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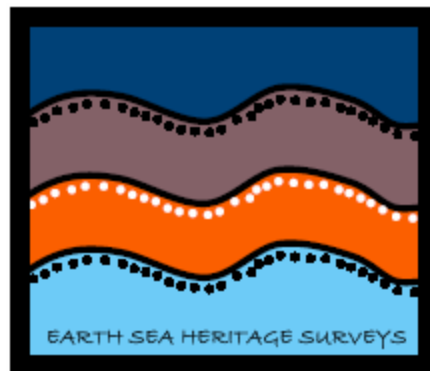
Victoria Highway Chainage 185 to 220 km Archaeological Report

Prepared for:

**Construction Division,
Department of Planning and Infrastructure
Northern Territory Government.**

by

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Executive Summary

Earth Sea Heritage Surveys were engaged by the Construction Division of the NT Department of Infrastructure and Planning to conduct a reconnaissance archaeological survey of potential gravel and fill extraction areas in the Victoria River Region as part of wider preliminary environmental reporting for the project as per the *Northern Territory Environmental Assessment Act 1994*. The scope of works for the survey included extensive sampling of four high priority areas, reconnaissance of a six other areas plus a desktop cultural heritage assessment of parts of the current alignment of the Victoria Highway west of the current Victoria River crossing. This included the development of an archaeological risk management model to aid future planning for the gravel extraction and road development.

Results Summary

The survey located seven archaeological sites and four background scatters of isolated artefacts in and near the areas of interest for gravel extraction. These included several sites of high archaeological and cultural heritage significance (RG7 AS02 to RG7 AS06). These sites consisted of features such as two historic graves, a carved boab, and extensive open stone artefact scatters. These sites are located on the river terraces around the boundary of Area RG7. Another artefact scatter was located in the river gravel of Area RG3. This site is potentially rare in the Northern Territory, being one of the few recorded stone artefact scatters located in a river bed in the Top End. A number of background scatters were recorded, however these tended to be of lower archaeological significance.

The review of the known archaeological record and this survey found that the banks of the Victoria River are an archaeologically significant zone. The Victoria River has been a focal point and resource for Indigenous people over millennia. Since European settlement, early explorers and the pastoral industry have used the Victoria River for a number of activities, further contributing to this rich archaeological resource. Therefore the levee bank zone along either side of the Victoria River tends to have a high archaeological potential. This includes a high sub-surface potential in this area. Despite this, the survey found that there tended to be areas away from the river where the archaeological potential diminished significantly. Some of the gravel search areas are located in these zones.

These Indigenous archaeological places recorded in this survey are considered significant within the terms of the NT *Heritage Conservation Act 1991* (HCA). These sites are afforded protected under Section 39 of the HCA and should be avoided by the proposed exploration works¹.

A risk management model for the project area has been developed in order to inform the future planning of the project. It is recommended that the archaeological sites recorded in this survey are avoided by the proposed development. It is also recommended that the area surrounding the proposed gravel search RG7 area is also avoided owing to its high level of archaeological sensitivity.

¹ The *Heritage Conservation Act* protects all Aboriginal archaeological places and objects using an 'automatic' 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 efficacious to avoid such sites in the planning stage of projects, thereby protecting Aboriginal cultural heritage and reducing the time required for applications etc.

1.0. INTRODUCTION

1.1. Introduction

Road Projects Division commissioned this survey to undertake archaeological inspections of the following areas: Area 24; Area 26; RG7; RG3. Proposed gravel search areas were also included for reconnaissance to assess archaeological and cultural heritage potential: Area 30; Area 21; Area 22; Area 27; and Area 29. In addition, the brief requested that a desktop assessment of the cultural heritage potential of the current road alignment be undertaken between chainages 185 km and 229 km. Recommendations and the assessment of the archaeological potential and risk to Indigenous cultural heritage places along the Victoria Highway and the road alignment are included at the end of this report.

The aim of the survey was to locate and record any prescribed archaeological objects or places as defined under the Northern Territory of Australia *Heritage Conservation Act* 1991. If located, the survey aimed to assess the nature, distribution and significance of these materials within the areas to be impacted upon by the bridge and road works. In addition, the survey aimed to identify historic places resulting from early non-indigenous settlement, mining or pastoralism activities in these areas. The results of the survey have been used to develop a archaeological risk management model for use by the project developer.

This report details the physical and cultural environment of the general area of the Victoria Highway immediately west of the Victoria River crossing. It notes the current land use and any available information of past land uses particularly by Aboriginal people. The report also briefly describes the ethnographic and ethno-historical information available on the area as well as the previous archaeological work undertaken in the region. This report contains the tabulated results and cultural heritage assessment of the areas that were inspected and reconnoitred. Following the gravel search area tables is the tabulated archaeological site and background scatter descriptions recorded during the survey. The final part of this report is a section on general cultural heritage recommendations that will be elaborated further in the final report. The brief also required recommendations regarding mitigative procedures where appropriate, and the formulation of short and long term management strategies for any materials located in the proposed development area if necessary.

The archaeological survey of the proposed Victoria Highway gravel search and fill areas was conducted in December 2005 by Daryl Guse and Richard Woolfe. Site mapping for this report was prepared by Richard Woolfe.

1.2. Scope of the Study

The archaeological study will:

- Identify archaeological material (prescribed archaeological places and objects) within the proposed development areas 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 System².

- Test previous archaeological site location models and evidence from previous archaeological surveys.
- Assess the cultural heritage significance of archaeological places and objects located during the survey.
- The consultant will make recommendations to ensure compliance with the Northern Territory *Heritage Conservation Act* and its Regulations and other relevant cultural heritage legislation.
- Develop an archaeological risk management for the Victoria Highway roads project.

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

| Type of Cultural Heritage Place | Relevant Legislation |
|--|---|
| 1. Sites of significance according to Aboriginal Tradition | <i>Northern Territory Aboriginal Sacred Sites Act 1989</i> ; <i>Aboriginal Land (Northern Territory) Rights Act 1976</i> |
| 2. Aboriginal archaeological places and objects | <i>Heritage Conservation Act 1991</i> |
| 3. Declared Heritage Places | <i>Heritage Conservation Act 1991</i> |

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 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 places 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.

² The survey datum was GDA94, the map grid MGA94. In the Northern Territory, this is within 1 metre of WGS 84.

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. Victoria River Region

The area of study was located within areas of Coolibah Station, the crown road reserve, crown land of the beds and banks of the Victoria River and freehold Aboriginal Land. The road reserve is now fenced for the greater part of the Highway limiting access by stock from the adjoining pastoral leases. Some of the areas near the creek crossings are used by local Aboriginal people and tourists as a stop over point. Following the gazettal of Gregory National Park, the economy and land use of the Victoria River district is now dominated by tourism. Pastoralism is still an important industry, as is the growing importance of the Defence Force use of the Bradshaw Field Training Area.

1.5. Consultation with Traditional Owners

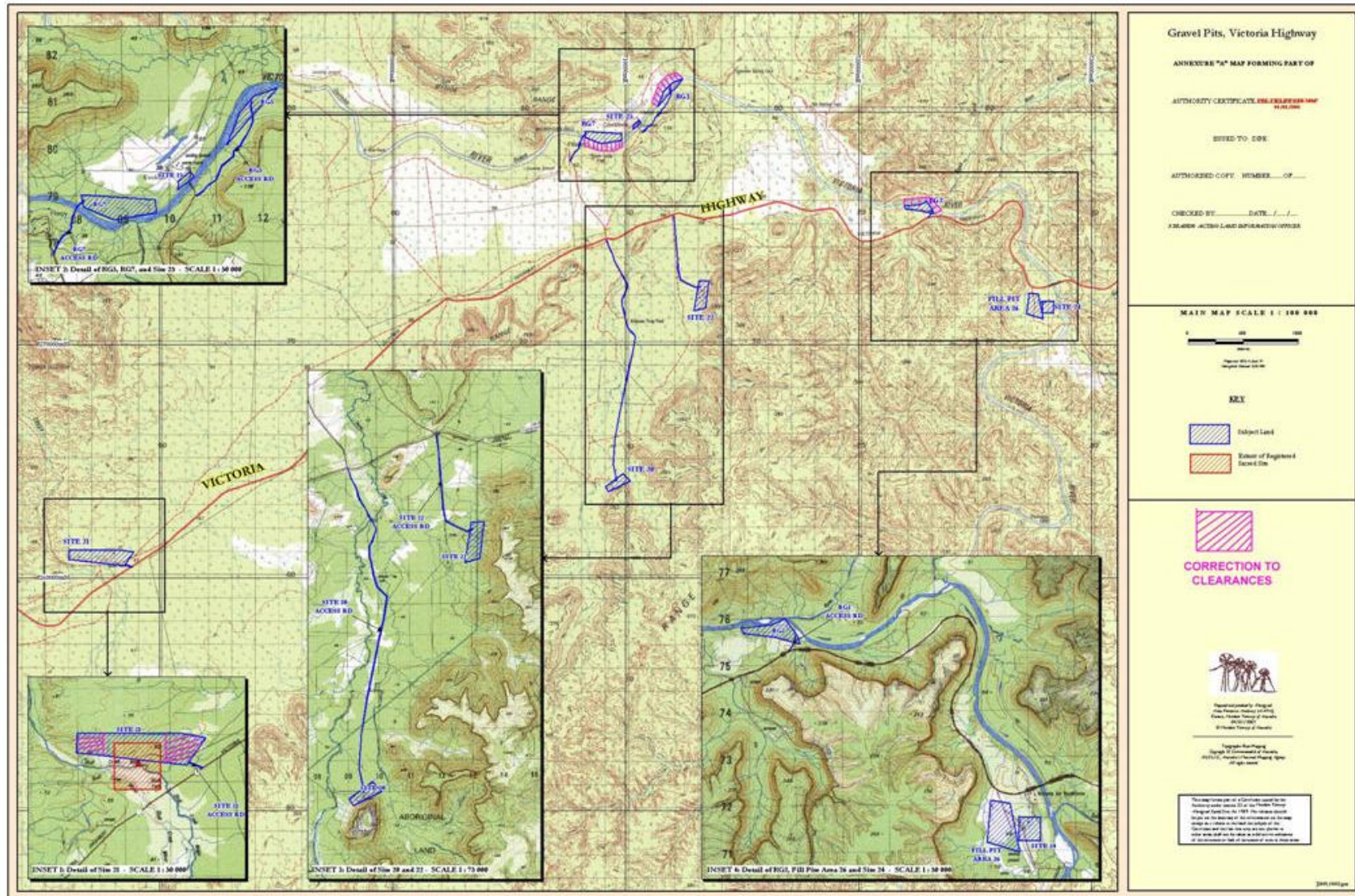
Consultations regarding sites of significance according to Aboriginal tradition, otherwise known as sacred sites, are normally undertaken in accordance with the Northern Territory *Sacred Sites Act* 1989 by the relevant statutory agency, the Aboriginal Areas Protection Authority. The Authority has a 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 required³. In this case, the Heritage Advisory Council Archaeological Sub-Committee forwards these permit applications to the Aboriginal Areas Protection Authority for comment. The Road Projects Division has begun the processes of consultation through the Aboriginal Areas Protection Authority to seek Authority Certificates for the project area and with the Northern Land Council over areas subject to Native Title.

In this case, consultations were held by Department of Planning and Infrastructure with the traditional owners of the land and representatives of the Northern Land Council. This led to the outlining of the proposed gravel and fill extraction areas. Local consultations were undertaken by Earth Sea Heritage Surveys to obtain permission to enter lands.

³ 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 1: Map showing the location of the proposed gravel search areas



2.0. ENVIRONMENT AND INDIGENOUS LAND USE

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.

2.1. *Geology and Geomorphology*

The creek and river crossings examined in this report are located within the greater Victoria River Plateau, which is a partly dissected plateau underlain by siltstone, sandstone and the carbonate rocks of the Auvergne and Bullita Groups (Sweet 1972:6). The area is dominated by the imposing escarpments of Stokes Range, part of Gregory National Park to the immediate south. These escarpments rise over 100 meters to Stokes Range, a sedimentary formation capped by weathering resistant sandstone.

The geology of the Stokes range area is dominated by the Jasper Gorge Sandstone formation, which includes quartz sandstone, minor conglomerates and greyish green siltstone. Nearer to Joe Creek, the Wondoan Hill formation, predominantly massive basal quartz sandstone, green and buff siltstone and some minor conglomerates dominate the area. The Stubb formation borders on the Lost and Sandy Creek catchment areas. This formation is predominantly grey and purple micaceous siltstone and shale with sandstone near the top of the escarpment (Sweet 1972: 10). These formations were deposited in shallow marine conditions during the Proterozoic era and have undergone a number of uplifting and erosion events followed by further sedimentary deposition before being uplifted to their present position.

The Fitzroy Range to the north of Stokes Range and south of the Victoria Highway is dominated by the Wondoan Hill formation. This formation consists of blocky to tabular cross-bedded sandstone, some of which contains glauconite, hematite bands and pebble lag deposits (Beier et al, 2002:9). This formation also occurs on the southern bank of the Victoria near Coolibah Station (Gravel area RG3). The flanks of the Fitzroy Range are dominated by the Bynoe Formation. The lithography of this formation consists primarily of medium to massive bedded micaceous dolomitic siltstone, minor mudstone and dolarenite (Beier et al, 2002:8). Skull Creek, at the western end of the project area, is dominated by the Skull Creek formation.

Lost, Sandy and Joe Creeks are some of a number of intermittent watercourses dissecting the Stokes Range massif to the south of the Victoria Highway. These creeks flow south to north to join the Victoria River. These creeks hold water during most of the dry season; however, it appears unlikely that any permanent water holes exist on any of these creeks within 300 meters of the crossing point.

2.2. Land Systems and Vegetation

The area of interest is located within the rugged stony country of the Pinkerton land system (Gregory, 1995:6). This system is characterised by rocky sandstone outcrops and skeletal soils closer to the escarpments grading to deeper alluvial soils on the flood plains of the Victoria and the lower reaches of the tributary creeks. The upper reaches of the catchment areas are dominated by open eucalypt woodland and spinifex species. Downstream at the crossing, soils change and the area is dominated by northern box-bloodwood woodland (*E. tectifera*, *E. foelsheana*, *E. latifolia*) (Gregory, 1995:6).

2.3. Indigenous Use of Environmental Resources

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 (1991) can provide more detailed descriptions of Aboriginal ecological ethnography.

Freshwater areas of Northern Australia tend to provide exceptionally diverse food resources. Wetland areas generally 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 kilometers in size and lagoons which carry water right through the dry. 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 also 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 1991). Plant resources that were utilised by Indigenous hunter-gatherers 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 and billabongs provided turtles, crocodile, crayfish and mussels (Dahl 1927:17-18).

According to ethnographic information water plant foods, turtles, file snakes, waterfowl and their eggs and various fish species were exploited by Indigenous communities (Brockwell 1989:255; Meehan 1988; Hodgson 1991). Brockwell (1989:255) states that during the wet season possums and wallabies were hunted while yams and wet season fruits were gathered.

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.

These studies are applicable in the Victoria River region, with their distinctive braided channel systems feeding into the main river. This pattern of utilisation of wetlands and billabongs, along with use of wider plains areas for hunting and foraging was repeated along the Victoria and its tributaries. This pattern of use should be reflected in the archaeology of the region, with extensive rather than intensive use of the river channel areas (i.e. should be reflected by extensive background scatters over high use sites).

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 authors have 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 Victoria River 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 1993). According to Hiscock and Mitchell (1993) most surface hard stone quarries have associated reduction sites.
- Knapping locations consisting of one or more knapping floors 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.
- Rock Art sites, include two main types of rock art, engravings and pouncing'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 including ancestral human skeletal remains, wax designs, rock art, grinding hollows, and caches of material culture objects.
- *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.
- *Hawk hunting hides* are small stone arrangements approximately 1 metre high and 1.5 metres in diameter that are unique to the Victoria River region. It is inferred that these sites were constructed specifically for the hunting of birds of prey. The hides are generally circular in shape constructed out of dry stone walls using locally available stone.
- *Carved Boabs* represent boab trees on which words, patterns, or pictures have been inscribed into the bark.

3.2. Historical background

The first European to reach this part of the Victoria River was the British maritime surveyor John Stokes (Hordern 2002: 186). Stokes walked overland to a point 70 kilometres upstream of Timber Creek adjacent to the Fitzroy Range to the west of Joe Creek. Although he didn't reach the Range named for him, later explorers labelled their maps Stokes Range.

AC Gregory and other traversed the area in 1856, naming many of the features we know today, including many of the creeks west of the Victoria River Crossing (Favenc 1998: 247). Thirty years after Gregory's exploration of the Victoria River district, pastoralists and miners moved into this part of northern Australia. This inaugurated an era of change for the Aboriginal people of the district, as traditional economies disintegrated under the combined impact of loss of lands and access to resources. Heritage features of the frontier era a common in the Victoria River District including carved boabs, the remains of timber stockyards, historic homesteads, lone graves and river crossings are some of the relics of this era.

A number of investigations of historic cultural heritage within the Victoria River region help to characterise the type of historic features likely to be encountered within the study area. The early European settlement of the Northern Territory was largely characterised by mining in the

Pine Creek region and the development of the pastoral industry in the Katherine, Daly, and Victoria River districts. The Vestey's cattle empire controlled a chain of cattle stations that stretched from Victoria River, crossing the Daly River and through to Katherine and Brocks Creek. The Daly River region also saw the establishment of several Missions. These historical developments had significant impacts on traditional Aboriginal life and occupation within the region. Aboriginal families and groups gravitated towards these various settlements and pastoral stations. World War II developments were mostly concentrated along the Stuart Highway. Intrusion from World War II in the remote areas was mostly limited to patrols by the North Australia Observer Unit (NAOU) and aircraft crashes.

This report uses the historic thematic framework established by Heritage Surveys (2000) for the Northern Territory. For a more detailed explanation of the rationale for this framework please see the report titled *Northern Territory Historic Thematic Framework Project* by Heritage Surveys (2000). According to Heritage Surveys (2000) there are a number of historic themes that can be explored and applied to the heritage of Northern Territory. The following table illustrates the six broad historic themes that are applicable to this project.

Table 2. Historic Thematic Framework for the Northern Territory (Heritage Surveys 2000:30-32).

| Theme | Description |
|-----------------------|---|
| Making a Profit | This theme relates to commercial and economic activities in the Northern Territory, with the sub-theme of 'commerce' including retailing, manufacturing and service industries including the provision of financial services. This theme also incorporates all activities related to primary production and primary extraction including pastoralism and other agriculture, mining and fishing. |
| Imposing Authority | The development of political authority and the application of law and order by the nation state are encompassed within this theme. Sub-theme 2A includes places reflecting government administration, government utilities and the administration of the justice system, while sub-theme 2B is related to the exploration and surveying of the Northern Territory. |
| Defeating Distance | Isolation is a constant thread through the Northern Territory history. Defeating distance relates to mechanical communications such as the overland telegraph and transportation including aviation, marine navigation, navigation, and road transport. |
| Serving the Community | This theme relates to the wide range of community services provided by colonial, state and commonwealth governments, community organisations and cultural and religious groups |
| Making a Home | Northern Territory homes are the focus of this theme, which deals with government and private housing. |
| Conflict | The first sub theme recognised under the theme conflict relates to conflict associated with Aboriginal resistance to the development of European control. Australia's front line encompasses heritage sites relating to the defence of northern Australia by the nation state, and is principally, although not exclusively, concerned with military activities during the Second World War. |

It is important to note that Heritage Surveys (2000:32) does not attempt to recognise ethnicity as a separate historic theme. As Heritage Surveys (2000:32) explains, the creation of such categories leads to the risk of reinforcing undesirable stereotypes, and the use of any ethnic category would involve the arbitrary decision regarding which ethnic group to include and exclude. These themes are also created without recognising any specific time period in order that historic places may be viewed with the "...perspective of their entire existence" (Heritage Surveys 2000:32)

Many of the historic themes documented by Heritage Surveys (2000) should be applicable to historic places identified in the subject area. The Australian Heritage Commission developed a guide to *Australian Historic Themes: A framework for use in heritage assessment and management 2001*. This historic theme framework will be utilised to assess historic places within a national context.

The history of the region has been influenced by the general themes identified by Heritage Surveys (2000) in the Northern Territory's history. Therefore it is expected that historic places likely to be encountered within the area of interest will be related to the pastoral industry, mineral exploration, and places of historic occupation by Aboriginal people. The density of historic heritage is expected to increase in the areas in the vicinity of established pastoral stations, the river and the Victoria Highway.

3.3. Archaeological Research in the Victoria River Region

The Victoria River Crossing area is part of the Wardaman country, which stretches from Flora west of Katherine to Timber Creek (Tindale, 1974: 237). This language group consists of a large number of clan groups who in previous times moved across the Victoria River landscape in seasonal migration patterns. It is not within the scope of this report to present a thorough ethnographic description of the area. It is sufficient to report that the area is rich in archaeological materials, a fact borne out by the large number of entries for the place on both the Register of Archaeological Places and the Sacred Site Register. It is important to realise the Victoria River area has a continuous Aboriginal relationship with the land.

In the past, archaeological research in the Victoria River area has traditionally focused on the area's rich rock art. A number of researchers have studied in the area. A considerable quantity and significant diversity of rock art sites occur throughout the Victoria River region (Flood and David 1994; Lewis 1984; Lewis and McCausland 1987; McNickle 1991; McWilliam 2002; Tacon 1999). According to Josephine Flood (1990:102), the Victoria River rock art style appears stylistically as a hybrid between the Kimberley Wandjana style and the Top End 'x-ray' style

There have been numerous studies in the Victoria River region that provide valuable information regarding archaeological site types and distribution in the landscape. The most recent of these having been the important investigation and synthesis of Indigenous (pre and post contact) settlement patterns in the Victoria River region by Gregory (1998). This thesis analyses the past 30 years of archaeological research in the Victoria River region and provides the basis of the majority of this chapter.

In the Victoria River region there has been considerable archaeological research that has characterised the archaeological chronology and development of human habitation in the region (David *et al* 1990a; David *et al* 1990b; Gregory 1998; Lewis 1988; McNiven *et al* 1992). To the north of the Victoria River, archaeological studies have been largely confined to the excavation and analysis of the Ingaladdi Rockshelter, first excavated by Flood in the late 1960s with the assemblage subsequently studied in later years (Cundy 1990; Flood 1970; Gregory 1998). Archaeological investigations in Wardaman country to the west of Katherine have been conducted since the 1930's through to the 1990's (Davidson 1935; Flood 1970, David *et al* 1990a, 1990b, Flood 1991; Flood and David 1994, Flood *et al* 1992, McNiven *et al* 1992). Flood and David (1994:9) predict that the Wardaman region was likely to have human occupation of a similar antiquity to that of Western Arnhemland where occupational debris, including stone artefacts and pieces of ochre, has been dated to +50,000 years BP.

Chronology of archaeological deposits in the Victoria River region have largely been dated to the Pleistocene-Holocene transition circa 15,000 to 10,000 years BP with major changes occurring within the stone tool technology of the region over the past 10,000 years (Flood and David 1994:9). These changes accompanied a dramatic increase in the amounts of charcoal, animal bone, stone artefacts, shellfish, and ochre deposited in these rockshelters. Flood and David (1994:9) have dated the introduction of stone points to approximately 3000 years ago.

3.4. Archaeological Surveys of the Victoria Highway

The Victoria River Highway has been extensively researched in the last 20 years by a succession of archaeological consultants surveying before road and bridge works, as well as the Telecom optical fibre cable which was installed in the mid 1990s. Robin Gregory and Daryl Guse documented a number of surveys in March 1995 for the Heritage Unit, Conservation Commission of the Northern Territory. This document, *A Review of Archaeological Surveys along the Victoria Highway, Northern Territory*, lists the work leading up to 1995 and makes recommendations as to the areas of the road reserve that do not require further surveying. This report suggests that within the road corridor from chainage 185km to 220km that no further archaeological surveys are warranted.

The report also documents the bridge crossings that have been surveyed in the past, including Sandy Creek to the west of Joe Creek. These surveys were carried out by Kinhill Engineers (1992), Mitchell (1994), Veth (1991), Thorley and Warren (1991) and Gregory (1994). These works have located a large number of Aboriginal archaeological places including rock art, petroglyphs, stone tool quarries, artefact scatters, isolated artefacts and hawk hunting hides.

3.5. Archaeological Site Patterns in the Victoria River Region

Gregory (1998) has undertaken, to date, the most comprehensive review of the Victoria River region archaeological record. Gregory (1998) divided the Ord-Victoria River region into primary geographical zones by which to investigate the archaeological settlement patterns. The three primary geographic zones consist of the Lowlands, Uplands, and the Inland Plains. The current study area is located wholly within the region Gregory (1998) identifies as the Uplands. Therefore the archaeological patterns of this environmental region will be described in this report. The Uplands geographic zone is defined by Gregory (1998:20) as:

Uplands: The majority of the Ord-Victoria River region consists of rugged dissected sandstone country incorporating part of both the Kimberley Plateau and Ord-Victoria geomorphic regions. The plateau consists of a series of structural plateau and benches, cuervas, mesas and buttes, hogbacks, and vales formed of Carpentarian siltstone, sandstone and volcanics. The Victoria River Plateau is a large dissected plateau formed of Adelaidian sediments and rarely exceeds 300m AHD. The topography consists of rounded hills, tablelands, rugged scarps and ridges. The rugged topography results from numerous small streams dissecting the plateau. (After Gregory 1998:20).

3.5.1. Uplands Archaeology

Gregory (1998:130) examined 385 previously recorded archaeological sites in the uplands zone. Sites occurred most frequently on river/stream banks (31.1%), rock outcrops (18.5%), escarpments (17.8%), and slopes (9.6%). The majority of sites were located in rockshelters (63%) on the rock outcrops, escarpments, and slopes. Over half of the uplands sites are located within 200 meters of an ephemeral stream. Archaeological site components consist of rock art, stone artefacts, grinding features, stone and ochre quarries, stone arrangements, modified trees, middens and burials. Mean site size (n=176) is approximately 12,000m² with a range from 1m² to 600,000m². Mean site artefact density (n=33) is 1.5/m² with a minimum site artefact density of 0.01/m² to a maximum of 11.2/m². The majority of sites consist of a single archaeological features, however some are recorded in various combinations. Quartzite (68%) and chert (42%) are the most commonly represented raw material types.

3.6. Archaeological Predictive Site Models for the Ord-Victoria River

Archaeological investigations elsewhere in the Northern Territory have shown that there is a relationship between the location of archaeological sites and the environmental features of the landscape (Hiscock and Mitchell 1991; Kinhill 1992a; 1992b; Gregory and Guse 1995; Guse and Gregory 1995).

Predictive archaeological models based on land systems have proven to be useful in the Northern Territory for indicating which area should be subject to intensive archaeological survey (Gregory 1998; Gregory and Guse 1995; Guse and Gregory 1995; Guse 1998; Guse 1999; Kinhill 1992a; 1992b). Kinhill (1992a) developed a predictive model of archaeological site distribution for approximately 800 kilometres along the Victoria Highway while working on a project for a Telstra optic fibre cable. Kinhill (1992a: 5-2) proposed that archaeological sites would occur more frequently where several features in the landscape converged. Kinhill (1992a: 3-5) also stated that the most archaeologically sensitive locations would be in those areas exhibiting the highest degree of land feature diversity. Therefore, land systems or land units which describe particular areas based on land feature diversity are a useful basis for archaeological modelling in the Northern Territory.

Gregory (1998) developed a predictive model assessment of the archaeological settlement patterns in the Ord-Victoria River region. Drawing from Binford and others, Gregory (1998) has developed her predictive model on concepts of hunter-gatherer mobility. The methodology is similar to the application of a diversity model as proposed by Thomas (1989) and Kintigh (1989). These authors propose that diversity, or richness, of the artefact assemblage can be used to distinguish variability in the archaeological record. This model has had an important role in recent archaeological interpretation (Kintigh 1989:25). The concept of archaeological richness has several properties.

- It is used when discussing variation in a nominal variable, such as stone-tool type, design element or ceramic type.
- It is typically a comparative property of archaeological material culture distributions.

Following the usage in mathematical ecology, it may be considered to have two dimensions. These are the numbers of different classes present in an assemblage, and their evenness, which is the uniformity of the distribution of different classes. (Kintigh 1989:26).

Thomas (1989:86) proposes that the overall relationship between number of implement classes and number of individual tools is influenced by ecological, technological, informational

and scheduling factors and describes three types of sites that can be distinguished by using richness of the artefact assemblage. Gregory (1998) proposed to distinguish these differences by defining type 1 and type 2 mobility patterns, which are defined below:

- **Type 1 Mobility Pattern:** Movement from one residential base to another. A high level of type 1 mobility can be characterised as frequent movements between base camps. Low level of type 1 mobility is characterised as long term occupation of a base camp. Type 1 mobility pattern results in the formation of 'base camps' or 'residential sites' across the landscape. (Gregory 1998a:85-86)
- **Type 2 Mobility Pattern:** Daily movement undertaken from a residential base camp in order to obtain resources. A high level of type 2 mobility is characterised by travelling greater distances during the daily and/or frequent movements between resource patches, whereas a low level of type 2 mobility involves travelling less distances (i.e. not far from the base camp) and targeting fewer resources. Type 2 mobility pattern results in the formation of 'resource procurement sites' across the landscape. (Gregory 1998a:85-86).

3.6.1. Settlement patterns of the Uplands

The following is an excerpt from Gregory (1998:275) describing the predicted settlement patterns of the Uplands:

“Initial occupation of the uplands occurred in the Pleistocene and is evident in the late Holocene and contact periods. Examining temporal changes in settlement prior to contact is difficult owing to a lack of dates from stratified sites, nevertheless a few observations may be made. It appears the intensity of site use in the uplands fluctuated before generally increasing in the most recent past. Territorial range appears to have varied as did the mobility patterns linked to use of the shelters at different times. The use of areas adjacent to water and rock shelters was associated with both type 1 and 2 mobility patterns. Macropods are likely to have been a key resource although aquatic taxa such as crocodile and fish were also exploited. Raw material procurement and use strategies varied in the uplands. During the contact period use of rock shelters appears to have increased and was accompanied by the incorporation of European items such as glass into the toolkit.”

3.7. Summary

Therefore the types of archaeological places likely to be encountered in the Victoria River region include shell middens (near the coast), stone artefact scatters, stone quarries, rockshelters, rock art, rock engravings, stone arrangements (i.e. hawk hunting hides) burials, contact sites, and a more or less continuous background scatter of stone artefacts across the landscape. Raw materials that have been documented in the region include basalt, chalcedony, chert, dolerite, fine grained sedimentary (siltstone & mudstone), glass, quartz, quartzite, sandstone, silcrete, tuff, and other volcanics, and are likely to be represented in artefact assemblages (Gregory 1998b:135). Many of these site features typically occur in combinations throughout the Victoria River landscape.

4.0. METHODOLOGY

4.1 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 Victoria River region. Overall the recommendations set out in this report follow the principles of heritage place management that are described in the Burra Charter.

4.2. 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 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 percussion;
- A definite erailure 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 exhibit 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 eclair 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 a concave depression or a convex surface.
- **Hammerstones** show use wear on the surface in the forms of abrasion, pitting and edge fracturing with some negative scarring from the process of producing stone tools.
- **Pounders** are artefacts that are used primarily for processing food and plant materials.

4.3. Raw Material Identification

Certain stone raw materials are chosen over others for manufacture of stone tools. The identification of these stone raw materials is an important factor in the recording of archaeological sites. Distinguishing between raw material types is useful in the interpretation of stone tool technologies and past Indigenous settlement and mobility patterns. Definitions of different stone raw material types commonly found in the Northern Territory can be found below:

- **Chalcedony:** Chalcedony is a microcrystalline translucent variety of the quartz, in which microscopic crystals have arranged themselves in layers of slender upright fibres, often in parallel bands (Pough 1988:270). Chalcedony is very hard (Mohs Hardness 6.5-7) with a smooth conchoidal fracture, transparent when colourless, otherwise translucent to opaque as colours get darker (Mottana et al 1978:245). Chalcedony is precipitated from silica bearing solutions and often forms cavity linings, veins and replacive masses in a variety of rocks (Bishop et al 2001:133). There are many varieties of chalcedony, including agate and jasper. The microcrystalline matrix that cements chert is a type of chalcedony.
- **Chert:** Chert is a microcrystalline sedimentary rock composed of primarily of quartz (chalcedony SiO_2). Chert has a microcrystalline granular texture, but rarely exhibits banding or translucency, thus often forming dull opaque masses. Usually chert has appreciable quantities of impurities, including water, with lustres ranging from earthy to sub-glassy to matte. Chert is also often tinted by ochre or haematite. Chert forms as the result of precipitation of silica bearing solutions in massive form or in nodules. Chert is frequently found in limestone, where microfossils such as radiolarians are often evident under a hand lens. (Pough 1988:270; Mottana et al 1978:245)
- **Hornfels:** A term for a group of compact fine-grained metamorphic rocks that form as a result of contact between sedimentary country rocks and a magma intrusion. There are usually roughly circular zones of lessening alteration with distance from the source of heat, solutions, and gas. Hornfels varies considerably in mineral composition, however mica and pyroxene are common (Pough 1988:35). Porphyroblasts of pyroxene, cordierite or andalusite are often developed. The high degree of recrystallisation that has occurred usually removes any original sedimentary structures. (Pellant 1992:218)
- **Quartzite:** Formed by metamorphism of sandstone. Since quartz grains, large or small, hot to cold, are about the same, heating and squeezing does little to sandstone except make a very hard rock. With deep burial and cementation, the sand grains eventually become so tightly welded that any fracture breaks across the grains instead of around, as in loosely bound surfaces of a sandstone. Quartzite is amongst the hardest and most resistant of all rocks. They show the same colours as sandstones: brown, yellow, grey, reddish, or white. Resistant to weathering, hard and brittle, outcrops lack the mellow rounding of sculptured sandstone or the fluting of soluble limestone, so they are not too hard to recognize (Pough 1988:34).

- **Basalt:** A basic volcanic rock consisting of calcic-plagioclase feldspar and pyroxene. Apatite and magnetite are always nearly present while olivine may occur. Basalt is the most abundant of all lava types. A fine grained rock, basalt has crystals which are both euhedral and anhedral. The crystals are not easy to see even with a hand lens. (Pellant 1992:202).
- **Siltstone:** By definition, siltstone is a fine grained sedimentary rock. It usually contains more quartz than either mudstones or shales. Siltstones are commonly laminated, due to variations in grain size. Organic content or amounts of calcium carbonate. The individual rock fragments and mineral grains in siltstone are too small to be visible to the naked eye (Pellant 1992:232). Post-depositional lithification of siltstone, such as silicification and/or laterization, is often termed porcellanite (Langford-Smith, 1978:3).
- **Mudstone:** This rock consists of a mixture of clay minerals, together with detrital quartz, feldspar, and mica. Iron oxides are also often present. Mudstone is a very fine grained rock, and the grains cannot be seen with the naked eye. It shares many characteristics with shale and may contain fossils, though it has less well defined lamination compared to shale. (Pellant 1992:232)
- **Silcrete:** Silcrete is regarded as a lithological term for a very brittle, intensely indurated rock composed mainly of quartz clasts cemented in a matrix of well crystallized quartz, cryptocrystalline quartz or amorphous (ie chalcedony or opaline) silica (Langford-Smith, 1978:3). Silcrete is formed by precipitation of siliceous solutions in a host rock such as siltstone or sandstone, and the removal of non-quartz minerals. Silcrete results from the weathering processes in host rocks in savannah regions of the world (common in Australia and South Africa). Hence the massive sandstone or siltstone deposits such as found in the Victoria River region in the Pinkerton land system are common hosts for silcrete. Silcrete is termed a duricrust, forming resistant caps in the mesa-plateau systems such as those found within the Victoria River region. Silcretes vary in colour, however light grey is most common. Grain sizes in silcretes reflect the host rock. Silcretes have a conchoidal fracture. The 'quality' of silcretes as a stone tool making rock varies from region to region and sometimes outcrop to outcrop.

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. Documenting the start and end of stone artefact scatters and quarries can prove to be difficult to distinguish against 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 the presence of a background density of stone artefacts in the general area, clusters of stone artefacts can be defined as a site when an average density of artefacts in the site is more than 10 times greater than the average density of the background scatter.

A site can also be defined where there is an identifiable boundary to a site where either artefact densities diminish sufficiently to be classified as a background scatter or environmental features, such as a creek line or escarpment, determine a boundary.

4.5. Definition of Background Scatters of Isolated Artefacts

Off-site archaeology is utilised to better inform archaeologists on the manner of land use and settlement patterns by Indigenous hunter-gatherer populations. It has been widely recognised that a strictly site based approach to the documentation of archaeological patterns does not adequately reflect the nature of Indigenous land use strategies and mobility. It is generally accepted that the definition of archaeology is the more or less continuous distribution of material culture across the landscape. Off-site archaeology employs this fundamental principle.

Off-site archaeology is defined by Foley (1981:10) as the study of the archaeological record on a regional scale, based on an assumption of underlying spatial continuity of archaeological materials, in the context of both behavioural and geomorphological properties. Foley (1981:10) states that there are four structural components essential to the analysis of off-site archaeology. These consist of behaviour, discard, accumulation and post-depositional factors (Foley 1981:10). The off-site archaeological approach uses a behaviour-discard approach in which the ecology, geology, and geomorphology are considered to influence the patterns of artefact discard by hunter-gatherers (Foley 1981b:2). Foley's (1981) study of Amboseli archaeology in Africa diagrammatically highlighted areas of high artefact density that were more intensively utilised and inhabited and other areas that had lower and intermediate artefact densities, which indicated less frequent occupation and specific utilisation of land resources. Therefore by recording the densities of artefacts through a systematic survey, such density patterns may reveal much more about the utilisation of an area than the distribution of sites themselves. It is the principle of this theory that is adopted for use in the Victoria Highway archaeological survey.

For the Victoria Highway project, isolated artefacts and background scatters of artefacts are recorded in the following manner:

- Manufacturer's specifications for hand held GPS receivers are constrained to a 15 metre accuracy, which the manufacturer warns can be greater depending on satellite coverage and other factors.
- Groups of stone artefacts that were identified in the landscape, that were not in great enough densities to constitute a 'site' according to the definition, but are located within a 20 metre diameter area, are defined as **background scatters of isolated artefacts**.

- Owing to the technological constraints of hand held GPS, it is not feasible to accurately record the grid reference of each isolated artefact that is within a 20 metre diameter area or a similar sized geographic feature that physically created a boundary for the background scatter (i.e. erosion scour).
- Therefore a group of isolated artefacts can be designated with the same ID number (i.e. E4-01) and the same grid reference.
- Artefacts found apart in distances greater area than 25 metres were given a new ID number and grid reference.
- This method allowed the effective recording of small groups of isolated artefacts in a time efficient manner.

Isolated artefacts and background scatters are dealt with in a similar manner to an archaeological site owing to legislative requirements where isolated artefacts require permission from the Minister for the Environment to be disturbed or destroyed. Whether it is technically correct according to the *Heritage Conservation Act* or not, the current administrative regime employed by the Northern Territory Government requires sufficient location detail of isolated artefacts similar to that of an archaeological site in order to process Ministerial consent to disturb or destroy. The method described above has been successfully utilised to the approval of the Northern Territory Government statutory administrative body, Heritage Conservation Services.

Archaeologically this does not mean that background scatters or isolated artefacts constitute an 'archaeological site'. An archaeological site is an arbitrary definition employed by archaeologists in an attempt to be able to analyse past Indigenous land use and settlement patterns. It is important to classify groups of archaeological materials into manageable units that can be compared and contrasted, and that may reflect different activities and uses of the landscape. This is sometimes easy to identify as in the case of a rock shelter, or stone arrangement. However sometimes it is much harder to define these boundaries when dealing with high densities of stone artefacts along an area such as the Victoria River terraces. This is why arbitrary definitions of an 'archaeological site' and 'background scatter' are employed to be able to distinguish between higher and lower artefact densities in the landscape.

The purpose of recording background scatters of isolated artefacts was to aid in the identification of Indigenous mobility and land use at a macro-scale according to land systems and land units. Land systems cover very large and broad areas, and land unit categories, such as river terrace, escarpment, can also cover broad areas. The purpose of this survey was not to specifically identify micro-scale archaeological land use, but use the macro-scale environmental information to help inform an assessment of archaeological patterns in the Victoria River region.

For the purposes of mapping archaeological materials within the project area, background scatters of isolated artefacts can be dealt with in a similar fashion as another category of archaeological site.

4.6. Taphonomic Processes in the Victoria River Region

Gregory (1998) investigated in detail the taphonomic processes at work on archaeological sites in the Victoria River region. Gregory (1998:123) found that a range of disturbance processes operate on archaeological sites, which include those associated with humans, animals, plant, wind, and water action. Overall, Gregory (1998:123) noted that fluvial action was primarily responsible for post-deposition disturbance. Gregory (1998:20) found that the wet season inundation of northern Australia has a large impact on the representation of artefact size classes on open archaeological sites. Therefore sheet wash and inundation are likely to “substantially modify” open archaeological sites in north Australia (Gregory 1998:123).

4.7. Survey Methodology.

The survey adopted the following approach to investigate the archaeological potential of the area of interest:

1. Selection of sample zones for intensive survey within Areas 24, 26, RG3 and RG7. These areas totalled approx 10% of the land area. The selections were based on previous research and experience in the area by the consultants. Special focus was attended to rock outcrops, creek and river banks and areas that had higher archaeological visibility⁴.
2. Reconnaissance of Areas 21, 22, 27, 29 and 30. This survey consisted of vehicle recon of the Area, then pedestrian survey of areas considered by the consultants to have high archaeological potential. Note that due to time constraints, the large land area of the survey and the developing wet season, it was not possible to extensively sample these areas. A 10% survey of these areas would have taken approx 2 weeks.
3. A desktop survey of the existing road alignment between chainage 185 km and 229 km. This was to be done by examining documents relating to previous surveys. Note that one of the consultants, Daryl Guse, undertook a survey of the existing road alignment for Telstra in the 1990s.
4. Development of recommendations following these surveys. These recommendations may include proposals to further survey some or all areas.

⁴ Note that the survey was undertaken in early December 2005. The area had already received some wet season rains resulting in patchy grass regrowth. In the opinion of the consultants, this did not influence the result of the survey apart from the complete inability to access Area 22. There were some areas on the southern bank of the Victoria near RG7 that had very low visibility all year long due to exotic grasses that had not been burned.

5.0. RESULTS

5.1. Introduction

The survey and summary inspection of the proposed gravel search areas was conducted in the first week of December 2005. Ground surface visibility within the survey area varied from good (>70%) to very poor (<5%). Early rain had promoted the growth of grasses in some areas. However in the majority of the survey area, ground surface visibility was obscured owing to dense grass cover that had not been burnt off during the previous dry season. Thick grasses are typical in this area along the Victoria River and associated tributaries and creeks. There were also dense patches of woody weeds along the levee banks of the Victoria River. However other areas of erosion along the levee banks offered areas of good ground surface visibility and the opportunity to inspect for sub-surface archaeological materials. Therefore it can be concluded that the ground surface visibility was sporadic throughout the study area at the time of the survey, however early rains and regrowth was a minor contributor to the poor ground surface visibility. Despite poor ground surface visibility, seven archaeological sites and four occurrences of isolated artefact scatters were documented during the survey. The following tables contain a brief description of each gravel search area and location and summary of archaeological sites or objects located during the inspection. Following this section are more detailed descriptions of the archaeological sites and background scatters.

5.2. Background Scatters

Four separate isolated background scatters of stone artefacts were recorded in the survey areas. Stone artefacts recorded in the background survey are mostly represented by chert and silcrete flakes. A high proportion of the background scatter assemblage displayed breakage and edge damage. Damage and breakage to these artefacts is likely to have been caused by cattle trampling rather than from stone tool technological processes.

Table 5. Tabulated data from the background scatter artefacts

| ID | LOCALITY | EASTING | NORTHING | ARTEFACT | L | W | TH | DESCRIPTION |
|----------|-------------------|---------|----------|---------------------------|----|----|----|--------------------------------------|
| 26 BS01 | Area 26 Map 3 | 727622 | 8270901 | Chert Flake | 22 | 24 | 7 | Distal break, edge damage, no cortex |
| 26 BS02 | Area 26 Map 3 | 727686 | 8270905 | Chert Flake | 53 | 27 | 17 | Some cortex |
| 27 BS01 | Area 27 Map 4 | 727670 | 8273989 | Silcrete Flake | 59 | 30 | 9 | Distal break, OHR |
| 27 BS01 | Area 27 | 727670 | 8273989 | Silcrete Retouched Flake | 98 | 52 | 32 | Some cortex, complete |
| 27 BS01 | Area 27 | 727670 | 8273989 | Silcrete Flake | 78 | 50 | 18 | Margin damage |
| 27 BS01 | Area 27 | 727670 | 8273989 | Quartzite Retouched Flake | 46 | 54 | 15 | Distal break, some cortex |
| RG7 BS01 | Area RG7 Map 2 | 710005 | 8278475 | Silcrete Flake | | | | Complete |

5.2. Victoria Highway Survey Results.

Table 3: Results of surveyed proposed gravel areas

| GRAVEL AREA | LOCATION | ENVIRONMENT | DESCRIPTION | SURVEY RESULTS |
|-------------|--|--|---|--|
| Area 24 | Located to the south of the Victoria Hwy and Victoria River Roadhouse on an open plain (MAP 3) | Sandy alluvial plain with no rock outcrop. Low relief Sparse open woodland dominated by Bloodwood and Northern Box with little understorey and tussock grass. | Alluvial deposition obscures artefact visibility. The area is likely to be 1 in 10 year floodplain, Target size small owing to limited visibility (<10%) with two exposures inspected. Visibility was limited owing to tall dense grass and alluvial deposition. The area has been extensively grazed, several tracks and fences in the area. There is a low likelihood of any archaeological materials being detected in Area 24 owing to the alluvial nature of the ground surface. | Transect survey length 800m. No artefacts or sites identified. |
| Area 26 | Located to the south of the Victoria Hwy and Victoria River Roadhouse on an open plain (MAP 3) | Sandy alluvial plain with no rock outcrop. Low relief Occasional eucalypt with little understorey and tussock grass. | Visibility ranged between 30-40% in the rehabilitated area near the western border of the gravel search area. Alluvial surface in the area was too densely vegetated to survey, however it was highly unlikely to contain sites owing to the aggrading land surface. The area has been extensively grazed and gravel extraction in the south western area. The plain may have been cleared in the past. There is a low likelihood of any archaeological materials being detected on the floodplain of Area 25 owing to the alluvial nature of the ground surface. However artefacts are likely to occur on the stony high ground adjacent to Area 25. | Transect survey length 3.1km. Isolated artefacts located: BS01, BS02 on the border of the area. |
| RG7 | Located on the Victoria River adjacent to the Coolibah Station Homestead. (MAP 2) | Victoria River gravel bed consists of stone cobbles. The River is flanked by steep levee banks and riparian zone. The banks are lined with mixed woodland and grasses. Steep sandstone ridges and hills are located nearby the river. Sandy Creek joins the Victoria River in this locality. | Ground surface visibility in the area of RG7 ranged from 10% to 100%. The area has been significantly eroded from 100 years of grazing and pastoral station use. Large erosion scalds and gullies mark the landscape. The cobble river bed and surrounding levee banks were inspected for archaeological materials. No artefacts were identified in the cobbles of the river bed. The banks and areas either side of the Victoria River in this locality have a high density of historic and Indigenous archaeological materials. | Transect survey length 6.3km. Sites Located: BS1; AS2, AS3, AS4, AS5, AS6 |
| RG3 | Located in the Victoria River bed. (MAP 2) | Victoria River gravel bed consists of stone cobbles. The River is flanked by steep levee banks and riparian zone. The banks are lined with mixed woodland and grasses. Steep sandstone ridges and hills are located nearby the river. | The southern bank consisting of a large cobble and gravel bed of the Victoria River was inspected for archaeological materials. Sampled the cobble bank down to the wet season waterline (200m x 80m area). Cobbles (up to 250mm in size) covered the area. Cobble raw materials include sandstone, red/brown silcrete, chert, and several metamorphic types. Artefacts were found in a discrete area (discussed further in report). Estimated that the site contains approximately +600 stone artefacts. It is likely that there are subsurface artefacts in the levee bank. Ground surface visibility on the levee bank was poor at the time of survey. | Sites Located: RG3 AS1 |

Table 4. Gravel Search Areas that were reconnoitred⁵

| GRAVEL AREA | ENVIRONMENT | DESCRIPTION |
|-------------|--|--|
| Area 30 | Mixed open woodland with varied Eucalypts and mid to tall height | Wet season growth obscured ground surface visibility. Likely to be low archaeological potential except for along creek line along the boundary of the area. Recommend to survey 10% random sample of the surface area. |
| Area 21 | A long stony strike ridge with mixed open woodland and shrubs with Spinifex understorey. Gravel and stony with silty sand sediments. Skull Creek runs parallel along the western side of the ridge. Raw materials such as silcrete, quartzite, and chert occur across the area. (MAP 1) | The ridge has been significantly disturbed from past gravel extraction. The former Victoria Highway alignment is located along the ridge and crosses Skull Creek. Recorded one open archaeological site (Skull Creek AS01) on the north side of Skull Creek Major. Adjacent to the site on the other side of the creek is a registered sacred site with carved Boabs. The registered site area is larger than 1km ² in size and extends onto the gravel ridge. The area has significant archaeological potential and Indigenous cultural significance and accordingly would require greater than 10% archaeological survey. |
| Area 27 | Victoria River levee banks on the eastern side of the river. Mixed open woodland with large river Eucalypts (i.e. E. Camuldensis), with sparse understorey and tall grasses. Undulating ground surface mostly silty sand alluvial deposits with areas of gravel and sandstone. Highly dissected by gullies and creeks with significant erosion. (MAP 4) | The levee bank is eroded in places exacerbated from pastoral use and access tracks. A background scatter of artefacts (27BS01) was recorded in an eroded area indicating possibility of subsurface artefacts. The principle levee banks of the Victoria River have a high archaeological potential. However the visibility of archaeological resources is generally obscured by extensive ground cover (grass and weeds) and aggrading soil deposition. Accordingly the area would require a minimum 10% archaeological survey. |
| Area 29 | Mixed open woodland dominated by Salmon Gums and Grevillea with tall grass understorey. Low flat terrain with some cobble and sandstone outcrop closer to the escarpment. | Silcrete and quartzite cobbles are found on the ground surface in this area. Area has been extensively grazed with large areas of disturbance along the Victoria Highway. This area has a moderate level of archaeological potential owing to raw material availability and would require a minimum 10% survey. |

⁵ Note that Area 22 was not accessible due to wet season downpours making the track difficult for even a four wheel drive.

5.3. Archaeological Sites

A total of seven archaeological sites were recorded within the survey areas. The archaeological sites consist of artefact scatters, stone artefact quarries, historic carved boabs, historic burial site, and scatters of historic artefacts. Site size ranged from 400m² to 6750m². Archaeological sites are found in close proximity to major freshwater sources. The majority of sites are located on the levee banks of the Victoria River. Average artefact densities ranged from 0.01/m² to 10/m² with a maximum artefact density of +50/m² noted at Site 21 AS1 (Skull Creek).

The archaeological site assemblages are represented mostly by flaked artefacts, with ground artefacts present on some sites including sandstone and quartzite grinding stones and basalt edge ground axes. Raw materials present on archaeological sites include silcrete, quartzite, chert, fine grained sedimentary, and basalt. Most of these raw materials were noted occurring as cobbles in the Victoria River bed, especially silcrete, quartzite, and chert nodules.

The historic sites recorded in this survey appear to date from the post-World War II period. A carved boab tree was inscribed with the date "1952". The burials are inferred to be modern owing to the presence of deteriorated plastic flower fragments. Diagnostic features from the scatter of historic artefacts appeared to date this material from the 1930s to the 1950s.

Table 6. Summary archaeological site data

| SITE | EASTING | NORTHING | FEATURES | SIZE | AV ARTEFACT DENSITY | ARTEFACTS | RAW MATERIALS |
|---------|---------|----------|----------------------------|----------------------------------|---------------------|----------------------------------|-----------------------------|
| 21 AS1 | 687449 | 8260551 | Quarry, Artefact Scatter | 100m x 50m (4000m ²) | 10/m ² | F, RF, BF, FP, C | FGS, Ch |
| RG3 AS1 | 711891 | 8281197 | Artefact Scatter | 150m x 45m (6750m ²) | 0.01/m ² | F, RF, C | Ch, Sil, MS, Qtze |
| RG7 AS2 | 709945 | 8278557 | Artefact Scatter, Historic | 100m x 50m (4000m ²) | 0.1/m ² | F, RF, BF, FP, C, UP, EGA, GS, P | Ch, Sil, MS, Qtze; SST |
| RG7 AS3 | 709741 | 8278447 | Artefact Scatter | 150m x 30m (4500m ²) | 0.01/m ² | F, RF, BF, FP, C, UP, GS, P | Ch, Sil, MS, FGS, Qtze; SST |
| RG7 AS4 | 709931 | 8278387 | Historic; Carved Tree | 20m x 20m (400m ²) | - | Historic fragments | Glass, metal |
| RG7 AS5 | 709908 | 8278398 | Historic Graves | 20m x 20m (400m ²) | - | - | - |
| RG7 AS6 | 709572 | 8277979 | Artefact Scatter | 200m x 30m (6000m ²) | 0.1/m ² | F, RF, BF, FP, C, GS, HS | Ch, Sil, MS, Qtze; B |

Artefact: F = flakes; retouched flake = RF; C = cores; BF = broken flake; FP = flake piece; UP = unifacial points; EGA = edge ground axe, GS = grinding stones; P = pounders, HS = Hammerstone
 Raw Materials: Ch = chert; Sil = silcrete; MS = mudstone; Qtze = quartzite, SST = Sandstone; FGS = fine grained sedimentary; B = Basalt

Site RG3-AS01

Grid Reference (GDA94): 711848E 8281172N

Map 2; Site Sketch Map Appendix 1; Site Photos; Appendix 3

Site Location:

The site is located on the cobblestone riverbed on the southern side of the Victoria River. Ground surface visibility was 100% across the site. Steep sided primary levee banks and dense riparian environmental zones flank the river.

Site Description:

The site is confined to a 150 meter by 45-metre area on a larger cobblestone riverbed area. The site map illustrates the location of the site. Artefacts are unevenly distributed across this area. Stone artefacts consist of flakes, retouched flakes and cores. Raw materials present on the site consist of chert, silcrete, mudstone, and quartzite. Average artefact density is likely to be no more than 0.01/m² with a highest density of 2/m². It is expected the site would contain approximately 600 artefacts in total.

Owing to the nature of the site location in a riverbed, caution was exercised in the identification of stone artefacts to distinguish between stones that displayed similar attributes from river inundation processes. The artefact assemblage exhibits all stages of the stone tool reduction sequences, primary, secondary, and tertiary artefacts. The majority of artefacts were secondary or tertiary artefacts. Most flakes are greater than 50mm in length and tend to be long and thin in shape. Cores tended to be greater than 150mm in size. Silcrete cores displayed deliberate reduction strategies and core rotation. Cores on average had +2 platforms with long negative flake scars in the same direction, typical of percussion flaking.

The raw materials found in the artefact assemblage are available as cobbles in the riverbed. It is likely that the riverbed also provided a source of raw materials for knapping. Larger artefact size classes are expected to be found on this site owing to taphonomic processes at work from annual inundation.

Relationship to Proposed Development:

The cobblestone riverbed has been identified as a potential road gravel source known as Area RG3. The gravel riverbed is approximately 400 meters by 200 meters in size. Artefacts are confined to a specific area within this gravel bed. Artefacts are likely to be impacted should the gravel be extracted from this location. It is also likely that sub-surface artefacts will be located in the silt and sand levee bank adjacent to the gravel bed.

Site RG7-AS02

Grid Reference (GDA94): 709945E 8278557N

Map 2; Site Sketch Map Appendix 1; Site Photos; Appendix 3

Site Location

The site is located on the crest of a sandy alluvial riverbank overlooking the Victoria River to the north. The Coolibah Station access road is located 196 meters to the south (@ 157°). A large sandstone hill is located to the south of the site. The environment consists of boabs, large eucalypts, low shrubs and sparse grasses. The Victoria River is less than 200 meters to the north of the site.

Site Description

The site covers an area approximately 100 meters east west by 50 meters north south. The artefact assemblage consists of both Indigenous pre-contact material and some historic objects. The pre-contact assemblage consists of a high diversity of stone artefact and raw material types. Artefact types represented in the assemblage includes flakes, cores, retouched flakes, flake pieces, broken flakes, cores, edge ground axe, grinding stones, pounders, and unifacial points. Raw material types include chert, silcrete, mudstone, quartzite, and sandstone. Several sandstone grinding stones and quartzite pounders were noted on the site. The flaked assemblage is dominated by silcrete and chert flakes, with a small proportion of retouched flakes. Silcrete flakes were mostly represented as tertiary decortication flakes. Flaked stone artefacts range in size from >10mm to 150mm.

Overall the site has variable artefact densities, the highest found in places of erosion along the northern edge of the levee bank. Average artefact density is 0.1/m² with maximum densities reaching 25/m². It is highly likely that sub-surface artefacts exist in the site area. The north-west end of the site contains the highest density area of artefacts with a small chert unifacial point, 2 x edge ground axes, and a cylindro-conical quartzite grinding stone.

Historic artefacts consist of old grader blades, soldered tins, flour tins, matchbox, and tobacco tins. No glass was noted. The assemblage is likely to be circa 1930s or 1940s.

The site has suffered significant erosion and disturbance from pastoral station use of the area. Erosion and annual inundation from flooding would have significant taphonomic effects on the artefact assemblage.

Relationship to proposed development

The site on the Victoria River bank is on the south eastern border of RG7. Although the site is not in the proposed gravel extraction zone could be at risk from associated activities, i.e. construction of access tracks.

Site RG7-AS03

Grid Reference (GDA94): 709776E 8278431N

Map 2; Site Sketch Map Appendix 1; Site Photos; Appendix 3

Site Location

The site is located on the crest of a sandy alluvial riverbank overlooking the Victoria River to the north. The Coolibah Station access road is located <300 meters to the south. A large sandstone hill is located to the south of the site. The environment consists of boabs, large eucalypts, low shrubs and sparse grasses. The Victoria River is less than 200 meters to the north of the site.

Site Description

Erosion has exposed stone artefacts along the 150 meters by 30-meters zone of a sandy levee bank. Artefacts are scattered along the crest of the bank. The site consists of two main areas linked by a low density scatter.

Stone artefacts consisted of flakes, retouched flakes, flake pieces, broken flakes, cores, grinding stones, mullers and pounders. Raw materials present of the site include chert, silcrete, fine grained sedimentary, and sandstone. Silcrete and chert tertiary flakes are predominant. Chert flakes are mostly <20mm in size. There are fewer silcrete cobble cores with primary and secondary decortication

stages. Ground mullers and pounders were also noted. The average artefact size class for flaked artefacts are <100mm and ground artefacts +150mm. Artefact densities are highest in eroded areas with the average density being 0.01/m². The maximum density in the Area A is 5/m² and in Area B is 10/m².

The site area is a highly eroded land surface with artefacts being transported by post-depositional processes. The area has been disturbed by long-term pastoral station land use and annual inundation. The levee has significant gullies and erosion.

Relationship to proposed development

The site on the Victoria River bank is on the south eastern border of RG7. Although the site is not in the proposed gravel extraction zone could be at risk from associated activities, i.e. construction of access tracks.

Site RG7 AS04

Grid Reference (GDA94): 709927E 8278393N

Map 2; Site Sketch Map Appendix 1; Site Photos; Appendix 3

Site Location

The site is located on secondary alluvial levee bank south of the Victoria River. The Coolibah Station access road is located approximately 150 meters to the south. A large sandstone hill is located to the south of the site. The environment consists of boabs, large eucalypts, low shrubs and sparse grasses. The Victoria River is less than 300 meters to the north of the site.

Site Description

The site consists of a large single carved boab with a scatter of historic material surrounding the site. The area appears to have been used as a campsite. Some broken glass and metal fragments are found at the base of the boab tree. A large iron spike is found in the tree. The following inscriptions could be discerned on the tree: "1952"; "Joe Howbottom"; "TPS"; "St...sy"; "M Hobbes 55". The carvings appear to date from the post-war period.

Relationship to proposed development

The site on the Victoria River bank is on the south eastern border of RG7.. Although the site is not in the proposed gravel extraction zone could be at risk from associated activities, i.e. construction of access tracks.

Site RG7 AS05

Grid Reference (GDA94): 709908E 8278398N

Map 2; Site Sketch Map Appendix 1; Site Photos; Appendix 3

Site Location

The site is located on secondary alluvial levee bank south of the Victoria River 30 meters north of Site RG7 AS04. The Coolibah Station access road is located approximately 150 meters to the south. A large sandstone hill is located to the south of the site. The environment consists of boabs, large

eucalypts, low shrubs and sparse grasses. The Victoria River is less than 300 meters to the north of the site.

Site Description

The site consists of two graves. The graves are from the modern post-war period. The remains of fragments of red and green plastic flowers are found on both gravesites. The graves are approximately 2.7 meters in length by 0.8 meters in width. Several limestone blocks mark the ends of the graves.

Relationship to proposed development

The site on the Victoria River bank is on the south eastern border of RG7.. Although the site is not in the proposed gravel extraction zone could be at risk from associated activities, i.e. construction of access tracks.

Site RG7 AS06

Grid Reference (GDA94): 709572E 8277979N

Map 2; Site Sketch Map Appendix 1; Site Photos; Appendix 3

Site Location

The site is located on the western side of Sandy Creek approximately 1.5 kilometers south of the Victoria River. Flat sandstone bedrock has been eroded to form a small steep sided gorge approximately 10m in height. Approximately 2 to 3 meters of loamy sand soil are found above the bedrock and have been eroded.

Site Description

The site consists of stone artefacts found along an eroded zone along the top of the dissected sandstone. Artefacts are found along a 200-meter zone that is approximately 30 meters wide. Artefacts consist of flakes, retouched flakes, broken flakes, flaked pieces, cores, grindstones, and hammerstones. Raw materials include chert, silcrete, quartzite, and basalt. Artefact densities along the erosion area vary with an average density of 0.1/m² with a maximum density of 5/m². Average flaked artefact size class is 10mm to 30mm. Ground artefacts including a sandstone muller, quartzite and basalt pounders were on the whole much larger (>200mm).

Relationship to proposed development

The site on the Victoria River bank is on the south eastern border of RG7.. Although the site is not in the proposed gravel extraction zone could be at risk from associated activities.

Skull Creek Area 21-AS01

Grid Reference (GDA94): 687450E 8260550N

Map 1; Site Sketch Map Appendix 1; Site Photos; Appendix 3

Site Location

This site has been previously recorded on the archaeological site database. The site is located on the eastern side of Skull Creek at a former road crossing. The AAPA registered sacred site 5066-90 is

located on the western side of Skull Creek. The previously recorded carved Boabs are located on the western side of the creek. The western side of the creek was inaccessible owing to the flooded creek.

Site Description

The site consists of a chert quarry and artefact scatter along the side of Skull Creek. Banded chert and fine-grained sedimentary (FGS) rocks crop out extensively in the surrounding area on the undulating ridge to the east. The banded chert and FGS rocks are blocky and have a high cleavage with fracture planes, which is prone to exfoliation, which can be exacerbated by fire. However there are pockets of fine-grained cryptocrystalline, conchoidal fractured material present in outcrop is better for knapping.

Artefacts consist of flakes, retouched flakes, broken flakes, flake pieces, and cores. Artefact densities vary, with an average density of 10/m² and in some areas up to 100/m². An area of 100 meters by 50 meters along the creek was defined as the site boundary. There is a high potential for a high-density background scatter across the nearby ridge and along Skull Creek.

Relationship to Proposed Development

The site is located in the Area 21 identified as a potential source of road gravel and fill.

6.0. Discussion and Heritage Assessment

6.1. Archaeological Discussion

The results of the archaeological survey are consistent with the predictions that have been previously made by Gregory (1998) for the Uplands geographical zone. Archaeological sites recorded in this study have been located near streams, major river courses or rocky outcrops. Owing to the location of these archaeological sites on the levee banks of the Victoria River, the sites are likely to date from the recent Holocene period. The average archaeological site size is half that of the 12,000m² site area average documented by Gregory (1998). Artefacts recorded in the site and background scatter assemblages are consistent with other archaeological assemblages recorded in the Uplands zone. Stone raw materials documented in this study are also consistent with those documented at other sites. Raw materials recorded on the archaeological sites tend to be available in the local area either as cobbles in the Victoria River gravel beds, or the hard quartzites from the nearby sandstone escarpments. Basalt is known to crop out in localities in the Victoria River region. All the stone raw materials show signs that the parent rock has undergone extreme metamorphism.

Mobility patterns represented by the archaeological sites and the background scatter are representative of both Indigenous archaeological mobility patterns described by Gregory (1998). Sites RG3 AS1, RG7 AS1, RG7 AS2, and RG7 AS7 located along the Victoria River are likely to reflect long term occupation sites from which resource gathering was conducting in the surrounding ecological zones. A diverse range of artefact and raw material types were found at these sites. Formal artefact types included numerous grinding implements associated with food and plant processing technologies. These types of tools tend to reflect the processing of resources brought back to a central site rather than being processed off site. Site 21 AS1 (Skull Creek) is a site that is associated with quarrying of local outcropping stone. This site is reflective of a resource specific activity, procurement and reduction of stone raw materials. Further investigation of this site may reveal a more complex stone artefact assemblage reflecting other activities were undertaken at this site.

The flaked stone assemblage documented on the sites is reflective of the typical stone tool technologies that have been previously summarised by Gregory (1998). Although the river bed site would be annually denuded of small flakes by river flood action and a summary inspection revealed that the majority of the overall flaked stone artefact assemblage is >15mm in size, artefact types found on the sites still reflect tertiary reduction strategies. Retouched flakes and unifacial points occurred on most of the sites.

Artefacts were mostly found on eroded and deflating land surfaces bordering the Victoria River. Artefact visibility and detection is therefore greatly increased in areas of erosion and poor vegetation cover. However isolated artefacts (BS01 & 02) could still be identified in areas covered in thick vegetation. Prior to European pastoral activities in the region, the Victoria River levee banks and floodplains were aggrading land surfaces. During pre-contact Aboriginal occupation, artefacts that were discarded would have been buried by flood sediments. Therefore it can be concluded that there should be significant sub-surface deposits of archaeological materials in these areas that are continuing to be exposed from ongoing erosion.

According to Holdaway *et al* (2005:36) land surfaces across a region will not be the same age, nor are the surface deposits deposited at the same time. The variability of surface age in a region may have implications for investigating the Indigenous occupation history through artefact scatters. Importantly, Holdaway *et al* (2005:36) found that the archaeological record found in the present is not a simple reflection of their structure in time and space. According to Nott (2003:3) denudation has significantly increased during the Quaternary period (last 1.6 million years ago to the present day) which has contributed to the erosion and deposition of sediments in the coastal regions of the Northern Territory. Nott (2003) states that uplands (Plateau) areas are usually composed of resistant sandstones and quartzites, and that typical lowland areas are usually made on more eroding strata, which both contribute to the build of unconsolidated sand plain sediments. Therefore, the Victoria River regions undulating plains environment may not be conducive for the discovery of artefacts deposited at various times in the past to lie on the current ground surface. Over time, it is expected that artefacts may become obscured in the accreting soft silt-sand deposits. The scarcity of archaeological material in open savanna woodland areas away from the Victoria River does not necessarily imply they were not utilised in prehistoric times as it has been shown elsewhere that the lowlands are an integral part of the Aboriginal subsistence cycle and the area provides a variety of resources (Brockwell 1989, Guse 1992, Hiscock, Mowat and Guse 1992).

6.2. Heritage Significance Assessment

Cultural significance of heritage places is usually assessed in terms of social, historic, scientific and aesthetic values.

6.2.1. Aesthetic Value

Stone artefact scatters are very rarely assessed as having high levels of aesthetic value. The landscape in which stone artefact scatters occur can have high aesthetic value owing to Western values of landscape and wilderness. Individual stone tools are known to hold high levels of aesthetic value, for example Kimberley Points owing to the intricate nature of the workmanship and the end product. In the case of the artefact scatters recorded in this study, there are a number of formal tool types that were documented that could be considered to have aesthetic value. These artefacts included chert and silcrete unifacial points, basalt edge ground axes, and sandstone/quartzite grinding stones such as those recorded on sites RG7 AS02, RG7 AS03, and RG7 AS07. These types of implements tend to be more prominently recognisable to the public and are usually displayed when discussing Indigenous stone tool technologies in site and museum interpretations. Therefore a minor portion of the stone artefact assemblage may have some aesthetic significance. Therefore it is concluded that overall the stone artefact scatters and isolated artefacts recorded in this survey have a low level of aesthetic significance.

The carved boab trees located at sites 21 AS01 and RG7 AS04 are known to have high levels of aesthetic value owing to natural and cultural perceptions of the boab tree and the role it has played as a cultural marker during European exploration.

6.2.2. Historic Significance

The Victoria River region has the highest number of previously recorded historic places associated with the pastoral history and early exploration of the Northern Territory (Mitchell 2000). At least four of the archaeological sites recorded in this survey have historic archaeological features, mostly historic objects, carved boab trees, and two unmarked graves. Site 21 AS1 is located at the former Victoria Highway Skull Creek crossing and the other sites are recorded on the southern bank of the Victoria River opposite Coolibah Station.

The carved boabs recorded at Site RG7 AS4 would appear to date from the early post World War II period. The two unmarked graves have the remnants of plastic flowers and are possibly less than 30 years old. Historic objects found on the sites in the area are much older with tins and glass dating from the early 20th Century. From the presence of the carved boabs, graves and scatter of historic items across the area, it is obvious this section of the Victoria River has been an important focal point in the historic period for Indigenous and European settlers.

An assessment of the potential historic heritage themes that occur at these historic sites has been undertaken in Table 7. The main historic heritage themes that are applicable involve pastoralism and commemorating the dead. It is concluded that the carved boab trees and historic archaeological remains have a limited potential for the analysis and interpretation of regional and Territory history.

Therefore it is concluded that the historic sites recorded in this survey have a moderate level of historic significance.

Table 7. Historic themes associated with recorded archaeological sites

| SITE | FEATURES | NT HISTORIC THEMES (MITCHELL 2000) | AUSTRALIAN HISTORIC THEMES (AHC 2001) |
|---------|--|---|---|
| 21 AS1 | Quarry, Artefact Scatter; Carved Boab Tree | 1B Pastoralism | 2.1 Living as Australia's earliest inhabitants 8.6.2 Maintaining religious traditions and ceremonies 3.5.1 Grazing Stock 5.1 Working in harsh conditions |
| RG7 AS2 | Artefact Scatter, Historic | 1B Pastoralism | 2.1 Living as Australia's earliest inhabitants 3.5.1 Grazing Stock 5.1 Working in harsh conditions |
| RG7 AS4 | Historic; Carved Boab Tree | 1B Pastoralism | 3.5.1 Grazing Stock 5.1 Working in harsh conditions |
| RG7 AS5 | Historic Graves | 1B Pastoralism 4D Commemorating the dead | 3.5.1 Grazing Stock 8.6.2 Maintaining religious traditions and ceremonies 9.7.3 Remembering the Dead 5.1 Working in harsh conditions |

6.2.3. Scientific/Research

Bowdler (1984:1) asserts that significance should be assessed according to timely and specific research questions and representativeness and that these qualities are fluctuating. Other factors that may be utilised in the assessment of the significance of an archaeological place include aesthetic, historic, scientific or social significance (Pearson and Sullivan 1995). Scientific significance for example, of an artefact scatter depends on site components, location, and representativeness.

However there are still general principles of archaeological research that are applicable to this group of sites. In a broad sense, the archaeological sites documented in this report have the potential to contribute to further understanding of the following areas:

- Settlement and mobility of Indigenous people through time and space
- Nature and distribution of archaeological sites
- Technological change and variability in artefact assemblage
- Adaptation to changing environments through time
- Nature and influence of the culture contact period of the Victoria River region

6.2.4. Social Significance

The fundamental principles regarding social significance to Indigenous communities in the Northern Territory is summarised by Palmer (2004a:121);

“...Aboriginal people in the region relate to each other, nature and places through kinship and moiety, which provide the basis for identity, ownership, rights, and authority... for Aboriginal people land is integral to corporeal identity.”

The presence of numerous recorded and registered cultural heritage places (under the *Sacred Sites Act 1989*) along the Victoria River and in close proximity to many of the proposed gravel search areas is a testament to the importance of the region to local Traditional Owners. There are a number of recorded cultural sites in the vicinity of the carved boabs and unmarked graves recorded during this survey. It is likely that these features relate to the previously recorded AAPA sites. The cluster of AAPA recorded sites in the vicinity of Coolibah Station shows that this area is still currently significant to Traditional Owners. Site 21 AS1 is recorded within the boundary of a registered sacred site. Therefore this area holds a high level of social significance to local Traditional Owners.

A preliminary assessment concludes that the suite of archaeological and historic sites recorded in this survey have moderate to high levels of social significance at a local regional level.

6.2.5. Representativeness and Rarity

As stated earlier, the results of this study are consistent with Gregory's (1998) description of the archaeological patterns of the Uplands in the Victoria River region. Artefact scatters recorded in this survey are known to occur widely in the Uplands geographical zone as described by Gregory (1998). Gregory (1998:130) notes that there are 385 previously recorded archaeological sites in the Uplands zone. Artefact scatters are represented in 43.1% of the archaeological sites in the Uplands zone (Gregory 1998:130). Gregory (1998:131) notes that sites with grinding features, stone quarries, and modified trees are recorded less frequently. Gregory (1998:131) found that artefact scatters located adjacent to water sources tended to have lower artefact densities than sites on higher ground in this particular geographical zone.

The artefact scatters and stone artefact assemblages recorded in this study are widely represented in the Victoria River region and could not be considered as rare. The sites are probably moderately significant representative examples of typical stone artefact scatters in the region. Fewer stone quarries have been previously recorded in the Uplands zone. Therefore the Site 21 AS1 (Skull Creek) quarry is considered to be a rare example of this type of site owing to the nature of the stromatolitic chert outcrop of stone. This type of quarry is not likely to be representative of typical quarries in the region. However it is representative of a quarry of an unusual source of raw material in the Northern Territory.

Historic features (burials and carved boabs) recorded in this survey are known to occur throughout the Victoria River region. There are 19 previously recorded historic cultural heritage places on the Delamere and 79 places on the Auvergne 1:250K map sheets. Pastoralism (18.8%) is the most commonly represented historic sub theme for heritage places in the Northern Territory (Mitchell 2000:42). The majority of historic places in the Northern Territory are from the 1920-1950 historic period with very few recorded from the 1950-1975 period. The most common representations of historic pastoral sites are building foundations, domestic built structures, yards or fences, and scatters of archaeological materials (Mitchell 2000). The largest concentration of the pastoralism historic sites occurs in the Victoria River region. This is largely owing to the apparent concentration of blazed (carved) boab trees with 44 recorded carved boab trees in the Victoria River region (Mitchell 2000:48). These carved boabs are mostly associated with early pastoralism activities.

Therefore the carved boab trees recorded in this study are typically representative of this class of site, and are not rare in the regional context.

There are 69 previously documented historic graves or cemeteries which represents 4.2% of the total historic sites recorded across the Northern Territory (Mitchell 2000:75). These sites include lone graves and cemeteries, with the majority of these places dating within the 1920 to 1950 period. There are a number of remote lone burials in the Victoria River region, mostly relating to the pastoral industry. The burials recorded in this study are likely to date within the last 30 years.

Therefore the historic burials in this study are representative of the type of remote lone burial; however date from a less commonly recorded period of time. Although not the only lone burials in the region, this class of site is relatively rare in occurrence.

6.2.6. Condition, Intactness and Integrity

Archaeological sites recorded in this survey tended to be affected by erosion and disturbance from pastoral industry use of the Victoria River area. All artefact scatters were recorded on deflating and eroded land surfaces, especially the primary and secondary levee banks of the Victoria River. Site RG3 AS1 in particular is located in a high zone of disturbance being located on the river bed. This site is prone to annual flooding of the river and therefore it could be assumed this site has a very minimal level of archaeological integrity. Artefact scatters RG7 AS1, AS2, AS3 and AS7 are located in a heavily gullied and eroded zone along the Victoria River. This zone has been eroded from successive decades of grazing with deep erosion gullies forming along the banks. The archaeological integrity of these sites is somewhat diminished owing to these impacts. Isolated artefacts tended to be found on eroded exposures. Therefore it is likely that there must be considerable sub-surface archaeological materials that are not detectable unless significant erosion has occurred.

The historic sites appear to be relatively intact. The carved boabs and the burials do not appear to have any significant signs of ongoing disturbance.

7.0. Recommendations

The results of this archaeological investigation located seven archaeological sites and four occurrences of isolated background scatters. These archaeological sites have been recorded and assessed as having low to high levels of cultural heritage significance. Recommendations in this section apply to the proposed use of areas for potential gravel extraction activities in the Victoria Highway area. Several of these sites are considered significant within the terms of the *Northern Territory Heritage Conservation Act 1991* (HCA). However, all archaeological sites and isolated artefacts are protected under Section 39 of the HCA and as such appropriate mitigation strategies are required.

7.1. Archaeological Risk Management Model

The following archaeological risk assessment model has been developed based on the archaeological data that has been previously discussed in this report. The overall project for the upgrade of the Victoria Highway depends on environmental, social, and economic constraints. Therefore these factors will influence the selection of future gravel extraction in the area. It is known that distance to potable water and raw material sources are major factors in influencing the detection of archaeological materials in the Victoria River region. Therefore the archaeological risk assessment model is based on topographic features that occur within the project area along the Victoria Highway. Table 8 below is a predicted frequency of archaeological materials for high, moderate, and low rankings. Table 9 is a breakdown of major archaeological site types in the region per geomorphic land unit.

Table 8 Frequency of archaeological sites and isolated artefacts for each ranking

| Frequency | Sites per km ² | Isolated Artefact Density per m ² |
|-----------|---------------------------|--|
| High | 0.5 – 1 | 0.0005 – 0.001 |
| Moderate | 0.1- 0.5 | 0.0001 – 0.0005 |
| Low | 0.01 – 0.1 | 0.00001 – 0.0001 |

Figure 6 illustrates diagrammatically the predictive model according to the topographic areas along the Victoria River. This map is designed to act as a guide to illustrate zones of high archaeological potential. It should be used as a planning tool for the project managers to assess potential risk to archaeological resources. The mapping should inform the project managers on the potential need for the level of potential archaeological examination. High risk areas will require a high level of archaeological survey, whereas low risk areas may require less intensive inspection.

Table 9: Predicted archaeological sensitivity for each geomorphological zone

| Geomorphic units | Stone Quarry | Artefact Scatter | Rockshelter & Rock Art | Stone Arrangements | Isolated Artefacts | Overall Archaeological Sensitivity |
|---|---------------|------------------|------------------------|--------------------|--------------------|------------------------------------|
| Victoria River banks and terraces | Low | High | Low | Low | High | High |
| Victoria River bed | Moderate | Moderate | Low | Low | Moderate | Low-Moderate |
| Major drainage systems | Low-Moderate | High | Low | Low | Moderate-High | Moderate |
| Steep rises on sandstone & quartzites | Moderate | Low-Moderate | High | Moderate | Moderate | Moderate |
| Mesa Plateau on sandstone & quartzites | Low | Low-Moderate | Low | Moderate | Moderate | Low-Moderate |
| Dissected Plateau on sandstone & quartzites | Moderate-High | Moderate-High | High | Low | Moderate | Moderate-High |
| Level to gentle lowland plains on deeply weathered quaternary sediments and colluvium | Low | Low | Low | Low | Low | Low |

7.2. General Recommendations

Recommendation 1. Integrated Resource Assessment

It is recommended that an integrated resource assessment approach is taken with regards to future development of potential gravel source areas⁶.

Currently the areas identified for gravel inspections are considerable in size and some have high levels of archaeological potential, which in turn warrant a high level of archaeological inspection. High levels of archaeological survey can be time consuming and costly to cover many square kilometres of an area when only a small portion will ultimately be used for gravel extraction. As the project involves the on-going identification of gravel extraction areas which may be excluded for a range of economic, environmental, and cultural reasons, it is recommended that the project adopts a strategy of integrating the archaeological assessment into the ongoing development of gravel extraction areas.

Recommendation 2. Future Gravel Extraction Areas

It is recommended that the proposed gravel extraction areas should be specifically identified to allow for an effective archaeological survey of the proposed gravel extraction area.

It is proposed that this could be achieved during the geotechnical assessment phase of the road project. While specific targets are inspected for geotechnical quality, these areas can be subject to archaeological inspection to assess archaeological risks. Therefore this process reduces the need to survey large areas that will not ultimately be used for any gravel extraction purposes.

⁶ *Integrated resource mapping is a term to describe the cooperative field work of archaeologists and geotechnical engineers toward accurately defining a resource while protecting archaeological and heritage assets. This methodology can be extended to the environment, Aboriginal cultural heritage and other interests in other contexts.*

Another factor is the likely presence of sub-surface archaeological deposits in accumulated soils along the Victoria River. The Victoria River has been a significant focal corridor for Aboriginal occupation for millennia. Therefore it is highly likely that there will be buried deposits of archaeological materials of some antiquity along this river corridor. Open archaeological deposits (other than shell middens) are generally rare in the Northern Territory, usually owing to difficulties in detection.

Therefore an integrated resource assessment would allow for the inspection of sub-surface deposits during geotechnical operations when they are excavating test pits.

Recommendation 3. Victoria Highway Chainage 185km to 220km

It is recommended that no further archaeological surveys are required within a 50 metre zone from the centreline of the Victoria Highway from chainage 185km to 220km. However should works be required outside of the 50 metre zone from the centreline along the Victoria Highway then further archaeological inspections are required in the high archaeological risk areas.

Gregory and Guse (1995) identified that this area has been adequately surveyed by past archaeological inspections within a 50 metre radius of the Victoria Highway centreline from past optic fibre cable and road project surveys. However the previous surveys do not cover an area of significant distance away from the centreline, therefore these areas have not been subject to previous archaeological surveys.

Recommendation 4. Consultations with Aboriginal Traditional Owners

It is recommended that Aboriginal Traditional Owners and Custodians ought to be consulted to obtain their views on the social significance of the archaeological materials should any archaeological sites require permission to disturb or destroy.

Archaeological places and objects form a part of the general suite of Indigenous cultural heritage in the Northern Territory. Traditional owners have varying degrees of perceptions regarding the archaeological record that occurs within their country or estate. For this reason it is important that should any archaeological sites require permission to be disturbed prior to the proposed works, Aboriginal Traditional Owners and Custodians ought to be consulted to obtain their views on the social significance of the archaeological materials⁷.

⁷ As noted earlier in this report, disturbance of Aboriginal archaeological sites requires consultation with the appropriate custodian/ traditional owner to comply with the terms of the Heritage Conservation Act.

7.3. Recommendations for Victoria Highway Gravel Search Areas

| GRAVEL AREA | LOCATION | ARCHAEOLOGICAL ASSESSMENT | RECOMMENDATION |
|-------------|--|---|---|
| Area 24 | Located to the south of the Victoria Hwy and Victoria River Roadhouse on an open plain (MAP 3) | The area has been extensively grazed, several tracks and fences in the area. There is a low likelihood of any archaeological materials being detected in Area 24 owing to the alluvial nature of the ground surface. | Proceed with gravel extraction in this area. |
| Area 26 | Located to the south of the Victoria Hwy and Victoria River Roadhouse on an open plain (MAP 3) | The area has been extensively grazed and gravel extraction in the south western area. There is a low likelihood of any archaeological materials being detected on the floodplain of Area 25 owing to the alluvial nature of the ground surface. However artefacts are likely to occur on the stony high ground adjacent to Area 25. | Proceed with gravel extraction in the floodplain area. Avoid the stony rises. |
| RG7 | Located on the Victoria River adjacent to the Coolibah Station Homestead. (MAP 2) | No artefacts were identified in the cobbles of the river bed. The banks and areas either side of the Victoria River in this locality have a high density of historic and Indigenous archaeological materials. | Proceed with gravel extraction in this area within the river gravel bed. Avoid and minimise ground disturbance of the banks of the Victoria River. Utilise existing access tracks. |
| RG3 | Located in the Victoria River bed. (MAP 2) | Artefacts were found in a discrete area. Estimated that the site contains approximately +600 stone artefacts. It is likely that there are subsurface artefacts in the levee bank. | Avoid the use of RG3 if possible. However, should this gravel source be required then a permit to disturb must be sought from the Minister for Environment with further documentation of the affected site. |
| Area 30 | Mixed open woodland with varied Eucalypts and mid to tall height | Likely to be low archaeological potential except for along creek line along the boundary of the area. | Recommend to survey 10% random sample of the surface area. |
| Area 21 | Skull Creek runs parallel along the western side of the ridge. | Recorded one open archaeological site (Skull Creek AS01) on the north side of Skull Creek Major. Adjacent to the site on the other side of the creek is a registered sacred site with carved Boabs. The area has significant archaeological potential and Indigenous cultural significance | Area would require greater than 10% archaeological survey. |
| Area 27 | Victoria River levee banks on the eastern side of the river. | A background scatter of artefacts (27BS01) was recorded in an eroded area indicating possibility of subsurface artefacts. The principle levee banks of the Victoria River have a high archaeological potential. | Accordingly the area would require a minimum 10% archaeological survey |
| Area 29 | Low flat terrain with some cobble and sandstone outcrop closer to the escarpment. | This area has a moderate level of archaeological potential owing to raw material availability. | Accordingly the area would require a minimum 10% archaeological survey |

7.4. Recommendations for archaeological sites identified during the survey of Victoria Highway Gravel Search Areas

| SITE NAME | MAJOR SITE TYPE | SIGNIFICANCE ASSESSMENT | RECOMMENDATIONS |
|-----------------------|---|--|--|
| 21 AS1 Skull Creek | Artefact Scatter, Quarry, Carved Boabs, Registered Sacred Site | The complex of sites in this area, including the Registered Sacred Site (carved boabs) across Skull Creek, demonstrates many layers of occupation through time. Extensive chert quarries in the Top End are not common, therefore this site has high archaeological potential. The area has a high level of Indigenous cultural significance owing to the presence of the registered sacred site. The carved Boabs also represent local historical significance from the pastoral history of the region. | It is recommended that this site and area is not disturbed. |
| 26 BS01 | Isolated Artefacts | Low archaeological significance | Recommend to disturb if necessary. |
| 26 BS02 | Isolated Artefacts | Low archaeological significance. | Recommend to disturb if necessary. |
| 27 BS01 | Isolated Artefacts | Low archaeological significance. | Recommend to disturb if necessary. |
| RG3 AS1 | Artefact Scatter | Few sites have been recorded in the beds of the major northern river systems. Although the site has a high level of taphonomic disturbance, the site is of archaeological interest in terms of further investigation of the underlying causes of site formation. | It is recommended that this site is not disturbed. It is recommended that an exclusion zone is enforced around the site. However, should this source be required then a permit to disturb must be sought from the Minister for Environment with further documentation of the affected site |
| RG7 BS01 | Isolated Artefacts | Low archaeological significance | Recommend to disturb if necessary. |
| RG7 AS2 | Artefact Scatter; Historic Artefacts | This site demonstrates a number of archaeological characteristics of interest to understanding and analysing regional archaeological research questions. Therefore it has a high degree of archaeological significance. | It is recommended that this site and area is not disturbed. |
| RG7 AS3 | Artefact Scatter | This site demonstrates a number of archaeological characteristics of interest to understanding and analysing regional archaeological research questions. Therefore it has a high degree of archaeological significance. | It is recommended that this site and area is not disturbed. |
| RG7 AS4 | Carved Boab Trees | Sites representing historic pastoral activities are considered to have a high level of local historical and social significance. | It is recommended that this site and area is not disturbed. |

| SITE NAME | MAJOR SITE TYPE | SIGNIFICANCE ASSESSMENT | RECOMMENDATIONS |
|------------------|------------------------|---|---|
| RG7 AS5 | Historic Graves | Sites representing historic pastoral activities are considered to have a high level of local historical and social significance. It is likely that these graves are recorded Sacred Sites on the AAPA register. Therefore these sites have a high level of contemporary Indigenous cultural significance. | It is recommended that this site and area is not disturbed. |
| RG7 AS6 | Artefact Scatter | This site demonstrates a number of archaeological characteristics of interest to understanding and analysing regional archaeological research questions. However the integrity of the site is affected by erosion. Therefore it has a moderate degree of archaeological significance. | It is recommended that this site and area is not disturbed. |

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