

## **Appendix 13**



Aboriginal Cultural Heritage Assessment

**Northparkes Mine  
Step Change Project**

**Report on  
Aboriginal Cultural Heritage Assessment**

**Prepared by  
Central Queensland Cultural Heritage Management**

**Prepared for  
Northparkes Mine**

**May 2013**

## **1. Introduction**

Northparkes Mine (NPM) is located 27 kilometres northwest of the township of Parkes in central western New South Wales (Figure 1). It is a metalliferous mine, producing copper concentrate for smelters in Japan and China. NPM is permitted for both open cut and underground mining although it is only currently mining its underground resources in both the E48 and E26 ore bodies.

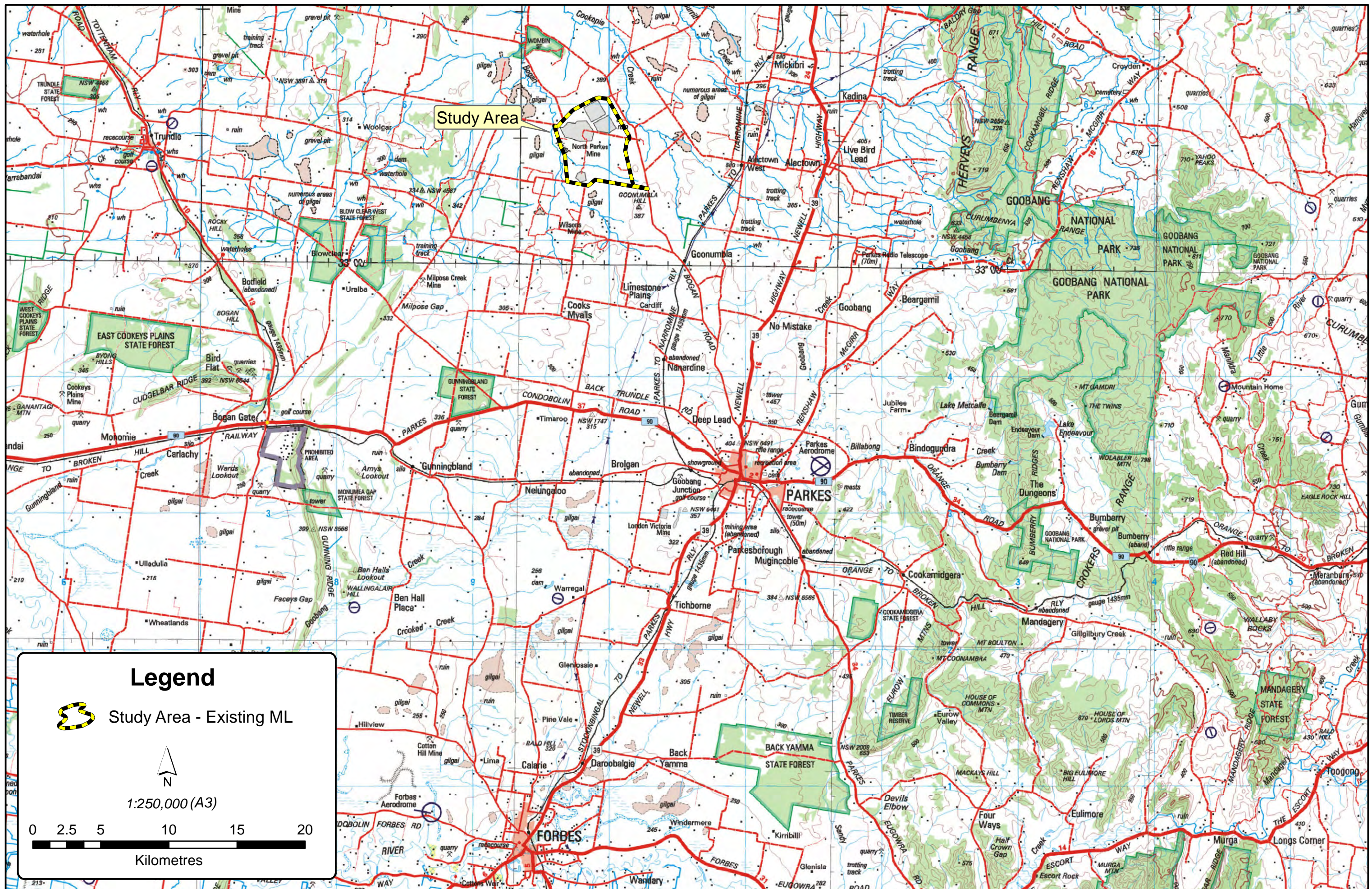
NPM undertook consultation with Registered Aboriginal Parties (RAPs) throughout 2011 and 2012, including undertaking surveys of NPM landholdings and surrounds. At this time, the Step Change Project (hereafter referred to as the Project) consisted of extensions to the existing ore bodies and a new area of mineralisation known as GRP 314 within the NPM mining lease area. The Project initially included the development of additional surface processing infrastructure, including expansions of tailings storage facilities, and a water pipeline from the Jemlaong Gap in the Lachlan Valley to NPM for the purposes of obtaining both groundwater and surface water for mining operations.

The Project has now been substantially revised subsequent to consultation with Registered Aboriginal Parties, settlement of field survey methodology and conduct of the cultural heritage surveys. NPM are seeking approval for a revised Project which encompasses the continuation of underground block cave mining in two existing ore bodies, the development of underground block cave mining in the E22 resource, additional campaign open cut mining located in existing mining leases, an augmentation of approved Tailings Storage Facility (TSF) and an extended mine life of 7 years until 2032.

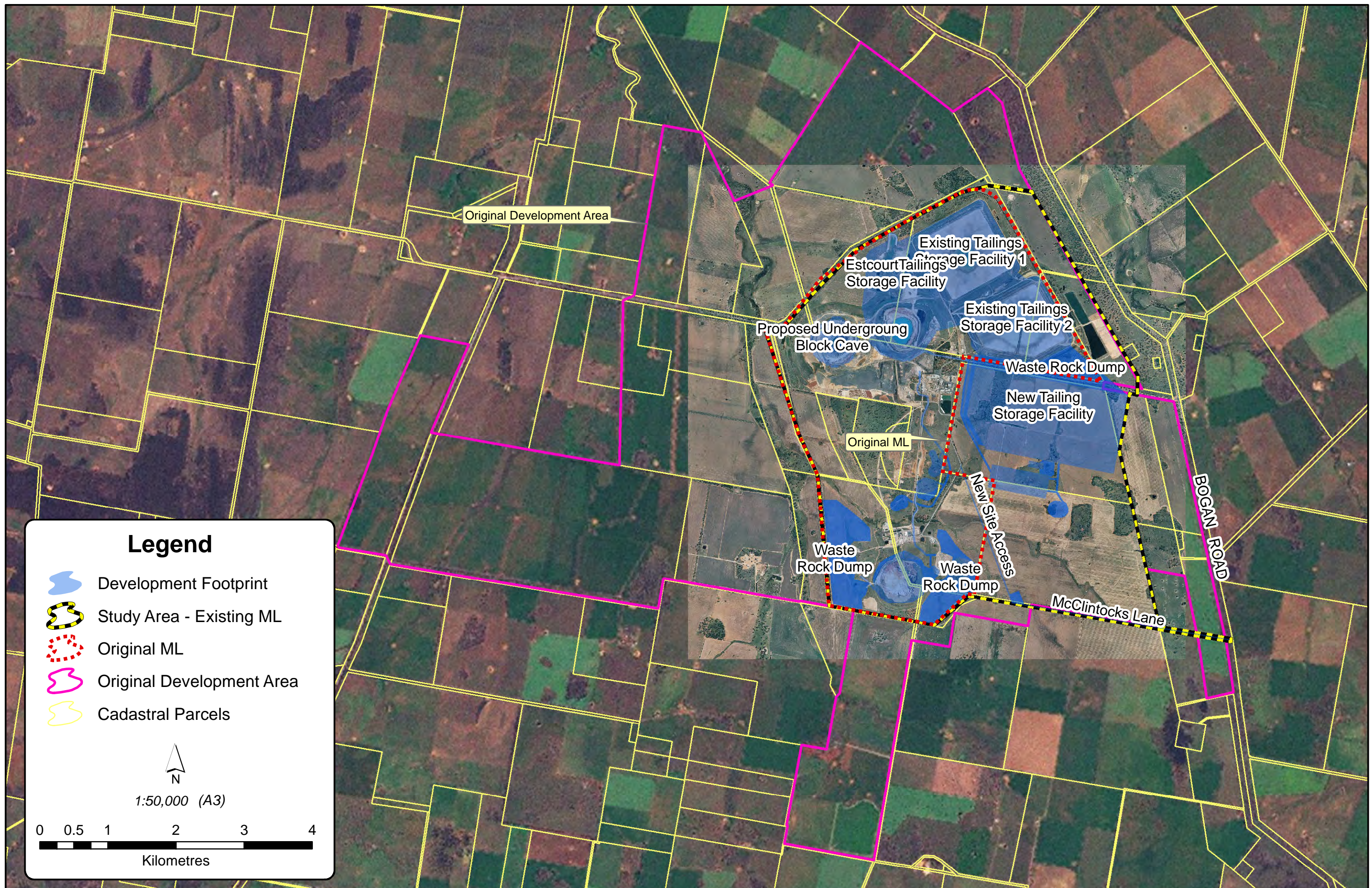
It is now the case that all infrastructure and development requirements will be situated largely within the bounds of the existing Mining Lease (ML) (see project description in appendix 1 and Figure 2). This area is now referred to as the Study Area – Existing ML in the remainder of this report.

This revision has resulted in much of the methodology and results of the cultural heritage survey relating to the original Project being reduced in areas that have not been previously disturbed. Because the Project will now affect a far smaller area in that much of it will be situated on the existing ML and all that area falls within the area that was already the subject of previous consultation for this Project it is not seen as necessary to commence a new round of consultation at this stage of the Project

# Figure 1: General Locality of Study Area



# Figure 2: Proposed Infrastructure of Study Area



approval process. Most notably these changes mean that the Project now does not include any of the originally proposed water pipeline alignments from the Jemalong Valley. These changes have been factored into discussion of impacts included within this report. But the basis on which the field survey and management consultation has been undertaken, notably the Terms of Reference included as an appendix in this report (Appendix 2), has not been amended thus ensuring they reflect the situation as it was when consultation took place: that is of a much larger project the area of which encompassed all the area of the now revised and reduced Project. Readers should take note of this important point when they review this report.

Attention is drawn to the use of two important terms relating to the Study Area – Existing ML: **Project area** and **development footprint**. The Project area relates to all land subject to the Project Application and this area aligns directly with the Study Area – existing ML as shown on Figure 2. The **development footprint** relates to areas of additional disturbance relative to existing approved operations and includes all mining and infrastructure areas proposed as part of the Project. The development footprint is shown in Figure 2. With the Project originally having a much larger Development Area, more than 90% of the Development Footprint configured has now been subject to survey.

All analyses of project impacts have been undertaken using this development footprint. As they are now redundant to the Project, previous water pipeline route options have now been excluded from any analyses although results have been used to contextualise results of the surveys undertaken across the Study Area – Existing ML, where relevant.

NPM currently implements an Aboriginal Heritage Management Plan (AHMP) in accordance with the existing PA 06\_0026. The AHMP applies to the existing project approval area for NPM and provides the framework for the management of identified cultural heritage within this area.

This Project is to be developed under provisions of Part 3A of the Environmental Planning and Assessment Act (EP&A) 1979. The objective of this study is to assist in securing approvals for the management of Aboriginal cultural heritage so that the Project can obtain Part 3A Approval and the development can proceed on this basis. Consequently, it will not be necessary to secure an AHIP under s90 of the *National Parks and Wildlife Act (NSW)*. However, approval will be sought from NSW

Department of Planning and Infrastructure (DP&I) informed by the Office of Environment and Heritage (OEH) with respect to Aboriginal cultural heritage. OEH requires that Part 3A major Project Assessments are completed to the equivalent standard as to that of securing an AHIP, and measures to this end have been set in place as part of Project's strategic approach.

The Project has been designed in an environmentally responsible manner that is consistent with the Rio Tinto's cultural heritage standards. The preferred approach to management will be application of the Avoidance Principle. The Avoidance Principle means, in relation to Aboriginal cultural heritage, the avoidance of Harm to Aboriginal cultural heritage and, to the extent where such harm cannot be avoided, to minimise harm to Aboriginal cultural heritage. The Avoidance Principle is consistent with best practice in cultural heritage management, with environmentally responsible development and with Rio Tinto's cultural heritage standards. As a first step in the application of this approach, NPM commissioned a Cultural Heritage Assessment (CHA) of sections of the development area for the purposes of informing design of the development footprint. Through refinements to the development footprint NPM have sought to avoid impacts on identified areas of cultural heritage within the Study area – Existing ML. In addition, NPM has committed to a comprehensive survey of all portions of the development footprint that have not been previously surveyed prior to disturbance. Thus, any and all areas of the development footprint that would be affected will be examined prior to construction commencing and agreed management measures will then be implemented. This commitment is consistent with existing management commitments in place at NPM.

Central Queensland Cultural Heritage Management (CQCHM) was commissioned to undertake a cultural heritage assessment of the proposed project development area. CQCHM was involved in all stages of the conduct of this assessment, including initial consultation, settlement of the terms of reference and methodology for the conduct of the fieldwork, preparation of the report and negotiation of management recommendations. Fieldwork was undertaken by Luke Godwin (Mine Area) and Scott L'Oste-Brown (Water Pipeline Route options), the report was drafted by Luke Godwin and maps and tables were prepared by Scott L'Oste-Brown. Jason Scriffignano designed all transects and prepared other data required in the course of the fieldwork.

## **2. Aboriginal Consultation**

The DGRs for the Project required NPM to satisfy OEH's consultation policies in relation to the CHA. NPM also noted that it had previously negotiated a Relationship Agreement with various Wiradjuri interests (notably the Wiradjuri Council of Elders and the Peak Hill Local Aboriginal Land Council). Consequently, NPM adopted a strategy of consultation that both met all conditions of OEH's consultation requirements as well as meeting the terms of its existing Relationship Agreement.

Accordingly, NPM issued letters to all entities specified in the OEH consultation requirements. These entities included:

Peak Hill Local Aboriginal Land Council;  
Condobolin Local Aboriginal Land Council;  
Lachlan Catchment Management Authority;  
National Native Title Tribunal (Southeast and Central – Sydney Office);  
Native Title Services Corporation (NSW);  
Operations Office - Office of Environment and Heritage – Dubbo;  
Parkes Shire Council;  
The Registrar - Aboriginal Land Rights Act.

Additionally, NPM placed advertisements in a series of local papers in early December 2011. These included:

*The Parkes Champion Post;*  
*The Forbes Advocate;*  
*The Daily Liberal;*  
*The Cowra Guardian.*

On the basis of advice from the above entities, letters sent to parties identified by those entities as possible interested parties, entities who are signatories to the Relationship Agreement and responses to the newspaper advertisements, a series of Registered Aboriginal Parties (RAPs) were identified. These RAPs have been invited to participate in all consultation regarding the project. Project RAPs are those persons and entities specified in appendix 3 of this report.

RAPs are, according to OEH, those Aboriginal people who may have an interest in the proposed project area and who hold knowledge relevant to determining the

cultural significance of any Aboriginal objects and/or places in the vicinity of the project. NPM took a broader view of the role of the RAPs. Accordingly, it invited them to assist in the design of the CHA as well as to participate in the assessment of the cultural significance of any Aboriginal objects and/or places in the vicinity of the project.

NPM convened a working group of the RAPs on 2 March 2012. This was designed to inform the RAPs on what the project may involve and to develop a Terms of Reference (ToR) including survey methodology in consultation with RAPs for the conduct of the ICHA. A copy of the agreed ToR is included here as appendix 2. Further to this, the necessary logistical arrangements for conduct of the ICHA were also discussed and agreed. In relation to the latter issue, it was agreed that, to satisfy all insurance and other OHS matters, field personnel would be employed through a labour hire company (GWS personnel) in Parkes who regularly provide labour hire to NPM and who held the necessary policies.

Once completed the draft ICHA report was circulated to all Registered Aboriginal Parties (RAPs) for review and comment. A meeting of the RAPs was then convened to address any issues relating to the ICHA. This meeting took place on 18 October 2012. Having received the draft report two weeks in advance of the meeting RAPs provided some commentary at the meeting. An additional two weeks was provided subsequent to the meeting to tender written responses but no written submissions were received. The report was amended subsequent to this meeting. The amended report has been forwarded to the RAPs with a list of the amendments made to the report also provided.

Additionally, meetings were also held with the Wiradjuri Executive Committee established under the Relationship Agreement in December 2011 and February 2012 where the original Project description was explained and the proposed methodology and preliminary versions of the ToR were also discussed.

### **3. Management Principles and Methodology**

The primary approach was to prepare a statement of Aboriginal cultural heritage values, assess the significance of identified impacts and develop a management strategy for these. The CHA adopted a sampling strategy for the archaeological cultural heritage in the **Study Area- Existing ML**. This sampling strategy was based on existing knowledge of the site, consultation with the RAPs, and an understanding

of NPM's commitment to undertake further survey in accordance with Rio Tinto's Cultural Heritage Standard, that is 100% survey of additional disturbance areas prior to any development. A broad definition of Aboriginal cultural heritage was adopted with all places of traditional, historical and contemporary significance will be recorded and included in the management strategy.

As outlined in Section 1, NPM currently implement and Aboriginal Heritage Management Plan in accordance with the existing PA06\_0026 which applies to the existing project approval area (Figure 2). The existing project approval area includes the majority of Study Area – Existing ML, and includes the majority of the development footprint. Using the results of the CHA, the existing Aboriginal Heritage Management Plan (AHMP) will be updated to provide for the management of Aboriginal cultural heritage in any areas of the **development footprint** and more broadly within the Project area.

The CHA was not to be used to argue that no further investigation is required within the development footprint area. Rather, NPM made a commitment that all areas that:

- a. fall within the development footprint; and
- b. were not surveyed as part of the CHA and / or previous survey within the Project area

would be subject to a comprehensive and systematic survey irrespective of the results of the CHA. That is, the sampling strategy would not be used as a predictive model. It was only to be used to inform understandings as to what was likely and inform development of a management strategy to manage those types of sites. The AHMP will reflect this commitment and make express provision for this. Also, the AHMP will outline processes for the variation in the management of Aboriginal heritage in the Project area in the event that subsequent survey identified any site type that was not provided for in the AHMP.

The primary objectives in undertaking the CHA were as follows:

- (a) Identify, collate and document information about Aboriginal Cultural Heritage within the Study Area, including a statement of the significance of any Aboriginal cultural heritage to the registered Aboriginal parties.
- (b) Identify the impacts of the Project on Aboriginal Cultural Heritage in the Study Area.

- (c) Develop options to avoid, minimise or mitigate the identified impacts in a culturally appropriate fashion.

A zoning scheme of the **Study Area – Existing ML** was created using environmental data and the results of previous cultural heritage investigations. Using this scheme, a sample of all environmental and cultural zones identified and to be affected by the proposed development was to be selected (see Figure 3).

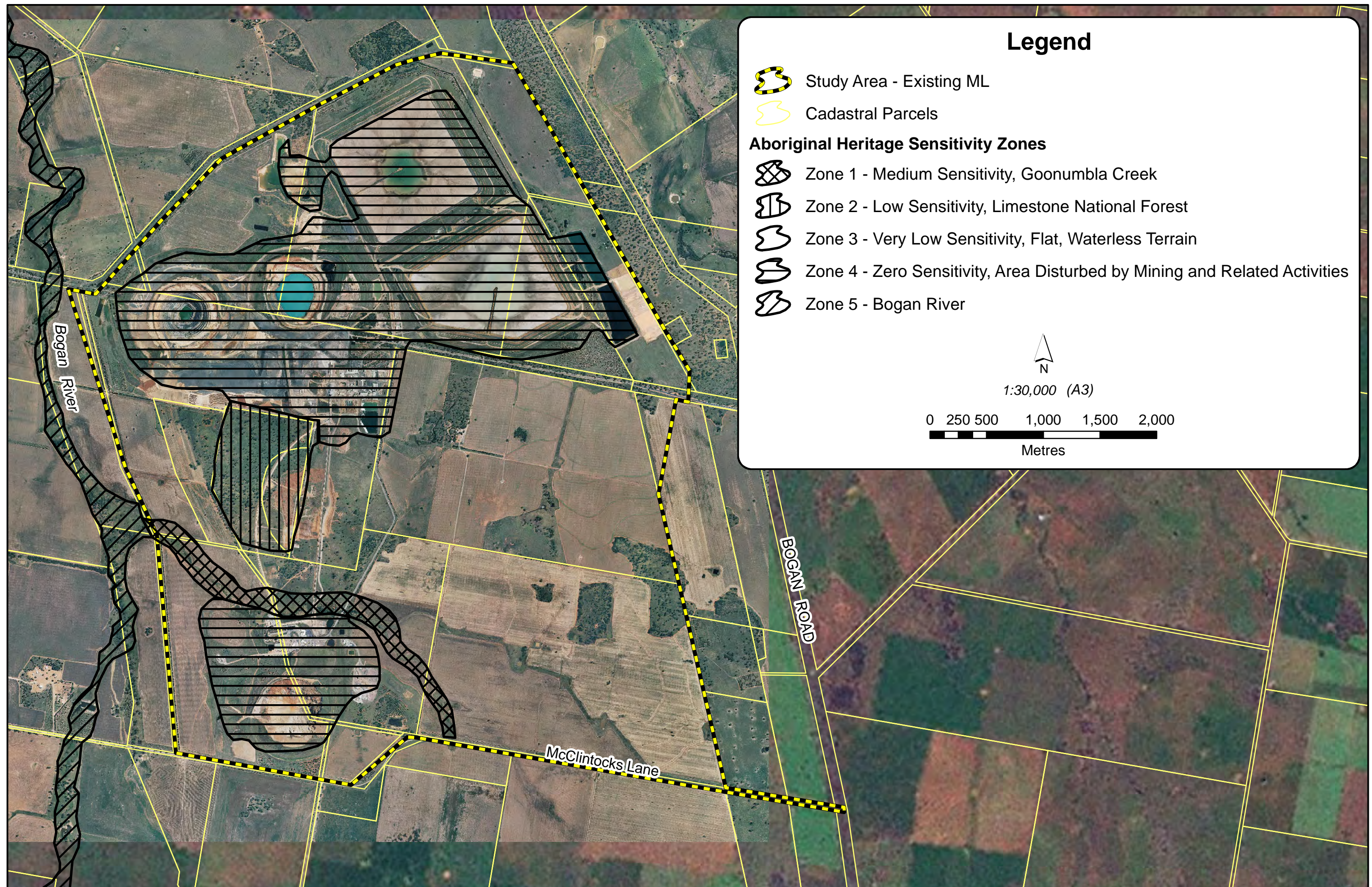
Each sample area was then to be subject of a systematic and comprehensive archaeological survey to identify Aboriginal cultural heritage objects and or areas. This survey was undertaken using a system of transects designed to ensure comprehensive coverage, and proceeded at a rate of 8-10km of transects per day. To facilitate this process, these data were incorporated in a GPS linked to a real time GIS. The design of the survey and the recording of all sites data was undertaken in a manner that takes account of *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* as well as all other relevant Survey standards and guidance as outlined in the Projects Director General's Requirements (DGR's) for the Environmental Assessment (EA).

Additionally, interviews were undertaken with knowledgeable Aboriginal persons nominated by the RAP's to identify any other cultural places that do not have a material signature.

All data collected were incorporated within a cultural heritage GIS. Using this, a management strategy for each category of site will be developed that will be used to populate the revised AHMP. It was possible to make some general statements of the nature and density of the cultural heritage that is likely to be encountered during future surveys. At a later date, these data may be used to inform the design of additional survey if further fieldwork is deemed necessary before settlement of the revised AHMP. However, it was stressed in all meetings that there was no intention to use the sampling strategy as a predictive model to determine the need for additional survey. All areas that will be affected by the proposed development (i.e. that lie within the development footprint and that were not surveyed as part of the ICHA) will be subject to comprehensive and systematic survey. The revised AHMP will make an explicit commitment to this.

It was necessary that the work was undertaken so that it:

# Figure 3: Study Area Aboriginal Heritage Sensitivity Zones



- Identified any objects, areas or places whether of archaeological or cultural significance;
- Described the significance of these objects, areas or places;
- Determined the actual or likely harm upon identified objects, areas or places that would arise as a result of the Project should it proceed;
- Provided a management strategy that minimises or otherwise effectively manages the actual or likely harm, and this should be informed by principles relating to Ecologically Sustainable Development (ESD) and Inter-generational equity.

The revisions to the AHMP and subsequent analyses not covered under works completed as a part of the CHA process would be used to refine the specific management measures to be implemented.

The revised AHMP will provide for a management and mitigation program. The management component is consistent with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*.

There were to be three distinct outputs from the Project:

- a. The GIS housing all data generated as a part of the ICHA cultural heritage assessment. This was developed in such a way as to facilitate use in the production of the Environmental Assessment (EA) and for future management purposes, and could be integrated with the overall EA GIS;
- b. A formal report documenting the ICHA strategy, methods, fieldwork, results, consultation and recommended management measures;
- c. A draft Aboriginal Heritage Management Plan (AHMP) that would take the results of the fieldwork, agreed management recommendations (settled in consultation with the RAPs), commitments made for additional fieldwork to be completed prior to disturbance (see above) and formulate a formal plan for management of all Aboriginal cultural heritage identified for the Project. With the Project now falling within the bounds of the area covered by the existing AHMP it will be a simple matter to revise the existing AHMP to accommodate issues arising from this Project. The

revised AHMP is to be developed once project approval has been received and prior to commencement of works in additional disturbance areas associated with the Project.

The Technical Adviser (CQCHM) was to provide a single formal written report detailing the results of the research and survey. The report was to include a description of the Aboriginal cultural heritage identified in the Study Area, the likelihood of further Aboriginal cultural heritage existing in a sub-surface context in the Study Area and the location and extent of any such areas, an assessment of significance of the Aboriginal cultural heritage, an assessment of the potential impact of Project related activities on them, preferred options that would minimise those impacts and suggested cultural heritage management options.

Once completed an Initial Cultural Heritage Assessment (ICHA) report was to be circulated to all Registered Aboriginal Parties (RAPs) for review and comment. A meeting of the RAPs would then be convened to address any issues relating to the ICHA. This meeting took place on 18 October 2012. Having received the draft report two weeks in advance of the meeting RAPs provided some commentary at the meeting. An additional two weeks were provided subsequent to the meeting to tender written responses but no written submissions were received. The report was amended subsequent to this meeting. The amended report has been forwarded to the RAPs with a list of the amendments made to the report also provided.

This CHA will also be distributed to the RAPs in draft format to provide an opportunity for further comment. The revised AHMP will also be presented to the RAP's with a comments period provided to settle the revised AHMP, with a further meeting called to discuss and settle its contents.

#### **4. Project Environmental Description**

The Study Area sits exclusively in the Bogan River catchment. Some general observations regarding the environment conditions associated with this area is outlined below.

Average annual rainfall in the area is 531mm and average monthly rainfall is between 38 and 55mm. Monthly evaporation rates greatly exceeds rainfall throughout the year and consequently the streams normally contain no surface water and stream flow is a rare event driven by exceptional sustained rainfall. As the stream beds are lined by

grey and brown clay, pools of water can survive for weeks to months after a stream flow event and although the hydrology of this system has undoubtedly changed since Aboriginal times as a result of European land use it is reasonable to predict, as numerous reports have done, that pools with greater longevity would have been a focus for human occupation in the past (these and subsequent observations are noted in further detail in the following section of the report).

The original vegetation would have likely been open woodland of grey box, yellow box and white cypress pine or similar with other western species such as rosewood and several acacia in the understorey. Remnants of all of these remain in fragments especially within Limestone State Forest but logging of cypress pine and the removal of eucalypt species have also modified the vegetation within this area. Most of the plains have been cleared and repeatedly cultivated, with isolated areas of native vegetation along drainage lines, property margins and local roads.

With stream flow a rare event in the smaller watercourses and low stream gradients, the small channels in the headwaters of the Bogan River have not been so extensively modified by erosion as might be expected in an agricultural landscape. Some channel erosion is apparent and, as others have noted, areas of floodout are then covered with a thin veneer of post-European sediment deposition. As a general statement, much of the areas covered by the Study Area have been subject to a wide range of disturbance: widespread cultivation, both sheet and wind erosion, track and fence construction, graded fire-breaks around crops, soil compaction by stock, and the earlier presence of a number of buildings. As others have remarked, the net effect all of these elements is that the soil biomantle has been thinned, compacted and repeatedly turned over. As a consequence, any archaeological open sites in such areas will have been disturbed with the loss of any stratigraphic integrity that may have existed and site use patterns (workshop areas or hearths for example) will have been disturbed to the extent that they may be difficult to identify with any certainty, leading to a depauperate, and biased, picture of the archaeological signature in such areas.

The Study area can be described as gently undulating country ranging between 190 and 230m AHD. It should be noted that the greater part of the proposed development area has been subject to significant disturbance either through previous mine-related works or from pastoral and cropping activity. Across most of the area native vegetation has been removed and replaced with improved pastures or various crops

of wheat, sorghum or other fodder plants. Much of the area now consists of ploughed paddocks, with parts of the mine still used for this purpose. An area known as the Limestone State Forest is probably the least disturbed area but even though it has not been ploughed it has been logged. Box trees are sparsely scattered across the area but in many areas the main trees to be found are relatively young or immature cypress pine regrowth. Other studies have suggested that prior to the large-scale reconfiguration of vegetation that has taken place the area would likely have been Box-dominated open sclerophyll woodland, a suggestion with which we concur.

Soils are predominantly red brown earths and self-mulching black cracking clays. Geologically, the area consists of Silurian volcanics. The main rock types are andesite and monzonite. These occur in very limited exposures, they are heavily weathered, badly fractured and as a consequence can be described as largely unsuitable for knapping. Various metasedimentary rocks are found in the Bogan River and Goonumbla Creek. These include chert, quartz and quartzite. These are well-suited to knapping but are not available in large quantities. The archaeological upshot of these observations is that the mine area and its immediate vicinity are not rich in stone that is suitable for the manufacture of knapped stone artefacts (or for that matter other stone implements).

There are two main watercourses in this part of the development area. The main one of these is the Bogan River, which is located immediately west of the Study area. While in its lower sections the river can be characterised as a permanent water source here it would be characterised as ephemeral because it does not flow freely along its whole length during the dry summer months, although in some places what can be described as permanent waterholes do exist. Goonumbla Creek as best described as an ephemeral watercourse that flows mainly during the wetter winter months and then rapidly dries out during summer.

## **5. Previous Cultural Heritage Studies**

The Study area itself has been the subject of a series of cultural heritage assessments over the years. These have been undertaken for different areas as plans for mine expansion have been developed and implemented. Finally, there have been various other studies in the general region that offer some insights into general patterns of site distribution. Each of these data sets is briefly reviewed here.

### *Northparkes Mine*

In 1986 Stone undertook an archaeological survey of the original Northparkes mining lease. Unfortunately, Stone did not detail the methodology adopted, the exact location of areas inspected or the length and width of any transects inspected. He identified a total of 16 sites. Of these, 13 were open artefact scatters, of which one was associated with a culturally modified tree. One isolated find was recorded. Overall sites were very small and in poor condition, either disturbed by ploughing or erosion. The largest site was comprised of 28 artefacts scattered over an area of 2,500 square metres. All other scatters consisted of ten or less artefacts.

Fifteen of these sites were located along the Bogan River or its tributaries assessed during the study. Seven of the sites were within 1 km of the confluence of Goonumbla Creek and the Bogan River. All 16 recorded sites were assessed as being of low scientific significance. Aboriginal representatives concurred that with their poor condition, the sites were of limited significance but did note that they were of some educational value.

In 1990 Nicholson undertook an archaeological survey of additional area to be included in the Northparkes project area, at that time. The primary new impact of mine expansion at that time was a tailings dam which was to be located in an area not previously assessed by Stone's 1986 survey although within the area known as the Goonumbla Mining Lease. The tailings dam was to be situated on flat to gently undulating land in the north-eastern corner of the mining lease over previously cleared paddocks that had been either ploughed or grazed. No cultural sites were identified during the course of the survey. Dense grass cover resulted in low ground surface visibility and thus reduced the likelihood of site detection. Consequently, the survey was focussed on fence lines and the areas around dams which resulted in coverage of only 4% of the impact area. Balanced against this constraining factor, however, was the observation that the lack of sites was not considered surprising due to the distance from permanent water and the type of landscape that was subject to assessment. This is an issue to which we shall return.

In 1996 Appleton undertook an assessment of further proposed extensions to existing mining operations, known as the E48 development. A heritage assessment was required over areas proposed as extensions to the existing mining operations, predominantly over sections of the Limestone National Forest and adjacent agricultural lands.

The survey area was noted as being about 60% cypress pine, although Appleton reasonably suggested that it was likely to have been box dominated dry sclerophyll open woodland in prehistory. Prior land-use impacts within the survey area were noted as including logging, grazing, and in some locations, ploughing. Generally, ground surface visibility was poor and the survey effort was focussed on areas around such features as erosion scars and tracks that offered greater than 25% visibility, and despite the variable visibility, survey coverage was assessed as effective.

Four archaeological sites were recorded as a result of this assessment, three being isolated finds and one being a possible scarred tree. This scarred tree was in very poor condition from termite activity and had disappeared by the time further work was undertaken in 2006. The overall paucity of archaeological material was interpreted as relating to the fact that the study area was dry sclerophyll woodland with no specific water source or other resources that would concentrate occupation and the area was seen as more likely used for activities such as foraging than for actual occupation.

The recorded sites were assessed by the Peak Hill LALC as being of low cultural, scientific and educational significance.

Renewed interest in the E48 project and redesign of project elements stimulated the need to investigate additional sections the NPM mining leases. This was undertaken by Paton in 2006. The aims of this assessment included the relocation and assessment of previously recorded sites, survey of areas to be impacted by the current proposal (although the surveys were undertaken for an earlier development) and the delineation of zones of potential archaeological sensitivity within the study area. Proposed impacts included the development of underground block cave mining and associated subsidence impacts, areas proposed for tailings and waste rock emplacement as well as borrow pits.

Paton divided the study area into four separate landform features:

- Goonumbla Creek: characterised as a broad, indistinct ephemeral waterway with some mature fringing vegetation;
- Limestone National Forest: characterised as slightly raised hill with skeletal soils that had not been subject to ploughing but had been logged in the past;

- Simple slopes and flats (Flat waterless terrain): characterised as heavily modified, waterless areas;
- Mined areas and infrastructure: characterised as stripped of topsoil.

He then proceeded to erect a small-scale predictive model based on results of earlier surveys of the mine and from work undertaken elsewhere in the region. He suggested that the most common site type would be stone artefact scatters, that these would be of small extent and that they would most likely be found on raised areas in the immediate vicinity of significant watercourses or waterholes.

Based on the landform units he identified and his predictive model, Paton made the following observations:

- Goonumbla Creek: medium archaeological potential with artefact scatters near the creek. These would be small and there was limited potential for sub-surface cultural material;
- Limestone State Forest: low archaeological potential with possible isolated finds and small artefact scatters. There was little likelihood of any major sites or any sub-surface deposits although scarred trees might be found if they had not been logged;
- Flat, waterless terrain: very low archaeological potential with perhaps some isolated finds but little else to be found;
- Mined areas and infrastructure: assessed as of nil archaeological potential due to high development impact and near complete removal of topsoil.

The study area was noted as being highly modified with the only area not completely cleared and disturbed being that of the Limestone State Forest, despite it having been logged in the past. Survey was undertaken in transects which targeted the zones. The survey was undertaken as a series of planned transects, albeit focusing on areas of better ground surface visibility and along watercourses. The transects

covered a total of 40 linear kilometres as follows: 27km in flat, waterless terrain, 10km in the Limestone State Forest and 3km on Goonumbla Creek. Using Witter's effective survey formula, Paton determined his overall survey coverage as high, estimated at 45–50%.

Three new sites were recorded as a result of this assessment, one small open camp site and two isolated finds (defined A1, A2 and A3 respectively) – see Figures 7 and 8. Sites A2 and A3 were isolated stone artefacts. Paton described site A1 (35-6-0153) thus:

**SITE A1**

**Site Type:** Artefact Scatter.

**Grid Reference:** 55H E597365 N6355499 (AMG 84).

**Environmental Setting:** This site is located on the northern side of a low lying, broad rise overlooking Goonumbla Creek. The site is located on a recently graded track which parallels the Creek. A ploughed paddock surrounds the track. The sediments at the site are shallow weathered clays underlain by decomposed rocks.

**Site Aspect:** Southerly 1 degree.

**Site Size:** Surface artefacts were noted over an area of 55m (E-W) x 5m (N-S).

**Site Contents:** Stone Artefacts:

- 1 Flake; silcrete; 23 x 6 x 4mm.
- 2 Flake; silcrete; 30 x 25 x 8mm
- 3 Flaked piece; quartz; 18 x 12 x 4mm
- 4 Flake; quartz; 12 x 12 x 4mm
- 5 Chert; flake; 32 x 34; 12 – snapped
- 6 Quartzite; flake; 45 x 23 x 12mm
- 7 Quartz; flake; 22 x 15 x 6mm
- 8 Quartz; flaked piece; 34 x 30 x 18mm
- 9 Quartz; flake; 10 x 8 x 4mm
- 10 Silcrete; flake; 40 x 22 x 7mm
- 11 Chert; flake; 18 x 13 x 7mm
- 12 Fine Grained Volcanic; flaked piece; 50 x 30 x 22mm
- 13 Fine Grained Volcanic; flake; 56 x 45 x 22 retouch along one lateral margin
- 14 Chert; Flake; 18 x 17 x 10mm
- 15 Chert; flaked piece; 10 x 10 x 4
- 16 Silcrete; flake; 34 x 20 x 10 hinge termination

**Site Condition:** Farm activities over many years have disturbed the entire area. The artefacts are exposed on a farm track in a ploughed field.

**Management Considerations:** The site is highly disturbed and of relatively low archaeological significance. Based on current plans this site can be avoided during construction, but it may continue to be affected by ongoing farming activities. If the site is to be affected by farming, it should be salvaged as part of a salvage project to be undertaken with the Peak Hill Local Aboriginal Land Council. The Land Council has suggested that they would like the artefacts to be relocated to a place nearby where they would remain undisturbed. A good possibility for this is the Limestone National Forest. This location would be determined in consultation with the Peak Hill Local Aboriginal Land Council. This work

Paton noted that the survey results seemed to fit well with his predictions. With one of the sites found in the Goonumbla zone being the largest (albeit heavily disturbed) he recommended a program of test-pitting in the vicinity of Goonumbla Creek.

Following on from Paton's recommendation, in October 2008 OzArk EHM conducted a test excavation and salvage programme within an area of the Goonumbla Creek that was to be impacted by an overland conveyor.

A total of 27 test pits were excavated. Of these, twenty did not contain any artefacts

or other cultural material.

Most pits, however, contained what was interpreted as intrusive, non-cultural material in the form of rounded pebbles, clay nodules and charcoal fragments. The geomorphologic assessment of the rounded pebbles is that they were intrusive as the alluvial deposits of the top-soil are otherwise free of lithic material. They were either, therefore, derived from the subsoil clays that may have river deposited material within them, or more likely, given the nature of the raw material, they were brought into the area as road base. With continued use of the roads, particularly in wet weather, this material would have been pushed into the soil profile. Thus of the thirteen items identified during the programme as artefacts only eight were seen as of likely human manufacture.

It was suggested that pieces of clay nodule that were recovered were more probably derived from clay that has been baked as tree roots during bushfires or initial clearing of the land than pieces of heat retainers from ancient hearths. The presence of tree root impressions in them was consistent with this interpretation. Similarly, it was thought that some charcoal was probably derived from recent fires. It was also noted that these charcoal fragments were recorded scattered throughout the deposit rather than as distinct lenses that might be expected from campfires.

A spoil heap also was sieved to retrieve cultural material. This spoil heap had been was the result of the unauthorised clearance of a drill pad in September 2007. Subsequent inspection had identified stone artefacts in this spoil. The sieving of the spoil heap recovered 23 items, including a ground-edge hand-axe. Of these, only seven were considered of likely human origin with the others possibly formed as a result of rock crushing (i.e. intrusive material brought in for road construction).

Subsequent to the test pitting program, Ozark also undertook a survey of a small area required for land to be affected by the Estcourt TSF, associated infrastructure and crusher development. The survey of these areas took place over two days in November 2008. Having developed a predictive model based on local and regional data, Ozark identified a single modified (scarred) tree in the study area (NPM-ST1 – 35-6-0160). They describe the tree thus:

NPM ST1 Culturally Modified Tree AGD 597826E 6359342N

The scar is contained within a dying Grey Box (*E. Microcarpa*) which has a height of approximately 20 m and a trunk diameter of 2.22 m. The scarred trunk is dead. The scar measures 960 x 350 mm and is

located 1130 mm from the ground. The scar has a depth of 120 mm. The scar is a symmetrical, ovoid shape orientated to the south-west. There are axe marks present.

Ozark noted that the absence of other cultural material was consistent with their predictive model. Additionally, they recommended that Aboriginal representatives be present during the removal of topsoil in the crusher area and topsoil in the vicinity of Goonumbla Creek. This was done, with two representatives undertaking the inspection. Robert Clegg, one of the representatives, advised in personal communications that no cultural material was identified in that area. However, results of the AHIMS search undertaken as part of this project also need review – see below.

### *Proximate Studies*

In 2006, Environmental Resources Management (ERM 2007) recorded 21 sites on the location of the proposed Condobolin Ethanol Production Facility. This is situated 5km west of Condobolin, some 100km to the southwest of the Study Area. These sites comprise mostly of flaked stone artefacts with some grindstone fragments. A total of 90 artefacts were recorded at all sites, mostly comprising flakes and broken flakes, grindstone fragments and a few cores. The artefact types and raw materials were typical of the region and while cores were present, debitage was absent indicating the lack of knapping floors. All sites consisted of low numbers of highly dispersed artefacts.

Other surveys in areas away from the permanent water of the Lachlan and other rivers display a very low density of artefacts. Appleton (2002) surveyed 975 ha of red, sandy soil 30 km west of Condobolin (some 100km to the southwest of the Study Area) in 2002 and recorded a single artefact. A previous survey by Appleton for the Syerston Nickel-Cobalt project located 20 km north of the Lachlan River and to the west of Condobolin (Appleton 2000), recorded low artefact numbers (less than 10) and isolated artefacts in areas not in close proximity to reliable water. Over the area of a 90 km pipeline for the project, Appleton recorded four isolated finds in areas away from water and one extensive artefact scatter on the banks of a major watercourse. Five scarred trees were also recorded in close association to major watercourses.

In 2006 Navin Officer (P/L) conducted a heritage assessment for the proposed Parkes Peaking Power Plant and associated corridors (URS 2006) west of Parkes. As a result of this survey, one possible modified tree was recorded and no landforms were assessed as having archaeological potential.

In 2008 the Australian Museum conducted a heritage survey for the proposed Wellington Gas Pipeline proposed to run from Wellington to the railway line at Alectown (Australian Museum, 2008). The southern end of this survey is approximately 10 km east of the mine area. This survey recorded an artefact scatter 6km north–east of Alectown on the banks of Kadina Creek. The site, which measures 25 x 10 m, comprised a total of 11 artefacts. These were not, however, recorded *in situ*, eroding from the bank, but rather were apparently moving down the slope from the ridge above. The recorded artefacts consisted of quartz bipolar flakes and chert and silcrete flakes. Eleven kilometres north–east of Alectown, the survey recorded a modified tree. The scar, measuring 50 x 40 cm is located 4 m from the ground and no other cultural material was observed in association with the modified tree.

In 2008 OzArk EHM conducted a heritage assessment of the corridor options for the proposed Manildra–Parkes 132kV Electricity Transmission Line (ETL) which is located to the east of the study area (OzArk 2008b). While it was noted that twenty-six sites had been previously recorded over all potential corridors being studied (of which 80 % were culturally modified trees), no new sites were recorded as a result of the assessment. However, the report noted that the primary focus of the assessment was a general archaeological assessment of many locations along the proposed study corridors in an attempt to characterise the potential Aboriginal heritage values of various portions of the corridors, rather than this being a comprehensive archaeological assessment.

Pardoe (2011) has undertaken a survey of the proposed Young-Wellington Gas Pipeline. Extending for a distance of 219km, the pipeline passes approximately 80km to the east of the mine site. The main point to note is that in the course of this survey Pardoe recorded only 19 archaeological sites, the majority of which consisted of either isolated finds or very small artefact scatters, along with 5 modified trees. The results of the survey are thus entirely consistent with those of other surveys in the general region described above.

### *Regional Models*

Two separate models have been developed for the distribution of Aboriginal archaeological cultural heritage in the central western slopes of NSW. In the first of these, Pearson (1981), working in the Macquarie catchment to the east, offered the following observations on site distribution:

- Site distance to water varied from 10 to 500 m, but in general larger sites are found closer to water;
- Good soil drainage and views over watercourses are important site location criteria;
- Most sites were located in contexts, which would originally have supported open woodlands;
- Burial sites and grinding grooves were situated as close to habitation areas as geological constraints would allow;
- Ceremonial sites such as earth rings ('bora grounds') were located away from campsites;
- Stone arrangements were also located away from campsites in isolated places and tended to be associated with small hills or knolls or were on flat land;
- Quarry sites were located where stone outcrops with desirable working qualities were recognised and were reasonably accessible.

Pearson also suggested that Aboriginal campsites were seldom used for longer than three nights and that large archaeological sites probably represented accumulations of material over a series of short visits.

Koettig (1985) undertook a comprehensive study of evidence relating to Aboriginal occupation within the Dubbo 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. Her subsequent limited fieldwork included detailed recording of various site types, and aimed to ensure the consistent sets of data to provide a good basis for comparative analysis. The field survey was undertaken to cover the three major physiographic zones.

As a result of this study, Koettig (1985: 81–82) noted 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.
- The location of sites and their relative size were determined by various factors, predominantly environmental and social (which seems to pretty

much cover it). Some of the environmental issues include:

- Proximity to water: consistent with Pearson, the largest campsites were located close to permanent water. However, sites continued to be found well away from obvious water.
- Geological formation: Unsurprisingly, and as noted by Pearson, certain sites require specific environmental conditions. Thus, 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 that can easily excavated by hand.
- Availability of food resources: With the widest range of potential foods found along the main water courses due to ecotonal effect and the supply of permanent water these were favoured locations. However, some foods would have been seasonal and required foraging away from water courses.

### *Concluding Comments*

As a set of general comments, and following some observations of Paton (2006), for the region we can conclude the greater majority of sites will be artefact scatters that are very small and with little or no sub-surface material or stratigraphy. Typically, they will consist of 50 or fewer artefacts. There may be quite large areas with little or no archaeological signature whatsoever, which is not to say they were not of other cultural significance. The largest sites, consisting of more than 300 artefacts, will be found on the banks of major watercourses or waterholes, typically on slightly elevated areas. The best chance of sub-surface material with some integrity is likely to be on the shorelines of lakes. The notion that surface manifestations of cultural material may represent only the tip of the iceberg do not seem to apply, as demonstrated by results from Goonumbla Creek and elsewhere. However, there may be open sites of considerable antiquity (as results from the Wombeyan Cave area indicate, where late Pleistocene material has been recovered from one such site). It should be noted that the Wombeyan Caves are not in close proximity to the Study Area and that no Pleistocene sites have been found in close proximity to the Study Area. There can be a wide range of raw materials, reflecting the generally limited availability of raw material from well-known quarries and the need to make use of any source of material that comes to hand from small stocks of pebble from creek beds. There will be the usual wide range of artefact types: edge-ground axes, backed blades, use of bipolar technology (notably with quartz), grinding implements. A wide range of sites

are known but the chances of encountering these are curtailed either by the impact of broad-scale agricultural practices and other development activities or constrained to certain locations by the environmental requirements that determine their presence (e.g. rock shelters, grinding grooves, quarries, burials).

## **6. Ethnographic Background**

The study area falls within the bounds of what is currently broadly accepted as territory of the Wiradjuri people. Certainly, various groups who closely identify as Wiradjuri people assert strong interests in the area and to our knowledge no other socio-linguistic groups have challenged this. Of course, the Wiradjuri covered a large area of NSW and there would have been smaller groups (often loosely called clans) who would have asserted particular interests in certain tracts of land and associated sites. Some semblance of this can be seen in the manner in which Wiradjuri people as a whole recognised the particular interests of the Condobolin Wiradjuri in relation to the Lake Cowal gold mine and negotiations with Barrick Gold. However, this remains a matter of some conjecture, and possibly contention in relation to Northparkes. At this stage we can note only that while some individuals or entities may assert particular interest in the area surrounding Northparkes and sections of the pipeline, no formally settled position seems to have been reached on this by the larger Wiradjuri cohort. It is also noted that OEH's consultation procedure does not really afford any such process primacy in the nomination and endorsement of RAPs in any case.

At this stage, no sites of traditional, historical or contemporary significance have been recorded in other studies either on the mine site or proximate to it. This may, in part, reflect the interests of personnel engaged to undertake such studies and the still dominant archaeological paradigm. There is, however, some limited ethnohistorical data that is directly pertinent to our purposes.

Mitchells' expedition of 1835 had set out to explore the Bogan River and passed close to Parkes and from it came accounts of contact with native groups (Unger n.d.: 3; Kass 2003: 6). In April Mitchell's party encountered a group of natives on the outskirts of what is today the town. From this meeting, Mitchell ascertained that what had been named the Hervey Range by Oxley in 1817 was in fact known to the locals as 'Goobang', apparently deriving from the Wiradjuri word *Coleong Coobung*, which meant place of many wattles (Kass 2003: 9). Mitchell's group camped close to one of their camps and his account is quoted by Unger (n.d.: 4):

*The natives who we met here were fine looking men, enjoying contentment and happiness within the precincts of their native woods. Their enjoyment seemed so derived from nature, that it almost excited a feeling of regret, that civilised men, enervated by luxury and all its concomitant diseases, should ever disturb the haunts of these rude happy beings. The countenance of the first man who came up to me, was a fine specimen of man in an independent state of nature. He had nothing artificial about him, save the badge of mourning for the dead, a white band (his was very white), round his brow. His manner was grave, his eye keen and intelligent, and, as our people were encamping, he seemed to watch the moment when they wanted fire, when he took a burning stick, which one of the natives had brought, and presented it in a manner expressive of welcome, and an unaffected wish to contribute to our wants. At a distance, their gins sat at fires, and we heard the domestic sounds of squalling children.*

When Mitchell's party left their camping spot, several natives reportedly followed them. One individual speared a large kangaroo, while others used new tomahawks to extract honey from tree branches. It is recorded that the natives accompanied the expedition for four days before retreating upon the appearance of further natives. This was interpreted by Mitchell as the original group of natives having reached their tribal boundary and thus being unwilling to proceed further (Unger n.d.: 5).

Episodes of early contact between Wiradjuri and European cultures from the nearby Lachlan Valley were documented early by the explorers Oxley and Cunningham in May 1817. Oxley (1817) wrote:

*About a mile from this place we fell in with a small tribe of natives, consisting of eight men; their women we did not see. They did not appear any way alarmed at the sight of us, but came boldly up: they were covered with cloaks made from opossum skins; their faces daubed with a red and yellow pigment, with neatly worked nets bound round their hair: the front tooth in the upper row was wanting in them all: they were unarmed, having nothing with them but their stone hatchets. It appeared from their conduct that they had either seen or heard of white people before, and were anxious to depart, accompanying the motion of going with a wave of their hand. (Whitehead 2003: 105).*

Cunningham (1817) reported:

*Calling to one another we were answered by strange voices, which left us in no doubt of natives being near us. It was a great point we should all join in again, which at length we did, after some time had passed over several miles on a cross-course, the labour of which might have been saved. Our people came up with seven or eight of the natives, who were clothed in mantles of skin reddened with a pigment from the river. There appeared not the most distant symptoms of hostility among them! They evidently had seen a horse before, and could pronounce some words in English, such as bread, and they had every appearance of having been with those at the Lachlan depot, from which we are now 54 miles west. From the columns of smoke ascending from the trees to which these harmless beings were advancing there is no doubts of their encampment being these situated, and it might be inferred that their gins or wives were there, from their evident objection to our people attempting to accompany them to their fires. The delay and loss of time occasioned by the above adventure had allowed our boatmen to work themselves through all the numerous windings of the river and overtake us. (Whitehead 2003: 105).*

There are general accounts from the region, much of which has been summarised by Pearson (1981) describing elements of the material culture of the people who inhabited the region. For our purposes here, while this is of general interest, much of it is not immediately relevant. It is noteworthy, however, that in relation to scarred trees we know these people were adept in manufacture of bark canoes, and that they constructed them from 2m in length to nearly 6m in length. The latter were used to transport up to 7 people at a time across major watercourses. This provides one explanation for the numerous scarred trees found near watercourses. However, given that bark was used manufacture all variety of items, from coolamons through to bark humpies, that trees were scarred from use of axes to extract honey and possums among other edible and useful products, and that bark was sometimes stripped to mark a tree for ceremonial reasons, we should not be too quick in applying this explanation to all scarred trees.

## **7. Survey Methodology**

The survey methodology applied to this ICHA included the application of two separate methodologies mine area (now broadly comprising the Study Area – Existing ML) and the previously proposed pipeline. Fieldwork for both areas was

undertaken over 9 days from 27 March to 4 April 2012, with the field crews previously inducted and briefed on 26 March 2012. As the project has now been modified to remove any requirement for the water pipeline options, the methodology for this survey and description of the results of this survey are included in appendix 4 as it is recognised that these data may be of use to RAPs and others at some other stage. Where pipeline transects extended across the Study Area – Existing ML the results of this survey were included in our consideration of the Study Area – Existing ML. The results of the pipeline have also been used in contextualising the results of the Study Area – Existing ML.

### *Study Area - existing ML*

The survey methodology for the Study Area – Existing ML was slightly different to the pipelines. Here, a predictive model based on Paton's categorisation was adopted, with one additional element (see Figure 3). We added an additional landform unit to Paton's categories. This was called the Bogan River landform unit, reflecting that as originally conceived, areas for possible development as part of the Project included areas in close proximity to the river – although this has now been excluded under the preferred configuration of the development footprint. We note that data to hand from previous surveys (refer to Section 5 above) suggests that this is where the largest sites are likely to be found, as Stone had found in his initial work and as other work throughout the region seems to confirm. It seemed appropriate to take this into account in the design of our strategy. Our survey area also included two of Paton's other landform units: flat, waterless terrain and mined areas and infrastructure. The former was described by him as having very low archaeological potential, and the latter to have nil archaeological potential. We simply excluded the latter from our survey for this reason and due to another expedient measure: special mine inductions would have been required if we were to walk within the bounds of the mine area itself. Noting that Paton's prediction seems entirely justified in relation to with respect to mined areas and infrastructure there seemed little point in securing the necessary inductions and permissions for little return. Consequently, the survey of the Study Area – Existing ML focused on two units: flat waterless terrain and the Bogan River. The Goonumbla landform unit and the Limestone National Forest landform unit were excluded because they did not fall within the boundary that described the development area at that time. Parts of both these areas have been previously surveyed in past archaeological studies for existing approved NPM operations. The preferred configuration of the development footprint still largely excludes both these areas. However, a sliver of the Goonumbla landform unit in the

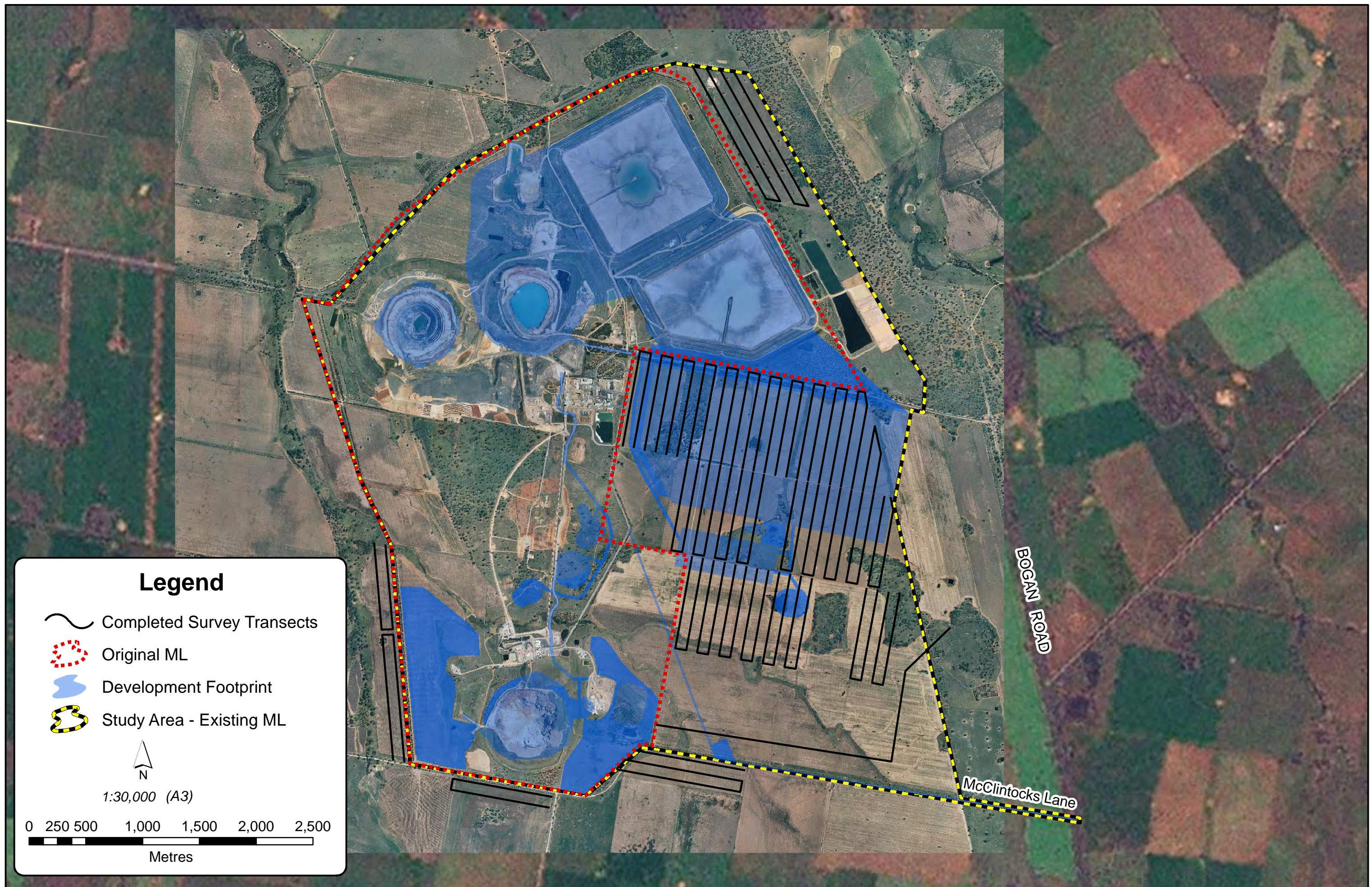
southwestern corner of the Study Area –Existing ML does fall within the preferred development footprint. It is noted that Northparkes' commitment to survey all areas that are to be affected will see this section surveyed prior to any ground disturbing activities (and as part of ground truthing for registered sites previously recorded in that area).

A total of 294 transects with a combined length of 516km were designed. A field team of six AFOs and one technical adviser then selected a series of these that sampled both of the land form units (flat, waterless terrain and Bogan River) (Figure 4). Flat, waterless terrain constituted by far the greatest percentage of the mine area, representing more than 90% of the area to be inspected. Defining what exactly constituted the Bogan River unit proved difficult on the ground because with land use having seen wholesale clearing and ploughing of both units there were few distinguishing features of each unit remaining, and meant they graded into one another and so could not easily be distinguished. An estimate of distance from the river was used to identify what were called the Bogan River transects.

The team was arrayed thus: the technical adviser walked the centre line of transects, with three field officers to either side. The team spread approximately 50 metres either side of the centre line giving a coverage of approximately 100m per transect. A differential GPS was also used in the mine area ensuring good locational information.

A total of 47 transects extending for 90km were inspected by the field team in 9 days, representing 63 person days, of fieldwork. Coverage thus averaged 10km per day. Four of the transects could be described as lying within the Bogan River unit, and these totalled 7km of the total transects walked although this area is now not included within the Study Area – Existing ML. Thus, 83km within the Study Area – Existing ML, the Development Area as now configured, were inspected. The Development Area covers an area of 2,644ha. Of this, 1117.6ha constitutes the Development Footprint. That portion of the Development Footprint inspected that was inspected was 308.2ha, or 27% of the Development Footprint. However, a conservative examination of the Development Footprint indicates that of the 1117.6ha of the Development Footprint, only 480ha might be considered undisturbed by previous mining activity (although by no means undisturbed by other land use activities highly damaging to Aboriginal cultural heritage sites. Of this 480ha, we examined 308ha, thus resulting in 64.2% of that undisturbed portion of

# Figure 4: Completed Survey Transects and Development Footprint



the Development Footprint having been inspected. This is a statistically sound sample and the results can be taken as a very good indication of likely results for the remainder of the area subject to effective coverage.

There is, of course, a significant difference between overall coverage, outlined above, and effective coverage. This has been discussed at some length in the literature and Witter and Hughes (1983) have offered a formula to determine effective coverage, which assesses the likelihood of cultural material being identified:

$(D1) \times (S) \times (V) \times (B) = D2$ , where:

D1 is area of square metres surveyed;

S is index of sedimentation (0.1 aggrading, 0.5 stable, 1 degrading);

V is visibility (0.1 negligible, 0.2 10%, 0.5 20%, 1 30%)

B is background effects (0.1 large amounts of quartz, 0.5 small amounts of quartz, 0.9 minimal quartz, 1 no quartz)

D2 is effective coverage.

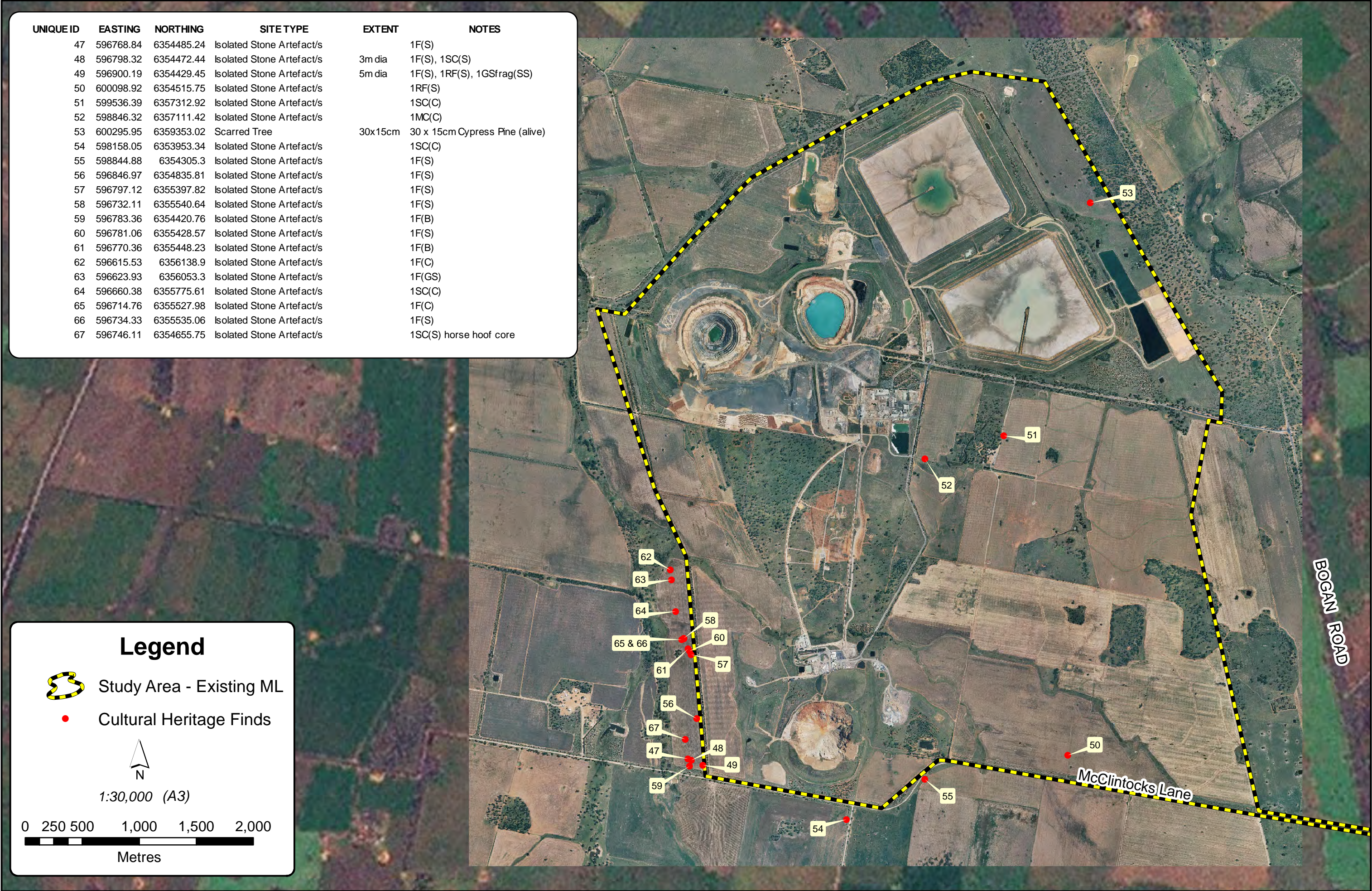
Based on this formula and taking a very conservative view that the environment is stable when actually it varies between stable and degrading, effective coverage on the survey was at least 50% and thus, in excess of 32% of the area to lying within the Development Footprint was subject to an highly effective survey. With the data taken together, this is a good sample from which to make some general observations regarding site distribution. It should be remembered that this will not, however, be used as a strict predictive model to determine further need for additional surveys within the development footprint. Any areas within the development footprint that have not been the subject of the ICHA (and that are not already disturbed by existing infrastructure) will be examined prior to development and agreed reasonable further management measures implemented.

## **8. Survey Results and Discussion**

The results of the surveys are tabled below and in appendices 5 and 6. Figure 5 also depict results. The fieldwork completed resulted in the identification and recording of 22 areas containing Aboriginal cultural heritage.

These included: 1 (4.5%) tree with a scar identified as being possibly of Aboriginal in origin and 21 (95.5%) areas containing isolated stone artefact/s.

Figure 5: Identified Cultural Heritage



<b>Project Element</b>	<b>Scarred Tree</b>	<b>Isolated Stone Artefact/s</b>	<b>Resource Place</b>	<b>Total</b>
Study Area – Existing ML	1	16	-	<b>17</b>
Pipeline Alignment through the Study Area – Existing ML	-	5	-	<b>5</b>
<b>Total</b>	<b>1</b>	<b>21</b>		<b>22</b>

#### Sites identified during CHA

These results tally closely with the results of previous studies and with Paton's predictive model. Few large sites are found anywhere. In fact, all finds of stone artefacts were made as isolated finds. However, the greatest number of isolated finds was made within the Bogan River landform unit. Of the 21 finds made in the Study Area – Existing ML only 6 were found in the flat waterless terrain unit which constitutes more than 90% of this area. On the other hand, 15 were found in the Bogan River unit (which is now excluded under the preferred configuration of the development footprint). Note, too, that the area surveyed in each unit was roughly equal to the percentage it constitutes of the development area. Moreover, they offered very similar ground surface visibility and had been subject to similar land use practices. Thus, these figures are not distorted by sample bias or other factors. These results accord well with those of Stone, who found all his sites and isolated finds close to the Bogan River, and mirror Paton's expectations. We can also note that there is little likelihood of substantial amounts of sub-surface material in the flat waterless terrain, and more likelihood of this in the Bogan River unit. As a general management observation, the more the development footprint can be located on flat, waterless terrain the greater effect can be given to the Avoidance Principle.

The scarred tree recorded within the mine area should be viewed through the lens of the Precautionary Principle. This scar was on a cypress pine, the tree was fairly immature and stands in the middle of a cleared and ploughed paddock. There are very reasonable prospects that it is not culturally scarred. However, the field team took the view it was better to record it and subject it to a second opinion that might well see it removed from the database as a cultural site. The revised Aboriginal Heritage Management Plan will make express provision for a verification procedure of this sort.

We can now turn to some general comments on the stone artefacts found during the survey. We have already noted that the distribution of material identified during the

survey accords well with previous work and predictions. On the previously proposed pipeline route surveys, the lack of good ground surface visibility was a significant constraint to identification. Notwithstanding the low density of material recorded, which is entirely consistent with all other surveys in this general region, various observations can be made.

Of the cultural heritage sites identified and recorded during the entirety of the surveys (Study area and pipeline), 27 consisted of stone artefact/s of which 21 were situated within the Study Area – Existing ML. The vast majority of these consisted of single isolated finds. There were only two exceptions to this, sites 48 and 49 (neither of which was within the Study Area – Existing ML), which contained two and three stone artefacts respectively. The extent of these two sites was likewise restricted at 3m and 5m in diameter respectively.

Four stone artefacts (Nos 33, 36-37 and 39) were located between the Lachlan River and the Study Area – Existing ML with three of these being identified within a 1.8km section of the pipeline to the north of Bogan Gate. These artefacts included a retouched blade made on very high quality silcrete (Place 39), a silcrete core containing a single platform from which flakes had been struck (Place 37), and two sandstone grindstone fragments.

Sixteen of the isolated finds were flakes, of which two (at Places 49 and 50 – within the Study Area – Existing ML) showed edge damage consistent with having either been used or reworked to enable continued use). Six cores were also present among this material. Of these only one (Place 52) contained more than a single platform from which flakes had been struck. The remaining two artefacts (at Places 46 and 49) were further fragments of sandstone which showed evidence of having been ground.

The predominance of stone artefacts within the Study Area – Existing ML is generally a factor of the higher ground surface visibility experienced in these areas as a result of these areas having been cleared and utilised for cropping and grazing purposes as well as these generally constituting the most common type of cultural site found in most places.

Apart from the sandstone which comprised the grindstone fragments found on the pipeline alignments, silcrete and chert dominated the recorded assemblage. Two unmodified flakes manufactured from basalt (Places 59 and 61) are the only other

raw materials observed as being utilised. Although stone artefact numbers are limited, the use of chert and basalt only occur in this area suggesting somewhat localized sources for these materials.

The Aboriginal pipeline field team also identified two additional cultural heritage places neither of them within the Study Area – Existing ML. These were useful and medicinal plants and were recorded as Resource Places (see Appendix 5). In both cases these were located to the south of Bogan Gate and within current road easements. The first (Place 1) consisted of an old gum-topped box whose leaves were noted as being used in smoking ceremonies. The size and age of this tree, along with it being one of only very few trees remaining along this section of the pipeline added to its importance among the field team. Further to the south a quinine tree (Place 2) was also observed. The leaves, bark and fruit of this tree were noted as having several medicinal uses.

## **9. AHIMS Search Results**

OEHS maintains the site register for NSW, using a system commonly known as Aboriginal Heritage Information Management System (AHIMS) for this purpose. A search was made of AHIMS to determine which sites OEHS considered were within or close proximity of the Development Area.

We note that locational data for OEHS registered sites can be problematic for a variety of reasons. The method of recording locations by field researchers has varied over the years. Until the mid-1990s locations were recorded on maps or aerial photographs. Minor errors in placement translated into significant errors in location. GPS seemingly improved accuracy but failure to appreciate the impact of selective availability (until the late 1990s). The implication of using different projections (e.g. MGA94 and AMG84) errors of several hundred metres can result. We note that Stone and probably Nicholson undertook their surveys before GPS were a standard survey tool. Appleton (1996) even if using a GPS would have been subject to selective availability. Even when GPS was available and selective availability had been removed as a problem most did not use differential GPS, and the inherent margin of error in hand-held units was often in excess of more than 20m. This would be the case with Paton's (2006) data. All of this ignores the very real issue of transcription errors.

We turn now to a closer examination of the AHIMS search data. The general area of