An Archaeological Survey of the Litchfield Road Reserve, Chainage 14 – 44 km.

Prepared for:

Campbell Project Management Services

and

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Executive Summary

This report was commissioned by the Construction Division of the Department of Planning and Infrastructure to assess the archaeological and heritage potential of proposed road works along Litchfield Rd from chainage 14 to 44 km from the Cox Peninsula Rd intersection. The scope of the works for the survey included investigation of a number of potential gravel areas and the road reserve 500m either side of the centre line of the existing Litchfield Rd.

The archaeological survey was undertaken in August and September 2005 by Richard Woolfe and Daryl Guse of Earth Sea Heritage Surveys.

The survey met a number of challenges including:

1. The large size of the gravel search areas;
2. Areas outside the road reserve were included in the gravel search zones. These areas included a number of sites of high archaeological potential;
3. White quartz was the rock predominantly used for the production of stone tools in the area. A large number of small sites, including quarries, open artefact scatters and isolated artefacts, and were located during the survey. Quartz was the most common raw material for these sites and artefacts. Quartz can be difficult to positively identify as an artefact, and recording these sites with care and accuracy was time consuming.

The sites located during the survey were recorded. Their locations and descriptions are included in the Results Section below. An assessment of their significance is included in the Discussion Section. The recommendations arising from the survey are included, as are maps of the site locations.

Results Summary

This report records the locations of a number of Indigenous archaeological places and assesses the significance of these places according to the heritage of the Northern Territory. The archaeological survey of the Litchfield Rd chainage 14 to 44 km documented 38 Indigenous archaeological sites. These sites are protected under Section 39 of the HCA and should be avoided by the proposed road works where possible. Most of the sites were located on the tops of ridges and hills within the

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1 All sites and artefacts are recorded using the UTM coordinate system. The datum is GDA94 and the map grid is MGA94
2 The Heritage Conservation Act 1991 protects all Aboriginal archaeological places and objects using a ‘blanket’ or ‘presumptive’ protection mechanism. This provides interim protection for all such sites until the Minister for the Environment and Heritage, on the advice of the Heritage Advisory Council or its delegates, makes a decision on the significance of the sites. Hence, it is possible to apply to the Minister for a permit to disturb or destroy such a site in the course of proposed works. In practice, it is better to avoid such sites in the planning stage of projects, thereby protecting Aboriginal cultural heritage and reducing the time required for applications etc.
geological Burrell Creek Formation. Generally speaking, these sites will not impact on the proposed gravel extraction or road work activities. However, to expedite the gravel search and extraction process and to mitigate potential damage to archaeological sites, the report recommended areas which are of high, medium, and low risk of either having located or non-located sites within them. These areas are mapped along with the site locations (Attachment 1).

Figure 1: Quartz bifacial point, Site AS1 typical of the bifacial points located during survey in a number of sites.
1.0. INTRODUCTION

1.1. Introduction

Earth Sea Heritage Surveys was engaged by the Construction Division of IPE through Peter Campbell Project Managers to investigate the archaeological and heritage potential of the Litchfield Rd from chainage 14 to 44 km, including a number of gravel search areas and the road reserve of 500 metres either side of the Litchfield Rd. The survey paid special attention to rock outcrops and creeks along the route.

The aim of the survey was to:

1. Locate and record any prescribed archaeological objects or places as defined under the Northern Territory of Australia Heritage Conservation Act 1991;
2. Assess the nature, distribution and significance of archaeological materials;
3. Identify historic places resulting from early non-indigenous settlement, mining and pastoral activities;
4. Provide advice and recommendations regarding mitigative procedures and short and long term management strategies for any materials located during the survey;
5. Ensure, to the greatest extent possible, that sites protected within the terms of the Heritage Conservation Act are not damaged or destroyed by the proposed works.

The scope of works included:

1. Archaeological survey in the vicinity of stream crossings, rock outcrops and other features along the Litchfield Park Road from chainage 14 to 44 km.
2. Survey of twelve gravel search areas (GSA) and access tracks between chainage 14 and 44 km.

The large area of the survey, particularly the extent of the gravel search areas, necessitated a methodology that sampled the archaeological potential of the survey area rather than an intensive ground survey of the entire route. The sampling strategy included random survey of areas within each GSA and stratified sampling of both the GSAs and the road reserve.

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3 Disclaimer: Earth Sea Heritage Surveys provide advice and recommendations aimed at ensuring that no heritage places or objects, including Aboriginal archaeological places and objects are damaged during proposed works. The consultant and the company do not take responsibility for such materials discovered during the course of works that were previously unknown, whether on the surface of the ground or below the ground.
1.2. Scope of the Study

The archaeological study will:

1. Identify archaeological material (prescribed archaeological places and objects) within the areas outlined above by means of a survey. Archaeological sites are to be recorded in such detail as to permit independent assessment of their significance. Location of archaeological places and objects were recorded using Global Positioning System, using GDA94 as the datum.

2. Assess the cultural heritage significance of archaeological places and objects located during the survey.

3. Earth Sea will ensure, to the greatest extent possible, that the Northern Territory Heritage Conservation Act 1991 and other relevant cultural heritage legislation are not contravened during the road construction works. This will be through provision of recommendations regarding compliance with the Heritage Conservation Act and its Regulations.

4. Where practical, mitigation advice will be provided to Construction Division staff during and after the fieldwork in the form of briefings by e-mail and by phone.

Figure 2: Quartz bifacial point and Gerowie Tuff flake, Site AS1
1.3. Legislative Basis for Cultural Heritage Protection

Cultural heritage in the Northern Territory is protected via several different legislative mechanisms. Protected cultural heritage places can be divided into three main areas which are listed below with Northern Territory legislation that is relevant to the development area.

**TABLE 1. LEGISLATIVE BASIS FOR PROTECTION OF INDIGENOUS CULTURAL HERITAGE PLACES**

<table>
<thead>
<tr>
<th>Type of Cultural Heritage Place</th>
<th>Relevant Legislation</th>
</tr>
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<tbody>
<tr>
<td>1. Sites of significance according to Aboriginal Tradition (sacred sites)</td>
<td>Northern Territory Aboriginal Sacred Sites Act 1989; Aboriginal Land Rights (Northern Territory) Act 1976</td>
</tr>
<tr>
<td>2. Indigenous archaeological places and objects</td>
<td>Heritage Conservation Act 1991</td>
</tr>
</tbody>
</table>

The Aboriginal Areas Protection Authority (AAPA) administers the Northern Territory *Aboriginal Sacred Sites Act* 1989, the aim of which is the protection and prevention of the desecration of sacred sites in the Northern Territory and the provision of a clearance mechanism for Government and industry. The AAPA does this through a site registration and Authority Certificate process.

Indigenous archaeological sites are protected under the *Heritage Conservation Act* as ‘archaeological places and objects’. The *Heritage Conservation Act* includes some sacred objects as archaeological objects for the purposes of the Act. These types of places and objects are afforded automatic protection under the *Heritage Conservation Act*, until the Minister makes a decision under Section 26 of that Act that either the place meets the heritage assessment criteria and should be permanently protected, or the place is not significant, and can be disturbed in the course of development or works. The Office of Environment and Heritage is the primary statutory agency for the conservation and protection of these sites.

The *Heritage Conservation Act* provides for the nomination and declaration of places and objects as ‘Heritage Places’ if they are significant to the Northern Territory. There are criteria that are to be applied to such places to assess whether they meet a sufficient level of heritage significance.
1.4. Consultation with Aboriginal Traditional Owners or Custodians of Sites.

The area of study was located almost entirely within the road reserve of the Litchfield Rd or on vacant crown land. Consultations regarding sites of significance according to Aboriginal tradition, otherwise known as sacred sites, are normally undertaken in accordance with the Northern Territory Sacred Sites Act 1989 by the relevant statutory agency, the Aboriginal Areas Protection Authority. The Authority has a Certificate process that provides proponents and landowners a statutory certificate with regards to sacred sites.

Under the Northern Territory legislative framework, there is no statutory requirement for consultation about archaeological sites unless permits to disturb such sites are required\(^4\). In this case, the Heritage Advisory Council Archaeological Sub-Committee forwards these permit applications to the Aboriginal Areas Protection Authority for comment. Therefore, it is highly recommended that the processes of consultation be held through the Aboriginal Areas Protection Authority when Road Projects Division seek Authority Certificates for the Litchfield Road area.

Gravel Search Areas 23 and 24 are with lands owned by the Wagait Land Trust. Applications to enter this land for the purposes of this survey are currently lodged with the Northern Land Council. The results of the survey of these areas will be forwarded after these permits are available.

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\(^4\) However, Earth Sea Heritage Surveys adopts the policy of the Australian Archaeological Association in this matter. This policy consists of consulting with Aboriginal people where-ever and when-ever possible on matters pertaining to Aboriginal cultural heritage.
Figure 3: Existing gravel extraction area, GSA 18.

Figure 4: Quartz outcrops, Site 22AS1.
2.0. ENVIRONMENTAL AND CULTURAL SETTING

The environmental setting of a region is important to analysing past human settlement behaviour and interpreting archaeological features and site patterns. Geomorphology, geology and vegetation of the study area are significant factors in understanding prehistoric archaeological patterns in the landscape. Changes in the landscape may have an influence on the types of archaeological material found and subsequent visibility.

The study area is dominated by the Burrell Creek Formation on the western boundary of the Pine Creek Geosyncline. Soft sandstones, siltstone, shale and phyllite dominate this formation. In the study area there are fewer occurrences of Gerowie Tuff than further to the south, however, there are large numbers of quartz outcrops. These outcrops erode and are modified to produce quartz gravel lag deposits. These are particularly common on the tops of ridges and hills, and were commonly used as a source for stone tools making raw materials.

The methodology of an archaeological survey in this environment should therefore be informed by the geomorphology of the area. A stratified survey (or judgement survey) would use the prevalence of quartz on hill tops and ridges to build a predictive model focusing on these features, particularly where they occur near freshwater sources. This model, built from previous archaeological study in the region, described in greater detail below.

2.1. Geology

The area of survey is part of the Burrell Creek Formation, one of the formations comprising the Finniss River Group. The formation is described as the youngest Early Proterozoic unit in the northwestern part of the Pine Creek Geosyncline (Pietsch & Stuart-Smith, 1988: 17). In the area of study, the formation consists of undulating hills, low ridges and strike ridges, dissected by numerous watercourses. Alluvial flats surround the ridges and hills. These are characterised by their impressive termite mounds built from the silt and sands of the alluvial flats. The Burrell Creek Formation comprises a sequence of shale, phyllite, siltstone, sandstone and minor greywacke, laid down as a submarine fan deposit in which turbidity flow was the main mechanism of sediment transport (Ahmad et.al. 1993:10).

Areas of potential gravel resources are usually located on the slopes away from alluvial flats, where alluvial material has eroded out leaving skeletal soils covering gravel composed primarily of quartz, with some quartzite, calcareous greywacke, argillite and lateritic pebbles.
2.2. Vegetation

The open woodland in the area is dominated by *Eucalyptus miniata* and *Eucalyptus tetrodonta*, with *Eucalyptus latifolia* and *Eucalyptus foelscheana* in small numbers. The understorey is dominated by the sand palm, *Livistonia humilis* in dry areas and *Pandanus spiralus* in wetter areas. The margins of creeks are habitat for occasional *Pandanus aquaticus*. *Sarga sp* (spear grass) dominates the ground story, growing to about 2-3 metres in some places.

Wilson et al (1990) refers to a single vegetation mapping unit in the area, with minor variations:

2.3. **Geomorphology**

There are six main geomorphic units in the Litchfield/Finniss/Reynolds River area:

1. **Black-soil plains**: These plains penetrate inland along the flood plains of the major river systems including the Charlotte and Darwin Rivers. The plains are seasonally flooded;
2. **Alluvial plains**: The plains consist of Quaternary alluvium and colluvium with deep sandy to silty soils supporting open woodland and occasional paperbark/pandanus forest;
3. **Lowlands**: Undulating lowlands of low to moderate relief have developed over granitic, metamorphic and sedimentary rocks. A thin veneer of sandy soil covers the granitic and metamorphic layers. Red and calcareous soils are developed over the sedimentary layers;
4. **Sandstone plateau**: Dominated by sub-horizontal Middle Proterozoic sandstone rising up to 180m above sea level;
5. **Dissected foothills**: Commonly undulating rubbly rises with low hills and strike ridges of poorly exposed early Proterozoic metasediments. The soils are skeletal, gravelly and lateritic;
6. **Dissected uplands**: Rising to 200 metres above sea level. These uplands area formed by prominent, erosion resistant strike ridges and intermittent low rubbly hills. The ridges and hills have boulder-strewn slopes and rocky crests with shallow skeletal soils (After Pietsch and Stuart-Smith 1988:4).

The area of the survey, along the first 14 kilometres of Litchfield Rd is characterised by dissecting foothills, alluvial plains and black soil plains. The area of the survey described by Pietsch and Stuart-Smith (1988:4) as dissected foothills is intermediate between the northern plains common in the Darwin area to the Litchfield Tabletop area, which is characterised with elevations over 200m above sea level. The dissected foothill area can be further subdivided into the following land units:

1. **Low ridges** with outcrops of various sedimentary and metamorphics (primarily quartz and quartzite);
2. **Intersecting alluvial plains**, characterised by the impressive Litchfield termite mounds;
3. **Small riparian environments** around creeks and billabongs (*Pandanus spiralus* common, occasional *Pandanus aquaticus*);
4. **Intermediate zones** between alluvial plains and the foothills and low ridges. These zones are often prime gravel extraction areas, as they do not have the silt overburden of the alluvial plains and have no outcropping country rock. They are characterised by shallow gravelly and rocky soils.
2.4. Hydrology:

Numerous tributaries of the Finniss, Charlotte River (west of the Litchfield Park road) and the Blackmore River (east of the Litchfield Park road) incise the area. These watercourses vary from small wet season channels to creeks containing permanent water holes. Some of these streams are large enough to produce small seasonal wetlands. Wet season conditions in these areas make some areas impassable to normal 4WD vehicles. During the dry season, most of these areas dry out to ‘black soil’ plains with pandanus lined billabongs along the watercourses.

The major watercourse in the region is the Finniss River. This river has a permanent flow based on springs in the higher areas of the Litchfield tableland. Archaeology in Australia often uses the distance from potable water as an indicator of the density of sites. Numerous works (ie Thorley 1998) discuss the relationship between water and site density. If this model is correct, then there should be an increase in the numbers of sites toward the Finniss Valley at the southwestern end of the study area.

2.5. Current land use:

The current land use of the region is a mixture of tourism driven by the Litchfield National Park area, small horticultural and rural lots, gravel extraction, and larger pastoral leases to the west. The Litchfield Road is the alternative route into the National Park used by tourists and locals as a shorter route to Wangi Falls and Walker Creek.

Indigenous people still carry on traditional pursuits in the region, although these are likely to be in the Reynolds and Finniss River wetland areas rather than the foothill areas of the Litchfield Park Road. The existence of sacred sites indicates that the area continues to be of significance to Indigenous people.
2.6. Indigenous Use of Environmental Resources

2.6.1 Aboriginal use of resources in the Top End.

Subsistence strategies of Aboriginal peoples have always been a principal component of archaeological research. Northern Australia has been the centre of ethnographic accounts on the subsistence strategies of Aboriginal groups. Ethno-historical accounts are heavily relied upon in explanations of past human behaviour (Meehan 1977, 1988; Schrire 1972, 1982). The following authors, Schrire (1982), Baker (1981), Meehan et al (1985), Brockwell (1989); Brockwell et al (1995), and Hodgson (1993) can provide more detailed descriptions of Aboriginal ecological ethnography.

The freshwater wetlands of Northern Australia are exceptionally diverse food resource areas. Wetland areas consist of black soil plains, freshwater swamps and lagoons. The black soil plains are seasonally inundated and are only accessible in the dry season. As the waters recede, wild rice (Oryza rufipogon) and the spike rush (Eleocharis dulcis) were utilised and several plants with edible tap roots or tubers are found on the plains (Jones 1980:114; Brockwell 1989:254; Schrire 1972:658). Goannas (Varanus gouldii) and long necked terrapins (Chelodin sp.) were hunted.

Freshwater swamps and lagoons vary in size from small depressions which dry up soon after the end of the wet to large swamps several kilometre’s in size and lagoons which carry water right through the dry (common in the study area). Edible water lilies (Nymphaeaceae) and Eleocharis dulcis were harvested at certain times of the year, particularly the early dry (Jones 1980:114; Jones and Bowler 1980:18; Brockwell 1989:249; Meehan et al 1985:119; Hodgson 1991). Freshwater areas attract large numbers of fauna, crocodiles, water snakes, turtles, fish and shellfish and waterfowl and also more terrestrial animals like the agile wallaby (Finlayson et al 1988). As these animals tend to congregate around diminishing water sources as the dry season moves on, this invariably presents easily caught prey (Jones 1980:114; Jones and Bowler 1980:18; Schrire 1972:658; Meehan 1988:6; Brockwell 1989:249; Hodgson 1993). Plant resources which were utilised in the wider region include yams, water lilies from lagoons, fruits of the cycads, pandanus, Terminalia and Eugenia species, the shoots of young palms and bamboo (Dahl 1927:17). Animal resources mentioned by Dahl include snakes, lizards, bandicoots and other small mammals, kangaroos, and bird’s eggs. Lagoons provided turtles, crocodile, crayfish and mussels (Dahl 1927:17-18).

Baker (1981:60) states that the ethnographic histories of Northern Australia stress the importance of plant foods in Aboriginal economies. Meehan et al (1985) and Brockwell (1988) make these same inferences. Ethnographic information has tended to be the determining factor in positing models for Aboriginal. Seasonality is the main ecological factor that is addressed by previous authors in their explanations of Aboriginal behaviour.
2.6.2 The Litchfield/ Finniss region:

Aboriginal people from a number of language groups occupied the Finniss and Reynolds area prior to European colonisation. The Litchfield Park Road area is on the northern borders of the Werat estate, the traditional owners of the northern section of Litchfield National Park (Gunn, 1991:11). These groups exploited a diverse and rich environment using a hunter gatherer fisher lifestyle, moving through the landscape in a seasonal pattern. Some of these activities have been integrated into the modern Aboriginal economy.

Ecological changes over the last 40,000 years, driven by climate change, intensified the occupation of the area by Aboriginal people (Guse 1997:75). These changes culminated in the establishment of freshwater swamps and large wetlands in the Finniss and Reynolds River area to the west of our study zone during the last 3000 years, further enhancing the abundance of flora and fauna. As an example of this great biodiversity and the richness of the resource base available to Aboriginal people in the Finniss region, E. R Petherick informed Guse’s study that more than 80 species of plant were used by Aboriginal people in the region (Guse 1997: 75).

Ray Petherick reports that the annual cycle of land use saw people use the wetlands during the dry season and the plateau during the wet. Use of the plateau included intensive use of rock shelters on the escarpment to overlook their respective estates (Gunn 1991:11). Petherick also reports that fruits were plentiful in rainforest areas, long yams on the sandy country in the plateau area and vine yams on rock outcrops. Echidna was probably the most plentiful animal food, followed by wallabies, goanna, fish and turtle (Gunn 1991:11).

This subsistence pattern suggests that the main areas of occupation were the Finniss wetlands to the west of our study area and the escarpment country to the south. Rock shelters, rock outcrops and creek margins were important areas to camp and obtain resources. This information informs the methodology of the survey in terms of locating significant archaeological sites.

2.7. Historical background

European settlement in the area began with an expedition to the area by Fred Litchfield from the settlement at Escape Cliffs near the mouth of the Adelaide River. The party mapped the escarpment country now named as Litchfield National Park and found the Finniss, named after the less than illustrious leader of the Escape Cliffs settlement. Litchfield also found gold in the Finniss, ensuring that the area would be visited and occupied shortly after permanent settlement.

This settlement initially came in the form of Chinese miners extracting tin from the Bamboo Creek area. Bamboo Creek Tin Mine, now on the Northern Territory Heritage Register, worked from the 1880s to its closure in 1954. Aboriginal and Chinese people worked the mine, leaving a number of descendants who still live in the area today.
Pastoralism came to the area in the 1920s, with the establishment of Blyth Homestead on the Tabletop Range (now Litchfield National Park). Timber was also a prominent industry in the area during and after WWII. Crocodile and buffalo shooting was pursued on a small scale by local communities. In 1985 the pastoral lease was sold to the Northern Territory Government and was then gazetted as a National Park.
3.0. BACKGROUND ARCHAEOLOGICAL INFORMATION

3.1. Types of archaeological material

According to Burke and Smith (2004:63) an archaeological site is defined as “any place that contains the physical evidence of past human activity” which can take on an “enormous variety of forms”. Archaeologists often make a distinction between relatively dense, localised concentrations of archaeological material and the sparsely distributed materials that surround them. In many areas of Australia there is a continuous scatter of stone artefacts often called "background artefact scatter" or "off-site archaeological material". The density of background artefact scatter varies in response to the nature and amount of past human activity. The geomorphic context of artefacts also affects their visibility and the conclusions that can be drawn about their deposition: for example, artefacts covered in sediment are not visible, and artefacts moved by erosion have a distorted relationship with their original location. As a result, background scatter of archaeological debris is often very important in the reconstruction of prehistory. Within a landscape littered with archaeological material, archaeologists also call unique or rare types of debris or especially dense concentrations of archaeological material "archaeological sites." These sites are taken to reflect that this point was a focus of particular activities, and their identification is usually regarded as important for management purposes.

There are a variety of archaeological site types previously recorded as occurring in the region that are documented in the Northern Territory Archaeological Site Register. According to Burke and Smith (2004:63) the two broadest categories of archaeological site types can be defined as Indigenous archaeological sites and non-Indigenous archaeological sites (more commonly referred to as European or historical sites. Many of the previously recorded sites have been recorded over several decades and the recorders have most likely used different definitions for each site type. For this reason the author has described these site definitions in the broadest sense. The following site definitions can also occur in conjunction with other types. Site types that are known to occur in the Litchfield region are as follows:

Artefact scatters may contain flaked or ground artefacts and hearthstones. Artefact scatters may occur as surface scatters of material or as stratified deposits where there have been repeated occupations. These scatters do not necessarily imply that prehistoric people actually camped on the site; rather, they may only indicate that some type of activity was performed there.

Stone Quarry: A site where stone for flaked or edge-ground artefacts have been extracted from an outcropping source of stone. This is a broad definition a stone quarry and there are further subdivisions of this site type (Hiscock and Mitchell 1993a). According to Hiscock and Mitchell (1993a) most surface hard stone quarries have associated reduction sites.

Knapping locations: consisting of one or more knapping floors, which are discrete scatters of artefacts, anywhere in the landscape, resulting from stone being worked.
at that spot. The criteria for a knapping floor are that the original block of stone can be at least partially reconstructed from scattered flaked stone pieces.

Stone arrangements: can range from simple cairns to more elaborate arrangements. Some stone arrangements were used in ceremonial activities and represent sacred or totemic sites. Other stone features were constructed by Aboriginal people as route markers, territory markers, and walls of huts, animal traps, hides, or seed traps.

Earth mounds are pre-European heaps of raised dirt, which consist mainly of charcoal rich sediment with stone artefacts and evidence of grinding activities (Balme and Beck 1996; Bourke 2000; Guse 1997). Earth mounds in the Northern Territory are generally located in association with the wetland environments of the major northern river systems.

Art sites: include two main types of rock art, engravings and pounding’s where the pattern is one of relief and the pictures were apparently produced by removing material from the rock surface and drawings, stencils and paintings where the material was added to the rock surface (Clegg: 1983). Can also include wax designs.

Rockshelter occupation sites: which contains a deposit of cultural material that has built up over time containing flaked or ground stone artefacts, faunal material and other various items of Aboriginal material culture. Also can contain skeletal remains, wax designs, rock art and grinding hollows.

Shell middens: which are deposits containing shells occurring somewhere in the open, near a beach or estuary or rocky shoreline, or an inland lake or river (see Meehan 1977). These shells have been placed in these deposits by humans exploiting marine resources. Middens may take the form of a thin veneer of shell over the land surface or a thick mound of shell.

Macassan Sites: Associated with Macassan visitation to the northern Australian coastline during the last 300-400 years. Macassan sites are generally characterised by the presence of stone lines, smokehouse depressions, Tamarind Trees and historic objects. Usually located along the coastline and on islands.

Contact sites: contain European materials, such as glass, ceramics or metal that exhibit modification by Aboriginal people. Alternatively, a contact site may be identified by the presence of European objects, which may be unmodified but are the result of transportation to that locality by Aboriginal people. Contact sites represent the interface between Aboriginal and Europeans during the early European expansion into the Northern Territory.

3.2. Northern Territory Archaeological Register Inspection

A search of the Northern Territory Archaeological Site Register held by the Office of Environment and Heritage reveals 126 recorded Indigenous archaeological sites within 30 km of the Litchfield Rd crossing of the Finniss River (Bad Crossing). The same register reports that there are no sites within the study area, owing to the result of a lack of surveys rather than a lack of sites.
Most of these sites have been recorded as the result of academic works focusing on the Litchfield Park area and the Finniss wetlands to the west of the study area (i.e. Gunn 1991 and Guse 1997). Most of the sites are rock shelter art sites, often with associated artefactual material. A number are open artefact scatters, earth mounds, and, on the coastal margins and wetlands, midden deposits.

3.3 Northern Territory Heritage Register Inspection

A search of the Northern Territory Heritage Register indicated that no declared heritage places would be impacted upon by the proposed gravel extraction or road realignment works. The nearest registered Heritage Place to the study area is Bamboo Creek Tin Mine. This site will not be impacted upon by the proposed road development activity.
3.4. Archaeological Investigations in the Finniss/ Litchfield Region.

Archaeological research in the Northern Territory has revealed Indigenous societies exploited with great success the resources of coastal and wetland environments (Jones 1985; Allen and Barton 1989; Brockwell 1989; Hiscock 1993b; Hiscock et al 1992; Meehan et al 1985; Mulvaney and Kamminga 1999; Schrire 1972, 1982). As discussed in this section, the archaeological evidence is mounting that stable Indigenous hunter-gatherer communities existed on Northern Territory wetlands (Brockwell 1996a, 1996b, 2001; Bourke 2000).

Evidence is also mounting that areas on the margins of the wetlands, such as the study area, were used on a cyclical seasonal basis, primarily for hunting, but also to exploit the resources of the smaller black soil plain/ waterhole environment around the Finniss and other waterways.

There have been a number of archaeological studies in the Litchfield/ Finniss area. Prominent among those was a study of Litchfield rock art by R.G Gunn who is quoted above. Gunn’s study focused on the rock art of the sandstone plateau and other sites in association with the rockshelters (1991: 13). Gunn also sought ethnographic information from the traditional owners such as Daisy Majar and others such as Tom, Ray, and Keith Petherick.

Daryl Guse has conducted a number of studies in the area. His study also focused on the archaeological sites on the Tabletop Range and in the McCallum Creek catchment area, and Reynolds River wetlands (Guse 1997: 6; 2005). Guse (2005) records a number of sites across the region informing this survey of the type and distribution of sites expected.
3.5. Archaeological Predictive Site Model

Existing archaeological data from the Litchfield/ Finniss region does not yet allow for the identification of areas that have high and low archaeological site occurrence. This is because, although many land units of the Litchfield uplands and the Finniss wetlands have been subject to archaeological survey, there have been few surveys done in the dissected hill areas that are part of this survey. In fact, this study should add greatly to the archaeological knowledge of the region as it covers a large land area and covers land units that have been under represented in former archaeological surveys.

However, previous surveys on the Burrell Creek Formation geological area in the greater Coomalie Shire have illuminated trends in archaeological site distribution that are relevant for the current study area. Guse (1998b) conducted a review of all previous archaeological research in the Coomalie Shire.

Guse (1998b) analysed all known sites against landform, vegetation, geological and geomorphological units to develop a predictive model of Aboriginal archaeology in the shire. At that time, the review noted that there were only six sites on the Northern Territory Archaeological Database within the Coomalie Shire (Guse 1998b:30). Guse (1998b) then expanded this review to include known sites on geological formations that were within a 50 kilometre radius of the Coomalie Shire. Of the 148 sites in this greater area, over 50 of them occurred within the Burrell Creek Formation, 30 on the Gerowie Tuff formation and 10 in the Mt Bonnie Formation (Guse 1998b33).

Guse also analysed this set of 148 sites by land units. He found that nearly 40 of the sites occurred on hillcrests and 21 on hill slopes. The remaining sites were distributed between alluvial plains, plains, rockshelters, steam banks and waterhole banks. Guse also noted that open artefact scatters were the majority of sites in the Coomalie Shire (Guse 1998b33). Guse’s review of sites in this area indicates that the August 2005 survey should expect to locate a number of open artefact scatters within the study area, principally on hill crests and rock outcrops, particularly when these land units are close to creeks and waterholes.

Subsequently, Woolfe (2005) conducted a survey of the Litchfield Rd chainage 0 – 14 km. This survey located no sites within the study area (the gravel search areas were much smaller than those of the current study, and there were few hills and ridges in the study area of this survey). In July 2005, Woolfe and Guse (2005) conducted a survey of the Coach Rd reserve north of Adelaide River for PowerWater Corporation. This area was completely within the Burrell Creek Formation. The PowerWater survey located 13 Indigenous archaeological sites. Ten of these sites were on ridges and hills and the other three on or near a rock outcrop within 100 metres of permanent water.
Although the results of these surveys are a somewhat incomplete picture of the archaeological site distribution of the greater region, the evidence so far accumulated points to concentrations of sites around the tops of ridges and hills, especially closer to permanent water.

In our study area we would expect this pattern to be reflected in a higher site distribution closer to the Finniss River and Walker Creek in the southwest. The table below summarises the archaeological patterns in this region.

Table 1: Key archaeological patterns in the Litchfield/ Finniss/ Coomalie Regions.

1. Open artefact scatters are the most frequent archaeological site.
2. These sites are most likely to occur within 1000 metres from permanent water.
3. These sites frequently occur on or near rock outcrops.
4. Quartz and tuffaceous chert is the most commonly used raw materials.
5. There is a paucity of archaeological sites located on black soil and sand plains geomorphological units.
4.0. METHODOLOGY

4.1 Project Methodology

As noted in the introduction, the size and scope of the gravel pit areas in this survey necessitated a selection of areas for survey according to a planned methodology. This methodology included:

1. A reconnaissance of every Gravel Search Area on the schedule, for the purposes of locating the boundaries of the area, and assessing the archaeological potential of the place. The extent of each area had been mapped in advance by consultants from Campbell Project Management Services using handheld GPS;
2. Selection of areas within each GSA for intensive ground survey focusing on areas that had high archaeological potential. This selection was made after the reconnaissance stage;
3. Intensive ground survey of the margins of the creek crossings and rock outcrops within 100 metres either side of the existing road centreline;
4. Location of access tracks to each GSA and survey of these by either vehicle or pedestrian transect.

4.1.1 Criteria used to select areas for stratified survey:

Each area was assessed for the extent of existing disturbance, as some had already been used as road gravel pits. Each area was inspected for watercourses, potential permanent or semi permanent water supplies and outcrops of potential stone tool making rock. A decision was then made as to the likelihood of each area having significant archaeological materials. This decision was made on the following criteria:

1. Nearest permanent or semi permanent water supply;
2. Nearest intermittent watercourse;
3. Vegetation type;
4. Nearest outcropping of quartz or other potential sources of stone tool making rock;
5. The existence of any rock shelter within the gravel search area.

If the gravel search area affirmed any of the above five criteria, the area was selected for more intensive survey. This survey consisted of stratified sampling of areas most likely to hold archaeological materials.
4.1.2 Archaeological visibility.

Archaeological visibility is defined by the ability of the archaeologist to locate artefactual material on the ground surface during the survey. Areas that are densely vegetated, covered by a layer of dry vegetation or where every stone looks like an artefact indicates a low archaeological visibility. Areas free of vegetation, such as after a dry season burn are considered to be of high archaeological visibility.

During this project, in the mid dry season, many areas had been burnt creating high ground surface visibility (Up to 100% visibility). Quartz artefacts and other stone tools were highly visible on this ground surface. There were a few areas that had not been burned, and the archaeological visibility was extremely limited (nearly 0%). The average visibility across the project area was estimated as 70-80% of the ground surface.

4.2 Heritage Management Principles

Heritage management in Australia is directed from two chief sources, State and Commonwealth heritage legislation, and the ethics and principles established by the *Australia ICOMOS Charter for the Conservation of Places of Cultural Significance* (hereafter referred to as the Burra Charter). Legislative basis for the protection and conservation of Indigenous archaeological places and objects can be found in Appendix 3. Definitions from the Burra Charter (Maquis-Kyle and Walker 1992:69) are listed below:

- **Place** means site, area, building or other work, group of buildings or other associated works together with associated contents and surrounds.
- **Cultural Significance** means aesthetic, historic, scientific, or social value for past, present or future generations.
- **Fabric** means all the physical material of the place.
- **Conservation** means all the processes of looking after a place so as to retain its cultural significance.
- **Restoration** means returning the EXISTING fabric of a place to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material.
- **Reconstruction** means returning a place as nearly as possible to a known earlier state and is distinguished by the introduction of materials (new or old) into the fabric. This is not to be confused with either recreation or conjectural reconstruction, which are outside the scope of this Charter.

Once the Burra Charter (Maquis-Kyle and Walker 1992:69) has defined these terms it applies a set of conservation principles of which Article 2 states:
“The aim of conservation is to retain the cultural significance of a place and must include provision for its security, its maintenance and its future.”

The principles that are set out in the Burra Charter (Maquis-Kyle and Walker 1992) are those by which the assessment of significance was concluded. As stated above, Cultural Significance means aesthetic, historic, scientific, or social value for past, present or future generations. Significance assessments are a helpful tool in the management of archaeological resources by allowing managers to make informed decisions especially in land use issues. Definitions of these concepts of significance are listed below (Maquis-Kyle and Walker 1992:73)

- **Aesthetic Value.** This 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.** This encompasses the history of aesthetics, science and society, and therefore to a large extent underlies all of the terms set out here. A place may have historic value because it has been influenced, or has been influenced by, an historic figure, event, phase, or activity.

- **Scientific Value.** The scientific value or research potential of a place will depend upon 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.

These values can be applied to the assessment of significance of archaeological sites in the Litchfield/ Finniss area. Scientific value will be a considerable factor in the assessment of significance for the majority of Aboriginal prehistoric sites. Overall the recommendations set out in this report follow the principles of heritage place management that are described in the Burra Charter.

### 4.3. Artefact identification

A requirement for successful archaeological projects involves the accurate identification of archaeological materials as highlighted by Burke and Smith (2004). Since the identification of stone artefacts is basic to the accurate recognition and measurement of the archaeological record it is imperative that people undertaking archaeological surveys be able to differentiate between natural objects and artefacts. Principles of artefact identification employed in this survey follow those recommended by Hiscock (1984) and Holdaway and Stern (2004).

Each time sufficient force is placed on the surface of an isotropic rock it will fracture into two pieces. The fragment that has been struck contains the ring-crack, where fracture was initiated, and is called the flake. The flake is usually the smaller of the two pieces of stone. The larger fragment, from which the flake has been removed, is
called the core. On both the flake and the core the surface that is struck is called the platform. Flakes are identified by the distinctive surface created when they are removed from the core. The classification of artefacts in this survey was based on identifiable characteristics originally outlined by Hiscock (1984, 1989). For an object to be classed as a flaked artefact, it needed to possess one or more of the following characteristics:

- A positive or negative ring crack;
- A distinct positive or negative bulb of force;
- A definite eraillure scar in an appropriate position beneath a platform;
- Remnants of flake scars (dorsal scars and ridges).

These characteristics indicate the application of an external force to a core. Artefact morphologies will be described by using the four types of artefacts as defined by Hiscock (1984:128-129):

- **Flake**: Flakes exhibits a set of characteristics that indicate they have been struck off a core. The most indicative characteristics are ring-cracks, which show where the hammer hit the core. The ventral surface may also be deformed in particular ways, for example a bulb or eraillure scar.
- **Core**: A piece of stone with one or more negative flake scars, but no positive flake scars.
- **Retouched Flake**: A flake that has had flakes removed from it, identified by flake scars on or deriving from the ventral surface.
- **Flaked Piece**: This is a chipped artefact which cannot be classified as a flake, core, or retouched flake. This category is used only when an artefact was definitely chipped but could not be placed in another group.

Other artefacts and implement types that have been identified in the region are listed below following characteristics as outlined by McCarthy (1976), Cundy (1989), Kamminga (1982) and Holdaway and Stern (2004) include:

- **Unifacial Points** are flakes that have been retouched along the margins from one surface (either dorsal or ventral) to give or enhance its pointed shape. These unifacial points are sometimes symmetrical or leaf shaped.

- **Bifacial Points** are retouched onto both ventral and dorsal surfaces of a flake to enhance or give the artefact its point shape. These points may have the platform removed and the proximal end rounded.

- **Serrated Points** are bifacial flaked points that have serrated margins.

- **Edge ground axes**. Classified primarily by the shaping process of flaking, pecking and polishing. These generally have only one working edge that has been ground to a sharp margin but there are also examples with two leading edges.

- **Grindstones** are characterised by a worn and abraded surface (‘s). The surface may either have concave depression of a convex surface.
• **Hammerstones** show use wear on the surface in the forms of abrasion, pitting and edge fracturing with some negative scarring.

### 4.4. Site definition

For the purposes of this project it was necessary to define site boundaries for description and mitigation. Indigenous archaeological sites can contain a wide variety of cultural materials and features. Boundaries of sites that are based on geographical features, such as a rockshelter, can be easily defined. Other sites such as shell middens also have definable limits to the extent of the cultural material. However documenting the end of stone artefact scatters and quarries can prove to be difficult to distinguish between the background scatter and the site proper. According to Burke and Smith (2004:220) the decision on defining the extent of an open site depends largely on the research and survey objectives. For this survey it is important to define site boundaries for the purpose of site management and mitigation in relation to the proposed development. An archaeological open site is defined as a concentration of cultural material with a moderate density relative to the background density of similar types of cultural debris at those or similar points in the landscape. This definition particularly applies to stone artefact densities. Due to presence of a background density of stone artefacts in the general area, clusters of stone artefacts can be defined as a site when the following criteria were met:

- An average density of artefacts of more than 5 times greater than the average density of the background scatter.

- There was an identifiable boundary to the site where either artefact densities diminished sufficiently to be classified as background scatter or environmental features determined a boundary.
5.0. ARCHAEOLOGICAL RESULTS.

5.1. Introduction

This survey located 37 Indigenous archaeological sites. Of these, most are associated with higher ground and are close to sources of raw material (refer to location maps attached).

The stone artefact assemblage across all sites was dominated by quartz artefacts. The major raw material in most sites was quartz consisting approximately greater than 95% of the assemblage. Formal implement types recorded on a number of sites included quartz bifacial points, several sandstone grinding mortars and grinding hollows, a dolerite edge ground axe, quartzite flakes, hornfels flakes, a single tuffaceous chert flake, and a small amount of ground haematite.

Stone artefact densities varied across the recorded sites from 0.01/m² to >50/m² on the quarry sites.

No rock art was located within the study area, as the Burrell Creek Formation does not create favourable rock shelter structures.

5.1.1. Analysis of results:

Table 2: Site numbers by Land Unit

<table>
<thead>
<tr>
<th>Landunit:</th>
<th>Number of sites:</th>
<th>Notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crest</td>
<td>20</td>
<td>Most sites on small knolls and ridges.</td>
</tr>
<tr>
<td>Upper Slope</td>
<td>9</td>
<td>Classified by steeper slope generally away from higher relief points.</td>
</tr>
<tr>
<td>Lower Slope</td>
<td>8</td>
<td>Lower slope on margins of black soil alluvial plain. Often gravel surface.</td>
</tr>
<tr>
<td>Alluvial Flat</td>
<td>0</td>
<td>Generally black or ‘white’ soil plain.</td>
</tr>
<tr>
<td>Creek Margin</td>
<td>1</td>
<td>Includes larger watercourses such as the Finniss.</td>
</tr>
</tbody>
</table>
The archaeological pattern shows a clear trend toward the location of sites on the tops of knolls and ridges. These knolls and ridges were of varying relief, from low rises of several metres to larger hills greater than 50 metres in height. The major reason appears largely to be influenced by the local geology, as quartz outcrops are prevalent in higher relief areas and on the upper, steeper slopes of hills. However a number of the artefact scatters were located on hilltops that provided suitable habitation areas close to nearby resources. (See recommendations: Avoidance of knolls, ridges and hill tops.)

Note: The survey methodology ensured that the full range of landunits in the area were surveyed to minimise skewing the statistical analysis. Therefore these site distributions are not the result of preferential surveying but reflect a genuine trend in the area.

Table 3: Analysis of results: distance from water

<table>
<thead>
<tr>
<th>Distance from permanent potable water:</th>
<th>Number of sites:</th>
<th>Notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 500 metres</td>
<td>3</td>
<td>One major site was only located as it was eroding from the river bank margins.</td>
</tr>
<tr>
<td>500 – 1000 metres</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>1000 – 1500 metres</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>1500 – 5000 metres</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>5000 – 10000 metres</td>
<td>0</td>
<td>Few places within the survey area are at this distance from water.</td>
</tr>
</tbody>
</table>

This test shows that the ‘distance to water’ criterion of the predictive model outlined above does not prove true, at least in this case. This may be due to a number of factors, including the location of the gravel search areas, which are more likely to be a reasonable distance from permanent water. In addition, black soil alluvial plains are, by definition, closer to rivers and creeks. As artefacts and sites are generally covered by soil as a result of the expansion and contraction of the surface across seasons, it would be reasonable to surmise that no artefacts or sites would be locatable in these landunits.
**Litchfield Road 14 – 44 Site Descriptions.**

Table 4: The following table lists all the noted sites and isolated artefacts located within the study area and its immediate environs. An assessment of the significance of these places and objects follows in the discussion section.

<table>
<thead>
<tr>
<th>Site ID</th>
<th>Chainage (km) and Offset (m)</th>
<th>Easting (GDA94)</th>
<th>Northing (GDA94)</th>
<th>Environment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS1</td>
<td>West side of road</td>
<td>687733</td>
<td>8559840</td>
<td>Dissected Uplands. Confluence of Two Sisters Granite and BCF(^3) sandstone. Quartz crops out on slope. Gravel sandy soil. Darwin Woolly Butt Woodland, Veg Map Unit 11. Dominated by <em>Livistonia humilis</em>.</td>
<td>Quartz flakes interspersed amongst quartz outcrop. Average background density of 0.001/m(^2). Quartz outcrops spread over an area of 150 meters (EW) by 200 meters (NS) of the undulating slope. Quartz occurs in variable quality. Ground surface visibility was high averaging around 85%.</td>
</tr>
<tr>
<td>AS1</td>
<td>East side of road</td>
<td>687831</td>
<td>8559850</td>
<td>Dissected Uplands. Confluence of Two Sisters Granite and BCF sandstone. Quartz crops out on slope. Gravel sandy soil. Darwin Woolly Butt Woodland, Veg Map Unit 11. Dominated by <em>Livistonia humilis</em>.</td>
<td>Quartz artefact scatter located on top of the undulating ridge. Appears to be reduction site for quartz quarried from nearby outcrops. Artefacts consist of flakes, retouched flakes, cores, and bifacial points. Approximately 15 artefacts in a 20 meter by 20 meter area. Minimum artefact density of 0.05/m(^2) with a maximum density of 4/m(^2). The area has been significantly disturbed from road grading activities. Ground surface visibility was high around 80%.</td>
</tr>
</tbody>
</table>

\(^3\) BCF = Burrell Creek Formation (Pietsch 1986)
<table>
<thead>
<tr>
<th>Site ID</th>
<th>Chainage (km) and Offset (m)</th>
<th>Easting (GDA94)</th>
<th>Northing (GDA94)</th>
<th>Environment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS2</td>
<td>West side of road</td>
<td>688454</td>
<td>8560800</td>
<td>Dissected Uplands. High BCF ridge overlooking Finniss River valley to north. Large outcrop of BCF SST&lt;sup&gt;6&lt;/sup&gt;. Sandy silty soil. Steep slope to north. Darwin Woolly Butt Woodland, Veg Map Unit 11.</td>
<td>Large open artefact scatter on the top of a ridge. The site is approximately 20 meters by 20 meters in size. Artefact assemblage includes complete and broken quartz bifacial points, numerous quartz flakes, flake pieces, steeply backed retouched flake, igneous hammerstone. Artefact densities averaged approximately 10/m&lt;sup&gt;2&lt;/sup&gt;, with a minimum density of 1/m&lt;sup&gt;2&lt;/sup&gt; and a maximum density of +50/m&lt;sup&gt;2&lt;/sup&gt;. The site has no signs of significant disturbance. Wet season sheet wash and some feral animal disturbance are likely to have had some minimal impact.</td>
</tr>
<tr>
<td>15AS1</td>
<td>180 meters west nearest point to road. 180m @270° from Area 15A Point</td>
<td>698029</td>
<td>8579728</td>
<td>Dissected Uplands. BCF Knoll, coarse grained SST conglomerate. Gravel surface Darwin Woolly Butt Woodland, Veg Map Unit 11. River Annie &lt;1km west</td>
<td>Stone artefact scatter on a small knoll of BCF outcrop on the northern end of a ridge. Site size is 40 meters by 20 meters. Clustered scatter of quartz stone artefacts including flakes, cores, retouched flakes, flake pieces, several broken bifacial points, and one complete bifacial point. Ground surface found on sandstone outcrop. Artefact density average &lt;1/m&lt;sup&gt;2&lt;/sup&gt; with maximum 20/m&lt;sup&gt;2&lt;/sup&gt;. Ground surface visibility 45%. Little evidence of ground disturbance.</td>
</tr>
</tbody>
</table>

<sup>6</sup> SST = Sandstone
<table>
<thead>
<tr>
<th>Site ID</th>
<th>Chainage (km) and Offset (m)</th>
<th>Easting (GDA94)</th>
<th>Northing (GDA94)</th>
<th>Environment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15AS2</td>
<td>50 meters west of road. Opp Area 15 Sign 12m @ 234º from Area 15E</td>
<td>697927</td>
<td>8579297</td>
<td>Dissected Uplands. BCF Knoll, coarse grained SST conglomerate. Gravel surface Darwin Woolly Butt Woodland, Veg Map Unit 11. River Annie &lt;1km west</td>
<td>Small clustered quartz stone artefact scatter on stony knoll. Site is 4 meters by 4 meters in size. Ground surface visibility averaged 25%. Stone artefacts consisted of quartz flakes, retouched flakes, flake pieces and a quartz pounder. Average artefact density is 4/m². Little evidence of ground disturbance.</td>
</tr>
<tr>
<td>15AS3</td>
<td>47 meters west of road. 5m @ 29º from Area 15G Point</td>
<td>697910</td>
<td>8579187</td>
<td>Dissected Uplands. BCF Knoll, coarse grained SST conglomerate. Gravel surface, laterite, quartz pebbles Darwin Woolly Butt Woodland, Veg Map Unit 11. River Annie &lt;1km west</td>
<td>A dispersed scatter of quartz stone artefacts around a BCF knoll. Site is 30 meters (NS) by 15 meters (EW). Ground surface visibility averaged 25%. Artefacts consisted of quartz flakes, retouched flakes, flake pieces, cores, and bifacial points. Average artefact density is 0.25/m² with a maximum of 3/m². A former access track is located to the north of the site, otherwise little evidence of disturbance.</td>
</tr>
<tr>
<td>15AS4</td>
<td>105 meters west of road. 66m @ 251º from Area 15J Point</td>
<td>697908</td>
<td>8578745</td>
<td>Dissected Uplands. High BCF ridge. Outcrop SST. Sandy silty soil. Deeply incised gully on hillside. Darwin Woolly Butt Woodland, Veg Map Unit 11. River Annie &lt;1km west.</td>
<td>A small discrete scatter of stone artefacts on the top eastern edge of a large hill. Site is 5 meters by 5 meters. Site consists of several artefacts, two large meta-sandstone grinding stones, several quartz pounders, a broken dolerite axe, and dolerite flake. The average density for the site is 0.25/m². A background scatter of flaked quartz artefacts (flakes, flake pieces) extends over the top of the hill in low densities (0.01/m²). No evidence of ground disturbance.</td>
</tr>
<tr>
<td>Site ID</td>
<td>Chainage (km) and Offset (m)</td>
<td>Easting (GDA94)</td>
<td>Northing (GDA94)</td>
<td>Environment</td>
<td>Description</td>
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</tr>
<tr>
<td>15AS5</td>
<td>175 meters west of road. 130 meters @ 264° from Area 15H</td>
<td>697840</td>
<td>8578947</td>
<td>Dissected Uplands. Steep elevated BCF ridge. Gravel surface. Darwin Woolly Butt Woodland, Veg Map Unit 11. River Annie &lt;1.5km west.</td>
<td>Approximately 20-25 quartz flaked artefacts in a 30 meter (NS) by 15 meter (EW) area on top of a ridge. Artefacts consist of quartz flakes, cores, retouched flakes, flake pieces. Maximum artefact density is 0.25/m² with an average density of 0.05/m². No signs of significant ground disturbance.</td>
</tr>
<tr>
<td>15BS1</td>
<td>180 meters west nearest point to road.</td>
<td>698029</td>
<td>8579749</td>
<td>Dissected Uplands. BCF Knoll, coarse grained SST conglomerate. Gravel surface Darwin Woolly Butt Woodland, Veg Map Unit 11. River Annie &lt;1km west</td>
<td>A single complete quartz bifacial point on the end of a BCF outcrop.</td>
</tr>
<tr>
<td>15BS2</td>
<td>113 meters west of road. 210 meters @ 231° from Area 15C.</td>
<td>697964</td>
<td>8579487</td>
<td>Dissected Uplands. Large outcrop of coarse grained BCF sandstone conglomerate. Darwin Woolly Butt Woodland, Veg Map Unit 11.</td>
<td>Single proximal end of quartz bifacial point.</td>
</tr>
<tr>
<td>Site ID</td>
<td>Chainage (km) and Offset (m)</td>
<td>Easting (GDA94)</td>
<td>Northing (GDA94)</td>
<td>Environment</td>
<td>Description</td>
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<tr>
<td>16AS1</td>
<td>1.5km west of road. 41 meters north of Area 16B point</td>
<td>696446</td>
<td>8579224</td>
<td>Dissected Uplands/Alluvial Plain. Outcrop of quartz on edge of River Annie floodplain. Quartz laterite gravel, sandy silty soils. Sparse open woodland, with sedge grass, Pandanus. Map Unit 11. River Annie &lt;50m east.</td>
<td>A quartz stone artefact scatter and quarry located on the edge of the River Annie headwaters floodplain over a 65 meter (EW) by 20 meter (NS) area. Outcrop of quartz bedrock with lag deposit of quartz gravel. Outcrop has numerous ground surfaces, evidence of anvil use on bedrock. Quarried quartz bedrock. High densities of flaked quartz with flakes, retouched flakes, cores (bipolar), bifacial points. Dolerite ground axe fragments and flakes present. Artefact densities ranged from 1/m² to 0.25/m² with maximum density of 15/m². No obvious signs of disturbance, some wet season inundation and run off with possibility of feral animal trampling. Ground surface visibility of 65%.</td>
</tr>
<tr>
<td>16AS2</td>
<td>65 meters west of road. 181 meters @ 11° north of Area 16A</td>
<td>697773</td>
<td>8578387</td>
<td>BCF Knoll, coarse grained SST. Ridge parallel to road. Gravel surface. Darwin Woolly Butt Woodland, Veg Map Unit 11. Headwaters River Annie &lt;500m west</td>
<td>Site consists of a small discrete quartz artefact scatter on a knoll. Site is 4 meters by 3 meters in size. Notable presence of quartz pounding/grinding stones. No quartz crops out at this locality. Quartz grinding stones used as anvils (presence of hertzian cone fractures). Other quartz artefacts include flakes, cores, retouched flakes, flake pieces, and bifacial points. Estimated the site has maximum of 20-30 stone artefacts present. No evidence of disturbance. Ground surface visibility of 10%. Quartz Grindstones: (a) 230mm x 170mm x 180mm (b) 150mm x 150mm x 130mm</td>
</tr>
<tr>
<td>Site ID</td>
<td>Chainage (km) and Offset (m)</td>
<td>Easting (GDA94)</td>
<td>Northing (GDA94)</td>
<td>Environment</td>
<td>Description</td>
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</tr>
<tr>
<td>16AS3</td>
<td>122 meters west of road 286 meters @ 339° north of Area 16A</td>
<td>697636</td>
<td>8578478</td>
<td>Dissected Uplands. Western side of BCF ridge, coarse grained SST. Gravel surface. Darwin Woolly Butt Woodland, Veg Map Unit 11. Headwaters River Annie &lt;500m west</td>
<td>A large low density quartz artefact scatter on the top of a large rounded ridge of BCF sandstone. Site is approximately 20 meters (NS) by 15 meters (EW). Artefacts consist of quartz flakes, retouched flakes, flake pieces, cores, and grinding stone. A ground surface was found on an outcrop of SST bedrock. Artefact densities estimated average of 0.1/m² with a maximum of 3/m². No signs of ground surface disturbance. Ground surface visibility 30%.</td>
</tr>
<tr>
<td>16AS4</td>
<td>65 meters east of road. 75 meters from Area 16C.</td>
<td>697794</td>
<td>8577900</td>
<td>Dissected Uplands. Low undulating BCF rounded knoll of coarse grained SST with blocky quartz vein outcrop. Gravel surface. Darwin Woolly Butt Woodland, Veg Map Unit 11. Headwaters River Annie &lt;1km west</td>
<td>Site consists of a quartz artefact scatter and quarry at a quartz outcrop. The site is approximately 20 meters by 20 meters in size. The site has several clustered high density reduction areas with quartz flakes &lt;10mm in size present. Quartz artefacts displayed high proportion of artefact attributes. Quartz outcrop with negative flake scars. Artefact types present include flakes, cores, retouched flakes, flake pieces and bifacial points. Densities ranged from 1/m² to 25/m². No significant disturbance noted although road only 60 meters to west. Ground surface visibility 25%.</td>
</tr>
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<td>Site ID</td>
<td>Chainage (km) and Offset (m)</td>
<td>Easting (GDA94)</td>
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<tr>
<td>16AS5</td>
<td>127 meters east of road. 247 meters @ 146° from Area 16C</td>
<td>697864</td>
<td>8577724</td>
<td>Dissected Uplands. Undulating BCF rounded ridge coarse grained SST. Gravel surface. Darwin Woolly Butt Woodland, Veg Map Unit 11. Headwaters River Annie &lt;1.5km west</td>
<td>A discrete knapping area of quartz artefacts. A reduction site associated with Site 16AS6. The site is approximately 15 meters by 15 meters in size. The site consists of quartz flakes, retouched flakes, flake pieces, cores (including several large cores &gt;15cm) and hammerstones. Several fragments of a meta-quartzite grinding stone slab were noted on the site. Average artefact density is 2.5/m² with a maximum density of 30/m². No sign of ground disturbance noted. Ground surface visibility was 45%.</td>
</tr>
<tr>
<td>16AS6</td>
<td>58 meters east of road. 196 meters @ 159° from Area 16C</td>
<td>697797</td>
<td>8577749</td>
<td>Dissected Uplands. BCF rounded knoll of coarse grained SST with large quartz boulder outcrop. Gravel surface. Darwin Woolly Butt Woodland, Veg Map Unit 11. Headwaters River Annie &lt;1.5km west</td>
<td>Site consists of a series of large quartz boulders that crop out over a 41 meter (NS) by 10 meter (EW) area on the slope of the low ridge. The quartz has been quarried for stone tool manufacture. Evidence consists of negative flake scars, pounding and grinding surfaces on at least six boulders. Some quartz flakes and flake pieces in the site area with a low average density of 0.01/m². No evidence of significant ground disturbance. Ground surface visibility is 60%.</td>
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<tr>
<td>17AS1</td>
<td>160 meters west of road. 67 meters @ 108° from Area 17A 48 meters @ 102° from northern DRCS Tower support line base.</td>
<td>698858</td>
<td>857385</td>
<td>Dissected Uplands. Undulating slope of BCF gravel consisting of laterite, siltstone, and lag deposit of quartz. Outcrop of coarse grained SST on eastern side of slope. Darwin Woolly Butt Woodland, Veg Map Unit 11. Headwaters Lagoon Ck &lt;500 east</td>
<td>A small discrete quartz artefact scatter in a small flat area on the eastern shoulder of the BCF ridge. The site is approximately 10 meters by 4 meters in size. Artefacts consist of quartz flakes, retouched flakes, flake pieces, bipolar cores, and several pounding stones. It is likely that the quartz is quarried from the slope of the surrounding hill. Artefact densities are highest at 10/m² in a 2 meter by 2 meter area with an average density of 1/m². A Telstra DRCS tower is located 50 meters south of the site, which has been significantly disturbed by the clearing. However the site has managed to be avoided owing to the SST outcrop, therefore there are no signs of significant disturbance. Ground surface visibility was 60%.</td>
</tr>
<tr>
<td>17AS2</td>
<td>56 meters east of road. Area 17 sign 130m @ 11°</td>
<td>698812</td>
<td>8573520</td>
<td>Dissected Uplands. Series of low undulating BCF rounded knolls of coarse grained SST outcrop. Gravel surface. Darwin Woolly Butt Woodland, Veg Map Unit 11. Headwaters Lagoon Ck &lt;1km east</td>
<td>A quartz artefact scatter located on a BCF knoll. The site is approximately 25 meters by 15 meters in size. The site consists of a high density knapping area with a significant representation of bipolar cores and retouched flakes. Several broken bifacial points noted. Other artefacts include flakes and flake pieces. Average artefact density is 1.5/m² with a maximum density of 15/m². Immediately to the north is a significantly disturbed area from bulldozing, however the site is unaffected.</td>
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<tr>
<td>17AS3</td>
<td>930m east of main road; 170m due west of track. Area 17 Sign 975m @ 240°</td>
<td>699630</td>
<td>8573878</td>
<td>Dissected Uplands. Series of high undulating BCF knolls and strike ridges of coarse grained SST outcrop. Quartz outcrop and gravel surface on low knoll. Darwin Woolly Butt Woodland, Veg Map Unit 11. Headwaters Lagoon Ck &lt;200 east</td>
<td>A stone artefact reduction and quarry site located on a low knoll at the base of BCF strike ridge. Quartz cobbles crop out as lag deposit and have been quarried. The site is 15 metres (NS) by 10 metres (EW). The site consists of a clustered high density knapping areas of quartz artefacts. Quartz artefacts include flakes, retouched flakes, and cores. A quartzite grinding stone was found on the site. Average artefact density is in +10/m² with a maximum density of +25/m². A low density scatter of quartz artefacts can be found across the nearby slope for a radius of 100 metres. No evidence of significant ground disturbance. Ground surface visibility is 40%.</td>
</tr>
<tr>
<td>17BS4</td>
<td>900m east of main road; 200m due west of track. Area 17 Sign 975m @ 240°</td>
<td>699661</td>
<td>8573888</td>
<td>Dissected Uplands. At base of strike ridges of coarse grained SST outcrop. Darwin Woolly Butt Woodland, Veg Map Unit 11. Headwaters Lagoon Ck &lt;200 east</td>
<td>A single broken edge ground axe made on hornfels.</td>
</tr>
<tr>
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<tr>
<td>17AS4</td>
<td>1.6km east of main road; 400m east of track. Area 17 Sign 1.8km @ 236°</td>
<td>700297</td>
<td>8574370</td>
<td>Dissected Uplands. At base of strike ridge of coarse grained SST outcrop. Slope with gravel surface and lag deposit of quartz cobbles. Blacksoil plan &lt;200m east. Darwin Woolly Butt Woodland, Veg Map Unit 11. Headwaters Lagoon Ck &lt;400 west</td>
<td>A sparse scatter of quartz artefacts found over an area of lag quartz cobble deposit reflecting opportunistic resource use. Artefacts found over a 300 metre (NS) by 80 metre (EW) area. Artefacts include quartz flakes, retouched flakes, flake pieces, cores, and bifacial points. Artefact density averaged 0.01/m² with a maximum density of 0.1/m². No evidence of significant ground disturbance. Ground surface visibility is 65%.</td>
</tr>
<tr>
<td>17AS6</td>
<td>1.58km east of main road; 480m east of track. Area 17 Sign 1.6km @ 251°</td>
<td>700290</td>
<td>8573912</td>
<td>Dissected Uplands. On southern end of strike ridge crest of coarse grained SST outcrop. Gravel surface. Steep slope off crest &gt;25°. Darwin Woolly Butt Woodland, Veg Map Unit 11. Headwaters Lagoon Ck &lt;400 west</td>
<td>Artefact scatter on a flat area on top of a high strike ridge. Site is 20 metres (NS) by 10 metres (EW). The size of the site is constrained by size of hilltop. Artefacts consist of quartz flakes, retouched flakes, flake pieces, cores and bifacial points. A number of broken and whole bifacial points found on this site. High proportion of assemblage consists of quartz flakes &lt;10mm in size. Large cores &gt;150mm were found on the site. Artefact densities averaged at 4/m² with a maximum of 25/m². No evidence of significant ground disturbance, some wet season erosion and sheet wash. Ground surface visibility is 80%</td>
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<tr>
<td>17AS7</td>
<td>1.55km east of main road; 330m east of track. Area 17 Sign 1.59km @ 242°</td>
<td>700196</td>
<td>8574136</td>
<td>Dissected Uplands. Saddle of a long high strike ridge of coarse grained SST outcrop. Outcrop of blocky quartz. Gravel surface. Steep slope off ridge &gt;25°. Darwin Woolly Butt Woodland, Veg Map Unit 11. Headwaters Lagoon Ck &lt;300 west</td>
<td>Quartz artefact quarry and scatter on a saddle between two high points of a BCF ridge. High quality quartz crops out as cobbles and blocky outcrop &gt;20cm in size. The site is 30 metres (NS) by 25 metres (EW) in size. Artefact assemblage includes quartz flakes, retouched flakes, flake pieces, cores, and a meta-quartzite hammerstone. Artefact densities average 1/m² with a maximum density of 10/m². No evidence of significant ground disturbance, some wet season erosion and sheet wash owing to 5° slope. Ground surface visibility is 80%</td>
</tr>
<tr>
<td>17AS8</td>
<td>1.5km east of main road; 330m east of track. Area 17 Sign 1.62km @ 238°</td>
<td>700185</td>
<td>8574246</td>
<td>Dissected Uplands. On top of a long strike ridge of coarse grained SST outcrop. Gravel surface. Steep slope off ridge &gt;25°. Darwin Woolly Butt Woodland, Veg Map Unit 11. Headwaters Lagoon Ck &lt;300 west</td>
<td>Artefact scatter in a flat area on top of a long strike ridge. Site is 20 metres (NS) by 15 metres (EW). Notable features include the presence of 4 large quartzite grinding stones. Several quartz cobbles used as anvils. Site boundary constrained by ridge top edge. Other artefacts include quartz flakes, retouched flakes, cores, and flake pieces. Artefact densities average 1/m² with a maximum density of 5/m². No significant ground disturbance, some wet season erosion and sheet wash. Ground surface visibility is 85%</td>
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<td>17BS1</td>
<td>305m east of main road; 195 metres @ 70° east of Telstra Tower. Area 17 sign 532m @ 203°</td>
<td>698999</td>
<td>8573878</td>
<td>Dissected Uplands. Undulating gravel rise with a low slope. Darwin Woolly Butt Woodland, Veg Map Unit 11. Headwaters Lagoon Ck &lt;1km east</td>
<td>Several quartz flakes and a hornfels flake found within a 20 metre diameter area. A modern steel tomahawk axe head was also found however is likely to be less than 25 years old.</td>
</tr>
<tr>
<td>18AS1</td>
<td>188m east of the main road.</td>
<td>697921</td>
<td>8570426</td>
<td>Dissected Uplands. On northern end of strike ridge crest with blocky coarse-grained SST outcrop. Gravel surface. Steep slope off crest &gt;25°, hill top 87m elevation Darwin Woolly Butt Woodland, Veg Map Unit 11. Finniss River &lt;2km south</td>
<td>A scatter of quartz artefacts on the crest of a high BCK ridge. The site is 30 metres (NS) by 5 metres (EW). The artefact has a significant number of quartz bifacial points. Other quartz artefacts include flakes, retouched flakes, flake pieces, and cores. The average artefact density is 2/m² with a maximum of 25/m². No significant ground disturbance, some wet season erosion and sheet wash. Ground surface visibility is 15% owing to post burn off leaf litter.</td>
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<tr>
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<tr>
<td>19AS1</td>
<td>360m @ 333° to main road. Approx 125m @ 32° to old track.</td>
<td>695899</td>
<td>8568299</td>
<td>Dissected Uplands. Undulating gravel and rubble rise with a low slope. Exposure of quartz cobbles. Darwin Woolly Butt Woodland, Veg Map Unit 11. <em>Livistonia humilis</em> present. Finniss River &lt;2km south</td>
<td>Quartz quarry and discrete knapping area situated on a low BCF rise. Quartz quarried from outcropping cobbles with a high density knapping area at the apex of the rise. The knapping floor area is 10 metres in diameter with a lower density background scatter covering the outcrop 150 metres (NS) and 50 metres (EW). The artefact assemblage consisted of quartz bipolar cores, flakes, retouched flakes, multiplatform cores, and flaked pieces. A dolerite hammerstone, quartzite core, abraded sandstone grinding stone and meta-quartz cobble hammerstones were recorded on the site. Artefact densities averaged 10/m$^2$ with a maximum density of +50/m$^2$. Numerous flakes &lt;10mm in size. No significant ground disturbance, sheet wash and some fallen tree uprooting disturbance. Ground surface visibility is 60%.</td>
</tr>
<tr>
<td>AS1</td>
<td>360m along track north of main road; approx 300m due east of Finniss River channel. 420m west of the western boundary of Area 21</td>
<td>691260</td>
<td>8566079</td>
<td>Alluvial Plains. Silty alluvial levee bank with residual laterite gravel. Likely to be Pleistocene levee bank. Darwin Woolly Butt Woodland, Veg Map Unit 11. Turkey bush in eroded area. Finniss River channel 300 metres west</td>
<td>Site consists of a high density artefact scatter revealed by extensive erosion of the levee bank. The levee bank is next to an old paleo-channel and given amount of laterite pisolith present is likely to be Pleistocene sediments. The scatter is located over a 20 metre diameter area. The site is characterised by high proportion of broken quartz bifacial points and retouched flakes. The assemblage consists of quartz flakes, retouched flakes, flake pieces, cores, bifacial cores, broken flakes, a single tuff flake, sandstone grinding stone and a piece of ground haematite. Average artefact density is 2/m$^2$ with a maximum density of 15/m$^2$. The site is significantly disturbed from erosion and a vehicle access track. Ground surface visibility is 80%. The slope on the levee bank was 5° facing south.</td>
</tr>
<tr>
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<tr>
<td>20AS1</td>
<td>200m past Old Finniss Roadhouse, LHS 50 m.</td>
<td>694692</td>
<td>8568208</td>
<td>Dissected Uplands. Low rubbly rises on LHS of road. Exposure of small quartz outcrops and cobbles. Darwin Woolly Butt Woodland, Veg Map Unit 11 Finniss 3000m south east. Intermittent One Mile Creek 1000 m north west</td>
<td>Site consists of a high density artefact scatter on a small rubbly BCF knoll. Approx 20 flakes and broken flakes. No bifacial points located. Raw material quartz only. One quartz core, single platform with two negative flake scars. Site area approx 15 m in diameter, average artefact density 0.1/m² with maximum of 5 /m². No recorded disturbance to this site.</td>
</tr>
<tr>
<td>21AS1</td>
<td>350m north east of the main road 292m @ 54° from Area 21B corner</td>
<td>691744</td>
<td>8565794</td>
<td>High ground adjacent to Alluvial &amp; Colluvial Plains. A BCF undulating rise of blocky SST outcrop and gravel. Darwin Woolly Butt Woodland, Veg Map Unit 11. Livistonia humilis present. Finniss River &lt;500m south</td>
<td>A moderate-density quartz artefact-scatter on the western side of an undulating rise. The site is a knapping area related to Site 21AS3. Quartz artefacts interspersed within BCF gravels over a 10 metre (NS) by (2 metre (EW) area. Artefact assemblage consists of quartz flakes, retouched flakes flake pieces, cores, and a sandstone grinding stone. The average artefact density is 0.25/m² with a maximum density of 4/m². A background scatter of quartz artefacts extends across the slope away from the site at an average density of 0.001/m². No significant ground disturbance, sheet wash and some fallen tree uprooting disturbance. Ground surface visibility is 80%.</td>
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<td>21AS2</td>
<td>250m north east of the main road. 245m @ 81° from Area 21B corner</td>
<td>691751</td>
<td>8565660</td>
<td>High ground adjacent to Alluvial &amp; Colluvial Plains. A BCF undulating rise of blocky SST outcrop and gravel. Darwin Woolly Butt Woodland, Veg Map Unit 11. Livistonia humilis present. Finniss River m south</td>
<td>The site consists of two sandstone block outcrops, both &gt;300mm in size, with abraded and ground surfaces.. The site is 2 metres by 2 metres in size. A background scatter of quartz flakes and cores were noted surrounding at an average density of 0.001/m².</td>
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<tr>
<td>21AS3</td>
<td>330m north east of the main road. 270m @ 46° from Area 21B corner</td>
<td>691701</td>
<td>8565801</td>
<td>High ground adjacent to Alluvial &amp; Colluvial Plains. A significant outcrop of quartz boulders on the edge of a BCF undulating rise of blocky SST outcrop and gravel. Darwin Woolly Butt Woodland, Veg Map Unit 11. Livistonia humilis present. Finniss River 680m west</td>
<td>The site consists of an extensive and high density quartz quarry. Quartz boulders &gt;500mm in size crop out along a strike of blocky BCF SST. The outcrop has extensive negative flake scars on the bedrock and evidence of anvil activity. Three sandstone boulders &gt;250mm in size had ground/abraded surfaces and pounding marks. The artefact assemblage was characterised high densities of artefacts averaging 20/m² with maximum densities exceeding +100/m². Quartz flakes &gt;10mm were noted. Artefacts consisted of flakes, flake pieces, and cores. There were no signs of significant disturbance. Some wet season sheet wash may occur as the site is on a 4° slope. Some trees in the vicinity of the site have been cut down, circa last 20 years. The ground surface visibility averaged 85%.</td>
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<td>22AS1</td>
<td>East side of road. Ch 37.5 km LHS 120m.</td>
<td>690475</td>
<td>8564250</td>
<td>On sloping ground at northern end of large ridge extending from chainage 37.5 to approx 39 km. Small outcrops of quartz mid slope. Alluvial flats to north east associated with Finniss River floodplain. Darwin Woolly Butt Woodland, Veg Map Unit 11 Finniss River 1300 m to NNE.</td>
<td>Small artefact scatter associated with small quartz outcrop. Height of outcrop approx 100mm. Outcrop has evidence of removal of raw material. Approx 10 artefacts in site of approx 5 by 5 metres. Average density 0.45 m⁻², max 2 m⁻². Artefacts all of quartz, all flakes and broken flakes possibly associated with removal and dressing of raw material. Significant disturbance 50 metres to north in the form of several existing maintenance gravel pits.</td>
</tr>
<tr>
<td>22AS2</td>
<td>West side of road. Ch 37.4 km RHS 100</td>
<td>690456</td>
<td>8564642</td>
<td>Sloping ground aspect NE. Small quartz outcrops and cobbles used for raw material source. Darwin Woolly Butt Woodland, Veg Map Unit 11 Finniss River 1050 m to NE</td>
<td>Small artefact scatter associated with 3 small quartz outcrops. Height of outcrops approx 100mm. Outcrop has evidence of removal of raw material. Approx 5 artefacts in site of approx 50 by 30 metres. Average density 0.1 m⁻², max 2 m⁻². Artefacts all of quartz, all flakes and broken flakes possibly associated with removal and dressing of raw material. Nil disturbance recorded. Vis 100%</td>
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<tr>
<td>22BS1</td>
<td>East side of road Ch 37.4km LHS 400</td>
<td>690739</td>
<td>8564040</td>
<td>1% slope aspect NE. Darwin Woolly Butt Woodland, Veg Map Unit 11. Spiralus on margins near alluvial plain. Finniss River 1000 m to NE.</td>
<td>Two isolated artefacts, quartz flakes approx 300mm apart on sand surface. No other material in situ.</td>
</tr>
<tr>
<td>25AS1</td>
<td>West side of road</td>
<td>688244</td>
<td>8560686</td>
<td>Dissected Uplands. High BCF ridge overlooking Finniss River valley to north. Large outcrop of BCF SST(^7). Sandy silty soil. Steep slope to south and west Darwin Woolly Butt Woodland, Veg Map Unit 11. Walker Creek 2.4 km west</td>
<td>Small open artefact scatter on southern end of ridge, which terminates in a slightly higher knoll. The site is approximately 10 meters by 10 meters in size. Artefact assemblage includes several quartz flakes, flake pieces. Artefact densities averaged approximately 10/m(^2), with a minimum density of 1/m(^2) and a maximum density of +50/m(^2).</td>
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\(^7\) SST = Sandstone
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<tr>
<td>25AS2</td>
<td>West side of road</td>
<td>688454</td>
<td>8560800</td>
<td>Dissected Uplands. High BCF ridge overlooking Finniss River valley to north. Large outcrop of BCF SST. Sandy silty soil. Gentle slope to west down to intermittent small creek and black soil plain</td>
<td>Large open artefact scatter on the top of a ridge. The site is approximately 20 meters by 20 meters in size. Artefact assemblage includes complete and broken quartz bifacial points, numerous quartz flakes, flake pieces, steeply backed retouched flake, igneous hammerstone. Artefact densities averaged approximately 10/m², with a minimum density of 1/m² and a maximum density of +50/m². The site has no signs of significant disturbance. Wet season sheet wash and some feral animal disturbance are likely to have had some minimal impact.</td>
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Darwin Woolly Butt Woodland, Veg Map Unit 11.

Walker Creek 2.4km west
Figure 5: Quartz artefact showing retouched edges, Site 22AS1.

Figure 6: Quartz outcrop used as quarry, Site 22AS2.
6.0. Heritage Significance Assessment

Archaeological and historic sites can be significant in a number of ways:

1. Significant to a group or many groups of people due to their connection to the past;
2. Sites that are significant to a specific group of people because they have religious or spiritual significance to those people (sacred sites for example);
3. Sites that are significant because of their research potential: the importance of the site in answering questions about past human behaviours;
4. Sites that are significant due to their representative uniqueness: sites or places that are rare or unique and are therefore conserved as a representative sample; and,
5. Sites that are significant due to their aesthetic or architectural values.

It follows from this that the significance of sites is assessed in various ways:

1. The significance of Aboriginal sacred sites and sites otherwise important to particular groups of Aboriginal people are decided by Aboriginal people, mostly through the mechanism of the Aboriginal Areas Protection Authority consultation process.
2. The significance of historic sites is decided by the wider community through the mechanism of the Heritage Advisory Council who set up significance criteria covering historic sites and environmental important sites;
3. Sites that may be of scientific significance are assessed by the above process, usually after recommendations by practitioners in that field.

In assessing the significance of archaeological sites, the practitioner will evaluate one or more of the following factors (after Guse 1998:46-47).

1. Is the site likely to have sub-surface artefactual material?
2. Is there diversity in the artefact assemblage?
3. Are the sites unique?
4. Has the site been substantially disturbed?
5. Has the region been subject to a number of quality archaeological studies?
6. Does the site offer significant research potential?
Figure 7: Fragment of sandstone used as mortar, Site 17AS8 Image 1.

Figure 8: Fragment of sandstone used as a mortar, Site 17AS8 Image 2.
6.1. Significance Assessment Methodology:

This report uses the above principles to build a risk assessment approach in assessing the significance of the sites located during the survey. Sites are assessed against the general principles of cultural heritage management set out in Section 4 of this report and against the assessment criteria outlined in Section 6.0 above. Sites and background artefacts are assessed as:

1. Low significance: These sites are unlikely to be nominated to the Northern Territory Heritage Register as they would not satisfy any heritage criteria. In addition, sites in this category often occur in large numbers across the Top End landscape (i.e., isolated artefacts.) These sites can add to our understanding of past lifeways by understanding they’re spatial and possibly temporal distribution. Some may demonstrate some information about technologies used in the past. While these sites are assessed as being of low significance, they are protected by Section 29 and 39 of the Heritage Conservation Act and the impacts of development should be mitigated where possible.

2. Medium significance: These sites may have characteristics that are assessable under one or more of the heritage assessment criteria, however they are unlikely to reach the thresholds necessary for permanent declaration to the Northern Territory Heritage Register. These sites have the potential to add to our knowledge of past lifeways. These sites enjoy the same legal protection as outlined above and should be avoided if at all possible.

3. High significance: These sites may be nominated to the Northern Territory Heritage Register and may, if assessed as of special significance in the Northern Territory by the Heritage Advisory Council, be recommended to the Minister for inclusion in the register.

6.2. Risk of locating additional archaeological materials

This assessment quantifies the possibility of locating additional archaeological materials if works on a site were permitted. This assessment is based on the consultant’s inspection of the site, the local geomorphology, archaeological visibility and a number of other factors. The assessment is categorised as low, medium and high corresponding to the likelihood of these materials being located (mostly sub-surface).
### 6.3. Significance Assessment:

<table>
<thead>
<tr>
<th>Site ID</th>
<th>Chainage (km) and Offset (m)</th>
<th>Easting (GDA94)</th>
<th>Northing (GDA94)</th>
<th>Assessment of significance</th>
<th>Risk of locating additional archaeological materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS1</td>
<td>West side of road</td>
<td>687733</td>
<td>8559840</td>
<td>Low.</td>
<td>Medium: Outcrops such as this may reveal sub-surface artefact associated with extraction of raw materials.</td>
</tr>
<tr>
<td></td>
<td>Approx Ch 43.5km</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS1</td>
<td>East side of road</td>
<td>687831</td>
<td>8559850</td>
<td>Low.</td>
<td>Low.</td>
</tr>
<tr>
<td></td>
<td>Approx Ch 43.5km</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS2</td>
<td>West side of road</td>
<td>688454</td>
<td>8560800</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15AS1</td>
<td>180 meters west nearest point to road</td>
<td>698029</td>
<td>8579728</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>180m @ 270° from Area 15A Point</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15AS2</td>
<td>50 meters west of road. Opp Area 15 Sign</td>
<td>697927</td>
<td>8579297</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>12m @ 234° from Area 15E</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site ID</td>
<td>Chainage (km) and Offset (m)</td>
<td>Easting (GDA94)</td>
<td>Northing (GDA94)</td>
<td>Assessment of significance</td>
<td>Risk of locating additional archaeological materials</td>
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</tr>
<tr>
<td>15AS3</td>
<td>47 meters west of road. 5m @ 290 from Area 15G Point</td>
<td>697910</td>
<td>8579187</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>15AS4</td>
<td>105 meters west of road. 66m @ 2510 from Area 15J Point</td>
<td>697908</td>
<td>8578745</td>
<td>Medium: shows diversity in the artefact raw materials including grinding stones and a broken dolerite axe.</td>
<td>Low</td>
</tr>
<tr>
<td>15AS5</td>
<td>175 meters west of road. 130 meters @ 2640 from Area 15H</td>
<td>697840</td>
<td>8578947</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>15BS1</td>
<td>180 meters west nearest point to road.</td>
<td>698029</td>
<td>8579749</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>15BS2</td>
<td>113 meters west of road. 210 meters @ 2310 from Area 15C.</td>
<td>697964</td>
<td>8579487</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Site ID</td>
<td>Chainage (km) and Offset (m)</td>
<td>Easting (GDA94)</td>
<td>Northing (GDA94)</td>
<td>Assessment of significance</td>
<td>Risk of locating additional archaeological materials</td>
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</tr>
<tr>
<td>16AS1</td>
<td>1.5km west of road. 41 meters north of Area 16B point</td>
<td>696446</td>
<td>8579224</td>
<td>Medium: diversity of artefact, size of site.</td>
<td>Medium.</td>
</tr>
<tr>
<td>16AS2</td>
<td>65 meters west of road. 181 meters @ 11o north of Area 16A</td>
<td>697773</td>
<td>8578387</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>16AS3</td>
<td>122 meters west of road 286 meters @ 339o north of Area 16A</td>
<td>697636</td>
<td>8578478</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>16AS4</td>
<td>65 meters east of road. 75 meters from Area 16C.</td>
<td>697794</td>
<td>8577900</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Site ID</td>
<td>Chainage (km) and Offset (m)</td>
<td>Easting (GDA94)</td>
<td>Northing (GDA94)</td>
<td>Assessment of significance</td>
<td>Risk of locating additional archaeological materials</td>
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</tr>
<tr>
<td>16AS5</td>
<td>127 meters east of road. 247 meters @ 146° from Area 16C</td>
<td>697864</td>
<td>8577724</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>16AS6</td>
<td>58 meters east of road. 196 meters @ 159° from Area 16C</td>
<td>697797</td>
<td>8577749</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>17AS1</td>
<td>160 meters west of road. 67 meters @ 108° from Area 17A 48 meters @ 102° from northern DRCS Tower support line base.</td>
<td>698858</td>
<td>8573851</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Site ID</td>
<td>Chainage (km) and Offset (m)</td>
<td>Easting (GDA94)</td>
<td>Northing (GDA94)</td>
<td>Assessment of significance</td>
<td>Risk of locating additional archaeological materials</td>
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</tr>
<tr>
<td>17AS2</td>
<td>56 meters east of road. Area 17 sign 130m @ 11°</td>
<td>698812</td>
<td>8573520</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>17AS3</td>
<td>930m east of main road; 170m due west of track. Area 17 Sign 975m @ 240°</td>
<td>699630</td>
<td>8573878</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>17BS4</td>
<td>900m east of main road; 200m due west of track. Area 17 Sign 975m @ 240°</td>
<td>699661</td>
<td>8573888</td>
<td>Medium: artefact raw material unusual and location does not fit predictive model of artefact distribution in the area.</td>
<td>Low</td>
</tr>
<tr>
<td>17AS4</td>
<td>1.6km east of main road; 400m east of track. Area 17 Sign 1.8km @ 236°</td>
<td>700297</td>
<td>8574370</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Site ID</td>
<td>Chainage (km) and Offset (m)</td>
<td>Easting (GDA94)</td>
<td>Northing (GDA94)</td>
<td>Assessment of significance</td>
<td>Risk of locating additional archaeological materials</td>
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</tr>
<tr>
<td>17AS6</td>
<td>1.58km east of main road; 480m east of track. Area 17 Sign 1.6km @ 251°</td>
<td>700290</td>
<td>8573912</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>17AS7</td>
<td>1.55km east of main road; 330m east of track. Area 17 Sign 1.59km @ 242°</td>
<td>700196</td>
<td>8574136</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>17AS8</td>
<td>1.5km east of main road; 330m east of track. Area 17 Sign 1.62km @ 238°</td>
<td>700185</td>
<td>8574246</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Site ID</td>
<td>Chainage (km) and Offset (m)</td>
<td>Easting (GDA94)</td>
<td>Northing (GDA94)</td>
<td>Assessment of significance</td>
<td>Risk of locating additional archaeological materials</td>
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</tr>
<tr>
<td>17BS1</td>
<td>305m east of main road; 195 metres @ 70° east of Telstra Tower. Area 17 sign 532m @ 203°</td>
<td>698999</td>
<td>8573878</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>18AS1</td>
<td>188m east of the main road.</td>
<td>697921</td>
<td>8570426</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>19AS1</td>
<td>360m @ 333° to main road. Approx 125m @ 32° to old track.</td>
<td>695899</td>
<td>8568299</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>360m along track north of main road; approx 300m due east of Finniss River channel. 420m west of the western boundary of Area 21</td>
<td>691260</td>
<td>8566079</td>
<td>High: variety in raw materials, manufacture of flakes and points. Difficult to determine age of site from inspection but may be of considerable antiquity, as site is eroding out of a levee bank on the Finniss.</td>
<td>High: site is likely to hold sub-surface artefacts due to the erosion of the levee bank.</td>
</tr>
<tr>
<td>Site ID</td>
<td>Chainage (km) and Offset (m)</td>
<td>Easting (GDA94)</td>
<td>Northing (GDA94)</td>
<td>Assessment of significance</td>
<td>Risk of locating additional archaeological materials</td>
</tr>
<tr>
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<td>-------------------------------------------------</td>
</tr>
<tr>
<td>20AS1</td>
<td>200m past Old Finniss Roadhouse, LHS 50 m.</td>
<td>694692</td>
<td>8568208</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>21AS1</td>
<td>350m north east of the main road. 292m @ 54° from Area 21B corner</td>
<td>691744</td>
<td>8565794</td>
<td>Medium: Associated with AS1, artefacts cover a large area of Gravel Search Area 21, hence the recommendation to avoid this area.</td>
<td>High: Highly likely to hold additional artefacts over a wide area.</td>
</tr>
<tr>
<td>21AS2</td>
<td>250m north east of the main road. 245m @ 81° from Area 21B corner</td>
<td>691751</td>
<td>8565660</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>21AS3</td>
<td>330m north east of the main road. 270m @ 46° from Area 21B corner</td>
<td>691701</td>
<td>8565801</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Site ID</td>
<td>Chainage (km) and Offset (m)</td>
<td>Easting (GDA94)</td>
<td>Northing (GDA94)</td>
<td>Assessment of significance</td>
<td>Risk of locating additional archaeological materials</td>
</tr>
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<td>---------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>22AS1</td>
<td>East side of road.</td>
<td>690475</td>
<td>8564250</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Ch 37.5 km LHS 120m.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22AS2</td>
<td>West side of road.</td>
<td>690456</td>
<td>8564642</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Ch 37.4 km RHS 100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22BS1</td>
<td>East side of road</td>
<td>690739</td>
<td>8564040</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Ch 37.4km LHS 400</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25AS1</td>
<td>West side of road</td>
<td>688244</td>
<td>8560686</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>25AS2</td>
<td>West side of road</td>
<td>688454</td>
<td>8560800</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>
7.0. Recommendations

The following are general recommendations relating to the survey. The Consultants believe that no site is of such significance that it should be added to the NT Heritage Register. However, as described above, these sites are protected by an automatic protection (Section 39, Heritage Conservation Act) until the Minister, on the advice of the Heritage Advisory Council, makes a decision on their significance. It is therefore practical to avoid impacting on these sites rather than applying for a permit to disturb them under the Act. This effectively allows conservation of the sites regardless of their relative significance against the heritage assessment criteria.

The consultant recommends in relation to these sites:

1. That the planned road works and gravel extraction areas avoid impacting on archaeological sites where possible.
2. That a buffer zone of 100 metres is employed between the sites and the proposed works where possible (some sites are within 100 metres of the current road alignment so it is not feasible to buffer these sites by 100 metres).
3. Sites that are located within the proposed road corridor that will be within 100 metres of any proposed road upgrade works may require temporary fencing or flagging prior to construction. The majority of the sites should not require fencing off or flagging. Alternatively, it may be more appropriate to flag the extents of the gravel search areas so as they avoid these sites.
4. That Gravel Search Area 21 be removed from the list of potential areas due to the large quarry and artefact scatters with the area. Site AS1, which has a high potential for sub surface materials, is also within this area and should be avoided.
5. That Gravel Search Areas 23 and 24 be surveyed for archaeological materials following permit approval to enter these lands.
References:


Brockwell, S. 2001 *Archaeological settlement patterns and mobility strategies on the lower Adelaide River, Northern Australia*. Unpublished PhD, Northern Territory University, Darwin


Guse, D 1998b Archaeological Site Patterns in the Coomalie Region, Northern Territory. Unpublished report for Heritage Conservation Branch, NT Department of Lands, Planning and Environment, Quaternary Archaeological Surveys, Darwin.


List of Attachments.

2. Location maps for Indigenous archaeological sites and potential gravel search areas.
Attachment 1. Summary of NT Cultural Heritage Legislation

Heritage Conservation Act 1991

In 1991 the Northern Territory enacted the Heritage Conservation Act which provides a mechanism to conserve heritage in the Northern Territory. Currently the agency responsible for the administration of this Act is the Heritage Conservation Services, Office of Environment and Heritage. The Act provides for the creation of a Heritage Advisory Council (HAC). The HAC assesses and recommends places to the Minister for the Environment for inclusion on the Northern Territory Heritage Register. The Office of Environment and Heritage plays a major role in promoting heritage conservation in the NT and maintains the Northern Territory Heritage Register. The Heritage Conservation Act provides legislative protection for declared heritage places in the Northern Territory.

Indigenous archaeological sites are protected under the Heritage Conservation Act as ‘archaeological places and objects’. The Heritage Conservation Act also has a provision to protect sacred objects. As both sites are afforded automatic protection under the Heritage Conservation Act 1991, the Office of Environment and Heritage, is the primary statutory agency for the conservation and protection of these sites.

The Heritage Conservation Act also provides for the nomination and declaration of places and objects as ‘Heritage Places’ if they are significant to the Northern Territory. There are criteria that are to be applied to such places to assess whether they meet a sufficient level of heritage significance.

Northern Territory Aboriginal Sacred Sites Act 1989

The Aboriginal Areas Protection Authority administers the Northern Territory Aboriginal Sacred Sites Act 1989 the aim of which is the protection and prevention of the desecration of sacred sites in the Northern Territory.

Aboriginal Land Rights Act (Northern Territory) 1976

The Aboriginal Land Rights Act 1976 (ALRA) establishes the role of Aboriginal Land Councils in the Northern Territory. The Act also places protective measures on sacred sites within Aboriginal Land Trusts. The ALRA cannot protect sites outside of Aboriginal Land Trusts. The Land Councils are required to maintain a Land Information Register, which usually includes details of Traditional Aboriginal Owners and site information. Like the Aboriginal Sacred Sites Act 1989, ALRA is limited to provide a protectionist framework for sites of significance according to Aboriginal tradition.

Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The function of the Aboriginal and Torres Strait Islander Heritage Protection Act 1984 is "An Act to preserve and protect places, areas and objects of particular significance to Aboriginals, and for related purposes." Its purposes are:
“... The preservation and protection from injury or desecration of areas and objects in Australia and in Australia and in Australian waters, being areas and objects that are of particular significance to Aboriginals in accordance with Aboriginal tradition.”

(Section 4)

The Act was intended for use as a last resort to protect Aboriginal heritage where state and Territory laws are ineffective or there is unwillingness to enforce them (Evatt 1996:5). Protection is provided indirectly by enabling the Minister to make short and long-term declarations to protect areas and objects of significance to Aboriginal people. These declarations are supported by a system of criminal penalties. The Hon Elizabeth Evatt undertook a comprehensive review of the Commonwealth Aboriginal and Torres Strait Islander Heritage Protection Act in 1995.

Environment Protection and Biodiversity (EPBC) Act 1999

The commencement of the Environment Protection and Biodiversity Conservation Act (EPBC Act) began on the 16 July 2000 to replace the following Commonwealth legislation:

- Environment Protection Act 1974
- Endangered Species Protection Act 1992
- National Parks and Wildlife Conservation Act 1975
- World Heritage Properties Conservation Act 1983
- Whale Protection Act 1980

The EPBC Act is primarily concerned with the protection and conservation of those aspects of national environmental significance. In repealing the above Acts, this Act attempts to consolidate into one statute most of the Commonwealths responsibilities for the environment. There are three major sections to this Act, environmental assessment and control, biodiversity conservation, and enforcement and administration. The EPBC outlines a process of referral for environmental assessment and approval. This is meant to ensure that “actions which are likely to have a significant impact on a matter of national environmental significance are subject to a rigorous assessment and approval process” (Environment Australia 1999:4).

The Act also provides for the protection and management of protected areas including Commonwealth reserves (national parks), World Heritage Properties, Ramsar wetlands and biosphere reserves. Enforcement and administration provisions establish several advisory committees, reporting mechanisms on the state of the environment, environmental audits and powers to remedy environmental damage caused by a contravention of the Act.
Location Map 1
Gravel Search Area 15 and 16, Litchfield Rd 14 km to 44 km.

Legend

Boundary of Gravel Search Area

Archaeological site

Mapping by Earth Sea Heritage Surveys
October 2005
Base map:
1:100,000 scale
Bynoe 5072
Location Map 2

Gravel Search Area 17, Litchfield Rd 14 km to 44 km.

Legend

Boundary of Gravel Search Area

Archaeological site

Access track

Alternative gravel search area

Mapping by Earth Sea Heritage Surveys
October 2005
Base map: 1:100,000 scale
Bynoe 5072
Location Map 3
Gravel Search Area 18 and 19, Litchfield Rd 14 km to 44 km.

Legend

Boundary of Gravel Search Area

Archaeological site

Access track

Alternative gravel search area

Mapping by Earth Sea Heritage Surveys
October 2005
Base map:
1:100,000 scale
Bynoe 5072
Reynolds River 5071
Location Map 4
Gravel Search Area 20, Litchfield Rd 14 km to 44 km.

Legend
- Boundary of Gravel Search Area
- Archaeological site
- Access track
- Alternative gravel search area

Mapping by Earth Sea Heritage Surveys
October 2005
Base map:
1:100,000 scale
Bynoe 5072
Reynolds River 5071
Location Map 5
Gravel Search Area 21 and 22, Litchfield Rd 14 km to 44 km.

Legend

Boundary of Gravel Search Area

Archaeological site

Access track

Alternative gravel search area

Mapping by Earth Sea Heritage Surveys
October 2005
Base map: 1:100,000 scale
Reynolds River 5071
Location Map 6
Gravel Search Area 25, Litchfield Rd 14 km to 44 km.

Legend

Boundary of Gravel Search Area

Archaeological site

Access track

Alternative gravel search area

Mapping by Earth Sea Heritage Surveys
October 2005
Base map:
1:100,000 scale
Reynolds River 5071
Location Map 7

Gravel Search Area 26, Litchfield Rd 14 km to 44 km.

Legend

Boundary of Gravel Search Area

Archaeological site

Access track

Alternative gravel search area

Mapping by Earth Sea Heritage Surveys
October 2005
Base map:
1:100,000 scale
Reynolds River 5071