

# 2012

TEMPUS ARCHAEOLOGY



## Report of an Archaeological Survey Doral Yoongarillup Resource Zones Southwestern W.A.

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# 1 Introduction and Background

## 1.1 Introduction

In May 2011, Tempus Archaeology was engaged by Ethnoscience (on behalf of Doral Mineral Sands Pty Ltd) to undertake an archaeological survey of the Yoongarillup Resource Zone (hereafter the Survey Area). The Yoongarillup Resource Zone is located approximately 17 km south-east of Busselton and encompasses four irregular parcels of land (Hadon East, Hadon West, State Forest and Catalano) amounting to an area of approximately 285ha (Figure 1 and Figure 2).

K. Edwards (Tempus Archaeology), assisted by W. and T. Webb (archaeological field assistants and members of the local Aboriginal community), completed the archaeological survey over a four-day period between 26-27 July 2011 and 3-4 October 2011.

## 1.2 Existing environment

### 1.2.1 Climate

The Survey Area experiences a warm Mediterranean climate with mild wet winters and hot dry summers (Beard 1990). Mean annual temperatures range from minima of between 7.2°C (July) and 15.6°C (February) and maxima of 17.3°C (July and August) to 29.8°C (February). Most of the annual rainfall of 839.7mm falls during the months of June and August.

### 1.2.2 Soils and Topography

The Survey Area is located within the Whicher Scarp soil-landscape system (Department of Agriculture and Food 2004). Within this system, three phases have been mapped to occur in the survey area:

- 214WsWC2 – Whicher gentle slopes phase
- 214WsYL1 – Yelverton flats phase
- 214WsYL2 – Yelverton very gentle flats phase

The area can generally be described as having moderate north-facing slopes with areas of laterite-capped rises and soils ranging from deep sands to sand, gravel, silt, clay and ironstone combinations (Keighery *et al.* 2008 cited in Mattiske Consulting Pty Ltd 2011: 5).

### 1.2.3 Regional Vegetation

The survey area forms part of the Whicher Scarp Vegetation Complex, which is described as an open forest of *Eucalyptus marginata* subsp. *marginata* – *Corymbia calophylla* on escarpment with some *Corymbia haematoxylon*, *Banksia attenuata* and *Xylomelum occidentale* in the humid zone. Gibson *et al.* (1994) identified three floristic community types occurring on the Whicher Scarp namely, *Eucalyptus haematoxylon* (now *Corymbia haematoxylon*) – *E. marginata* woodlands on Whicher foothills, shrublands on southern Ironstones and southern *Banksia attenuata* woodlands (Mattiske Consulting Pty Ltd 2011: 5). Post-European clearance and subsequent land-use has had a varied impact on native vegetation, the condition of which is now rated between completely degraded in the agricultural and plantation areas to very good (Mattiske Consulting Pty Ltd 2011: 17).

## 1.3 Aims and scope of the archaeological investigations

The main objectives of the present investigations are to:

- Identify any known or potential Aboriginal heritage issues that may affect the proposed development;
- Undertake research and/or consultation that may be required to meet the requirements of the *Aboriginal Heritage Act 1972* (AHA);
- Locate/record Aboriginal sites and any other Aboriginal heritage issues; and
- Develop appropriate Aboriginal heritage management policies and practices.

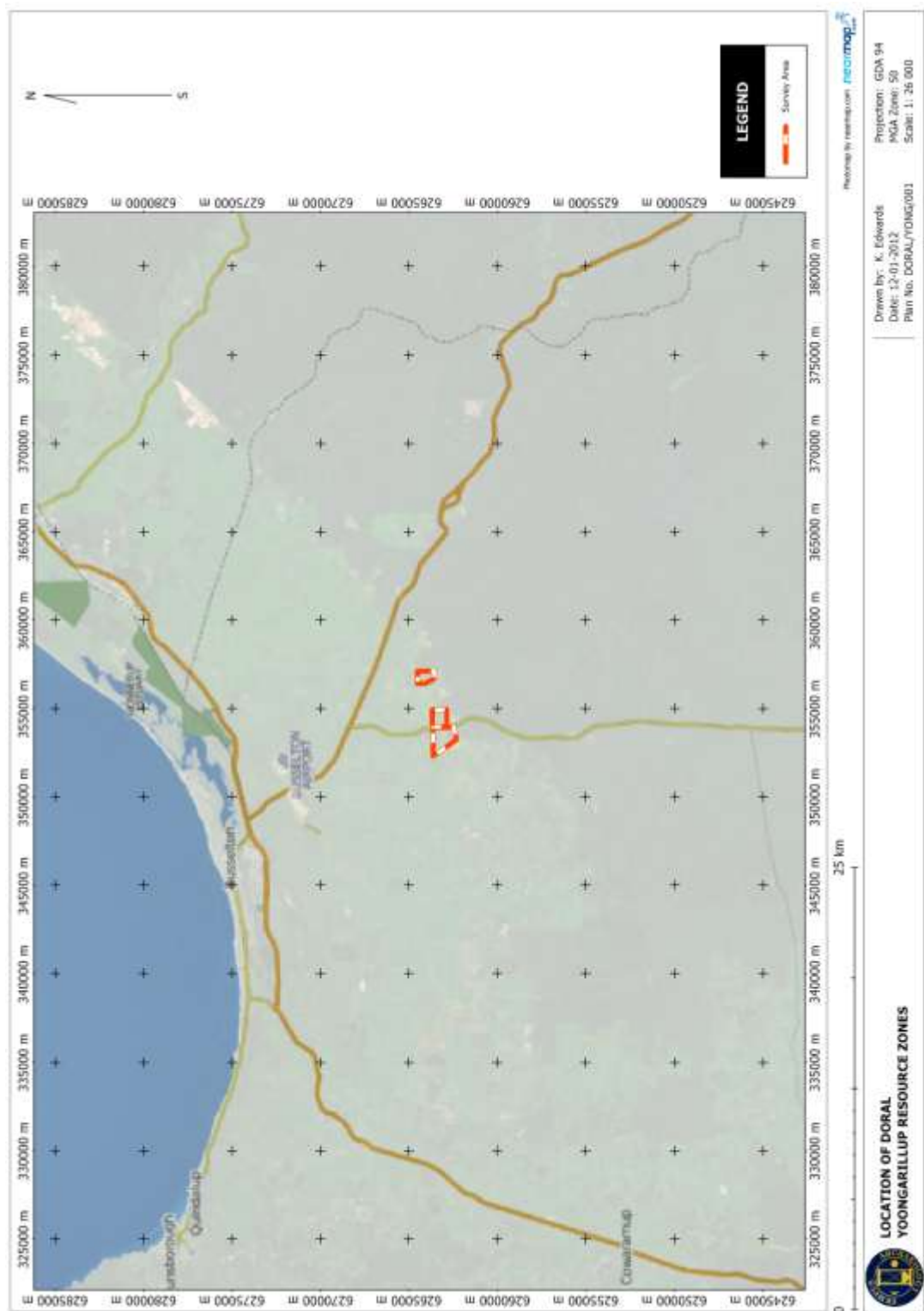


Figure 1 Map showing the location of the Yoongarillup Resource Zones (Source: Doral Mineral Sands Pty Ltd).



Figure 2 Aerial Photograph of the Yoongarillup Resource Zones (Source: Doral Mineral Sands Pty Ltd).

## 2 Archaeological Context

### 2.1 Prehistoric context

Humans first appear to have first reached the Australian continent more than 50,000 years ago, and within a few thousand years had occupied virtually every part of the Australian continent, from the Kimberley to the Tasmanian uplands. In Southwestern Australia, the earliest archaeological evidence for human occupation comes from Devils Lair, a small limestone cave located in the Leeuwin-Naturaliste region some 300 km south of Perth (C. Dortch 1974, 1976, 1979, 1984; Dortch and Dortch 1997; Dortch and Merrilees 1971). This site contains some five metres of sediment preserving a record of intermittent human occupation between 45,000 to 12,000 years ago (and possibly as late as 6000 years ago), with the most intensive phase of occupation occurring between 23,000 and 12,000 years ago (Dortch and Dortch 1996; Turney *et al.* 2001).

While no other archaeological sites of such extreme antiquity have been recorded in the lower southwest, evidence of human occupation pre-dating the last ice age has been found at cave sites such as Tunnel Cave (occupied 22,000 to 1300 years ago; J. Dortch 1994, 1996, 2004) and Cheetup Rockshelter (occupied between 13,245 years ago and European contact; Smith 1993) and at open sites, including Kalgan Hall (occupied between 18,850 years ago and European contact; Ferguson 1985), Quininup Brook (occupied 18,500 to 10,600 years ago; Ferguson 1981) and Arumvale (occupied 18,400 years ago to some point prior to European settlement; Dortch and McArthur 1985). The balance of the 50 or so dated archaeological sites in the lower southwest appear to be Holocene in age (that is, less than 10,000 years old).

When humans first arrived in Southwestern Australia, sea levels were up to 75m lower than at present. As a consequence, a much greater area of the continental shelf was exposed, linking Australia, Tasmania and New Guinea into an enlarged landmass referred to as 'Greater Australia' or 'Sahul' (Figure 3). Temperatures were probably slightly cooler than at present, and evidence from the interior suggests that lake levels were also similar to those of today.

With the onset of the last ice-age, however, environmental conditions began to deteriorate. At the height of the last ice-age, between 18,000 and 15,000 years ago, global sea levels dropped to 130m below their current level. This affected the maritime climate and reduced rainfall to the coastline, which at this time was between 30km and 40km west of its present location. Evidence from areas 400km to 600km east of Perth shows that there was an increase in dune building and a fall in lake levels consistent with higher wind speeds and decreased rainfall (Ross, Donnelly, and Wasson 1992:78-88).

Improvement in the Australian climate appears to have occurred at different rates and at different times across the continent. Between 9,000 and 6,000 years ago, temperature, rainfall and density of vegetation cover appear to have reached their peak, thereafter decreasing to modern levels. Sea-levels also appear to have stabilised at this time, leading to the formation of large coastal dunes and infilling of estuaries and interdunal areas – a process clearly illustrated at Lake Jasper, where submerged Aboriginal camps believed to be more than 4,000 years old have been recorded (Dortch 1997).

The effects of environmental changes on Aboriginal groups over the past 40,000 years or so have yet to be fully determined. The loss of territory associated with rising sea-levels towards the end of the last ice-age would increasingly have restricted movement along the coastal margin, necessitating population adjustments and changes in patterns of exploitation. At Devil's Lair and Tunnel Cave, for example, archaeologists have found evidence for shifts in the animals species exploited by Aboriginal groups, with an increased emphasis on non-forest species (O'Connor, Veth and Hubbard 1993). Stone artefacts from these and other sites also show a consistent decrease in the size of artefacts made from chert, which suggests that Aboriginal groups were forced to adopt a variety of means to conserve or ration what reserves they had when quarries and other sources of chert were lost to rising sea-levels (Ferguson 1980).

While archaeological evidence from Devil's Lair and Tunnel Cave suggests that the intensity of Aboriginal occupation at these sites did not change significantly during the ice-age, some researchers have argued that large areas of Southwestern Australia were subsequently abandoned as a result of the expansion of resource-poor karri forest (Ferguson 1985). While this interpretation has informed most recent studies of Aboriginal occupation of Southwestern Australia, recent work shows that sites within the purported expanded zone of karri distribution actually continue to be occupied throughout the period in question, and that any apparent changes in Aboriginal occupation patterns are more likely to result from Aboriginal groups dynamically relocating themselves according to shifts in favourable habitats (J. Dortch 2004).

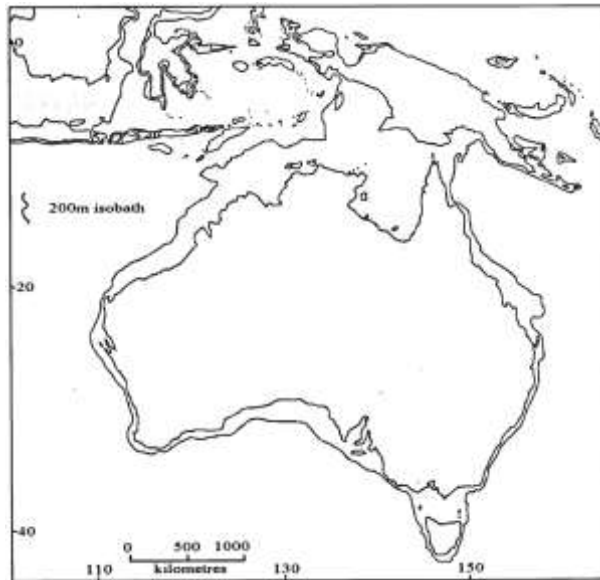


Figure 3 Map showing the extent of 'Greater Australia' or 'Sahul' during the last ice age.

Archaeological evidence for the material culture used by prehistoric Aboriginal groups is somewhat limited. In part, this is due to the fact that the materials from which most implements were made (including wood, fibre and skin) do not survive well in archaeological deposits. Generally, it appears that Aboriginal groups employed a basic flaked stone assemblage that included *scrapers*, *cores* and *utilised flakes* that were used in woodworking and cutting tasks. Rare examples of organic artefacts, including bone points, utilised macropod incisors and beads, have been recovered from Devil's Lair (C. Dortch 1984).

The bone points, the earliest of which was recovered from levels 22,000 years old, are of a type still in use at the time of European settlement in the mid-nineteenth century. These are believed to have been a multi-function implement used in the manufacture of skin cloaks and as ornamentation. Some of the bones had gum adhering to them, suggesting that they

were occasionally hafted into composite tools of some sort. The utilised macropod incisors from Devil's Lair were probably used to sharpen spear points (as historically attested) or as engraving tools.

## 2.2 Post-Contact context

The arrival of European settlers during the first half of the nineteenth century was to have a profound impact on Southwestern Aboriginal populations. While initial contact between Europeans and local Aboriginal was relatively peaceful, disease, population movement and on-going encroachment by European settlers resulted in widespread attenuation of Aboriginal links to land, so much so that by the 1860s (and in many cases much earlier than this) Aboriginal lifeways were radically different from what had gone before (Green 1981).

At the time of European contact in the nineteenth century, the Survey Area formed part of the territory of the *Wardandi* (literally 'sea people') group, whose country encompassed much of the coastal area between Bunbury and Cape Leeuwin (Tindale 1974) (Figure 2). This group was one of thirteen socio-dialect groups (more commonly referred to as 'tribes') that formed a distinct socio-cultural bloc distinguished from their neighbours to the north and east by language, kinship and ritual practices. Today, Aboriginal people belonging to this socio-cultural bloc often refer to themselves as 'Nyungars'.

The size of the Aboriginal population of Southwestern Australia is difficult to determine. Estimates based on census data collected for the Perth region suggests a population density of approximately one person per 10 square kilometres (Hallam 1986). However, this figure is only likely to be reliable for the resource-rich wetlands of the Swan Coastal Plain. It is unclear how population density may have varied outside this region, particularly in the forested areas of the lower southwest

The basic unit of *Nyungar* social organisation was the family. The most important economic unit, however, was the *band*, which usually comprised two or more family groups and which could number up to 25 individuals. The size and composition of these groups varied in accordance with the timing and availability of seasonal resources and social factors. The number of people involved in such economic and social activities could range from a few individuals up to occasional meetings of several hundred people.

Large gatherings formed an important aspect of the social, economic and ceremonial behaviour amongst Nyungars, with people travelling 200 kilometres or more to attend (Gibbs 1987). Gatherings provided a context for the making of 'tribal decisions', trade, exchange and controlled resolution of disputes. The timing and location of gatherings were determined by an assessment by elders as to whether circumstances warranted a gathering, and secondly, whether food resources were reliable and available in sufficient quantity to feed a large group of people for periods of up to one month.

Nyungars had an intimate knowledge of their environment and the resources it contained. As noted by George Grey in 1841 (Vol. 2:262), "...in his own district a native...knows what it produces, the proper time at which the several articles are in season, and the readiest means of procuring them. According to these

*circumstances he regulates his visits to the different portions of his hunting ground...*" This awareness of their physical environment is reflected in the fact that Nyungars recognised six main seasons:

- *Maggoro* (June-July)
- *Jilba* (August-September)
- *Kambarang* (October – November)
- *Birok* (December – January)
- *Burnuru* (February – March)
- *Wanyarang* (April – May)

Each of these seasons corresponded to seasonal variations in, and availability of, particular foodstuffs. For example, *burnuru* was the time of year that zamia plants fruited and mullet, salmon and tailor were plentiful in the rivers and estuaries.

Food resources exploited by Nyungars included mammals, birds and eggs, many reptiles and frogs, fish (especially marine species from the lower reaches of rivers, and from estuaries and inlets), and some invertebrates (especially the larvae of some beetles and moths) were eaten. So was a wide range of roots, seeds and fruits. In addition to food, plants provided a range of materials that could be used as medicines or for other purposes, such as in the production of string, fastenings, shelter, ornaments and implements (Meagher 1974; Meagher and Ride 1980).

The available evidence suggests that Nyungars practiced a regime of 'casual but constant' movement across the landscape. Each family group would have had a focal point that was most frequently used by them. Movement within and between such areas was generally facilitated by a network of trackways which connected camping grounds and resource procurement areas. Trackways were maintained by a programme of systematic firing, which not only kept the trackways open, but also rejuvenated the soil and provided environments that encouraged game. These trackways also facilitated European exploration of Southwestern Australia, with many subsequently forming the basis of the current road system.

The material culture of *Nyungars* included a diverse toolkit comprising axes, spears, knives, spear-throwers, throwing sticks, digging sticks, shields, string, clothing and body ornaments. Of particular interest are two items distinctive of Southwestern Australia. The so-called '*kodj*' or '*kodja*' axe comprised one or two pieces of stone attached with gum resin to a wooden handle typically manufactured from the common wattle tree. Composite knives known as '*taap*' were similarly manufactured, and comprised one or more rows of stone flakes hafted onto a wooden shaft. The primary function of *taap* knives appears to have been to cut meat, although the pointed end of the haft was sometimes used to assist in climbing trees.

Spears appear to have come in three varieties. Simple spears were manufactured from a single piece of wood, with a recessed butt for use in conjunction with a spear-thrower. The second type of spear was supplied with wooden barbs, which were attached with sinew, string or hair and set with gum. Typically, these spears were used for hunting and fishing. The final type of spear had stone flakes attached to the shaft much in the manner of a *taap* knife. These spears were usually reserved for fighting. Spears were manufactured from slender trees or saplings (typically wattle or mallee) that were straightened over a fire and sharpened using the front tooth of a kangaroo.

Spear-throwers came in a variety of forms, but were manufactured from a thin flat piece of wood, with a peg attached at one end to receive the butt of a spear. The handle was generally formed from a knob of gum attached to the end of the shaft opposite the peg. Throwing sticks and clubs generally comprised a short heavy stick that could be used to bring down birds and other animals, and which was occasionally used in fights. Little information is available on boomerangs, shields or women's implements.

## **2.3 Previous investigations and known archaeological assets**

As a preliminary to the archaeological field survey, the consultant conducted a review of the following documentary and archival resources:

- Department of Indigenous Affairs' (DIA) Aboriginal Heritage Management System (AHMS);
- Interim and Permanent site registers maintained by the DIA;
- Contract reports; and
- Published and unpublished material.

The Aboriginal Heritage Inquiry System (AHIS) maintained by the Department of Indigenous Affairs (DIA) was interrogated in order to determine the location, number, type and identity of known Aboriginal sites within a notional 5km radius of the Survey Area. The query was run on 10 January 2012 and enclosed and encompassed an area of approximately 10km<sup>2</sup> with the following coordinates:



- 350000mE 6268510mN (NW corner)
- 360000mE 6258510mN (SE corner)

The query indicated that **no** Aboriginal sites have previously been recorded within the Haddon East, Haddon West, State Forest or Catalano survey blocks (Figure 4). Indeed, only one Aboriginal site has been identified to date; this is the Sabina River (DIA Site ID 17353), which is recorded as having both mythological and historical associations.

The paucity of known Aboriginal sites in the general vicinity of the Survey Area can be seen to be more a function of geographical biases in past Aboriginal heritage survey coverage than an accurate reflection of past Aboriginal use of the landscape (Figure 5). For example, the DIA AHIS indicates that only a limited number of Aboriginal heritage investigations have been undertaken in the vicinity of the Survey Area, typically as part of either broad-brush regional assessments or strategic infrastructure developments. These include:

- Goode (2003). An addendum to a desktop preliminary Aboriginal heritage survey for Water Corporations proposed development of the Yarragadee Aquifer extending to the Blackwood groundwater area. Unpublished report prepared for the Department of Environmental Protection.
- Goode and Rundin (2002). Ethnographic survey of Vasse Highway, Nannup to Busselton, South West Western Australia. Unpublished report prepared for Gutteridge Haskins and Davey Pty Ltd and Main Roads Western Australia.
- Greenfield and Goode (2002). Archaeological survey of proposed highway corridor and deviation, Vasses Highway (Busselton to Nannup). Unpublished report prepared for Gutteridge Haskins and Davey Pty Ltd and Main Roads Western Australia
- Lantzke and Parker (2003). Ethnographic site avoidance survey under the Aboriginal Heritage Act (1972) of South West Yarragadee investigation drilling program at south west Western Australia. Unpublished report prepared for Western Australian Water Corporation on behalf of Australian Interaction Consultants.

Given the relatively limited scope of past Aboriginal heritage investigations (and commensurately limited inventory of known sites in the wider Study Area) it will be necessary to draw upon regional-scale analyses in order to gain a more detailed impression of the archaeological potential of the Survey Area. The most detailed dataset on the distribution of Aboriginal sites on the Swan Coastal Plain (but with applicability elsewhere in the south-west of Western Australia) remains that captured by Hallam (1972, 1977, 1983, 1987) as part of the Swan Area Archaeological Survey (SAAS).

Over 400 archaeological sites were recorded during the course of the SAAS. More than half of these sites were provisionally interpreted as reflecting ephemeral usage of the landscape by small groups. The balance of sites recorded were either large or very large, containing thousands or tens of thousands of surface artefacts, including retouched artefacts, cores,debitage (i.e. waste flakes from stone tool production), and grinding/percussion material - the latter generally indicating the presence of women, and hence family groups. Large sites of this type were interpreted as representing occupation for long periods of time by large (and on occasion very large) groups of Aboriginal people.

This dataset was collated and subjected to a detailed computer analysis by Strawbridge (1989) as part of the development of an Aboriginal heritage management plan for the Perth metropolitan region. Strawbridge's (1989:34) computer analysis revealed that:

- Sites are most likely to be situated on sandy, well-drained dunes ridges;
- Sites are most likely to be located within 350m of a potential water source, including (in order of decreasing frequency) swamps, creeks, rivers, lakes, surface water, springs and soaks.
- Sites are unlikely to be located in low-lying, poorly drained or seasonally inundated areas; and
- Sites are unlikely to be located more than 350m away from a potential water source.

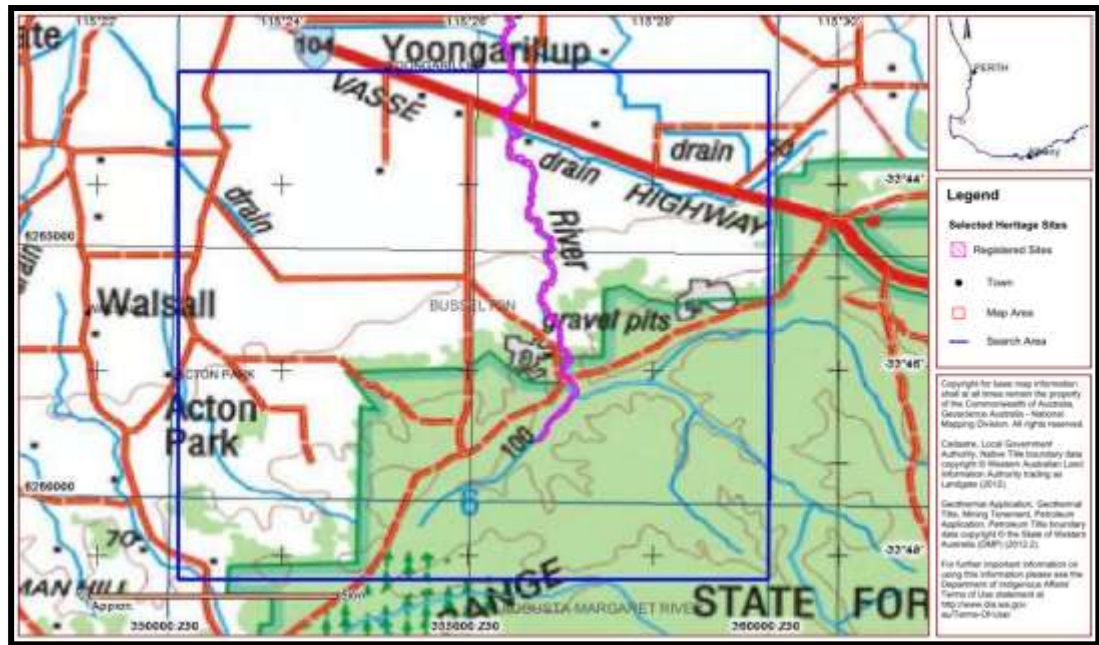


Figure 4 Abstract from DIA Aboriginal Heritage Inquiry System (AHIS) showing the location of known Aboriginal sites within a notional 5km radius of the Survey Area (Source: DIA AHIS).

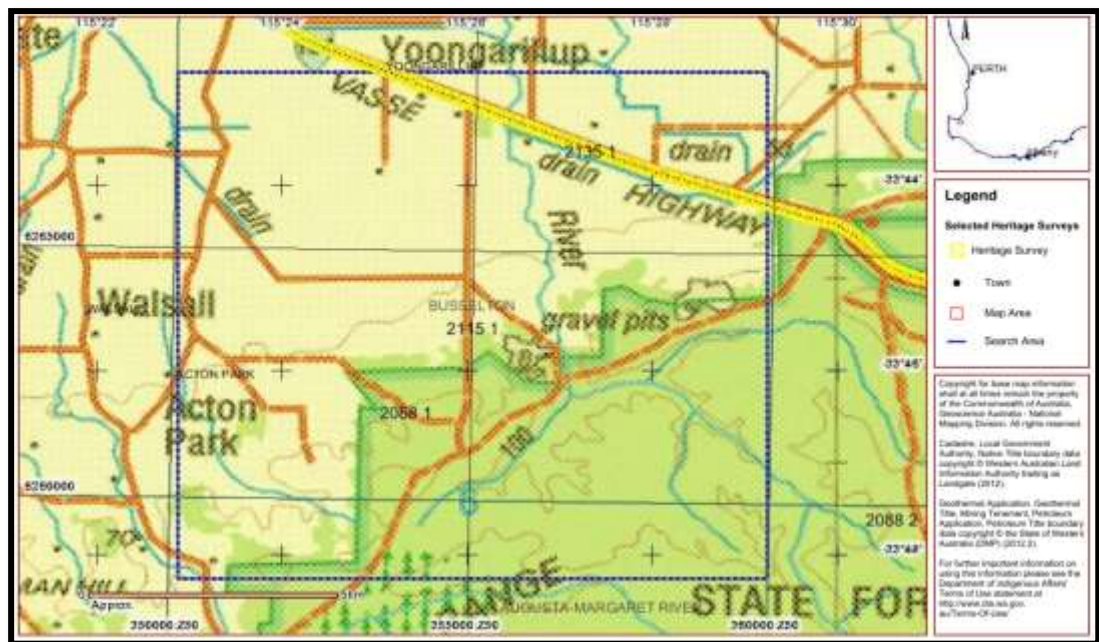


Figure 5 Abstract from DIA Aboriginal Heritage Inquiry System (AHIS) showing the location of previous Aboriginal heritage surveys within a notional 5km radius of the Survey Area (Source: DIA AHIS).

### 3 Survey Strategy and Recording Methods

#### 3.1 Field survey strategy

Previous research in the wider study area indicates that the archaeological signature of the Survey Area is likely to comprise relatively discrete open artefact clusters, the apparent location, density and composition of which are likely to be contingent on a range of factors, including the archaeological survey technique(s) adopted, the disturbance history of the area in question, and technical constraints on survey efficacy, including ground surface visibility and artefact obtrusiveness (ie size, colour).

In order to be responsive to these factors, two complementary survey strategies were adopted:

- Systematic, closely-spaced, north-south oriented pedestrian transects within survey corridors of nominal 50m width; and
- Purposive inspection of all firebreaks, tracks and other areas of relatively high ground surface visibility.

A breakdown of proposed survey coverage within each of the survey blocks is presented in Table 1 and in Figure 7.

Survey Block	No. 50m survey corridors	Min length	Max length	Average length	Total Length
Haddon West	16	100m	800m	658m	10,531m
Haddon East	10	800m	800m	800m	8,000m
State Forest	10	220m	520m	414m	4,556m
Catalano	7	450m	900m	793m	5,555m
				<b>TOTAL</b>	<b>28,642m</b>

Table 1 Proposed archaeological survey corridor coverage within the Yoongarillup Resource Zones.

In general terms, it is intended that the three-person archaeological survey team be evenly spaced within the pre-defined 50m transect corridors. In practice, this would involve one member of the team walking the centreline while the two remaining team members walk parallel 20m offsets (refer Figure 6). Owing to the considerable time and practical constraints in establishing physical controls for the start and end-points for each of the proposed archaeological survey corridors, a decision was made to employ desktop and mobile geographic information systems (GIS) as an aide to navigation, survey and recording.

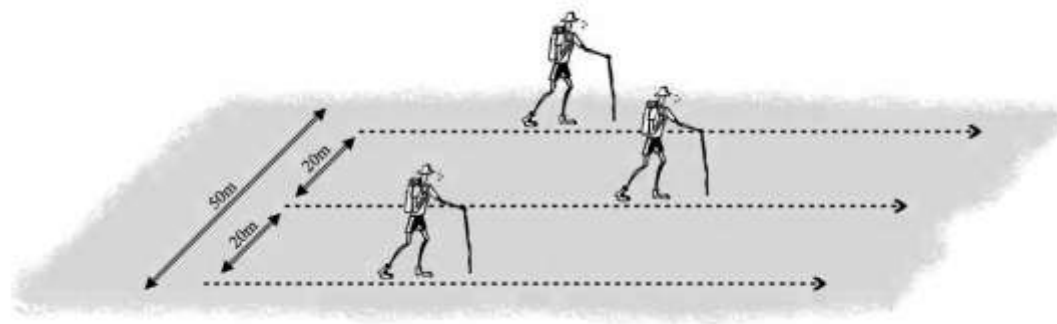


Figure 6 Diagram illustrating archaeological survey method and crew spacing within pre-defined survey corridors.

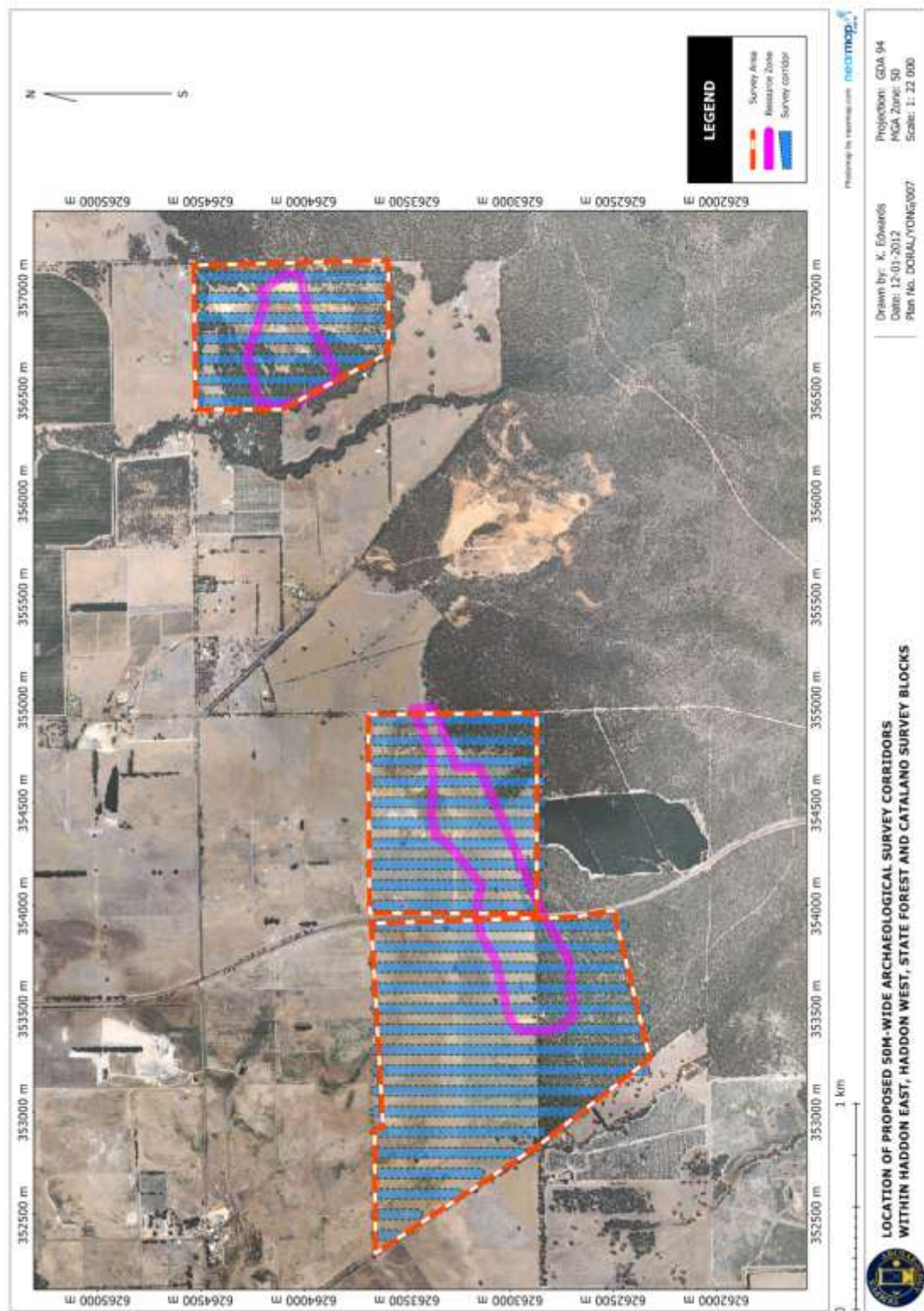


Figure 7 Map showing the location of proposed 50m-wide archaeological survey corridors.



A desk-top based GIS system (Manifold version 8.0.26.0 Professional Edition © 1993-20011 CDA International Ltd) was used to generate separate coverages for each of the four survey blocks within the Yoongarillup Resource Zones (ie Haddon West, Haddon East, State Forest and Catalano). Summary details are provided in Table 1. The GIS coverage containing details of the 50m wide survey transect corridors, together with geo-referenced aerial photography, were downloaded onto a pair of mapping-grade handheld GPS receivers (Garmin Oregon 550T and Garmin GPSMap 76CSx), which were used both to navigate the survey transects and maintain a tracklog of purposive and opportunistic survey coverage. The system also facilitated the in-field recording of environmental and archaeological data and the capture of geo-referenced photographs.

### 3.2 Site definitions and recording methods

#### 3.2.1 Site definition

The *Aboriginal Heritage Act 1972* (s. 5) defines an Aboriginal site as:

- (a) any place of importance and significance where persons of Aboriginal descent have, or appear to have, left any object, natural or artificial, used for, or made or adapted for use for, any purpose connected with the traditional cultural life of the Aboriginal people, past or present;
- (b) any sacred, ritual or ceremonial site, which is of importance and special significance to persons of Aboriginal descent;
- (c) any place which, in the opinion of the Committee, is or was associated with the Aboriginal people and which is of historical, anthropological, archaeological or ethnographical interest and should be preserved because of its importance and significance to the cultural heritage of the State;
- (d) any place where objects to which this Act applies are traditionally stored, or to which, under the provisions of this Act, such objects have been taken or removed.

Despite the existence of this broad definition, heritage managers in south-western Australia generally adopt somewhat arbitrary operational definitions to distinguish between salient archaeological features ('sites') on the one hand and apparently unpatterned background 'noise' on the other (Tainter 1998:169-70). As a consequence of this emphasis on salient archaeological features, the majority of 'minor' archaeological sites and isolated artefacts recorded in the region fail to receive adequate recording, analysis, interpretation, or management consideration.

In a move away from such limited perspectives, many archaeologists have rejected the 'site' concept in favour of so-called 'off-site' or 'non-site' perspectives. These alternative approaches are best summed up by Dunnell and Dancey (1983:272), who state that a far more useful, less biased model of the archaeological record can be constructed if:

...the objective of data collection is broadly conceived as the recovery of artefacts [sic] as opposed to the recovery of sites. Adopting this view, the archaeological record is most usefully conceived as a more or less continuous distribution of artefacts [sic] over the land surface with highly variable density characteristics. Sites in this context represent only a part of the total record, explicitly defined by density characteristics.

While such perspectives may be more sensitive to the realities of the archaeological record, their adoption nevertheless poses significant methodological and pragmatic problems in the context of heritage management (particularly small-scale contract surveys), given that management is more readily achieved when archaeological phenomena can be clearly defined and located (Fanning and Holdaway 2002). Thus, while there are ontological problems inherent in the retention of the *notion* of 'sites', it remains a useful heuristic provided that certain minimal criteria can be met (Tainter 1983:13). As such, a working definition of what constitutes an archaeological site should be:

- easily operationalized;
- have administrative feasibility;
- provide results which are comparable;
- be sensitive to the recognition of low density remains; and
- focus attention on past behaviour which was purposive and patterned, rather than on behaviour which was accidental or idiosyncratic.

In order to meet these requirements, we follow an approach developed by Tainter (1983), which recognises two main classes of surface artefact expression - *sites* and *isolated artefacts*:

A *site* is location where one can reasonably infer from the physical remains that a *purposeful activity* took place. The term *purposeful activity* differentiates the remains of sites from remains that one can reasonably infer were lost, discarded, broken, and/or abandoned. The latter are considered *isolated finds*, and are locations where no demonstrable activity took place. In practice, isolated finds will be single items that do not

clearly reflect an activity (such as single lithic items...) or broken pieces of what had once been a single item. Sites will be indicated by the presence of two or more *different* items, or different classes of items, in close proximity (Dr. Joseph Tainter, Archaeologist, U.S. Department of Agriculture, Albuquerque, NM, professional communication cited in Zeidler 1995).

For the purposes of the present investigations, we sub-divide lithic sites into *artefact clusters* and *artefact aggregations* in order to better account for differences in the recovery context of archaeological material. Definitions are as follows:

- **Artefact cluster:** two or more artefacts that cannot be spatially resolved using off-the-shelf mapping-grade GPS equipment (i.e. two or more artefacts within a radius of  $\pm 5\text{m}$ ).
- **Artefact aggregation:** two or more artefacts contextually associated with a discrete disturbance feature (i.e. sand quarry, erosion exposure). Artefact aggregations typically comprise conflation surfaces/lag deposits and can encompass a combination of *artefact clusters* and *isolated finds*.
- **Isolated find:** a spatially discrete artefact that does not meet the criteria for artefact clusters or artefact aggregations.

### 3.3 Site recording techniques and standards

Where identified, archaeological material will be recorded in accordance with the guidelines set out in the Department of Indigenous Affairs *Draft Guidelines for Aboriginal Heritage Assessment in Western Australia* and *Draft Spatial Standards*. Details of archaeological sites and isolated artefacts will be recorded on standard forms issued by the Department of Indigenous Affairs. A photographic archive will also be maintained.

### 3.4 Stone artefact definitions and recording techniques

For the purposes of the present report, four main classes of stone artefacts are recognised. These are:

- unmodified flaked pieces
- cores
- retouched/utilised artefacts; and
- grinding/percussion material.

Unmodified flaked pieces: Here the term 'unmodified flaked pieces' is used in preference to the more commonly used 'debitage', as the latter term has a number of different definitions, some of which are incompatible with current practice. For example, debitage is widely characterised as all lithic waste material generated during the production of stone tools or implements, such as scrapers, points or adzes. In the context of South western Australia, where flakes themselves were often the desired outcome, this definition is obviously less than satisfactory in that no adequate distinction can be made between flakes removed for use as tools (i.e. as simple cutting flakes) and flakes removed in order to allow other flakes suitable as tools to be removed (Van Pool, Van Pool, Antillón, Leonard and Harmon n.d.).

Following the classifications developed by Hiscock (1988:362) and Sullivan and Rozen (1985), unmodified flaked pieces will be classified as either complete flakes, broken flakes, or flaked pieces. Complete flakes are defined as pieces of rock struck from a core, and which exhibit attributes such as a ringcrack, a point of force application, a bulb or percussion, an erailure scar or any combination of these attributes. Broken flakes are flakes that have been broken during or after production either by transverse or longitudinal snapping. Flaked pieces are artefacts that cannot be classified as a complete flake or broken flake owing to the absence of defining attributes, and can include such material as flake fragments and angular shatter or debris.

Cores: These are nodules of stone from which fragments have been detached by blows from hard or soft percussors (i.e. pieces of stone, wood, or other material). Artefacts were classified as cores if they exhibited at least two negative flake scars and lacked a single interior surface.

Retouched/utilised artefacts: These are artefacts that exhibit evidence of deliberate modification, either towards the production of a particular implement or for the purposes of maintaining a working edge. Three main classes are recognised:

*Retouched/utilised flakes* covers a wide range of amorphous flakes that display damage and/or deliberate reworking of one or more margins.



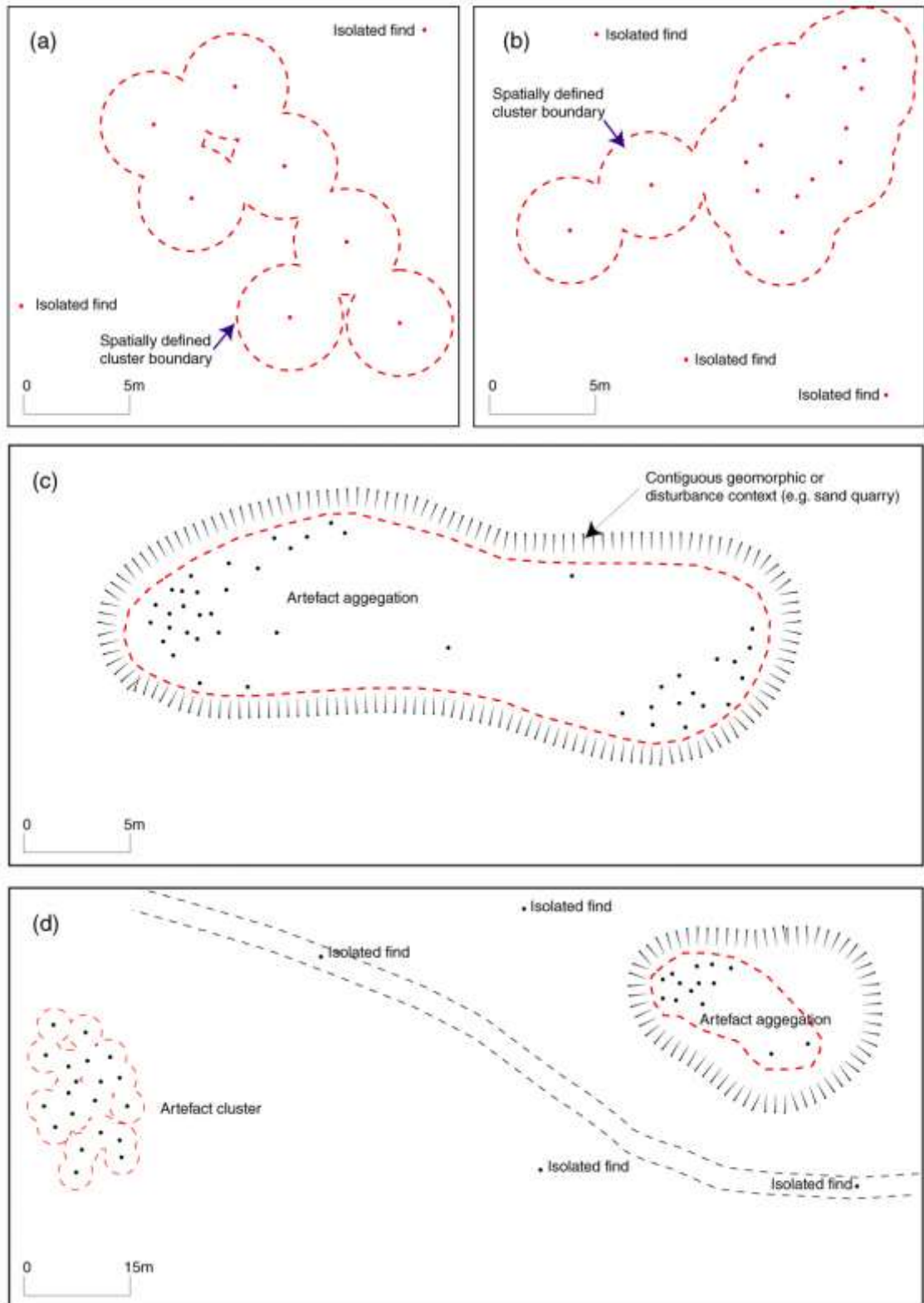


Figure 8 Examples of artefact clusters (a and b) and artefact aggregations (c), and their relationship to one another and isolated finds (d).

*Retouched/utilised cores* include any core exhibiting edge retouch in the form of a row of contiguous flake scars. The presence of edge retouch on cores is a much-debated issue. Replicative studies have demonstrated that damage believed to result from utilisation is identical to patterns observed in platform preparation. Additionally, stepped or undercut edges are seen to be the result of attempts to remove flakes from a core when the angle between the platform and the exterior surface approaches ninety degrees (Flenniken and White 1985:140; Kamminga 1982). For this reason, cores with step-terminated flake scars were excluded from this category.

*Retouched/utilised pieces* includes artefacts displaying edge damage or retouch that have been broken during manufacture or through subsequent trampling.

Grinding/Percussion Material: This category includes pieces or slabs of stone that exhibit:

- polishing or abrading on one or more surfaces in a manner consistent with their use as a grinding base or pestle (*muller*); or
- pitting on one or more surfaces in a manner consistent with use as a hammer or anvil in the production of stone artefacts or in the processing plant materials (e.g. nuts and seeds).

For recording purposes, we follow the methodology outlined by Hiscock (1984). In general, the lithology and maximum dimensions (length, width, thickness) of each artefact identified will be recorded, together with other relevant technological attributes, including:

- Flake platform type, length and width
- Flake termination
- Degree of cortex cover
- Evidence of core rotation
- Location and extent of pitting and/or abrading; and
- Location, extent and type of edge modification.

## 4 Archaeological Survey Outcomes

### 4.1 Survey process and outcomes

The archaeological survey was conducted by K. Edwards (Tempus Archaeology) with the assistance of W. Webb and T. Webb (archaeological assistants and members of the local Aboriginal community). The archaeological survey was initiated on 26 July 2011, but had to be discontinued the following day owing to the onset of severe weather and the ill-health of one of the archaeological assistants. The survey was completed on 3-4 October 2011.

Overall, it is estimated that over 97% of the proposed 50m archaeological survey corridors were inspected in detail, with each crew member walking approximately 28km of transects across the Haddon East, Haddon West, State Forest and Catalano survey blocks (refer Table 2, Figure 9 and Figure 10). An additional 10.4km of transect coverage was achieved as part of the purposive investigation of firebreaks, tracks and other areas with high ground surface visibility.

Survey Block	Systematic Survey (corridor length)	Purposive Survey	Total
Haddon West	10,031m	3,200m	13,231m
Haddon East	7,700m	3,004m	10,704m
State Forest	4,556m	1,700m	6,256m
Catalano	5,555m	2,500m	8,055m
<b>TOTAL</b>	<b>27,842m</b>	<b>10,404m</b>	<b>38,246m</b>

Table 2 Breakdown of systematic and purposive archaeological survey coverage within survey blocks.

Based on the figures presented in Table 2, it can be calculated that an area of approximately 158ha, representing 56% of the Survey Area as a whole, was inspected in detail. Nevertheless, order to determine the overall *efficacy* of archaeological survey coverage, several factors need to be taken into consideration, including:

- Crew spacing within the 50m survey corridors;
- Estimated field of view of each member of the survey crew;
- Detection limiting factors; and
- Other factors (time of day, crew fatigue, crew experience etc).

Estimated fields of view (under average conditions) for each member of the survey team ranged between  $\pm 3\text{m}$  to  $\pm 5\text{m}$  (based on in-field observations), and as such were well within observational requirements. Necessarily, these figures varied between crewmembers and were influenced to a lesser or greater degree by a range of detection limiting factors and other technical constraints, including past and on-going disturbance processes (eg excavation of dams and clearing of tracks), degree of vegetation cover, presence of standing water, presence of gravel and other non-artefactual stone, and lighting conditions.

Specifically, it was observed during the course of the present investigations that survey conditions were highly variable across each of the four survey blocks. As discussed in Section 1.2 above, the majority of the Survey Area (with the exception of the State Forest survey block) has been cleared of native vegetation and given over to a range of agricultural and other land uses, including small-scale sand and gravel extraction. Generally, ground surface visibility was poor, owing to the presence of a fairly ubiquitous ground cover of winter field grasses and crops which limited visibility across many areas to less than 10% overall. Extensive waterlogging was also observed across the lower-lying portions of Haddon East, Haddon West and State Forest survey blocks (refer Plates 1-15).

While acknowledging these constraints on survey efficacy, it is considered that archaeological survey coverage was of sufficient scope and intensity to serve the purposes of a Phase 1 (ie non-invasive) due diligence assessment (Department of Indigenous Affairs 2011).

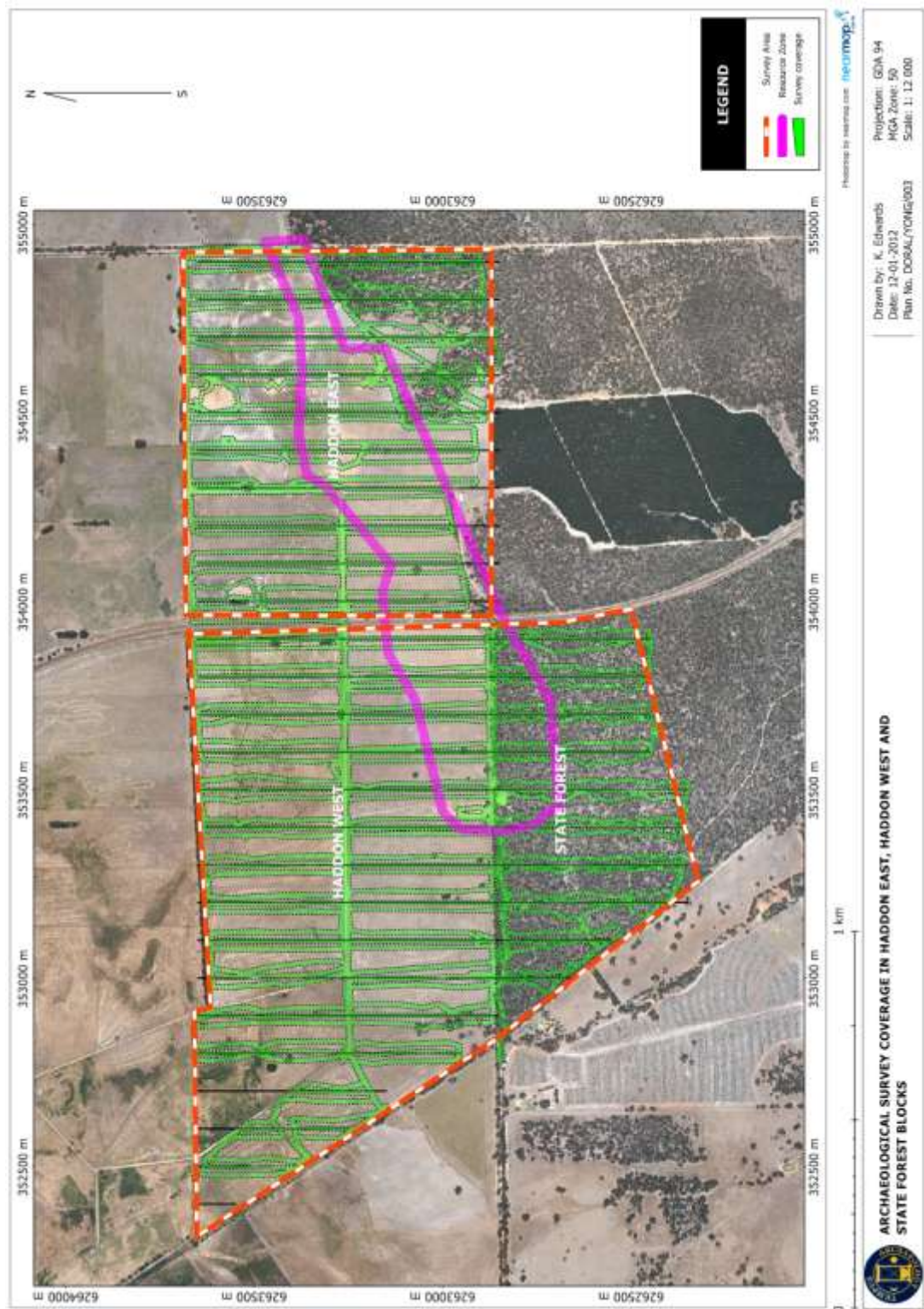


Figure 9 Map showing archaeological survey coverage (indicative) within the Haddon East, Haddon West and State Forest survey blocks.



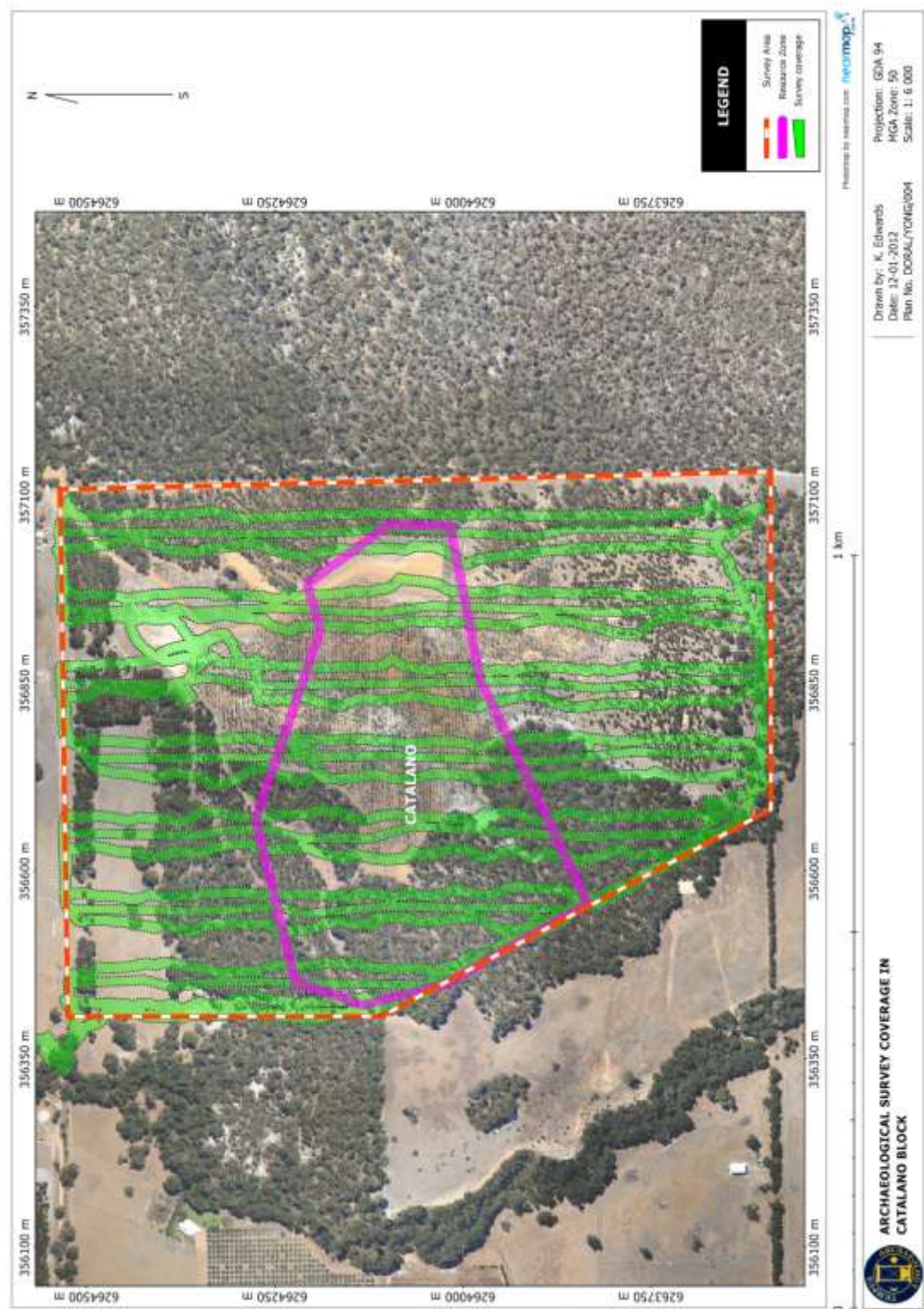


Figure 10 Map showing archaeological survey coverage (indicative) within Catalano survey block.

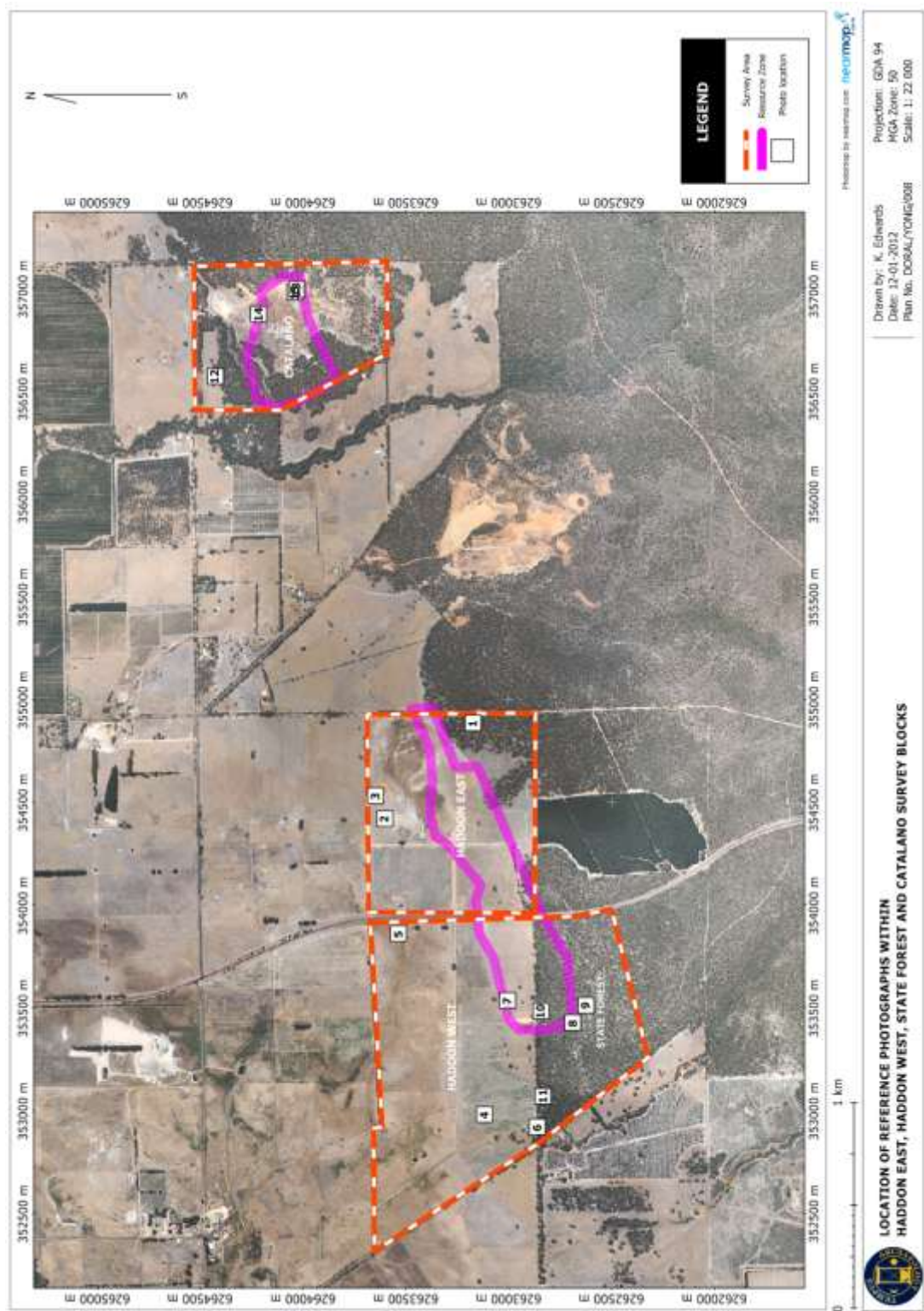


Figure 11 Map showing location of reference photographs within the Haddon East, Haddon West, State Forest and Catalano survey blocks.





*Plate 1 Haddon East – general view looking west across secondary regrowth; note poor ground surface visibility.*

*Location:*

*354882mE 6263173mN.*

*Photo reference: 1*



*Plate 2 Haddon East – general view looking south-south-east across cleared and devegetated portion of paddock*

*Location:*

*354418mE 6263602mN.*

*Photo reference: 2*



*Plate 3 Haddon East – general view looking west across sand/gravel quarry(?). Note standing water.*

*Location:*

*354529mE 6263647mN.*

*Photo reference: 3*



*Plate 4 Haddon west – general view looking south across field in crop.*

Location:

352979mE 6263117mN

Photo reference: 4



*Plate 5 Haddon West – general view looking north-east towards Sues Road; note dense ground cover and drainage culvert.*

Location:

353858mE 6263536mN

Photo reference: 5



*Plate 6 Haddon West – general view looking east along firebreak/access track.*

Location:

352917mE 6262860mN

Photo reference: 6



*Plate 7 Haddon West – general view looking south along base of sand extraction area; note depth of cut.*

Location:

353535mE 6263006mN

Photo reference: 7





*Plate 8 State Forest – general view looking south-west across bushland.*

Location:

353425mE 6262687mN

Photo reference: **8**



*Plate 9 State Forest – general view looking north-west across bushland; note sandy exposure.*

Location:

353512mE 6262625mN

Photo reference: **9**



*Plate 10 State Forest – general view looking south into sand/gravel quarry; note depth of cut.*

Location:

353484mE 6262844mN

Photo reference: **10**



*Plate 11 State Forest – general view looking west along access track; note extensive standing water.*

Location:

353070mE 6262831mN

Photo reference: **11**



*Plate 12 Catalano – general view looking south-west towards remnant woodland.*

Location:

356571mE 6264428mN

Photo reference: **12**



*Plate 13 Catalano – general view looking north-west across plantation; note heavy ground disturbance.*

Location:

356978mE 6264038mN

Photo reference: **13**



*Plate 14 Catalano – general view looking south-east across plantation; note severe ground disturbance*

Location:

356874mE 6264215mN

Photo reference: **14**



*Plate 15 Catalano – general view looking east across sand/gravel extraction area.*

Location:

356978mE 6264038mN

Photo reference: **15**

## 4.2 Description of newly recorded archaeological features

Two minor artefact clusters (designated DYONG-001 and DYONG-002) and three finds of isolated stone artefacts (designated DYONG-ISO/001 to DYONG-ISO/003) were identified and recorded (Figure 12 and Figure 13). Details are as follows.

### 4.2.1 Doral Yoongarillup Mineral Sands Mine Artefact Cluster 001 (DYONG-001)

A minor cluster of flaked stone artefacts located within the State Forest survey block, approximately 470m due west of Sue's Road and 15m south of Goulden Road, an east-west running access track forming the boundary between Haddon West and State Forest survey blocks (Figure 14, Plate 16 and Plate 17). A total of three stone artefacts were identified over an area of 3m<sup>2</sup> on the gently sloping entrance to a sand extraction area. The sand extraction area encompassed an area of approximately 30m<sup>2</sup> and had been excavated to a depth of up to 3.5m, revealing a deep profile of yellow loamy sand. Visibility across the approaches to, and floor of, the sand extraction area was generally excellent (>75%), with few detection limiting factors of note other than minor leaf litter and some fly-tipping. Vegetation in the immediate vicinity of the sand extraction area comprised open forest of *Eucalyptus marginata*, *Corymbia calophylla* and *Banksia grandis*.

Details of the artefacts are as follows:

- Chert Flake Fragment (distal): 13.9mm (L) x 18.5mm (W) x 5.8mm (T), clean transverse break, feather termination.
- Chert Flake: 4.6mm (L) x 16.6mm (W) x 3.4mm (W), bending initiation 4.4mm (L) x 15.8mm (W), 2x dorsal scars, no cortex, feather termination.
- Quartz Debris: 23.6mm (L) x 14.3mm (W) x 6.3mm (T), smoothed edges, suggestive of long exposure and/or transportation.

The cluster can be defined by an irregular polygon with one branch and three coordinates:

Point 1: 353480mE 6262861mN

Point 2: 353477mE 6262843mN

Point 3: 363462mE 6262851mN

### 4.2.2 Doral Yoongarillup Mineral Sands Mine Artefact Cluster 002 (DYONG-002)

A minor cluster of flaked stone artefacts located within the Catalano survey block, approximately 2.36km east of Yoongarillup Road and 230m south of an unsurfaced extension of Espinos Road (Figure 13, Figure 15, Plate 18 and Plate 19). A total of three quartz artefacts were identified over an area of 5m<sup>2</sup> on the northern margin of a deeply incised north-south running drainage channel that empties into an extensive sand extraction area immediately adjacent to the cluster. The area over which the artefacts were observed comprises leached grey/white sand with some lateritic gravel. Visibility was generally excellent (>75%), with few detection limiting factors of note other than a sparse to very sparse ground cover of grasses and minor exposures of gravel. Much of the surrounding area has been cleared of native vegetation and given over to plantation and sand extraction activities; the degree of disturbance arising from these activities is indicated by the presence of modern materials at depth within the profile of the drainage channel. Pre-disturbance vegetation is likely to have comprised open forest of *E. marginata* and *Allocasuarina* sp.

Details of the artefacts are as follows:

- Quartz Debris: 16.4mm (L) x 11.8mm (W) x 3.8mm (T)
- Quartz Flake Fragment (distal): 10.8mm (L) x 12.9mm (W) x 3.7 mm (T)
- Quartz Flake Fragment (distal): 23.3mm (L) x 12.9mm (W) x 4.3mm (T)

The cluster can be defined by an irregular polygon with one branch and three coordinates:

Point 1: 356899mE 6264362mN

Point 2: 356907mE 6264343mN

Point 3: 356884mE 6264342mN

#### 4.2.3 Doral Yoongarillup Mineral Sands Mine Isolated Find 001 (DYONG-ISO/001)

An isolated quartz artefact located at 354080mE 6262951mN within the Haddon East survey block, approximately 130m due east of Sue's Road (Figure 12, Plate 20). The artefact was observed on an partially overgrown east-west running firebreak/access track. Ground surface visibility was generally adequate (50%-75%), with detection limiting factors comprising leaf litter and other ground covering vegetation. While much of the surrounding area has been cleared and given over to agriculture/grazing, the limited surviving native vegetation indicates that the area would have comprised an open woodland of *E. marginata*, *Corymbia spp.* and *Allocasuarina fraseriana* on leached sandy loams.

The artefact itself comprises a piece of quartz debris with the following dimensions: 7.8mm (L) x 4.9mm (W) x 2.6mm (W).

#### 4.2.4 Doral Yoongarillup Mineral Sands Mine Isolated Find 002 (DYONG-ISO/002)

An isolated artefact located at 354581mE 6263188mN within the Haddon East survey block, approximately 630m west of Sue's Road and 50m north of an unsurfaced east-west running access track (Figure 12, Plate 21). The artefact was observed on the north-facing slope of a minor rise overlooking a seasonally-inundated dampland. The surrounding area has been completely cleared and given over to agricultural uses. Ground surface visibility in the vicinity of the artefact was generally excellent (>75%), with few detection limiting factors of note other than sparse to very sparse grass cover, minor lateritic gravel, and European occupation debris (brck fragments etc). Pre-clearance vegetation is likely to have comprised an open woodland of *E. marginata*, *Corymbia spp.* and *Allocasuarina fraseriana* on leached sandy loams.

The artefact itself comprises a transversely broken chert flake with the following measurements and attributes: 36.8mm (L) x 13.9mm (W) x 4.3mm (T), gullwing platform 5.7mm (L) x 1.4mm (W), 2x dorsal scars, no cortex, snap termination.

#### 4.2.5 Doral Yoongarillup Mineral Sands Mine Isolated Find 003 (DYONG-ISO/003)

An isolated artefact located at 354611mE 6263168mN within the Haddon East survey block, approximately 660m west of Sue's Road and 20m north of an unsurfaced east-west running access track (Figure 12, Plate 22). The artefact was observed on the north-facing slope of a minor rise overlooking a seasonally-inundated dampland. The surrounding area has been completely cleared and given over to agricultural uses. Ground surface visibility in the vicinity of the artefact was generally excellent (>75%), with few detection limiting factors of note other than sparse to very sparse grass cover, minor lateritic gravel, and European occupation debris (brck fragments etc). Pre-clearance vegetation is likely to have comprised an open woodland of *E. marginata*, *Corymbia spp.* and *Allocasuarina fraseriana* on leached sandy loams.

The artefact itself comprises a quartz distal flake fragment with the following measurements: 11.1mm (L) x 8.6mm (W) x 2.0mm (T).





Figure 12 Map showing the location of newly recorded archaeological residues in Haddon East, Haddon West and State Forest survey blocks.

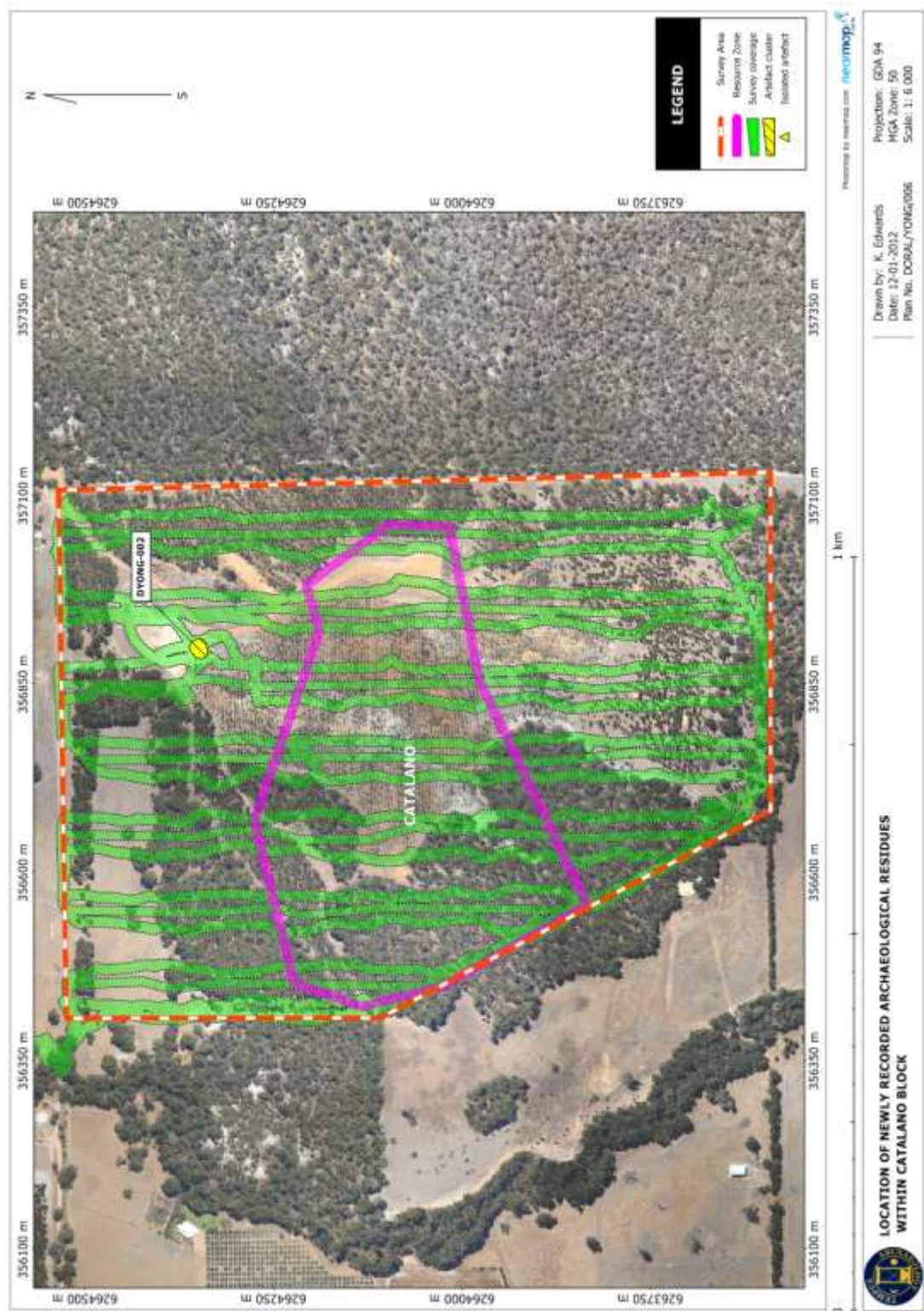


Figure 13 Map showing the location of newly recorded archaeological residues in Catalano survey block.





Figure 14 Map showing the location and extent of Doral Yoongarillup Mineral Sands Mine Artefact Cluster 001 (DYONG-001).

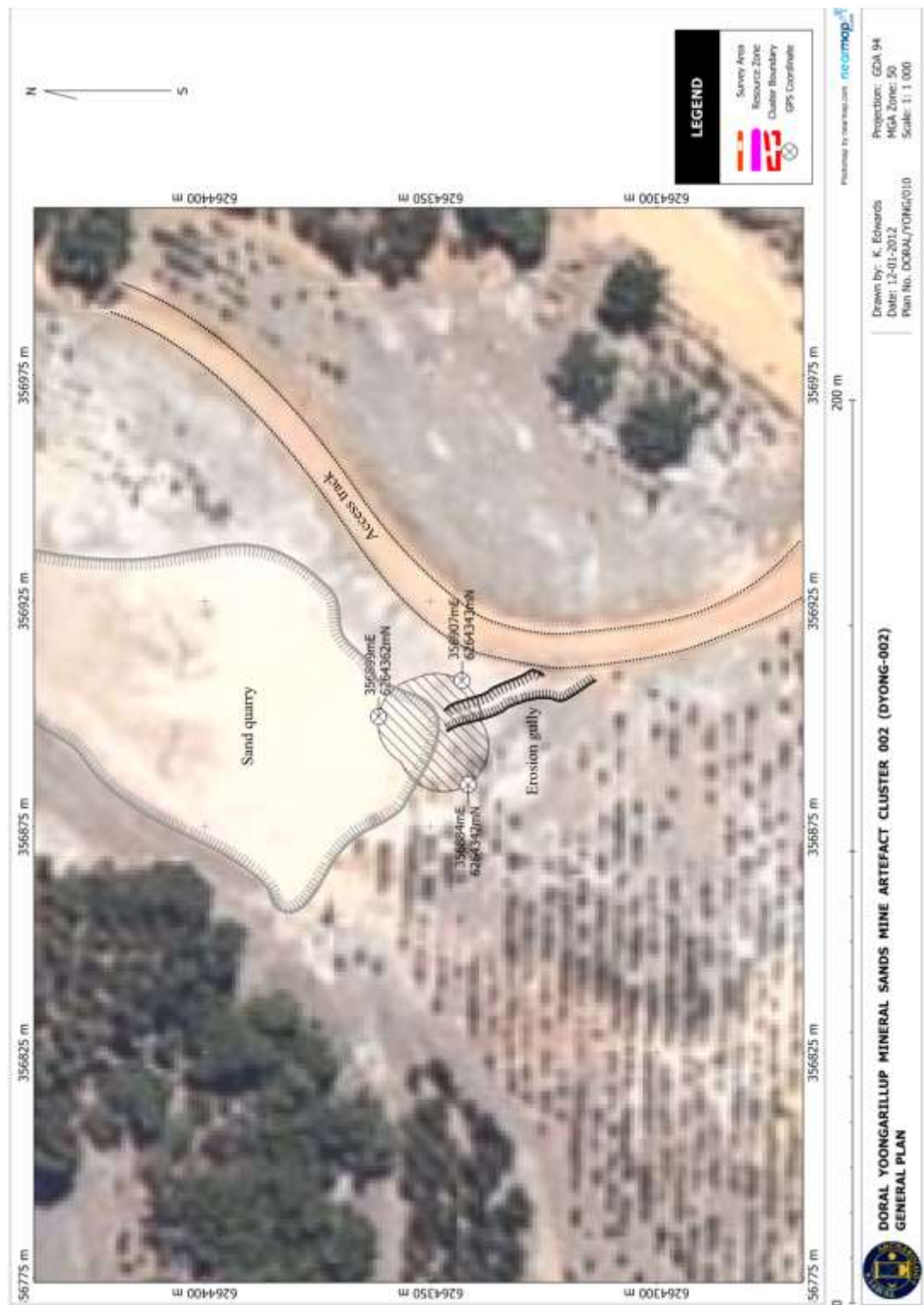


Figure 15 Map showing the location and extent of Doral Yoongarillup Mineral Sands Mine Artefact Cluster 002 (DYONG-002).



Plate 16 Doral Yoongarillup Mineral Sands Mine Artefact Cluster 001 (DYONG-001): general view looking SW.



Plate 17 Doral Yoongarillup Mineral Sands Mine Artefact Cluster 001 (DYONG-001): detail of chert artefact (scale in centimetre divisions).



Plate 18 Doral Yoongarillup Mineral Sands Mine Artefact Cluster 002 (DYONG-002): general view looking SE; note deeply incised erosion gully.



Plate 19 Doral Yoongarillup Mineral Sands Mine Artefact Cluster 002 (DYONG-002): detail of quartz artefact (scale in centimetre divisions).





Plate 20 Doral Yoongarillup Mineral Sands Mine Isolated Find 001 (DYONG-ISO/001).



Plate 21 Doral Yoongarillup Mineral Sands Mine Isolated Find 002 (DYONG-ISO/002).



Plate 22 Doral Yoongarillup Mineral Sands Mine Isolated Find 003 (DYONG-ISO/003).

## 5 Discussion and Recommendations

### 5.1 Known and potential Aboriginal heritage assets within the Survey Area

Archaeological investigations undertaken in relation to the Yoongarillup Resources Zone were completed over a four-day period between 26-27 July and 3-4 October 2011. Through the integration of geospatial technologies (high-resolution GPS and Geographic Information Systems) and an intensive and extensive survey strategy geared towards the recovery of artefacts as opposed to 'sites', it has been possible to quantify the disposition and density-distribution characteristics of archaeological material to a much higher level than is typically the case in contract-based heritage surveys.

Nevertheless, our current ability to interpret the survey findings is constrained by a number of factors, including:

- The relatively small biogeographical sample afforded by the Survey Area;
- High levels of disturbance across much of the Study Area;
- The lack of detailed environmental/palaeoenvironmental data that would facilitate the contextualisation of survey findings (ie the inability to reconstruct the variable distribution, availability and abundance of food and non-food resources necessary to sustain life in prehistory and early Contact period);
- Paucity of previous archaeological research in and around the Survey Area;
- Variations between researchers in the definition and description of Aboriginal archaeological residues; and
- Limitations inherent in non-invasive surface archaeological survey (i.e. lack of chronological control and potential observation/recovery biases).

In discussing the survey findings it is important first to distinguish between the surface archaeological record, i.e. the empirical reality of the surface archaeological deposits, and the surface archaeological document, which comprises the sample of the archaeological record actually recovered or measured by archaeologists (Wandsnider and Camilli 1992:170). The degree of agreement between the archaeological record and the archaeological document is itself a function of several factors that determine artefact obtrusiveness. In this context, obtrusiveness relates to the overall discovery potential of archaeological material under any given set of circumstances (Schiffer et al. 1978:6). Artefact discovery is also affected by visibility, which is conditioned by the extent and nature of vegetation cover, natural surface stone material, and sedimentation (Wandsnider and Camilli 1992:171).

During the course of the archaeological survey, ground surface visibility across much of the subject land was reported as poor to very poor (typically less than 10%) owing to the presence of crops and ground covering vegetation and other detection limiting factors, such as waterlogging. Extensive ground disturbance was also noted across much of the Survey Area. This took a variety of forms, including vegetation clearance, extractive activities (sand and gravel), infrastructure development (roads, drains and culverts), grazing and agriculture. Such disturbance may have destroyed and/or displaced surface and sub-surface archaeological residues and have initiated or accelerated natural post-depositional processes. This has a number of implications for the interpretation of the archaeological document.

Firstly, processes such as erosion can create areas of apparent high artefact density through the process of conflation, resulting not only in the mixing of archaeological material of different ages, but also in the apparent attenuation and merger of the visible artefact component over time. Secondly, taphonomic studies have demonstrated that disturbance processes can result in significant vertical displacement of artefactual material which, in turn, can result in the size-sorting of artefacts (with smaller size classes migrating down through the deposit) and the generation of a near-surface 'reservoir' or mixing horizon of cultural material (Baker 1978; Robins 2000), which may account for the apparent absence of small-sized debitage (i.e. material <10mm in maximum dimension) in the observed and recorded assemblage sample. In both cases, the obvious implication is that surface artefact assemblages cannot be seen as representative of the total artefact inventory of any given area (Baker 1978: 292; Hiscock 2001).

### 5.2 Provisional interpretation of archaeological residues within the Survey Area

As outlined in Section 4.1, two minor artefact clusters (DYONG-001 and 002) and three isolated finds of flaked stone artefacts (DYONG-ISO/001 to 003) were identified within a surveyed area of approximately 285ha. The archaeological residues are difficult to interpret owing to a small overall sample size (n=9) and extremely low density (approximately one artefact per 32 hectares). In very general terms, it would appear that the survey data is consistent with regional site distribution patterns, with much of the material occurring in relatively

elevated topographic contexts in the vicinity of wetlands and/or other drainage features, and that variations in artefact density (ie the occurrence of small clusters and isolated finds) reflects varying levels of Aboriginal group mobility within 'home ranges' (e.g. Binford 1980, 1983). Such variations in mobility are likely to have been made in response to (though not necessarily dictated by) environmental variability, differential access to resources and other material or ideational affordances. That Aboriginal groups resident in and around the Survey Area were embedded within broader social and economic structures is hinted at by the presence of chert artefacts (ie DYONG-ISO/002 and as part of the assemblage at DYONG-001). While it was not possible to provide a positive identification in the field, certain types of fossiliferous chert are only rarely found more than 10km inland, having been obtained (either directly or through mechanisms such as trade) from source zones off the present-day coastline prior to the mid-Holocene sea-level rise (J. Dortch 2004).

While necessarily speculative, the available data suggests that Aboriginal groups have been resident in and around the Survey Area for several thousand years. That so little evidence of this occupation exists can largely be attributed to the effects of post-European land-use practices. While the degree to which disturbance processes and other technical constraints have biased our current understanding of the archaeological document within the Yoongarillup Resources Zone cannot be determined on the basis of surface survey alone, it must nevertheless be recognised that there is a potential (albeit low) for as yet unrecorded archaeological material to be present within the Survey Area. In recognition of this, the proponent should implement an appropriate management regime to ensure that any such archaeological material is identified and dealt with in a timely and appropriate manner.

### **5.3 Management of archaeological residues within the Survey Area**

In order to effectively manage known archaeological residues within the Survey Area, it is necessary to undertake an assessment of significance, develop conservation and management strategies, and outline a programme of implementation. The logic behind this progression is that the management of Aboriginal heritage places should always be commensurate with their cultural significance (Byrne, Brayshaw and Ireland 2003:141).

#### **5.3.1 Ethnographic significance**

Aboriginal community opinion regarding the significance of archaeological residues identified within the Survey Area was canvassed as part of a programme of ethnographic consultation, which is reported under a separate cover (Ethnoscience 2011).

#### **5.3.2 Archaeological significance**

Owing to the potential for rapid changes in the substantive and theoretical domains of archaeological research, it is common practice to base assessments of scientific significance on two inter-related factors; 'representativeness' and research potential (Bowdler 1984:10) (Figure 12).

##### Representativeness

In assessing the degree to which a site can be said to be 'representative', heritage managers are required to examine a range of data regarding regional archaeological patterning in an attempt to determine how common specific site attributes are. Ultimately, such a process is predicated upon (a) a willingness to collapse an effectively infinite range of archaeological variability into a restricted number of site types (based primarily on presumed economic function within a 'settlement system', e.g. basecamps, activity areas, quarries) or site categories (e.g. small, medium or large artefact scatter), and (b) the availability of high quality up-to-date information.

In Western Australia, information regarding Aboriginal sites is managed by the Department of Indigenous Affairs (DIA), which maintains a database of over 23,000 Aboriginal sites (Bloor 1989). The quality of information supplied to the DIA is, necessarily, highly variable, depending as it does on a range of inter-related factors, including:

- the willingness (or lack thereof) of land-owners and land-users to report findings and/or allow research on their properties;
- the skills, knowledge and experience of the person making the report;
- differences in the timing, location and intensity of Aboriginal heritage research;
- technical, methodological or definitional differences between consultants;
- the organisational and bureaucratic practices of DIA itself; and
- the degree to which sites are visible, and the extent to which they have been (and indeed, continue to be) affected by post-depositional or other processes.

This situation is further complicated by relatively low staffing levels within DIA, which makes it difficult to effectively police the *Aboriginal Heritage Act (1972)* or monitor the condition of individual sites. As a consequence, many Aboriginal sites have been either disturbed or destroyed without appropriate Ministerial consent. As the disparity between the number of 'official' and 'actual' Aboriginal sites grows, the utility of the site register as a planning tool diminishes in proportion.

In this context, newly recorded Aboriginal archaeological residues within the Survey Area can most parsimoniously be considered representative not of arbitrary and antonymic constructs (ie 'sites'/isolated finds) but of the 'regional archaeological structure' as it is currently understood. This concept better accommodates the multiplicity of factors contributing to the generation of the contemporary archaeological document (refer Foley 1981: 13; Robins 1998).

#### Research Potential

For the wider Swan Coastal Plain, Strawbridge (1989) has developed a list of research priorities designed to address questions relating to demography, chronology, technology site formation processes.

These research priorities can be summarised as follows:

- What are the processes of site formation and disturbance that have acted upon Aboriginal sites on the Swan Coastal Plain?
- Why do so many sites show no evidence of any build-up of deposit?
- Is this purely the result of urban development or have changing climatic conditions destabilized and degraded any such build-up?
- What does the apparent site distribution indicate?
- To what degree is it skewed by concentrated urban development?
- What does the age of wetlands areas imply about the age of clearly associated sites?
- If these wetlands areas were not present when sea level was lower what was the pattern and intensity of occupation of the Swan Coastal Plain and what does this suggest about sites on the different geo-morphic zones?
- Why is the number of sites on the Bassendean Sands formation so high when compared to the other zones?
- How far can the amount of artefactual material present at sites be taken as an indication of population changes?
- To what extent might technological innovations produce changes in the amount of artefact debris produced?
- Which sites might contain further archaeological material in a clear sequence and with dateable samples to support or dispute the existing scheme of technological changes?
- If the supply of fossiliferous chert found on sites was lost when the sea level rose can we detect technological changes in assemblages as a result of the decline of this stone resource?

In order to assess the known or potential ability of data recovered from sites to address these research priorities, several additional factors need to be evaluated, including site structure, site contents, and site condition/ integrity:

- *Site structure* refers to the physical disposition and other properties of an archaeological site. Information regarding site structure can be used to address research priorities relating to site formation processes, distribution patterns and change over time.

The overall archaeological signature of the Survey Area comprises an extremely sparse surface expression of archaeological residues. The potential for archaeological site structure to encompass sub-surface cultural deposits cannot be adduced on the basis of the available evidence, but is unlikely given high levels of past disturbance.

- *Site content* refers to the cultural and biological residues of past Aboriginal use and/or occupation of a place. Analysis of high-density artefact loci (i.e. artefact scatters) and what is often derided as 'background noise' (i.e. isolated finds) can allow researchers to address research priorities relating to site function, site age, technological organisation, technological change over time, and site formation processes.

Newly recorded artefact clusters DYONG-001 and 002 and isolated artefacts DYONG-ISO/001 to 003 can most parsimoniously be interpreted as reflecting non-salient activities, such as casual discard or loss. Nevertheless, there remains the possibility that such items (particularly the clusters) may have formed part of larger artefact aggregations that have been otherwise disturbed or destroyed as a result of disturbance processes.

- *Site integrity* encompasses both the structure and content of Aboriginal archaeological sites.

Visual observations made during the course of the archaeological survey indicate that much (if not all) of the archaeological material identified within the Survey Area has been affected (to a lesser or greater extent) by a range of environmental and anthropogenic processes (such as sand extraction, land clearance and pastoral/agricultural activities). These processes are likely to have led to on-going changes in both the disposition (spatial arrangement) and expression (representativeness of various assemblage components) of archaeological materials.

#### 5.4 Statement of significance

- Artefact clusters DYONG-001 and DYONG-002 are assessed as having a low level of archaeological significance. These clusters comprise a very minor assemblages of flaked stone artefacts, the integrity of which appears to have been somewhat compromised as a result of anthropogenic and environmental processes. As a consequence, neither cluster can be used to generate data of a sufficient quality or quantity to address regional research priorities except in the very broadest of terms.

DYONG-001 and DYONG-002 are not considered to constitute Aboriginal sites under Section 5 of the *Aboriginal Heritage Act (1972)*.

- Newly recorded isolated artefacts DYONG-ISO/001 to 003 are assessed as having a low level of archaeological significance. While documenting Aboriginal activity(s) in the landscape, these artefacts have little potential to generate any additional data that could be used to address regional research priorities.

DYONG-ISO/001 to 003 are not considered to constitute Aboriginal sites under Section 5 of the *Aboriginal Heritage Act (1972)*.

#### 5.5 Management guidelines

A series of guidelines are proposed for the management of known and any as-yet undiscovered archaeological residues within the Survey Area. These guidelines have been developed on the basis of assessments of archaeological significance, Aboriginal community opinion, and potential impacts arising from the proposed development.

##### 5.5.1 General issues

The newly recorded artefact clusters (DYONG 001 and DYONG 002) isolated finds of stone artefacts (YONG-ISO/001 to 003) have been assessed and considered **not** to constitute Aboriginal sites under the meaning of Section 5 of the *Aboriginal Heritage Act (1972)*. However, it is only the Aboriginal Cultural Material Committee (ACMC) that is empowered to make a binding assessment on whether a place is a site for the purposes of the Act. Consequently, the proponent should seek the opinion of the ACMC before proceeding.

Seeking such advice is important as, under section 17 of the *Aboriginal Heritage Act (1972)*, any person who (a) excavates, destroys, damages, conceals or in any way alters any Aboriginal site or (b) in any way alters, damages, removes, destroys, conceals, or who deals with in a manner not sanctioned by relevant custom, or assumes the possession, custody or control of, any object on or under an Aboriginal site, commits an offence unless he is acting with the authorisation of the Registrar of Aboriginal Sites under section 16 of the *Aboriginal Heritage Act (1972)* or the consent of the Minister for Indigenous Affairs under section 18 of the *Aboriginal Heritage Act (1972)*.

Should the ACMC determine that any of the newly recorded archaeological residues identified within the Survey Area constitute sites, and these cannot be avoided via a design solution, the Proponent should seek appropriate consent from the Minister for Indigenous Affairs in accordance with Section 18 of the *Aboriginal Heritage Act (1972)*. Section 18 application forms and guidelines are available at: <http://www.dia.wa.gov.au/Heritage/Standardsweb/s18Notice/s18Toc.aspx>.

The proponent should review and understand the wording of any consent(s) granted under Section 18 of the *Aboriginal Heritage Act (1972)* and any conditions attached to it. In the case of any potential ambiguity or misunderstanding, advice should be sought from the Registrar of Aboriginal Sites or DIA Officer assigned to the project. The proponent (or duly authorised agents) should comply fully with any conditions imposed on consents granted under Section 18 of the *Aboriginal Heritage Act (1972)*, including the appointment of specialist consultants as required.



#### 5.5.2 *Monitoring and management of additional Aboriginal heritage sites or features identified during the course of development*

Irrespective of whether or not Ministerial consent is required (see above), the proponent should be cognizant of the potential for unrecorded Aboriginal cultural (and to a much lesser extent skeletal) material within the Survey Area. The identification of any such material is likely to be problematic owing to (a) extremely low artefact density, (b) high levels of past and on-going disturbance and (c) the relative ineffectiveness (particularly in a development context) of traditional archaeological monitoring procedures. Given this, any as-yet unrecorded Aboriginal cultural material would best be managed through the adoption and implementation of a comprehensive Aboriginal Heritage Contingency Plan (AHCP).

The AHCP should detail:

- Site control structures;
- Reporting processes for discoveries during development;
- Reporting of any suspected or actual breaches of the *Aboriginal Heritage Act (1972)*; and
- General guidelines for staff and contractors employed in redevelopment activities within the Survey Area.

In general terms, should any person (staff, contractor, sub-contractor) have reason to suspect the presence of any previously unreported non-skeletal archaeological material work must cease immediately. The area is to be demarcated with caution tape/flagging material to locate the site and discourage unauthorised entry.

The Site Manager (or other designated responsible person on the work site) is to be informed immediately. The Site Manager will then contact DIA (Heritage, Culture and Policy Advice at Head Office) or Aboriginal heritage consultant if one has been appointed. Developers are to arrange for a suitably qualified archaeologist to undertake an inspection and evaluation of the site/feature in consultation with the relevant Aboriginal community(s). Details of the site/feature should be recorded on a standard DIA Aboriginal Site Recording Form and advice sought from the DIA as to the need for further action, including application for Ministerial consent.

A report of the findings of the evaluation should be prepared in good order and submitted to the DIA. Any archaeological mitigation recommended as a result of the evaluation and/or stipulated as part of existing Section 18 consents should be undertaken by a suitably qualified archaeologist in consultation with Aboriginal community representatives. Management of the site/feature shall be commensurate with its significance.

In the case of suspected human skeletal remains, work must cease immediately as by law the area becomes a crime scene. The area is to be demarcated with caution tape/flagging material to locate the site and discourage unauthorised entry.

The Site Manager (or other designated responsible person on the work site) is to be notified. The Site Manager will then contact DIA (Heritage, Culture and Policy Advice at Head Office) or Aboriginal heritage consultant if one has been appointed. The Police Department must also be notified (if the material does not appear to be Aboriginal in origin, the Police should be the first point of contact). If the human skeletal material is deemed to be modern, the appropriate law enforcement officials shall assume jurisdiction and the Aboriginal heritage management process concluded.

The proponent should arrange for a suitably qualified archaeologist to undertake an inspection and evaluation of the skeletal material in consultation with the relevant Aboriginal community(s). A report of the findings of the evaluation should be prepared in good order and submitted to the DIA. The relevant Aboriginal community(s) should be consulted regarding the management of the skeletal material once jurisdiction has been determined. No further work at the location should be undertaken until all relevant parties have been consulted and all appropriate consents (including Ministerial approval) obtained.

The location of the skeletal material should be recorded in accordance with guidelines outlined in the DIA Draft Spatial Standards to ensure its future protection. Any proposed remedial work should be undertaken by a suitably qualified archaeologist in consultation with the relevant Aboriginal community(s). Should a decision be reached to relocate the skeletal material, a data recovery programme, planned in consultation with the Aboriginal community and the DIA should be developed and implemented. This will include, but not be limited to, recording the location of the skeletal material, compilation of a photographic archive, collection of samples, and recovery and recording of skeletal material.

Representatives of the Aboriginal community should be present during the recovery phase of the operation. The skeletal remains shall be transferred to a suitable keeping-place or re-interment location to be negotiated between the developer, Aboriginal community representatives and relevant government agencies. The proponent should respect any request made by the Aboriginal community to undertake appropriate ceremonies.

## 5.6 Recommendations

On the basis of the above discussion, a number of **recommendations** can be made with respect to the management of Aboriginal heritage assets within the Survey Area.

1. It is **recommended** that the proponent seek the opinion of the ACMC regarding the legal status of newly recorded artefact clusters DYONG-001 and DYONG-002 and isolated finds DYONG-ISO/001 to 003 with respect to *the Aboriginal Heritage Act (1972)*.
2. It is **recommended** that, the Proponent seek appropriate consent from the Minister for Indigenous Affairs in accordance with Section 18 of *the Aboriginal Heritage Act (1972)* prior to undertaking any activity that may result in a breach of Section 17 of the *Act*.
3. It is **recommended** that the proponent develop and implement an Aboriginal Heritage Contingency Plan (AHCP) to ensure that any as yet unrecorded Aboriginal cultural or skeletal material that comes to light during the course of development activity is dealt with in a timely and appropriate manner.

The proponent is reminded of their obligation under Section 15 of the *Aboriginal Heritage Act (1972)* to report and Aboriginal sites that may come to light during the course of development.

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*Ethnoscience*

ABN 47 065 099 228

*Aboriginal Heritage*

Report of an Ethnographic Survey of  
Doral's Yoongarillup Resource Zones,  
Yoongarillup, near Busselton, Western  
Australia

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*Prepared for Doral Mineral Sands*

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August 2012

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### **Disclaimer**

The results, conclusions and recommendations contained within this report are based on information available at the time of its preparation. Whilst every effort has been made to ensure that all relevant data has been collated, the author can take no responsibility for omissions and/or inconsistencies that may result from information becoming available subsequent to the report's completion.

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### **Abbreviations**

ACMC:	Aboriginal Cultural Material Committee
AHA:	<i>Aboriginal Heritage Act 1972</i>
AHIS:	Aboriginal Heritage Inquiry System
AHCP:	Aboriginal Heritage Contingency Plan
DIA:	Department of Indigenous Affairs
Doral:	Doral Mineral Sands Pty Ltd
SWALSC:	South West Aboriginal Land and Sea Council
SWB:	South West Booijarah #2 (WC06/4) Native title claim
YRZ:	Yoongarillup Resource Zone

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### **Summary & Recommendations**

Doral Mineral Sands Pty Ltd (Doral) commissioned Ethnoscience to undertake archaeological and ethnographic surveys of the Yoongarillup Resource Zone which Doral plans to mine for mineral sands. Tempus Archaeology undertook the archaeological survey of the study area on behalf of Ethnoscience and the results are presented under a separate cover (Edwards 2012).

The survey area, which is within three mining leases (M700458, M700459 and M700641) and an exploration lease (E7004072), is located approximately 17km southeast of Busselton. The subject land includes four irregular parcels of land (Haddon East, Haddon West, State Forest and Catalano) amounting to an area of approximately 285ha (Figure 1) and is presently occupied by open pasture, a sand quarry and remnant bush in addition to a portion of State Forest.

The survey area is located wholly within the South West Boojarah #2 (WC06/4) native title claim which is represented by the South West Aboriginal Land and Sea Council (SWALSC). SWALSC was consulted about the proposed development and the heritage assessment and through them the South West Boojarah #2 (WC06/4) native title claim Working party nominated seven Aboriginal consultants to participate in the ethnographic survey. In the event, four of these were able to take part in the field survey and another nominated a proxy to attend. A sixth, who had already assisted with the archaeological survey, was interviewed by phone, as was his mother who he had nominated as a person who is knowledgeable about the Yoongarillup area.

The desktop research found that one Aboriginal site (Sabina River, DIA Site ID 17353) intersects with the western end of mining lease M700641 and exploration lease E7004072. Information at hand indicates that this site will not be impacted upon by Doral's mining proposal. Doral also reports that strict environmental controls will be in place in order to prevent impacts on the river.

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No ethnographic Aboriginal sites or 'Other Heritage Places' are listed in the Yoongarillup Resource Zone mining leases M700458 and M700459. No ethnographic sites were identified by the SWB Aboriginal consultants within the proposed mine pit and operations areas during the field survey or in the telephone interviews.

Artefact clusters DYONG-001 and DYONG-002, comprising three artefacts each discovered in the course of the archaeological survey (Edwards 2012), were assessed as being of low cultural significance. However, there was a request that archaeological monitoring of topsoil removal be undertaken.

### **Recommendations**

1. It is recommended that Doral's planned Yoongarillup Resource Zone development proceed.
2. It is recommended that Doral continue to consult with the South West Boojarah #2 (WC06/4) native title claimants regarding the proposed development and possible environmental impacts and particularly about any likely impact on the State Forest.
3. It is recommended that Doral adopt and implement an Aboriginal Heritage Contingency Plan (AHCP) to establish procedures for handling Aboriginal cultural material, including skeletal material, which might be unearthed in the course of the development.
4. It is also recommended that Doral give consideration to the South West Boojarah #2 claimants' request that archaeological monitoring of topsoil removal be undertaken.
5. It is further recommended that Doral give consideration to the South West Boojarah #2 claimants' request that the local Nyungar community be given access to any timber removed in the course of the proposed development.

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## *Aboriginal Heritage*

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# *Ethnoscience*s

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### Introduction

In May 2011, Ethnoscience was commissioned by Doral Mineral Sands Pty Ltd (Doral) to undertake archaeological and ethnographic surveys of the Yoongarillup Resource Zone (YRZ) which Doral plans to mine for mineral sands.

The survey area is located approximately 17km southeast of Busselton and the YRZ is encompassed within four irregular parcels of land (Haddon East, Haddon West, State Forest and Catalano) amounting to an area of approximately 285ha (Figure 1). The land containing the proposed mining development area, which will consist of two proposed pits, is presently occupied by open pasture, a sand quarry and remnant bush, in addition to a portion of State Forest. The proposed mining development area is encompassed by three mining leases (M700458, M700459 and M700641) and an exploration lease (E7004072) (Figure 1).

The survey area is located wholly within the South West Boorah #2 (WC06/4) (SWB) native title claim, which is represented by the South West Aboriginal Land and Sea Council (SWALSC).

The main objectives of the ethnographic survey were to:

- ❖ Identify any known or potential Aboriginal heritage issues that may affect the proposed development;
- ❖ Undertake research and/or consultation that may be required to meet the requirements of the *Aboriginal Heritage Act 1972* (AHA);
- ❖ Record any Aboriginal sites within the survey area and develop appropriate Aboriginal heritage management policies; and
- ❖ Prepare a survey report which complies with the standards published online by the Department of Indigenous Affairs (DIA).<sup>1</sup>

Tempus Archaeology undertook an archaeological survey of the study area on behalf of Ethnoscience and the results are presented under a separate cover (Edwards

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<sup>1</sup> The latest guidelines can be accessed on the DIA's website:  
[http://www.dia.wa.gov.au/Documents/HeritageCulture/Heritage%20management/AHA\\_Due\\_Diligence\\_Guidelines.pdf](http://www.dia.wa.gov.au/Documents/HeritageCulture/Heritage%20management/AHA_Due_Diligence_Guidelines.pdf)

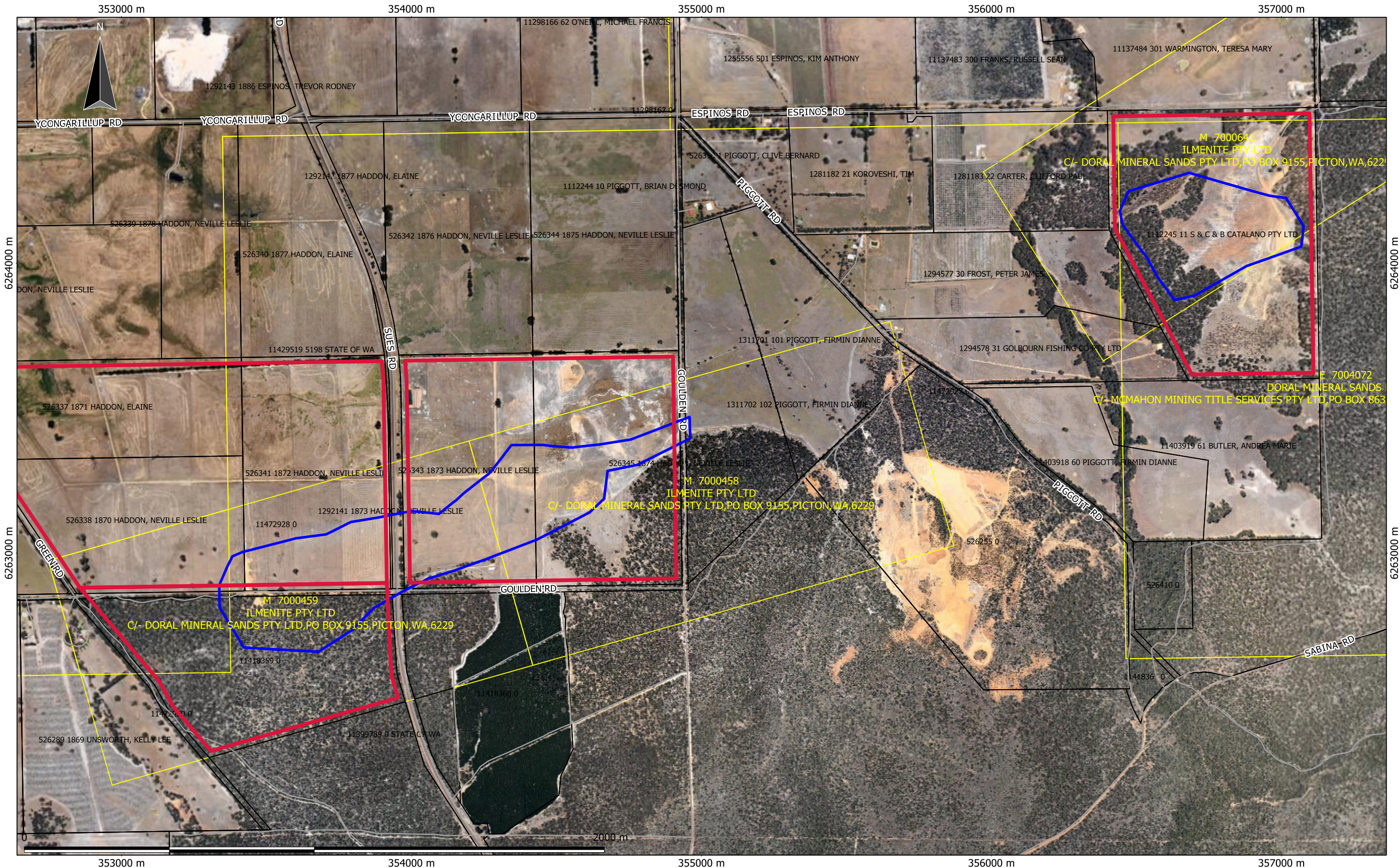
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2012). It was decided to undertake the archaeological survey first so that the results would be available to the SWB consultants for their consideration during the ethnographic survey. The archaeological survey was completed in October 2011 (Edwards 2012).





Doral

PERTH BASIN TENEMENTS

Figure 1: Map showing the location of the Yoongarillup Resource Zone and the proposed mine pits layout (Source: Doral)

Yoongarillup Resource Zones (Blue).  
State Forest, Haddon West and East and Catalano (Red).

	MGA94	Drawn By: DAW
File Name: Geology plan20110209yoong.map		Date:16/03/2011



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### **Ethnographic Survey Methods**

The ethnographic survey was conducted in the following stages:

- ❖ Desktop research;
- ❖ Consultation with the SWALSC regarding the survey and the selection of Aboriginal consultants from the SWB claim;
- ❖ Interviews and site inspections with the SWB Aboriginal consultants;
- ❖ Consultation regarding the results of the archaeological survey; and
- ❖ Report preparation.

Edward McDonald undertook the desktop research which included an examination of the Register of Aboriginal Sites using the online Aboriginal Heritage Inquiry System (AHIS) operated by the DIA. A review of previous published and unpublished ethnohistorical and ethnographic material, including previous heritage reports, was also undertaken.

McDonald consulted SWALSC regarding the ethnographic survey. SWALSC was initially contacted in early November 2011 regarding the proposed ethnographic survey and advice was sought in relation to obtaining Aboriginal consultants for the project. After numerous inquiries, a list of seven consultants nominated by the Working Party of the SWB native title claim group was forwarded to Ethnoscience on May 14, 2012.

It was not possible to contact one of those nominated. Two others were unable to attend the survey on the appointed day. Mrs Van Leeuwin resides in the Perth Metropolitan Area and reported that as a result of an illness in the family she would not be able to participate in the survey. She nominated Mark Blurton, a nephew, as a proxy. Mr Webb reported that he was participating in another heritage survey on the same day and would not be able to attend. He was, however, interviewed by phone about the survey area and confirmed that he had assisted with the archaeological survey undertaken by Tempus Archaeology (see Edwards 2012). In the course of the

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interview he noted that his mother, Mrs Vilma Webb, had lived for many years in the Tutunup area, where her father had worked on the railway.

The ethnographic field survey was undertaken on May 24, 2012 with five SWB consultants (Table 1). Mrs Webb was interviewed about the study area following the completion of the field survey.

Name	Type of Participation in Heritage Assessment
Harry Nannup	Field survey
Barbara Corbett	Field survey
Janice Michaels	Field survey
Sue Kelly	Field survey
Mark Blurton	Field survey
Wayne Webb	Telephone Interview
Vilma Webb	Telephone Interview

**Table 1: Names of those participating in the Yoongarillup ethnographic survey**

McDonald conducted the ethnographic field survey using a site identification methodology which the DIA's Draft Guidelines defines as follows:

*In this type of survey, sites are located and documented and the spatial extent and significance of sites to Aboriginal people is recorded. This information may be made available to the proponent in report form, subject to agreement from the relevant Aboriginal people. Alternatively, confidential information may be presented in a restricted report to the APMC, usually via the DIA. The report should contain recommendations on steps to be taken by the proponent to ensure compliance with the AHA (Department of Indigenous Affairs 2002:17).*

The ethnographic survey party was assisted in the field by Ms Rebecca Dix, Environmental Officer Doral Mineral Sands, who provided the participants with an overview of the proposed mine development and addressed queries raised by the SWB consultants (Plate 1).



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**Plate 1: Rebecca Dix (Doral) on right outlines the proposed mine development plans to (from left) Harry Nannup, Janice Michaels, Sue Kelly, Barbara Corbett and Mark Blurton (Photo: McDonald, May 2012)**

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**Plate 2: General view of mining lease M7000459, looking southwest, with State Forest in background (Photo: McDonald, May 2012)**

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### **Ethnographic Background**

Daisy Bates (1985, 1992 and n.d.) was the first researcher to systematically collect information regarding the social organisation, language and customs of the indigenous people of the Southwest region of Western Australia.

Bates (1985:39) referred to the Aboriginal people occupying the Southwest from around Jurien Bay in the north to a point just east of Esperance as the 'Bibbulmun Nation'. She reports that the Bibbulmun were comprised of a number of local groupings with similar customs and beliefs though regional differences, including forms of descent and dialect, were evident (Bates 1985:46–54). According to Bates (1985:54), the Bibbulmun who traditionally occupied the Busselton area were known as the *Dunan Wongi* after the name of their local dialect.

Later researchers, however, provide a different perspective to that of Bates. Berndt (1979), following Tindale (1974), for example, suggested that at the time of British colonisation the Southwest was occupied by thirteen 'tribes' or socio-dialectal groups that formed a discrete socio-cultural bloc similar to what Bates referred to as the 'Bibbulmun Nation'. Tindale (1974) and Berndt (1979) reported that the groups occupying the region in which the study area is located were the *Wardandi* 'tribe' or socio-dialectal group (see Figure 2). Tindale (1974:259) described the *Wardandi* territory as:

*From Bunbury to Cape Leeuwin, chiefly along the coast; at Geographe Bay, the vicinity of Nannup and Busselton. According to one informant, the tribal name is linked with the [wardan'] or crow, but the name given in vocabularies for crow is [kwa:kum']. They were also called the "seacoast people," and the detailed Nina Layman MS gives "werdandie" also "wartine" as meaning "the sea". In yet another version it is the derivative of the negative term.*

Bates (1985:47) also had reported that the Bibbulmun around the Busselton area were called *Waddarn-di*, or sea people; however, she commented that this term referred to

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all coastal people, including the groups stretching from Esperance to Bunbury and beyond.<sup>2</sup>

Bates' unpublished notes (for example, n.d. Section II Geographical Distribution) suggest that a number of important camping places associated with an initiates' (*beedawong* or *moolyeet*) trail were located in the Busselton area north of Yoongarillup (see also Bates 1985). Bates' list begins with the Porongorups and runs west to Augusta, then follows the coast to Perth and finally ends at *Karboordup* near where the Perth Town Hall is located. Hammond (1933:19) also refers to a *bidi* or pathway linking Perth to the Southwest that probably would have encompassed these and other campsites.

Hallam (1975), Ward (1981:18) and Gibbs (1987) provide detail of various aspects of the traditional economic and social life of Nyungars in the area. The research indicates that the rich habitat of the Busselton region, particularly the riverine and estuarine zones where numerous fish traps [*mungah/mungar*] were constructed, allowed for large gatherings of Aborigines during seasonal availability of certain foods around (see Collard 1994, Ward 1981; Gibbs 1987). When food resources became limited at various times of the year, there is some evidence to suggest that Nyungars dispersed in smaller family groups over their range (see Hallam 1975; Ward 1981).

Shann (1978) and Jennings (1983) document various aspects of Nyungar-European relations during the colonial period in the Busselton area.

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<sup>2</sup> The term *Waddarn-di/Wardandi* is an example of what Sutton (2003:74–75) would refer to as 'environmental identity names' and not a language group name. Bates (1985:47) also reports that people who lived along rivers in the Southwest were referred to as 'Bilgur'; estuary people as 'Darbulung'; and hill people as 'Buyun-gur'. Sutton (2003) discusses how 'tribal' names identified by Tindale (1974) whose provenance might be somewhat doubtful have now been adopted by Aboriginal groups. McDonald and Christensen (n.d.) have questioned the basis of Tindale's, and particularly Berndt's, analyses.



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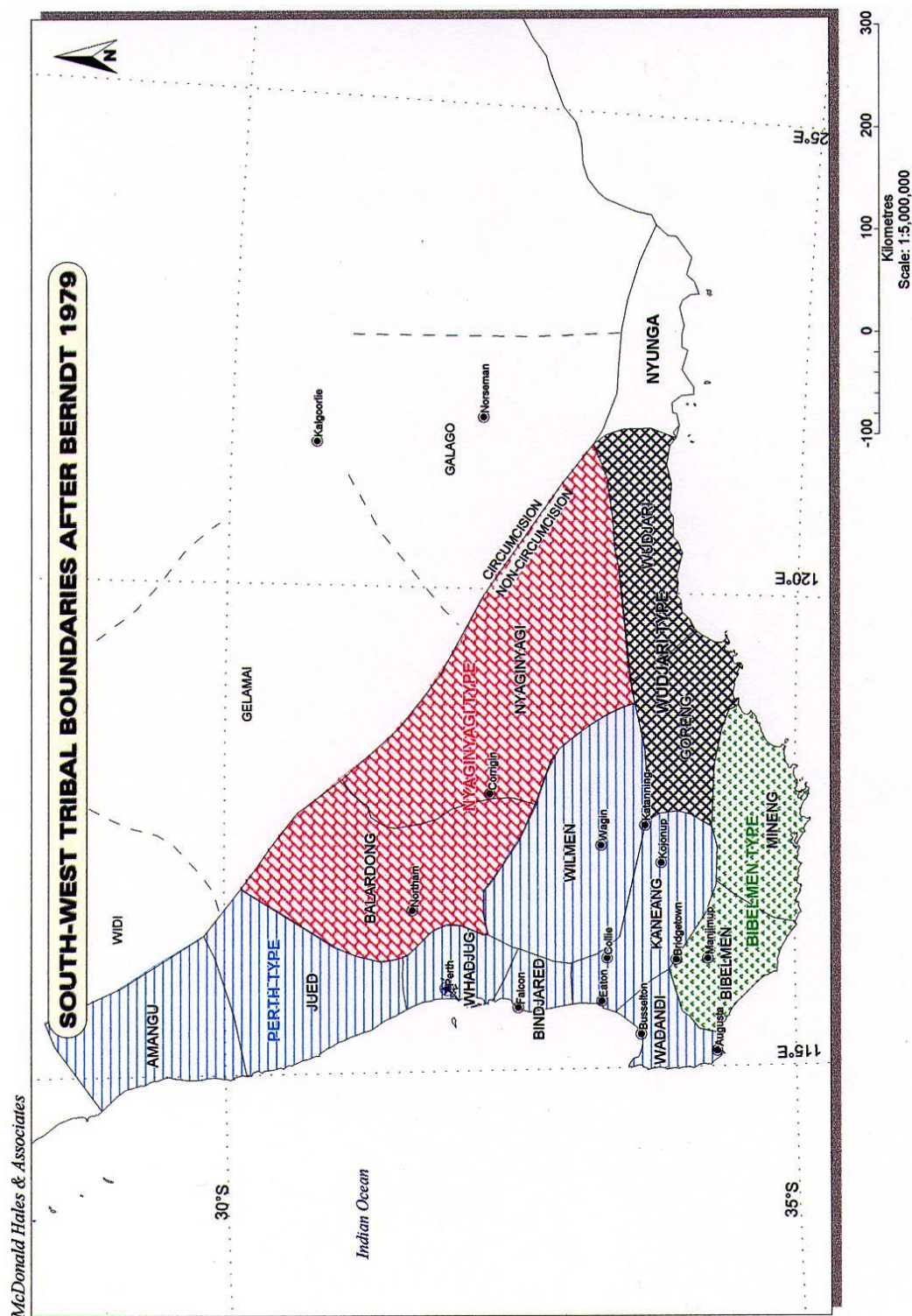


Figure 2: South-West Tribal Boundaries after Berndt 1979

Report of an Ethnographic Survey of Doral's Yoongarillup Resource Zones, Yoongarillup, near Busselton, Western Australia



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### **Ethnographic Survey Results**

#### **Archival Results**

A search of the AHIS did not identify any listed ethnographic Aboriginal sites or 'Other Heritage Places' in the Yoongarillup Resource Zone mining leases M700458 and M700459.

The Sabina River (DIA Site ID 17353), which is a Registered Aboriginal Site of mythological and historical significance, intersects with the western end of mining lease M700641 and exploration lease E7004072, though outside of the identified mining envelope. This site was reported and listed after a survey of another mining area to the north by Cuthbert and Hovingh (1998; see also McDonald 2007/2011 and Goode 1999). Doral report that the Sabina River site will not be impacted upon and that strict environmental controls will be in place in order to prevent impacts.

The AHIS also indicates that no specific heritage surveys have previously been conducted over the subject land. However, the Yoongarillup area was included in a number of broad-scale heritage investigations, including the Lower South-west Aboriginal heritage study undertaken by McDonald, Hales & Associates for the Busselton-based Gnuraren Aboriginal Progress Association under the National Estates Grants Programme (McDonald, Hales & Associates 1994) and the research undertaken as part of the National Estate Component of the Western Australia Regional Forest Agreement (CSR, Edith Cowan University and McDonald, Hales & Associates 1997). No ethnographic sites were reported in the Yoongarillup area in either of these studies.

#### **Results of the Ethnographic Field Survey**

No ethnographic sites were identified by the Aboriginal consultants within the proposed mine pit and operations areas during the field survey or in the telephone interviews.

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Members of the survey party could not recall any particular use (e.g., hunting) of the land Doral was looking to mine. Mr Webb reported that the name *Yoongarillup* is derived from the Nyungar for 'kangaroo lies down' [*yongar* = male kangaroo; Bindon and Chadwick 1992:302]. Mrs Webb confirmed that she had grown up in the Tutunup area where her father had worked on the railway and that she was familiar with Yoongarillup (see McDonald, Hales & Associates 2002:25). She was not aware of any places of heritage significance in the study area.

The SWB Aboriginal consultants raised a number of questions regarding environmental impacts which Ms Dix addressed by outlining the sorts of environmental controls that would be in place and addressed a number of issues including dewatering and run-off and management of topsoil and waste. The SWB consultants also expressed some concern about the prospect of the mine development including a portion of State Forest. Ms Dix noted that approval had not as yet been given for Doral to use the forest land. However, if approval was given, she said, strict environmental controls would be placed on Doral and the company would be expected to replace the vegetation once the mine operations ceased.

The SWB consultants requested that the claim group be kept informed of developments with respect to the forest area. They also requested that the local Nyungar community be given access to trees that would be cleared should Doral be allowed to use the section of State Forest under consideration. The SWB consultants also asked about employment opportunities for local Nyungars during the project.

### **Consultation Regarding Archaeological Findings**

As noted above, the archaeological survey was conducted by Kevin Edwards of Tempus Archaeology (Edwards 2012). As a result of the archaeological survey, two minor artefact clusters (designated DYONG-001 and DYONG-002, each comprising three (3) artefacts) and three finds of isolated stone artefacts (designated DYONG-ISO/001 to DYONG-ISO/003) were identified and recorded. Owing to high levels of disturbance across the survey area, Edwards (2012:1) concluded that "the potential

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for additional archaeological material to be present within the Survey Area was assessed as low". Nevertheless, Edwards (2012:35–36) recommended that a comprehensive Aboriginal Heritage Contingency Plan (AHCP) be adopted and implemented in order to deal with the event of unrecorded Aboriginal cultural material, including skeletal material, being unearthed during the mine development.

Copies of Edwards' preliminary archaeological advice were distributed to the SWB consultants who assessed the artefact clusters DYONG-001 and DYONG-002 as being of low cultural significance. However, Mrs Corbett expressed the view that additional material might still be present in the proposed mine development area and requested that people from the local Nyungar community be engaged to monitor ground disturbance. The other SWB consultants agreed. Mark Blurton, however, added that the actual interest was only in the topsoil as it was unlikely that artefactual material would be found below that. Ms Dix responded that Doral would examine the engagement of monitors.

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### **Conclusions**

This report presents the findings of an ethnographic survey undertaken by Ethnoscience for Doral of its Yoongarillup Resource Zone. An archaeological survey of the proposed development area was previously conducted by Tempus Archaeology on behalf of Ethnoscience. The Yoongarillup Resource Zone comprises three mining leases (M700458, M700459 and M700641) and an exploration lease (E7004072) in four parcels of land (Haddon East, Haddon West, State Forest and Catalano).

SWALSC was consulted about the proposed development, the heritage assessment and the selection of SWB consultants for the ethnographic survey. In May 2012, seven SWB consultants were nominated to participate in the ethnographic survey. In the event, four of these were able to take part in the field survey and another nominated a proxy to attend. A sixth, who had already assisted with the archaeological survey, was interviewed by phone, as was his mother, who he had nominated as a person who is knowledgeable about the Yoongarillup area.

The desktop research found that one Aboriginal site (Sabina River, DIA Site ID 17353) intersects with the western end of mining lease M700641 and exploration lease E7004072. Information at hand indicates that this site will not be impacted upon by Doral's mining proposal. Doral also reports that strict environmental controls will be in place in order to prevent impacts on the river. No ethnographic Aboriginal sites or 'Other Heritage Places' are listed in the Yoongarillup Resource Zone mining leases M700458 and M700459.

No ethnographic sites were identified by the SWB Aboriginal consultants within the proposed mine pit and operations areas during the field survey or in the telephone interviews.

Artefact clusters DYONG-001 and DYONG-002, comprising three artefacts each, were assessed as being of low cultural significance. However, there was a request that archaeological monitoring of topsoil removal be undertaken.

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### **Recommendations**

1. It is recommended that Doral's planned Yoongarillup Resource Zone development proceed.
2. It is recommended that Doral continue to consult with the South West Boojarah #2 (WC06/4) native title claimants regarding the proposed development and possible environmental impacts and particularly about any likely impact on the State Forest.
3. It is recommended that Doral adopt and implement an Aboriginal Heritage Contingency Plan (AHCP) to establish procedures for handling Aboriginal cultural material, including skeletal material, which might be unearthed in the course of the development.
4. It is also recommended that Doral give consideration to the South West Boojarah #2 claimants' request that archaeological monitoring of topsoil removal be undertaken.
5. It is further recommended that Doral give consideration to the South West Boojarah #2 claimants' request that the local Nyungar community be given access to any timber removed in the course of the proposed development.



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