail.com m: 0435843324	SB rang 3:30pm Dot regarding the insurances. Dot is still waiting for Jamie to call her back- he is chasing them from Annabelle. Reinforced can't go on site without them
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	SB received email from Charles Tindale with insurance papers. Not covering the relevant period
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	SB rang GIO - GIO sent the Cert of Currency. SB clearly identified as ringing from OzArk. Certificate sent through almost immediately valid to the 30.6.13
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	SB emailed a copy to Darren Toomey and confirmed conversation with GIO
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	Darren Toomey rang and SB confirmed the cert and informed Darren that she had spoken to GIO
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	SB received blank wages declaration forms for DLALC from GIO, SB forwarded to Darren and deleted email
24.6.13	BWWHS	Dorothy Stewart 260 Myall St Dubbo NSW 2830 e: jamiegray66@gmail.com m: 0435843324	SB rang Dot. Dot has had a stroke and in the hospital. Dot requested SB call Jamie Gray 0468 608 210
24.6.13	BWWHS	Dorothy Stewart 260 Myall St Dubbo NSW 2830 e: jamiegray66@gmail.com m: 0435843324	SB rang and spoke to Jamie, Jamie will call back in 10 mins. Reinforced not able to attend if insurance not through
24.6.13	BWWHS	Dorothy Stewart 260 Myall St Dubbo NSW 2830 e: jamiegray66@gmail.com m: 0435843324	Jamie rang back- insurance company to call me directly and send through information

Date	Organisation	Contact Name	Comment
24.6.13	BWWHS	Dorothy Stewart 260 Myall St Dubbo NSW 2830 e: jamiegray66@gmail.com m: 0435843324	SB rang Jamie and updated
25.6.13	BWWHS	Dorothy Stewart 260 Myall St Dubbo NSW 2830 e: jamiegray66@gmail.com m: 0435843324	SB rang Jamie. Email received with insurances, Nominated worker did not arrive. Team waited till 8:30am. Discussed that Jamie would attend tomorrow if Jimmy wasn't available (Jamie was unsure of Jimmy's last name). Jamie to call SB back and confirm
25.6.13 - 26.6.13Test excavation - Attendance Wirrimbah - Mal Burns -2 days Dubbo LALC - Terry Toomey - 2 days			
10.7.13	WDD	Arna Kerkland	SB rang and left a message regarding sending invoice
10.7.13	WDD	Arna Kerkland	SB rang regarding invoice- didn't leave a message
15.7.13	WDD	Arna Kerkland	SB rang regarding sending an account - left message
15.7.13	WDD	Arna Kerkland	SB sent email requesting tax invoice to be sent through for Malcolm Burns - site officer
15.7.13	WDD	Arna Kerkland	Lewis Burns rang back and will be submitting an invoice and Malcolm's report to SB today
15.7.13	DLALC	Darren Toomey	SB sent email requesting tax invoice to be sent through for Terry Hill - site officer
6.8.13	WDD	Arna Kerkland	SB rang regarding the proposed time of the AFGM (Tuesday 13.8.13) if they are likely to be able to attend. Mobile switched off or not in range.
6.8.13	BWWHS	Dorothy Stewart	SB rang regarding the proposed time of the AFGM (Tuesday 13.8.13) if they are likely to be able to attend> Dorothy said to put her down as a yes and she will also ask Jamie to attend. SB will call back towards the end of the week and confirm
6.8.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart	SB rang regarding the proposed time of the AFGM (Tuesday 13.8.13) if they are likely to be able to attend. Dianne said to put her down however she's not really sure as she may have to go away, SB will call towards the end of the week
6.8.13	DLALC	Darren Toomey	SB rang regarding the proposed time of the AFGM (Tuesday 13.8.13) if they are likely to be able to attend. 4:00pm Phone rang out . 68845276. rang again at 4:30pm spoke to Darren, Darren said he will be available and will attend
6.8.13	WDD	Arna Kerkland	SB emailed and posted invite to AFGM
6.8.13	BWWHS	Dorothy Stewart	SB emailed and posted invite to AFGM
6.8.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart	SB posted invite to AFGM
6.8.13	DLALC	Darren Toomey	SB emailed and posted invite to AFGM
9.8.13	WDD	Arna Kerkland	SB phone re attendance at AFGM and how many. SB rang mobile - switched off or not in a mobile area. SB rang land line- left message
9.8.13	BWWHS	Dorothy Stewart	SB phone re attendance at AFGM and how many. SB rang mobile - service is temporarily unavailable
9.8.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart	SB phone re attendance at AFGM and how many. Land line rang out. SB Rang mobile - Diane will attend with one other. Diane confirmed that she received the paperwork, however would not be there until 10:30 due to school drop-offs. SB to call back Monday re whether we will be on site or not at this time.
9.8.13	DLALC	Darren Toomey	SB phone re attendance at AFGM and how many. Darren is a definite, he will see if his Chairperson can attend as well. Darren asked for SB to resend email invite

Date	Organisation	Contact Name	Comment
9.8.13	DLALC	Darren Toomey	SB re emailed invite without the report as size too big. Hard copy of report previously sent
12.8.13	WDD	Arna Kerkland	SB rang re confirmation of meeting tomorrow for the AFGM. Landline - left message to call back. Mobile is switched off or not in a mobile area - unable to leave a message. SB rang Geoff Ryan landline 6881 8659 to speak about tomorrow AFGM. Left message to call back. SB rang Lewis Burns on 0418 987 095 - left message to return call.
12.8.13	BWWHS	Dorothy Stewart	SB rang re confirmation of meeting tomorrow for the AFGM. Mobile temporarily not available. Not able to leave a message
12.8.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart	SB called landline - call could not be connected. SB rang mobile- Dianne cannot make it tomorrow however if she has anything to add she will ask Dorothy to represent her. Dianne will see if she can locate Dorothy and get her to call SB regarding tomorrow's meeting.
12.8.13	BWWHS	Dorothy Stewart	SB rang Jamie re confirmation of meeting tomorrow for the AFGM. Jamie said that Dorothy's mobile may not be on. Jamie said he did not receive email regarding email. SB to resend invite Jamie to contact Dorothy and see about attendance. Jamie flagged a possible clash with RMS meeting tomorrow
12.8.13	BWWHS	Dorothy Stewart	SB resent email invite to Jamie. Jamie confirmed receipt and will go see Dorothy and let SB know.
12.8.13	WDD	Arna Kerkland	SB received a return call from Geoff Ryan (received message to call from Arna). Geoff Ryan will attend tomorrow and also Ray Smith from WDD
12.8.13	WDD Binjang DLALC	OZ ARK found 3 emails quarantined in the Out box for the original invite to the AFGM.	
12.8.13	DLALC	Darren Toomey	SB received email from Darren confirming attendance by himself, Willie Carr and community rep Jamie McLennan
12.8.13	BWWHS	Dorothy Stewart	SB rang and spoke to Jamie. 3:50pm. Jamie is still waiting on response from Dorothy, Informed Jamie that the other meeting he was having with RMS - Parkes would not be on as RMS rep is on way to BH. SB to send through Nick Harrop mobile to Jamie to confirm later tonight
12.8.13	BWWHS	Dorothy Stewart	SB emailed Nicks mobile to Jamie
13.8.13 AFGM - TOONGI HALL - 8:45am - 2:30pm (including site tours) LALC - Darren Toomey, Willie Carr WDD- Geoff Ryan, Ray Smith OzArk- Jodie Benton, nick Harrop, Sheridan Baker Alkane - Michael Sutherland			
13.8.13	WDD	Arna Kerkland	message on message bank that Lewis Burns was away and contact to be made through Geoff Ryan
13.8.13	WDD	Geoff Ryan PO Box 2070 Dubbo tubar@yahoo.com.au 0469 256 587	All contact to be made with WDD through Geoff Ryan
19.8.13	DLALC	Darren Toomey	report extract distributed by email
19.8.13	BWWHS	Dorothy Stewart	report extract distributed by email to Dorothy and Jamie
19.8.13	WDD	Anna Kerkland	report extract distributed by email

Date	Organisation	Contact Name	Comment
20.8.13	DLALC	Darren Toomey	report extract and minutes (hardcopy) hand delivered to Fallon at the DLAC office, asked Fallon to flag with Darren that SB will call him for feedback Wednesday afternoon
20.8.13	BWWHS	Dorothy Stewart	report extract and minutes (hardcopy) hand delivered to Dorothy at 260 Myall Street, Dubbo
20.8.13	WDD	Geoff Ryan	report extract and minutes (hardcopy) posted to Geoff Ryan
20.8.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart	SB called Dianne regarding dropping off documents. Dianne will have them collected from OzArk office in the afternoon
20.8.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart	Documents collected
20.8.13	WDD	Geoff Ryan	SB received email confirmation from Geoff Ryan that minutes are fine. Additional feedback was that it was a productive meeting and that the site inspections were excellent, all parties felt comfortable and pleased with the discussion
21.8.13	BWWHS	Dorothy Stewart	SB received call. Dot said she was a bit upset, Dianne Stewart had rung her regarding the draft and was not happy that Wirrimbah had been put down as traditional owners and the LALC for care of the artefacts. Where does Binjang fit in with this? Binjang are the traditional owners of the area whereas Wirrimbah are only for Dubbo and the LALC are not. I explained that this was in accordance with the meeting but this is why we send out a draft and ask for feedback in case it doesn't capture everything, or there is further to add. This is what consultation is all about. I said that we would ring her back in about 10 minutes
21.8.13	BWWHS	Dorothy Stewart	SB rang Dot back as a courtesy that relevant staff are out and that someone will call her back in 1-2 hours. Dorothy also requested that the artefacts be collected by traditional owners and taken to the Wiradjuri Park, displayed with plaque and aerial photo. This is to be paid by alkane along with the traditional owners time.

Date	Organisation	Contact Name	Comment
21.8.13	BWWHS	Dorothy Stewart	SB rang Dorothy back and informed I would record that…..Binjang have said they would like to be part of any care and control agreements that are made and that they would like the artefacts to be collected and placed with a plaque and aerial photographs at the Wiradjuri park. I explained that it is better for her to put in writing so as the document can be included and it is not only in the conversation log. I said I would need to have this document by tomorrow lunch and Dot said that should be right. I explained that the details of the care and control etc. will be done through the management plan , in the future. Dorothy was happy with all the above
21.8.13	WDD	Geoff Ryan	SB sent email confirming if there was any feedback on the extract documents
22.8.13	WDD	Geoff Ryan	SB received email confirming that they are in support of the draft report.
22.8.13	DLALC	Darren Toomey	Darren Toomey on behalf of the LALC has no issues with the draft report or minutes. Additional feedback was that the meeting was great and the site tour was very helpful. Darren is looking forward to working together on the project
22.8.13	Binjang	Dorothy Stewart	Dorothy rang and left a message for SB to call back
22.8.13	Bingang Dianne Stewart	Dorothy Stewart Dianne Stewart	SB rang Dorothy's number back and Dianne Stewart answered wanting to speak to Jodie. Jodie spoke to Dianne. Dianne wanted to discuss concerns over the minutes of the AFGM and the draft report. Jodie encouraged both Dorothy and Dianne to put their concerns in writing ensuring that there is no confusion. Dianne discussed her points and Jodie clarified them with her - to ensure correct. 1. concerns over who will be signing the care agreement (i the minutes for the AFGM), Di & Dot feel that as traditional owners they want to be part the agreement, and they are actively concerned about the fate of the scarred trees and the artefacts. 2.Dot and Dot wish to play a part in their ongoing management. Jodie noted that these issues are better resolved by all parties being at the one table to discuss and come to some agreement, and that if the project is approved this will be facilitated through the management plan to be developed.

Sample EOI Advertisement in the Daily Liberal

Expression of Interest
Cultural Heritage Management

OzArk Environmental & Heritage Management P/L seeks registration of Aboriginal groups or individuals who are interested in being consulted about the cultural heritage assessment for the proposed Dubbo Zirconia Project at Toongi, NSW. This cultural heritage assessment will assist Australian Zirconia Ltd to identify and manage any cultural heritage present which has the potential to be impacted by the development.

The Study Area is an estimated area of 3,000 ha located approximately 30 km south of Dubbo, NSW.

If you hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects or places in the proposed Study Area, please register your interest by fax: 02 6882 0630, post: OzArk EHM PO Box 2069 Dubbo NSW 2830, email: cheryl@ozarkehm.com.au, or by phoning OzArk between 9.00am and 5.00pm week days on 02 6882 0118.

All submissions should be received no later than 5pm **Monday 23 January, 2012.**

Correspondence to Agencies Seeking Knowledge of Aboriginal Groups / Individuals in Study Area

22nd December 2011

Attn: Mr P Houston

Aboriginal Heritage Officer

OEH – North West Branch

PO Box 2111

Dubbo NSW 2830

Dear Paul

Re: Aboriginal Heritage Assessment for the proposed Dubbo Zirconia Project, Toongi.

OzArk Environmental & Heritage Management P/L is seeking knowledge of any Aboriginal groups, stakeholders or traditional knowledge holders in the Dubbo area with an interest in the management of Indigenous heritage matters.

We are currently undertaking Indigenous heritage consultation as per the OEH "*Aboriginal cultural heritage consultation requirements for proponents 2010',* for the proposed Dubbo Zirconia Project (DZP), Dubbo (see attached **Figure 1**).

The proposed Dubbo Zirconia Project (DZP) would be located on a site of 3,000 ha located near Toongi, approximately 30 km south of Dubbo. If OEH can recommend and provide contact details for any known Aboriginal groups with a cultural interest in this area we can then include them in the consultation process with regard to potential Indigenous heritage issues.

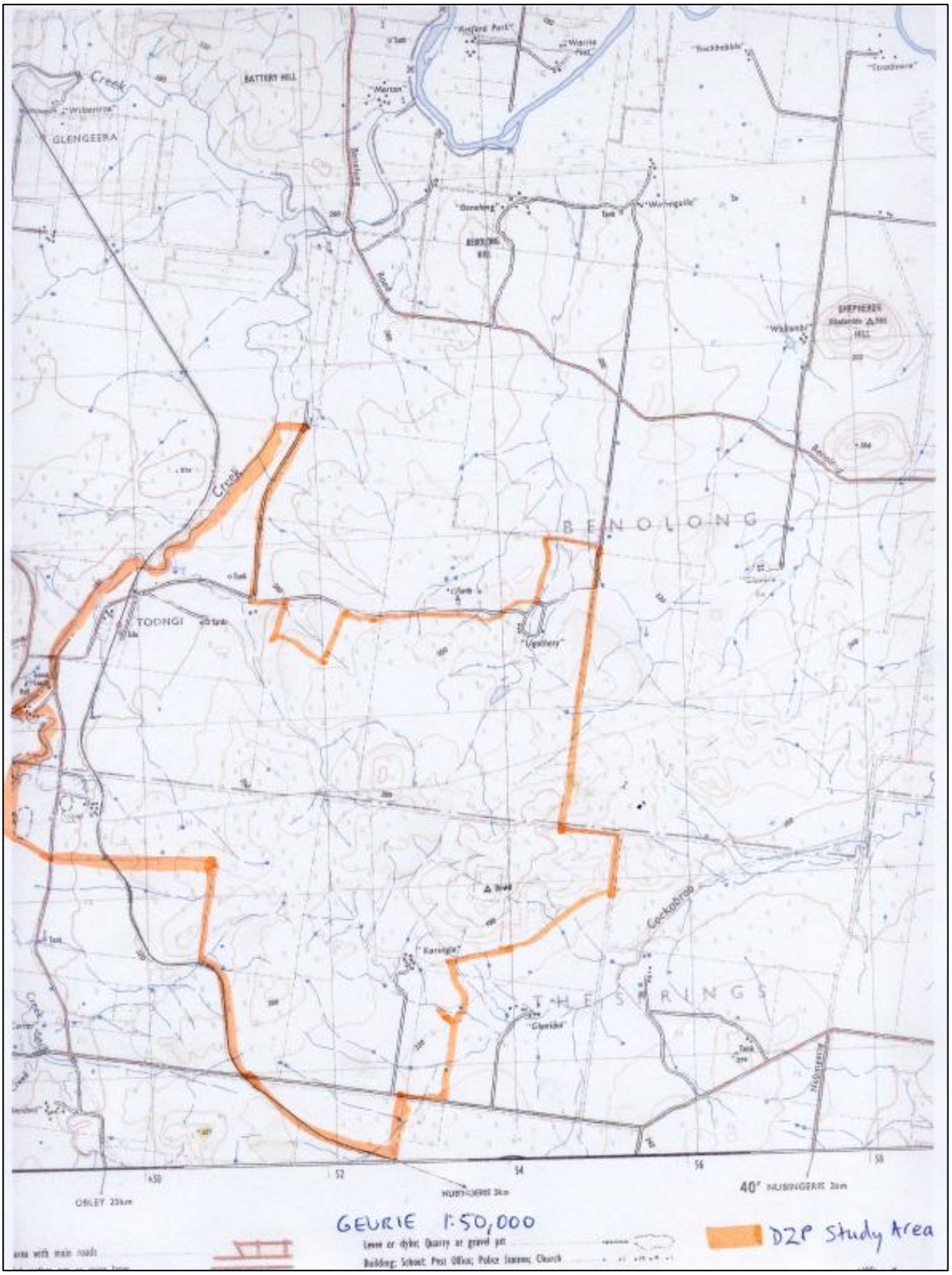
We would appreciate it if you could provide any feedback regarding these Indigenous stakeholder groups by **Monday 23rd January 2012.**

Yours truly

Cheryl Burke

Consultation Officer

Figure 1: Dubbo Zirconia Project Study Area delineated by orange line.



Correspondence to Indigenous groups / individuals in Study Area advising of project

22nd December 2011

Members: Wirrimbah Direct Descendants

c/- Mr S Ryan

PO Box 2070

Dubbo NSW 2830

E: < stephen.ryan@alc.org.au

Dear Steve

Re: Aboriginal Heritage Assessment for the proposed Dubbo Zirconia Project, Toongi.

OzArk Environmental & Heritage Management P/L is currently seeking Expressions of Interest from relevant Aboriginal Groups and individuals in the Dubbo area, to form a consultation group to assist in the cultural heritage evaluation for the above mentioned project.

The Study Area (see attached **Figure 1)** has the potential to be impacted by the development and the cultural heritage assessment will assist Australian Zirconia Ltd (AZL) (The Proponent) to identify and manage any cultural heritage present.

The proposed Dubbo Zirconia Project (DZP) would be located on a site of 3,000 ha located near Toongi, approximately 30 km south of Dubbo. If you hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects or places in the proposed Study Area please register your interest by contacting our office. The closing date for expressions of interest for this project will be **Monday 23rd January 2012**.

If you wish to register interest it is noteworthy that as per the OEH guidelines we are required to provide your details to the OEH unless advised you do not wish your details to be released.

Once relevant groups and individuals have been identified, they will form part of the formal consultation and evaluation process for the project.

Yours truly

Cheryl Burke

Consultation Officer

Response from the OEH

NSW GOVERNMENT | Office of Environment & Heritage

Your reference	Proposed Zirconia Project, Toongi
Our reference	DOC12/278
Contact	Paul Houston 68835361

OZARK
Po Box 2069
DUBBO NSW 2800
Att: Cheryl Burke

16th January 2012

Dear Cheryl,

WRITTEN NOTIFICATION AS REQUIRED UNDER OFFICE OF ENVIRONMENT AND HERITAGE (OEH) ABORIGINAL CULTURAL HERITAGE REQUIREMENT FOR PROPONENTS 2010 – For the proposed Dubbo Zirconia project, Toongi NSW.

I refer to your letter dated 22nd December 2011 to the Environment Protection Authority (EPA) regarding the above matter.

A list of known Aboriginal parties that EPA feels is likely to have an interest in this development is attached as Attachment 1 (overleaf). Please note this list is not necessarily an exhaustive list of all interested Aboriginal parties and receipt of this list does not remove the requirement of a proponent/consultant to advertise in local print media and contact other bodies seeking interested Aboriginal parties, in accordance with the requirements.

If you wish to discuss any of the above matters further please contact me, at your earliest convenience, on (02) 6883 5361.

Yours sincerely

Paul Houston
Aboriginal Heritage Planning Officer
EPA - North- West Branch

The Department of Environment Climate Change and Water is now known as
The Office of Environment and Heritage.

PO Box 2111, Dubbo NSW 2830
48-52 Wingewarra St Dubbo NSW
Tel: (02) 6883 5330 Fax: (02) 6884 9382
www.environment.nsw.gov.au

ATTACHMENT 1

EPA'S LIST OF ABORIGINAL STAKEHOLDER GROUPS WITHIN THE DUBBO LGA - THAT MAY HAVE AN INTEREST IN THE PROJECT; PROVIDED AS PER THE "OEH ABORIGINAL CULTURAL HERITAGE REQUIREMENT FOR PROPONENTS 2010".

Organisation/Affiliation	Name/Title	Address
Binjang Wellington Wiradjuri heritage Survey	Dorothy Stewart	260 Myall St, Dubbo NSW 2830
DUBBO LALC	Chairperson	PO Box 1565 DUBBO NSW 2830
Mooka	Neville Williams	Po Box 70 Cowra NSW 2794
Peter Peckham		27 Jennings St, Geurie, NSW 2831
Wellington Valley Wiradjuri Aboriginal Corporation	Chairperson	PO Box 508 , Wellington NSW 2820
Wiradjuri Council of Elders	Robert Clegg	3 Loretta Pl, Glendenning NSW 2761
Wirrimbah Direct Descendants		P.O. Box 2070 Dubbo NSW 2830
Central West Catchment Management Authority	Aboriginal Reference Group	PO Box 227 Wellington NSW 2820

The Department of Environment Climate Change and Water is now known as
The Office of Environment and Heritage.

PO Box 2111, Dubbo NSW 2830
48-52 Wingewarra St Dubbo NSW
Tel: (02) 6883 5330 Fax: (02) 6884 9382
www.environment.nsw.gov.au

OFFICE OF THE REGISTRAR
ABORIGINAL LAND RIGHTS ACT 1983 (NSW)

11-13 Mansfield Street
Glebe NSW 2037
PO Box 112, Glebe NSW 2037
P 02 9562 6327 F 02 9562 6350

Cheryl Burke
OZARK ENVIRONMENTAL MANAGEMENT
PO Box 2069
Dubbo NSW 2830

Dear Cheryl

Re: Request - Search for Registered Aboriginal Owners

I refer to your letter dated 22 December 2011 regarding an Aboriginal Heritage Assessment for the proposed Dubbo Zirconia Project in Toongi, NSW.

I have searched the Register of Aboriginal Owners and the project area described does not have Registered Aboriginal Owners pursuant to Division 3 of the *Aboriginal Land Rights Act* 1983 (NSW).

I suggest you contact the Dubbo Local Aboriginal Land Council. They may also be able to assist you in identifying other Aboriginal stakeholders for this project.

Yours sincerely

Tabatha Dantoine
Administration Officer
Office of the Registrar, *Aboriginal Land Rights Act* (1983)

10 January 2012

Response from the National Native Title Tribunal

National Native Title Tribunal

South-East & Central Registr
Sydney Office
Level 25, 25 Bligh Street
Sydney NSW 2000
GPO Box 9973
Sydney NSW 2000
Telephone (02) 9227 4000
Facsimile (02) 9227 4030

9 January 2012

Cheryl Burke
Consultation Officer
OzArk
PO Box 2069
Dubbo NSW 2830

Our Reference: 4665/12KL
Your Reference: -

Dear Ms Burke

Native Title Search Results of Dubbo City Council Local Government Area

Thank you for your search request of 04th January 2012 in relation to the above area.

Search Results
The results provided are based on the information you supplied and are derived from a search of the following Tribunal databases:

Register Type	NNTT Reference Numbers
Schedule of Applications (unregistered claimant applications)	Nil.
Register of Native Title Claims	NC09/2,NC09/4
National Native Title Register	Nil.
Register of Indigenous Land Use Agreements	Nil.
Notified Indigenous Land Use Agreements	Nil.

I have included registered extracts and maps for the claims above and also a NNTT Registers fact sheet to help you understand the search result.

Please note that there may be a delay between a native title determination application being lodged in the Federal Court and its transfer to the Tribunal. As a result, some native title determination applications recently filed in the Federal Court may not appear on the Tribunal's databases.

The search results are based on analysis against external boundaries of applications only. Native title applications commonly contain exclusions clauses which remove areas from within the

Resolution of native title issues over land and waters.

Freecall 1800 640 501
www.nntt.gov.au

external boundary. To determine whether the areas described are in fact subject to claim, you need to refer to "Area covered by claim" section of the relevant Register Extract or Application Summary and any maps attached.

Search results are the existence of native title
Please note that the enclosed information from the Register of Native Title Claims and/or the Schedule of Applications is **not** confirmation of the existence of native title in this area. This cannot be confirmed until the Federal Court makes a determination that native title does or does not exist in relation to the area. Such determinations are registered on the National Native Title Register.

Tribunal accepts no liability for reliance placed on enclosed information
The enclosed information has been provided in good faith. Use of this information is at your sole risk. The National Native Title Tribunal makes no representative, either express or implied, as to the accuracy or suitability of the information enclosed for any particular purpose and accepts no liability for use of the information or reliance placed on it.

If you have any further queries, please contact me on 1800 640 501.

Yours sincerely

Kailah Longbottom
Administrative Assistant
Telephone: (02) 9227 4017
Facsimile: (02) 9227 4030
Email: kailah.longbottom@nntt.gov.au

Page 2

Response from Dubbo City Council

From: Steven Jennings
Sent: Monday, 23 January 2012 4:36:40 PM
To: Cheryl Burke
Subject: Aboriginal Heritage Assessment for the proposed Dubbo Zirconia Project, Toongi
Response requested: No
Importance: Normal

Hi Cheryl,

In relation to your correspondence to Council dated 22 December 2011, the two Aboriginal groups likely to have an interest in the project will be the following:

Wirrimbah Direct Descendants
Wirrimbah Direct Descendants Aboriginal Corporation
PO Box 2070
Dubbo NSW 2830

Dubbo Local Aboriginal Land Council
Dubbo
Cnr Wingewarra & Darling
Sts DUBBO 2830 PO Box 1565 DUBBO NSW 2830 dlalc@bigpond.com 02 6884 5276 02 6884 3441

I hope this information helps, if you require any further information please contact me.

Thanks

Steven Jennings

Planning Services Supervisor

Building and Development Services

Dubbo City Council

PO Box 81 Dubbo NSW 2830

P (02) 6801 4000

Response from NTSCORP

From: Peter Schultz [mailto:pschultz@ntscorp.com.au]
Sent: Friday, 23 December 2011 10:37 AM
To: Cheryl Burke
Subject: RE: Dubbo Zirconia Project

Hello Cheryl – please refrain from sending notices via email. If I happen to be on leave or working on-country, notices might not be processed within given time frame. In this case, please note that the locality diagram will not copy. Accordingly I await receipt of the hard copy and in this regard the time frame will need to be extended to 30 January 2012. thank you.

ntscorp

Peter Schultz Senior Consultant – Land & Notifications

t: +61 2 9310 3188 | f: +61 2 9310 4177
e: pschultz@ntscorp.com.au | w: www.ntscorp.com.au

NTSCORP Limited proudly acknowledges that our offices are situated on the country of the Gumbaynggirr People and on the country of the Gadigal People of the Dharug Nation and we acknowledge their ancestors who have been custodians of their country for thousands of years.

NTSCORP Limited also wishes to acknowledge and pay our respect to their Elders past and present.

NTSCORP Limited proudly acknowledges that our offices are situated on the country of the Gumbaynggirr People and on the country of the Gadigal People of the Dharug Nation and we acknowledge their ancestors who have been custodians of their country for thousands of years.

NTSCORP Limited also wishes to acknowledge and pay our respect to their Elders past and present.

Expression of Interest from Wirrimbah Direct Descendants

From: Stephen Ryan
Sent: Saturday, 24 December 2011 5:10:13 AM
To: Cheryl Burke
Subject: Re: Dubbo Zirconia Project
Importance: Normal

Cheryl
Please register Wdd as an interested group I'n this project

Expression of Interest from Binjang Wellington Wiradjuri Heritage Survey

From: jamie gray
Sent: Wednesday, 11 January 2012 9:44:48 AM
To: Cheryl Burke
Subject: In regard project Dubbo Zirconia , Toongi
Response requested: No
Importance: Normal

Cheryl Burke
Consultation Officer

Dear Cheryl

In regards letter,proposed Dubbo Zirconia project,Toongi. I wish to register as an stake holder and would like the methodology report email sent to me.

Cheers
Dorothy Stewart
C.E.O
Binjang Wellington Wiradjuri Heritage Survey
0435843324
260 Myall St Dubbo NSW 2830

Correspondence to OEH Advising of Registered Aboriginal Parties (RAPs)

15th March 2012

Attn: Mr P Houston

Aboriginal Heritage Officer

OEH – North West Branch

PO Box 2111

Dubbo NSW 2830

E: < paul.houston@environment.nsw.gov.au

Dear Paul

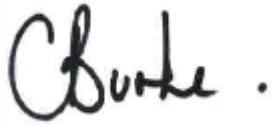
Re: Indigenous heritage consultation – Dubbo Zirconia Project, Toongi, NSW.

As you are aware OzArk has recently undertaken Indigenous heritage consultation as per the Office of Environment & Heritage (OEH) guidelines for the proposed Dubbo Zirconia Project, located approximately 30 km south of Dubbo.

OzArk would like to advise, as per Section 4.1.6 of the ACHCR's, that the following organisations / individuals formally registered interest in the project and we are subsequently consulting with them about the proposed activity.

1. Wirrimbah Direct Descendants
2. Wellington Valley Wiradjuri Aboriginal Corporation
3. Binjang Wellington Wiradjuri Heritage Survey
4. Diane Stewart

Yours sincerely



Cheryl Burke

Consultation Officer

Sample Invitation to Attend Project Inception Meeting with Methodology

16th April 2012

Members – Wirrimbah Direct Descendants

c/- Mr S Ryan

PO Box 2070

Dubbo 2830

e: stephen.ryan@alc.org.au

Dear Steve

Re: Aboriginal Heritage Assessment for the proposed Dubbo Zirconia Project, Toongi.

Thank you for the WDD registration of interest to form part of the stakeholder group to be consulted concerning potential Indigenous heritage issues for the proposed Dubbo Zirconia Project at Toongi.

On behalf of Australian Zirconia Ltd (AZL), OzArk would like to invite a representative from your organisation to an inception meeting which aims to outline details of the proposed works and develop open communication between all parties. We recognise and acknowledge the cultural knowledge held by Stakeholders, however please note that there are no fees associated with attendance at this meeting. This meeting is scheduled to be held:

Date: Tuesday 24th April 2012

Time: 10 am

Place: Alkane Office / Board Room

Second Floor 21 Church Street – Dubbo

Refreshments will be provided.

An agenda for the meeting and the draft methodology is attached. Should you wish to nominate any additional items for the agenda, please do not hesitate to contact me prior to the meeting. In addition to comments on the draft methodology, if your organisation can share any Aboriginal cultural heritage knowledge relevant to the proposed study area, we welcome this input so as to improve our assessment outcomes and to ensure Aboriginal cultural values are considered.

If you wish to attend the meeting, or send a representative, we ask that you RSVP by contacting our office through telephone or email, by no later than Friday 20th April, 2012.

If you have any queries, please feel free to contact our office.

Kind regards

Cheryl Burke / Consultation Officer

OzArk Environmental & Heritage Management P/L
145 Wingewarra St / PO Box 2069 DUBBO NSW 2830
WEB: www.ozarkehm.com.au
ABN: 59 104 582 354

Proposed Methodology

for the Aboriginal Cultural Heritage Assessment associated with the proposed Dubbo Zirconia Project, Toongi, NSW.

Proposed Dubbo Zirconia Project.

Project Overview - see **Attachment 1.**

Methodology for the current investigation:

- Provide registered stakeholders with maps of the proposed impact location and seek further comment of any known Indigenous cultural values;
  - In relation to the above, a shape file of the Study Area has been submitted to the OEH AHIMS database. The results of this search indicated a total of thirty two (32) Aboriginal sites have previously been registered on the AHIMS database. These results will be discussed at the meeting and plotted prior to field work so as to identify any sites near the impact footprint so we can determine if they will be affected by the development.
  - As mentioned OzArk will bring this information to the meeting on Tuesday 24th April, 2012 for further discussion.
- Provide the stakeholders with the opportunity to identify if there is a need to meet and consult elders to receive additional information about a particular area. If so this should be flagged with OzArk either before or at the **Tuesday 24th April** meeting, so that we may manage any additional meetings on a case by case basis.
- To undertake physical survey of the Study Area by utilising an Archaeological team comprising Aboriginal Community Stakeholder Groups representatives and OzArk staff, the logistics and team number to be determined through discussion with stakeholders. The fieldwork is tentatively scheduled for late May 2012. Physical assessment will include;
  - pedestrian survey of areas considered to have potential and / or good ground surface visibility (GSV).
  - Vehicle transects of areas with poor GSV or areas of significant prior disturbance.
  - With agreement of Community and Archaeologists some areas may not be physically surveyed if considered to be too disturbed or to have very low likelihood of sites.

Tel: 6882 0118; Fax: 6882 0630; Mob: 0403 763 504 / 0423 198 898
E-mail: jodie@ozarkehm.com.au / phil@ozarkehm.com.au / cheryl@ozarkehm.com.au

- Discuss in the field, at the end of the field survey, any findings, identified cultural values, management of cultural heritage and culturally acceptable mitigation measures to be considered.

- OzArk will prepare a draft report based on the field survey that will include preliminary comments from the stakeholder groups and their assessment of cultural significance for the area or recorded sites. Each group will be invited to review this draft report and provide comment within a given time frame and feedback will be included in report finalisation and provided as an appendix to the final report.

A copy of the final report will be provided to each stakeholder group prior to the Proponent submitting it to the relevant authorities.

We look forward to working together with you in undertaking this Aboriginal cultural heritage investigation. Please note that information regarding cultural values / significance is invited from representatives at any stage of the project.

Although the inception meeting will provide project details and allow attendees to discuss the proposed methodology, we ask that any comments or feedback you wish to incorporate in the methodology is submitted by close of business Wednesday 16th May, 2012. This input can be either written or verbal; however it is important it is received within the noted twenty eight (28) day time frame.

Inception Meeting

We would like to encourage attendance and input from a representative of your organisation at the preliminary **meeting** being held **Tuesday 24th April, 2012,** light refreshments will be available. If you wish to attend the meeting or send a representative, we ask that you RSVP by no later than *Friday 20th April, 2012* by contacting our office via phone, fax or email.

Phone: 02 6882 0118
Fax: 02 6882 0630
Email 'cheryl@ozarkehm.com.au'

We look forward to your participation in the Dubbo Zirconia Project.

An agenda for the meeting is also attached. Should you wish to nominate any additional items for the agenda, please do not hesitate to contact our office prior to the meeting

Yours faithfully

Cheryl Burke
Consultation Officer

Agenda

Aboriginal Cultural Heritage Management Meeting
Dubbo Zirconia Project
Tuesday 24th April 2012
Alkane Office - Dubbo
Second Floor 21 Church Street

Invitees: All Registered Aboriginal Parties, Australian Zirconia Ltd and OzArk EHM

10.00 AM	Acknowledgement OF COUNTRY GENERAL ADMINISTRATION DETAILS INTRODUCTION OF ATTENDEES
10.30 AM	INTRODUCTION TO THE PROJECT
11.00 AM	DISCUSS METHODOLOGY FIELDWORK LOGISTICS
11.30 AM	Refreshments
12.00 PM	OPEN DISCUSSION ADDRESS AGENDA ITEMS SUBMITTED BY STAKEHOLDERS
1.30 PM	MEETING CLOSE

Minutes from Inception Meeting 24th April, 2012

Consultation Meeting Regarding Aboriginal Cultural Heritage associated with the Dubbo Zirconia Project (DZP).

24th April, 2012

Alkane Board Room.

Meeting commenced: 10.15 am

Present:	Dot Stewart – Binjang Wellington Wiradjuri Heritage Survey
	Diane Stewart
	Mike Sutherland – Alkane Resources
	Jodie Benton – OzArk EHM
	Cheryl Burke – OzArk EHM
Apologies:	Steve Ryan – Wirrimbah Direct Descendants

Mike Sutherland presents a project overview.

Jodie Benton discusses the archaeological subject matter which includes -

- Survey undertaken by Lloyd Nolan twelve years ago;
- Previously recorded archaeological sites over the Study Area; and
- The proposed methods for the archaeological assessment.

Jodie talks of the fieldwork and the need to re-locate previously recorded sites. General discussion about the importance of re-survey, since factors such as ground surface visibility would be different. Jodie also notes that vegetation growth and erosion may have changed the landscape since the original survey.

Jodie discusses the physical component of the survey, which will be undertaken with site officers representing the registered stakeholders. The fieldwork will include both pedestrian and vehicle survey. To effectively cover all the areas which require survey, Jodie proposes the survey team will include two teams, each supervised by an archaeologist with four site officers in each team. At this early stage Jodie is unable to predict how many days it will take.

General discussion about the consultation process, DZP is following the Aboriginal Cultural Heritage Consultation Requirements (ACHCRs). Jodie notes the importance of stakeholder feedback and how capturing cultural information relevant to the Study Area enables a better outcome.

General discussion about legislation, and confirmation that Aboriginal cultural issues and sites will be managed under an Aboriginal Cultural Heritage Management Plan (ACHMP). This plan will be devised with input from all stakeholders.

Mike Sutherland speaks about seeking the cultural connection associated with the site by contacting the Aboriginal families of the area who may have resided there. Mike also notes that obtaining the European history will assist with understanding the significance of the Study Area and the interaction of the community.

General brainstorming about people who can be contacted who may have an association and knowledge which is relevant to the Study Area.

- Donald Nolan - the Meadows / the Springs
- Sandra at Macquarie Regional Library – source a book with 'Emu' in title which relates to Toongi.
- The Meadows / Charlie / Richard Carr (Patient Transfer)
- Lesley Morgan (Quilt Shop)
- 'Bucky' Burns (Will Burns' uncle)
- Tom Gordon

Jodie clarifies that notice will be sent to stakeholders about the first survey, proposed dates being 22nd and 23rd May, with 2-3 site officers each day.

Meeting close: 11.45 am

Sample Correspondence to RAPs Regarding Fieldwork

17th July 2012

Members – Wirrambah Direct

Descendants Ab Corp

c/- Mr S Ryan

PO Box 2070

Dubbo NSW 2830

E: < stephen.ryan@alc.org.au

Dear Steve

Re: Aboriginal Heritage Assessment for the proposed Dubbo Zirconia Project (DZP), Toongi.

We wish to advise as part of the fieldwork program for the DZP, two days of assessment have been scheduled for next week - Tuesday 24th and Wednesday 25th July, 2012.

With respect to this the Proponent (Australian Zirconia Ltd) is offering four (4) positions for stakeholder group representatives to attend per day of this two (2) day survey phase. Site Officer's participation over the course of the survey program will be managed by a roster to allow for representatives from the registered stakeholder groups to accompany the OzArk archaeologists during the fieldwork.

Field Assessment:

OzArk would like to invite two (2) Site Officers from WDD to participate in the field assessment, scheduled over two days.

- **Survey Date(s):** Tuesday 24th July and Wednesday 25th July 2012.
- **Time and location to meet:** Tuesday 24th July at **8.00 am** at the OzArk Office 145 Wingewarra Street (transport to and from the site and along the route will be provided by OzArk).
- **Duration:** two (2) full days of up to 8 hours each.

It is a requirement that your organisation has valid Workers Compensation and Public Liability insurance; please forward a copy of each relevant Certificate of Currency to our office in addition to the name and contact number of the site officer that will be representing your organisation. **We require this information by Friday 20th July, 2012 at the latest for your representative to be considered**. This information can be either faxed to us on 6882 0630 or emailed to cheryl@ozarkehm.com.au.

During the field assessment we request that your Site Officer wear full personal protective equipment, namely;

- long sleeve pants;
- long sleeve shirt;
- wide brimmed hat;
- appropriate footwear.

In addition your Site Officer will need to bring any food or water required.

Fee offer:

The Proponent is offering $600.00 (excl. GST) per day per site officer. This fee is inclusive of travel / travel time, fuel, and meal expenses. Invoices are to be addressed:

Australian Zirconia Ltd

c/-o OzArk EHM P/L

PO Box 2069

Dubbo NSW 2830

Attention: Cheryl Burke, e: cheryl@ozarkehm.com.au

Payment terms:

All correct and fully completed Tax Invoices will be paid by Australian Zirconia Limited on the following terms.

The invoice should be submitted with a *brief* summary documenting that the survey was completed over the nominated days, the name of the site officer who represented your organisation, information on conditions, if any sites were identified and confirmation (or otherwise) of availability to review reports (see attached example).

On receipt of the invoice *and* the summary survey report, the claimed amount will be paid within 14 days of the receipt, please include bank details on the invoice submitted.

Please note the terms of payment; invoices *will not* be paid immediately.

In relation to the scheduled dates and fee we would appreciate confirmation of your representative's participation in the field assessment by *Friday 20th July, 2012*.

Yours faithfully

Cheryl Burke

Consultation Officer

Minutes from informal consultation meeting 10th August, 2012

Meeting commenced: 10.15 am

Present:	Dot Stewart – Binjang Wellington Wiradjuri Heritage Survey
	Jamie Gray – Binjang Wellington Wiradjuri
	Mike Sutherland – Alkane Resources
	Phil Cameron – OzArk EHM
	Emily McCuistion – OzArk EHM
Apologies:	Steve Ryan – Wirrimbah Direct Descendants
	Diane Stewart

Discussion began with Phil speaking to importance of having input from Aboriginal community stakeholders about the cultural side of the project. Specifically, he discussed the difference between what kinds of information can be revealed through archaeological assessment and the information that can be only expressed though local k knowledge and is generally not revealed through archaeological remains. This kind of information includes where in the project area families used to live and stories about the area. Vicinities in which these stories take place may have little archaeological significance (as in, there are no physical remains to demonstrate that significant events took place there), but may have high cultural significance. Knowledge-holders are encouraged to share any cultural information such as this, but need not divulge anything they do not want to. There is a way to record sensitive information without including it in the report as well.

Archaeological sites recorded in the area thus far were plotted on a map, which was given to each of the individuals present. Emily spoke about the types of sites identified thus far, and briefly about a couple of sites with potential archaeological deposit. Also discussed was the miss-plotting of previously recorded sites and the difficulties encountered in relocating them. Disturbances (ploughing) in the project area were also spoken to, and how these impacts may be affecting the archaeology of the area.

Mike Sutherland asked about how the sites will be managed. Emily responded saying that avoidance of sites is always the preferred option. If sites cannot be avoided an AHIP must be applied for in order to harm the sites. Salvage collection and test excavation will be required at some sites. Phil interjects that Aboriginal stakeholders are an integral part of that planning process.

Specific sites are discussed, namely, The Springs. Dot expressed interest in protecting this area. Mike asked if The Springs drain into Paddy's Creek, as this might have been used as a travel corridor in the past. A newly recorded site in a heavily ploughed area is discussed. It's location seems unusual, as it is not on a drainage. It is next to a modern water reservoir, which may have been a natural spring before modification. A small modified drainage is also located nearby with possible grinding grooves (lichen-covered).

Dot says that she wants the project to go forward, and that more discussions about management of the sites should occur when more finalised data is available.

Dot shares a story about the Run.

Emily will book in more fieldwork after returning from trip next week. Future survey will include remainder of paddock survey. The train tracks will be surveyed with sampling (discussed with OEH archaeologist Phil Purcell) and targeting where creeks cross. The waterline route is being finalised.

Emily will contact Dot the week after next to set up a time to discuss ethnographic/cultural history on the study area. She will also create a better map of sites recorded thus far and sent it to Mike Sutherland.

Meeting close: 11.00 am

Confirmations of Participation from WDD

WIRRIMBAH DIRECT DESCENDANTS Ab Corp
PO Box 2070 Dubbo NSW 2830
ABN: 77589476721

15TH June 2012

Australian Zirconia Ltd
CO-Alex Irwin/Mr Corkery

Dear People

RE:Wirrimbah Direct Descendants Ab. Corp.-Toongi Site Work Participation

This is to confirm that our organization did participate in the abovementioned site work in May 2012 through Ashley Hill for 2 days.

We are currently awaiting a report from Ozark & will comment on such report when it is received, although I understand there is more site work on this project, & I understand that such a report might not be prepared until after that work is completed.

It will be truly appreciated if you could provide details of proposed site work(dates, number of site workers required from WDD, etc) in the not too distant future to allow us to prepare for our inclusion.

I apologise for the delay in providing this letter.

Yours Truly

Stephen Ryan(Public Officer/Committee Member)

WIRRIMBAH DIRECT DESCENDANTS Ab Corp
PO Box 2070 Dubbo NSW 2830
ABN: 77589476721

1st August 2012

Australian Zirconia Ltd
CO-Alex Irwin/Mr Corkery

Dear People

RE:Wirrimbah Direct Descendants Ab. Corp.-Toongi Site Work Participation

This is to confirm that our organization did participate in the abovementioned site work in August 2012 through Ashley Hill & Mr Robert Hill for 2 days.(7 & 8 August 2012)

We are currently awaiting a report from Ozark & will comment on such report when it is received.

It will be truly appreciated if you could provide details of any more proposed site work(dates, number of site workers required from WDD, etc) in the not too distant future to allow us to prepare for our inclusion.

Yours Truly

Stephen Ryan
(Public Officer/Committee Member)

WIRRIMBAH DIRECT DESCENDANTS Ab Corp
PO Box 2070 Dubbo NSW 2830
ABN: 77589476721

24 September 2012

Australian Zirconia Ltd
CO-Alex Irwin/Mr Corkery

Dear People

RE:Wirrimbah Direct Descendants Ab. Corp.-Toongi Site Work Participation

This is to confirm that our organization did participate in the abovementioned site work on 11,12 & 13 September 2012, through Ashley Hill.
We are currently awaiting a report from Ozark & will comment on such report when it is received.

Yours Truly

Stephen Ryan
(Public Officer/Committee Member)

WIRRIMBAH DIRECT DESCENDANTS Ab Corp
PO Box 2070 Dubbo NSW 2830
ABN: 77589476721

2 November 2012

Australian Zirconia Ltd
CO-Alex Irwin/Mr Corkery

Dear People

RE:Wirrimbah Direct Descendants Ab. Corp.-Toongi Site Work Participation

This is to confirm that our organization did participate in the abovementioned site work in October 2012 through Robert Hill.
We are currently awaiting a report from Ozark & will comment on such report when it is received.

Yours Truly

Stephen Ryan
(Public Officer/Committee Member)

Survey 22-23 May 2012

Record of Aboriginal Representative Participation in Cultural Heritage Fieldwork

Project Name: D2P

Client Name: Alkane / OzArk EHM

Client Address: 165 Wingewarra St Dubbo

Name of Aboriginal Organisation: Jamie Gray Binjang
Ashley Hill D Lands Council, Eric Ferrando Binjang.

Name of Representative(s):

Name of Archaeologist: Jodie Benton Jenni Streatfeild

Address of Archaeologist: 145 Wingewara Street Dubbo

Type of participation:

- ☐ Guided inspection of study area or sites
- ☑ Accompanied and participated in the archaeological survey of the study area
- ☐ Undertook a separate inspection of the study area
- ☐ Participated in excavation programme

Period of participation:

Dates	Start	Finish
22/5/12	8·00	4·00
23/5/12	8·00	4·00

Were sites recorded? ~~[illegible]~~ scarred tree x 2
YES. 1 open artefact scatter

Issues Discussed: • route of transects - community happy.
• more work to be done in PAD D2P-AS1 and near ST-2 suggest more survey in scarred tree area.
• Very poor visibility

Reps Rec.

Signed Aboriginal Representative: Eric Ferrando Jamie Gray Ashley Hill

Signed Archaeologist:

Survey 24-25 July 2012

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name: Dubbo Zirconia Project

Client Name: ~~Wirrimbah~~ Alkane

Client Address:

Name of Aboriginal Organisation: Wirrimbah Direct Descendants A.C

Name of Representative(s): Ashley Hill

Name of Archaeologist: Josh

Address of Archaeologist: 145 Wingewarra st. , Dubbo, NSW 2830

Type of participation:

- [ ] Guided inspection of study area or sites
- [x] Accompanied and participated in the archaeological survey of the study area
- [ ] Undertook a separate inspection of the study area
- [ ] Participated in excavation programme

Period of participation:

Dates	Start	Finish
24/7/12	8.00	4.00
25/7/12	8.00	3.30

Were sites recorded? : yes, one site recoreded.

Issues Discussed: We all agreed that Artifact was found.

Signed Aboriginal Representative:

Signed Archaeologist:

OZARK ENVIRONMENTAL & HERITAGE MANAGEMENT P/L –PO Box 2069 Dubbo NSW 2830
Tel: 6882 0118; Fax: 6882 0630; Mob: 0403 763 504 / 0423 198 898;
E-mail: jodie@ozarkehm.com.au / phil@ozarkehm.com.au / cheryl@ozarkehm.com.au
Web: www.ozarkehm.com.au

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name: DZP

Client Name: RWC

Client Address:

Name of Aboriginal Organisation: Bingjang

Name of Representative(s): BRETT Hill

Name of Archaeologist: Josh Em

Address of Archaeologist: 145 Wingewarra st. , Dubbo, NSW 2830

Type of participation:

- [ ] Guided inspection of study area or sites
- [x] Accompanied and participated in the archaeological survey of the study area
- [ ] Undertook a separate inspection of the study area
- [ ] Participated in excavation programme

Period of participation:

Dates	Start	Finish
24.7.12	8am	4pm
25.7.12	8am	3.30pm

Were sites recorded? : Possible scared trees and artifacts recorded

Issues Discussed:

Signed Aboriginal Representative:

Signed Archaeologist:

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Tel: 6882 0118; Fax: 6882 0630; Mob: 0403 763 504 / 0423 198 898;
E-mail: jodie@ozarkehm.com.au / phil@ozarkehm.com.au / cheryl@ozarkehm.com.au
Web: www.ozarkehm.com.au

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name: DZP

Client Name: RWC

Client Address:

Name of Aboriginal Organisation: Bungyang

Name of Representative(s): James Gray

Name of Archaeologist: Josh Em

Address of Archaeologist: 145 Wingewarra st. , Dubbo, NSW 2830

Type of participation:

- ☐ Guided inspection of study area or sites
- ☑ Accompanied and participated in the archaeological survey of the study area
- ☐ Undertook a separate inspection of the study area
- ☐ Participated in excavation programme

Period of participation:

Dates	Start	Finish
24.7.12	8am	4pm
25.7.12	8am	3.30pm

Were sites recorded? : possible scared trees, artefacts dessrated

Issues Discussed:

Signed Aboriginal Representative:

Signed Archaeologist:

OzArk Environmental & Heritage Management P/L –PO Box 2069 Dubbo NSW 2830
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E-mail: jodie@ozarkehm.com.au / phil@ozarkehm.com.au / cheryl@ozarkehm.com.au
Web: www.ozarkehm.com.au

Survey 7-8 August 2012

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name:...Dubbo Zirconia Project.....

Client Name:...R.W.Corkery.....

Client Address:.....

Name of Aboriginal Organisation:Wiriinbar.....

.....

Name of Representative(s):.....ASHLEY HILL.....

Name of Archaeologist: Emily McCuistion...and...Morgan.....

Address of Archaeologist:145 Wingewarra, Dubbo NSW 2830

Type of participation:

- ☐ Guided inspection of study area or sites
- ☑ Accompanied and participated in the archaeological survey of the study area
- ☐ Undertook a separate inspection of the study area
- ☐ Participated in excavation programme

Period of participation:

Dates	Start	Finish
7-8-8	8	4

Were sites recorded? :....yes.....

.....

.....

Issues Discussed:.....

.....

.....

.....

.....

Signed Aboriginal Representative:.....Ashley Hill.....

Signed Archaeologist:.....Emily.....

OZARK ENVIRONMENTAL & HERITAGE MANAGEMENT P/L –PO Box 2069 Dubbo NSW 2830
Tel: 6882 0118; Fax: 6882 0630; Mob: 0403 763 504 / 0423 198 898;
E-mail: jodie@ozarkehm.com.au / phil@ozarkehm.com.au / cheryl@ozarkehm.com.au
Web: www.ozarkehm.com.au

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name:...Dubbo Zirconia Project.....

Client Name:...R.W.Corkery.....

Client Address:.....

Name of Aboriginal Organisation:.....Wirembah Direct Descendants.....

Name of Representative(s):.....ROBERT HILL.....

Name of Archaeologist: Emily McCuistion...and.....Morgan.....

Address of Archaeologist:145 Wingewarra, Dubbo NSW 2830

Type of participation:

- ☐ Guided inspection of study area or sites
- ☑ Accompanied and participated in the archaeological survey of the study area
- ☐ Undertook a separate inspection of the study area
- ☐ Participated in excavation programme

Period of participation:

Dates	Start	Finish
7-8 - 8-8	8.00	4.00

Were sites recorded? :.....yes.....

Issues Discussed:.....

Signed Aboriginal Representative:.....Robert Hill.....

Signed Archaeologist:.....Emily.....

OZARK ENVIRONMENTAL & HERITAGE MANAGEMENT P/L –PO Box 2069 Dubbo NSW 2830
Tel: 6882 0118; Fax: 6882 0630; Mob: 0403 763 504 / 0423 198 898;
E-mail: jodie@ozarkehm.com.au / phil@ozarkehm.com.au / cheryl@ozarkehm.com.au
Web: www.ozarkehm.com.au

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name:...Dubbo Zirconia Project.....

Client Name:...R.W.Corkery.....

Client Address:.....

Name of Aboriginal Organisation:.....Binjang.....

.....

Name of Representative(s):.....BRETT Hill.....

Name of Archaeologist: Emily McCuistion...and....Morgan.....

Address of Archaeologist:145 Wingewarra, Dubbo NSW 2830

Type of participation:

- ☐ Guided inspection of study area or sites
- ☑ Accompanied and participated in the archaeological survey of the study area
- ☐ Undertook a separate inspection of the study area
- ☐ Participated in excavation programme

Period of participation:

Dates	Start	Finish
7.8.2012	8am	4 pm
8.8.2012	8am	4pm

Were sites recorded? :.....2 possible Scar trees and some artifads.....

.....

Issues Discussed:.....

.....

.....

.....

.....

Signed Aboriginal Representative:.....

Signed Archaeologist:.....

OZARK ENVIRONMENTAL & HERITAGE MANAGEMENT P/L –PO Box 2069 Dubbo NSW 2830
Tel: 6882 0118; Fax: 6882 0630; Mob: 0403 763 504 / 0423 198 898;
E-mail: jodie@ozarkehm.com.au / phil@ozarkehm.com.au / cheryl@ozarkehm.com.au
Web: www.ozarkehm.com.au

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name:...Dubbo Zirconia Project.....

Client Name:...R.W.Corkery.....

Client Address:.....

Name of Aboriginal Organisation:....Binjang.....

.....

Name of Representative(s):....James Gray.....

Name of Archaeologist: Emily McCuistion...and....morgan.....

Address of Archaeologist:145 Wingewarra, Dubbo NSW 2830

Type of participation:

- ☐ Guided inspection of study area or sites
- ☑ Accompanied and participated in the archaeological survey of the study area
- ☐ Undertook a separate inspection of the study area
- ☐ Participated in excavation programme

Period of participation:

Dates	Start	Finish
7.8.2012	8 am	4 pm
5.8.2012	8 am	4 pm

Were sites recorded? :....2 possible scar trees and some artifacts.....

.....

Issues Discussed:.....

.....

.....

.....

.....

Signed Aboriginal Representative:.....

Signed Archaeologist:....Emily McC.....

OzArk Environmental & Heritage Management P/L –PO Box 2069 Dubbo NSW 2830
Tel: 6882 0118; Fax: 6882 0630; Mob: 0403 763 504 / 0423 198 898;
E-mail: jodie@ozarkehm.com.au / phil@ozarkehm.com.au / cheryl@ozarkehm.com.au
Web: www.ozarkehm.com.au

Survey 11-13 September 2012

Record of Aboriginal Representative Participation in Cultural Heritage Fieldwork

Project Name: DZP

Client Name: R. W. Corkery

Client Address:

Name of Aboriginal Organisation: WIRRIMBAH DIRECT

Name of Representative(s): ASHLEY

Name of Archaeologist: Emily McCuistion

Address of Archaeologist: 145 Wingewara Street Dubbo

Type of participation:

- [ ] Guided inspection of study area or sites
- [x] Accompanied and participated in the archaeological survey of the study area
- [ ] Undertook a separate inspection of the study area
- [ ] Participated in excavation programme

Period of participation:

Dates	Start	Finish
11/9/12	8	4
12/9/12	8	3:30
13/9/12	8	3:15

Were sites recorded? :

Issues Discussed:

Signed Aboriginal Representative:

Signed Archaeologist:

Record of Aboriginal Representative Participation in Cultural Heritage Fieldwork

Project Name: DZP

Client Name: R.W. CORKERY

Client Address:

Name of Aboriginal Organisation: BINJANG

Name of Representative(s): BRETT HILL

Name of Archaeologist: Emily McCuistion

Address of Archaeologist: 145 Wingewara Street Dubbo

Type of participation:

- [ ] Guided inspection of study area or sites
- [x] Accompanied and participated in the archaeological survey of the study area
- [ ] Undertook a separate inspection of the study area
- [ ] Participated in excavation programme

Period of participation:

Dates	Start	Finish
11.9.2012	8am	4pm
12.9.2012	8am	~~4pm~~ 3:30 am
13.9.2012	8am	~~3pm~~ 3:15 am

Were sites recorded? : yes

Issues Discussed:

Signed Aboriginal Representative:

Signed Archaeologist: Emily McCuistion

Record of Aboriginal Representative Participation in Cultural Heritage Fieldwork

Project Name: DZP

Client Name: R.W. CORKERY

Client Address:

Name of Aboriginal Organisation: Dubbo Local Aboriginal Land Council

Name of Representative(s): Michael Toomey

Name of Archaeologist:

Address of Archaeologist: 145 Wingewara Street Dubbo

Type of participation:

- ☐ Guided inspection of study area or sites
- ☑ Accompanied and participated in the archaeological survey of the study area
- ☐ Undertook a separate inspection of the study area
- ☐ Participated in excavation programme

Period of participation:

Dates	Start	Finish
12/9/12	8 AM	3:30 pm
13.9.12	8 am	3:15pm

Were sites recorded? : Yes.

Issues Discussed:

Signed Aboriginal Representative:

Signed Archaeologist:

Survey 18-19 October 2012

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name:.....

.....

Client Name:.....

Client Address:.....

Name of Aboriginal Organisation:.....Wirembah D D.....

.....

Name of Representative(s):.....ROBERT HILL.....

Name of Archaeologist:..... .....

Address of Archaeologist:.....145 Wingewarra st. , Dubbo, NSW 2830

Type of participation:

- ☐ Guided inspection of study area or sites
- ☐ Accompanied and participated in the archaeological survey of the study area
- ☐ Undertook a separate inspection of the study area
- ☐ Participated in excavation programme

Period of participation:

Dates	Start	Finish
18·10·12	8·30	4·30
19·10·12	8·30	3·00

Were sites recorded? :.....YES grinding groove, Scarred tree's Artifacts.....

.....

Issues Discussed:.....

.....

.....

.....

.....

Signed Aboriginal Representative:.....Robert Hill.....

Signed Archaeologist:..... .....

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Web: www.ozarkehm.com.au

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name: DZP

Client Name:

Client Address:

Name of Aboriginal Organisation: Bingang

Name of Representative(s): BRETT Hill

Name of Archaeologist: Emily

Address of Archaeologist: 145 Wingewarra st. , Dubbo, NSW 2830

Type of participation:

- ☐ Guided inspection of study area or sites
- ☑ Accompanied and participated in the archaeological survey of the study area
- ☐ Undertook a separate inspection of the study area
- ☐ Participated in excavation programme

Period of participation:

Dates	Start	Finish
18.10.2012	9am	430pm
19.10.2012	8.30am	3.30pm

Were sites recorded? Yes

Issues Discussed:

Signed Aboriginal Representative:

Signed Archaeologist:

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Web: www.ozarkehm.com.au

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name: D.Z.P

Client Name: R.W. CORKERY

Client Address:

Name of Aboriginal Organisation: Dubbo local Aboriginal land council

Name of Representative(s): Michael toomey

Name of Archaeologist: EMILY McCUISTION

Address of Archaeologist: 145 Wingewarra st. , Dubbo, NSW 2830

Type of participation:

- ☐ Guided inspection of study area or sites
- ☑ Accompanied and participated in the archaeological survey of the study area
- ☐ Undertook a separate inspection of the study area
- ☐ Participated in excavation programme

Period of participation:

Dates	Start	Finish
18.10.12	8.30	4:30
19.10.12	8:30	3:30

Were sites recorded? : YES

Issues Discussed:

Signed Aboriginal Representative:

Signed Archaeologist:

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Web: www.ozarkehm.com.au

Survey 17-20 October 2012

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name: D Z P

Client Name: Edward Ryan*

Client Address: 16 Forrest Cres

Name of Aboriginal Organisation: Land Council

Name of Representative(s):

Name of Archaeologist: Nick Harrop

Address of Archaeologist: OzArk

Type of participation:

- [ ] Guided inspection of study area or sites
- [x] Accompanied and participated in the archaeological survey of the study area
- [ ] Undertook a separate inspection of the study area
- [ ] Participated in excavation programme

Period of participation:

Dates	Start	Finish
* 17-12-12		
* 18-12-12		
19-12-12	8:00	4:00

* Terry Toomey was site officer, 8 hr days worked. No participation form filed for Terry

Were sites recorded? Yes

Scarred Trees, Artefacts

Issues Discussed:

Signed Aboriginal Representative:

Signed Archaeologist:

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Web: www.ozarkehm.com.au

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name: D.Z.P

Client Name:

Client Address:

Name of Aboriginal Organisation: Binjang

Name of Representative(s): Jamie Gray

Name of Archaeologist: Nick (OZARK)

Address of Archaeologist: "

Type of participation:

- ☐ Guided inspection of study area or sites
- ☑ Accompanied and participated in the archaeological survey of the study area
- ☐ Undertook a separate inspection of the study area
- ☐ Participated in excavation programme

Period of participation:

Dates	Start	Finish
17.12.12	8am	4pm
18.12.12	8am	4pm
19.12.12	8am	4pm

Were sites recorded? Yes

SCARRED TREE, ARTIFACTS

Issues Discussed:

Signed Aboriginal Representative:

Signed Archaeologist:

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Web: www.ozarkehm.com.au

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name: D Z P

Client Name: R.W. CORKERY

Client Address:

Name of Aboriginal Organisation: W.D.D

Name of Representative(s): ROBERT HILL

Name of Archaeologist: NICK (OZARK)

Address of Archaeologist: OZARK

Type of participation:

- ☐ Guided inspection of study area or sites
- ☑ Accompanied and participated in the archaeological survey of the study area
- ☐ Undertook a separate inspection of the study area
- ☐ Participated in excavation programme

Period of participation:

Dates	Start	Finish
17-12-12	8.00	4.00
18-12-12	8.00	4.00
19 " "	8.00	4

Were sites recorded? Yes

SCARRED TREE'S, ARTIFACTS

Issues Discussed:

Signed Aboriginal Representative: Robert w Hill

Signed Archaeologist: Emily McA[illegible]

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Web: www.ozarkehm.com.au

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name: D2P

Client Name: R.W. CORKERY

Client Address: 12 Pegasus Place Dubbo

Name of Aboriginal Organisation: Binjang

Name of Representative(s): Fonua Havili

Name of Archaeologist: EMILY McWISTION

Address of Archaeologist: OZ ARK

Type of participation:

- ☐ Guided inspection of study area or sites
- ☑ Accompanied and participated in the archaeological survey of the study area
- ☐ Undertook a separate inspection of the study area
- ☐ Participated in excavation programme

Period of participation:

Dates	Start	Finish
17.12.12	8:00	4:00
18.12.12	8:00	4:00

Were sites recorded? : Yes

Issues Discussed:

Signed Aboriginal Representative: N Havili

Signed Archaeologist: Emily

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Web: www.ozarkehm.com.au

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name: DZP

Client Name: R.W. CORKERY

Client Address: 95 Meadowbrook dr

Name of Aboriginal Organisation: Wiradjuri

Name of Representative(s): Ashley Kell

Name of Archaeologist: EMILY McLUISTON

Address of Archaeologist:

Type of participation:

- [x] Guided inspection of study area or sites
- [x] Accompanied and participated in the archaeological survey of the study area
- [ ] Undertook a separate inspection of the study area
- [ ] Participated in excavation programme

Period of participation:

Dates	Start	Finish
17-12-12	8:00	4:00
18-12-12	8:00	4:00
19-12-12	8:00	4:00

Were sites recorded? Yes

Issues Discussed:

Signed Aboriginal Representative:

Signed Archaeologist:

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Web: www.ozarkehm.com.au

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name: DZP

Client Name: BINGJANG

Client Address:

Name of Aboriginal Organisation:

Name of Representative(s): TIM STEWART

Name of Archaeologist: EMILY M'CUISTION

Address of Archaeologist: OZ ARK

Type of participation:

- [ ] Guided inspection of study area or sites
- [x] Accompanied and participated in the archaeological survey of the study area
- [ ] Undertook a separate inspection of the study area
- [ ] Participated in excavation programme

Period of participation:

Dates	Start	Finish
19/12/12	8.00am	4.00pm

Were sites recorded? : YES

Issues Discussed:

Signed Aboriginal Representative: Timothy A Stewart

Signed Archaeologist: Emily M'Cuistion

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Web: www.ozarkehm.com.au

Record of Aboriginal Site Officer Participation in Cultural Heritage Fieldwork

Project Name: DZP

Client Name: R.W. CORKERY

Client Address:

Name of Aboriginal Organisation: LAND COUNCIL

Name of Representative(s): R. SMITH

Name of Archaeologist: EMILY McCUISTION

Address of Archaeologist: OZ ARK

Type of participation:

- ☐ Guided inspection of study area or sites
- ☑ Accompanied and participated in the archaeological survey of the study area
- ☐ Undertook a separate inspection of the study area
- ☐ Participated in excavation programme

Period of participation:

Dates	Start	Finish
17-12-12	8	4
18-12-12	8	4
19-12-12	8	4

Were sites recorded? YES

Issues Discussed:

Signed Aboriginal Representative:

Signed Archaeologist:

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Web: www.ozarkehm.com.au

Survey 5 February 2013

OzArk Environmental & Heritage Management P/L

Record of Aboriginal Representative Participation in Cultural Heritage Fieldwork

Project Name: DZP

Client Name: Alkane / RWC

Client Address:

Name of Aboriginal Organisation: BINJANG

Name of Representative(s): Brett Hill

Name of Archaeologist: Nick Harrop

Type of participation:

- [x] Accompanied and participated in the archaeological survey of the study area
- [ ] Guided inspection of study area or sites

Period of participation:

Dates	Start	Finish
5/2/2013	8am	4:30pm

Were sites recorded?: None Recorded

Issues Discussed: Growth of survey areas ~~was~~ ~~[illegible] most~~ made it near impossible to see ground.

Signed Aboriginal Site Officer / Representative [signature]

Signed Aboriginal Site Officer / Representative

Signed Archaeologist: [signature]

OzArk Environmental & Heritage Management P/L

Record of Aboriginal Representative Participation in Cultural Heritage Fieldwork

Project Name: DZP

Client Name: Alkane / RWC

Client Address:

Name of Aboriginal Organisation: (Wiriniin bar)
Talbragar Maing

Name of Representative(s): Malcolm George Burns

Name of Archaeologist: Nick Harrop

Type of participation:

- [x] Accompanied and participated in the archaeological survey of the study area
- [ ] Guided inspection of study area or sites

Period of participation:

Dates	Start	Finish
05-02-13	8 am	4.30pm

Were sites recorded? : No sites where recorded
some pissible artifacts noted

Issues Discussed:

Signed Aboriginal Site Officer / Representative M G Burns

Signed Aboriginal Site Officer / Representative

Signed Archaeologist: Nicholas Harrop

Minutes of AFGM 13 August 2013

DUBBO ZIRCONIA PROJECT
Aboriginal Focus Group Meeting
Topic – Aboriginal Focus Group Meeting
8.45am-1pm, 13 August 2013
Toongi Hall, Toongi

Minutes of Meeting

RAP /Proponent Invites: Dianne Stewart, Binjang Wellington Wiradjuri Heritage Survey, Wirrimbah Direct Descendants Aboriginal Corporation, Dubbo Local Aboriginal Land Council, Alkane.
Attendance:

OzArk	Jodie Benton
	Nick Harrop
	Sheridan Baker
DLALC	Darren Toomey
	Willie Carr
WDD	Ray Smith
	Geoff Ryan
Alkane	Michael Sutherland

Apologies: Dianne Stewart, Binjang were unable to attend on the day

---

Meeting commenced: 9.20am

Welcome: Nick Harrop
Acknowledgement of Traditional Owners: Jodie Benton
Welcome to Country: Geoff Ryan
Overview - Proceedings and Objectives: Nick Harrop

General project description and status update : Mike Sutherland

Notable Points:
General
Approx. 230 people will be employed, with approx. 35 brought in for specialist roles. Other workers will be trained and preference will be given to local residents.
Alkane are currently working with TAFE and schools on what skills and qualifications the upcoming workforce requires, to help prepare the local community.

Timeframes
The mine is expected to have an eighty year (80) lifespan.
Hopeful that the project submission will go up for public comment approx. Sept 2013.
Hopeful that the project approval will be received from the Government March – June 2014.

Site visit
All participants went and viewed a selection of representative archaeological sites, that will be impacted, as well as a look at a grinding groove site that will be conserved. Notable comments have been grouped below:

Sites Visited
36-1-0365, 36-1-0367, 36-1-0366, GI-AS1, GI-AS2, and 36-1-0314

Notable points:

Scarred trees
Seeds of fuzzy boxes generally, which some scars appear on, will be collected from the trees and planted on other locations within the land boundaries (Mike Sutherland).

The scars could be a track/ location marker or a marker of potential community significance (Geoff Ryan).

The scarred trees on the sites are not the best examples of scars and some may also have been made naturally, can be very hard to determine (Jodie Benton).

RAPs suggested plaster casts of scarred portions of trees be created and retained for possible education purposes in the future (Geoff Ryan).

Artefacts
Moving any salvaged artefacts to a safer location is agreeable as long as they stay within the project area (RAPs general discussion).

General
Pink- tailed worm-lizards will be relocated from the resource area to a nearby safe area within the project area.
Viewed the regeneration of land by Alkane: comments on how it was hard to see long term impact (RAPs general comments).

12.30 Lunch
Discussion regarding the project and the sites by RAP's was undertaken alone, i.e. without OzArk or Alkane representatives present. This discussion was consequently not recorded.

1 pm General discussion – All present:
Mike Sutherland apologised and left due to other meeting commitments (1pm)

Management
- Preservation of sites is important for the future generations.
- Statement by RAPs that although preservation is the generally the preference, they understood this is not always feasible. Where sites cannot be saved, it is ideal to have the negative impacts offset by positive impacts. These may include saving other sites for purposes such as education and/or employment as a result of the proposed works.
- All representatives were agreeable with the scarred trees being removed.
- Scarred portions of the trees to be kept in a safe, protected place, possibly temporarily within the project area, until the RAP's determine their permanent keeping place. The potential long term solutions were using the scarred portions of the trees or casts thereof in artistic / educational displays.
- Artefacts to be salvaged and kept for future education and display purposes. It was noted by Jodie Benton that the number of artefacts may be quite small based on the fact that the sites being salvaged were either isolated finds or small scatters. Possibly some artefacts not as useful for educational purposes may end up being reburied on site. This could only be decided once the whole assemblage had been looked at, hence it was thought best in the first instance to obtain Care and Control of all salvaged sites (scarred tree trunk portions and stone artefacts).
- Discussion was held over the right people to speak for country. Due to possible changes in the management of various organisations, Wirrimbah Direct descendants and the Dubbo LALC

agreed that it would be best if both organisations were nominated on the Care and Control Agreement.

Cultural value discussion

The RAPs agreed that the presence of the Aboriginal archaeological sites over the region (including within the Project Area) provides proof that their ancestors lived as active communities utilising the landscape. This evidence provides direct connection to country and the local area, and this is part of the bigger aboriginal history. "…. there is a strong significance on country".

Other issues discussed included the healing possibilities of the landscape and the sites within it.

Meeting closed: 2.30pm

APPENDIX 2: DESKTOP DATABASE RESULTS- AHIMS SEARCH

Note: This Appendix can be viewed on the Project CD

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Office of Environment & Heritage NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : DZP Mine Site
Client Service ID : 84116

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
36-1-0313	TS-IF-01	AGD	55	653040	6406810	Open site	Valid	Artefact : -	Isolated Find	
	Contact	Recorders	Lloyd Nolan					Permits		
36-1-0314	Ts-GG-01	AGD	55	653130	6406420	Open site	Valid	Grinding Groove : -	Axe Grinding Groove	
	Contact	Recorders	Lloyd Nolan					Permits		
36-1-0315	OR-ST-02	AGD	55	648580	6408540	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Lloyd Nolan					Permits		
36-1-0316	OR-ST-01	AGD	55	648570	6408540	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Lloyd Nolan					Permits		
36-1-0142	Obley Road;	AGD	55	648000	6415900	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Warren Bluff					Permits		
36-1-0143	Obley Road;	AGD	55	648000	6416000	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Warren Bluff					Permits		
36-1-0144	Obley Road;	AGD	55	647500	6412500	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Warren Bluff					Permits		
36-1-0145	Wirrabilla;	AGD	55	648700	6409100	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Warren Bluff					Permits		
36-1-0146	Obley Road;	AGD	55	648100	6407900	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Warren Bluff					Permits		
36-1-0147	Wambangalang;	AGD	55	646300	6404600	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Warren Bluff					Permits		

Report generated by AHIMS Web Service on 29/10/2012 for Joshua Noyer for the following area at Datum :GDA, Zone : 55, Eastings : 646200 - 657500, Northings : 6403300 - 6416300 with a Buffer of 0 meters.Additional Info : DZP heritage assessment. Number of Aboriginal sites and Aboriginal objects found is 35

Office of Environment & Heritage NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : DZP Mine Site
Client Service ID : 84116

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
36-1-0119	H1 Dubbo	AGD	55	648020	6415700	Open site	Valid	Artefact : -	Open Camp Site	1065
	Contact	Recorders	N Franklin,Margrit Koettig,Rex Silcox					Permits		
36-1-0120	H2 Dubbo	AGD	55	647800	6415090	Open site	Valid	Artefact : -, Modified Tree (Carved or Scarred) : -	Open Camp Site,Scarred Tree	1065
	Contact	Recorders	N Franklin,Margrit Koettig,Rex Silcox					Permits		
36-1-0369	TS-ST-08	AGD	55	653370	6413550	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0370	TS-ST-09	AGD	55	653353	6414042	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0371	TS-ST-10	AGD	55	653353	6414042	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0372	TS-ST-02	AGD	55	650740	6409270	Open site	Valid	Artefact : -, Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0373	TS-ST-03	AGD	55	650020	6408560	Open site	Valid	Modified Tree (Carved or Scarred) : -, Artefact : -		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0374	TS-ST-01#	AGD	55	650830	6409370	Open site	Valid	Artefact : -, Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0375	TS-ST-04	AGD	55	649840	6408380	Open site	Valid	Artefact : -, Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0356	TS-OS-03	AGD	55	652080	6411910	Open site	Valid	Modified Tree (Carved or Scarred) : -, Artefact : -		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		

Report generated by AHIMS Web Service on 29/10/2012 for Joshua Noyer for the following area at Datum :GDA, Zone : 55, Eastings : 646200 - 657500, Northings : 6403300 - 6416300 with a Buffer of 0 meters.Additional Info : DZP heritage assessment. Number of Aboriginal sites and Aboriginal objects found is 35

Page 2 of 4

Office of Environment & Heritage NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : DZP Mine Site
Client Service ID : 84116

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
36-1-0357	TS-OS-01	AGD	55	652070	6407770	Open site	Valid	Artefact : -, Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0358	TS-OS-02	AGD	55	651440	6410150	Open site	Valid	Artefact : -, Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0359	TS-ST-11	AGD	55	653384	6413947	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0360	TS-GG-03	AGD	55	652070	6407360	Open site	Valid	Artefact : -, Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0361	TS-GG-02	AGD	55	652120	6407580	Open site	Valid	Artefact : -		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0362	TS-IF-02	AGD	55	651390	6409620	Open site	Valid	Artefact : -		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0363	TS-OS-06	AGD	55	653074	6413567	Open site	Valid	Artefact : 7		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0364	TS-OS-05	AGD	55	652806	6413359	Open site	Valid	Artefact : 17		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0365	TS-OS-04	AGD	55	652080	6411910	Open site	Valid	Artefact : -		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0366	TS-ST-05	AGD	55	650340	6408150	Open site	Valid	Modified Tree (Carved or Scarred) : -, Artefact : -		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		
36-1-0367	TS-ST-06	AGD	55	650340	6408150	Open site	Valid	Modified Tree (Carved or Scarred) : -, Artefact : -		
	Contact	Recorders	Guarra Aboriginal Site Surveys					Permits		

Report generated by AHIMS Web Service on 29/10/2012 for Joshua Noyer for the following area at Datum :GDA, Zone : 55, Eastings : 646200 - 657500, Northings : 6403300 - 6416300 with a Buffer of 0 meters.Additional Info : DZP heritage assessment. Number of Aboriginal sites and Aboriginal objects found is 35

Office of Environment & Heritage NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : DZP Mine Site
Client Service ID : 84116

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
36-1-0368	TS-ST-07	AGD	55	652121	6408340	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Guarra Aboriginal Site Surveys					**Permits**		
36-1-0423	ORT-ST2	AGD	55	647639	6412462	Open site	Valid	Modified Tree (Carved or Scarred) : -		98397
	Contact	**Recorders**	Doctor,Jodie Benton					**Permits**		
36-1-0424	ORT-ST1	AGD	55	647535	6412622	Open site	Valid	Modified Tree (Carved or Scarred) : -		98397
	Contact	**Recorders**	Doctor,Jodie Benton					**Permits**		
36-1-0539	BRST-1	GDA	55	652530	6416115	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact Searle	**Recorders**	Doctor,Jodie Benton,Mr.Phillip Cameron					**Permits**		

Report generated by AHIMS Web Service on 29/10/2012 for Joshua Noyer for the following area at Datum :GDA, Zone : 55, Eastings : 646200 - 657500, Northings : 6403300 - 6416300 with a Buffer of 0 meters.Additional Info : DZP heritage assessment. Number of Aboriginal sites and Aboriginal objects found is 35

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Office of Environment & Heritage NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : DZP rd and rail
Client Service ID : 84117

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
36-1-0130	Dundillamal;	AGD	55	650413	6426385	Open site	Valid	Modified Tree (Carved or Scarred) : 3	Scarred Tree	1333
	Contact	**Recorders**	Warren Bluff					**Permits**		
36-1-0131	Obley Road;	AGD	55	649500	6422800	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1333
	Contact	**Recorders**	Warren Bluff					**Permits**		
36-1-0132	Obley Road;	AGD	55	649500	6422900	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1333
	Contact	**Recorders**	Warren Bluff					**Permits**		
36-1-0133	Obley Road;	AGD	55	649700	6422500	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	**Recorders**	Warren Bluff					**Permits**		
36-1-0134	Obley Road;	AGD	55	650000	6422000	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	**Recorders**	Warren Bluff					**Permits**		
36-1-0135	Obley Road;	AGD	55	650000	6421900	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	**Recorders**	Warren Bluff					**Permits**		
36-1-0136	Obley Road;	AGD	55	650000	6421500	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	**Recorders**	Warren Bluff					**Permits**		
36-1-0137	Obley road;	AGD	55	650000	6421500	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1333
	Contact	**Recorders**	Warren Bluff					**Permits**		
36-1-0138	Obley road;	AGD	55	650000	6421500	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1333
	Contact	**Recorders**	Warren Bluff					**Permits**		

Report generated by AHIMS Web Service on 29/10/2012 for Joshua Noyer for the following area at Datum :GDA, Zone : 55, Eastings : 649165 - 651990, Northings : 6417800 - 6427632 with a Buffer of 0 meters.Additional Info : DZP rd and rail assessment. Number of Aboriginal sites and Aboriginal objects found is 80

Office of Environment & Heritage NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : DZP rd and rail
Client Service ID : 84117

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
36-1-0139	Cumboogle;	AGD	55	650100	6420700	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	**Recorders**	Warren Bluff					**Permits**		
36-1-0140	Obley Road;	AGD	55	649600	6418900	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	**Recorders**	Warren Bluff					**Permits**		
36-1-0141	Obley Road;	AGD	55	649500	6418500	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	**Recorders**	Warren Bluff					**Permits**		
36-1-0157	dundullirial;	AGD	55	650210	6426810	Open site	Valid	Artefact : -	Open Camp Site	1333
	Contact	**Recorders**	Warren Bluff					**Permits**		
36-1-0163	GL-IF2	AGD	55	649450	6425600	Open site	Valid	Artefact : 1	Open Camp Site,Scarred Tree	3713
	Contact	**Recorders**	Jim Kelton					**Permits**		
36-1-0164	GL-OS-1	AGD	55	649150	6425443	Open site	Valid	Modified Tree (Carved or Scarred) : -, Artefact : -	Open Camp Site,Scarred Tree	3713
	Contact	**Recorders**	Central West Archaeological and Heritage Services Pty Ltd					**Permits**		
36-1-0165	GL-OS-2	AGD	55	649610	6425490	Open site	Valid	Artefact : 10	Open Camp Site,Scarred Tree	3713
	Contact	**Recorders**	Jim Kelton					**Permits**		
36-1-0166	GL-OS-3	AGD	55	649610	6425580	Open site	Valid	Artefact : -	Open Camp Site,Scarred Tree	3713
	Contact	**Recorders**	Jim Kelton					**Permits**		
36-1-0167	GL-OS-4	AGD	55	650130	6424930	Open site	Valid	Artefact : -	Open Camp Site,Scarred Tree	3713
	Contact	**Recorders**	Jim Kelton					**Permits**		
36-1-0168	GL-OS-5	AGD	55	650080	6424870	Open site	Valid	Artefact : -	Open Camp Site,Scarred Tree	3713
	Contact	**Recorders**	Jim Kelton					**Permits**		
36-1-0171	GL-OS-8	AGD	55	649150	6425740	Open site	Valid	Artefact : -, Modified Tree (Carved or Scarred) : -	Open Camp Site,Scarred Tree	3713
	Contact	**Recorders**	Central West Archaeological and Heritage Services Pty Ltd					**Permits**		

Report generated by AHIMS Web Service on 29/10/2012 for Joshua Noyer for the following area at Datum :GDA, Zone : 55, Eastings : 649165 - 651990, Northings : 6417800 - 6427632 with a Buffer of 0 meters.Additional Info : DZP rd and rail assessment. Number of Aboriginal sites and Aboriginal objects found is 80

Office of Environment & Heritage NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : DZP rd and rail
Client Service ID : 84117

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
36-1-0172	GL-ST-1	AGD	55	649060	6425420	Open site	Valid	Artefact : -	Open Camp Site	3713
	Contact	**Recorders**	Central West Archaeological and Heritage Services Pty Ltd					**Permits**		
36-1-0173	GL-ST-2	AGD	55	649150	6424561	Open site	Valid	Artefact : -	Open Camp Site	3713
	Contact	**Recorders**	Central West Archaeological and Heritage Services Pty Ltd					**Permits**		
36-1-0114	M21 Dubbo	AGD	55	651120	6425550	Open site	Valid	Artefact : 25	Open Camp Site	1065
	Contact	**Recorders**	N Franklin,Margrit Koettig,Rex Silcox					**Permits**		
36-1-0115	M22 Dubbo	AGD	55	650940	6426290	Open site	Valid	Artefact : 219	Open Camp Site	1065
	Contact	**Recorders**	N Franklin,Margrit Koettig,Rex Silcox					**Permits**		
36-1-0118	C1 Dubbo	AGD	55	649600	6422810	Open site	Valid	Artefact : -	Open Camp Site	1065
	Contact	**Recorders**	N Franklin,Margrit Koettig,Rex Silcox					**Permits**		
36-1-0221	OR-ST-9 (Eulomogo)	AGD	55	650036	6427148	Open site	Valid	Modified Tree (Carved or Scarred) : 1	Scarred Tree	3737,4738
	Contact	**Recorders**	Jim Kelton					**Permits**		
36-1-0222	OR-IF-2 (Eulomogo)	AGD	55	650120	6427000	Open site	Valid	Artefact : 1	Isolated Find	3737,4738
	Contact	**Recorders**	Jim Kelton					**Permits**		
36-1-0223	OR-IF-1 (Eulomogo)	AGD	55	649855	6427169	Open site	Valid	Artefact : -	Isolated Find	3737,4738,98215
	Contact	**Recorders**	Doctor Jodie Benton,Jim Kelton					**Permits**		
36-1-0224	OR-ST-6 (Eulomogo)	AGD	55	650300	6426330	Open site	Valid	Modified Tree (Carved or Scarred) : 1	Scarred Tree	3737,4738
	Contact	**Recorders**	Jim Kelton					**Permits**		
36-1-0227	OR-ST-4 (Eulomogo)	AGD	55	650320	6426060	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	3737,4738
	Contact	**Recorders**	Jim Kelton					**Permits**		
36-1-0021	Dundallimal;	AGD	55	650921	6426608	Open site	Valid	Aboriginal Ceremony and Dreaming : -, Ceremonial Ring (Stone or Earth) : -, Hearth : -, Artefact : -, Grinding Groove : -	Axe Grinding Groove,Mound (Oven),Open Camp Site	
	Contact	**Recorders**	P Gresser,A.K. Morris					**Permits**		
36-1-0029	Dubbo;	AGD	55	650751	6422043	Open site	Valid	Modified Tree (Carved or Scarred) : -	Carved Tree	65

Report generated by AHIMS Web Service on 29/10/2012 for Joshua Noyer for the following area at Datum :GDA, Zone : 55, Eastings : 649165 - 651990, Northings : 6417800 - 6427632 with a Buffer of 0 meters.Additional Info : DZP rd and rail assessment. Number of Aboriginal sites and Aboriginal objects found is 80

Office of Environment & Heritage NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : DZP rd and rail
Client Service ID : 84117

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	**Recorders**	David Bell					**Permits**		
36-1-0190	K-OS-1;	GDA	55	651870	6427290	Open site	Valid	Artefact : -	Open Camp Site	3348
	Contact	**Recorders**	Jim Kelton					**Permits**		
36-1-0228	OR-ST-3 (Eulomogo)	AGD	55	650290	6426370	Open site	Valid	Modified Tree (Carved or Scarred) : 1	Scarred Tree	3737,4738
	Contact	**Recorders**	Jim Kelton					**Permits**		
36-1-0229	OR-ST-5 Eulomogo)	AGD	55	650390	6425980	Open site	Valid	Modified Tree (Carved or Scarred) : 1	Scarred Tree	3737,4738
	Contact	**Recorders**	Jim Kelton					**Permits**		
36-1-0191	K-ST-1;	GDA	55	651870	6427290	Open site	Valid	Modified Tree (Carved or Scarred) : 1	Scarred Tree	3348
	Contact	**Recorders**	Jim Kelton					**Permits**		
36-1-0192	K-IF-1;	GDA	55	651940	6427470	Open site	Valid	Artefact : -	Isolated Find	3348
	Contact	**Recorders**	Jim Kelton					**Permits**		
36-1-0105	M12 Dubbo	AGD	55	650360	6426700	Open site	Valid	Modified Tree (Carved or Scarred) : 1	Scarred Tree	1065
	Contact	**Recorders**	N Franklin,Margrit Koettig,Rex Silcox					**Permits**		
36-1-0106	M13 Dubbo	AGD	55	650940	6426590	Open site	Valid	Artefact : -	Open Camp Site	1065
	Contact	**Recorders**	N Franklin,Margrit Koettig,Rex Silcox					**Permits**		
36-1-0107	M14 Dubbo	AGD	55	651780	6426690	Open site	Valid	Modified Tree (Carved or Scarred) : 1	Scarred Tree	1065
	Contact	**Recorders**	N Franklin,Margrit Koettig,Rex Silcox					**Permits**		
36-1-0108	M15 Dubbo	AGD	55	651200	6426450	Open site	Valid	Artefact : -	Open Camp Site	1065
	Contact	**Recorders**	N Franklin,Margrit Koettig,Rex Silcox					**Permits**		
36-1-0112	M19 Dubbo	AGD	55	651290	6424640	Open site	Valid	Artefact : 30, Shell : -, Modified Tree (Carved or Scarred) : -	Midden,Open Camp Site,Scarred Tree	1065
	Contact	**Recorders**	N Franklin,Margrit Koettig,Rex Silcox					**Permits**		
36-1-0113	M20 Dubbo	AGD	55	651110	6424400	Open site	Valid	Artefact : -, Shell : -	Midden,Open Camp Site	1065
	Contact	**Recorders**	N Franklin,Margrit Koettig,Rex Silcox					**Permits**		

Report generated by AHIMS Web Service on 29/10/2012 for Joshua Noyer for the following area at Datum :GDA, Zone : 55, Eastings : 649165 - 651990, Northings : 6417800 - 6427632 with a Buffer of 0 meters.Additional Info : DZP rd and rail assessment. Number of Aboriginal sites and Aboriginal objects found is 80

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Office of Environment & Heritage NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : DZP rd and rail
Client Service ID : 84117

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
36-1-0336	TA-ST-02	AGD	55	651550	6424410	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Lloyd Nolan					**Permits**		
36-1-0100	M7 Dubbo	AGD	55	650100	6427100	Open site	Valid	Artefact : -, Modified Tree (Carved or Scarred) : -	Open Camp Site,Scarred Tree	1065
	Contact	**Recorders**	N Franklin,Margrit Koettig,Rex Silcox					**Permits**		
36-1-0101	M8 Dubbo	AGD	55	650350	6427000	Open site	Valid	Artefact : -, Modified Tree (Carved or Scarred) : -	Open Camp Site,Scarred Tree	1065
	Contact	**Recorders**	N Franklin,Margrit Koettig,Rex Silcox					**Permits**		
36-1-0102	M9 (a)(b)(c) Dubbo	AGD	55	650580	6426970	Open site	Valid	Modified Tree (Carved or Scarred) : 3	Scarred Tree	1065
	Contact	**Recorders**	N Franklin,Margrit Koettig,Rex Silcox					**Permits**		
36-1-0103	M10 Dubbo	AGD	55	650320	6426840	Open site	Valid	Shell : -, Artefact : 93	Open Camp Site	1065
	Contact	**Recorders**	N Franklin,Margrit Koettig,Rex Silcox					**Permits**		
36-1-0104	M11 Dubbo	AGD	55	650200	6426900	Open site	Valid	Modified Tree (Carved or Scarred) : 1	Scarred Tree	1065
	Contact	**Recorders**	N Franklin,Margrit Koettig,Rex Silcox					**Permits**		
36-1-0416	WPZ-OS4	AGD	55	649737	6425805	Open site	Valid	Artefact : -		98215
	Contact	**Recorders**	Doctor.Jodie Benton					**Permits**		
36-1-0417	WPZ-OS5	AGD	55	649732	6425381	Open site	Valid	Artefact : -		98215
	Contact	**Recorders**	Doctor.Jodie Benton					**Permits**		
36-1-0418	WPZ-ST1	AGD	55	650233	6425860	Open site	Valid	Modified Tree (Carved or Scarred) : 1		98215
	Contact	**Recorders**	Doctor.Jodie Benton					**Permits**		
36-1-0420	WPZ-ST3	AGD	55	649708	6426094	Open site	Valid	Modified Tree (Carved or Scarred) : 1		98215
	Contact	**Recorders**	Doctor.Jodie Benton					**Permits**		
36-1-0412	WPZ-IF1	AGD	55	649331	6425621	Open site	Valid	Artefact : -		98215
	Contact	**Recorders**	Doctor.Jodie Benton					**Permits**		

Report generated by AHIMS Web Service on 29/10/2012 for Joshua Noyer for the following area at Datum :GDA, Zone : 55, Eastings : 649165 - 651990, Northings : 6417800 - 6427632 with a Buffer of 0 meters.Additional Info : DZP rd and rail assessment. Number of Aboriginal sites and Aboriginal objects found is 80

Office of Environment & Heritage NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : DZP rd and rail
Client Service ID : 84117

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
36-1-0432	ORWM- ST1	AGD	55	650428	6425534	Open site	Valid	Modified Tree (Carved or Scarred) : 1		98799
	Contact	**Recorders**	Doctor.Jodie Benton					**Permits**		
36-1-0433	ORWM-ST2	AGD	55	650449	6425393	Open site	Valid	Modified Tree (Carved or Scarred) : 1		98799
	Contact	**Recorders**	Doctor.Jodie Benton					**Permits**		
36-1-0434	WPZ-IF2	AGD	55	649331	6425621	Open site	Valid	Artefact : 2		98895
	Contact	**Recorders**	Doctor.Jodie Benton					**Permits**		
36-1-0435	WPZ-IF2a	AGD	55	649331	6425621	Open site	Valid	Artefact : 1		98946
	Contact	**Recorders**	Doctor.Jodie Benton					**Permits**		
36-1-0458	BBS; Dubbo LALC; TSR	AGD	55	649648	6422505	Open site	Valid	Artefact : 6		99169
	Contact	**Recorders**	Phil Purcell,Dubbo LALC					**Permits**		
36-1-0535	Restriction applied. Please contact ahims@environment.nsw.gov.au.					Open site	Valid			
	Contact S Scanlon	**Recorders**	Ms.Allira Chatfield					**Permits**		
36-1-0556	DLGA-ST-03	AGD	55	650466	6427053	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact Searle	**Recorders**	OzArk Cultural Heritage Management					**Permits**		
36-1-0557	DLGA-ST-02	AGD	55	651652	6427032	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact Searle	**Recorders**	OzArk Cultural Heritage Management					**Permits**		
36-1-0558	DLGA-ST-01	AGD	55	651300	6426770	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact Searle	**Recorders**	OzArk Cultural Heritage Management					**Permits**		
36-1-0559	DLGA-OS-03	AGD	55	651324	6427339	Open site	Valid	Artefact : 5		
	Contact Searle	**Recorders**	OzArk Cultural Heritage Management					**Permits**		
36-1-0560	DLGA-OS-02	AGD	55	651407	6427264	Open site	Valid	Artefact : 2		
	Contact Searle	**Recorders**	OzArk Cultural Heritage Management					**Permits**		
36-1-0561	DLGA-OS-01	AGD	55	651688	6427148	Open site	Valid	Artefact : 18		
	Contact Searle	**Recorders**	OzArk Cultural Heritage Management					**Permits**		
36-1-0563	DLGA-IF-01	AGD	55	651353	6427429	Open site	Valid	Artefact : -		

Report generated by AHIMS Web Service on 29/10/2012 for Joshua Noyer for the following area at Datum :GDA, Zone : 55, Eastings : 649165 - 651990, Northings : 6417800 - 6427632 with a Buffer of 0 meters.Additional Info : DZP rd and rail assessment. Number of Aboriginal sites and Aboriginal objects found is 80

Office of Environment & Heritage NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : DZP rd and rail
Client Service ID : 84117

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact Searle	Recorders	OzArk Cultural Heritage Management					Permits		
36-1-0613	Dundullimal Reserve Scarred Tree 1 (DR-ST1)	AGD	55	650605	6426823	Open site	Valid	Modified Tree (Carved or Scarred) : -		101792
	Contact	Recorders	OzArk Cultural Heritage Management					Permits		
36-1-0614	Dundullimal Reserve Scarred Tree 2 (DR-ST2)	AGD	55	650695	6426925	Open site	Valid	Modified Tree (Carved or Scarred) : 1		101792
	Contact	Recorders	OzArk Cultural Heritage Management					Permits		
36-1-0615	Dundullimal Reserve Open Site with PAD (DR-OS1-WITH PAD)	AGD	55	650592	6426739	Open site	Valid	Artefact : 50		
	Contact	Recorders	OzArk Cultural Heritage Management					Permits		
36-1-0599	C-ST-5 (Eulomogo) Cumboolgle Obley Rd	GDA	55	650430	6420510	Open site	Valid	Modified Tree (Carved or Scarred) : -		4698
	Contact	Recorders	Jim Kelton					Permits		
36-1-0600	C-ST-6 (Eulomogo) Cumboogle Obley Rd	GDA	55	650420	6420450	Open site	Valid	Modified Tree (Carved or Scarred) : -		4698
	Contact	Recorders	Jim Kelton					Permits		
36-1-0601	C-ST-7 (Eulomogo) Cumboogle Obley Rd	GDA	55	650440	6420290	Open site	Valid	Modified Tree (Carved or Scarred) : -		4698
	Contact	Recorders	Jim Kelton					Permits		
36-1-0602	C-ST-8 (Eulomogo) Cumboogle Obley Rd	GDA	55	650430	6420350	Open site	Valid	Modified Tree (Carved or Scarred) : -		4698
	Contact	Recorders	Jim Kelton					Permits		
36-1-0603	C-ST-9 (Eulomogo) Cumboogle Obley Rd	GDA	55	650480	6420450	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Jim Kelton					Permits		
36-1-0595	C-ST-1 (Eulomogo) Cumboogle Obley Rd	GDA	55	650170	6420850	Open site	Valid	Modified Tree (Carved or Scarred) : -		4698
	Contact	Recorders	Jim Kelton					Permits		
36-1-0596	C-ST-2 (Eulomogo) Cumboogle Obley Rd	GDA	55	650350	6420800	Open site	Valid	Modified Tree (Carved or Scarred) : -		4698

Report generated by AHIMS Web Service on 29/10/2012 for Joshua Noyer for the following area at Datum :GDA, Zone : 55, Eastings : 649165 - 651990, Northings : 6417800 - 6427632 with a Buffer of 0 meters.Additional Info : DZP rd and rail assessment. Number of Aboriginal sites and Aboriginal objects found is 80

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Office of Environment & Heritage NSW

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : DZP rd and rail
Client Service ID : 84117

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Jim Kelton					Permits		
36-1-0597	C-ST-3 (Eulomogo) Cumboogle Obley Rd	GDA	55	650340	6420650	Open site	Valid	Modified Tree (Carved or Scarred) : -		4698
	Contact	Recorders	Jim Kelton					Permits		
36-1-0598	C-ST-4 (Eulomogo) Cumboogle Obley Rd	GDA	55	650340	6420570	Open site	Valid	Modified Tree (Carved or Scarred) : -		4698
	Contact	Recorders	Jim Kelton					Permits		
36-1-0616	TA-ST-01	AGD	55	651770	6424670	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Lloyd Nolan					Permits		

Report generated by AHIMS Web Service on 29/10/2012 for Joshua Noyer for the following area at Datum :GDA, Zone : 55, Eastings : 649165 - 651990, Northings : 6417800 - 6427632 with a Buffer of 0 meters.Additional Info : DZP rd and rail assessment. Number of Aboriginal sites and Aboriginal objects found is 80

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Office of Environment & Heritage NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : DZP gas and rail
Client Service ID : 84118

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
36-1-0299	TP-OS-1	AGD	55	651120	6433690	Open site	Valid	Artefact : 30	Open Camp Site	4362
	Contact	Recorders	Jim Kelton					Permits		
36-1-0194	TC-ST-2	AGD	55	653329	6433340	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	3351
	Contact	Recorders	Jim Kelton					Permits		
36-1-0195	TC-ST-1	AGD	55	653384	6432980	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	3351
	Contact	Recorders	Jim Kelton					Permits		
36-1-0016	Troy Junction;	AGD	55	652330	6434968	Open site	Valid	Stone Quarry : -, Artefact : -	Open Camp Site	511
	Contact	Recorders	Margrit Koettig					Permits		
36-1-0193	TC-OS-1	AGD	55	652887	6433514	Open site	Valid	Artefact : -	Open Camp Site	3351
	Contact	Recorders	Jim Kelton					Permits	2285	
36-1-0238	MD47	AGD	55	651090	6433680	Open site	Valid	Artefact : 5	Open Camp Site	
	Contact	Recorders	Kerry Navin,Mr.Kelvin Officer					Permits		
36-1-0402	SP-OS-03	AGD	55	651120	6433030	Open site	Valid	Artefact : -		
	Contact	Recorders	L Nolan					Permits		
36-1-0398	SP-OS-01	AGD	55	651210	6433470	Open site	Valid	Artefact : -		
	Contact	Recorders	L Nolan					Permits		
36-1-0517	TR-ST-001	AGD	55	652648	6434595	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Lloyd Nolan					Permits		
36-1-0518	TR-IF-02	AGD	55	653266	6434831	Open site	Valid	Artefact : -		
	Contact	Recorders	Lloyd Nolan					Permits		
36-1-0519	TR-IF-04	AGD	55	653143	6434515	Open site	Valid	Artefact : -		
	Contact	Recorders	Lloyd Nolan					Permits		
36-1-0520	TR-IF-03	AGD	55	653302	6434800	Open site	Valid	Artefact : -		
	Contact	Recorders	Lloyd Nolan					Permits		
36-1-0521	TR-IF-01	AGD	55	652843	6434869	Open site	Valid	Artefact : -		
	Contact	Recorders	Lloyd Nolan					Permits		
36-1-0522	TR-GG-01	AGD	55	653061	6434419	Open site	Valid	Artefact : -		
	Contact	Recorders	Lloyd Nolan					Permits		

Report generated by AHIMS Web Service on 29/10/2012 for Joshua Noyer for the following area at Datum :GDA, Zone : 55, Eastings : 651200 - 653700, Northings : 6432000 - 6435300 with a Buffer of 0 meters.Additional Info : DZP gas and rail assessment. Number of Aboriginal sites and Aboriginal objects found is 16

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Office of Environment & Heritage NSW

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : DZP gas and rail
Client Service ID : 84118

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
36-1-0592	PL-IF 1	AGD	55	652574	6433937	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Doctor,Jodie Benton,OzArk Cultural Heritage Management,Mr.Phillip Cameron					**Permits**		
36-1-0606	SP-OS-02	AGD	55	651210	6433470	Open site	Valid	Artefact : 7		
	Contact	**Recorders**	Lloyd Nolan					**Permits**		

Report generated by AHIMS Web Service on 29/10/2012 for Joshua Noyer for the following area at Datum :GDA, Zone : 55, Eastings : 651200 - 653700, Northings : 6432000 - 6435300 with a Buffer of 0 meters.Additional Info : DZP gas and rail assessment. Number of Aboriginal sites and Aboriginal objects found is 16

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APPENDIX 3: SITE TYPE DEFINITIONS

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Scarred Trees

This site type results from the deliberate removal of bark (and sometimes wood) from trees, for the purpose of obtaining raw material for the manufacture of various items of material culture – i.e. shields, coolamons, shelters, canoes, and cradles. They may also result from foraging and hunting - for instance, toe holes cut in trees to allow access to upper branches and hollows, and axe marks around natural hollows for the extraction of small tree-living fauna (such as possums or birds) or honey.

The identification and interpretation of a scar as being Aboriginal in origin can often be difficult, as bark can be removed from trees by a variety of means e.g. animal and bird foraging, the natural breaking off of tree limbs, lightning strikes to the tree, the result of machinery damage to trunks and the removal of bark by Europeans to define land boundaries. To assist archaeologists in the accurate identification of Aboriginal scarred trees, the DEC Western region provides a set of criteria against which each scar must be assessed (DEC and Long 1995).

These diagnostic criteria are as follows:

1. The scar must not touch the ground - (scars resulting from fire, fungal attack or lightning nearly always reach the ground). Such a termination does not necessarily preclude an Aboriginal origin. Ethno-historic accounts of canoe manufacture occasionally demonstrate scarring to ground level. If the scar does run to the ground, the sides must be relatively parallel (i.e. not triangular). It must be noted that discussion with Native Title from other areas suggests that scars may indeed extend to the ground, especially when the bark is planned for use in a shelter. This information is derived from oral histories recorded in Dubbo and observations from further afield;
2. The ends of the scar should be squared off or evenly tapered - Different shapes at the top and bottom (e.g. pointed at top, squared at bottom; round at top, flaring at bottom) are suggestive of natural processes (e.g. branch loss);
3. The sides of the scar should be parallel or symmetrical - Few natural scars are likely to have these properties, with the possible exception of fire scars which may be symmetrical but are usually wider at their base. Modern surveyors' marks are typically triangular, and often adzed. These also (regardless of shape) usually have a number carved in the wood, within the scar;
4. The length of the scar must be on the same axis as the tree and not oblique or slanting across the tree or the branch - Scars which are natural in origin tend to have irregular outlines, sometimes have irregular regrowth and may occur against the axis of the tree.

5. The tree should be reasonably old – i.e. over 100 years - The tree upon which the scar is found should be old enough (i.e. of sufficient age) to have been used by Aboriginal people in (at least) a semi-traditional manner. This means the tree should be at least c. 100 years old. The age of the scar should also be reflected in the thickness of the regrowth. Young scars (e.g. some natural scars caused by branches falling or birds or horses gnawing, have characteristically thin regrowth);
6. There must be no obvious natural or other artificial cause such as a branch rip, lightning strike, cockatoo chewed bark or healed bark tears from machinery damage or car impact – Any signs that the scar may not be Aboriginal should be carefully assessed; and,
7. The tree must not be an introduced species – For obvious reasons, the tree upon which the scar is found should be endemic to the region, i.e. this excludes historic (exotic) plantings.

Also helpful in scarred tree identification, but not within the OEH criteria are the following points:

1. Axe or adze marks - A scar with cut marks on the original wood is likely to be anthropogenic in nature (i.e. as a result of human actions). The location and shape/size may lend support to the scar's origin. For example stone axe marks would indicate an Aboriginal origin, while steel axe marks post-date the arrival of Europeans. These of course could still have been made by an Aboriginal person in the post-contact era; and,
2. The presence of epicormal growth – Many scars of Aboriginal origin tend to have an epicormal shoot originating at the base of the scar. This is a new branch shooting from the point of damage and is part of the trees self-preservation mechanism.

As noted in the OEH criteria, any tree that does not fit these rules cannot be accepted as likely to be of Aboriginal origin. This may mean that a few authentic scars are omitted from the Aboriginal Sites register, but it is the only means to establish consistency in identification.

However, even when applied, the above criteria cannot always provide a definitive classification, and a natural origin for the scar cannot be ruled out. For this reason interpretations of Aboriginal origin are qualified by the recorders degree of certainty. The following categories are used:

- DEFINITE ABORIGINAL SCAR

This is a scar which conforms to all of the criteria stated above and/or has in addition a feature or characteristic that provides definitive identification, such as diagnostic axe or adze marks, or a historical identification. All conceivably natural causes of the scar can be reliably discounted.

- ABORIGINAL SCAR

This is a scar which conforms to most of the criteria, and where an Aboriginal origin is considered to be the most likely. Despite this, a natural origin cannot be completely ruled out.

- POSSIBLE ABORIGINAL SCAR

This is a scar which conforms to most of the criteria but where an Aboriginal origin would appear unlikely.

Natural Mythological or Cultural / Ceremonial sites

Natural mythological sites can be any natural feature and like a cultural / spiritual are not detectable without the traditional knowledge of specific areas. Lindsey Moran from the BLALC is a keeper of such knowledge and was present in an effort to establish the presence of any such site type.

Isolated Finds

An artefact, usually of stone, but possibly of other materials, that is located but has no relationship to other identifiable archaeological features.

Open camp sites

Often called stone artefact scatters, these sites (for the purposes of the OEH AHIMS database) were in the past defined by the presence of two or more stone artefacts located within 50 m of one another. Current guidelines, however, delineate no hard and fast determinations, more loosely describing these camp sites as places exhibiting evidence of past human activity. This can be, and is most frequently, in the form of stone artefacts, but may also include other evidence such as hearths or midden material. Such sites provide evidence for the range of activities that may have been undertaken at a particular place, including the production of stone tools and the preparation of food including the butchering of animals or grinding of seeds. However, the distinction between a single, isolated artefact versus a place where numerous artefacts have been recorded together provides a necessary division in terms of the possible information that a site can reveal about past activities. Further information recorded about open sites includes assessments of the sites' integrity (how intact the site is) and subsequently whether sub-surface deposits are thought to be present.

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APPENDIX 4: SITE AND PAD COORDINATES

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Coordinates of Newly Located Sites

Site	GDA (Zone 55H)		AGD	
	Easting	Northing	Easting	Northing
UG-AS1	653276	6408524	653164	6408341
UG-AS2	655142	6409706	655030	6409523
UG-AS3	654868	6408931	654756	6408748
UG-AS4 with PAD	654444	6408809	654332	6408626
UG-ST1	653454	6407774	653342	6407591
UG-ST2	654645	6409715	654533	6409532
UG-IF1	653058	6407827	652946	6407644
UG-IF2	654142	6410222	654030	6410039
UG-IF3	654921	6409431	654809	6409248
UG-IF4	654636	6408490	654524	6408307
UG-IF5	654611	6408432	654499	6408249
UG-IF6	651651	6408365	651539	6408182
UG-IF7	654892	6408139	654780	6407956
K-AS1 with PAD	653494	6404781	653382	6404598
K-AS2 with PAD	652632	6405846	652520	6405663
K-IF1	652642	6405350	652530	6405167
K-OP1	652826	6406187	652714	6406004
GI-AS1	652761	6406650	652649	6406467
GI-AS2	653003	6406694	652891	6406511
GI-ST1	652781	6406684	652669	6406501
PH-ST1	650993	6407373	650881	6407190
PH-ST2	650135	6407019	650023	6406836
PH-IF1	650695	6407055	650583	6406872
TV-AS1	652009	6408159	651897	6407976

Site	GDA (Zone 55H)		AGD	
TV-AS2 with PAD	650740	6410316	650628	6410133
TV-AS3 with PAD	651625	6408100	651513	6407917
TV-ST1	651997	6407329	651885	6407146
TV-ST2	651568	6407623	651456	6407440
TV-IF1	652253	6408305	652141	6408122
G-AS1	653841	6410946	653729	6410763
G-IF1	654630	6412306	653164	6408341
Macquarie Water Pipeline				
MM-AS1	653239	6413941	653127	6413758
MM-AS2	651663	6411405	651551	6411222
MM-IF1	651266	6410925	651154	6410742
MM-IF2	651012	6410597	650900	6410414
Obley Road Alignment				
OR-AS1 with PAD	647874	6415464	647762	6415281
OR-ST1	649529	6423523	649417	6423340

Coordinates of Previously Recorded Sites

Site	Location	GDA (Zone 55H)		AGD	
		Easting	Northing	Easting	Northing
#36-1-0373 (TS-ST-03)	AHIMS	650020	6408560	649908	6408377
	Resurvey	650019	6408565	649907	6408382
#36-1-0365 (TS-ST-04)	AHIMS	652080	6411910	651968	6411727
	Resurvey	649883	6408413	649771	6408230
#36-1-0366 (TS-ST-04)	AHIMS	650340	6408150	650228	6407967
	Resurvey	650619	6408376	650507	6408193
#36-1-0367 (TS-ST-06)	AHIMS	650340	6408150	650228	6407967
	Resurvey	650355	6408167	650243	6407984
#36-1-0368 (TS-ST-06)	AHIMS	652121	6408340	652009	6408157
	Resurvey	652331	6407540	652219	6407357
#36-1-0313 (TS-IF-01)*	AHIMS	653040	6406810	652928	6406627
#36-1-0314 (TS-GG-01)	AHIMS	653130	6406420	653018	6406237
	Resurvey	653127	6406427	653015	6406244
#36-1-0374 (TS-ST-01)	AHIMS	650830	6409370	650718	6409187
	Resurvey	650844	6409385	650732	6409202
#36-1-0372 (TS-ST-02)	AHIMS	650740	6409270	650628	6409087
	Resurvey	650739	6409277	650627	6409094
#36-1-0357 (TS-OS-01 with PAD)	AHIMS	652070	6407770	651958	6407587
	Resurvey	652057	6407786	651945	6407603
#36-1-0358 (TS-OS-02)*	AHIMS	651440	6410150	651328	6409967
#36-1-0361 (TS-GG-02 with PAD)	AHIMS	652120	6407580	652008	6407397
	Resurvey	652133	6407859	652021	6407676
#36-1-0360 (TS-GG-03)	AHIMS	652070	6407360	651958	6407177
	Resurvey	652066	6407360	651954	6407177

Site	Location	GDA (Zone 55H)		AGD	
#36-1-0362 (TS-IF-02)	AHIMS	651390	6409620	651278	6409437
	Resurvey	651393	6409601	651281	6409418
Macquarie Water Pipeline					
#36-1-0356 (TS-OS-03 with PAD)	AHIMS	652080	6411910	651968	6411727
	Resurvey	652078	6411926	651966	6411743
#36-1-0364 (TS-OS-05 with PAD)	AHIMS	652806	6413359	652694	6413176
	Resurvey	653217	6413743	653105	6413560
	Obley Road Alignment				
#36-1-0432 (ORWM-ST1)	Resurvey	650552	6425580	650440	6425397
#36-1-0433 (ORWM-ST2)	Resurvey	650533	6425729	650421	6425546
#36-1-0120 (H2 with PAD)	Resurvey	647872	6415317	647760	6415134

* Not relocated in resurvey. In some cases artefacts were identified in this general location and included in the same site.

Coordinates of PADs

Site	GDA (Zone 55H)		AGD	
	Easting	Northing	Easting	Northing
UG-AS4 with PAD	654448	6408899	654336	6408716
	654397	6408775	654285	6408592
	654472	6408774	654360	6408591
	654522	6408865	654410	6408682
K-AS1 with PAD	653314	6404761	653202	6404578
	653347	6404850	653235	6404667
	653515	6404689	653403	6404506
	653548	6404783	653436	6404600
K-AS2 with PAD	652802	6406140	652690	6405957
	652924	6406062	652812	6405879
	652699	6405713	652587	6405530
	652580	6405789	652468	6405606
PAD 12	652273	6405743	652161	6405560
	652485	6405912	652373	6405729
	652807	6405543	652695	6405360
	652585	6405373	652473	6405190
TV-AS2 with PAD	650678	6410192	650566	6410009
	650604	6410248	650492	6410065
	650768	6410454	650656	6410271
	650843	6410396	650731	6410213
TV-AS3 with PAD	651743	6407942	651631	6407759
	651527	6408114	651415	6407931
	651587	6408191	651475	6408008
	651800	6408019	651688	6407836

Site	GDA (Zone 55H)		AGD	
#36-1-0357 (TS-OS-01 with PAD)	652030	6407757	651918	6407574
	652173	6407763	652061	6407580
	652163	6407898	652051	6407715
	652020	6407889	651908	6407706
#36-1-0361 (TS-GG-02 with PAD)	Included in TS-OS-01 PAD			
Macquarie Water Pipeline				
#36-1-0356 (TS-OS-03 with PAD)	652003	6411861	651891	6411678
	652106	6411847	651994	6411664
	652025	6412007	651913	6411824
	652125	6411992	652013	6411809
#36-1-0364 (TS-OS-05 with PAD)	652916	6413573	652804	6413390
	652947	6413521	652835	6413338
	653168	6413648	653056	6413465
	653138	6413699	653026	6413516
Obley Road Alignment				
OR-AS1 with PAD	647834	6415349	647722	6415166
	647847	6415503	647735	6415320
	647910	6415495	647798	6415312
	647896	6415341	647784	6415158
#36-1-0120 (H2 with PAD)	647721	6415315	647609	6415132
	647881	6415301	647769	6415118
	647890	6415361	647778	6415178
	647730	6415376	647618	6415193

APPENDIX 5: UNANTICIPATED FINDS PROTOCOL

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UNANTICIPATED FINDS PROTOCOL

An Aboriginal artefact is anything which is the result of past Aboriginal activity. This includes stone (artefacts, rock engravings, etc.), plant (culturally scarred trees) and animal (if showing signs of modification; i.e. smoothing, use). Human bone (skeletal) remains may also be uncovered while onsite.

Under the NSW National Parks and Wildlife Act 1974, which protects all sites and objects with cultural heritage significance, these artefacts must be protected. Cultural heritage significance is assessed by the Aboriginal community and is typically based on traditional and contemporary lore, spiritual values, and oral history, and may also take into account scientific and educational value.

Protocol to be followed in the event that previously unrecorded or unanticipated Aboriginal object(s) are encountered:

1. All ground surface disturbance in the area of the finds should cease immediately the finds are uncovered.

a. The discoverer of the find(s) will notify machinery operators in the immediate vicinity of the find(s) so that work can be halted; and

b. The site supervisor will be informed of the find(s).

2. If there is substantial doubt regarding an Aboriginal origin for the finds, then gain a qualified opinion from an archaeologist as soon as possible. This can circumvent proceeding further along the protocol for items which turn out not to be archaeological. If a quick opinion cannot be gained, or the identification is positive, then proceed to the next step.

3. Immediately notify the following authorities or personnel of the discovery:

a. OEH (Dubbo Office); and

b. Registered Aboriginal stakeholders.

4. Facilitate, in co-operation with the appropriate authorities and registered Aboriginal stakeholders:

a. The recording and assessment of the finds;

b. Fulfilling any legal constraints arising from the find(s). This will include complying with OEH directions; and

c. The development and conduct of appropriate management strategies. Strategies will depend on consultation with the registered Aboriginal stakeholders and the assessment of the significance of the find(s).

5. Where the find(s) are determined to be Aboriginal Objects, any re-commencement of construction related ground surface disturbance may only resume in the area of the find(s) following compliance with any consequential legal requirements and gaining written approval from OEH (as required).

What to do if you come across any unanticipated suspected human remains during construction work?

1. Cease all ground surface disturbance in the area of the find(s) immediately by notifying machinery operators in the immediate vicinity of the find(s). Also avoid touching the discovered remains.

2. Inform the site supervisor as soon as possible and he/she will organise for a qualified professional opinion: usually the police in the first instance.

3. Create a buffer zone of 50m x 50m around the find spot. No authorised entry or earth disturbance will be allowed until the discovery has been assessed.

APPENDIX 6: UPDATED FIGURES

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Figure 54: Extended Mining Lease Application Area 23.08.13.

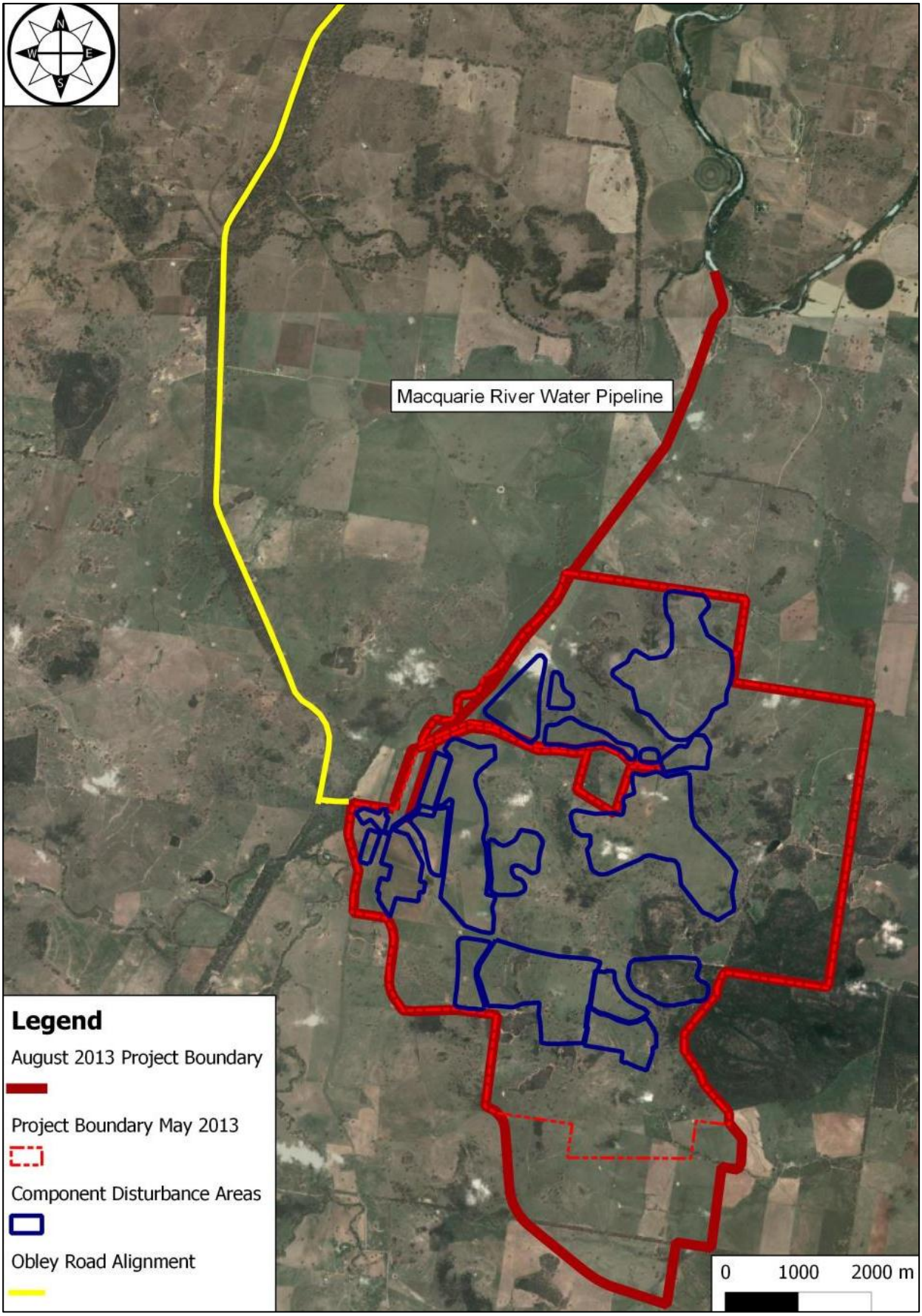
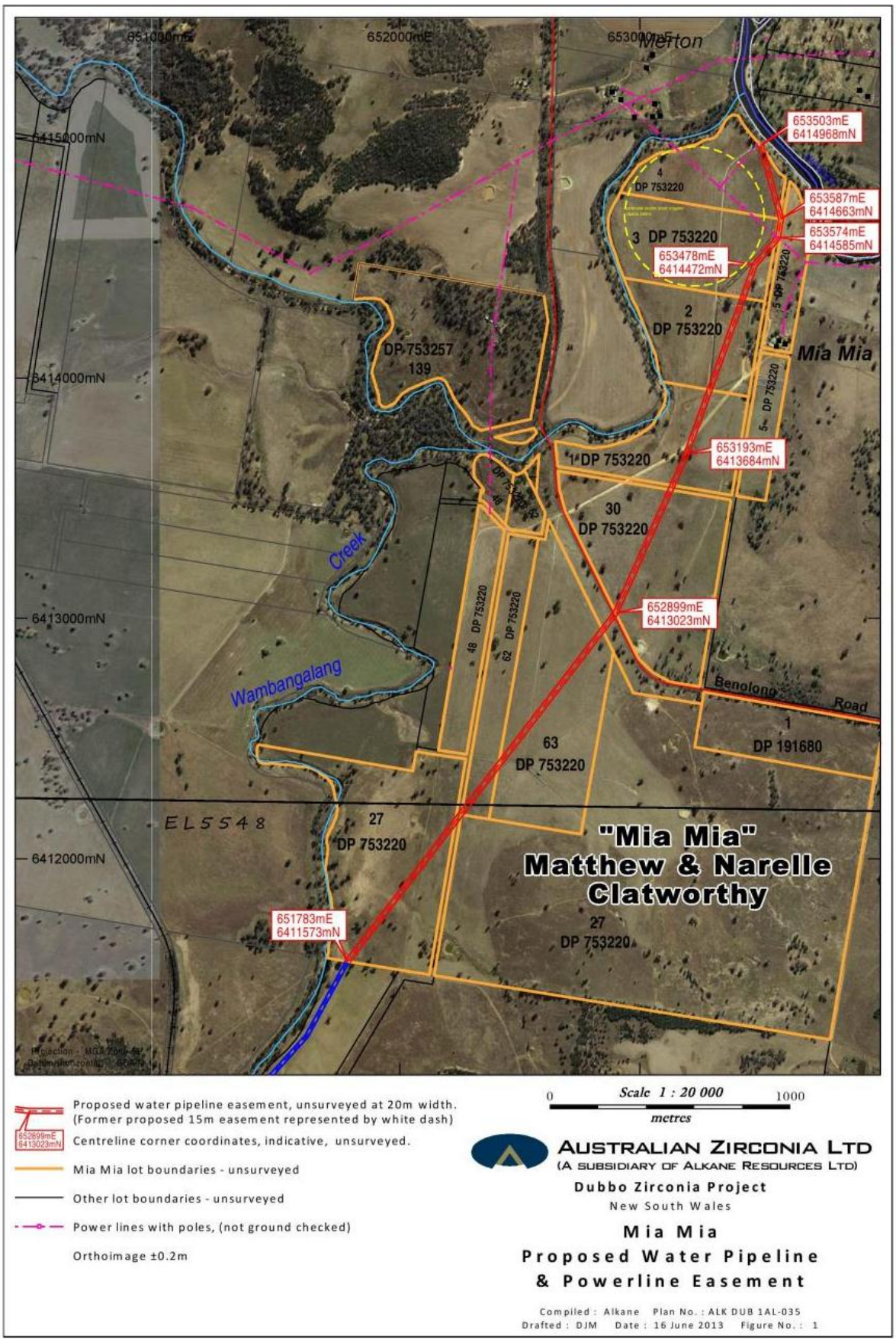


Figure 55: Altered Route of the Macquarie River Water Pipeline



APPENDIX 7: DZP TEST EXCAVATION

Note: This Appendix can be viewed on the Project CD

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VIEW SOUTH THROUGH TS-OS-03 WITH PAD.

ARCHAEOLOGICAL TEST EXCAVATION

TS-OS-03 with PAD
TS-OS-05 with PAD

Dubbo Zirconia Project

August 2013

Prepared by
OzArk Environmental and Heritage Management Pty Ltd
for R.W.Corkery Pty Limited
on behalf of Australian Zirconia Ltd.

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EXECUTIVE SUMMARY

The Dubbo Zirconia Project (DZP, the Proposal) comprises four distinct impact areas associated with the mining operations: the DZP Site; Toongi-Dubbo Rail Line and Gas Pipeline Corridor; Macquarie River Water Pipeline (**Figure 1–2**); and Obley Road realignment.

The alignment of the proposed water pipeline overlaps with Potential Archaeological Deposits (PADs) associated with two identified sites: TS-OS-03 with PAD and TS-OS-05 with PAD[1] (**Figures 1–3** and **1–4**). OzArk Environmental & Heritage Management Service (OzArk) has been commissioned to undertake test excavations at both locations to better inform management recommendations for the proposed works.

The test excavation revealed disturbed soil profiles and very few artefacts. Five artefacts were recorded were at TS-OS-03 with PAD and were within disturbed soils. No subsurface artefacts were recorded at TS-OS-05 with PAD. It was concluded that sites TS-OS-03 with PAD and TS-OS-05 with PAD are surface sites and there is very low likelihood of intact subsurface deposits associated with either site.

Following the results of the test excavation the recommendations for TS-OS-03 with PAD and TS-OS-05 with PAD are as follows.

1. No further subsurface archaeological investigation is required at sites TS-OS-03 with PAD and TS-OS-05 with PAD. The test excavation programme has established that there are no associated archaeological deposits in the areas defined by the proposed impact footprint at either site.
2. The surface artefacts within the impact footprint at sites TS-OS-03 with PAD and TS-OS-05 with PAD are to be collected prior to the construction of the proposed Macquarie River Water Pipeline. This would be done as part of a wider program of surface artefact collection in the Dubbo Zirconia Project.
3. Impacts are to be confined to the 10m-wide easement of the proposed pipeline. Temporary fencing should be instated along the proposed pipeline corridor for the duration of the proposed works to avoid inadvertent impact to areas of the site beyond the impact footprint.
4. Within the bounds of each site, the soil excavated for the pipeline should be, where feasible, reinstated on site to ensure that any artefacts remain in their general location.

1 NSW Office of the Environment and Heritage [OEH] Aboriginal Heritage Information Management System [AHIMS] #36-1-0089 and #36-1-0089

CONTENTS

FIGURES

PLATES

APPENDICES

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1 INTRODUCTION

1.1 BRIEF DESCRIPTION OF THE PROPOSAL

The Dubbo Zirconia Project (DZP, the 'Proposal') comprises the development, mining and processing of ore containing rare metals, zirconium and niobium, and rare earth elements (REEs) near Toongi, approximately 25km south of the town of Dubbo (**Figure 1–1**). There are four distinct impact areas associated with the mining operations: the DZP Site; Toongi-Dubbo Rail Line and Natural Gas Pipeline Corridor; Macquarie River Water Pipeline (**Figure 1–2**); and Obley Road realignment.

OzArk Environmental & Heritage Management Service (OzArk) was engaged to assess the impact areas. This included a background study of the area as well as archaeological survey (OzArk 2013). The assessment identified 52 sites, both previously and newly recorded, within the area of the Proposal. Six sites were located along the Macquarie River Water Pipeline route, two of which are directly within the impacts. These were previously-recorded sites 36-1-0356 (TS-OS-03 with PAD) and 36-1-0364 (TS-OS-05 with PAD)[2].

The alignment of the proposed water pipeline overlaps with Potential Archaeological Deposits (PADs) associated with sites TS-OS-03 with PAD and TS-OS-05 with PAD (**Figures 1–3** and **1–4**). OzArk has been commissioned to undertake test excavations at both locations to better inform management recommendations for the proposed works. Excavations undertaken as per the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (*The Code*; DECCW 2010b) do not require an Aboriginal Heritage Impact permit (AHIP) under the *National Parks and Wildlife Act 1974* (NPW Act).

[2] These sites are primarily referred to by their NSW Office of the Environment and Heritage [OEH] Aboriginal Heritage Information Management System [AHIMS] ID numbers #36-1-0356 and #36-1-0364 in the Assessment report, but are here referred to by their site names.

Figure 1-1: Locality of the Dubbo Zirconia Project.

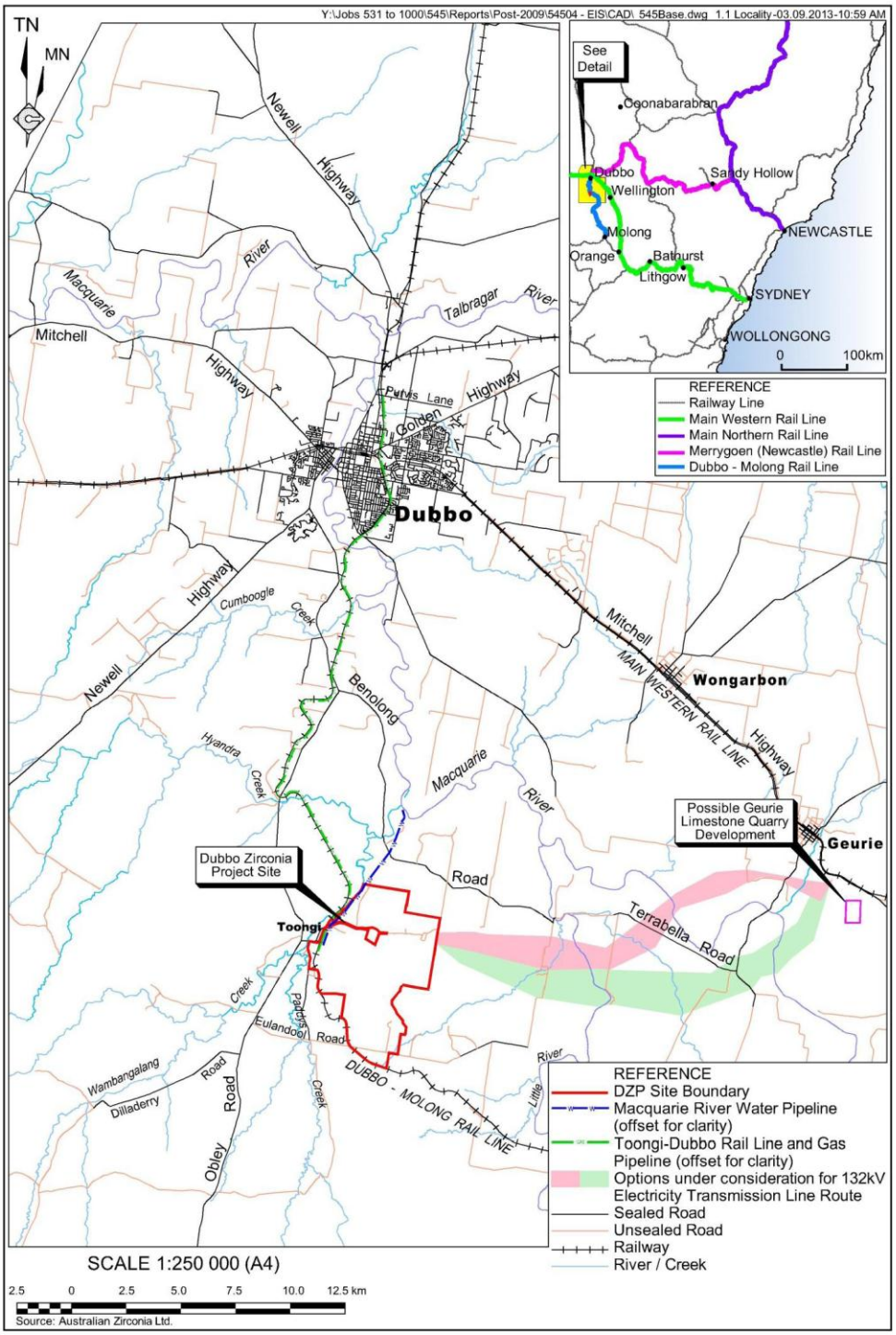


Figure 1-2: Location of the proposed Macquarie River Water Pipeline (purple) in relation to Dubbo.

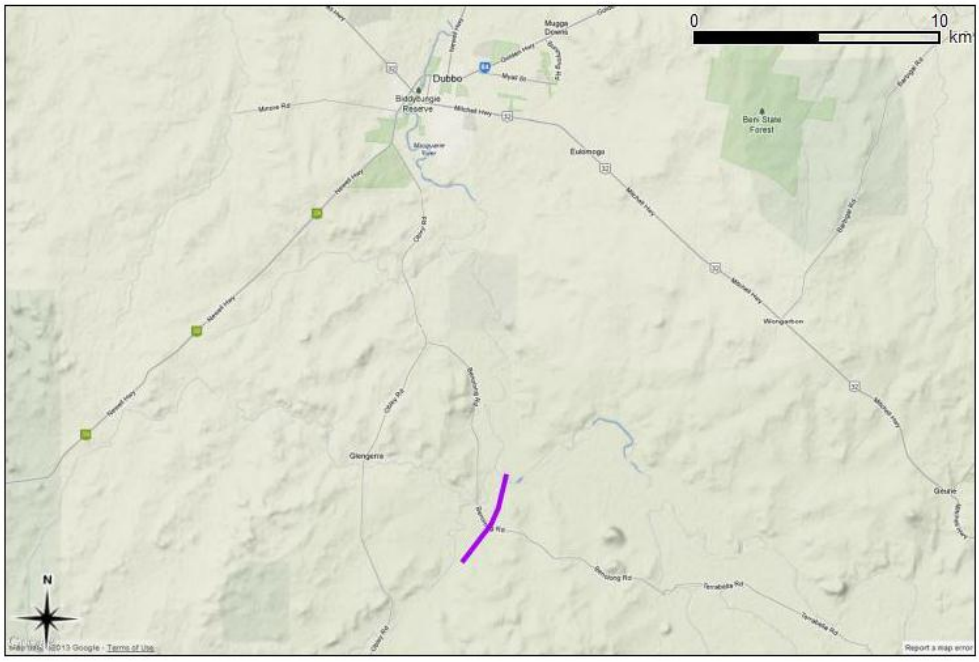
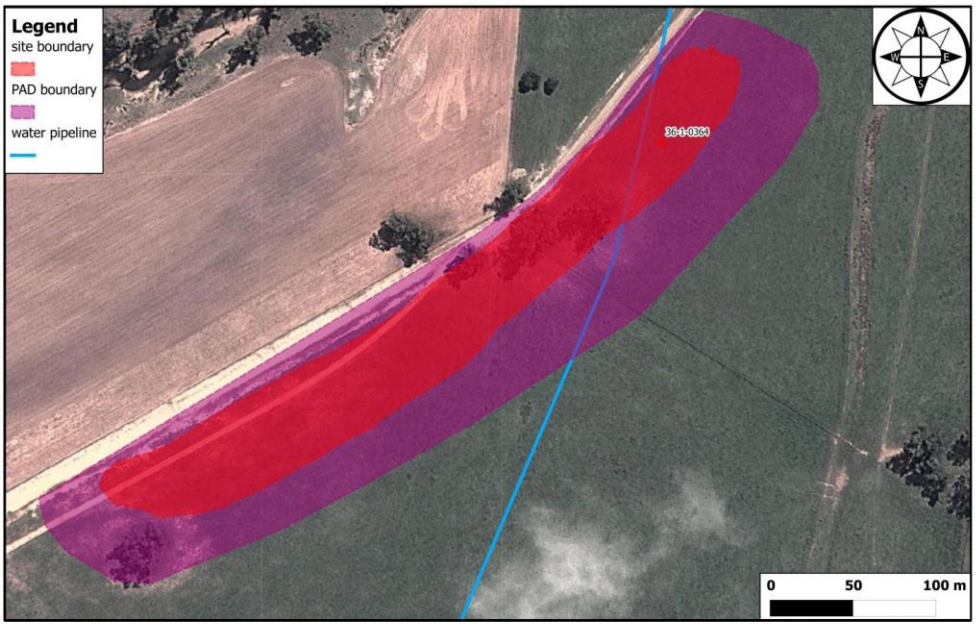


Figure 1-3: TS-OS-03 with PAD (#36-1-0356); plan view map.

Figure 1-4: TS-OS-05 with PAD (#36-1-0364); plan view map.



1.2 PROPOSED WORKS

The easement for the Macquarie River Water Pipeline would be 20m wide; although the actual impacts from the pipeline trench would be no greater than 2m to 5m in width. However, the entire 20m easement could be subject to impacts from heavy vehicle movement during construction of the pipeline.

The pipeline intersects TS-OS-03 with PAD between GDA Zone 55H 652053E 6411924N and 652093E 6411976N for a length of approximately 66m. This gives an approximate impact area of 660m^2.

The pipeline intersects with the boundary of TS-OS-05 with PAD between GDA Zone 55H 6413633E 653170N and 6413789E 653218N, with a turning point at GDA Zone 55H 653193E 6413685N for an overall overlap of 163m or approximately 1,630m^2.

1.3 EXCAVATION AREA

The excavation area consists of two discreet areas on the 'Mia Mia' property situated within the Macquarie River floodplain, Dubbo NSW (**Plate 1** and **2**).

TS-OS-03 with PAD is located over 100m to the east of Wambangalang Creek (**Plate 7**). The eastern portion of the site is located on a gentle slope, but levels out toward the west of the site.

TS-OS-05 with PAD is situated on a low terrace overlooking a floodplain that is adjacent to Wambangalang Creek.

1.4 PRIOR DISTURBANCE

There has been extensive disturbance from agricultural activities in the PADs subject to the proposed test-excavation. The type and extent of impacts are summarised below:

- Ploughing has evidently been employed in large sections of the PADs (**Plate 3** and **4**). This often substantially impacts upon the integrity of the vertical distribution of artefacts, but typically only blurs horizontal distribution.
- Other agricultural activities such as land clearing, fencing and grazing have impacted the PADs to a lesser extent.
- Dirt tracks run through both PADs and intersect with the proposed pipeline alignment. Substantial impacts to the surface and at least the upper 10cm of soil can be expected in these areas.
- Heavy rain, flooding, and wind erosion would all have impacted the PADs over time. These effects would have been exacerbated by the soil destabilisation caused by the farming practices outlined above.

2 THE ARCHAEOLOGICAL INVESTIGATION

2.1 PURPOSE AND OBJECTIVES OF THE ARCHAEOLOGICAL INVESTIGATION

The purpose of the current study is to carry out archaeological test excavations within the PADs associated with TS-OS-03 with PAD and TS-OS-05 with PAD that would be impacted by the Macquarie River Water Pipeline associated with the DZP.

The test excavation will better establish the nature and extent of archaeological deposits at TS-OS-03 with PAD and TS-OS-05 with PAD, including the possible presence of intact archaeological deposits below the plough zone. This will add to the body of evidence about Aboriginal occupation in the region and inform future management options for the sites.

Archaeological investigation at TS-OS-03 with PAD and TS-OS-05 with PAD follows community consultation with registered stakeholders and takes place under the auspices of *The Code*. The aims are therefore to:

- **Objective One:** Determine the nature and extent of sub-surface archaeological deposits at TS-OS-03 with PAD and TS-OS-05 with PAD;
- **Objective Two:** Use the data gained from the test excavation programme to better evaluate the archaeological significance and potential of the area;
- **Objective Three:** Relate the findings of the excavations at TS-OS-03 with PAD and TS-OS-05 with PAD to the wider picture of archaeological research in the region; and
- **Objective Four:** Use the findings of the archaeological excavations to better inform the future management of the sites in relation to the proposed impacts.

2.2 DATE OF ARCHAEOLOGICAL EXCAVATION

The test excavation programme ran for two days on 25 and 26 June 2013.

2.2.1 Aboriginal Community Involvement

The test excavation was a collaborative effort between OzArk and representatives of the Registered Aboriginal Parties (RAPs) established for the DZP, including Dubbo Local Aboriginal Land Council (Dubbo LALC) and the Wirrimbah Direct Descendants (WDD). The Aboriginal representatives participated in all aspects of the excavation including the formulation of the excavation methodology, involvement in fieldwork and on-site discussion.

The representatives' physical input to the excavation is acknowledged and their willingness to express their local and traditional knowledge and advice is appreciated.

Consultation was undertaken by OzArk according to the *Aboriginal Community Heritage Consultation Requirements* (ACHCRs) process.

Mal Burns from WDD and Terry Toomey representing Dubbo LALC participated in the field excavation on both days of the program. Binjang Wellington Wiradjuri Heritage Survey (BWWHS) were offered a position on the excavation but no representative was able to attend. A log of community consultation pertaining to the test excavation is presented in **Appendix 1**.

2.3 OZARK EHM INVOLVEMENT

2.3.1 Field excavation team

The fieldwork component of the current project was undertaken by:

- Fieldwork director: Nick Harrop (BA[Hons], University of Sydney); senior archaeologist;
- Archaeologist: Morgan Wilcox (BArch [Hons], La Trobe University, Melbourne); and
- Operations Manager: Jenn McGee.

2.3.2 Reporting

The reporting component of the current project was undertaken by:

- Report authors: Heidi Kolkert (BA, BSc Hons University of Tasmania), Nick Harrop and Morgan Wilcox;
- Reviewer: Ben Churcher, BA (Hons),University of Queensland; Dip. Ed., University of Sydney: OzArk senior archaeologist.

2.4 PROJECT CONSTRAINTS

There were no constraints to successfully conducting the fieldwork and fulfilling the objectives outlined in **Section 2.1**.

3 ARCHAEOLOGICAL EXCAVATION: BACKGROUND

According to Tindale's map of tribal boundaries (1974), the Dubbo area falls within the northern limits of Wiradjuri country, as defined by the limits of the Wiradjuri language group. It is important to note that the designation of lines on a map as 'tribal boundaries' has been a controversial issue (Bowdler 1983: 22). More information on the ethnographic context can be found in the DZP Assessment (OzArk 2013).

3.1 LITHIC ANALYSIS

Over the past 150 years archaeologists have endeavoured to research what can be learnt from the observed differences in lithic assemblages. The main points of the research can be summarised as follows:

Since the 1960s, archaeologists have discussed variation in the composition of artefact assemblages in terms of four key variables:

- the mechanical properties of the raw materials being worked;
- the techniques used to work those raw materials;
- the uses to which the tools in an assemblage were put; and
- cultural idiosyncrasies (or style).

The observation that contemporary hunting and gathering groups use different items of material culture for different purposes in different contexts led to the suggestion that the same structuring principles would have influenced the behaviour of prehistoric groups and, therefore, the composition of artefact assemblages. This idea was put forward most forcefully by Binford in the 1960s, to explain variation in Middle Palaeolithic artefact assemblages.

The properties of raw materials will influence the products of a particular stone-working technique and experimental knapping studies can provide important information about the flaking properties and edge qualities of different raw materials. When applied to the interpretation of archaeological assemblages, this information—especially when used in conjunction with information about raw material distribution, tool use and edge resharpening—may help to explain differences in artefact morphology.

While different portions of the archaeological record can be characterized by different manufacturing techniques, it is also the case that each of these different techniques can be characterized by a different strategy of core reduction. The impact of different core reduction techniques on assemblage composition can be investigated through a combination of experimental knapping (seeking to identify debris diagnostic of a particular core reduction technique or stage of reduction), the analysis of flaking debris and refitting studies.

Thus there is considerable debate about the sort of information that can be gained from the study of lithic assemblages. In the Australian context (and undoubtedly for stone-age societies around the world), it needs to be remembered that the stone tool was often a 'means to an end'; namely that the tool itself was not as culturally important as the object it manufactured. Thus it was other artefact classes (which are largely missing from the archaeological record due to their organic nature) such as bark containers, wooden shields, boomerangs, spear throwers, body paint, clothing, temporary (sand) art etc., that were the artefacts that conveyed meaning and context for their users.

Stone artefacts are probably the most resilient physical evidence of Aboriginal occupation in Australia and for many parts of the country form the most abundant archaeological evidence of Aboriginal occupation. Stone artefacts are important because they are tangible evidence of Aboriginal use of an area and can potentially contain information about lithic activities, the organisation of stone technologies, and potentially information about larger-scale issues of settlement organisation across regions and even social change over time.

The kinds of information which can be obtained from stone artefacts may vary considerably, depending in part on:

- The numbers of artefacts which can be examined and recorded: generally, the larger the number of artefacts the more reliable will be statistical statements about them;
- The presence of other assemblages with which the artefacts can be compared;
- The condition of sites in which they occur: generally undisturbed sites have more information potential than disturbed sites, depending on the scale at which research is carried out; and
- The theory which underlies the artefact recording and analysis.

Statistically useful sample sizes

A large enough number of artefacts need to be recorded so that analyses can be based on statistically sound data (Leonard and Jones 1989). The numbers of artefacts which are needed in a sample will depend on how common or rare certain kinds of artefacts are. If a summary of most common raw material types is required then a random sample of 20 or 30 artefacts might suffice. On the other hand if no backed artefacts were found, and this type normally makes up 1% of an assemblage, then several hundred artefacts would need to be recorded to indicate whether or not backed artefacts are present on a site or in a certain landscape setting. Some site recorders may not detail artefacts on small sites, or think that small sites are unimportant because they have few artefacts. However, depending on the kind of question that is asked, it may be possible to group several small sites to give a large enough sample of artefacts to be statistically useful. For example, if many small sites with 10 artefacts each were found on ridge tops then it might be possible to group all the sites together to study Aboriginal use of ridge tops

within a larger landscape. Ideally, sample sizes should be large enough to be able to carry out statistical tests of significance (Clegg 1990).

Comparable assemblages

One way to understand an assemblage is to have another to compare it to. It then becomes possible to investigate similarities and differences, and to discuss reasons for them. If artefact assemblages come from different landscape settings then it may be possible to discuss Aboriginal use of a landscape. For example, one site might be close to a stone quarry and another site might be far away. One site might be close to a big river and another associated with a minor creek in the hinterland. On a stratified site it may be possible to compare an older assemblage from lower deposits with a younger assemblage from upper deposits. If there are no other assemblages for comparison it may still be possible to make behavioural interpretations of the artefacts but it may be difficult to assess the results.

Condition

As a general rule artefacts from undisturbed sites may be able to provide more information than artefacts from disturbed sites. On sites in good physical condition it may be possible to identify artefacts relating to individual lithic activities, such as knapping floors (Hiscock & Mitchell 1993). It may be possible to refit or conjoin artefacts, and analyse the evidence from those activities (White 1999). For example, a person may have obtained some stone, taken it to a camp site, flaked it in a particular way, made some tools, left a lot of debris behind, and perhaps took some of the stone with them when they went to another camp. Other people might have obtained different kinds of stone from other quarries and flaked it in other ways, or just picked up a bit of stone that someone had left behind when they camped there once before.

On very heavily disturbed sites the artefacts themselves may be very broken, making it harder to analyse them. However, some disturbed sites may still be able to provide good information, if comparisons are made between sites. If 100 artefacts from one site are compared with 100 artefacts from another site, it might not particularly matter if the two sites have been disturbed or not.

Theory and recording

Stone artefacts can be recorded and analysed in different ways to give different kinds of information about different topics. The variables that are recorded and the interpretations which are made will depend in part on the theory which underlies the analysis. If someone wants to know what stone tools were used for, then artefacts should be examined under a microscope for use-wear and residues. If someone wants to know how stone was flaked and tools were made then a technological analysis may record data on stone flaking such as patterns of scarring on cores or flakes. If someone wants to know about how stone materials were obtained

(procured), transported and discarded then recording might focus on stone raw materials – information about raw material types and where they occur naturally in the landscape will be critical, and raw material type and size of artefacts may be recorded.

Someone might be interested in the distributions of certain artefact types, so recording might focus on retouched or backed artefacts, rather than debitage. In the future, Aboriginal people might want information about topics or issues that have not yet even been thought about.

Consulting projects may seek to provide a basic description of an assemblage, recording just a few variables to give information about general topics. The present analysis records provenance information (where each artefact was found) and five other variables, with some additional information for modified artefacts and cores. This level of recording should not be regarded as a definitive record of the assemblage. If artefacts are kept in a safe place they can be reanalysed in the future to provide new information and address new questions.

With microscopic use-wear and residue analysis it may be possible to identify the kinds of things that stone tools were used for. It is now known that many backed artefacts have plant residues on them, indicating that they were not always used—if at all—as spear points or barbs (e.g. Barton 1992a, 1992b, 1994; Fullagar 1992, Fullagar *et al.* 1994; although see Fullagar *et al*. 2010 that details conclusive proof that microliths were used as spear points).

If different sites in different kinds of landscape settings were studied it may be possible to say something of peoples' activities in different parts of a region. Some sites may have been occupied as general camps; other sites may have been used for dinner-time camps, or lookout sites for watching kangaroos. People may have used stone in different ways at different kinds of sites, e.g. intensive stone flaking to make stone tools may have been carried out at camp sites, with lots of artefacts left behind. But prepared stone or made tools might have been taken to dinner-time sites and few artefacts left behind. Different numbers of artefacts, and different kinds of artefacts, may have been left at different kinds of sites (e.g. Bamforth 1986, 1991; Binford 1979, 1980; Kelly 1992; Kuhn 1989, 1994; McNiven 1991). Some sites contain stratified deposits, deeper soils having older artefacts, and upper soils having younger (more recent) artefacts. Such stratified assemblages are found most often at stone shelter sites, but sometimes open sites might also have stratified assemblages. From excavations at shelter sites in and around the Blue Mountains, we know that there have been changes over time in the appearance of stone artefact assemblages. Most notable are changes in raw material use (use of different rock types), changes in artefact size, changes in the kinds of stone tools that were made (particularly backed artefacts, but also edge-ground axes), and changes in the way stone was flaked (especially asymmetric alternating and bipolar flaking). There have also been changes in the numbers of sites that were occupied at different times and in the numbers of artefacts that were left behind (e.g. Attenbrow 1987; Johnson 1979; McDonald 1994; White 1999).

Such changes in stone artefact assemblages have probably resulted from changes in how people lived. How many people there were, what group affiliations there were (who they knew, who they visited), the size of territories, how they organised their occupation of their territories, perhaps too, there may have been changes in which sites were significant. For example, if territories were very large then people could have occupied high colder mountain areas in summer, and in winter they could have moved down into lower country, or occupied more sheltered valleys. When population increased people may have had smaller territories, so they may have had to stay within smaller territories year round.

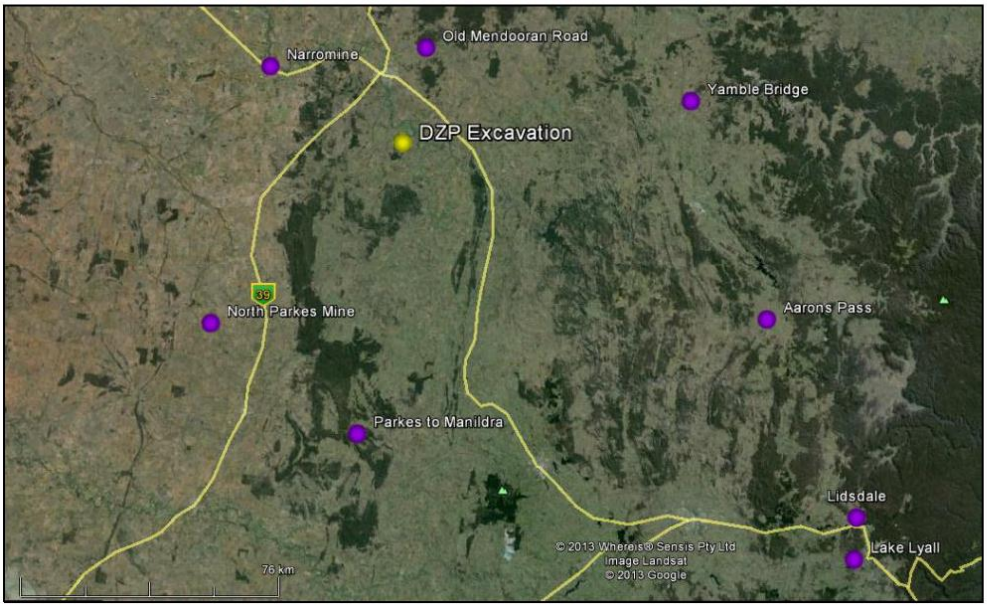
3.2 REGIONAL ARCHAEOLOGICAL EXCAVATION CONTEXT

3.2.1 Introduction

Across the region there are relatively few excavated sites, and combined with information derived from surveys, the available data points to a variable use of the region, with some sites indicating ephemeral, casual or limited use, and other sites showing more intensive or repeated use.

Regarding archaeological excavations in the region, only two excavation programmes (undertaken in Narromine and Old Mendooran Road in Dubbo by OzArk in 2011) are located in the general vicinity of the TS-OS-03 with PAD and TS-OS-05 with PAD (**Figure 3–1**).

Figure 3-1: Aerial photograph showing proximity of the current Study Area with other excavation programs.



From the broader region, substantial excavations have been completed between Parkes and Manildra (OzArk 2011b), Aarons Pass (OzArk 2010), Northparkes Mine (OzArk 2009), Lidsdale (OzArk 2004b), and Yamble Bridge (OzArk 2004a). The results of these excavation programmes are summarised in the following sub-sections.

3.2.2 Old Mendooran Road

The Old Mendooran Road excavation program was undertaken in Dubbo by OzArk (OzArk 2011a) in March 2011.

The excavation of site OMR-OS1 with PAD revealed a reasonably intact site, consisting of distinct clusters of artefacts and *in situ* features such as a fire-pit.

The artefact analysis showed a few major characteristics: the dominance of quartz; the high incidence of debitage; the higher than usual rate for recording cores and the low incidence of backed blades and other tool forms. This would indicate that OMR-OS1 with PAD was being primarily utilised for quartz knapping and low frequency camping.

The artefact analysis at OMR-OS1 with PAD also indicates that the site probably dates to the Late-Bondaian period of the past 1600 years due to the high incidence of quartz tools and the low incidence of backed tools.

The surface assemblage at OMR-OS1 with PAD consists of 500 artefacts that were collected from three distinct zones within the Project impact footprint at the site. These artefacts reflected the range of raw material and tool types as was seen in the excavation assemblage but, nevertheless, recorded a range of tools, particularly scrapers: from fine thumbnail scrapers through to steeply retouched end-scrapers on fist-sizes nodules. One particular end-scraper appears to have been constructed from the remains of a spent ochre crayon. Grinding dish fragments were also recorded adding to our knowledge concerning the subsistence economy of the site.

OMR-OS1 with PAD shares site characteristics with other sites west of the Blue Mountains particularly in terms of quartz being the dominant raw material utilised and the low incidence of backed artefacts. In contrast, OMR-OS1 with PAD displays a higher than usual rate for the recording of cores when compared to sites across the region.

Comparing the excavation assemblage to other sites excavated across the region indicates that OMR-OS1 with PAD was an infrequently visited camp site lying within a landscape that had a reasonably high population density of Aboriginal people. This assessment is based on the fact that the range of tool types at OMR-OS1 with PAD is low when compared with sites that were more obviously larger 'base' camps (such as the Lidsdale site). Further, the site preserves a distinct distribution of artefacts with foci of artefact concentrations adjacent to areas where few

or no artefacts were recorded. This indicates that the site was not occupied frequently enough for there to be a more even distribution of artefacts across the site.

3.2.3 Narromine NTWP-OS1 with PAD

The Tomingley Gold Project excavation program was undertaken in Narromine by OzArk (OzArk 2011) in February 2011.

The artefacts recovered from the test excavation occurred at low density compared to the surface expression of the site near the palaeo-channel at the western extent of the site. Artefact density within the test units ranged from 7.2 artefacts/m^3 in excavation square A to 27.2 artefacts/m^3 in excavation square B. Preliminary surface examination of the site extending outside the impact area indicates that the site has a much greater density extending west toward the nearby palaeo-channel and away from the impact footprint.

Excavation showed little subsurface deposit depth throughout the area of the site tested as 82.6% of the artefacts were recovered from spit 1 (0–20cm) with 14% from spit 2 (20–40cm) and only excavation square C produced any artefacts beyond spit 2 with 3.4% (4 total artefacts) recovered from spit 3 (40–60cm). A fourth spit (60–80cm) was excavated in excavation squares A, B and C, however, no cultural material was recovered from this depth. Stratigraphy within all the excavation squares was unclear and due to the high levels of disturbance activity it is highly possible that the stratigraphic context of all artefacts recovered have been impacted by disturbances resulting from use and construction activities associated with the adjacent gravel road and buried telecommunications cable.

Of the 121 lithic artefacts recovered during the excavation, 88 have features which distinguish them as of Aboriginal origin. The remaining 33 had questionable diagnostic features and were included due to their occurrence in context with multiple artefacts that presented easily distinguishable cultural features. The lithic material type of questionable artefacts was also taken into consideration when determining their inclusion and was based off the frequency of the material both in the assemblage and within the natural landscape.

Quartz material made up the majority of the assemblage with chert being the next most common material. Of the artefacts with questionable diagnostic features that were included; the vast majority of these were quartz. This fact can be attributed to the poor flaking quality of quartz. As such, questionable quartz artefacts were included when they were recorded from a context containing other quartz artefacts with clearly distinguishable diagnostic features. This was done to ensure that the material was accurately represented and so that analysis accounted for its poor flaking properties. In total, these “unclear” artefacts account for 27% of the total assemblage.

The test excavation programme established that site NTWP-OS1 with PAD has, at its eastern margins, a low artefact density, shallow deposits and a high likelihood of prior disturbance.

3.2.4 Yamble Bridge

Excavations at Yamble Bridge (near Gulgong on the Cudgegong River; OzArk 2004) were undertaken over the proposed corridor for the re-alignment of the MR 233, 22.5km west of Gulgong, NSW. Sub-surface testing focussed on the proposed impact area within two defined locations: Potential Archaeological Deposit (YBCR-PAD 1, site # 36-2-105) on the west side of the Cudgegong River and open site YBCR-OS2 with PAD (site # 36-2-106) on the east side of the River, both of which were identified during archaeological survey of this proposed realignment corridor. Findings from this excavation can be summarised:

- The lithic assemblage consists of a total of 2,542 artefacts, with 710 other items which may or may not be artefacts, and 89 items which do not appear to be artefacts.
- The main focus of occupation appears to have been on the alluvial terrace with the sand mantle. The test squares indicate that this landform has an average density of 127 artefacts/m^2, with square B2 having a maximum density of 258 artefacts in a 1x1m square. Artefact density away from the terrace with the sand mantle appears to be much lower, with an average of about 12 artefacts/m^2.
- Artefact bearing sediments on the alluvial terrace with the sand mantle appear to be 80cm deep with a few artefacts recovered below this depth. The vertical distributions of artefacts in various test squares differ. In squares A1, A2, A3, C4, D1 and less so D4 peak densities occur deep in the deposit, below 40cm depth. In squares B2 and C3 peak densities occur higher in the deposit, above 40cm depth. In squares A4, B1, B3, D2 and D3 peak densities occur in spits 2 and/or 3 (the middle of the deposit) with lower densities above and below these spits. It is possible that such variation in artefact density with depth may be due to different activities resulting in different artefact density, having been carried out at different locations, at different times.
- The assemblage is dominated by quartz, with 79% of all excavated artefacts of this material. Siliceous tuff / FGS is the next most frequent material, with 19% of all artefacts of this material. There is some variation across the site in the relative frequencies of these two materials with siliceous tuff / FGS making up 38% of artefacts in square A3 but only 3.5% in square D3.
- Modified artefacts include a grindstone fragment and a bifacially flaked hatchet head, both recovered during the surface collection.
- The assemblage excavated from the terrace with the sand mantle is dominated by debitage, and quite consistently so in each spit, varying from 95.8% to 97.5%. The

relative frequencies of cores are also quite consistent, varying from 0.8% to 1.1%. However, backed artefacts are most frequent in spit 1 making up 1.2% of the assemblage, and become less frequent with depth; in spits 2 and 3 backed artefacts are rare making up 0.1% and 0.3%. No backed artefacts were found in spit 4, despite good overall sample size (>500 artefacts). By comparison with dated shelter assemblages it appears that the deepest assemblage may be Pre-Bondaian, spits 2 and 3 may be Early Bondaian and spit 1 may be part of the main phase of backed artefact production.

- Of a total of 41 cores only four are flaked cobbles (10%), and three can be identified as flakes (7%). Most cores (83%) are of indeterminate form, extensive flaking having removed evidence of the original artefact types.
- Unifacial flaking of cores appears to have been predominant, occurring on 54% of cores and in combination with bifacial flaking on another 20% of cores. Asymmetric alternating flaking is present on only four cores (10%), and two cores show bipolar flaking (5%).
- Only 22 cores were recovered from the alluvial terrace with the sand mantle; the sample size is small, but it can be noted that the bipolar core and two cores showing asymmetric alternating flaking were found in spits 1 and 2. Most of the cores from spits 3 and 4 show unifacial flaking.

3.2.5 Aarons Pass, AHIMS Site # 45-1-2573 and AHIMS Site # 45-1-2574

Excavations at Aarons Pass (OzArk 2010) concentrated at sites AP1 and AP2 that were to be impacted by the realignment of the Castlereagh Highway at Aarons Pass, south of Mudgee NSW.

Following this archaeological investigation in was assessed that AP1 is not an Aboriginal site.

Excavation at AP2 demonstrated that the artefact assemblage is best characterised as the result of many discrete knapping events over a period of time. Milk quartz artefacts dominate the assemblage, although other raw materials are present with evidence that these were also being knapped at AP2.

The total recorded assemblage of 2619 artefacts at AP2 comprises 1095 flakes, cores and tools and 1524 items of debitage (small flakes, chips and chunks with facets removed).

85% of recorded artefacts at AP2 were quartz along with 9% fine-grained siliceous, 4% volcanics and 2% coarse-grained siliceous. Other materials were present but in negligible quantities.

Of the 1095 flakes, cores and tools, 902 are unmodified flakes (mostly complete as very low levels of breaks were recorded), 129 are cores or core fragments, 53 are backed artefacts and nine have been modified as scrapers. Small numbers of other tool types were also recorded.

Artefacts were most dense within the first 20cm and particularly dense between 10cm and 20cm (salvage excavation spit 2). Notable concentrations of artefacts were recorded at AP2 with the most dense cluster of 371 artefacts being recorded at excavation square 11. Low artefact densities were recorded at other excavation squares and this suggested a variable distribution of artefacts across AP2. Within this artefact distribution, clusters of activity were noted in that some squares recorded only quartz artefacts while other squares had evidence that non-quartz stone was being knapped as, rarely, non-quartz materials were the most numerous artefacts in that square.

AP2, while relatively close to the surface, displayed intactness and surprising little disturbance. There was a recorded lack of artefact breakages and the observed variable nature of artefact distribution indicates that material has not been moved.

No dateable material was retrieved from the excavation that lacked archaeological stratigraphy. However, the relatively high incidence of backed artefacts and the recorded micoliths indicated that AP2 probably dates to the late Holocene and could have been used at any time over the past 3000 years.

3.2.6 NorthParkes Mine

Results from the test excavations at NorthParkes Mine (OzArk 2008) and accompanying geomorphological assessment indicated that the excavation area had been impacted in the past by both agricultural land use and mining infrastructure and was assessed as being disturbed over most of the area investigated by the excavation programme. These disturbances included the construction of roads, overhead electricity lines, underground water mains and ploughing for crops. In addition, the area has been cleared of native vegetation.

This disturbance was noted in the excavated pits, which were shallow (c. 10–20cm before B Horizon clays were reached) and the shallow top-soils were impregnated with intrusive rock (brought in as road surfaces), recent charcoal (from vegetation clearing) and no archaeological stratigraphy was noted in any pits.

Artefact densities across the area were low and although artefacts of Wiradjuri origin were recorded (the lithic assemblage of the excavations consisted of a total of 13 artefacts), it was extremely difficult to determine if any of these were from *in situ* deposits, although it is assessed to be unlikely (OzArk 2008).

3.2.7 Lidsdale

Test excavation of two Potential Archaeological Deposits (PADs) was undertaken by OzArk (OzArk 2004b) in February 2003 in the face of potential impacts from the realignment of the Castlereagh Highway at Lidsdale, NSW.

Located on terraces above Coxs River, these PADs were recorded as PAD1 (AHIMS # 45-1-2573) and PAD2 (AHIMS # 45-1-2574). The results of the test excavation indicated the presence of an extensive open site with low to moderate artefact densities. The test excavation revealed that a variety of activities appear to have been carried out on the site, evidenced by the presence of hammers/anvils for on-site stone tool production or food preparation. The systematic flaking of stone was carried out at several locations across the site, with one discrete knapping event, associated with a stone feature, showing the manufacture of backed artefacts (specifically Bondi points). Pits showing deeper soil profiles, mainly located in the area of PAD2, also revealed preliminary evidence for possible stratification, and higher artefact densities in this part of the site may indicate repeated occupation. Quartz was the predominant raw material, although silicified tuff apparently increases in incidence in the upper portion of the profile. The excavated test pits revealed soil profiles indicative of an intact site with good structural integrity.

On the basis of the text excavation results, PAD2 was assessed as being of high Aboriginal significance and moderate to high archaeological significance. It was considered to have the potential to provide data on a range of archaeological questions, including:

- whether the site showed evidence of use as a transient camping location for a specific activity or, was repeatedly occupied through time;
- possible changes through time in the use of various raw materials and stone tool production, and the technological strategies that underpin these factors; and,
- whether the site exhibited spatially discrete activity areas.

Consequently, it was recommended that AHIMS #45-1-2574 was worthy of salvage excavation prior to any further impacts.

Salvage excavations were completed on the 18th July 2003 under Consent to Destroy Permit #1666.

The Salvage excavation (OzArk 2004) showed that Lidsdale PAD2 (# 45-1-2574) is a large and complex site. The site showed internal spatial variation in lithic assemblages. The deeper soil in Area I was found to have retained some cultural stratigraphy: the lithic assemblages from spits 1, 2 and 3+4 differing and showing change over time. Areas II and III were excavated in locations with more shallow soils, but the lower spits also retain slight variations in the frequencies of different raw material types, suggesting that early occupation of the site may have been widespread, not just confined to the area of deeper soils.

Excavation of this site has been quite extensive with a total of 132m^2 excavated as part of the salvage work, and an additional 22m^2 excavated during the test excavation phase: a total of 154m^2 of excavation. Almost 6,100 artefacts were recovered. Additional monitoring of the site during construction works provided an additional 441 artefacts.

The key features of the Lidsdale assemblages were:

- Raw materials varied across the site. In Area I quartz was strongly predominant (76%), less predominant in Area II (52%) and a minor material in Area III (17%). Silicified tuff was not uncommon in Area I (20%), much more frequent in Area II (43%) and relatively rare in Area III (9%). Silcrete, and a material which appears to vary between quartzite and silcrete, occurred very rarely in Area I (just 1 artefact comprising <0.1%), a little more frequent in Area II (2.6%) and it dominated the assemblage from Area III (68%).
- Quartz occurs as large pebbles & cobbles, one artefact weighed 373g and three others between 150g and 166g. The large size of quartz artefacts contrasts regionally with smaller quartz pebbles found in the sandstones and conglomerates of the Narrabeen formation which forms the surrounding sandstone country.
- Non-local materials, particularly silicified tuff and silcrete, and probably also other fine-grained siliceous (FGS) materials, were also taken to the Lidsdale site. Together, these materials made up 40% of the artefacts recovered, indicating the importance of non-local stone.
- The imported silcrete, and much of the imported silicified tuff was used for systematic flaking and backed artefact production (knapping floors). These materials may have augmented local quartz, which was also sometimes used for these kinds of lithic activities. The FGS materials were used for limited flaking events.
- Backed artefacts were not uncommon on the site, making up 2.4% of the assemblage overall, and c. 2% of the assemblages from spits 1 and 2 in Area I. The backed artefacts varied in shape and size. One from Area II (and another from the monitoring) appears to have been used as a steep-edged tool ("scraper") at one end.
- An array of retouched and/or used flake tools were recovered, one of quartz with a rare dentate worked edge.
- An igneous broken flake had a bifacially ground edge. This is not an overly large artefact (just 3-3.5cm in size and 9.0g in weight), and I have not previously seen before. Bifacial grinding occurs more often on cobbles as edge-ground hatchets and although a ground-edge adze was found at Lyell Dam site LD3 (Barton & McDonald 1995:27), edge-grinding on a flake of this size was noted as rare.

- Several hammers and anvils were also recovered.
- Change over time was evident within Area I. The assemblage from the lower spits 3 and 4 appeared to be of Pre-Bondaian age. It lacked backed artefacts and lacked evidence of asymmetric alternating flaking: no cores showing this flaking pattern and no faceted platforms were recovered from these spits. This Pre-Bondaian assemblage is dominated by quartz, and has higher frequencies of quartzite and igneous artefacts than more recent assemblages. The assemblage also includes two hammers and no bipolar artefacts.
- The assemblage from spits 1 and 2 both included backed artefacts, cores showing asymmetric alternating platforms and debitage with faceted platforms. Both assemblages are dominated by quartz, but silicified tuff is more frequent in spit 1 than in spit 2. A few bipolar artefacts occured in spit 2. A piece of utilised pigment was also found in spit 2.
- Deeper sediments from the site (Area I square 35E 118N) have been dated using OSL dating. The sample 30cm depth was 7,400+700 years before 2000 AD and sample 45cm depth was 13,500+1,000 years before 2000 AD. While these age determinations do not directly date the lithic assemblages they suggest a time frame consistent with other early dates from sites in the region (from c. 6,000–14,000 BP) such as Kariwara sites 22 and 35, Capertee 3 and Noola, Bobadeen 1, Horseshoe Falls and Lyre Bird Dell.

As a result, no other site in the Lidsdale—Wallerawang area has been investigated in a manner comparable to site #45-1-2574.

3.2.8 Parkes - Manildra

Salvage excavations were conducted by OzArk at eight of the sites along the Parkes – Manildra Electricity Transmission Line. Eight sites were excavated acros a variety of landforms including ridge lines, creek banks, terraces, and slopes. The sites exhibited little stratigraphic variation and A-horizon soils were generally shallow, typically no greater than 20cm – 30cm in depth.

In total, 48m^2 was excavated across the eight sites. The excavation area was relatively small at most sites due to the small area of impact footprint overlapping the sites. Also, some sites contained few artefacts below the surface and some many had a uniform distribution. This limited the scope for patterns to be drawn of horizontal and vertical distribution of artefacts. However, some sites yielded numerous sub-surface artefacts and some tentative patterns could be drawn. Some of the salient points emerging from the dig are as follows.

- Spit 1 (0 - 10cm) contained a lower percentage of artefacts than spits 2 and 3, indicating some remnant integrity of the sites.

- Sites that contained higher numbers of artefacts had localised fluctuations in artefact densities that suggested distinct areas of activity.
- Over 85% of artefacts were flakes of some kind with no retouch. Retouched artefacts and cores represented a very low percentage of the artefact assemblage relative to the region.
- Volcanics and quartz were the most common material types used for artefacts, with silcrete, mudstone, and other materials represented.
- Artefacts with cortex were lower in proportion than is typical of the broader region. This suggests that reduction was common in the sites.
- Elongated flakes and quartz artefacts were notably better represented in the sub-surface assemblage than in the surface assemblage, but there was a higher proportion of cores on the surface than in the sub-surface.

4 EXCAVATION METHODOLOGY

4.1 INTRODUCTION TO THE SITES

4.1.1 Overview of TS-OS-03

The site is located at: (GDA94 Zone 55) 652078E / 6411926N (MM-6 Survey Unit; **Figure 1-4**). This is a medium-sized artefact scatter with a relatively high artefact density, of a diversity of flakes and cores. The site is located in an eroded gully and dirt track. A cropped paddock (which the survey crew was asked to remain out of) is located to the east of the site. The Wambangalang Creek is located well over 100m to the west. There is nil ground surface visibility off the exposures.

4.1.2 Overview of TS-OS-05

This site would be crossed by the proposed pipeline near (GDA94 Zone 55) 653217E / 6413743N (MM-2 Survey Unit; **Figure 1**). This is a large lithic scatter site, measuring well over 100m in length. The boundaries of the site were expanded in the current assessment, as more artefacts were identified to the north of the original site extent. Artefacts were identified in two dirt tracks running parallel to each other from Benolong Road up to the "Mia Mia" house complex. South of the gate (the original extent of the site) artefacts are sparse, with the majority of them identified in the eastern road. North of the gate (the newly noted extent) artefact density is greater, with most of the artefacts concentrated on the east side of the road. The northern extent of the surface scatter was not determined as it is not in the impact footprint and therefore not in the scope of the study.

4.2 EXCAVATION STRATEGY

The primary objective of the archaeological excavation programme was to assess the nature, extent and integrity of TS-OS-03 with PAD and TS-OS-05 with PAD by means of a test excavation programme. This information was then to be applied to inform further management such as the possibility of salvage excavation.

The broad objectives of the test excavation were reached through the following general methodological applications.

- The test excavation programme, being excavated in transects, should intersect areas displaying greater concentrations of artefacts;
- The representative sample of artefacts retrieved was to characterise the site in terms of raw material utilisation, use of particular artefacts, the presence or otherwise of stone tool manufacture at the site and methods of subsistence employed at the site; and

- There was provision to expand around areas of higher artefact density and or features. This would enable a better understanding of the site's more significant manifestations.

This information would enable both sites to be aligned with the regional context and determine their representativeness or rarity. It would also provide information regarding site complexity and, within the area assessed, site extent.

The excavation strategy for TS-OS-03 with PAD and TS-OS-05 with PAD involved a two-stage process.

In the first instance, linear transects were set out along the centre-line of the proposed water pipeline alignment within the PADs (**Figures 4–1** and **4–2**). An offset of up to 5m either side of the centre line was allowed for, to account for localised disturbances that influence the suitability of the various possible transects. Following this test pits 50cm by 50cm in area were excavated at intervals along this transect. This stage would be treated as an exploratory, test, phase, the results of which would inform the need for a salvage phase. An offset of up to 3m for each individual pit was allowed should disturbance in the originally designated location of any particular pit outweigh that of adjacent areas. When disturbance was substantial enough so that no suitable location can be found within a 3m radius of the designated position, then that test pit was missed.

Figure 4-1: Alignment of transect through TS-OS-03 with PAD

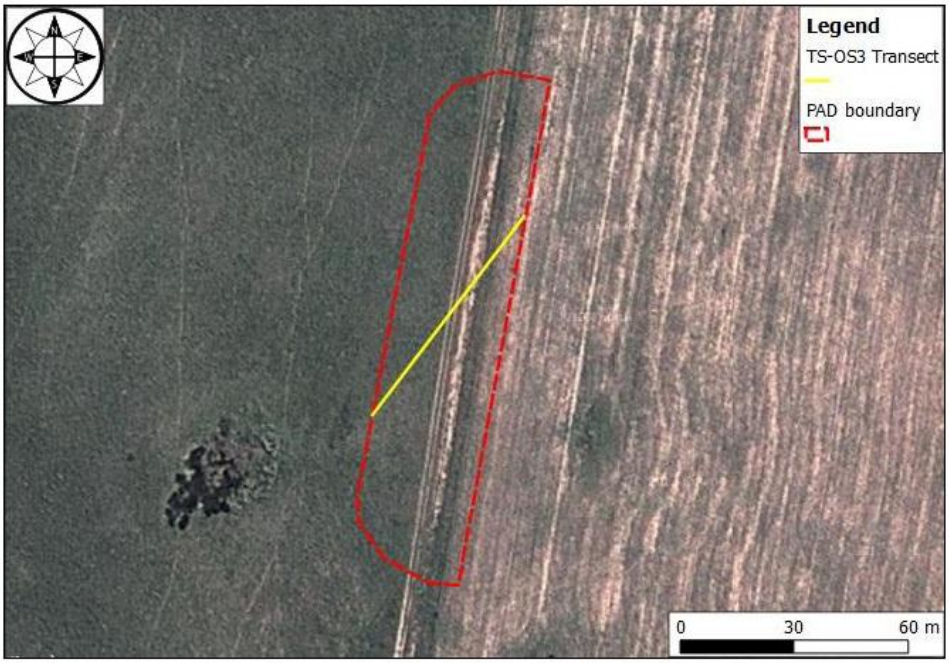
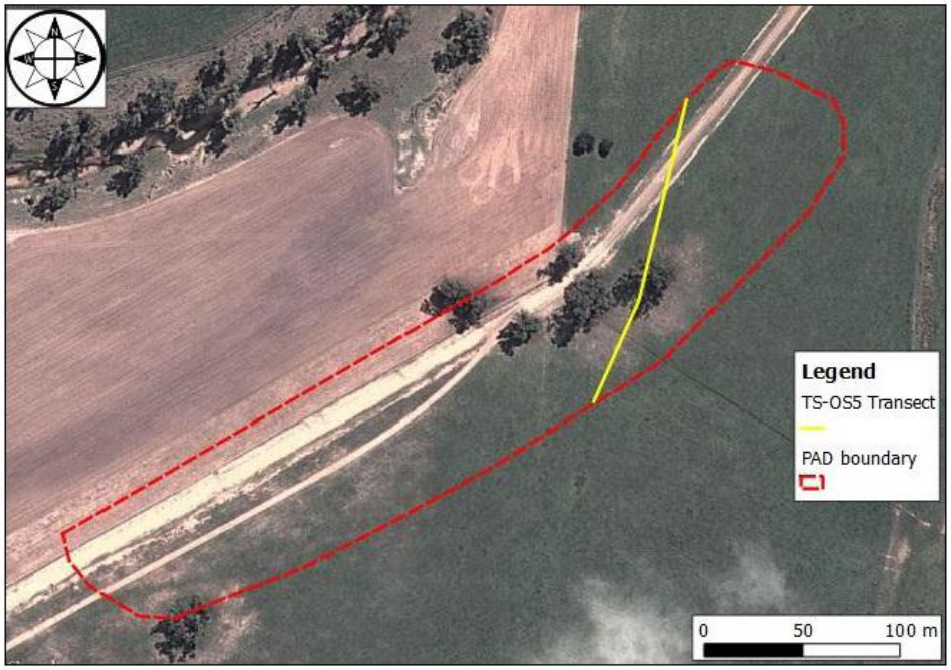


Figure 4-2: Alignment of transect through TS-OS-05 with PAD



Site TS-OS-03 with PAD was excavated at 10m intervals along the transect. Pit 3 was moved 5m to the northeast along the transect as its original location was in the middle of the road. As such, Pit 2 was not excavated because of the 15m distance between Pits 1 and 3, and the projected location of Pit 2 within an a disturbed gully.

The first two spits of each test pit were excavated manually in 5cm spits with the following spits excavated in 10cm depths. With the exception of Pit 11, this was excavated in 5cm spits in its entirety. Excavation continued down a spit until culturally sterile levels, such as basal clays, were reached. This is when artefacts are no longer present and/or artefacts are present but density drops sharply and this trend continues. Such levels may be accompanied by a change in soil, but artefact density will ultimately be used to determine what qualifies as 'culturally sterile'.

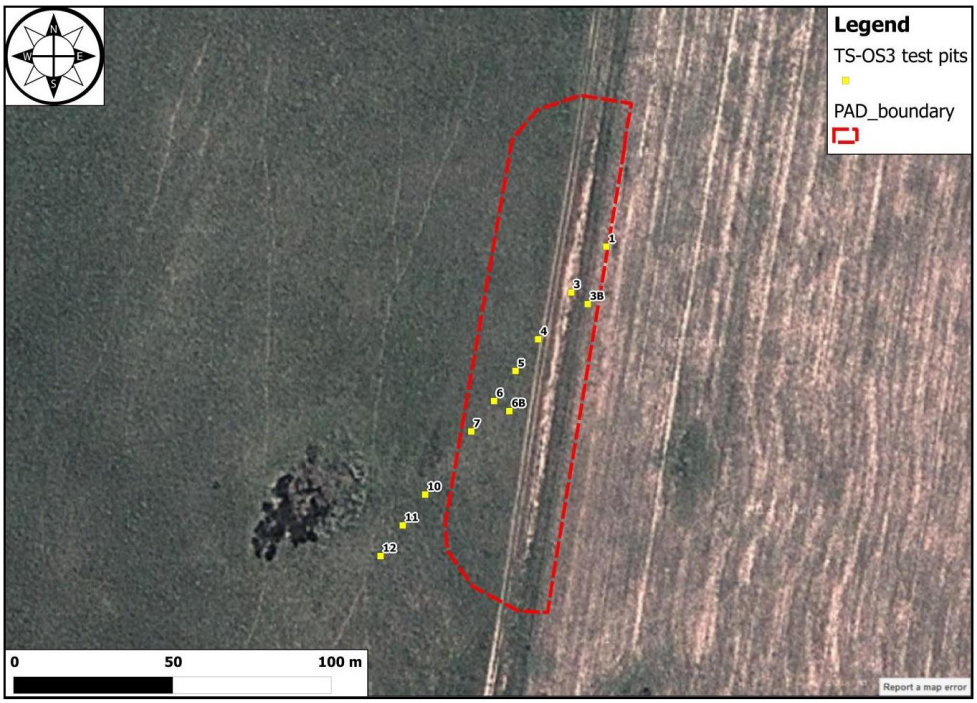
TS-OS-05 with PAD was excavated at 20m intervals along the intercepting transect (due to a lack of findings). As such, the even-numbered pits were not excavated but they were assigned a number in case excavation was required at a later date. Pit 5 was skipped due to its location on a dirt track. Likewise, Pits 4 and 6 were located within the drains of the dirt track and could be excavated in place of Pit 5. Therefore, there was a 40m interval along the transect that contained no pits. The first two spits of each test pit were excavated manually in 5cm spits with

the following spits excavated in 10cm depths. With the exception of Pit 7 that was excavated entirely in 5cm spits. As per TS-OS-03 with PAD, each pit was excavated manually until culturally sterile levels were reached.

The data gained from the test phase informed the placement of additional excavation squares. The aim of the additional squares was to expand excavation around known concentrations of artefacts to allow a better appreciation of the overall features of site TS-OS-03 with PAD and for TS-OS-05 with PAD.

At site TS-OS-03 with PAD, two extra pits were excavated 5m to the southeast (perpendicular to the transect) of Pits 3 and 6 (**Figure 4–3**). These pits (3B and 6B) aimed to better investigate the area around the concentration of surface artefacts. Three pits (10, 11, and 12) were set out beyond the PAD (30m southwest of Pit 7 along pipeline route) to test an area assessed as having archaeological potential during the test-excavation. A *gilgai* (spring) located between Pits 7 and 10, and a localised area of low elevation southwest of Pit 12, were deemed to have higher archaeological sensitivity.

Figure 4-3: Location of test pits at site TS-OS-03 with PAD.



All deposits from the test excavation were to be wet sieved and the artefacts retained for further analysis. No surface salvage of artefacts was undertaken.

4.3 FIELD METHODS

At both sites, excavation was by hand with the soil emptied into labelled buckets for later sieving.

At TS-OS-03 with PAD, nine pits were excavated during the test excavation programme (Pits 1, 3, 4, 5, 6, 7, 10, 11 and 12) while a further two squares were excavated to better investigate the area around the concentration of surface artefacts. (3B and 6B squares; **Figure 4–3**).

At TS-OS-05 with PAD, seven pits were excavated during the test excavation programme (Pits 1, 3, 7, 9, 11, 13 and 15) (**Figure 4-4**).

Figure 4-4: Location of test pits at site TS-OS-05 with PAD.

All deposits excavated as part of the test excavation programme were wet sieved though 5mm and 3mm mesh sieves in order to retrieve all artefacts.

5 RESULTS OF ARCHAEOLOGICAL EXCAVATION

5.1 EXCAVATION SQUARES

All excavation squares at TS-OS-03 with PAD and TS-OS-05 with PAD are 50cm by 50cm and all were hand excavated (**Plate 3**).

At TS-OS-03 with PAD, 11 squares were excavated during the test excavation programme (**Figure 4–3**).

At TS-OS-05 with PAD, 7 squares were excavated during the test excavation programme (**Figure 4–4**).

All 18 squares within both archaeological areas were excavated down to culturally sterile clays.

5.1.1 Location of Excavation Squares

At both areas of investigation the archaeological investigation was limited to remaining within the proposed impact footprint of the Proposal. The site manifestations already present at both sites meant that the archaeological investigation focused on this area.

As part of the test excavation methodology devised for the Proposal, one transect through each site was investigated (**Figures 4-1** and **4-2**), These transects closely followed the pipeline alignment to an accuracy of +/- 1m.

The salvage excavation methodology for the Proposal allowed for intensified excavation in areas that seemed more likely to provide information concerning site complexity, subsistence strategies and overall archaeological significance. Pits 3B and 6B were examples of intensified excavation in areas of high surface artefact density.

5.1.2 Stratigraphy and Soils

At Site TS-OS-03 with PAD the soil profile has been substantially affected by agricultural practises (**Plate 3**). Three basic soil layers were evident in all pits. Spit 1 (0cm to 5cm deep) was characterised by dark brown, soft, silty clayey loam that transitioned into a mid-brown clayey loam at Spit 2 (5cm to 10cm deep). From the 8cm to 10cm depth range, the soil gradually becomes more clayey and lighter in colour. An orange-brown, solid clay base was reached at approximately 27cm to 30cm in pits excavated at the north-eastern end of the transect (**Plate 8**), but this diminished to approximately 20cm in pits excavated at the south-western end of the transect (**Plate 5**). A lense of dark soil or charcoal was found at depth, likely resulting from a recent burning event. Grass roots penetrated Spit 1 whilst the occasional large root was found at depth. Gravels were infrequent.

At Site TS-OS-05 with PAD the uppermost two spits (to 9cm to 12cm) consist of dark brown, soft, clayey loam with grass roots. The soil becomes lighter in colour and more clayey to 20cm,

with some gravels appearing at base. From approximately 20cm transition to leached clayey loam (mid-brown in colour), becoming more clayey to base at 35cm to 40cm with indurated sands increasing at depth. Indurated sands are only found in the northern half of site (**Plate 10**), while a shallow orange-brown clay base was recorded in the south (**Plate 11**).

Further information on soil stratigraphy per spit from TS-OS-03 with PAD is presented in **Appendix 2**.

5.2 ARTEFACTS RECORDED

5.2.1 Background

All artefacts from the excavation were catalogued to include a description of the raw material, the artefact type, artefact features and dimensions. 'Artefact', by the terms of this report, refers to all stone items that either through evident morphological features or type of raw material was likely to have been manufactured or carried to the site by Aboriginal people. Thus the term embraces flaked pieces and lithic debitage (either small flakes under 10mm in size or shatter fragments). The term covers other types other artefact types such as hammerstones, blades, scrapers, anvils, grinding dishes or edge-ground tools. Debitage is a by-product of knapping and consists of the small (<10mm) flakes and chips that are sometimes detached when removing a larger flake from a core. Also included in this category are small chunks (<10mm) of raw material that have at least one clean facet removed. These are likely produced as a core is roughly worked into shape and particularly apply to quartz debitage where a rough cobble is first shaped.

5.2.2 Excavation TS-OS-03 with PAD and TS-O5 with PAD

Five artefacts were retrieved at site TS-OS-03 with PAD during the test excavation (**Plate 12**). These are summarised in **Table 5–1**. No subsurface artefacts were recorded at TS-OS-05 with PAD.

5.2.2.1 *Vertical and Horizontal Distribution*

There are insufficient artefacts located in both TS-OS-03TS-OS-03 with PAD and TS-OS-05TS-OS-05 with PAD to adequately describe patterns in artefact distribution either across the landscape or within the soil profile. Every attempt was made to investigate areas deemed most likely to contain artefacts within each PAD but no such areas were located.

5.2.2.2 *The Artefact Assemblage*

The catalogue of the five recorded artefacts is shown in **Table 5–1**.

Table 5-1: Artefacts recorded during the excavation.

Location	Type	Material	Size (mm)			Comment
			length	width	thickness	
TS-OS-03, Pit 1, Spit 2	distal flake	quartzite	22	23	12	tertiary
TS-OS-03, Pit 1, Spit 2	flaked piece	quartz	36	31	20	tertiary, negative scarring
TS-OS-03, Pit 6, Spit 3	flake	grey volcanic (granite?)	63	29	12	secondary
TS-OS-03, Pit 6B, Spit 3	distal flake	quartz	17	17	7	tertiary
TS-OS-03, Pit 11, Spit 2	flaked piece	chert?	39	29	15	two negative scars

5.3 DISCUSSION

5.3.1 Summary

The lack of artefacts recovered in the test excavation is somewhat surprising given the more numerous surface artefacts (**Section 4.1**). Disturbances including ploughing, flooding and stock/vehicle movements are likely to have affected the integrity of the sites, but would not have removed sub-surface artefacts. This suggests that the landforms are degrading and therefore artefacts are not being buried by natural deposition of soils. Disturbances are likely to be the only reason why any artefacts were found at depth, and as such, the artefacts retrieved in the test excavation were almost certainly not *in situ*. It appears that the sites TS-OS-03 with PAD and TS-OS-05 with PAD are surface sites only without any associated subsurface archaeological deposits.

Very few artefacts were recorded during the test excavation. The attributes of the artefact catalogue is summarised below.

- Three flakes and two flaked pieces were recorded at TS-OS-03.
- A variety of materials were present.
- All artefacts were found within 20cm of the surface.
- Only one artefact was greater than 40mm in length or width.

5.3.2 Comparison with Previously Recorded Artefacts

The artefacts found in the test excavation reflected the artefact types and materials of the previously recorded surface artefacts. Sizes were smaller, but this is likely a result of the method of investigation (i.e. test excavation versus surface survey). The paucity of sub-surface artefacts makes meaningful comparison with the surface artefacts difficult.

5.4 CONCLUSION

In **Section 3.1**, four considerations were discussed in relation to their effect on the artefact analysis, namely assessing both sites against:

1. Statistically useful sample size;
2. Comparable assemblages;
3. Site condition; and
4. Theory and recording.

Each of these will be considered in turn.

Statistically useful sample size

Only five artefacts were identified during the test excavation which does not allow for a meaningful statistical analysis.

Comparable assemblages

The sub-surface artefact assemblage was not substantial enough to form adequate comparison with other sites. The stone material recorded (quartz, quartzite and chert) reflect the range of raw material that has been noted in other regional excavation assemblages.

Site Condition

The condition of the site can be described as poor, particularly since all artefacts were derived from the surface of upper 20cm. This is very much within the plough zone, which along with land clearing, exacerbates the effects of natural processes such as flooding on soil destabilisation. It is concluded that the recorded subsurface artefacts are not *in situ* but have been moved to these locations by these disturbances. Neither location investigated has associated subsurface archaeological deposits and the sites remain, primarily, as surface manifestations only.

Theory and Recording

The small size of the artefact assemblage does not allow for particularly meaningful interpretation. Therefore, only basic flake attributes were recorded for posterity purposes.

5.5 ABORIGINAL COMMUNITY INPUT

Aboriginal representatives participated in all aspects of the excavation from the formulation of the excavation methodology, through to excavation and wet sieving.

No member of the Aboriginal community present at the excavation had any specific cultural knowledge about the area containing TS-OS-03 with PAD and TS-OS-05 with PAD.

The input of labour and knowledge by the Aboriginal community was appreciated by OzArk and is hereby acknowledged.

5.6 ASSESSMENT OF HERITAGE SIGNIFICANCE

5.6.1 Introduction

The appropriate management of cultural heritage items is usually determined on the basis of their assessed significance as well as the likely impacts of any proposed developments. Scientific, cultural and public significance are identified as baseline elements of significance assessment, and it is through the combination of these elements that the overall cultural heritage values of a site, place or area are resolved.

5.6.2 Cultural Significance

This area of assessment concerns the importance of a site or features to the relevant cultural group: in this case the Aboriginal community. Aspects of cultural significance include assessment of sites, items, and landscapes that are traditionally significant or that have contemporary importance to the Aboriginal community. This importance involves both traditional links with specific areas, as well as an overall concern by Aboriginal people for their sites generally and the continued protection of these. This type of significance may not be in accord with interpretations made by the archaeologist: a site may have low scientific significance but high cultural significance, or *vice versa*.

The significance of the archaeological site located within the Study Area was addressed during the excavation with the community representatives who were present during the excavation.

5.6.3 Scientific Significance

Assessing a site in this context involves placing it into a broader regional framework, as well as assessing the site's individual merits in view of current archaeological discourse. This type of significance relates to the ability of a site to answer current research questions and is also based on a site's condition (integrity), content and representativeness.

The overriding aim of cultural heritage management is to preserve a representative sample of the archaeological resource. This will ensure that future research within the discipline can be based on a valid sample of the past. Establishing whether or not a site can contribute to current research also involves defining 'research potential' and 'representativeness'. Questions regularly asked when determining significance are: can this site contribute information that no other site can? Is this site representative of other sites in the region?

5.6.4 Public Significance

Sites that have public significance do so because they can educate people about the past. By reducing ignorance about why sites are important to the Aboriginal and scientific community, important sites can be protected from ignorant or inadvertent destruction. Educating the public to understand the need for site preservation should increase the likelihood of maintaining an archaeological resource into the future. For a site to have high public significance it should contain easily identifiable and interpretable elements, and be relatively easily accessed.

5.7 ASSESSED SIGNIFICANCE OF TS-OS-03 WITH PAD AND TS-OS-05 WITH PAD

5.7.1 Cultural Significance

The Aboriginal community representatives who were present at the excavation of TS-OS-03 with PAD and TS-OS-05 with PAD said that they regarded the site as holding **moderate cultural significance**. This assessment was reached by the Aboriginal representatives as the site demonstrates their peoples' long association with the area.

5.7.2 Scientific Significance

The analysis of the stratigraphy and artefacts from TS-OS-03 with PAD and TS-OS-05 with PAD demonstrate that the site holds little archaeological integrity and a low density of artefacts. Further, as TS-OS-03 with PAD and TS-OS-05 with PAD are mostly surface manifestations, the scientific significance of both sites is lowered.

In terms of the types of raw materials used, the classes of artefacts manufactured and the relative numbers of artefacts, TS-OS-03 with PAD and TS-OS-05 with PAD are representative of other sites in the area.

As a result of the archaeological work performed at both sites, it is therefore assessed that there is little further scientific information that could be gained at the site. There remains an extensive and diverse range of stone artefacts at both sites however.

TS-OS-03 with PAD and TS-OS-05 with PAD are assessed as holding **low-moderate scientific significance**.

5.7.3 Aesthetic Significance

Both TS-OS-03 with PAD and TS-OS-05 with PAD are within ploughed paddocks. The setting is somewhat natural, but has been compromised somewhat. It would not be apparent to most people that this is a site. The artefacts have some aesthetic value, but are not particularly outstanding.

TS-OS-03 with PAD and TS-OS-05 with PAD are assessed as holding **low aesthetic significance**.

5.7.4 Historic Significance

There are no known historic associations with the sites as such TS-OS-03 with PAD and TS-OS-05 with PAD are assessed as holding **low historic significance**.

5.8 LIKELY IMPACTS TO ABORIGINAL HERITAGE FROM THE PROPOSAL

TS-OS-03 with PAD and TS-OS-05 with PAD would be impacted by the proposed Macquarie River Water Pipeline as part of the DZP. Direct impact to these sites would occur resulting in the partial loss of value.

However, the results of the excavation conclude that impacts to TS-OS-03 with PAD and TS-OS-05 with PAD would be minimal. This is because of the low density of sub-surface artefacts at each site. Furthermore, surface artefact collection would take place prior to works, reducing the potential for intact artefacts to be impacted by the laying of the pipeline.

6 MANAGEMENT AND MITIGATION: ABORIGINAL HERITAGE

6.1 GENERAL PRINCIPLES FOR THE MANAGEMENT OF ABORIGINAL SITES

Appropriate management of cultural heritage items is primarily determined on the basis of their assessed significance as well as the likely impacts of the proposed development. **Section 5.7** describes the significance of the recorded sites from a cultural, scientific and public-interest perspective, while **Section 5.8** details the impact from the Project. The following management options are based on general principles, in terms of best practice and desired outcomes.

Specific management options for the identified Aboriginal sites based on known site impacts follow.

- Avoid impact - by altering the development proposal. Although the pipeline bisects both sites it is manoeuvrable and could avoid areas of known artefact density. If this is feasible then a suitable curtilage around the recorded sites must be determined so as to ensure its protection both during the short term construction phase of development and in the long term use of the area. Specific mitigation measures may be designed to minimise potential adverse impacts. If plans are altered, care must be taken to ensure that sites previously assessed as not impacted, remain so. This may be facilitated where necessary through the fencing off of sites during construction so as to minimise inadvertent impacts.
- Minimise Impact - If impact is unavoidable then management measures should be considered that lessen the degree of impact. Examples of this include fencing along the pipeline corridor where it intersects with the PAD to confine works to those specific locations, and collection of artefacts within the impact areas only. It should be noted that archaeological investigation at TS-OS-03 with PAD and TS-OS-05 with PAD follows community consultation with registered stakeholders and took place under the auspices of *The Code*.
- Mitigate/Offset – Implement measures designed to compensate for the loss of portions of the sites. This could include archival standard of recording and offsetting the impacts by conserving the remainder of that site or perhaps other sites in perpetuity.

6.2 MANAGEMENT AND MITIGATION OF RECORDED ABORIGINAL SITES

Sites TS-OS-03 with PAD and TS-OS-05 with PAD were both within management Group 3 as defined by the *Aboriginal Heritage Assessment* for DZP (OzArk 2013). The OzArk 2013 assessment defined Group 3 management as:

Group 3: Sites requiring further investigation.

Areas within the impact zone that have been designated as having potential archaeological deposits. Test excavations should be undertaken in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b) guidelines. Further recommendations for the manner of salvage excavation would be informed by the test excavations but this would normally occur post-approval and be governed by the ACHMP.

Now that test excavation is complete and no deposits worthy of further assessment were found, the sites move into Group 2a. This group's management is:

Group 2a: Surface collection of artefacts

Detailed recording and collection of surface artefacts would be the primary management approach for sites in this category. All but one site in this group (UG-AS1) have been assigned a low scientific value and only limited further investigation is considered necessary.

6.3 RELEVANT LEGISLATION

Cultural heritage is managed by a number of NSW and Commonwealth Acts. Baseline principles for the conservation of heritage places and relics can be found in the Burra Charter[3], which recognises that there are places worth keeping because they can enrich our lives on many levels. The significance of such places may be embodied in fabric (physical material), environmental setting, contents, use or meaning to people, and should be assessed through methodical data collection. Since its adoption in 1979, The Burra Charter has become the standard of best practice in the conservation of heritage places in Australia, and heritage organisations and local government authorities have incorporated the inherent principles and logic into guidelines and other conservation planning documents. The Burra Charter generally advocates a cautious approach to changing places of heritage significance. This conservative notion embodies the basic premise behind legislation designed to protect our heritage, which operates primarily at a State level.

[3] The Burra Charter defines the basic principles and procedures to be followed in the conservation of all kinds of places such as monuments, buildings, Aboriginal sites, roads, archaeological sites, whole districts or even regions. It was first adopted in 1979, based on the Australian ICOMOS (International Council on Monuments and Sites) review (1977) of the 1966 Venice Charter (Australian ICOMOS Inc. 1998).

A number of Acts of parliament provide for the protection of Aboriginal heritage at various levels of government[4]. The three most important statutes in New South Wales are the:

- *Environmental Planning and Assessment Act 1979* (EP&A Act), amended by the *Environmental Planning and Assessment Amendment (Infrastructure and Other Planning Reform) Act 2005* (EP&AA Act).
- *National Parks and Wildlife Act 1974* (NPW Act).
- *Heritage Act 1977* (Heritage Act)

While at Commonwealth level, the following statute is relevant:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) amended by the *Environment and Heritage Legislation Amendment Act (no. 1) 2003*.

6.3.1 NSW legislation

6.3.1.1 *Environmental Planning and Assessment Act 1979*

The EP&A Act established requirements relating to land use and planning. The main areas controlled by the Act pertaining to heritage are:

- Part 4: local government development assessments, including heritage. May include schedules of heritage items.
    - Division 4.1: approvals process for State Significant Development (not infrastructure related).
- Part 5: environmental impact assessment requirements (for those developments not requiring consent under Part 4). State owned heritage items listed on Local Environment Plans are governed by Part 5.
    - Division 5.1: approvals process for State Significant Development (infrastructure related).

6.3.1.2 *National Parks and Wildlife Act 1974*

Amended during 2010, the NPW Act provides for the protection of Aboriginal objects (sites, objects and cultural material) and Aboriginal places. Under the Act (S.5), an Aboriginal object is defined as: any deposit, object or material evidence (not being a handicraft for sale) relating to Aboriginal and non-European habitation of the area that comprises New South Wales, being habitation both prior to and concurrent with the occupation of that area by persons of European extraction, and includes Aboriginal remains.

[4] NSW Heritage Office 1998: *Living with Aboriginal Culture*, p. 3.

An Aboriginal place is defined under the NPW Act as an area which has been declared by the Minister administering the Act as a place of special significance for Aboriginal culture. It may or may not contain physical Aboriginal objects.

As of 1 October 2010, it is an offence under Section 86 of the NPW Act to 'harm or desecrate an object the person knows is an Aboriginal object'. It is also a strict liability offence to 'harm an Aboriginal object' or to 'harm or desecrate an Aboriginal place', whether knowingly or unknowingly. Section 87 of the Act provides a series of defences against the offences listed in Section 86:

- The harm was authorised by and conducted in accordance with the requirements of an Aboriginal Heritage Impact Permit (AHIP) under Section 90 of the Act.
- The defendant exercised 'due diligence' to determine whether the action would harm an Aboriginal object.
- The harm to the Aboriginal object occurred during the undertaking of a 'low impact activity' (as defined in the regulations).

Under Section 89A of the Act, it is a requirement to notify the OEH Director-General of the location of an Aboriginal object. Identified Aboriginal items and sites are registered with the OEH on AHIMS.

6.3.2 Commonwealth Legislation

6.3.2.1 *Environmental Protection and Biodiversity Conservation Act 1999*

Amendments in 2003 established the National Heritage List and the Commonwealth Heritage List, both administered by Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC). Ministerial approval is required for proposals involving significant impacts to National/Commonwealth heritage places.

6.3.3 Applicability to the Application Area

The following provides a summary of the applicability of the legislation identified in the preceding sections.

- There are no Aboriginal items listed on the National or Commonwealth heritage registers (see **Table 1**) within the Study Area. Therefore the EPBC Act is not applicable.
- The Proposal is being assessed under Part 4.1 of the EP&A Act.
- The Aboriginal sites recorded here have legislative protection under the NPW Act.

7 RECOMMENDATIONS

Following the results of the test excavation, the recommendations for TS-OS-03 with PAD and TS-OS-05 with PAD are as follows.

1. No further subsurface archaeological investigation is required at sites TS-OS-03 with PAD and TS-OS-05 with PAD. The test excavation programme has established that there are no associated archaeological deposits in the areas defined by the proposed impact footprint at either site.
2. The surface artefacts within the impact footprint at sites TS-OS-03 with PAD and TS-OS-05 with PAD are to be collected prior to the construction of the proposed Macquarie River Water Pipeline. This would be done as part of a wider program of surface artefact collection in the Dubbo Zirconia Project.
3. Impacts are to be confined to the 10m-wide easement of the proposed pipeline. Temporary fencing should be instated along the proposed pipeline corridor for the duration of the proposed works to avoid inadvertent impact to areas of the site beyond the impact footprint.
4. Within the bounds of each site, the soil excavated for the pipeline should be, where feasible, reinstated on site to ensure that any artefacts remain in their general location.

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DECCW 2010b	NSW Department of Environment, Climate Change & Water 2010. *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*.
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PLATES

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Plate 1: TS-OS-05 with PAD general view in a southwest direction.

Plate 2: TS-OS-05 with PAD general view along middle and north-eastern end of transect to the northeast from Pit 11.

Plate 3: TS-OS-03 with PAD, Pit 3B. Showing poly pipe disturbance in Pit 3B and ploughing disturbance in field beyond;

Plate 4: Evidence of recent ploughing in adjacent fields.

Plate 5: TS-OS-03 with PAD soil profile at south-western end of transect.

Plate 6: TS-OS-03 with PAD, general view of transect to northeast from Pit 11. The small depression/gilgai is between the two pits in the foreground (10 & 11) and the pits in the background.

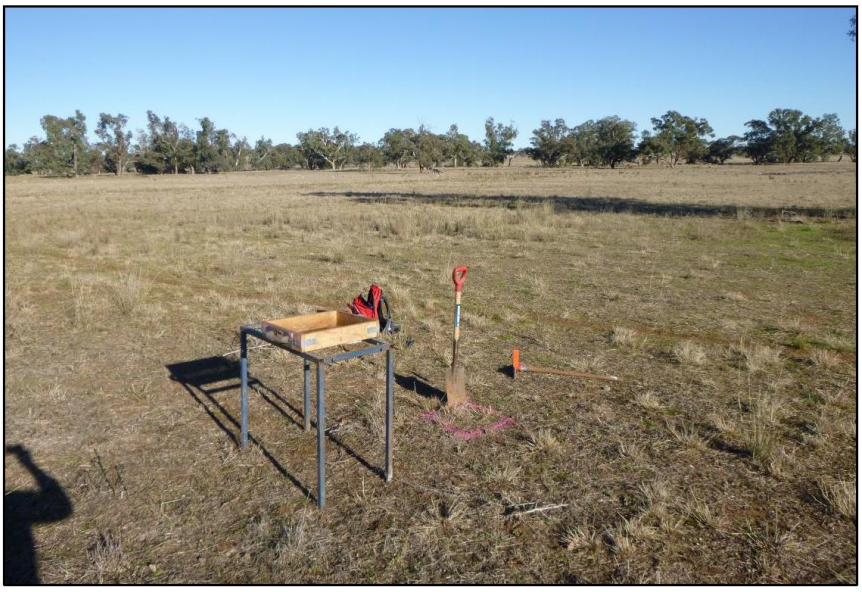

Plate 7: TS-OS-03 with PAD general view to the west of the site from Pit 11 toward Wambangalang Creek.

Plate 8: TS-OS-03 with PAD, Pit 3, southeast section. Picture shows a charcoal lens/blackened soil and typical soil profile at north-eastern end.

Plate 9: TS-OS-05 with PAD, soil profile in middle of transect .

Plate 10: TS-OS-05 with PAD, soil profile in northern end of transect.

Plate 11: TS-OS-05TS-OS-05 with PAD, soil profile in south of transect

Plate 12: Artefacts from TS-OS-03 with PAD. Top left: Quartz flaked piece, Pit 1, Spit 2; Top centre: Quartzite distal flake, Pit 1, Spit 2; Top right: Volcanic stone flake, Pit 6, Spit 3; Bottom left: Quartz distal flake Pit 6B, Spit 3; Bottom right: Chert flaked piece, Pit 11, Spit 2.

APPENDIX 1: ABORIGINAL COMMUNITY CONSULTATION LOG

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DUBBO ZIRCONIA PROJECT—Community Consultation Relevant to the Test Excavation				
Date	**Organisation**	**Contact Name**	**Comment**	**OzArk staff/method**
12.6.13	Binjang Wellington Wiradjuri Heritage Survey	Members: BWWHS c/ - Ms Dorothy Stewart e: <jamiegray66@gmail.com e: <mamma2830@hotmail.com 0435 843 324 260 Myall St Dubbo NSW 2830	invite to participate in field work sent	email/mail
12.6.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528 0409 046 588	invite to participate in field work sent	mail
12.6.13	Wirrimbah Direct Descendants	Members: Wirrimbah Direct Descendants Aboriginal Corporation Arna Kerkland PO Box 2070 Dubbo NSW 2830 Phone 0408 576 682 Chair@Tubba-gah.org	invite to participate in field work sent	email/mail
12.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	invite to participate in field work sent	email/mail
18.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	Darren called SB - he will have a site officer in attendance , and will confirm who in email over next couple of days. Darren will also send through updated insurances by email	phone
19.6.13	Binjang Wellington Wiradjuri Heritage Survey	Members: BWWHS c/ - Ms Dorothy Stewart e: <jamiegray66@gmail.com e: <mamma2830@hotmail.com 0435 843 324 260 Myall St Dubbo NSW 2830	Rang mobile - 'service is temporarily not available, please try again later'	SB phone
19.6.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528 0409 046 588	Rang landline - number disconnected Rang mobile: spoke to Dianne confirming site officer attendance. Dianne will call back tomorrow with confirmation. Discussed that Dianne will need to organise a copy of the appropriate insurance for us before the site officer can go on site	SB phone
19.6.13	Wirrimbah Direct Descendants	Members: Wirrimbah Direct Descendants Aboriginal Corporation Arna Kerkland PO Box 2070 Dubbo NSW 2830 Phone 0408 576 682 Chair@Tubba-gah.org	SB rang and left a message to return call	SB phone

DUBBO ZIRCONIA PROJECT—Community Consultation Relevant to the Test Excavation				
Date	**Organisation**	**Contact Name**	**Comment**	**OzArk staff/method**
21.6.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528 0409 046 588	Dianne rang and spoke to Jodie Benton. Dianne said she was interested in have a representative there howeverhad not yet organised insurances.Jodie discuss that with out current workers comp workers are not able to go on site	SB phone
20.6.13	Wirrimbah Direct Descendants	Members: Wirrimbah Direct Descendants Aboriginal Corporation Arna Kerkland PO Box 2070 Dubbo NSW 2830 Phone 0408 576 682 Chair@Tubba-gah.org	SB rang and spoke to lewis Burns - Lewis will call back in 1/2 hour. Lewis is seeing whether his brother Malcolm Burns will be able to attend	SB phone
20.6.13	Wirrimbah Direct Descendants	Members: Wirrimbah Direct Descendants Aboriginal Corporation Arna Kerkland PO Box 2070 Dubbo NSW 2830 Phone 0408 576 682 Chair@Tubba-gah.org	Lewis Burns rang back and spoke to SB. Malcolm Burns will meet OzArk on Tuesday morning for the field work	SB phone
21.6.13	BWWHS	Dorothy Stewart 260 Myall St Dubbo NSW 2830 e: jamiegray66@gmail.com m: 0435843324	SB rang mobile; 'Service is temporarily not available, please try again later'	SB phone
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	SB received email nominating Terry Toomey as site officer for Tuesday Wednesday	email
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	SB sent email requesting Workers Comp insurance urgently	email
24.6.13	BWWHS	Dorothy Stewart 260 Myall St Dubbo NSW 2830 e: jamiegray66@gmail.com m: 0435843324	Dot rang SB and confirmed that Brett Hill will be in attendance tommorrow and Wednesday. Discussed that the insurance expired 3.6.12. Dot will chase it up today and get it throught to SB. Dot was informed that officers would not be going on site without it	phone
24.6.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528 0409 046 588	SB rang. House phone could not be connected Rang mobile - left a message to call back	SB phone
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	SB rang Dubbo LALC and spoke to Fallon, they do not know where to find the insurances requested that I ring Darrens Mobile as he is at the NSWALC	phone

DUBBO ZIRCONIA PROJECT—Community Consultation Relevant to the Test Excavation				
Date	**Organisation**	**Contact Name**	**Comment**	**OzArk staff/method**
			conference 0426121912	
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	SB rang and left a message on Darrens mobile	phone
24.6.13	Mrs Diane Stewart (individual)	Mrs Diane Stewart 3 Flinders Close Dubbo 2830 ph: 6882 4528 0409 046 588	Sb rang and spoke to Dianne, Dianne will not be supplying a representative for this project	SB phone
24.6.13	BWWHS	Dorothy Stewart 260 Myall St Dubbo NSW 2830 e: jamiegray66@gmail.com m: 0435843324	SB rang 3:30pm Dot regarding the insurances. Dot is still waiting for Jamie to call her back- he is chasing them from Annabelle. Reinforced cant go on site without them	phone
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	SB received email from Charlse Tindale with insurance papers. Not covering the relevant period	email
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	SB rang GIO - Gio sent the Cert of Currency. SB clearly identified as ringing from OzArk. Certificate sent through almost immeadiately valid to the 30.6.13	email/phone
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	SB emailed a copy to Darren Toomey and confirmed conversation with GIO	email
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	Darren Toomey rang and SB confirmed the cert and informed Darren that she had spoken to GIO	Phone
24.6.13	Dubbo LALC	Darren Toomey dlalc1@optusnet.com.au	SB received blank wages declaration forms for DLALC from GIO, SB forwarded to Darren and deleted email	Phone
24.6.13	BWWHS	Dorothy Stewart 260 Myall St Dubbo NSW 2830 e: jamiegray66@gmail.com m: 0435843324	Sb rang Dot. Dot has had a stroke and in the hospital. Dot requested SB call Jamie Gray 0468 608 210	phone
24.6.13	BWWHS	Dorothy Stewart 260 Myall St Dubbo NSW 2830 e: jamiegray66@gmail.com m: 0435843324	Sb rang and spoke to Jamie, Jamie will call back in 10 mins. Reinforced not able to attend if insurance not through	phone
24.6.13	BWWHS	Dorothy Stewart 260 Myall St Dubbo NSW 2830 e: jamiegray66@gmail.com m: 0435843324	Jamie rang back- insurance company to call me directly and send through information	Phone

DUBBO ZIRCONIA PROJECT—Community Consultation Relevant to the Test Excavation				
Date	**Organisation**	**Contact Name**	**Comment**	**OzArk staff/method**
24.6.13	BWWHS	Dorothy Stewart 260 Myall St Dubbo NSW 2830 e: jamiegray66@gmail.com m: 0435843324	SB rang Jamie and updated	Phone
25.6.13	BWWHS	Dorothy Stewart 260 Myall St Dubbo NSW 2830 e: jamiegray66@gmail.com m: 0435843324	SB rang Jamie. Email received with insurances, Nominated worker did not arrive. Team waited till 8:30am. Discussed that Jamie would attend tommorrow if Jimmy wasn't available (Jamie was unsure of Jimmys last name). Jamie to call SB back and confirm	Phone
25.6.13 - 26.6.13Test excavation - Attendance Wirrimbah - Mal Burns -2 days Dubbo LALC - Terry Toomey - 2 days				

APPENDIX 2: STRATIGPHRAPHY AT TS-OS-03 WITH PAD AND TS-OS-05 WITH PAD

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TS-OS-03 with PAD				
Pit	**Spit**	**Depth (cm)**		**Notes**
1	1	5	30	
	2	5		Two artefacts recorded.
	3	10		
	4	10		
3	1	5	30	
	2	5		
	3	10		Lens of charcoal/ash.
	4	10		
3B	1	5	20	
	2	5		Poly pipe in northwest corner of pit. Disturbed to this level at least.
	3	10		
4	1	5	30	
	2	5		
	3	10		
	4	10		
5	1	5	30	
	2	5		
	3	10		
	4	10		
6	1	5	30	
	2	5		
	3	10		Artefact recorded.
	4	10		
6B	1	5	30	
	2	5		
	3	10		Artefact recorded.
	4	10		
7	1	5	20	
	2	5		
	3	10		
10	1	5	30	
	2	5		
	3	10		Thick root here and in Spit 4.
	4	10		
11	1	5	20	Root penetrates all spits (c.3cm in diameter),
	2	5		Artefact recorded.
	3	5		
	4	5		
12	1	5	30	
	2	5		
	3	10		
	4	10		
TOTAL ARTEFACTS			**5**	

Artefacts Recorded by Spit and depth at TS-OS-05 with PAD.

TS-OS-05 with PAD				
Pit	**Spit**	**Depth (cm)**		**Notes**
1	1	5	40	
	2	5		
	3	10		
	4	10		
	5	10		
3			40	
7	1	5	35	
	2	5		
	3	5		
	4	5		
	5	5		
	6	5		
	7	5		
9			40	
				Roots present.
				Roots present.
				Roots present.
11				
13				Roots present.
				Roots present.
15				
TOTAL ARTEFACTS				**0**