

A REPORT OF THE RECONNAISSANCE  
ASSESSMENT OF CULTURAL HERITAGE SITES  
WITHIN THE ASHBURTON SALT PROJECT AREA,  
URALA STATION, WESTERN AUSTRALIA

October 2020

For  
*Buurabalayji Thalanyji*  
Aboriginal Corporation

By  
Archae-*aus* Pty Ltd



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## **DISCLAIMER**

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The authors are not accountable for omissions and inconsistencies that may result from information which may come to light in the future but was not forthcoming at the time of this research.

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## **WARNING**

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Please be aware that this report may contain images of deceased persons and the use of their names which in some Aboriginal communities may cause sadness, distress or offence.

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## **CONSULTATION**

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The archaeological survey work took place within a portion of Western Australia's Pilbara region that is subject to Thalanyji Native Title (WCD2008/003). Under the Native Title determination, the Thalanyji People are recognised as the holders of specific rights and interests over their traditional lands.

The Buurabalayji Thalanyji Aboriginal Corporation (BTAC) is the Prescribed Body Corporate by whom the Native Title rights and interests are held. As such, the Thalanyji representatives who participated in the archaeological survey, as detailed in this report, were nominated by BTAC.

The February 2020 fieldwork was undertaken collaboratively with BTAC. Their onsite representatives were briefed on the Scope of Works and the nature of the assessment methods throughout the fieldwork period. The Thalanyji representatives participated in all aspects of the survey and assessment.

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## **REPORT FORMAT**

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The format and contents of this report adhere to those suggested by the Western Australian Department of Planning, Lands and Heritage (DPLH) 'Guidelines for preparing Aboriginal Heritage Reports'. The report is split into two sections, an Introduction and a Results section. The Introduction provides a background to the project and an outline of the scope of works. The report's results section details the outcomes of the survey and includes maps and tables providing spatial data for the surveyed corridors and boundaries of Aboriginal archaeological places.

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## EXECUTIVE SUMMARY

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Ashburton Salt is a solar salt project proposed to be located approximately 40 km southwest of Onslow, on Urala Pastoral Lease (see Map 1). Solar salt is the result of a naturally occurring process using the sun and wind to evaporate sea water. The project is being developed by K+S Salt Australia, a local company established by German-based K+S.

Archae-aus was engaged by Buurabalayji Thalanyji Aboriginal Corporation (BTAC) to conduct the reconnaissance assessment on behalf of K+S Salt and EnviroWorks Consulting (EnviroWorks) for the Ashburton Salt Project Area. The scope of work entailed:

- 1) Undertake a desktop review and analysis of available historical information, reports and spatial data relevant to Aboriginal cultural heritage of the Ashburton Salt Project location.
- 2) From the desktop review summarise the:
  - a) Landscape context where relevant to historical aboriginal occupation (topography, geology/soils, hydrology, vegetation, climate, land-use history etc)
  - b) Historic sources of Aboriginal culture
  - c) Regional and local archaeological and ethnographic context
  - d) Existing known Aboriginal cultural heritage site locations (from previous surveys and database searches).
- 3) Formulate a predictive model for Aboriginal archaeological site location based on available spatial and historic information analysed during the desktop review.
- 4) Use the above predictive model to identify and map areas which are most likely to host Aboriginal archaeological sites (within the previously provided survey area).
- 5) Review spatial data on likely areas of disturbance and impact of the Ashburton Salt Project.
- 6) In consultation with EnviroWorks, select agreed reconnaissance survey locations prior to survey mobilisation (survey target location map to be agreed).
- 7) Undertake a 5 day helicopter based survey of agreed reconnaissance survey locations.
- 8) Provide a draft report including:
  - a) Landscape context where relevant to historical aboriginal occupation (topography, geology/soils, hydrology, vegetation, climate, land-use history etc)
  - b) Historic sources of Aboriginal culture
  - c) Regional and local archaeological and ethnographic context
  - d) Existing known Aboriginal cultural heritage site locations
  - e) Details of predictive model used to predict Aboriginal archaeological site location
  - f) Reconnaissance survey target areas, methods, scope and findings.
  - g) Maps of areas likely to contain Aboriginal archaeological sites based on predictive model.
  - h) Maps of areas surveyed during reconnaissance survey.
  - i) Maps of confirmed locations, extent and types of Aboriginal archaeological sites (as determined via the site reconnaissance survey).
- 9) Provide GIS shapefiles of all maps.
- 10) Attend a 1 hour briefing meeting on the above survey, report and findings with representatives from EnviroWorks and K+S.
- 11) Consider comments on the draft report to be provided by EnviroWorks.
- 12) Update and finalise the above report.

This report provides details of items 1 to 7 and is fulfilment of item 1.

The reconnaissance assessment took place between the 2 November 2019 and 6 November 2019, with the full involvement of BTAC representatives.

During the 2019 Reconnaissance 14 areas were inspected (see Map 4). Thirty two previously recoded sites were revisited and 19 newly identified sites that require further recording were identified (see Table 8).

A predictive model or “heat map” was also produced which shows areas across the study area, most likely to contain cultural heritage sites.

Table 2. All Identified Aboriginal Heritage Sites in the Ashburton Salt Project Area

Place_ID	Name	Status	Type	Surface Geology
808	SAPPHIRE 1	Registered Site	Artefacts / Scatter, Camp, Other: 1920'S-1940'S	colluvium 38491
809	SAPPHIRE 2	Stored Data / Not a Site	Artefacts / Scatter	colluvium 38491
814	URALA 94 E	Registered Site	Artefacts / Scatter	sand plain 38499
5956	GRIFFIN GAS 06	Stored Data / Not a Site	Artefacts / Scatter, Midden / Scatter	dunes 38496
6536	URALA DUNE RIDGE	Registered Site	Artefacts / Scatter, Midden / Scatter	lake deposits 38492
6537	URALA SAND RIDGE	Registered Site	Artefacts / Scatter, Midden / Scatter	lake deposits 38492
7061	URALA MIDDEN 4	Stored Data / Not a Site	Artefacts / Scatter, Midden / Scatter	dunes 38496
7371	URALA STATION CROSSING 1	Registered Site	Artefacts / Scatter, Midden / Scatter	alluvium 38485
7374	URALA STATION 02.	Registered Site	Artefacts / Scatter, Midden / Scatter, Camp	dunes 38496
15309	WYLOO DAM 04	Stored Data / Not a Site	Artefacts / Scatter	colluvium 38491
15310	WYLOO DAM 05	Registered Site	Artefacts / Scatter	dunes 38496
SS05-01	Straits Salt 01	Not Lodged	Artefacts / Scatter, Midden / Scatter	colluvium 38491
SS05-02	Straits Salt 02	Not Lodged	Artefacts / Scatter, Midden / Scatter	colluvium 38491
SS05-03	Straits Salt 03	Not Lodged	Artefacts / Scatter	colluvium 38491
SS05-04	Straits Salt 04	Not Lodged	Artefacts / Scatter	colluvium 38491
SS05-05	Straits Salt 05	Not Lodged	Artefacts / Scatter	colluvium 38491
SS05-07	Straits Salt 07	Not Lodged	Artefacts / Scatter, Midden / Scatter	estuarine and delta deposits 38489
SS05-08	Straits Salt 08	Not Lodged	Artefacts / Scatter, Midden / Scatter	sand plain 38499
SS05-09	Straits Salt 09	Not Lodged	Artefacts / Scatter, Midden / Scatter	sand plain 38499
SS05-10	Straits Salt 10	Not Lodged	Artefacts / Scatter	sand plain 38499
SS05-11	Straits Salt 11	Not Lodged	Artefacts / Scatter, Midden / Scatter	sand plain 38499
SS05-12	Straits Salt 12	Not Lodged	Artefacts / Scatter, Midden / Scatter	sand plain 38499
SS05-13	Straits Salt 13	Not Lodged	Artefacts / Scatter, Midden / Scatter	estuarine and delta deposits 38489
SS05-14	Straits Salt 14	Not Lodged	Artefacts / Scatter, Midden / Scatter	estuarine and delta deposits 38489
SS05-15	Straits Salt 15	Not Lodged	Artefacts / Scatter, Midden / Scatter	sand plain 38499
SS05-17	Straits Salt 17	Not Lodged	Artefacts / Scatter	sand plain 38499
SS05-18	Straits Salt 18	Not Lodged	Artefacts / Scatter, Midden / Scatter	sand plain 38499
SS05-27	Straits Salt 27	Not Lodged	Artefacts / Scatter, Midden / Scatter	sand plain 38499
SS05-28	Straits Salt 28	Not Lodged	Artefacts / Scatter	sand plain 38499
SS05-29	Straits Salt 29	Not Lodged	Artefacts / Scatter	estuarine and delta deposits 38489
SS05-30	Straits Salt 30	Not Lodged	Artefacts / Scatter	estuarine and delta deposits 38489
SS05-31	Straits Salt 31	Not Lodged	Artefacts / Scatter, Midden / Scatter	sand plain 38499
SS05-32	Straits Salt 32	Not Lodged	Artefacts / Scatter, Midden / Scatter	estuarine and delta deposits 38489
SS05-44	Straits Salt 44	Not Lodged	Artefacts / Scatter, Midden / Scatter	sand plain 38499
SS05-45	Straits Salt 45	Not Lodged	Artefacts / Scatter, Midden / Scatter	sand plain 38499

Place_ID	Name	Status	Type	Surface Geology
SS05-46	Straits Salt 46	Not Lodged	Artefacts / Scatter, Midden / Scatter	sand plain 38499
SS05-47	Straits Salt 47	Not Lodged	Artefacts / Scatter, Midden / Scatter	sand plain 38499
TBR01	Reconnaissance Site 01	Not Lodged	Artefacts / Scatter, Midden / Scatter	colluvium 38491
TBR02	Reconnaissance Site 02	Not Lodged	Artefacts / Scatter, Midden / Scatter	colluvium 38491
TBR03	Reconnaissance Site 03	Not Lodged	Artefacts / Scatter, Midden / Scatter	colluvium 38491
TBR04	Reconnaissance Site 04	Not Lodged	Artefacts / Scatter	dunes 38496
TBR05	Reconnaissance Site 05	Not Lodged	Artefacts / Scatter	dunes 38496
TBR06	Reconnaissance Site 06	Not Lodged	Artefacts / Scatter	dunes 38496
TBR07	Reconnaissance Site 07	Not Lodged	Artefacts / Scatter	sand plain 38499
TBR08	Reconnaissance Site 08	Not Lodged	Artefacts / Scatter	sand plain 38499
TBR09	Reconnaissance Site 09	Not Lodged	Artefacts / Scatter	dunes 38496
TBR10	Reconnaissance Site 10	Not Lodged	Artefacts / Scatter	dunes 38496
TBR11	Reconnaissance Site 11	Not Lodged	Artefacts / Scatter	dunes 38496
TBR12	Reconnaissance Site 12	Not Lodged	Artefacts / Scatter	dunes 38496
TBR13	Reconnaissance Site 13	Not Lodged	Artefacts / Scatter	dunes 38496
TBR14	Reconnaissance Site 14	Not Lodged	Artefacts / Scatter	colluvium 38491
TBR15	Reconnaissance Site 15	Not Lodged	Artefacts / Scatter	colluvium 38491
TBR16	Reconnaissance Site 16	Not Lodged	Artefacts / Scatter	colluvium 38491
TBR17	Reconnaissance Site 17	Not Lodged	Artefacts / Scatter	colluvium 38491
TBR18	Reconnaissance Site 18	Not Lodged	Artefacts / Scatter	colluvium 38491
TBR19	Reconnaissance Site 19	Not Lodged	Artefacts / Scatter	colluvium 38492

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## TERMINOLOGY AND ABBREVIATIONS

Term / Abbreviation	Meaning / Interpretation
Aboriginal archaeological place or assemblage	A place (or group of physical sites) in which evidence of past activity by Aboriginal people is preserved (either prehistoric or historical or contemporary), and which has been, or may be, investigated using the discipline of archaeology and represents a part of the archaeological record.
Aboriginal Site	This term is used only for archaeological and ethnographic sites to which the <i>AHA</i> applies by the operation of Section 5.
ACMC	The Aboriginal Cultural Material Committee.
<i>AHA</i>	Abbreviation for <i>Aboriginal Heritage Act 1972</i> .
Archaeological site	Is a place (or group of physical sites) in which evidence of human past activity is preserved (either prehistoric or historical or contemporary), and which has been, or may be, investigated using the discipline of archaeology and represents a part of the archaeological record. This term is used to refer to a place regardless of whether it has been assessed under section 5 of the <i>AHA</i> .
Artefact	Any object made, affected, used, or modified in some way by humans.
Assessment	Professional opinion based on information that was forthcoming at the time of consideration.
Cultural material / archaeological material	Any object made, affected, used, or modified in some way by humans.
DPLH	Department of Planning, Lands and Heritage (formerly the Department of Aboriginal Affairs).
GPS unit	Handheld device used as a Global Positioning System.
Heritage survey	Survey and inspection undertaken in order to investigate and document the archaeological record of a particular area.
Isolated Artefact	<i>Single or low number of artefacts that are not considered to constitute Aboriginal Sites according to sections 5 and 39 (2) the AHA.</i>
HPA	<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i> (the HPA).
LGM	Last Glacial Maximum.
Native Title	Recognition of the traditional rights and interests to land and waters of Aboriginal and Torres Strait Islander people.
NTA	<i>Native Title Act 1993</i> .
Object	An artefact - any object made, affected, used, or modified in some way by humans.
Section 16	In the <i>Aboriginal Heritage Act 1972</i> , the section that allows for the archaeological investigation / research of an Aboriginal site.
Section 16 Permit	A document from the DPLH detailing the conditions attached to the permission granted by the Registrar of Aboriginal sites to conduct further investigations at a site.
Section 17 Disturbance	When an Aboriginal site has been damaged by ground disturbance works without Section 18 permission.
Section 18	The section of the <i>Aboriginal Heritage Act 1972</i> that details the process for permission to disturb the land on which an Aboriginal site is located.
Section 18 Approval	A letter from the Minister of Aboriginal Affairs providing approval for the disturbance of land on which a site is located.
Section 39(2) Assessment	Process of the ACMC assessing a reported site's significance and interest.
Scope of Works	The nature of the work undertaken as requested by the client or proponent.

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## SECTION ONE - INTRODUCTION

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### THE PROJECT AREA

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Ashburton Salt is a solar salt project proposed to be located approximately 40 km southwest of Onslow, on Urala Pastoral Lease (see Map 1). Solar salt is the result of a naturally occurring process using the sun and wind to evaporate sea water. The project is being developed by K+S Salt Australia, a local company established by German-based K+S.

### SCOPE OF WORKS

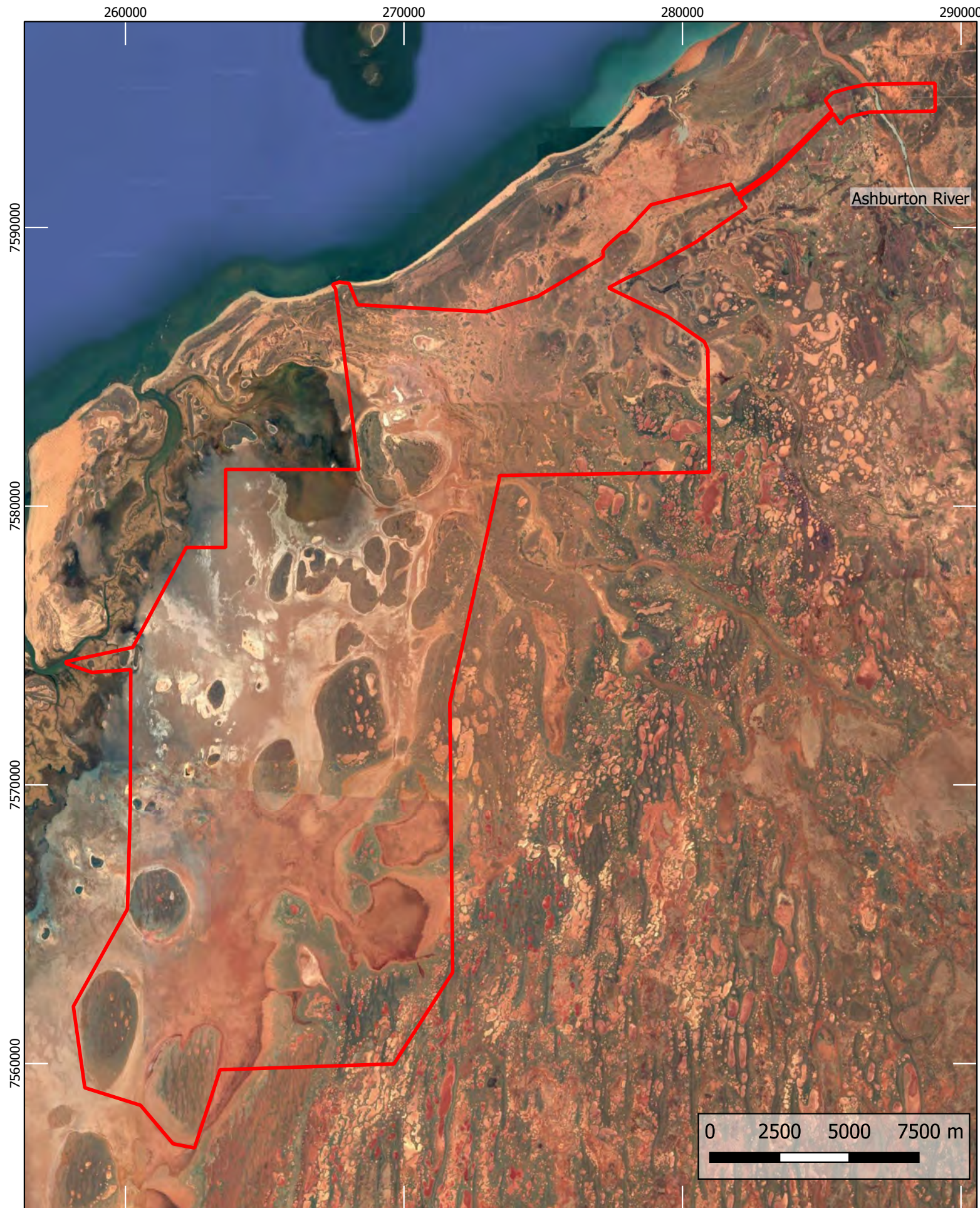
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Archae-aus was engaged by *Buurabalayji Thalanyji* Aboriginal Corporation (BTAC) to conduct the reconnaissance assessment on behalf of K+S Salt and EnviroWorks Consulting (EnviroWorks) for the Ashburton Salt Project Area. The scope of work entailed:

- 1) Undertake a desktop review and analysis of available historical information, reports and spatial data relevant to Aboriginal cultural heritage of the Ashburton Salt Project location.
- 2) From the desktop review summarise the:
  - a) Landscape context where relevant to historical aboriginal occupation (topography, geology/soils, hydrology, vegetation, climate, land-use history etc)
  - b) Historic sources of Aboriginal culture
  - c) Regional and local archaeological and ethnographic context
  - d) Existing known Aboriginal cultural heritage site locations (from previous surveys and database searches).
- 3) Formulate a predictive model for Aboriginal archaeological site location based on available spatial and historic information analysed during the desktop review.
- 4) Use the above predictive model to identify and map areas which are most likely to host Aboriginal archaeological sites (within the previously provided survey area).
- 5) Review spatial data on likely areas of disturbance and impact of the Ashburton Salt Project.
- 6) In consultation with EnviroWorks, select agreed reconnaissance survey locations prior to survey mobilisation (survey target location map to be agreed).
- 7) Undertake a 5 day helicopter based survey of agreed reconnaissance survey locations.
- 8) Provide a draft report including:
  - a) Landscape context where relevant to historical aboriginal occupation (topography, geology/soils, hydrology, vegetation, climate, land-use history etc)
  - b) Historic sources of Aboriginal culture
  - c) Regional and local archaeological and ethnographic context
  - d) Existing known Aboriginal cultural heritage site locations
  - e) Details of predictive model used to predict Aboriginal archaeological site location
  - f) Reconnaissance survey target areas, methods, scope and findings.
  - g) Maps of areas likely to contain Aboriginal archaeological sites based on predictive model.
  - h) Maps of areas surveyed during reconnaissance survey.
  - i) Maps of confirmed locations, extent and types of Aboriginal archaeological sites (as determined via the site reconnaissance survey).
- 9) Provide GIS shapefiles of all maps.
- 10) Attend a 1 hour briefing meeting on the above survey, report and findings with representatives from EnviroWorks and K+S.
- 11) Consider comments on the draft report to be provided by EnviroWorks.
- 12) Update and finalise the above report.

This report provides details of items 1 to 7 and is fulfilment of item 1.

The reconnaissance assessment took place between the 2 November 2019 and 6 November 2019, with the full involvement of BTAC representatives.



**Legend**  
 □ K+S Heritage Survey Area (20190826 v2)



**Map 1. Overview of Ashburton Salt Project Area**

Drafted by Nigel Bruer, 15 November 2019. GDA94, Zone 50. Satellite imagery courtesy of Google and WikiMaps.



## LEGISLATION

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Western Australia's *Aboriginal Heritage Act 1972* (the *AHA*) is the main legislative framework for Aboriginal heritage in the State. Important and significant Aboriginal sites and objects are protected under it. The *AHA* protects sites and objects that are significant to living Aboriginal people as well as Aboriginal sites of historical, anthropological, archaeological and ethnographic significance. The *AHA* is currently administered by the Department of Planning, Lands and Heritage (DPLH).

The primary sections of the *AHA* that need to be considered are section 5 which defines the term 'Aboriginal Site'<sup>[1]</sup> and section 39 (2) which details what the Aboriginal Cultural Materials Committee (ACMC) should have in regard to considering the importance of objects and places. Section 17 of the *AHA* states that it is an offence to: alter an Aboriginal site in any way, including collecting artefacts; conceal a site or artefact; or excavate, destroy or damage in any way an Aboriginal site or artefact; without the authorisation of the Registrar of Aboriginal Sites under section 16 or the Minister of Aboriginal Affairs under section 18 of the *AHA*.

Aboriginal heritage sites are also protected under the Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (the *HPA*). The *HPA* complements state / territory legislation and is intended to be used only as a 'last resort' where state / territory laws and processes prove ineffective. Under the *HPA* the responsible Minister can make temporary or long-term declarations to protect areas and objects of significance under threat of injury or desecration. The *HPA* also encourages heritage protection through mediated negotiation and agreement between land users, developers and Aboriginal people.

Aboriginal human remains are protected under the *AHA* and the *HPA*. In addition, the discovery of human remains requires that the following people are informed: the State Coroner or local Police under section 17 of the *Coroners Act 1996*; the State Registrar of Aboriginal Sites under section 15 of the *AHA* and the Federal Minister for Aboriginal Affairs under Section 20 of the *HPA*.

In terms of broader recognition of Aboriginal rights, the Commonwealth *Native Title Act* (the *NTA*) recognises the traditional rights and interests to land and waters of Aboriginal and Torres Strait Islander people. Under the *NTA*, native title claimants can make an application to the Federal Court to have their native title recognised by Australian law. The *NTA* was extensively amended in 1998, with further amendments occurring in 2007, and again in 2009. Under the future act provisions of the *Native Title Act*, native title holders and registered native title claimants are entitled to certain procedural rights, including a right to be notified of the proposed future act, or a right to object to the act, the opportunity to comment, the right to be consulted, the right to negotiate or the same rights as an ordinary title holder (freeholder).

The Aboriginal Heritage Inquiry System (AHIS), managed by the DPLH, is the tool through which the public can access information about heritage places and their legal status. There are two broad categories by which the AHIS uses to characterise heritage places: Aboriginal Sites (registered sites) or Other Heritage Places.

A registered Aboriginal Site is a place that fulfils the following definitions for protection under section 5 of the *AHA*:

- 1) 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.
- 2) Any sacred, ritual or ceremonial site which is of importance and special significance to persons of Aboriginal descent.

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[1] <http://www.daa.wa.gov.au/en/Heritage-and-Culture/Aboriginal-heritage/Aboriginal-Site-and-other-Heritage-Places/>

- 3) Any place which, in the opinion of the Aboriginal Cultural Materials Committee (ACMC), is or was associated with 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.
- 4) Any place where objects to which the AHA applies are traditionally stored, or to which, under the provisions of the AHA, such objects have been taken or removed.

The category 'Other Heritage Place' is complex and is not a reliable indicator for the legal status of a heritage place under the AHA.

The status of most 'Other Heritage Places' is either 'Lodged' or 'Stored Data'. Lodged indicates a potential Aboriginal Site that has been reported but not yet assessed by the ACMC. These places are therefore immediately protected under the AHA. Stored Data / Not a Site indicates a place that has been assessed by the ACMC, who have decided that the place does not fulfil the above definitions for an Aboriginal Site, protected under the AHA. A small number of 'Other Heritage Places' have 'Contact DPLH' as their status, indicating that contact needs to be made with the Department of Planning, Lands and Heritage regarding these places, to access further information/advice.

Thus some 'Other Heritage Places' are protected under the AHA, while others are not. Consequently, Archae-aus would recommend full and transparent consultation with Traditional Owners about all of their heritage places.

Furthermore, the status of both Aboriginal sites and Other Heritage Places may change as the information available or assessment procedures change through time. In the last few years, the register status of some places has changed from one of these categories to another. An apparent shift has occurred in the benchmarks used by the ACMC in the assessment of places as Aboriginal Sites under section 5 of the AHA. These changes have been most noticeable since 2012, particularly in the outcomes of section 18 applications, despite no change in the AHA itself. For example, some Aboriginal Sites have been re-classified as Other Heritage Places, meaning that they are no longer considered to meet the criteria to be registered as Aboriginal Sites and thus may no longer be protected under the AHA. This process is being challenged by Aboriginal groups in the Supreme Court. One decision by the court in April 2015 determined that the ACMC criteria used for assessing places under 5b was incorrect<sup>[1]</sup>. The ACMC was instructed to reassess those places assessed by the ACMC under 5b since 2012. This reassessment process has begun and several places have been placed back on to the register of Registered Sites under the AHA. Other challenges under 5a assessments are in train through the Supreme Court.

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<sup>[1]</sup>[https://www.dlapiper.com/~media/Files/Insights/Publications/2015/04/Supreme\\_court\\_clarifies\\_meaning\\_of\\_sacred\\_site\\_in\\_WA.pdf](https://www.dlapiper.com/~media/Files/Insights/Publications/2015/04/Supreme_court_clarifies_meaning_of_sacred_site_in_WA.pdf)

## PERSONNEL

---

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This report was written by archaeologists and/or anthropologists Fiona Hook, Myles Mitchell, and Stuart Rapley. Archaeologists Emily Martin and Jim Stedman also assisted.

## SECTION TWO – ABORIGINAL HERITAGE CONTEXT

### ENVIRONMENTAL BACKGROUND

#### Climate

The Project Area lies within a tropical semi-arid area. Rainfall is described as 'bixeric' (Beard 1975), with rainfall peaking in March, dropping again in April and then peaking once again during May and June, owing to winter rains. However, these climatic conditions are affected, to a large percentage, by tropical cyclones, bringing destructive winds and heavy rainfall to the Pilbara (Beard 1975). The average yearly rainfall in Onslow is 264 mm. The maximum temperature ranges from 35.8° to 24.8°, with the highest maximum recorded as 48.3°. The minimum temperature ranges from 23.6° to 11.5° and the lowest minimum recorded was 3.0°. The percentage of relative humidity ranges, throughout the year, from 50 to 60% (Beard 1975).

Table 3. Mean yearly maximums and minimums for Onslow

Temperature (C°)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Onslow (Max)	35.8	35.6	35.4	33.2	28.8	25.4	24.8	26.5	29.1	31.6	33.8	35.2
Onslow (Min)	23.6	24.2	23.2	20.3	16.2	13.1	11.5	12.4	14.1	16.5	19.1	21.6

(Source: [www.bom.gov.au](http://www.bom.gov.au))

Table 4. Mean average rainfall for Onslow

Rainfall (mm)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Onslow	26.7	51.4	47.8	19.8	47.2	45.2	18.1	9.1	1.3	0.7	1.4	5.4

(Source: [www.bom.gov.au](http://www.bom.gov.au))

#### Geology

The Project area is in the Pilbara geological block. Thought to be around 2.8 billion years old, the Pilbara region is comprised of generally rugged terrain with some extensive coastal plains and contains some of the earth's oldest rock formations and most important mineral deposits. The Pilbara block is a continental shield formed predominantly in the Proterozoic and Archaean periods. The shield, shaped like an ellipse with a slight downward tilt, runs in a west-north-west/east-south-east direction. This shield directs the courses of both the Fortescue and Ashburton Rivers. Near Onslow the Middle Proterozoic rocks are exposed as the Mt Minnie mountain range. This group consists of sandstone, siltstone and conglomerate.

Onslow is located within the Carnarvon Basin geological division. This is a sedimentary basin, mostly covered by alluvium and colluvium, with some localised areas with exposed rocks of Permian age to Recent age (Beard 1990). The coastal area consists of low-lying salt flat areas, with minimal vegetation (Western Australian Planning Commission 2003). The project area is located within a coastal sand dune system, although the soil within the general Onslow town area is mostly clay. The Onslow Coastal Plain is a broad expanse of seaward sloping low-lying alluvium deposited in the Quaternary (Beard 1975; Dames & Moore 1994). The coastline in the Onslow region is described as low-lying and muddy, with the country behind the mudflats covered with fine grained sand and gravel. Seif sand dunes trending north south occur near the coast. Sief dunes also occur further inland on the sandy plains, and usually trend in a NW-SE direction.

Specifically, the surface geology of the Project Area includes the following six geological units (see Map 6)<sup>1</sup>.

<sup>1</sup> [http://resource.geosciml.org/classifier/cgi/geologicunittype/lithostratigraphic\\_unit](http://resource.geosciml.org/classifier/cgi/geologicunittype/lithostratigraphic_unit)

- 1) Alluvium 38485 - Channel and flood plain alluvium; gravel, sand, silt, clay; may be locally calcreted.
- 2) Colluvium 38491 - Colluvium and/or residual deposits, sheetwash, talus, scree; boulder, gravel, sand; may include minor alluvial or sand plain deposits, local calcrete and reworked laterite.
- 3) Dunes 38496 - Dunes, sandplain with dunes and swales; may include numerous interdune claypans; may be locally gypsiferous.
- 4) Estuarine and delta deposits 38489 - Estuarine, tidal delta and lagoonal deposits; coastal mud flats, silt and evaporite deposits; may contain older vegetated black soils.
- 5) Lake deposits 38492- Lake and swamp deposits; mud, silt, evaporites, limestone; minor sand, peat.
- 6) Sand plain 38499 - Sand or gravel plains; may include some residual alluvium; quartz sand sheets commonly with ferruginous pisoliths or pebbles; local clay, calcrete, laterite, silcrete, silt, colluvium.

### Soils

The soils of the coastal plain in the Onslow area have been placed into four groups. These include, incoherent sands along active rivers and streams, calcareous loams and clays over calcrete and kunkar, cracking clays forming 'crabhole plains' and stripped hardpan soils (Beard 1975). Generally, soil in the Onslow area is dominated by sandy alluvium that forms sand sheets or siefs and dunes across the landscape (Beard 1975).

The drainage of the Onslow region can be described as external, where the water flows into the low-lying areas and the coast. As discussed above the direction of the major water courses in this area are directed by the Pilbara geological block. Drainage tends to flow north, however, the Ashburton flows to the west. These rivers are usually dry and only flow after heavy rain. The Yannery river while flowing west terminates in the Holocene dunes before reaching the coast. Permanent water holes may occur in the beds of the rivers. These rivers usually become more deeply incised the closer they are to the coastline.

Regionally, unconfined groundwater is limited to alluvial aquifer systems along major river systems within partly calcretised alluvial sediments of the Ashburton and Cane Rivers and dune beach sands. Groundwater levels in the area are generally less than 10 m below ground surface in inland areas and shallow to ground surface near the coast. Groundwater flow is to the northwest, towards the coast.

### Vegetation

Onslow is located within the northernmost portion of the Carnarvon Basin Botanical District as defined by Beard (1990). This Botanical District mainly comprises Acacia scrub and low woodland becoming tree and shrub steppe in the north, with halophytes along the lower river courses. The Onslow area is located on an extensive coastal plain with salt flats, claypans and coastal sand dunes. The vegetation tends to be very patchy and consists of snakewood (*Acacia xiphophylla*) mixed with *A. victoriae* and *A. tetragonophylla*. *Spinifex*, *Plectrachne schnizii* provides a general cover on the dunes with *Triodia basedowii* and *T. epactia* on the flats between the dunes. The shrubs on the dunes include *A. victoriae*, *A. coriacea*, *A. translucens*, *Calytrix brevifolia* and *Grevillea stenobotrya*. The most likely weeds to be expected would be Kapok (*Aerva javanica*) and Buffel Grass (*Cenchrus ciliaris*). These weeds are widespread in disturbed areas in the Pilbara region. The Project Area has some of the following vegetation communities (Biota 2005).

#### 1. Island and coast margins and inland saline flats

1a: Open samphire shrubland.

#### 2. Coastal Flats and Dune Systems

2a: *Acacia sclerosperma* over *Acacia stellaticeps* over *Triodia epactia* and Buffel grass  
\**Cenchrus ciliaris* on eroded slopes.

2a.1: Scattered to Open Shrubland of *Acacia sclerosperma* over Scattered Low Shrubs of *Acacia stellaticeps* over Mid-dense Hummock Grassland of *Triodia epactia*.

2a.2: Scattered to Open Shrubland of *Acacia sclerosperma* over Scattered Low Shrubs of *Acacia stellaticeps* over Tussock Grassland of Buffel grass \**Cenchrus ciliaris*.

2b: *Melaleuca cardiophylla* over *Triodia epactia* on limestone outcroppings in coastal dunes

2c: Dune swales and coastal flats

2d: Semi-consolidated linear and parallel red sand dunes

2e: Unconsolidated mobile dunes

### 3. Bare Claypans with Fringing Plant Communities

3a.1 Fringing *Eucalyptus victrix* and *Melaleuca leiopyxis* over *Triodia epactia* around bare claypan.

3a.2: Bare pans with *Triodia epactia*, herbs and grasses on fringe

3b: Vegetated claypans of Coolibah *Eucalyptus victrix* Low Woodland over Grassland

Most of the flora and vegetation sites assessed during the field survey were in a very good to excellent condition, with few signs of disturbance such as heavy weed infestation, grazing by livestock or frequent fires (Biota 2005).

### Fauna

Terrestrial fauna within the area contains species from the Pilbara and Carnarvon biogeographic regions, as the area is located within the transitional zone between these two regions. Not only does the area contain some species of these two regions, there is an endemic element to the biota, particularly associated with the red sands that are themselves reminiscent of the regions that include the Great and Little Sandy Deserts. Sandy soils in some parts of the Carnarvon region, notably on the Cape Range Peninsula, are noted for having relict populations of southwest species (e.g. the skink, *Lerista elegans*), and there is potential for similar such outlying populations to be present in the Onslow area (BHP Billiton Petroleum 2005).

The Survey Area supports mainly spinifex and *Acacia* shrubland on sandy soils. These sandy soils can be expected to support some reptile and mammal species. Subterranean fauna comprise stygofauna (aquatic, groundwater fauna) and troglofauna (obligate terrestrial subterranean fauna). There is little evidence to date that the project area has any significance for this fauna. The majority of the onshore project area is low coastal sand dunes backed by hypersaline mudflats. These habitats are not known to provide suitable habitat for this fauna (hypersaline instead of fresh), which typically occur in karstic (vugular) limestone environments. Subterranean fauna also occur in unconsolidated sediments associated with structural features or large-grain size, granular sand/gravel aquifer (BHP Billiton Petroleum 2005).

## ETHNOGRAPHIC BACKGROUND

The Thalanyji people are the traditional custodians and occupants of the Onslow region in the West Pilbara, Western Australia. The Thalanyji people's society and culture were first described in the late 1800s (Yabaroo 1899; Bates 1914, 1985; (Radcliffe-) Brown 1912, n.d). Their traditional country is focussed along the lower reaches of the Ashburton River (Mindurru) and extends from the vicinity of Mt Stuart and Uaroo Station in the south-east to the current town of Onslow and the Old Onslow townsite in the north-west, including the pastoral stations of Minderoo, Uaroo, Nanutarra, Yanrey, Emu Creek (Nyang), Urala, and Koordarie. Early researchers mapped their territory in slightly different places with Tindale (1940) first mapping the Talaindji (Thalanyji) as living at the "Head of Exmouth Gulf; North-west Cape; inland to Ashburton River; about Nanutarra". In contrast, Tindale (1974: 256) later identified the Talandji (Thalanyji) (see Figure 2) only on the east side of Exmouth Gulf, though not the Gulf shore itself, and extending inland around the Ashburton River with Tindale noting that the Jinigurdira [Yinikutira] lived in the Cape and Exmouth areas.

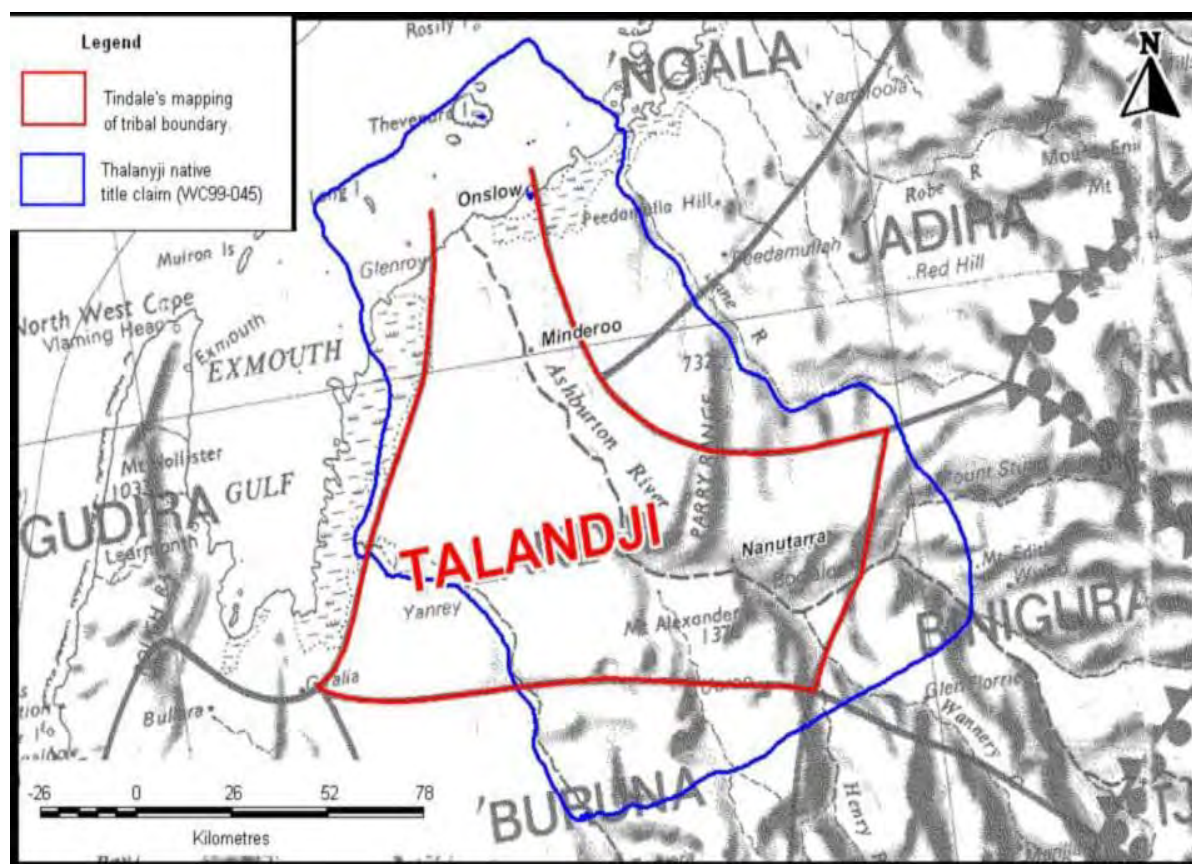


Figure 1. Map comparing Tindale's (1974) mapping of Talandji boundary with the Thalanyji native title determination area (from McDonald (2004))

The name Yinikutira is more likely to be a local group (band) of Thalanyji speakers who lived around the Giralia Range and Yinikurti (Cardabia Creek). Linguists suggest that the '-ra' is a suffix for naming people after places with the name Yinikutira referring to people living by the Yinikurti (Cardabia Creek) (Austin (cited in Thieberger 1996)). Further, McDonald (2004) notes that the placement of this group does not fit with Tindale's (1974:55-74) own theories regarding Aboriginal groups control of physiography (e.g. hills, rivers, changes in ecology). Tindale's (1974) justification in the case of the Thalanyji living on the coast at Onslow is that "their extension to the coast at Exmouth Gulf is probably all due to late migration". The lack of any apparent physiographic barriers or clear boundary markers in the area doesn't support this claim. McDonald (2004) concludes that:

it is difficult to believe that the Thalanyji occupy the coast and use marine resources around Onslow and the mouth of the Ashburton River but not along the shore of Exmouth Gulf, a short distance to the south, while occupying the region's hinterland. On the basis of linguistic and ethnographic data (Bates, Brown and other early ethnographers), and the cultural logic that Tindale himself articulates for the basis of tribal boundaries, it would seem safe to assume that the Thalanyji people occupied Exmouth Gulf's eastern foreshore and littoral and that the Jinigurdira [Yinikutira] are a subgroup of the Thalanyji.

In terms of their social organisational features the Thalanyji have cultural commonalities with groups in the Ashburton and Gascoyne region (referred to by Radcliffe-Brown (1930–31: 211–15) and share a kinship system. According to McDonald (2004):

*The Thalanyji have a totemic system based on local totemic centres called 'talū' (thalu or dalu) among the Thalanyji, Noala and Binigura. Local estate groups (patrilineal clans according to Radcliffe-Brown 1930–31: 213) possessed a number of such totemic centres within its country. According to (Radcliffe-) Brown (n.d.), the Thalanyji local totemic groups or clans included those listed in Table 2 below. Radcliffe-Brown (1930–31: 212) estimated that a local estate group's land was typically somewhat less than 200 sq miles. For example, according to (Radcliffe-) Brown's (n.d.) unpublished notes, Mandari estate country (see Table 2 below) stretched from "Mandarara on the Yannarie River to Uaroo Station on Rouse Creek". The patrilineal clans were grouped together in a number of named (with male and female forms) "inter-tribal totemic divisions" or "cult groups". For example, the Kadjaru (fem. Ngadjuri) totemic division was found in all tribes in the region and any clan with rain (bilana) as its totem belonged to this division as did things associated with water/moisture such as water birds, frogs, water plants and grass-seed.*

These talu sites are places where ceremonies are performed to ensure that certain species of plants and animals were maintained and perpetuated. Tonkinson (1991: 117) notes, such sites are the "spirit-homes of the many different varieties of plants and animals, left there by the Dreaming beings". Pertinent to the Project is the fact that the Ashburton River has a number of talu sites. McDonald (2004) describes an important talu for rain at Peepingee (Bibinji) (DPLH 11068) (Bates 1914: 393; (Radcliffe-) Brown n.d.; see also McDonald, Hales & Associates 2001). (Radcliffe-) Brown (1930–31: 215) states that Peepingee was "the most famous totem-centre" and that "in former times a ceremony for making rain used to be held here at which Karjaru men from several tribes used to be present and take part". Another rain/cloud talu was located at Ngalsaramai in the vicinity of Winning Pool. There is also a *bardura* (bush turkey) talu at Winning Pool.

*Mindurru* (The Ashburton River) is central to Thalanyji culture. Detailed dreaming stories about the creation of the river by *Warnamankura* (water snake) are well understood by Thalanyji people and these stories imbue the River with a sacred significance. The upper reaches of *Mindurru* (The Ashburton River) occurs within the Project Area and given the river's importance special care will need to be taken by the K+S to consult sufficiently with the Thalanyji regarding any potential impacts.

Tindale (1974: 254) reports the use of offshore islands by the *Mardudunera* [Martuthunira] and *Noala* [Nhuwala] and specifically mentions the *Noala* visiting "Barrow and Monte Bellow Islands using a form of wooden 'canoe'". However, it is not clear what sort of craft and what type of usage of the islands he is referring. Though not referring to the use of the islands by the Thalanyji, there is no reason to believe that the Thalanyji, like their coastal neighbours, did not have watercraft and visit the offshore islands. Indeed, Bates (1985: 257–258) notes the exploitation of offshore island by Aboriginal people:

*Along the Northwest coast there is [sic] a number of small islands which the natives of the Roebourne district are able to reach. ... In the early days the natives transported themselves to the various islands by means of logs of mangrove wood, two of these being joined neatly together end to end ... while a third and shorter piece formed a primitive stern.*

Like other areas of the Pilbara, Thalanyji people experienced great upheaval following the arrival of European settlers in the 19<sup>th</sup> century. Those impacts continued and increased in the 20<sup>th</sup> Century amid a backdrop of land and resource acquisition through the pastoral, mining, pearling, oil and gas and other



industries. The Thalanyji were unique in their initial success in forcibly driving back early would-be settlers through fierce fighting, culminating most notably in the Battle of 'Mindurroo' in 1869 (McDonald 2018; Gifford 2018). Following the early failed attempts, the pastoral industry was eventually established along the Ashburton river in the late 1870s, including the establishment of Minderoo Station (McDonald 2018). Many Thalanyji people worked in the pastoral industry and their association with pastoralism continues to be an important element in Thalanyji history and culture.

#### *Native Title*

For cultural heritage management purposes their country can be considered as the extent of their Native Title determination area (WCD2008/003)<sup>2</sup>, which covers an area of some 11,120 km<sup>2</sup>. However, their traditional country is larger than this, and is more accurately represented by the original Native Title application area<sup>3</sup> which extends further north and east, as well as westward, incorporating offshore islands and an area of the Indian Ocean.

#### *Current Connection*

Within the Project Area, *Mindurru* (The Ashburton River) is central to Thalanyji culture. Detailed dreaming stories about the creation of the river by *Warnamankura* (water snake) are well understood by Thalanyji people and these stories imbue the River with a sacred significance (McDonald 2018). This significance has important practical applications for Thalanyji people because it enshrines a responsibility to protect and care for the river into law and custom, and all Thalanyji people understand that they inherit this responsibility from their ancestors and bequeath it to their children.

In addition to sacred values, *Mindurru* was and continues to be an important resource for Thalanyji people for activities such as camping and hunting (McDonald 2018). Thalanyji people maintain a unique system of totemic organisation which links individuals and families with specific water sources, often associated with *Mindurru* (McDonald 2018). This system has been described variously as "patrician subsets" (Sutton 2018); 'phratries' (Bates 1913); 'inter-tribal totemic divisions' (Radcliffe-Brown (1930-31), 'totem classes' (Austin 1992) or "totemic division" (McDonald 2018). This system is still used today among Thalanyji people as a way to understand how individuals and families connect with one-another and with landscape (McDonald 2018).

Today, most Thalanyji people reside in Onslow, Carnarvon or elsewhere in the Pilbara or Perth. They still maintain deep connections to their traditional land and culture, maintaining distinct laws and customs that distinguish them as Thalanyji people.

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<sup>2</sup> <https://www.thalanyji.com.au/native-title/>

<sup>3</sup> [https://www.thalanyji.com.au/resources/WCD2008\\_003-2.-Maps-of-the-Determination-Area.pdf](https://www.thalanyji.com.au/resources/WCD2008_003-2.-Maps-of-the-Determination-Area.pdf)

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## ARCHAEOLOGICAL BACKGROUND

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The Project Area is in a geographical and cultural interface between the Northwest coast and the inland Pilbara and Ashburton regions. Archaeological excavations conducted along Australia's Northwest coast have revealed a sequence of Aboriginal occupation that dates from the Pleistocene, around 50,000 years ago (Veth et al. 2017). To the east in the Pilbara ranges, archaeological excavations at Djadjjiling near Hope Downs in the Hammersley Ranges revealing an occupation sequence dating back as early as 41,000 years (Law et al. 2010; ACHM 2012), while excavations in the Chichester ranges have yielded sequences of similar antiquity (Niyaparli Community et al. 2015). Excavations in rock shelters at Channar and adjacent areas, including the Eastern Ranges, have demonstrated that Aboriginal occupation of the area dates from at least 22,000 cal BP at a site called *Yirra*, and numerous other sites in the region show occupation during the last 8,000 years (Veitch et al. 2005). The Ashburton River, as evidenced from the exotic Pleistocene stone and ground artefact record on Barrow Island, was a major travel route for Aboriginal people over the last 53,000 years (Veth et al. 2017).

While there are a number of archaeological variables to consider in interpreting the results or archaeological surveys (such as taphonomy and the selection of areas to survey), the distribution of sites reflects the varied use of the landscape by the Thalanyji people's ancestors in response to changing environmental and social pressures of a semi-arid landscape (Tonkinson 1978). People would have primarily moved through the landscape in small groups, forming larger groups periodically at better watered places with major focus on places such as Mindurru and on the coast.

Previous heritage surveys of the Onslow coastal region, stretching from Giarlia Gulf in the west to Cane River in the east, have recorded over 100 middens (see for example Veth et al. 1990; Veitch et al. 1993; Mulvaney 1991/1984; Hook et al. 2006). Research has focused on the timing of economic shellfish exploitation and the extent to which changes in species reflect either cultural preference or coastal productivity (Veitch and Warren 1992). The Onslow coast is unusual within the context of the larger Pilbara region in that it is located within a sedimentary/limestone belt. It contains both terminal Pleistocene and emergent Holocene sand dunes and therefore has the ability to preserve both older and more recent coastal occupations.

Veitch and Warren (1992) excavated five shell middens and took surface shell samples from an additional three sites along a linear transect from the coast (Field Site 2) to 1 km inland (Field Site 9) near Urala Station. Mangrove shellfish (*Terebralia* sp.) were exploited between 5,261 cal BP and 4,333 cal BP, while mudflat shellfish (*Anadara granosa*) are registered between 4,685 cal BP and 812 cal BP, and the Coral Oyster (*Hyotissa* spp.) between 5,174 cal BP and 1,168 cal BP. These dates fall within the time range described for the adjacent Abydos Plain (Clune and Harrison 2009). The results show a cline from the youngest sites close to the contemporary coastline through to the oldest sites inland. This likely reflects progradation of the coastline through time, as also recorded for the successive chronology of middens from the Roebuck Plains near Broome (O'Connor and Sullivan 1994). In 2013 surface samples of shellfish were collected from 12 sites between Urala Station and Onslow (Hook 2014a, 2014b). The radiocarbon dates show a slightly different pattern to that observed by Veitch and Warren (1992). The exploitation of the coral dwelling shellfish (*Hyotissa* sp.) occurs between 5,993 cal BP to 513 cal BP while, in contrast, the *Terebralia* sp. dates are younger, with *Telligarca* sp. dated to between 4,518 cal BP and 551 cal BP.

The time-span of dates returned from open area middens and shell scatters in the Onslow area and North-West Cape (Morse 1996, 1999), demonstrate that the exploitation of shellfish (re)commenced immediately after sea level stabilisation. Indeed, the earliest dates for shell scatters from North-West Cape at the Warroora and Mulanda sites are 8,607 cal BP and 7,997 cal BP, respectively. These early dates neatly straddle the abandonment phase of the Montebello and Barrow Islands, currently sitting at c. 8,300 cal BP. There is unequivocal evidence for continuity of shellfish procurement throughout the Holocene from contiguous sites within the Carnarvon bioregion.

## TRADITIONAL LAND USE

Results from archaeological research and previous cultural heritage work along Australia's northwest coast and its hinterland provide a data set on which to build an understanding of the *Thalanyji* people's ancestors past use of the landscape. This is an essential component in understanding and interpreting the results of the current archaeological survey. Archae-aus has compiled the results of over 20 Aboriginal heritage surveys with details of almost 700 Aboriginal sites from the northwest coastal area, primarily comprising work from around Onslow and Cape Preston (Craig, Tierney, & Hammond, 2011; Di Lello, 2009b; Hook, 2007; Hook & Sinclair, 2007; Hammond, Jimenez-Lozano, & Dias, 2005; Hammond, Hook, Veitch, Ash, & Jimenez-Lozano, n.d.; Sinclair, Skippington, Edwards, & Di Lello, 2009; Di Lello, Skippington, & Edwards, 2009; Dias, Di Lello, Sinclair, Gardiner, & Jimenez-Lozano, 2009; Eureka Archaeological Research and Consulting, 2008; Hook et al., 2008; Di Lello, Jimenez-Lozano, & Hook, 2008; Australian Interaction Consultants, 2007; Stedman & Sinclair, 2014). Summaries from this data set are provided in Appendix Two and will form a comparative data set against which to evaluate the results of the archaeological places detailed in this report.

The results of previous archaeological works in the region show a predominance of open stone artefact scatters; with numerous middens / shell scatters, reduction areas, quarries and sites with grinding material; occasional rock shelters and rock art sites and small numbers of structures, burials, water sources, scarred trees, historical / maritime sites and ceremonial places (see Appendix Two). The majority (81%) of the sites in the sample include a stone artefact scatter component, with lesser numbers comprising middens / shell scatters (22%) and grindstones (13%).

### Predictive Models

Hook & Veitch (2004) by analysing the sample results in conjunction with data from the DPLH Register of Aboriginal Sites, produced a basic predictive model of archaeological site location for the Onslow coastal area (Table 5).

Table 5. Occurrence of archaeological site types in the Onslow Region

Landscape Type	Site Types	Relative Archaeological Sensitivity	References
Coastal dunes (Holocene)	Medium to large shell and artefact scatters. Burials	High	(Kee and Mulvaney, 1984; Veth, Strawbridge and Moore, 1990; Veitch, Hook and Greenfeld, 1993; Quartermaine Consultants, 1998)
Coastal dunes (Pleistocene)	Small shell scatters ( <i>Blood Cockle (Terebralia spp.)</i> spp. dominant) with some flaked stone artefact component	Moderate	(Veitch, Hook and Greenfeld, 1993; Quartermaine Consultants, 1998)
Mud/Salt flats (tidal)	Small shell and artefact scatters, Occasional isolated artefacts	Very Low	(Kee and Mulvaney, 1984; Veitch, Hook and Greenfeld, 1993; Quartermaine Consultants, 1998)
Clay pans	Small to medium-size artefact and shell scatters	Moderate	(Veth, Strawbridge and Moore, 1990; Veitch, Hook and Greenfeld, 1993)
Inland sand plains	Small artefact scatters (usually task-specific), Isolated artefacts	Low	(Veth, Strawbridge and Moore, 1990)
Major river systems	Medium to large artefact scatters, repeated isolated artefacts	Moderate	(Kee and Mulvaney, 1984; Veth, Strawbridge and Moore, 1990; Quartermaine Consultants, 1998)
Smaller drainage lines	Small to medium artefact scatters	Low	(Veth, Strawbridge and Moore, 1990)

Hook & Veitch (2004) conclude that for the Urala area:

- 1) the largest shell and stone artefact scatters are located in coastal sand dunes;
- 2) burials are more likely to be encountered in coastal dunes than any other landscape type. The presence of burials in this landscape unit makes it a high archaeologically sensitive area;

- 3) clay pans have a high number of previously recorded artefact and shell scatters, although sites are generally smaller in size than those recorded in the sand dunes; and
- 4) mud flats represent the lowest relative risk in regards to encountering archaeological sites, and those that have been recorded tend to be smaller and potentially less archaeologically significant than sites encountered in other landscape units.

While there are a number of archaeological variables to consider in interpreting these results (such as taphonomy and the selection of areas to survey), site distribution is believed to reflect a varied use of the landscape by the *Thalanyji* people's ancestors in response to changing environmental and social pressures. People would have primarily moved through the landscape in small groups, forming larger groups periodically at better watered places. During the different phases of movement through the landscape, Aboriginal people undertook different activities which are sometimes visible in the archaeological record. During times of high mobility, when people were dispersed in small groups, occupations tended to be brief - resulting in smaller archaeological assemblages focused on expedient stone knapping. Conversely, during the periodic gatherings at well-resourced places, people congregated for longer, resulting in a wider range of stone types knapped, later stage stone reduction and an increase in the number of formal tools discarded. This model for understanding past Aboriginal use of the landscape is a very broad approach that does not take into account many aspects of past life (such as ritual obligations, trade networks and the use of quarries).

## PREVIOUS HERITAGE ASSESSMENTS

A search of the Department of Planning, Lands and Heritage Aboriginal Heritage Inquiry System (AHIS) shows that the Project Area has both previously recorded sites and heritage assessments over portions of the Project Area (see Map 2 and Map 3).

### Heritage Assessments

Twelve heritage assessments relating to this Project were identified in the AHIS search with an additional assessment completed by Archae-aus and Ethnoscience for BTAC on behalf of Straits Salt (see Table 6).

Table 6. Summary Table of Heritage Assessments

DPLH Report ID	Report Title	Report Authors
17429	Archaeological Survey, J84a Seismic Program, Urala Station, West Pilbara, W.A.	Mulvaney, K.
21528	An Ethnographic Survey and Aboriginal Consultation, of BHP Petroleum's Proposed Gas Processing Plant and Associated Pipeline Routes. Jan. 1993.	Wright, G.
101893	Report on a preliminary archaeological investigation of Aboriginal sites Onslow to Tubridgi lateral gas pipeline route	Quartermaine, Gary.
101978	Report of Additional Reconnaissance along the Tubridgi Pipeline, Onslow, Western Australia. March 1991.	Veitch, B.
101979	A Report of an Archaeological Survey of two Pipeline Routes for the Griffin Gas Development, Tubridgi, Near Onslow. [Final Report] April 1993.	Veitch, B.
101985	Report of an Ethnographic and Archaeological Survey of the Proposed Tubridgi Extension - West of Onslow. June 1992.	Wright, G.
102275	The Report of an Aboriginal Heritage Survey of the Ruby 1 well Site on the Ep110 Petroleum Lease Near Onslow, WA. November 1996.	Jackson, Gavin.
102499	Ethnographic Addendum to Report of an Archaeological and Ethnographic Survey of the Tubridgi Pipeline, Onslow, Western Australia. May 1990.	Moore, P.
102895	Report of an Archaeological and Ethnographic Survey of Tubridgi Pipeline, Onslow, Western Australia. March 1990.	Veth, P. & Strawbridge, L. & Moore, P.
102907	Roller/Skate Gas Export Pipeline Roller 'A' To Tubridgi. Jun 1993.	West Australian Petroleum Pty Ltd.
103065	A Survey for Aboriginal Sites in the Vicinity of the Urala Seismic Survey Program 1994, Onslow, Pilbara, W.A. 1994.	Strawbridge, L.
103084	A Survey for Aboriginal Sites in the Vicinity of Exploratory Drilling Site Sapphire 1, Onslow, Northwest Australia. Aug 1992.	Strawbridge, L.
NA	A Report of an Aboriginal Archaeological Heritage Assessment of the Straits Salt Pty Ltd Proposed Pilbara Salt Project, Northern Field Boundary, Giralia Gulf, Western Australia	Hammond, C, Hook, F, et al
NA	Report of an Ethnographic Survey: Straits Resources Exmouth Salt Project Ashburton Region, Western Australia	McDonald, E

### Registered Heritage Sites

Within the Project Area there are eight registered Aboriginal archaeological sites, four Other Heritage Places that have been previously identified. In addition, there are 26 previously recorded sites that were identified during a survey for Straits Salt (see Table 7).

Table 7. Summary Table of Previously Recorded Sites

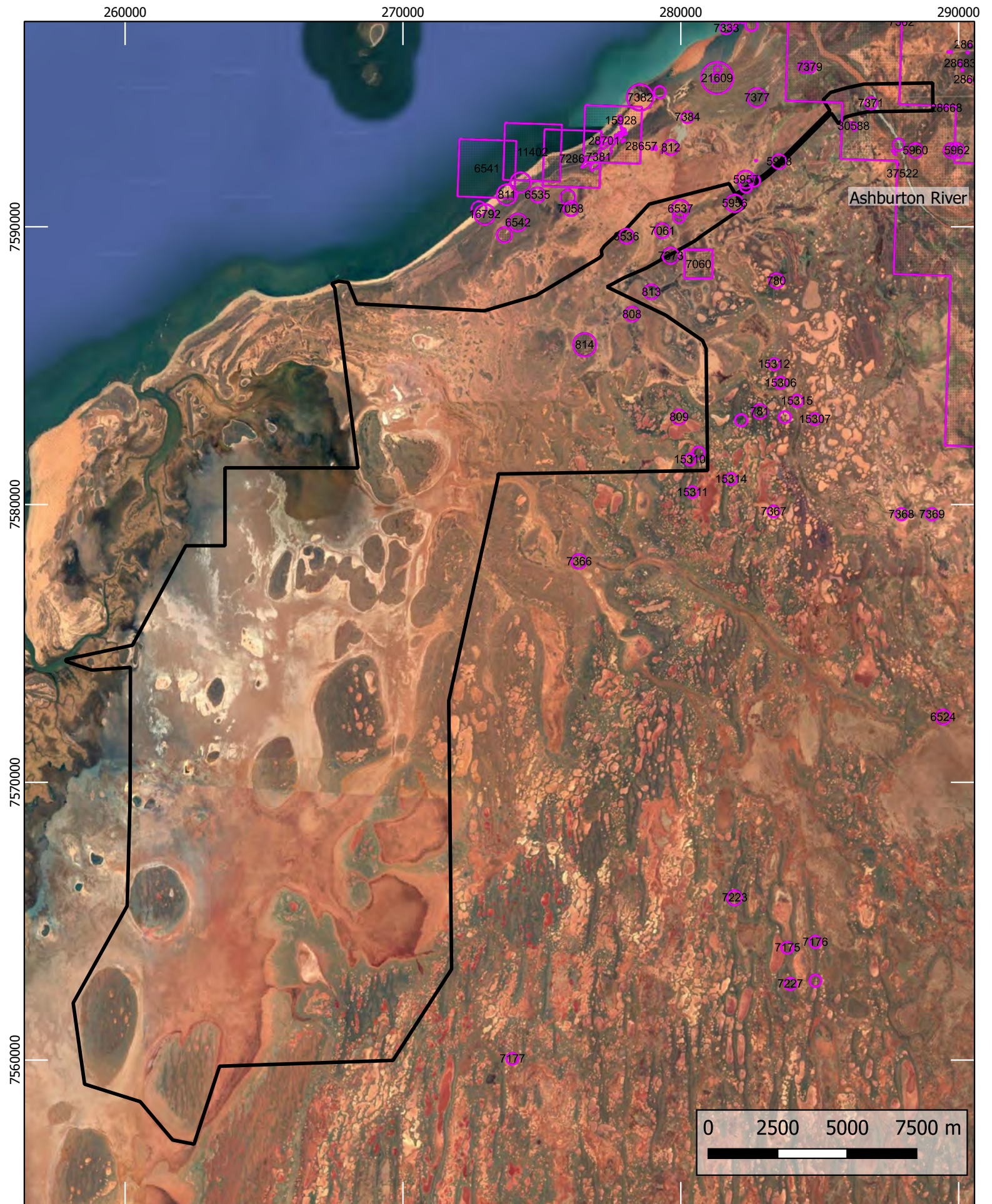
Place_ID	Name	Legacy_ID	Register Status	Type	Data Source
808	Sapphire 1	P07319	Registered Site	Artefacts / Scatter, Camp, Other: 1920'S-1940'S	AHIS
809	Sapphire 2	P07320	Stored Data / Not a Site	Artefacts / Scatter	AHIS
814	Urala 94 E	P07325	Registered Site	Artefacts / Scatter	AHIS



A report on the reconnaissance survey of Aboriginal archaeological sites within the Ashburton Salt Project Area, Urala Station, Western Australia  
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Place_ID	Name	Legacy_ID	Register Status	Type	Data Source
5956	Griffin Gas 06	P07164	Stored Data / Not a Site	Artefacts / Scatter, Midden / Scatter	AHIS
6536	Urala Dune Ridge	P06433	Registered Site	Artefacts / Scatter, Midden / Scatter	AHIS
6537	Urala Sand Ridge	P06434	Registered Site	Artefacts / Scatter, Midden / Scatter	AHIS
7061	Urala Midden 4	P05892	Stored Data / Not a Site	Artefacts / Scatter, Midden / Scatter	AHIS
7371	Urala Station Crossing 1	P05559	Registered Site	Artefacts / Scatter, Midden / Scatter	AHIS
7374	Urala Station 02.	P05562	Registered Site	Artefacts / Scatter, Midden / Scatter, Camp	AHIS
15309	Wyloo Dam 04	P07909	Stored Data / Not a Site	Artefacts / Scatter	AHIS
15310	Wyloo Dam 05	P07910	Registered Site	Artefacts / Scatter	AHIS
37522	Mindurru (Ashburton River)		Registered Site	Mythological	AHIS
SS05-01	Straits Salt 01		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)
SS05-02	Straits Salt 02		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)
SS05-03	Straits Salt 03		Not Submitted	Artefacts / Scatter	Archae-aus (2005)
SS05-04	Straits Salt 04		Not Submitted	Artefacts / Scatter	Archae-aus (2005)
SS05-05	Straits Salt 05		Not Submitted	Artefacts / Scatter	Archae-aus (2005)
SS05-07	Straits Salt 07		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)
SS05-08	Straits Salt 08		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)
SS05-09	Straits Salt 09		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)
SS05-10	Straits Salt 10		Not Submitted	Artefacts / Scatter	Archae-aus (2005)
SS05-11	Straits Salt 11		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)
SS05-12	Straits Salt 12		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)
SS05-13	Straits Salt 13		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)
SS05-14	Straits Salt 14		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)
SS05-15	Straits Salt 15		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)
SS05-17	Straits Salt 17		Not Submitted	Artefacts / Scatter	Archae-aus (2005)
SS05-18	Straits Salt 18		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)
SS05-27	Straits Salt 27		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)

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Place_ID	Name	Legacy_ID	Register Status	Type	Data Source
SS05-28	Straits Salt 28		Not Submitted	Artefacts / Scatter	Archae-aus (2005)
SS05-29	Straits Salt 29		Not Submitted	Artefacts / Scatter	Archae-aus (2005)
SS05-30	Straits Salt 30		Not Submitted	Artefacts / Scatter	Archae-aus (2005)
SS05-31	Straits Salt 31		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)
SS05-32	Straits Salt 32		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)
SS05-44	Straits Salt 44		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)
SS05-45	Straits Salt 45		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)
SS05-46	Straits Salt 46		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)
SS05-47	Straits Salt 47		Not Submitted	Artefacts / Scatter, Midden / Scatter	Archae-aus (2005)



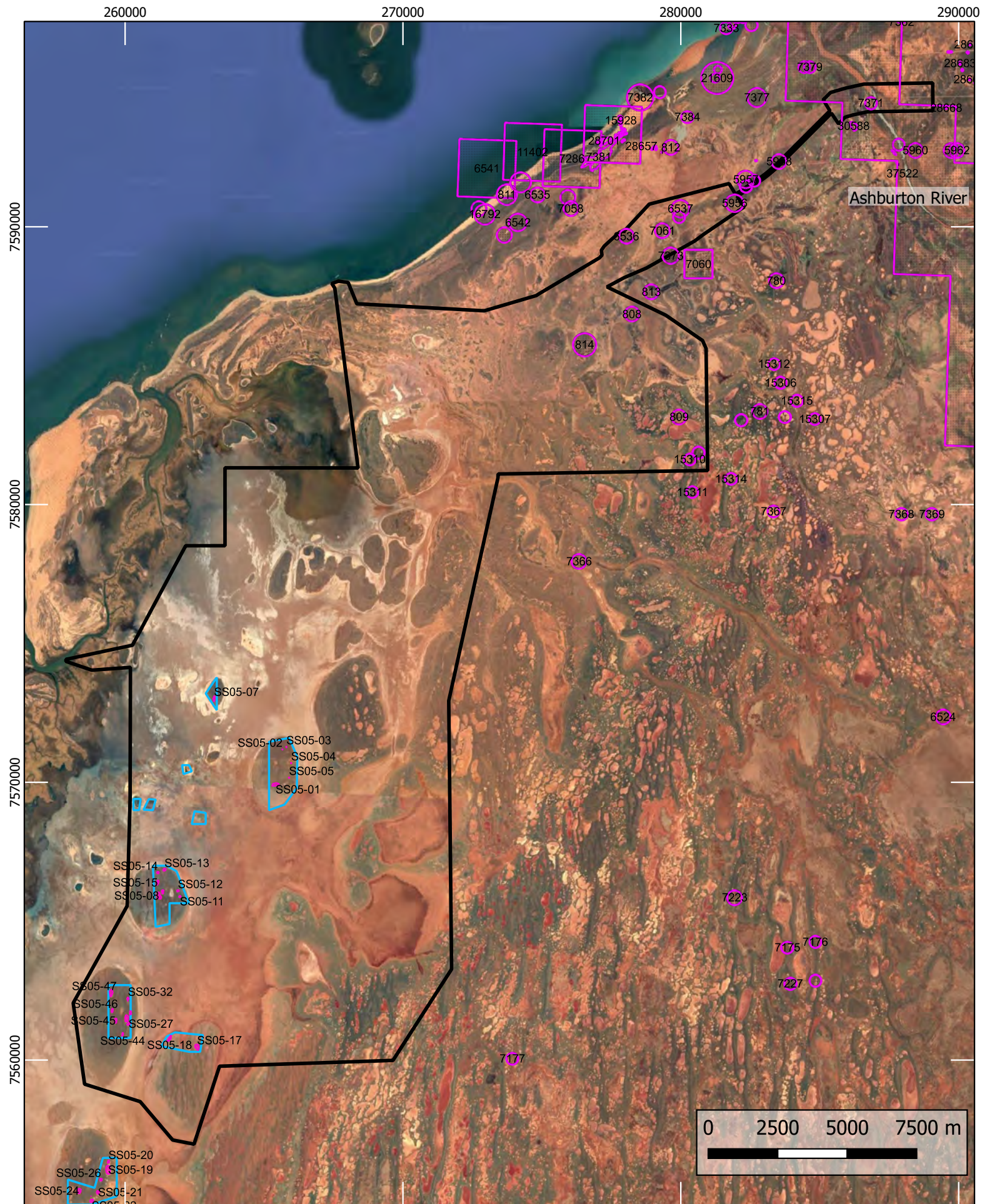
- Legend**
-  K+S Heritage Survey Area (20190826 v2)
  -  DPLH Register



**Map 2. Ashburton Salt Project Area and Registered Sites and Other Heritage Places**

Drafted by Nigel Bruer, 15 November 2019. GDA94, Zone 50. Satellite imagery courtesy of Google and WikiMaps.





### Legend

- K+S Heritage Survey Area (20190826 v2)
- DPLH Register
- Straits Survey Areas
- Stratis Sites

**Map 3. Ashburton Salt Project Area and Aboriginal Sites identified during the 2004 Straits Salt heritage assessment**

Drafted by Nigel Bruer, 15 November 2019. GDA94, Zone 50. Satellite imagery courtesy of Google and WikiMaps.

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## SECTION THREE - METHODS

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For this study, after a detailed desktop review of relevant environmental information and previous surveys of the area, fourteen Heritage Investigation Areas were selected to sample a range of environment types and previously recorded sites. They were accessed using a helicopter to fly the survey team to each area between the 2<sup>nd</sup> and 6<sup>th</sup> of November 2019.

The survey team consisted of:

- Archae-aus archaeologists and/or anthropologists Stuart Rapley and Myles Mitchell.
- BTAC Representatives Meachum Kelly, Joseph Kelly and Clayton Hayes.

Each of the 14 Heritage Investigation Areas (see Map 4) were inspected via parallel transects no greater than 35 m apart, with team members visually inspecting areas for archaeological material.

Handheld GPS units (Garmin GPSMAP 64sx) were used to mark isolated artefacts and the boundaries of identified sites. The newly identified Aboriginal archaeological site was noted only.

Previously recorded sites were investigated to compare changes since their last recording.

The methods and definitions for identifying cultural material are listed in Appendix 2.

The modelling was completed by comparing the results of past work and the recently identified places. A single point was created for each site. This was then plotted in GIS with an underlay of the surface geology. Within the model area (see Map 5) the total area of each geological unit and its percentage of the area was calculated. The site locations were then compared against the surface geology area percentages to predict the likelihood of occurrence of Aboriginal archaeological sites within specific surface geology types. There are inherent assumptions within this type of modelling, however, the results are transparent and replicable. The major limitation is that this type of process fails to identify red flag sites that don't fit the pattern. Therefore, field checking and sampling in all areas, including areas with a low prediction, is still recommended.

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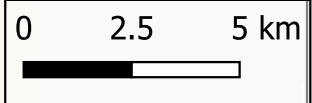
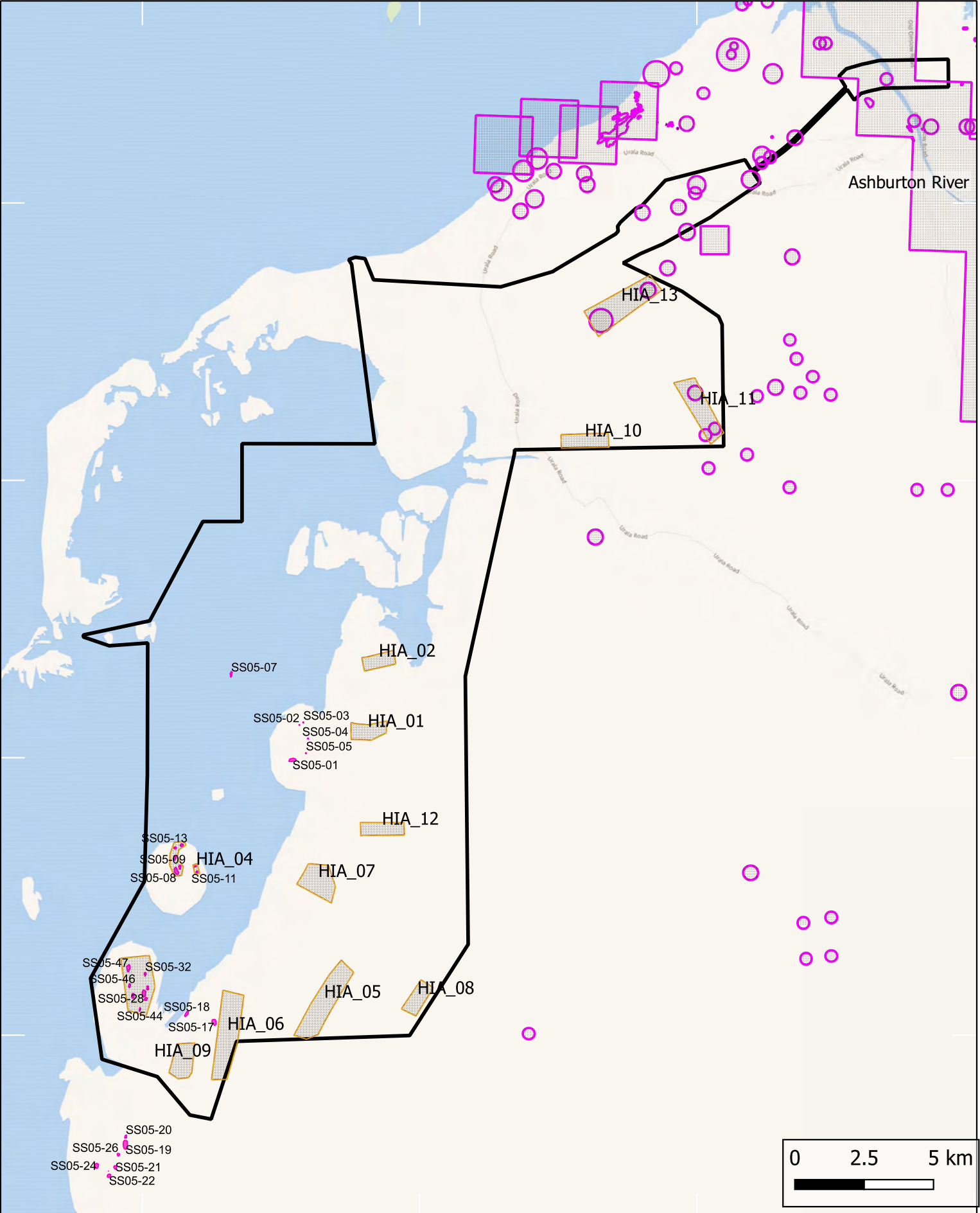
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


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**Legend**

-  Project Area
-  DPLH Register
-  2005 Straits Salt Sites
-  Reconnaissance Areas



**Map 4. Ashburton Salt Project Area and 2019 Reconnaissance Areas**

Drafted by Fiona Hook, 10 May 2020. GDA94, Zone 50. Satellite imagery courtesy of Google and WikiMaps.

## SECTION FOUR - RESULTS

### HERITAGE INVESTIGATION AREAS

During the 2019 Reconnaissance 14 areas were inspected (see Map 5). Thirty two previously recorded sites were revisited and 19 newly identified sites that require further recording were identified (see Table 8).

Table 8. Heritage Investigation Area – summary of results

Heritage Investigation Area	Environmental Context	Archaeological Materials Observed During 2019 Fieldwork	Previously Recorded Sites	New Sites
HIA 001	Claypans and dunes	-	-	-
HIA 002	Claypans and eroding dunes	Stone artefacts (dolerite river pebbles, chert – flakes and cores)	-	TBR10
HIA 003	Claypans, vegetated dunes and limestone outcrops	Stone artefacts (including a tula adze) and shell Melo spp., Tegillarca granosa and Terebralia spp.	SS05-08, SS05-09, SS05-13, SS05-14, SS05-15	-
HIA 004	Vegetated dunes and claypans	Stone artefacts	SS05-11	-
HIA 005	Claypan	Stone artefacts (basalt, dolerite river pebbles – flakes, fragments, cores manuports)	-	TBR09
HIA 006	Claypan and Sand dunes	Stone artefacts (basalt, chert, quartz, silcrete -flakes, single platform cores, all small in size)	-	TBR08, TBR19
HIA 007	Claypan, red sand dunes	Chert reduction area (river rounded chert cores and flakes), possible weathered basal sandstone grindstone, mullers, baler shell	-	TBR05, TBR06
HIA 008	Claypan	Stone artefacts (Quartz, basalt, chert, silcrete, dolerite, banded iron formation, quartzite – flakes and single platform cores)	-	TBR13, TBR12, TBR11
HIA 009	Vegetated dunes	-	-	-
HIA 010	Claypan and eroding dunes	Stone Artefacts (silcrete, basalt, quartz, dolerite – flakes, cores), oyster shell	-	TBR18, TBR17
HIA 011	Red sand dunes and claypan	Baler shell and stone artefacts (dolerite, quartz, basalt and chert – manuports, flakes, cores)	DPLH-809, DPLH-15309, DPLH-15310	TBR03, TBR04
HIA 012	6-8 small claypans, sand dunes	Stone Artefacts (quartz, basalt, dolerite, silcrete, quartzite, chert - flakes, cores and manuports)	-	TBR16, TBR15, TBR14
HIA 013	Claypans and vegetated dunes. Cattle causing heavy ground disturbance	Stone artefacts (including large millstone and muller, quartz flakes, chert flakes, dolerite manuports, quartzite grinding fragment, dolerite muller fragment, basalt flakes, quartzite and chert single platform cores). Shell material (lots of broken Terebralia spp.	DPLH-814, DPLH-808	-
HIA 014	Claypans (some vegetated), vegetated and eroding sand dunes	Shell material (including Cerithiopsis, Tegillarca, baler, tellin) and stone artefacts (including quartz, - flakes, a tula adze, cores and manuports)	SS05-27, SS05-28, SS05-30, SS05-32, SS05-44, SS05-45, SS05-46, SS05-47	TBR07

Each previously recorded site and newly identified site is discussed in more detail in the following section.

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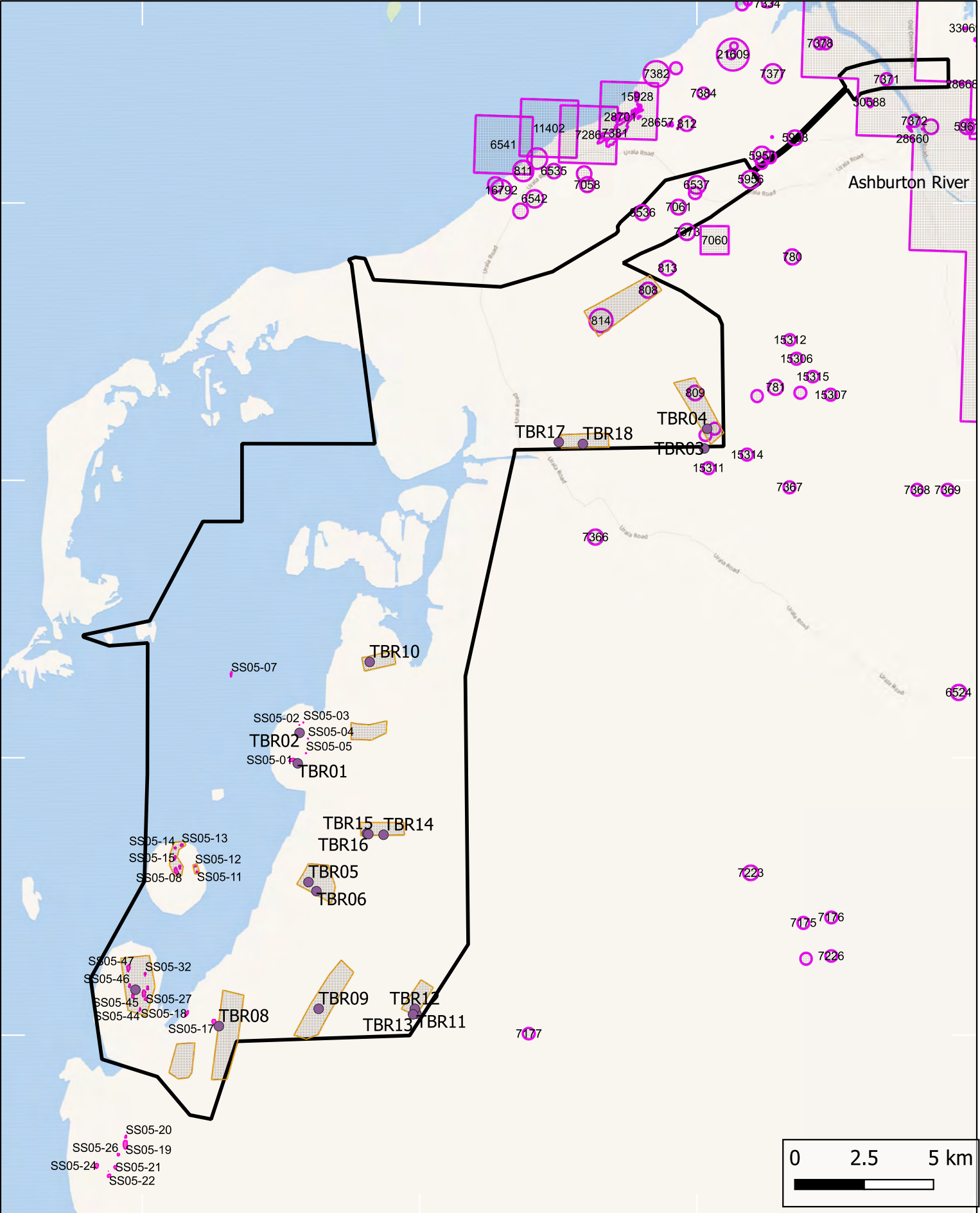
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### Legend

- Project Area
- DPLH Register
- 2005 Straits Salt Sites
- 2019 Reconnaissance Areas
- 2019 Reconnaissance Sites



**Map 5. Ashburton Salt Project Area and 2019 Reconnaissance Results**

Drafted by Fiona Hook, 10 May 2020. GDA94, Zone 50. Satellite imagery courtesy of Google and WikiMaps.

## REVISITED ABORIGINAL ARCHAEOLOGICAL SITES

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Of the 34 previously recorded sites in the Project Area 32 were revisited during the reconnaissance.

### SS05-01

SS05-01 is a shell and stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*This large stone artefact and shell scatter measures 110 m (north/south) by 260 m (east/west) and covers an area of approximately 28,000 m<sup>2</sup>. Artefacts occur within three discreet areas: in a claypan in the western half of the site; at the base of an eroding red sand dune in the centre of the site; and in a series of washes in the eastern section. The shell scattered throughout the site consisted of *Anadara*<sup>1</sup> spp. and *Melo* spp. (Baler shell). The highest densities of stone artefacts occur in and around the edge of the water filled claypan.*

*Sample square one (2 m x 2 m) placed in the eastern section contained two stone artefacts. The stone pieces consisted of a flake made from basalt and a muller grinding fragment manufactured from quartzite. Sample square two in the centre of the site consisted of 25 stone artefacts. They consisted of complete flakes (n=7), flake fragments (n=5), debris (n=5), manuports (n=4), multi platform cores (n=3), and a grinding fragment. A diverse range of lithologies were recorded comprising mostly of chert (n=12) with the remainder consisting of basalt (n=5), quartzite (n=5), quartz (n=1), mudstone (n=1) and sandstone (n=1). Sample square three (1 m x 1 m) on the southern edge of the water filled claypan contained five stone artefacts. These consisted of flakes (n=3) and grinding fragments (n=2) and were made from chert (n=3), banded iron formation (n=1) and quartz (n=1).*

*Four stone artefacts with evidence of grinding were recorded. The total stone artefact population is difficult to judge as the claypan contained water at the time of the survey but it is estimated to contain a minimum of 100 pieces.*

*The shell scatter consists of two concentrations, one within the wash area to the east (sample square one) and the other in the centre of the site (sample square two). Shell species consisted of *Anadara*<sup>4</sup> spp. and *Melo* spp. (Baler shell) and they did not display any evidence of modification or burning. A minimum number (MNI) of three *Anadara*<sup>1</sup> spp. and one *Melo* spp was recorded.*

In 2019, in the western claypan there is a concentration of stone artefacts in the southern section as per the 2004 original recording. In 2019 artefacts are exposed across the entire claypan. The reason these artefacts are now exposed across the entire claypan is likely due to the current lack of any water in the claypan. The newly exposed artefacts are a slightly lower density than the originally recorded southern concentration. The stone artefacts are all made from quartzite and include flakes, flake fragments, single platform cores, multi-platform cores and debris. A single platform core made from a quartzite river pebble was noted and one grinding fragment was also observed. A single baler shell (*Melo* spp.) fragment was also found in the claypan.

In the central dune, three flakes were found on the western side of the dune, two of which were made from chalcedony and one from basalt. On the eastern side of the same dune a number of blood cockle (*Tegillarca granosa*) shells were observed to be eroding out of the dune. They are accompanied by a number of basalt and dolerite artefacts including flakes, a possible hammerstone, a sandstone grinding fragment and various lithic debris. One fragment of baler shell (*Melo* spp.) was also noted.

In the eastern dune, blood cockle (*Tegillarca granosa*) shells were observed eroding from this dune's western edge, as well as a few stone artefacts across the dune frontage, which included a large banded iron formation flake, a sandstone flake and basalt debris.

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<sup>4</sup> Reclassified as *Tegillarca granosa*



Plate 1. SS05-01 – View west of west claypan (M Kelly in background)



Plate 2. SS05-01 – View north of eastern dune



Plate 3. SS05-01 – View north of central dune



Plate 4. SS05-01 – Blood Cockle (*Tegillarca granosa*) eroding out of dune



Plate 5. SS05-01 – Blood Cockle (*Tegillarca granosa*) shells and Baler shell (*Melo* spp.) at edge of central dune



Plate 6. SS05-01 – Retouched dolerite flake



Plate 7. SS05-01 –Baler (Melo spp.)



Plate 8. SS05-01 – Muller fragment

### SS05-02

SS05-02 is a shell and stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*The site is a small stone artefact scatter with dimensions of 10 m (north/south) by 5 m (east/west) and an area of approximately 50 m<sup>2</sup>. Artefacts are scattered across the claypan especially near the western claypan wall. The entire artefact assemblage was recorded and consists of complete flakes (n=3), flake fragments (n=3), a core fragment and two fragments of Baler shell (Melo spp.). The artefacts are made from chert (n=3), quartzite (n=2), silcrete (n=1) and basalt (n=1). Signs of retouch were noted on the left lateral margin of a silcrete flake fragment. No stone artefacts displayed signs of grinding.*

Five of the original seven stone artefacts were visible in 2019. In addition, two baler (*Melo spp.*) shell fragments that weren't visible in 2005 are now present. Four of the flaked stone artefacts are now embedded in silty clay sediment. A baler shell and a flaked stone artefact were noted on the west side of the claypan, too far away to be part of original site recording and are newly observed material eroding out of the dune. The dune at the northern edge of the claypan is heavily eroded.



Plate 9. SS05-02 – View along dune on northern boundary, looking west



Plate 10. SS05-02 – Site view with Meachum Kelly, looking north



Plate 11. SS05-02 – Baler (*Melo* spp.)

Plate 12. SS05-02 – Quartzite flake

### SS05-03

SS05-03 is a stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*The site is a small stone artefact scatter that measures 35 m (north/south) by 25 m (east/west) and covers an area of approximately 750 m<sup>2</sup>. Artefacts are within three interconnecting claypans and are in highest densities within the largest northern claypan. Artefacts within the sample square (2 m by 2 m) totalled 10 pieces consisting of complete flakes (n=5), flake fragments (n=4) and a piece of debris. Artefact lithology was mainly chert (n=8) with basalt (n=1) and quartz (n=1) also present. A large proportion of the artefact assemblage consists of microdebitage. Total artefact population for the site is estimated at 40 to 50 pieces.*

In 2019, only two flakes (one basalt, one chert) were observed in the northern claypan, where there were ten artefacts in the original recording. An additional single chert fragment was observed in the southern claypan.



Plate 13. SS05-03 – View of north claypan with Meachum Kelly, looking south



Plate 14. SS05-03 – Chert flake in northern claypan



Plate 15. SS05-03 – Chert flake fragment found in south claypan

#### SS05-04

SS05-04 is a stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond *et al.*, 2005). It was described as follows.

*The site is a small artefact scatter with dimensions of 30 m (north/south) by 30 m (east/west) and covers an area of approximately 900 m<sup>2</sup>. Artefacts are concentrated on a sandy area devoid of vegetation at the base of an eroding red sand dune. Artefact types recorded within a 5 m by 5 m sample square consist of complete flakes (n=3) and debris (n=2). The artefacts were manufactured from basalt (n=3), quartzite (n=1) and chert (n=1). No evidence of grinding or retouch was noted.*

At SS05-04, only two of the original five artefacts are now visible. There is heavy dune erosion around the claypan and the site is exposed to another claypan to the north-west, which may have caused the other three artefacts to be buried.



Plate 16. SS05-04 – View north-west towards claypan from site



Plate 17. SS05-04 – View of site looking south-east with Meachum Kelly



Plate 18. SS05-04 – Single platform core made from banded iron formation



Plate 19. SS05-04 – Basalt flake fragment

#### SS05-05

SS05-05 is a stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond *et al.*, 2005). It was described as follows.

*The site is a small artefact scatter with dimensions of 30 m (north/south) by 30 m (east/west). The assemblage comprises of stone artefacts in several dry erosion wash areas separated by low dunes. The central sample square (4m<sup>2</sup>) had a total of eight stone artefacts comprising of five complete flakes, a multi platform core, a piece of debris and a retouched piece. The lithologies used for the manufacture of the artefacts consisted of chert (n=3), silcrete (n=2), chalcedony (n=2), and quartzite (n=1). The total artefact population for the site is approximately 15 to 20 pieces.*

In 2019, only two artefacts are now visible, a chert multi-platform core and a chert flake. The remainder of the original artefacts have been buried beneath the silty clay layer of sediment. The two observed artefacts that are still visible are embedded in the surface sediment.



Plate 20. SS05-05 – View east of central dune



Plate 21. SS05-05 – View of claypan and dune in corner of site, looking east



Plate 22. SS05-05 – Single platform core made from chert



Plate 23. SS05-05 – Chert flake

#### SS05-06

SS05-06 is a stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond *et al.*, 2005). It was described as follows.

*The site is a very small artefact scatter with maximum dimensions of 3 m (north/south) x 3 m (east/west). The entire artefact assemblage of nine artefacts were recorded and consisted of flake fragments (n=4), complete flakes (n=3), a single platform core and a multi-platform core. The assemblage was knapped mainly from chert (n=5) with basalt, quartz and dolerite also present. It is probable that artefacts are submerged within the claypan.*

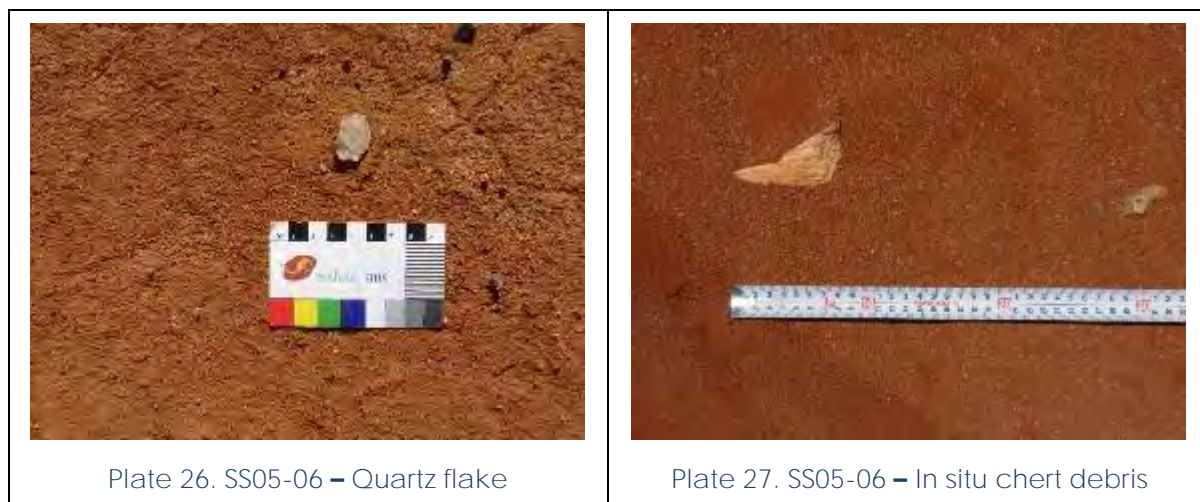
In 2019 the observed assemblage at SS05-06 is the same as described above. The artefacts are visible in the northern section of the claypan only.



Plate 24. SS05-06 – View of site looking west with Meachum Kelly and Clayton Hayes



Plate 25. SS05-06 – View of eroding dune near artefacts, looking north-east



### SS05-07

SS05-07 is a shell and stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*The site is a large shell and stone artefact scatter with dimensions of 180 m (north/south) by 65 m (east/west) and covers an area of approximately 11,700 m<sup>2</sup>. Shells and artefacts occur in four distinct concentrations along the dune with no stone artefacts evident in between the concentrations.*

*The total minimum number of individual (MNI) shell species recorded within four sample squares was 69. The most numerous shell species was *Anadara*<sup>5</sup> spp. with a MNI of 52 individuals, this represents 75% of the shell species recorded across the site. Other shell species recorded consist of Blood Cockle (*Terebralia* spp.) spp. (MNI=13, 19%), *Cerithiidae* spp. (MNI=3, 4%) and Baler Shell (*Melo* spp.) (MNI=1, 2%). The distribution of *Anadara*<sup>1</sup> spp. was fairly even across the four sample squares (see Error! Reference source not found.). Blood Cockle (*Terebralia* spp.) spp. were recorded in sample squares one, two and four while Baler shell (*Melo* spp.) and *Cerithiidae* spp. were only recorded in the southern section of the site within sample square three.*

*Fragments of Baler shell (*Melo* spp.), *Nerita* spp. and *Syrinx aruanus* were noted outside of the sample squares.*

*Stone artefacts were recorded in sample squares three and four. Sample square three contained one stone artefact consisting of a chert flake fragment. Sample square four contained a total of four stone artefacts all of which were complete flakes. Two of the pieces were manufactured from chert and two pieces were made from chalcedony. Large pieces of limestone conglomerate are found throughout the site and may have been used for the opening of shells. Total stone artefact population for the entire site is estimated at 80 – 100.*

In 2019, a red sand dune runs through the middle of the site on a north-south axis. There are numerous erosion events along top of the dune. Stone artefacts were observed on site, but in lower numbers than the 2004 recording. The concentration of Snail Creeper (*Cerithiidae* spp.) and Baler (*Melo* spp.) shell that was originally recorded in the southern section of the site was no longer visible. The site, however, is heavily vegetated which prevented clear visibility and made it difficult to confirm the presence of these features. In 2019 a number of concentrations eroding out of the dune top and sites with at least 10 erosion areas including Blood Cockle (*Tegillarca granosa*), Dog Whelk (*Terebralia* spp.) spp. and some Baler (*Melo* spp.) shell fragments.

<sup>5</sup> Reclassified as *Tegillarca granosa*



Plate 28. SS05-07 – Site view looking south



Plate 29. SS05-07 – Blood Cockle (*Tegillarca granosa*) and Dog Whelk (*Terebralia* spp.) scatter



Plate 30. SS05-07 – Blood Cockle (*Tegillarca granosa*) and Dog Whelk (*Terebralia* spp.) scatter



Plate 31. SS05-07 – Blood Cockle (*Tegillarca granosa*) and Dog Whelk (*Terebralia* spp.) eroding out of dune top



Plate 32. SS05-07 – Dog Whelk (*Terebralia* spp.)



Plate 33. SS05-07 – Baler (*Melo* spp.)

Plate 34. SS05-07 – Baler (*Melo* spp.)Plate 35. SS05-07 – Baler (*Melo* spp.)

### SS05-08

SS05-08 is a shell and stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*The site is a large stone artefact scatter that measures 250 m (north/south) by 160 m (east/south) and covers an area of approximately 40,000 m<sup>2</sup>. The artefact scatter has four distinct concentrations around the edge of a claypan. Artefact densities are high (up to 5.5 artefacts/m<sup>2</sup>) on the western and north-western margins and fall to approximately 0.25 artefacts/m<sup>2</sup> in the centre and eastern sections of the claypan. Stone pieces are absent in the southern third of the site.*

*A range of artefact types were recorded in all four sample squares. On the north-western margin of the claypan, sample square one (2 m by 2 m) contained 16 artefacts. Artefact types consisted of complete flakes (n=9), flake fragments (n=3), debris (n=3) and a broken flake. A majority of the artefacts were manufactured from chert (n=13) with the remainder made from banded iron formation (n=1), basalt (n=1) and quartzite (n=1).*

Observations at SS05-08 were similar to the original recording, with stone artefacts and shell observed at the western and north-western edge of the claypan. In the eastern section of the claypan only a few bits of shell were visible and no stone artefacts were found in the southern section.



Plate 36. SS05-08 – Site view looking north, with Meachum Kelly

Plate 37. SS05-08 – Baler (*Melo* spp.)



Plate 38. SS05-08 – Basalt proximal flake fragment



Plate 39. SS05-08 – Baler (*Melo* spp.)

#### SS05-09

SS05-09 is a shell and stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*The site is a stone artefact scatter with dimensions of 60 m (north/south) by 60 m (east/west) and covers an area of approximately 3,600 m<sup>2</sup>. Stone artefacts are evident throughout the claypan with concentrations on the western and northern edge. Shell fragments of Baler (*Melo* spp.), Blood Cockle (*Terebralia* spp.) spp. and *Syrinx aruanus* are scattered throughout the site.*

*A sample square (2 m by 2 m) was placed within the main artefact concentration on the north-western edge of the claypan. A total of 18 artefacts were recorded within the sample square and apart from a single piece of basalt, all artefacts were manufactured from chert. Artefact types comprised of complete flakes (n=8), flake fragments (n=6) and pieces of debris (n=4). Two of the chert flakes contained evidence of retouch or use-ware on the distal margins. The majority of stone artefacts are small (<3cm) and a minimum total stone artefact population is estimated at 200–250.*

Observations of SS05-09 in 2019 did not really match the original recording. Three Baler (*Melo* spp.) were observed at the south western edge and some shell was eroding out from the northern edge of the dune, including Dog Whelk (*Terebralia* spp.). There is a concentration of stone artefacts on the western edge, which matches the original recording but with less shell. An estimated maximum number of 50-75 artefacts were observed which is significantly less than the estimated 200-250 artefacts in the original recording. This discrepancy likely reflects the dynamic nature of these landscapes with shifting sand dunes and claypan surfaces being impacted by heavy rainfall events.





Plate 40. SS05-09 – Site view looking north, with Clayton Hayes in background



Plate 41. SS05-09 – View along eroding west dune, looking north



Plate 42. SS05-09 – Basalt and chert flakes on western edge of claypan



Plate 43. SS05-09 – Cerithiopsis fragment

#### SS05-10

SS05-05 is a stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond *et al.*, 2005). It was described as follows.

*The site is a medium sized artefact scatter with dimensions of 65 m (north/south) by 50 m (east/west) and an area of approximately 3,250 m<sup>2</sup>. The claypan contains stone artefacts around the perimeter with a concentration on its northern edge.*

*A sample square (2 m x 2 m) was placed on the northern bank of the claypan. It contained eight artefacts of which four were complete flakes and four flake fragments. All of the stone pieces were manufactured from chert. The majority of stone artefacts are small (<3cm) and a total artefact population of 100 pieces is estimated for the entire site.*

Observations made at SS05-10 in 2019 did not match the original recording. This site was almost empty of artefacts except for two quartz artefacts near the centre of the claypan and one chert flake on the southern edge. There has been some heavy erosion within the dune in the north section of the site, around which the original recording noted artefacts. This erosion probably accounts for the difference in what was observed in 2005 to 2019.



Plate 44. SS05-10 – Site view with Meachum Kelly and Clayton Hayes in background



Plate 45. SS05-10 – Quartz flake



Plate 46. SS05-10 – Quartz single platform core

#### SS05-11

SS05-11 is a shell and stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*The site is a stone artefact and shell scatter with dimensions of 60 m (north/south) by 85 m (east/west) and covers an area of approximately 5,100 m<sup>2</sup>. There are concentrations of stone artefacts on the north and west sides of the claypan with a low artefact density throughout the rest of the claypan. A minimum total artefact population of 100 pieces is estimated for the entire site.*

*A sample square (2 m x 2 m) within the artefact concentration on the west side of the claypan contained a total of fourteen artefacts. Artefact types consisted mainly of complete flakes (n=7) together with flake fragments (n=3), debris (n=3), a broken flake and a core fragment. Artefacts were manufactured entirely from chert (n=13) except for a single piece made from quartz. Approximately five Baler (*Melo spp.*) s (*Melo spp.*) were noted outside of the sample square.*

At SS05-11, approximately 25 stone artefacts were observed in 2019, which is significantly less than the estimated 100 artefacts noted in the original recording. None of the baler shell from the original recording was observed. There is heavy erosion along the surrounding dunes, especially on the east side, and vegetation is also extending down from the dunes. It is considered likely that the vegetation and erosion are obscuring some of the artefacts and shell material.



Plate 47. SS05-11 – Dune edge on the eastern side of the site, view north



Plate 48. SS05-11 – Site view, looking north



Plate 49. SS05-11 – Chalcedony flake



Plate 50. SS05-11 – Basalt flake

#### SS05-12

SS05-12 is a shell and stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*The site is a medium stone artefact scatter with dimensions of 60 m (north/south) by 80 m (east/west) and covers an area of approximately 4,800 m<sup>2</sup>. Stone artefacts are concentrated in two distinct areas, on the northern claypan margin and on the southern claypan margin. Artefact densities range from 6 artefacts/m<sup>2</sup> within these concentrations to an estimated density of less than 0.2 artefacts/m<sup>2</sup> across the rest of the site with a minimum total artefact population estimated at 50 pieces. Several Baler shell (*Melo* spp.) fragments were observed throughout the site.*

*A sample square (1 m x 1 m) in the southern margin of the claypan contained a total of six artefacts. Artefact types consist of complete flakes (n=5), and a flake fragment. The flakes have been manufactured mainly from chert (n=4) and other lithologies consisting of mudstone (n=1) and silcrete (n=1). Two flakes, one made from chert and the other from mudstone, displayed evidence of retouch on both the left and right margins.*

In 2019, stone artefacts were observed along the northern edge of the site (as per the original recording). A baler fragment was also observed which was not in the original recording. At the southern edge of the site, five Baler (*Melo* spp.) and two *Nerita balteata* shells were observed and a red sand dune is eroding into the claypan.



Plate 51. SS05-12 – Southern dune where baler fragment was found



Plate 52. SS05-12 – Site view, looking north-west



Plate 53. SS05-12 – Baler (*Melo* spp.) and quartzite flake eroding out of northern dune



Plate 54. SS05-12 – Baler (*Melo* spp.)

### SS05-13

SS05-13 is a stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond *et al.*, 2005). It was described as follows.

*The site is a stone artefact scatter with dimensions of 100 m (north/south) by 60 m (east/west) and covers an area of approximately 6,000 m<sup>2</sup>. Artefacts are evident throughout the claypan with concentrations along the southern and western margins. Artefact density ranged from 0.68 artefacts/m<sup>2</sup> within these concentrations to an estimated average of 0.2 artefacts/m<sup>2</sup> across the remainder of the site. The total artefact population is estimated at 120 pieces.*

*A sample square (5 m x 5 m) on the western margin of the claypan contained a total of 17 artefacts. Artefact types consisted of complete flakes (n=7), flake fragments (n=6), debris (n=3) and a single platform core. A diverse range of lithologies were counted within the sample square including chert (n=7), quartzite (n=5), basalt (n=3), ironstone (n=1) and dolerite (n=1). No retouch or utilised pieces were evident but a high number of primary flakes and cores were noted.*

In 2019, approximately 15 artefacts were visible in the centre of the claypan and very few elsewhere. All the surrounding dunes were checked, and no shell was observed. One small piece of baler was found on the south western edge of the claypan. There is an estimated total of 30-40 artefacts visible at the site. It appears that erosion and dynamic landform processes may be obscuring much of the artefact material that was visible in 2005.



Plate 55. SS05-13 – Site view, looking west-south-west



Plate 56. SS05-13 – Baler (Melo spp.)



Plate 57. SS05-13 – Basalt Flake



Plate 58. SS05-13 – Quartzite flake

#### SS05-14

SS05-14 is a stone artefact and shell scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*The site is a medium sized stone artefact and shell scatter with dimensions of 75 m (north/south) by 80 m (east/west) and covers an area of approximately 6,000 m<sup>2</sup>. Artefacts and shells are on the margins of the claypan but are mainly concentrated in the northern section. Stone artefacts are also visible within the water filled areas of the claypan. Artefact densities ranged from high (17 artefacts/m<sup>2</sup>) within the northern concentration to low (approximately 0.2 artefacts/m<sup>2</sup>) elsewhere within the claypan. The minimum total artefact population is estimated at 300 pieces.*

*A sample square (2 m x 2 m) placed on the north-western margin of the claypan and contained a total of 68 artefacts and 25 pieces of *Anadara*<sup>6</sup> spp. shell. Artefact types within the sample square consisted of complete flakes (n=34), flake fragments (n=16), pieces of debris (n=13) and multi, single platform cores (n=3) and broken flakes (n=2). Most of the artefacts were manufactured from chert (n=53) while other raw materials comprised quartzite (n=7), chalcedony (n=4), basalt (n=3) and a single piece of silcrete. No retouch or utilised pieces were recorded.*

<sup>6</sup> Reclassified as *Tegillarca granosa*.

Shell pieces recorded within the sample square consisted entirely of *Anadara*<sup>7</sup> spp. The shell comprised of fragments (n=21), right hinged pieces (n=3), left hinged pieces (n=1) resulting in a MNI of three. Shell species present throughout the site are predominantly *Anadara*<sup>1</sup> spp. (estimated at 90%) with some fragments of *Baler* and *Terebralia* also noted.

In 2019 artefacts were observed along the entire boundary of the claypan with a few more in the centre. The highest concentration was on the northern edge where approximately 100 small artefacts, a tula adze, 30 Blood Cockle (*Tegillarca granosa*) and two *Baler* (*Melo* spp.) were noted. Overall the site appears to be consistent between the two recordings, noting that most of the claypan was underwater during the 2004 recording, and dry in 2019.



Plate 59. SS05-14 – Site view east



Plate 60. SS05-14 – View east of dune at northern edge of site



Plate 61. SS05-14 – View west of shell and stone artefact concentration at north of site



Plate 62. SS05-14 – *Baler* shell (*Melo* spp.) fragments

<sup>7</sup> Reclassified as *Tegillarca granosa*.

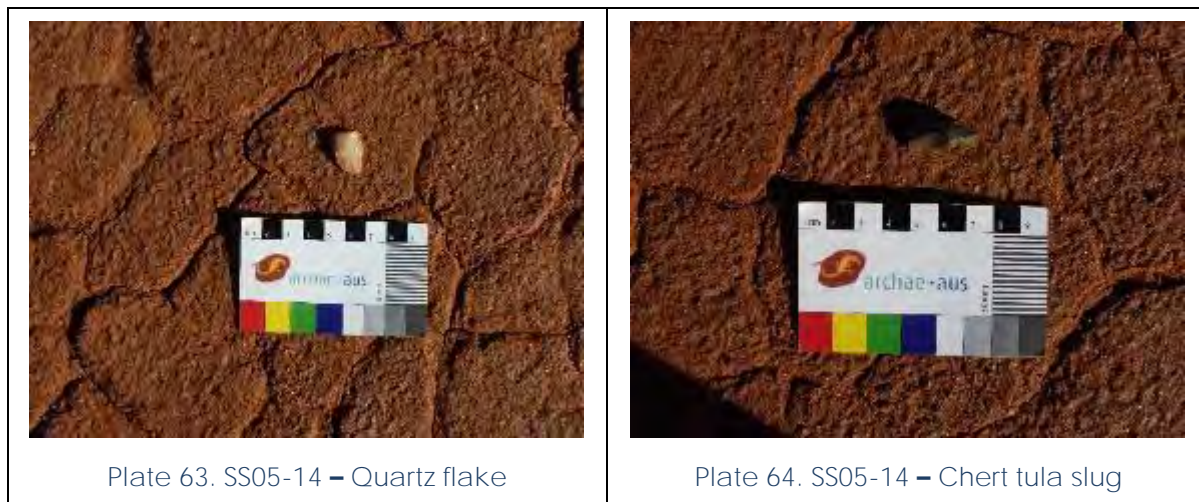


Plate 63. SS05-14 – Quartz flake

Plate 64. SS05-14 – Chert tula slug

### SS05-15

SS05-15 is a stone artefact and shell scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*The site is a large stone artefact and shell scatter that measures 180 m (north/south) by 70 m (east/west) and covers an area of approximately 12,600 m<sup>2</sup>. Artefacts are concentrated on the western side of the larger claypan where there is exposed, weathered limestone eroding out of the dune. Artefacts are also concentrated on the northern margin of the smaller claypan. Two shell scatters consisting of *Tegillarca* spp. are within the dunes on the east side of each claypan.*

*A sample square (2 m x 2 m) was recorded in the northwest of the site and yielded nine artefacts consisting of complete flakes (n=3), flake fragments (n=4), a broken flake and a single platform core. They were made from chert (n=6), banded iron formation (n=2) and dolerite (n=1).*

*A sample square (1 m x 1 m) in the north-western margin of the smaller claypan comprised a total of four artefacts. These consisted of flake fragments (n=3) and a complete flake. The artefacts were made from chert (n=3) and quartzite (n=1). A chert flake fragment displayed evidence of retouch.*

*Two small *Tegillarca* sp scatters were identified on the eastern margins of the larger and smaller claypans.*

Observations in 2019 also describe SS05-15 as containing two claypans, one large and one small. The highest concentration of shell was observed along the eastern edge of the smaller claypan, with some stone artefacts and shell (approximately 10-15) noted along the other edges. In the large claypan, most of the shell and stone artefacts were observed on the western edge, near a limestone outcrop. Another concentration was noted in the north-eastern section in association with three Baler (*Melo* spp.) and one Blood Cockle (*Tegillarca granosa*) eroding out of the edge of the dune. Some light erosion was observed along all edges of the claypan. The two descriptions are broadly consistent with one another which indicates minimal change at this site over time.



Plate 65. SS05-15 – View south with M. Kelly and C. Hayes



Plate 66. SS05-15 – View north of limestone outcrop at western edge of site



Plate 67. SS05-15 – Blood Cockle (*Tegillarca granosa*) on limestone outcrop



Plate 68. SS05-15 – Baler shell (*Melo* spp.) at east edge of large claypan



Plate 69. SS05-15 – Dog Whelk (*Terebralia* spp.) eroding from dune on east edge of small claypan



Plate 70. SS05-15 – Quartzite single platform core



## SS05-17

SS05-17 is a stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*The site is a large stone artefact scatter with dimensions of 115 m (north/south) by 140 m (east/west) and covers an area of approximately 16,100 m<sup>2</sup>. Artefacts were identified throughout the claypan with areas of highest artefact concentration on the east margin. The minimum total artefact population is estimated at 300 stone pieces.*

*A range of artefacts were recorded in two sample squares. Sample square one (5 m x 5 m) on the western margin of the claypan yielded a total of eight artefacts. Artefact types consisted of flakes (n=5), a broken flake, a flake fragment and a multi platform core. The artefacts were made from chert (n=4), dolerite (n=2), chalcedony (n=1) and basalt (n=1). Sample square two (2 m x 2 m) on the east side of the claypan contained seven artefacts comprising of flake fragments (n=3), muller grinding pieces (n=3) and a complete flake. These artefacts were made from dolerite (n=2), quartzite (n=2), silcrete (n=1), chert (n=1) and basalt (n=1).*

The original recording of SS05-17 noted concentrations of cultural material in the western and eastern sections of the site. In the 2019 recording however, only the western concentration could be relocated. A single Baler fragment was noted in the south-west section with sparse artefact coverage elsewhere. The northern section was empty of any artefacts. The difference between the two recordings is likely due to shifting sand dunes and erosional processes.



Plate 71. SS05-17 – View south with M. Kelly



Plate 72. SS05-17 – View north at concentration of cultural material



Plate 73. SS05-17 – Baler shell (*Melo* spp.)



Plate 74. SS05-17 – Quartz flake

## SS05-18

SS05-18 is a stone artefact scatter and grinding area originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond *et al.*, 2005). It was described as follows.

*The site is a large stone artefact scatter with dimensions of 150 m (north/south) by 110 m (east/west) and covers an area of approximately 16,500 m<sup>2</sup>. Stone pieces are eroding out of three to four small to medium red sand dunes and are most visible on the several erosion washes in between and surrounding these dunes. A large number of cores and grinding tools were noted along with a diverse range of artefact lithologies. Artefact densities range from an estimated 0.2/m<sup>2</sup> up to a high density of 7/m<sup>2</sup>. The minimum artefact population is estimated between 1,200 and 1,500. [...] Many stone pieces displaying evidence of grinding were noted. One shell piece, a fragment of Baler shell (*Melo spp.*), was recorded at the site.*

In 2019, no grinding material was noted at all, which differs markedly from the original recording which stated there was a lot of grinding present. There has been a lot of erosion, especially from the raised dunes in the northern section. Vegetation is heavy across the site, which may be obscuring previously noted artefacts. An estimated maximum of 100-150 artefacts were noted. No Baler shell was seen within the site, however, one Baler (*Melo spp.*) fragment, one Blood Cockle (*Tegillarca granosa*) shell and two flaked stone artefacts (one quartz flake and one chert flake), were noted on the western edge of a very large clay flat adjacent to the site. These have possibly eroded down from the site which is raised in comparison to the flat. A number of cores and manuports (river pebbles) were noted.



Plate 75. SS05-18 – View northeast with M. Kelly and C. Hayes



Plate 76. SS05-18 – View south with C. Hayes



Plate 77. SS05-18 – Concentration of stone artefacts



Plate 78. SS05-18 – Dolerite and silcrete cores

## SS05-27

SS05-27 is a stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*Site SS05-27 is a large artefact scatter that measures 100 m (north/south) by 115 m (east/west) and covers an area of approximately 11,500 m<sup>2</sup>. The artefacts are distributed in the periphery of the claypan, with artefact density low in the south and south-eastern sections (approximately 0.2/m<sup>2</sup>) and high density in the north, northwest and western sections.*

*Twenty-five artefacts were recorded in a 5 m by 5 m sample square, placed in the northern edge of the site. The majority of the artefacts recorded in the sample square were complete flakes (n=16), with the remainder including flake fragments (n=5), debris (n=3) and a multi platform core (n=1). The artefacts were manufactured on a range of lithologies dominated by chert (n=15) with fewer numbers of quartzite (n=5), dolerite (n=3), mudstone (n=1) and silcrete (n=1). A flake fragment displayed evidence of retouch, but no formal tools or grinding materials were recorded. The artefacts at the site were noted to primarily small in size (<20 mm) and made from a variety of lithologies. The total artefact population for the site is approximately 300 to 350 pieces.*

Heavy erosion from dunes all around the claypan was observed at SS05-27 in 2019. Some shell (*Cerithiopsis* spp.) and stone artefacts were eroding out of the dune above the location of the original sample square in the north west of the site. There is an estimated minimum of 100 stone artefacts across the entire site, as per the original recoding.



Plate 79. SS05-27 – View south

Plate 80. SS05-27 – *Cerithiopsis* spp. shell

Plate 81. SS05-27 – Stone artefacts

Plate 82. SS05-27 – Baler shell (*Melo* spp.)

## SS05-28

SS05-28 is a stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*Site SS05-28 is a large artefact scatter that measures 245 m (north/south) by 130 m (east/west) and covers an area of approximately 31,850 m<sup>2</sup>. The artefacts are found on the margins of the claypan with the highest artefact density on the western and north-western margins. Lower artefact densities are found in the southern and eastern edges, approximately 0.2 artefacts/m<sup>2</sup>.*

*Seventeen artefacts were recorded in a 2 m by 2 m sample square placed on the western margin of the claypan. The majority of the artefacts recorded in the sample square were complete flakes (n=14) with the remainder including flake fragments (n=2) and debris (n=1). This assemblage was manufactured from lithologies dominated by chert (n=14,) with lower numbers of basalt (n=1), mudstone (n=1) and silcrete (n=1). Generally the artefacts are small in size (<20 mm) and are primarily manufactured from chert. No artefacts displayed evidence of retouch or were any formal tools or grinding material observed at the site. The total population of artefacts for the site is estimated to be around 400 to 450 pieces.*

As per the original recording a concentration of cultural material was observed on the western margin of SS05-28 in 2019. There is also an eroding dune in this location. Five artefacts were noted in the north west section, with some quartz flakes extending out in to the claypan from this concentration.



Plate 83. SS05-28 – View east with C. Hayes



Plate 84. SS05-28 – Dolerite single platform core

## SS05-29

SS05-29 is a stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*Site SS05-29 is a medium artefact scatter that measures 70 m (north/south) by 60 m (east/west) and covers an area of approximately 4,200 m<sup>2</sup>. The artefact density is highest in the north eastern section of the site; approximately 5-6 artefacts/m<sup>2</sup> and of low density elsewhere, estimated at 0.2 artefacts/m<sup>2</sup>.*

*Nine artefacts were recorded in a 2 m by 2 m sample square placed at the northern margin of the site. The majority of the artefacts recorded in the sample square were complete flakes (n=6), with the remainder including a broken flake (n=1), a flake fragment (n=1) and a multi platform core (n=1). These artefacts were manufactured on a diverse range of lithologies including basalt (n=2), chert (n=2), mudstone (n=2), chalcedony (n=1), dolerite (n=1) and quartz (n=1). The artefacts noted to be generally small in size and made from a variety of lithic materials. No formal*

or grinding materials were recorded. The total artefact population for the site is estimated to be 80 to 100 pieces.

In 2019 a small concentration of five artefacts were noted in the north-east section of SS05-29, where there is also a heavily eroding dune. A maximum number of 20 artefacts was observed, which differs markedly from the 80-100 observed in the original recording. This difference in artefact numbers is likely due to sand dune erosion obscuring artefacts from site.



Plate 85. SS05-29 – View west of northeast dune edge



Plate 86. SS05-29 – View east



Plate 87. SS05-29 – Dolerite flake fragment



Plate 88. SS05-29 – Chalcidony single platform core

#### SS05-30

SS05-30 is a stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*Site SS05-30 is a medium artefact scatter that measures 55 m (north/south) by 65 m (east/west) and covers an area of approximately 3,575 m<sup>2</sup>. The site has a low artefact density except for its eastern margin, where artefact concentration is highest.*

*Eighteen artefacts were recorded in a 2 m by 2 m sample square placed in the eastern margin of the site. The majority of the artefacts recorded in the sample square were complete flakes (n=15), with fewer numbers of multi platform cores (n=2) and flake fragments (n=1). These artefacts were manufactured primarily from chert (n=10) with smaller numbers of silcrete (n=3), dolerite (n=2), basalt (n=1), quartz (n=1) and quartzite (n=1). One of the flakes displayed*

*evidence of dorsal retouch but no formal tools or grinding materials were recorded. The total artefact population for the site is estimated at 150 to 180 pieces.*

In 2019, a concentration of twelve artefacts was observed on the eastern margin, which is the same location as the original recording but with lower artefact numbers. The dune in this location is eroding heavily. A higher concentration of artefacts was observed in the centre of the claypan than in the original recording. Cores, flakes, and manuports noted were noted in this location, totalling approximately 20 artefacts in total. A few artefacts and eroding dunes were noted on all other margins of the claypan. An estimated 60-80 artefacts are currently visible across the site. The differences between these recordings demonstrates the dynamic nature of landscapes in this area and how this can change the visibility of surface artefact scatters.



Plate 89. SS05-30 – View south of sand dune at stone artefact concentration, east edge of site



Plate 90. SS05-30 – Artefacts in concentration at base of dune



Plate 91. SS05-30 – Dolerite single platform core in claypan



Plate 92. SS05-30 – Basalt flake

#### SS05-31

SS05-31 is a shell and stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond *et al.*, 2005). It was described as follows.

*Site SS05-31 is a small shell scatter interspersed with a low density stone artefact scatter. The site measures 25 m (north/south) by 10 m (east/west) and covers an area of approximately 250 m<sup>2</sup>. A minimum of five stone artefacts were identified at the site but no formal tools or grinding materials were observed.*

The shell scatter is comprised of only *Anadara*<sup>8</sup> and it is estimated that there are 300 to 350 shells present in the scatter with no shell observed displaying modification or burning. A single sample square was placed in the eastern section of the claypan in an area of high shell density. A total of 37 *Anadara*<sup>1</sup> spp. fragments were recorded, with a MNI of 15. A single chert complete flake was also recorded within this square.

As per the original recording, approximately 300 Blood Cockle (*Tegillarca granosa*) and a chert flake were relocated in in the eastern section of SS05-31 in 2019. There is some sparse erosion occurring to the south of the main concentration.



Plate 93. SS05-31 – Site view with M. Kelly and C. Hayes



Plate 94. SS05-31 – Concentration of Blood Cockle (*Tegillarca granosa*)



Plate 95. SS05-31 – Concentration of Blood Cockle (*Tegillarca granosa*)



Plate 96. SS05-31 – Detail of Blood Cockle (*Tegillarca granosa*)

#### SS05-32

SS05-32 is a shell and stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond *et al.*, 2005). It was described as follows.

*Site SS05-32 is a medium sized artefact and shell scatter that measures 70 m (north/south) by 80 m (east/west) and covers an area of approximately 5,600 m<sup>2</sup>. The site extends over two claypans with the northern claypan smaller and contains a low artefact density (0.2/m<sup>2</sup>) and has only one*

<sup>8</sup> Reclassified as *Tegillarca granosa*.

area of artefact concentration. Conversely, the southern claypan is significantly larger and the artefact density is highest in the western half and low throughout its remainder.

Along the western margin of the southern claypan is a low density *Anadara* shell scatter with an estimated shell density of 0.5/m<sup>2</sup>. None of the observed shell displayed any modification or was burnt. Small numbers of stone artefacts were observed in the middle of both claypans.

Five chert complete flakes were recorded in a 2 m by 2 m sample square placed in the northwest margin of the northern claypan. Seven artefacts were recorded in the 2 m by 2 m sample square placed on the southern margin of the southern claypan. This assemblage consisted of flakes (n=5) and flake fragments (n=2) manufactured on a diverse range of lithologies including basalt (n=3), chert (n=1), mudstone (n=1), quartzite (n=1) and silcrete (n=1). Two of the flakes recorded displayed retouch but no formal tools or grinding materials were observed at the site.

SS05-32 contains a southern and a northern claypan. In 2019, eighteen Blood Cockle (*Tegillarca granosa*) shells were noted in the southern claypan. There is also additional Blood Cockle (*Tegillarca granosa*) material eroding from the western edge of the dune. No artefacts were visible in the centre of the southern claypan. In the northern claypan, five artefacts were noted on the western edge along with an eroding dune. Natural processes of deposition, erosion and re-deposition probably account for the lower numbers of artefacts visible in 2019. The claypans in this area are subject to periodic flooding events which deposits new sediment and often obscures artefacts.



Plate 97. SS05-32 – View southwest with M. Kelly and C. Hayes



Plate 98. SS05-32 – Blood Cockle (*Tegillarca granosa*) at claypan margin



Plate 99. SS05-32 – Blood Cockle (*Tegillarca granosa*) at foot of sand dune

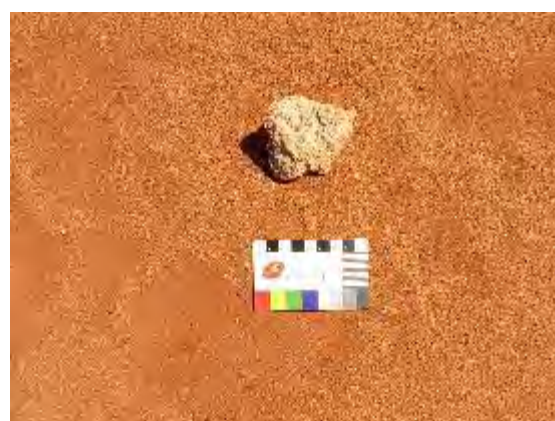


Plate 100. SS05-32 – sandstone manuport



## SS05-44

SS05-44 is a shell and stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*Site SS05-44 is a sparse, medium artefact scatter in the eastern half of a claypan. The site measures 140 m (north/south) by 30 m (east/west) and covers an area of approximately 4,200 m<sup>2</sup>. Apart from a small artefact concentration at the northern edge of the site the density is very low and averages approximately 0.2/m<sup>2</sup>.*

*A single sample square (5 m by 5 m) was placed at the northern end of the site in an area of high artefact concentration. This square yielded 16 artefacts mainly consisting of complete flakes (n=9) with lesser numbers of flake fragments (n=3), debris (n=3) and a multi platform core (n=1). This assemblage was manufactured from a diverse range of lithologies that includes chert (n=7), banded iron formation (n=3), basalt (n=2), chalcedony (n=1), dolerite (n=1), quartz (n=1) and silcrete (n=1).*

*The site assemblage is typical for the area with the artefacts commonly small in size and manufactured from various lithics. Several fragments of baler shell were observed throughout the site though they did not display any evidence of modification or burning. No formal tools or grinding materials were observed at the site.*

In 2019 the northern concentration from the original recording of SS05-44 was still visible, but it is very spread out. There are dunes eroding in the eastern and northern edges. Quite a few artefacts were observed in the centre of the claypan with a total estimated minimum number of 50 artefacts across the site. Two pieces of baler shell noted on the eastern edge.



Plate 101. SS05-44 – Site view south



Plate 102. SS05-44 – View north along face of dune at east side of site

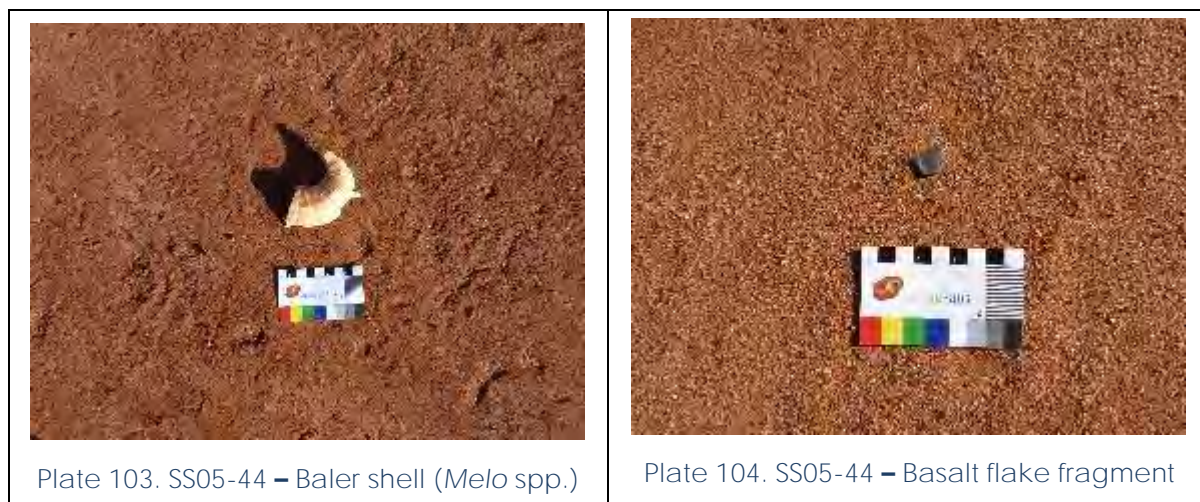
Plate 103. SS05-44 – Baler shell (*Melo* spp.)

Plate 104. SS05-44 – Basalt flake fragment

### SS05-45

SS05-45 is a shell and stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*Site SS05-45 is a large artefact scatter that measures 170 m (north/south) by 80 m (east/west) and covers an area of approximately 13,600 m<sup>2</sup>. Stone artefacts are highly concentrated on the western side of the claypan with a low density in the remainder of the site estimated at 0.2/m<sup>2</sup>. A low number of Baler (*Melo* spp.) s were observed scattered on the claypan margins and a small scatter of *Anadara* sp. shells and shell fragments were found in the southeast corner. None of the observed shell displayed evidence of modification or burning.*

*A single sample square (5 m by 5 m) was placed on the western margin of the claypan. A total of 23 artefacts were recorded in this square which consists primarily of complete flakes (n=13), flake fragments (n=4), debris (n=3), a tula slug (n=1), a complete blade (n=1) and a multi platform core (n=1). This assemblage was manufactured on a diverse range of lithologies dominated by chert (n=11) and with lesser numbers of mudstone (n=4), chalcedony (n=3), silcrete (n=3), banded iron formation (n=1) and quartz (n=1). Four artefacts displayed evidence of utilisation, including the mudstone blade.*

*The total artefact population for the whole site is estimated to be 400 to 450 pieces. Several broken grinding fragments were observed.*

In 2019, the Blood Cockle (*Tegillarca granosa*) mentioned in original recording (south-east corner) could not be relocated. There were only a few Blood Cockle (*Tegillarca granosa*) noted on the eastern edge, with some Tellin (*Tellinella* spp.) shell in the centre of the claypan and some Baler (*Melo* spp.) on the edge of the southern dune. The original recording mentions a high concentration of stone artefacts on the western edge. In this location one Baler (*Melo* spp.) fragment and a tula adze were located within a concentration of other artefacts.



Plate 105. SS05-45 – View north with M. Kelly and C. Hayes



Plate 106. SS05-45 – Baler shell (*Melo* spp.) on dune overlooking claypan



Plate 107. SS05-45 – artefact concentration along western dune edge



Plate 108. SS05-45 – chert tula slug

#### SS05-46

SS05-46 is a shell and stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*Site SS05-46 is a medium sized, low to moderate density artefact scatter that measures 135 m (north/south) by 50 m (east/west) and covers an area of approximately 6,750 m<sup>2</sup>. The majority of the artefacts (approximately 80%) are found in the northern portion of the claypan. This area has a high artefact density and a few *Anadara* spp. shell fragments were also found in this section.*

*The site also extends onto a small blow out north of the claypan. This area contains 10 *Anadara* sp. shells, two *Baler* shell fragments and 10 stone artefacts.*

*A single sample square (5 m by 5 m) was placed in the northeast corner of the site, in an area of high artefact density. A total of 27 stone artefacts were recorded in the square consisting of complete flakes (n=15), flake fragments (n=5), debris (n=5) and multi platform cores (n=2). This assemblage was manufactured on a diverse range of lithologies dominated by chert (n=19) with lesser numbers of silcrete (n=4), basalt (n=1), chalcedony (n=1), mudstone (n=1) and quartz (n=1). The total population of artefacts for the site is estimated at 350 to 400 pieces. A complete chert flake and a chert flake fragment displayed evidence of retouch. The sites artefacts are mainly small in size and made from a variety of lithologies and there is a distinct lack of cores and large artefacts at the site.*

As per original recording the majority of the artefacts were found in the north-east corner of SS05-46, where 21 artefacts were counted, along with two Baler (Melo spp.). There is an estimated minimum of 35 stone artefacts across the site. They are sparsely distributed outside of the concentration. A significantly lower number of artefacts were visible in 2019. This is likely due to natural processes of sedimentary accumulation in claypans and erosion of sand dunes.



Plate 109. SS05-46 – View south with M. Kelly and C. Hayes



Plate 110. SS05-46 – view south of artefact concentration in northeast of site



Plate 111. SS05-46 – concentration of stone artefacts in northeast of site



Plate 112. SS05-46 – Baler shell (Melo spp.)

#### SS05-47

SS05-47 is a shell and stone artefact scatter originally recorded by BTAC/Archae-aus during the 2004 heritage survey for the Straits Salt Project (Hammond et al., 2005). It was described as follows.

*Site SS05-47 is a large artefact scatter spread across three separate claypans. The site measures 250 m (north/south) by 130 m (east/west) and covers an area of approximately 32,500 m<sup>2</sup>.*

*Claypan one is the northern most pan which contains a very sparse shell scatter and stone artefacts. The shells are predominantly Anadara sp. with very low numbers of Baler (Melo spp.). The southern portion of the claypan has a high number of artefacts with the remaining area containing a low to moderate density. The total stone artefact population for this claypan is estimated at 60 to 80 pieces.*

Claypan two is immediately southwest of claypan one and is approximately the same size. It contains a low density of artefacts with very low numbers present in its northern half. The total stone artefact population for this claypan is estimated at 30 to 50 pieces.

Claypan three is the largest and southern most pan and its artefacts are restricted to the western half. A single sample square (2 m by 2 m) was placed in the north/west edge of the pan and yielded 20 artefacts. These consisted primarily of complete flakes (n=14) with lesser numbers of single platform cores (n=2), debris (n=1), a flake fragment (n=1), a multi platform core (n=1) and a muller fragment (n=1). This assemblage was manufactured on a moderate selection of lithologies that include chert (n=15), dolerite (n=3), basalt (n=1) and quartzite (n=1). Two complete chert flakes display evidence of retouch. The total stone artefact population for this area is estimated to be around 250 to 300 pieces.

The total artefact population for the whole site is estimated to be around 450 to 500 pieces.

As described in 2005, SS05-47 contains three claypans. In the first claypan, there is a high level of erosion on the surrounding dunes, with approximately 40 Blood Cockle (*Tegillarca granosa*) shell and three Baler (Melo spp.) shell fragments located across the southern half of the claypan. Numerous stone artefacts are mixed in with the shell. In the second claypan very sparsely distributed artefacts were observed, along with an embedded Baler shell in the southern half. Some embedded Blood Cockle (*Tegillarca granosa*) shell was observed in the Northern half. Approximately ten stone artefacts were seen across the claypan in total. Erosion was observed on all edges of the claypan.

In the third claypan, no artefacts were observed on the edges but a number were seen in the centre. Baler (Melo spp.) could be seen in centre of the site and on its northern edge. Some light erosion was observed in the dunes around the edge of the claypan.

The observations in 2019 were broadly similar to the original recording, although it appears some of the artefacts have moved around, within the site as a result of natural processes.



Plate 113. SS05-47 – View north with M. Kelly and C. Hayes



Plate 114. SS05-47 – Dolerite flake



Plate 115. SS05-47 – Baler shell (*Melo* spp.) fragment embedded in claypan



Plate 116. SS05-47 – Sandstone grindstone fragment



Plate 117. SS05-47 - Dolerite muller fragment



Plate 118. SS05-47 – *Tegillarca granosa* valve and stone artefact

#### *DPLH Registered Site 808 (Sapphire 1)*

This registered site was recorded by Strawbridge (1992) as a large artefact and shell scatter with a historical camp from the 1920s. During the reconnaissance site 808 was revisited and is a large artefact scatter on a low rise, covered in spinifex and grasses. The grasses are being eaten by cattle and the surface is heavily disturbed as a result. A partially buried large millstone (50 cm long) and a muller were found in the centre of the site. One side of the millstone is very concave, and it has been ground on both sides. The muller was found very close to the millstone. It is a broken dolerite river pebble, possibly broken to make it hand sized. The muller had been ground on both sides. Not many other artefacts were found, but the site has been severely disturbed by cattle. The grass and spinifex may be obscuring the visibility of artefacts.



Plate 119. DPLH Site 808 – Site view, looking north-east



Plate 120. DPLH Site 808 – Meachum Kelly holding millstone



Plate 121. DPLH Site 808 – Basalt flake in centre of site



Plate 122. DPLH Site 808 – Muller fragment

#### *DPLH OHP 809 (Sapphire 2)*

This site was recorded by Strawbridge (1994) as an artefact and shell scatter with ground artefacts and Baler (*Melo* spp.) s. During the reconnaissance site 809 was not able to be located. It is a very large claypan and no artefacts or cultural materials were observed. However, owing to the very large circular polygon in the AHIS further investigation in this area is recommended.

#### *DPLH Registered Site 814 (Urala 94 E)*

This site was recorded by Strawbridge (1994) as an artefact scatter with ground artefacts. During the reconnaissance site 814 was revisited and it is at the southern end of a large claypan that is sectioned off from the rest of the claypan by a very small rise/dune. Numerous broken dogwhelk (*Terebralia* spp.) shells were noted. The shell material is eroding out of a small dune at the southern end. The claypan is surrounded by dunes, with no erosion evident elsewhere. The broken dogwhelk (*Terebralia* spp.) fragments were observed across most of the site. Stone artefacts observed across the site include five quartz flakes, one chert flake, two dolerite manuports, a weathered quartzite grinding fragment, a chert single platform core, one basalt flake fragment, a broken dolerite muller and quartzite single platform core.



Plate 123. DPLH Site 814 – Site view



Plate 124. DPLH Site 814 – Muller fragment

Plate 125. DPLH Site 814 – Blood Cockle  
(Terebralia spp.) shell fragmentPlate 126. DPLH Site 814 – Quartzite  
grindstone fragment*DPLH OHP 15309 (Wyloo Dam 04)*

This site was recorded in 1996 during the Tourmaline Seismic Survey for Carnarvon Petroleum (DPLH Site File) as a small artefact scatter. During the reconnaissance 15309 was revisited and is in a medium sized claypan with a low red sand dune along the northern, eastern and southern boundaries. A station track cuts through on a north-south axis along the western edge. The western boundary has a red sand dune along a portion of it. Stone artefacts were observed across the entire site with a higher concentration in the eastern half. Most artefacts are embedded in clay. No erosion appeared to be occurring due to the dunes being vegetated. It is estimated that between 30-50 artefacts were visible, including flakes, single platform cores, multi-platform cores and some retouch was noted in the assemblage. Lithology included quartz, quartzite, chert and dolerite. A few dolerite river pebbles were noted with some broken.

*DPLH Site 15310 (Wyloo Dam 5)*

This site was recorded in 1996 during the Tourmaline Seismic Survey for Carnarvon Petroleum (DPLH Site File) as a very large artefact scatter.

During the reconnaissance 15310 was revisited and it is in a large blow out (approximately 80 m north-south by 30 m east-west) on top of a very large red sand dune that runs along a north-south axis. There are two eroded mounds in western section. An estimated minimum of 300 artefacts were observed, including flakes, single platform cores, multi platform cores and manuports (dolerite rivers cobbles, and a muller. Lithologies include chalcedony, chert, basalt, dolerite, quartzite, mudstone, and banded iron formation. Retouch was noted on a chalcedony flake. Artefacts were noted in higher concentration in



the centre of the site. Artefacts were also observed on the higher ground, south of the blow out. Manuports, flakes, cores (numbering approximately 100) and shell were observed on the high ground. A high number of cores were noted across the site. Two pieces of burnt wood (largest piece 80 mm wide) were noted in the middle of the site at the bottom of the blowout. The site is eroding inwards on all sides.

## NEWLY IDENTIFIED SITES

As part of the reconnaissance 19 newly identified cultural material was noted, but not recorded in detail. These places include artefact scatters and shell scatters of varying sizes and densities.

### TBR01

Stone artefacts were observed in two claypans situated approximately 100-125 m east of SS05-01. Approximately 10-12 stone artefacts could be seen in the first smaller claypan, and 20-30 artefacts in the larger, eastern-most claypan. Artefact types included a dolerite muller fragment, a basalt flake, and a banded iron formation manuport (a river cobble, possibly used to break shells). Lithologies observed included silcrete, dolerite, chert and basalt. Shells noted include *Melo* spp., Blood Cockle (*Terebralia* spp.) spp. and *Tegillarca granosa*. The artefacts are eroding out of the dune.



Plate 127. TBR 1 – View along western edge of claypan

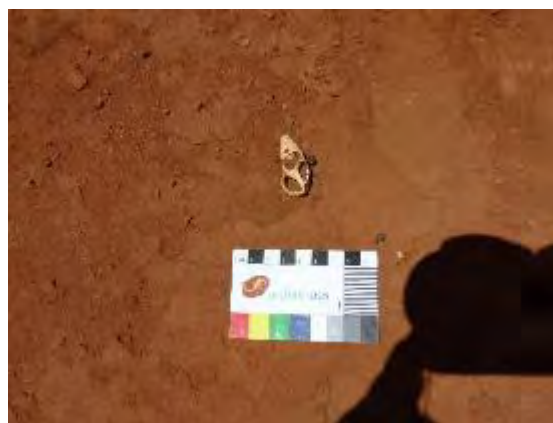


Plate 128. TBR 1 – Dog Whelk (*Terebralia* spp.) shell



Plate 129. TBR 1 – Possible hammerstone



Plate 130. TBR1 – Dolerite flake

### TBR02

Approximately 30 artefacts were observed eroding out of a dune running north-south on the western side of a large claypan, approximately 160 m south east of SS05-02 and 190 m south west of SS05-03. The

A report on the reconnaissance survey of Aboriginal archaeological sites within the Ashburton Salt Project Area, Urala Station, Western Australia  
October 2020

artefacts comprised flakes, flake fragments and a river pebble manuport, possibly used for breaking shells. Lithologies observed included silcrete, sandstone, dolerite, chert and basalt. *Melo* spp., *Tegillarca granosa* and *Blood Cockle (Terebralia spp.)* spp. shells were also observed.

#### TBR03 (HIA 011)

Baler shell (*Melo* spp.), dolerite manuports and a quartz flake were noted along a large red dune which runs south from site 15310. This a possible extension to site 15310.

#### TBR04 (HIA 011)

On the west side of a red dune and claypan, a concentration of artefacts was observed including flakes of basalt, dolerite, chert and quartz. A second, smaller concentration of artefacts was also noted approximately 80 m north-east of TBR04. This second concentration included cores and flakes.

#### TBR05 (HIA 07)

A possible weathered sandstone millstone was found at the base of a red dune, adjacent to the northern edge of a very large claypan. The object is heavily weathered, and no grinding is now evident. It has a definite concave area in the centre and a small section has broken off. A lot of exfoliating stone was observed across the site, some of it modified. Sand dunes surround the claypan. Artefacts were noted in the west end every few metres. Artefacts, including mullers, and baler (*Melo* spp.) shell fragments were noted on the south-western edge.



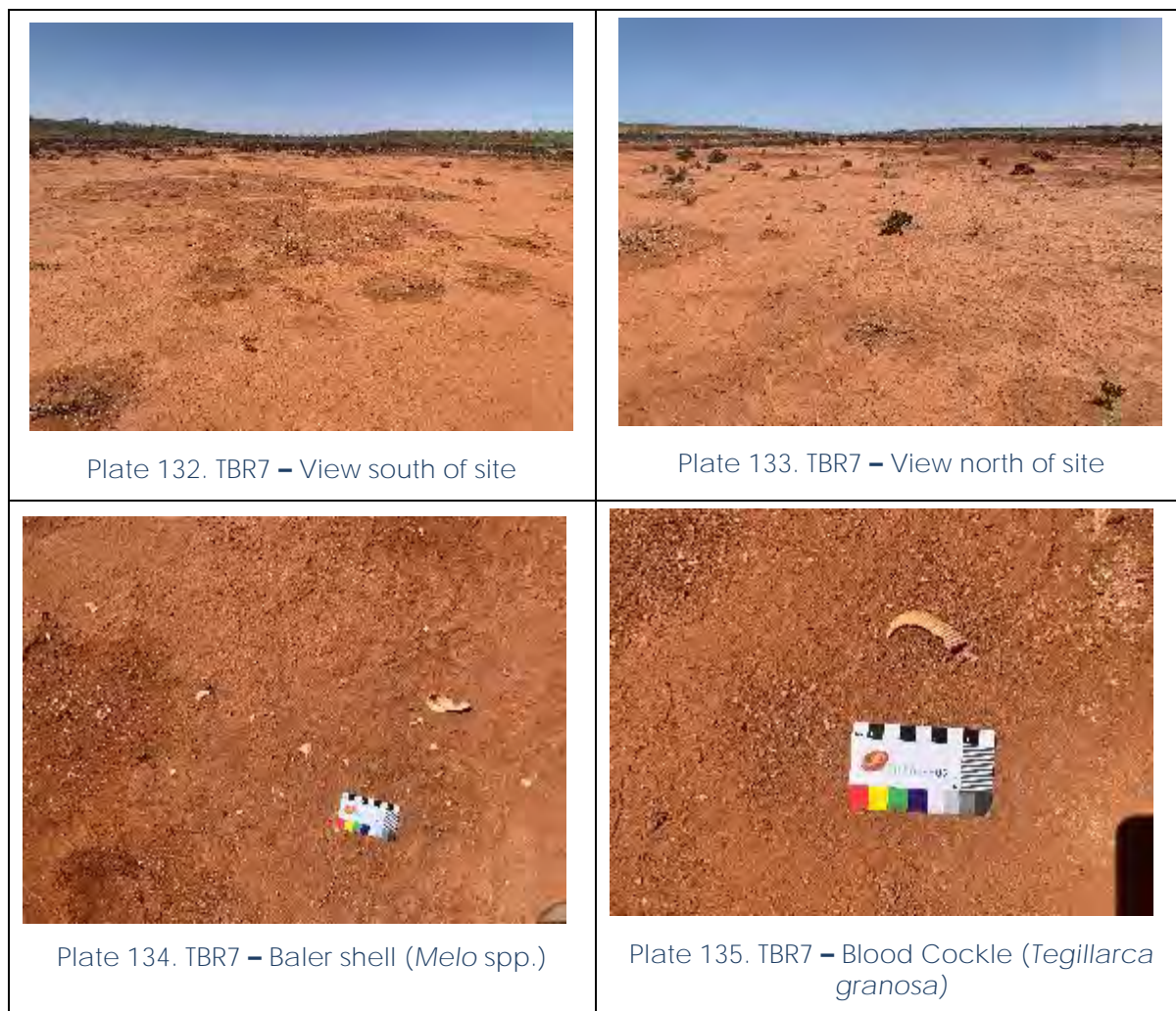
Plate 131. TBR 5 – Possible millstone

#### TBR06 (HIA 07)

A localised chert reduction area with 12-15 river rounded chert cores and flakes embedded in the surface clay of a claypan. The main concentration is in the central north-western edge, with a couple more artefacts out on the southern edge of the claypan.

#### TBR07 (HIA 014)

A number of fragmented *Tegillarca granosa* and baler (*Melo* spp.) shell were observed at the site which occurs in a vegetated claypan, surrounded by nine previously recorded sites. It is estimated that there are thousands of shell present. These shell fragments were concentrated in the centre of the claypan, with no artefacts seen on the margins.



#### *TBR08 (HIA 06)*

At least 20 artefacts were observed on the central west margin of a medium to large claypan. All artefacts observed were small in size and included single platform cores and flakes, made of basalt, chert, quartz and silcrete.

#### *TBR09 (HIA 05)*

A sparse artefact scatter was observed on the south-eastern margin of the large claypan, mostly consisting of basalt and including flakes, fragments and single platform cores. More basalt cores and debris and a dolerite river pebble manuport were noted towards the centre of the claypan. Another concentration was noted on the western margin, with approximately twenty artefacts.

#### *TBR10 (HIA 02)*

Artefacts were noted on the southern edge of a large claypan. There is a high dune eroding to the north into the claypan. Seven artefacts were observed with three dolerite river pebble pieces, one flake, one single platform core and some chert artefacts. There is a dune to the south and an adjacent large claypan with possibly 10 artefacts scattered along the northern edge, worthy of further investigation.



Plate 136. TBR 10 – Artefacts eroding out of the dune

*TBR11 (HIA 08)*

Stone artefacts were observed in the south east section of a large claypan on the south-east corner of the survey area. Approximately 15 artefacts were seen, including flakes and single platform cores of basalt, chert and dolerite. Artefact distribution extends to the centre of the claypan with flakes and cores of dolerite, basalt, quartzite, silcrete and quartz.

*TBR12 (HIA 08)*

Artefacts were noted on the north-western edge of a claypan, with flakes of basalt, banded iron formation, silcrete and dolerite.

*TBR 13 (HIA 08)*

Adjacent to the claypan to the west of TBR 11, artefacts were seen in a small claypan including flakes and cores of quartz, basalt, and chert. The area then opens into a very large claypan where no artefacts were noted. In a small claypan to the north-west, a small number of large artefacts were seen.

*TBR 14 (HIA 12)*

An artefact concentration of approximately 30 pieces was observed on the western edge and centre of a small claypan. Artefacts include single platform cores, flakes and manuports. Lithologies include quartz, basalt, chert and dolerite, eroding out of a sand dune on the western edge with artefacts continuing across the site in lower densities.

*TBR15 (HIA 12)*

Twenty artefacts, including flakes and cores of quartz, basalt, and silcrete were seen in a small claypan amongst a series of small claypans and washes. There is also one large quartzite flake. The artefacts are embedded in the clay surface.



Plate 137. TBR 15 – Large quartzite flake

*TBR16 (HIA 12)*

This is a small claypan with artefacts observed along all edges, including flakes, core and manuports of quartz, basalt, dolerite, silcrete and quartzite. The claypan is among a series of eight small claypans, all with artefacts which may indicate that they are part of one large site, bordered to the east by a large sand dune.

*TBR17 (HIA 10)*

Fifteen artefacts were noted eroding out of a dune on the southern edge of a large claypan. The artefacts include flakes and cores of silcrete, basalt, quartz and dolerite.



Plate 138. TBR 17 – Dolerite Flake



Plate 139. TBR 1 – Dolerite Flake

*TBR 18 (HIA 10)*

Approximately 25 artefacts were observed on the western edge of a medium to large claypan. There is an eroded dune adjacent to the artefacts which extend from the dune to halfway into the claypan.

*TBR 19 (HIA 06)*

Two flakes were observed in a series of small blow in an area of heavy dune erosion.

## DISCUSSION

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Given the antiquity of Boodie Cave on Barrow Island (dating to at least 53,000 cal BP), the nature of the exotic lithics at this site and other sites of similar Pleistocene antiquity in the inland Pilbara, the Ashburton River has been a focal point in the landscape since the Thalanyji's ancestors first arrived in the. It is of great mythological importance to the Thalanyji. In this region, large river systems with permanent to semi-permanent pools provided a constant base from which Thalanyji would have retreated to during periods of low rainfall. The Ashburton would have provided travel routes, food, resources for material culture, and are places of sustained memory owing to their significance. Sites along the rivers would have been repeatedly revisited and utilised. Artefact scatters that are repeat visit sites would contain millstones, and a higher number of retouched and utilised artefacts. Evidence of ceremonial activities may be evidence in the form of stone arrangements and notches scrapers in artefact scatters that were used for making dancing sticks (Rhoads & Bird 2013).

Further any visible archaeological signature of activity along the Ashburton River today is the result of interaction between the tangible evidence of past use of the land by the Thalanyji over thousands of years and a range of geomorphological processes which serve to reveal, conceal or remove that evidence. The banks of the Ashburton River are subject to repeat flooding and sediment deposition. Flooding has removed much of the most recent evidence of visitation by ancestral Thalanyji, while sediment deposition has buried past evidence of their use of the Ashburton River banks. Therefore, any surface artefacts and sites provide a hint as to the possible sub-surface archaeology along the Ashburton River.

As is apparent from Table 5 artefact scatters are the most common site type. Owing to the presence of water, a diverse habitats along the river and across the sandplain and claypans were preferred camping locations. It would be expected that given the importance of water to ancestral Thalanyji, rare artefacts such as tula adzes, scrapers, notched artefacts and a large number of grinding material occur on and in between the clay pans. The presence of food grinding platforms in particular identify persistent places, well-known to the Thalanyji's ancestors (used as a food preparation areas). Grinding material, especially grinding platforms, are site furniture and provide evidence of repeat visitation to these locations. This is the result of women caching or leaving the grinding platforms in favoured places to be re-used on future visits. The grindstones are signs in the landscape that mark places of tradition and memory and are significant.

While shell scatters are relatively common in this region, the shell scatters are important and significant in that the shell record allows for these sites to be placed in a dated and environmental context. This is unusual for sites in the Pilbara region. Further the archaeological material is evidence of the traditional adaptation of the Thalanyji over the last 6,000 years during climatic and environmental changes as the current coastline stabilised after the last glacial maximum.

The presence of Blood Cockle (*Terebralia* sp.) shell in a number of the recorded sites in the Project Area is significant. Dog whelk (*Terebralia* spp.) is a mangrove species which was predominantly targeted by the Thalanyji's ancestors in this area 4,500 years ago. Today, there are limited mangroves nearby and often the sites occur in areas where no mangroves occur now. Such sites provides evidence of the use of landscapes and environments that no longer exist in this area. As evidenced by sites excavated by Veitch & Warren (1992), the current coastline is prograding and has seen quite dramatic changes over the last 6,000 years.

Baler (*Melo* spp.) shell is also present in a large number of sites. Limited work has been completed on *Melo* sp. tool manufacturing sites, where baler shell is made into water carriers, sacred ornaments and as knives for trade and local use (Hook 2009; Akerman 1973). This area is one of the manufacturing hubs for the trade of *Melo* sp. artefacts, ornaments and water carriers inland. Further there are direct links with the material culture of *Melo* sp. shell knives in the late Pleistocene on Barrow Island with those on the Onslow coastline which has only just begun to be understood (Veth et al. 2017). The *Melo* sp. shell fragments, therefore, are directly related to Thalanyji material cultural traditions of great antiquity.

Blood Cockle (*Telligarca granosa*) shell often in large numbers is occur in a number of sites. *Telligarca* is a mud flat species which was targeted by the Thalanyji's ancestors in this area from at least 4,600 years ago. Today, the site is immediately adjacent to the coast with mud flats possibly occurring in this part of the coastline, however, malacological studies in the region have not located any *Telligarca* in these tidal mudflats<sup>9</sup>. Therefore, sites with this species provide evidence of the use of landscapes and environments that no longer exist in this area. As evidenced by sites excavated by Veitch & Warren (1992), the current coastline is prograding and has seen quite dramatic changes over the last 6,000 years.

The coastal dunes on Urala Station are a known burial ground with numerous burials recorded. A number of these burials are in good condition. Ngundabugga (Ngoorndabooja) Ngarrari (Ngardarri), which is immediately north of the Project Area, is a burial ground that is extensive in size, and contains the remains of numerous Ancestral Thalanyji. The burial ground was selectively chosen by Ancestral Thalanyji people as an appropriate place for laying to rest and honouring those who had passed away, consistent with tradition and sacred beliefs. The site is meaningful to Thalanyji people as a place where for over five thousand years Ancestral Thalanyji have conducted funerary rituals and maintained foundational cultural practices. Thalanyji people today continue to honour the Ancestral Thalanyji buried in the site and observe cultural practices and spiritual beliefs associated with the site.

The sites that were previously recorded and revisited during the reconnaissance all show that there is a degree of sub-surface archaeology in this landscape that has yet to be fully understood. The identified sites are the visible surface expression of cultural material that sits within the sand dunes. This sub-surface potential will need careful consideration with regards to impacts and will need to be explored fully and systematically,

#### Revised Predictive Model

In 2005 Archae-aus (Hammond et al 2005) developed a predictive model for the Straits Salt Project (see page 13). This model did not use GIS. Utilising the AHIS Database, the results of the Straits Salts heritage assessment, the 2019 Reconnaissance and the Geoscience surface geology data<sup>10</sup> a heat map of the likelihood of the presence of archaeological sites has been developed. There is finer grained surface geology in the vegetation mapping completed for the project, however, this detailed vegetation mapping has only occurred in the Project Area. Unfortunately, there are insufficient sites recorded within the Project Area, to provide enough data to allow for a robust prediction using the detailed vegetation mapping. Using a larger Predictive Model Area (see Map 6) consisting of surface geology mapping and the recorded sites a distinct pattern is clear. That is, when comparing the percentage size of each of the geological areas with the percentage of sites that occur in those areas there is distinct patterning of sites according to surface geology type (Table 9). Estuarine and Delta Deposits have the lowest potential for archaeological sites, whilst Alluvium, Coastal Dunes, Lake Deposits and Sand Plains have the highest potential for these sites (Map 7).

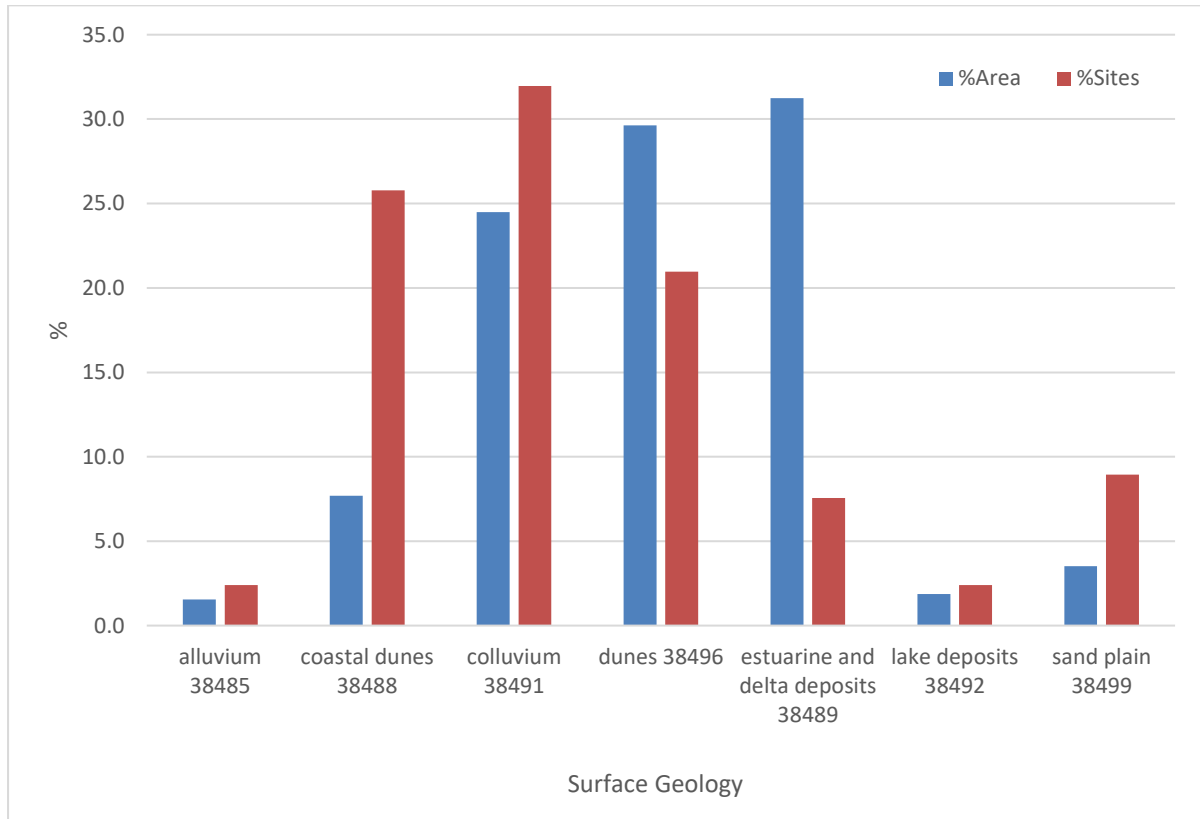
Table 9. Surface geology units and the percentage of those units and Aboriginal archaeological sites

Surface Geology	% Area	% Sites	Prediction
Alluvium 38485	1.5	2.4	High
Coastal Dunes 38488	7.7	25.8	High
Colluvium 38491	24.5	32.0	Moderate
Dunes 38496	29.6	21.0	Moderate
Estuarine and Delta Deposits 38489	31.2	7.6	Low
Lake Deposits 38492	1.9	2.4	High
Sand Plain 38499	3.5	8.9	High

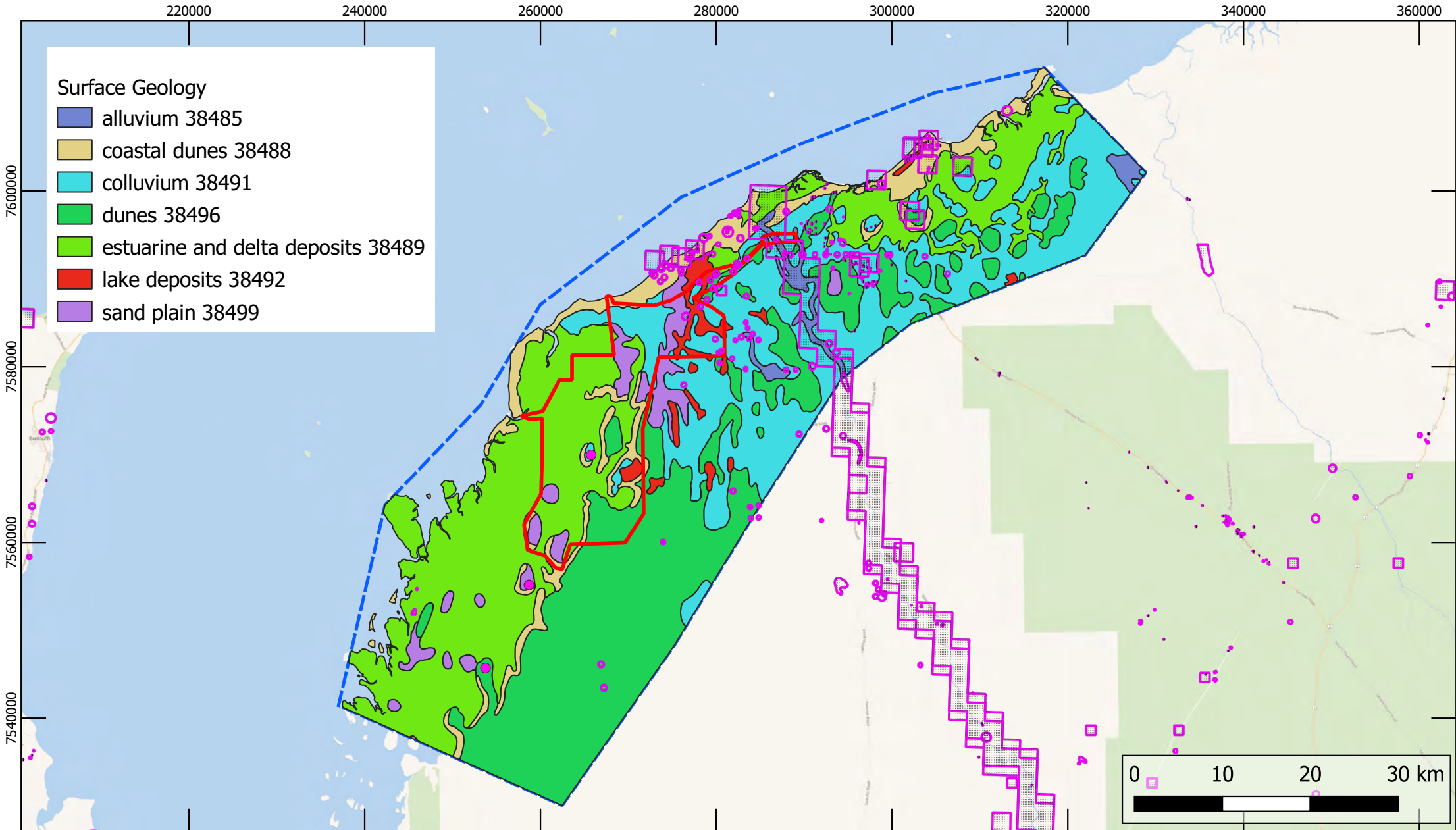
<sup>9</sup> [http://www.epa.wa.gov.au/sites/default/files/PER\\_documentation/A0419\\_R0578\\_CER\\_Appendices.pdf](http://www.epa.wa.gov.au/sites/default/files/PER_documentation/A0419_R0578_CER_Appendices.pdf)

<sup>10</sup> [http://resource.geosciml.org/classifier/cgi/lithology/material\\_formed\\_in\\_surficial\\_environment](http://resource.geosciml.org/classifier/cgi/lithology/material_formed_in_surficial_environment)

Plate 140. Graph of surface geology units and the percentage of those units and Aboriginal archaeological sites



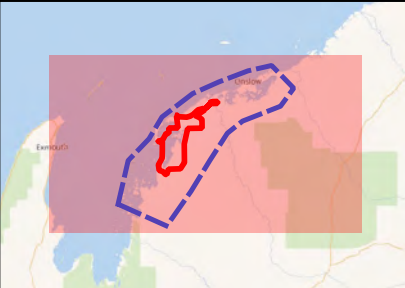
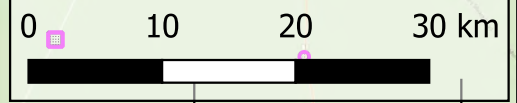




- Surface Geology**
- alluvium 38485
  - coastal dunes 38488
  - colluvium 38491
  - dunes 38496
  - estuarine and delta deposits 38489
  - lake deposits 38492
  - sand plain 38499

7600000  
7580000  
7560000  
7540000

220000 240000 260000 280000 300000 320000 340000 360000



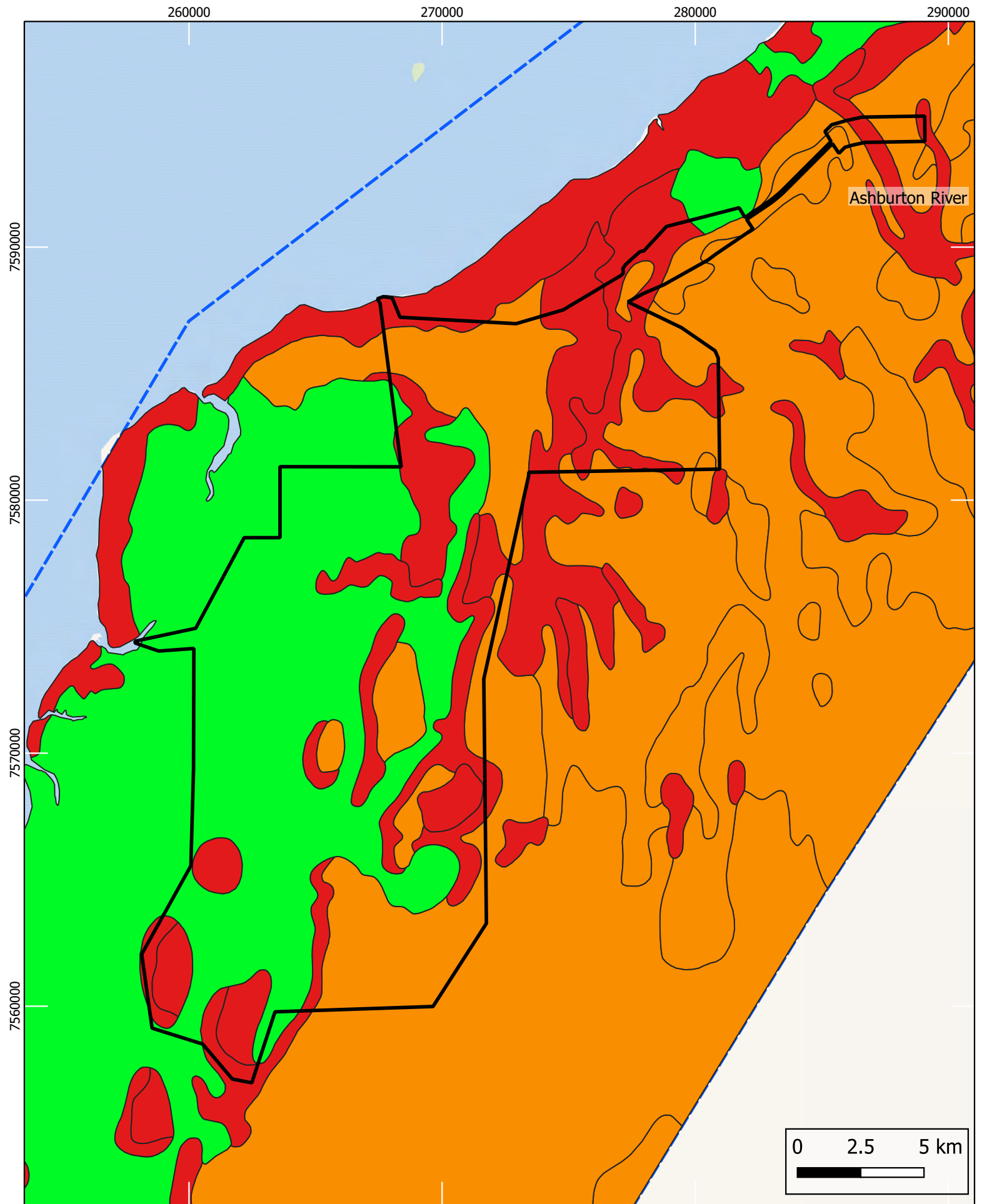
**Legend**

- Registered Sites and Other Heritage Places
- Model Area
- Project Area







**Map 6. Predictive Model Area and Surface Geology**

Drafted by Fiona Hook, 10 May 2020. GDA94, Zone 50. Satellite imagery courtesy of Google.



Onslow

**Legend**

-  Project Area
- Predictive Model
-  High
-  Low
-  Moderate



archae-aus

**Map 7. Archaeological Site Predictive Areas**

Drafted by Fiona Hook, 10 May 2020. GDA94, Zone 50. Satellite imagery courtesy of Google and WikiMaps.

## ADVICE

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- 1) It is advised that:
  - a) This is a reconnaissance report only and does not constitute a detailed heritage assessment.
  - b) That there are heritage places within the project area that are yet to be identified.
  - c) K+S and its contractors are made aware of the presence of the Aboriginal Sites identified in this report and their importance and significance to the Thalanyji people.
  - d) The Ashburton River and its banks are of special significance to the Thalanyji.
  - e) the TBR01 to TBR19 sites have not been recorded in any detail or their boundaries determined.
  - f) the predictive model indicates that there are large sections of the Project Area that are of High and Moderate archaeological sensitivity which will contain Aboriginal archaeological sites that are of significance.
  - g) Any planned ground disturbance works will require full heritage assessment and detailed archaeological investigation and research prior to those works commencing and application under Section 18 of the AHA.

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## APPENDIX ONE: DEFINITIONS

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### SITE DEFINITIONS

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#### *Site Types*

On the basis of previous archaeological studies in the region, a number of different types of Aboriginal archaeological sites may be encountered. Definitions of the various site types can be found on the DAA webpage<sup>11</sup>.

#### *Site scale definitions*

The definitions for scales of site size, density and raw material diversity used in the report are as follows.

- ◆ Sites that measure:
  - ◆ <2,500 m<sup>2</sup> are classified as small;
  - ◆ 2,500<7,500 m<sup>2</sup> are classified as medium;
  - ◆ 7,500<50,000 m<sup>2</sup> are classified as large; and
  - ◆ >50,000 m<sup>2</sup> are classified as extensive.

### STONE ARTEFACT DEFINITIONS

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All artefacts recorded were categorised using the following criteria.

#### *Lithology*

The type of raw material of all identified stone artefacts was recorded. Broad material types recorded include oxide minerals (eg quartz, chalcedony), sedimentary rocks (eg. mudstone, banded ironstone, ironstone, chert, orthoquartzite, silcrete), metamorphic rocks (eg metaquartzite) and igneous rocks (eg. basalt, dolerite, granite, rhyolite). Identification of the material was based on the definitions in Pellant, 2000.

#### *Stone Artefact Types*

Flaked stone artefacts were identified and classified according to the schemes laid out in Andrefsky, 1998 and Hiscock, 2002.

Artefacts that could not be identified as cores, retouched flakes or flakes owing to the absence of diagnostic attributes, have been sorted into a 'debitage' category. This group is split into three types; broken flakes, flaked fragments and debris (Sullivan and Rozen, 1985). Formal implement types such as tulas, backed artefacts and macroblades are not included in the above schemes.

Ground stone artefacts were identified as per the definitions proposed by Smith, 1986.

### STONE ARTEFACT RECORDING PROCEDURES

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Stone artefacts within both the background scatter and on Aboriginal archaeological sites were recorded individually to characterise spatial variation in the range and types of archaeological materials across the landscape.

#### *Flakes and Retouched Flakes*

The following morphological attributes were measured or recorded for flakes and retouched flakes.

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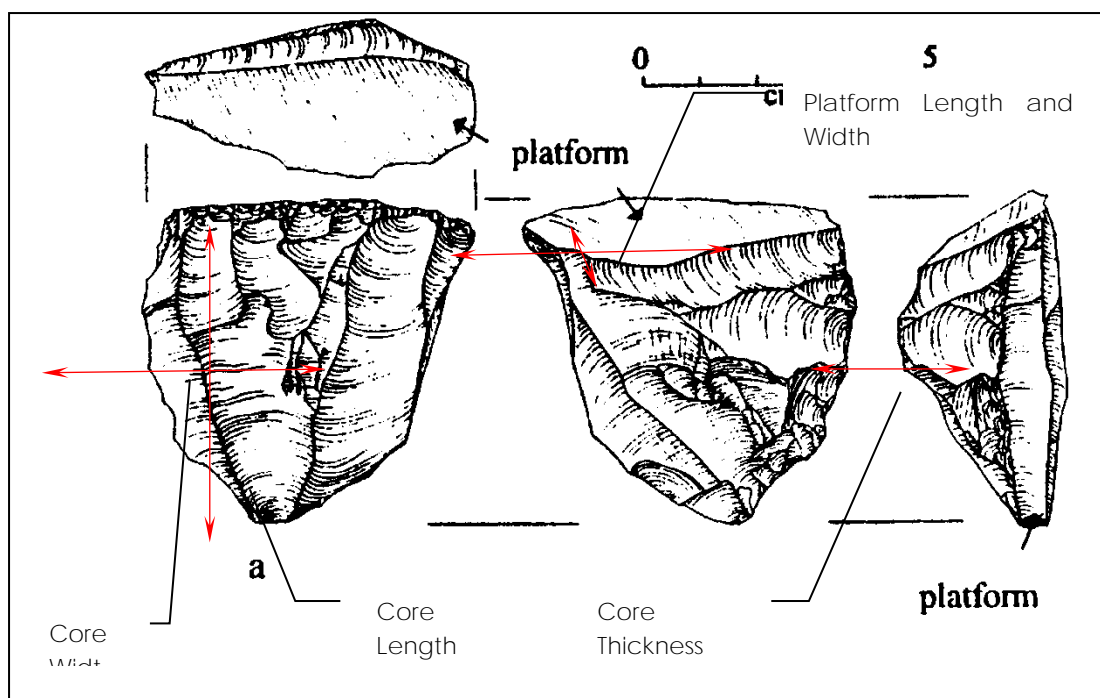
<sup>11</sup> <http://www.daa.wa.gov.au/en/Heritage-and-Culture/Aboriginal-heritage/Reporting-a-Site/Recording-Aboriginal-Sites/07-Type-of-Site/Definitions-and-descriptions-for-types-of-sites/>

- ◆ Length, or the distance along the percussion axis from the ring crack to the distal margin.
- ◆ Width, or the distance between the lateral margins measured at right angles to the percussion axis half way between the ring crack and distal margin.
- ◆ Thickness, or the maximum distance between the ventral and dorsal surface of the flake half way between the ring crack and the distal margin.
- ◆ Platform width, or the distance along the striking platform from one lateral margin to the other.
- ◆ Platform thickness, or the distance across the striking platform from the centre of the ring crack to the dorsal surface.
- ◆ Type of striking platform. Five types of platforms were recognised on flakes.
  - ◆ Cortical (unmodified platform consisting entirely of the outer surface of the parent rock).
  - ◆ Flat (platform where it is not possible to determine whether it has a partial single flake scar, or if it has been heat fractured).
  - ◆ Flaked (striking platform formed by one flake scar).
  - ◆ Faceted (striking platform has a number of flake scars resulting from rotation of the core)
  - ◆ Crushed (the proximal end of the flake is constituted by a sharp edge lacking a distinct platform).
- ◆ Number of dorsal flake scars.
- ◆ The proportion of cortex on the dorsal surface of flakes was measured to the nearest 5%.
- ◆ Overhang removal. The presence or absence of this form of platform preparation, which is "accomplished when the knapper strikes or brushes the edge of the platform and removes small flakes from the edge" (Hiscock, 1986).
- ◆ Retouch/utilisation. The presence of edge modification by the removal of small flakes was measured and the location noted.

### *Cores*

- ◆ The following attributes were recorded for cores.
- ◆ Length, or the size of the core along its maximum dimension.
- ◆ Width, or the size of the core measured at a perpendicular angle to the length.
- ◆ Thickness, or the size of the core measured at 90° to both the width and the length.
- ◆ Number of platforms.
- ◆ Number of flake scars.
- ◆ The length and width of each complete flake scar, and measured in the same way as complete flakes (see above).
- ◆ Proportion of cortex measured to the nearest 5%.
- ◆ Presence of Retouch/utilisation.

Figure 2. Core (multi-platform) measurements (after Andrefsky 1998: 24)



### Grindstones

For all ground stone artefacts recorded, the following morphological attributes were noted.

- ◆ Length, or the size of the artefact along its maximum dimension.
- ◆ Width, or the size of the artefact measured at a perpendicular angle to the length.
- ◆ Thickness, or the size of the artefact measured at 90° to both the width and the length.
- ◆ Number of grinding surfaces.
- ◆ Length and width of the grinding surface(s).
- ◆ Modification if any, such as pitting of grinding surface or hammer dressing to shape artefact.

### Other Artefacts

The following attributes were recorded for manuports, anvils, shell and hammer stones.

- ◆ Length, or the size of the artefact along its maximum dimension.
- ◆ Width, or the size of the artefact measured at a perpendicular angle to the length.
- ◆ Thickness, or the size of the artefact measured at 90° to both the width and the length.
- ◆ Modification if any, such as pitting, indentations, or hammer dressing to shape artefact.

## ECONOMIC SHELL IDENTIFICATION AND RECORDING PROCEDURES

### Identification

Differentiating between natural shell accumulations and cultural shell middens/scatters without excavation or collection was based on the criteria outlined in Hughes & Sullivan, 1974, which has been variously revised or discussed since its original publication (Attenbrow, 1992; Claassen, 1998; Burke and Smith, 2004; Bowdler, 2005). The criteria are summarised in Error! Reference source not found..

Table 10: Criteria used to differentiate between cultural and non-cultural shell accumulations (based on Hughes & Sullivan 1974; Burke & Smith 2004)

Cultural Middens/Scatters	Natural shell beds/scatters
Contain charcoal, mammal bones, burnt wood, blackened shells, artefacts, hearth stones	No cultural material
Unstratified or partly stratified	Well stratified and have sedimentary features of water laid deposits
Contain edible species and sizes	Contain wide range of species both edible and non-edible and a range of shell sizes
Limited number of articulated shells	Contain larger number of articulated shells
Shell breakage consistent with meat extraction (eg. Blood Cockle ( <i>Terebralia</i> spp.)/ <i>Telescopium</i> posterior end removed)	Shell broken randomly
Shell shows no wear; especially water rolling	Water-worn shell owing to transport from the offshore or beach zone
Marine worm, coral, pumice, rounded stones and shell grit are not present	Marine worm, coral, pumice, rounded stones and shell grit are present

Shell species were identified using Wells & Bryce, 1988. The main economic shell species that are encountered on the Onslow area and their recorded habitats are listed below (Wells and Bryce, 1988; Bougher and Wells, 2005).

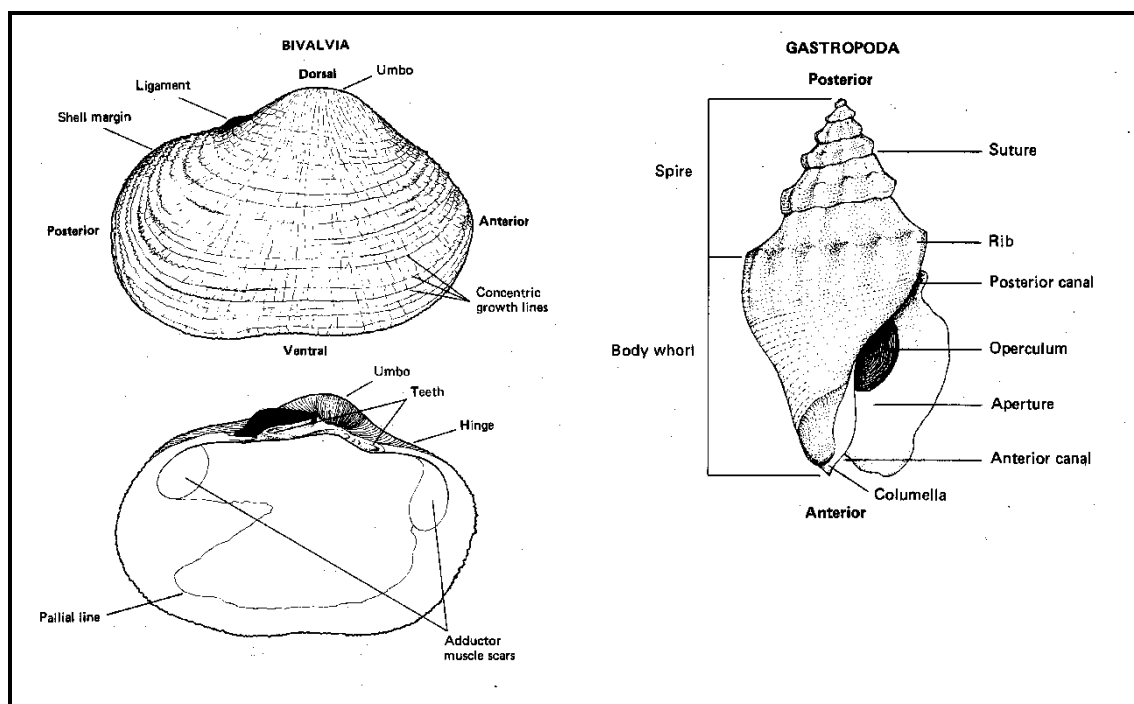
#### Gastropods

- ◆ *Cerithidea largillierti* (Creeper) – mangrove swamps.
- ◆ *Melo amphora* (Baler) – lower intertidal and sub tidal sand; used as water carriers.
- ◆ *Murex* – intertidal rocks.
- ◆ *Nerita* spp. (Nerites) - mangrove tree trunks and low tidal reef.
- ◆ Blood Cockle (*Terebralia* spp.) spp. & *Telescopium* spp. (Mud whelk) - mangrove swamps.
- ◆ *Syrinx* spp. (Conch) - low tidal reef.
- ◆ *Vasum ceramicum* (Vase shells) – low tidal reef.

#### Bivalves

- ◆ *Tegillarca granosa* & *Trisidos semitorta* (Ark shell) – intertidal mud/sand flat.
- ◆ *Chlampys australis* (Scallop) – intertidal sand flat.
- ◆ *Glycymeris stritularis* (Dog Cockle) – intertidal sand flat.
- ◆ *Hytotissa hyotis* & *Saccostrea* spp. (Oyster) – large populations recorded on intertidal rocks or with smaller numbers on mangrove tree trunks.
- ◆ *Tellina virgata* (Tellins) - intertidal sand flat.

Figure 3: Bivalvia and Gastropoda shells showing common elements and terminology (from Wells & Bryce 1988: 196-197)



#### Recording Procedures

The morphological attributes were measured or recorded for bivalve and gastropod whole shells according to Claassen, 1998.

Shells were counted in each sample square; in the case of bivalves, whole valves and umbos were included in the count; in the case of gastropods, only whole shells were counted. Where fragmented shells were present, minimum numbers of individuals (MNI) were calculated by counting the anteriors, posteriors and outer lips and arriving at the MNI estimate by recording the maximum number of one anatomical part (Bowdler, 1983). Shell fragments were counted and speciated where possible; if speciation was not possible, they were recorded as unidentifiable bivalves or gastropods.

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## STATISTICAL MEASURES

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In examining the various attributes recorded at sites in the Onslow Coastal Plain area, several basic statistical measures are employed in an effort to find results that can be considered typical, or to find ranges which can be considered typical, against which new results can be compared.

### *Averages – mean and median*

Two main types of average calculations are employed as measures of central tendency: means and medians.

#### *Mean*

The mean is calculated by the addition of all the results in a sample set and dividing by the number of results. This result will normally be presented with a standard deviation figure ( $\sigma$ ); calculated using Microsoft Excel and is the average amount by which the results deviate from the mean.

In a normally distributed set of data the standard deviation accounts for 34.1% of the entire data set, with one standard deviation to either side of the mean accounting for 68.2% of the entire set. The bracket of one standard deviation to either side of the mean is routinely employed to distinguish the majority of the sample, against which new results can be compared.

#### *Median*

While the mean offers an excellent measure of central tendency for normally distributed samples, many of the archaeological results in the Onslow Coastal Plain are not normally distributed. In such cases the median is employed.

The median is obtained by arranging the data set from smallest to largest and selecting the result that divides the set into two even halves. This result is more useful with data that is not normally distributed as it is resistant to outliers.

The median is typically combined with the inter-quartile range to present a range of data that captures the most typical results (synonymous to presenting the mean with the standard deviation). The lower value of the inter-quartile range is the value that, when the data is arranged from smallest to largest, captures the first 25% of the set. This is also referred to as the first quartile. The upper value of the inter-quartile is the value that, when the data is arranged from smallest to largest, captures the first 75% of the set. This is also referred to as the third quartile.

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## **APPENDIX TWO - COMPARATIVE DATA**

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### COMPARATIVE DATA

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The following data is compiled from the results of over 20 Aboriginal heritage surveys and almost 700 Aboriginal sites from the northwest coastal area, primarily comprising works from around Onslow and Cape Preston.

Table 11. Percentage of sites with a particular feature

	Artifact Scatter	Reduction Area	Quarry	Structure	Midden / Shell Scatter	Burial	Water Source	Engraving / Painting	Grinding Fixed/Movable	Rockshelter	Scarred Tree	Historical / Maritime	Mythological/Ceremonial
#	565	121	97	6	154	1	3	49	91	5	1	10	7
% of total sites with this feature	80.8	17.3	13.9	0.9	22.0	0.1	0.4	7.0	13.0	0.7	0.1	1.4	1.0

Table 12. Site features relative to landscape units

	Artifact Scatter	Reduction Area	Quarry	Structure	Midden / Shell Scatter	Burial	Water Source	Engraving / Painting	Grinding Fixed/Movable	Rockshelter	Scarred Tree	Historical / Maritime	Mythological / Ceremonial	TOTALS
Plains	57.3264781	16.966581	4.6272494	0	9.768638	0	0.514138817	1.285347	7.7120823	0.2571	0	1.0282776	0.5141388	100
Low Hills	48.2758621	21.83908	16.091954	0	1.149425	0	1.149425287	6.8965517	3.4482759	0	0	0	1.1494253	100
Mid-Level Plateau	66.6666667	11.111111	22.222222	0	0	0	0	0	0	0	0	0	0	100
Hill/Range Slope	49.5238095	18.095238	24.761905	0	2.857143	0	0	1.9047619	1.9047619	0.9524	0	0	0	100
Hill/Range Top	45.4545455	20.454545	15.909091	0	0	0	0	13.636364	2.2727273	0	0	0	2.2727273	100
Gully Slope	62.5	0	25	0	0	0	0	0	12.5	0	0	0	0	100
Gully Base	33.3333333	33.333333	25	0	0	0	0	0	0	8.3333	0	0	0	100
Salt/Mud Flat	26.3157895	0	5.2631579	0	36.84211	0	5.263157895	10.526316	15.789474	0	0	0	0	100
Claypan	63.2911392	1.2658228	1.2658228	0	17.72152	0	0	0	15.189873	0	0	1.2658228	0	100
Claypan Margin	66.6666667	0	0	0	33.33333	0	0	0	0	0	0	0	0	100
Sand Dune	40	0	0	2.8571429	48.57143	2.8571429	0	0	2.8571429	0	0	0	2.8571429	100
White Dune	37.5	0	0	0	37.5	0	0	0	12.5	0	0	12.5	0	100
Red Dune	32.3943662	5.6338028	1.4084507	0	45.07042	0	0	0	11.267606	0	0	4.2253521	0	100
Dune Swale	0	0	0	0	100	0	0	0	0	0	0	0	0	100
Sand Plain	37.9310345	0	6.8965517	6.8965517	27.58621	0	0	0	20.689655	0	0	0	0	100



Table 13. Numbers of sites relative to site size

	Number of sites	%	Average size m <sup>2</sup>	SD
Small <99 m <sup>2</sup>	139.0	20.9	33.2	217436.53
Small-medium 100-999 m <sup>2</sup>	258.0	38.9	281.6	612.21915
Medium-large 1,000 -9,999 m <sup>2</sup>	172.0	25.9	3488.9	1458.4
Large 10,000 - 99,999 m <sup>2</sup>	93.0	14.0	31191.8	10856.8
Very large >100,000 m <sup>2</sup>	29.0	4.4	475934.8	20654.6
Total	691.0	104.1		

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## **APPENDIX THREE: DPLH REGISTER SEARCHES**

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## List of Registered Aboriginal Sites

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### Search Criteria

9 Registered Aboriginal Sites in Shapefile - Heritage\_Survey\_Area\_20190826\_V2\_region

### Disclaimer

The *Aboriginal Heritage Act 1972* preserves all Aboriginal sites in Western Australia whether or not they are registered. Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist.

The information provided is made available in good faith and is predominately based on the information provided to the Department of Planning, Lands and Heritage by third parties. The information is provided solely on the basis that readers will be responsible for making their own assessment as to the accuracy of the information. If you find any errors or omissions in our records, including our maps, it would be appreciated if you email the details to the Department at [AboriginalHeritage@dplh.wa.gov.au](mailto:AboriginalHeritage@dplh.wa.gov.au) and we will make every effort to rectify it as soon as possible.

### Copyright

Copyright in the information contained herein is and shall remain the property of the State of Western Australia. All rights reserved.

### Coordinate Accuracy

Coordinates (Easting/Northing metres) are based on the GDA 94 Datum. Accuracy is shown as a code in brackets following the coordinates.

### Terminology (NB that some terminology has varied over the life of the legislation)

**Place ID/Site ID:** This a unique ID assigned by the Department of Planning, Lands and Heritage to the place.

#### Status:

- **Registered Site:** The place has been assessed as meeting Section 5 of the *Aboriginal Heritage Act 1972*.
- **Other Heritage Place which includes:**
  - **Stored Data / Not a Site:** The place has been assessed as not meeting Section 5 of the *Aboriginal Heritage Act 1972*.
  - **Lodged:** Information has been received in relation to the place, but an assessment has not been completed at this *stage* to determine if it meets Section 5 of the *Aboriginal Heritage Act 1972*.

#### Access and Restrictions:

- **File Restricted = No:** Availability of information that the Department of Planning, Lands and Heritage holds in relation to the place is not restricted in any way.
- **File Restricted = Yes:** Some of the information that the Department of Planning, Lands and Heritage holds in relation to the place is restricted if it is considered culturally sensitive. This information will only be made available if the Department of Planning, Lands and Heritage receives written approval from the informants who provided the information. To request access please contact [AboriginalHeritage@dplh.wa.gov.au](mailto:AboriginalHeritage@dplh.wa.gov.au).
- **Boundary Restricted = No:** Place location is shown as accurately as the information lodged with the Registrar allows.
- **Boundary Restricted = Yes:** To preserve confidentiality the exact location and extent of the place is not displayed on the map. However, the shaded region (generally with an area of at least 4km<sup>2</sup>) provides a general indication of where the place is located. If you are a landowner and wish to find out more about the exact location of the place, please contact the Department of Planning, Lands and Heritage.
- **Restrictions:**
  - **No Restrictions:** *Anyone* can view the information.
  - **Male Access Only:** Only *males* can view restricted information.
  - **Female Access Only:** Only *females* can view restricted information.

**Legacy ID:** This is the former unique number that the former Department of Aboriginal Sites assigned to the place. This has been replaced by the Place ID / Site ID.

## Aboriginal Heritage Inquiry System

### List of Registered Aboriginal Sites

ID	Name	File Restricted	Boundary Restricted	Restrictions	Status	Type	Knowledge Holders	Coordinate	Legacy ID
808	SAPPHIRE 1	No	No	No Gender Restrictions	Registered Site	Artefacts / Scatter, Camp, Other: 1920'S-1940'S	*Registered Knowledge Holder names available from DAA	278238mE 7586855mN Zone 50 [Reliable]	P07319
814	URALA 94 E	No	No	No Gender Restrictions	Registered Site	Artefacts / Scatter	*Registered Knowledge Holder names available from DAA	276538mE 7585755mN Zone 50 [Unreliable]	P07325
6536	URALA DUNE RIDGE	No	No	No Gender Restrictions	Registered Site	Artefacts / Scatter, Midden / Scatter	*Registered Knowledge Holder names available from DAA	278038mE 7589655mN Zone 50 [Reliable]	P06433
6537	URALA SAND RIDGE	No	No	No Gender Restrictions	Registered Site	Artefacts / Scatter, Midden / Scatter	*Registered Knowledge Holder names available from DAA	279988mE 7590655mN Zone 50 [Reliable]	P06434
7371	URALA STATION CROSSING 1	No	No	No Gender Restrictions	Registered Site	Artefacts / Scatter, Midden / Scatter	*Registered Knowledge Holder names available from DAA	286838mE 7594455mN Zone 50 [Reliable]	P05559
7373	URALA STATION 01	No	No	No Gender Restrictions	Registered Site	Artefacts / Scatter, Midden / Scatter	*Registered Knowledge Holder names available from DAA	279638mE 7588955mN Zone 50 [Reliable]	P05561
7374	URALA STATION 02.	No	No	No Gender Restrictions	Registered Site	Artefacts / Scatter, Midden / Scatter, Camp	*Registered Knowledge Holder names available from DAA	279938mE 7590355mN Zone 50 [Reliable]	P05562
15310	WYLOO DAM 05	No	No	No Gender Restrictions	Registered Site	Artefacts / Scatter	*Registered Knowledge Holder names available from DAA	280317mE 7581631mN Zone 50 [Reliable]	P07910
37522	Mindurru (Ashburton River)	Yes	Yes		Registered Site	Mythological	*Registered Knowledge Holder names available from DAA	Not available when location is restricted	

## List of Other Heritage Places

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### Search Criteria

8 Other Heritage Places in Shapefile - Heritage\_Survey\_Area\_20190826\_V2\_region

### Disclaimer

The Aboriginal Heritage Act 1972 preserves all Aboriginal sites in Western Australia whether or not they are registered. Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist.

The information provided is made available in good faith and is predominately based on the information provided to the Department of Planning, Lands and Heritage by third parties. The information is provided solely on the basis that readers will be responsible for making their own assessment as to the accuracy of the information. If you find any errors or omissions in our records, including our maps, it would be appreciated if you email the details to the Department at [AboriginalHeritage@dplh.wa.gov.au](mailto:AboriginalHeritage@dplh.wa.gov.au) and we will make every effort to rectify it as soon as possible.

### Copyright

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### Coordinate Accuracy

Coordinates (Easting/Northing metres) are based on the GDA 94 Datum. Accuracy is shown as a code in brackets following the coordinates.

Terminology (NB that some terminology has varied over the life of the legislation)

Place ID/Site ID: This a unique ID assigned by the Department of Planning, Lands and Heritage to the place.

Status:

- Registered Site: The place has been assessed as meeting Section 5 of the Aboriginal Heritage Act 1972.
- Other Heritage Place which includes:
  - Stored Data / Not a Site: The place has been assessed as not meeting Section 5 of the Aboriginal Heritage Act 1972.
  - Lodged: Information has been received in relation to the place, but an assessment has not been completed at this stage to determine if it meets Section 5 of the Aboriginal Heritage Act 1972.

Access and Restrictions:

- File Restricted = No: Availability of information that the Department of Planning, Lands and Heritage holds in relation to the place is not restricted in any way.
- File Restricted = Yes: Some of the information that the Department of Planning, Lands and Heritage holds in relation to the place is restricted if it is considered culturally sensitive. This information will only be made available if the Department of Planning, Lands and Heritage receives written approval from the informants who provided the information. To request access please contact [AboriginalHeritage@dplh.wa.gov.au](mailto:AboriginalHeritage@dplh.wa.gov.au).
- Boundary Restricted = No: Place location is shown as accurately as the information lodged with the Registrar allows.
- Boundary Restricted = Yes: To preserve confidentiality the exact location and extent of the place is not displayed on the map. However, the shaded region (generally with an area of at least 4km<sup>2</sup>) provides a general indication of where the place is located. If you are a landowner and wish to find out more about the exact location of the place, please contact the Department of Planning, Lands and Heritage.
- Restrictions:
  - No Restrictions: Anyone can view the information.
  - Male Access Only: Only males can view restricted information.
  - Female Access Only: Only females can view restricted information.

Legacy ID: This is the former unique number that the former Department of Aboriginal Sites assigned to the place. This has been replaced by the Place ID / Site ID.

## Aboriginal Heritage Inquiry System

### List of Other Heritage Places

ID	Name	File Restricted	Boundary Restricted	Restrictions	Status	Type	Knowledge Holders	Coordinate	Legacy ID
809	SAPPHIRE 2	No	No	No Gender Restrictions	Stored Data / Not a Site	Artefacts / Scatter	*Registered Knowledge Holder names available from DAA	279938mE 7583155mN Zone 50 [Reliable]	P07320
5956	GRIFFIN GAS 06	No	No	No Gender Restrictions	Stored Data / Not a Site	Artefacts / Scatter, Midden / Scatter	*Registered Knowledge Holder names available from DAA	281938mE 7590855mN Zone 50 [Reliable]	P07164
5957	GRIFFIN GAS 07	No	No	No Gender Restrictions	Stored Data / Not a Site	Midden / Scatter	*Registered Knowledge Holder names available from DAA	282338mE 7591705mN Zone 50 [Reliable]	P07165
5958	GRIFFIN GAS 08	No	No	No Gender Restrictions	Stored Data / Not a Site	Artefacts / Scatter	*Registered Knowledge Holder names available from DAA	283538mE 7592355mN Zone 50 [Reliable]	P07166
7061	URALA MIDDEN 4	No	No	No Gender Restrictions	Stored Data / Not a Site	Artefacts / Scatter, Midden / Scatter	*Registered Knowledge Holder names available from DAA	279338mE 7589855mN Zone 50 [Reliable]	P05892
7375	URALA STATION 03	No	No	No Gender Restrictions	Stored Data / Not a Site	Artefacts / Scatter, Midden / Scatter	*Registered Knowledge Holder names available from DAA	282338mE 7591455mN Zone 50 [Reliable]	P05563
7376	URALA STATION 04	No	No	No Gender Restrictions	Stored Data / Not a Site	Artefacts / Scatter, Midden / Scatter	*Registered Knowledge Holder names available from DAA	282638mE 7591655mN Zone 50 [Reliable]	P05564
15309	WYLOO DAM 04	No	No	No Gender Restrictions	Stored Data / Not a Site	Artefacts / Scatter	*Registered Knowledge Holder names available from DAA	280641mE 7581867mN Zone 50 [Reliable]	P07909