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## **The South African Radio Astronomy Observatory Square Kilometre Array Project: National Heritage Resources Act, 1999 (Act No. 25 of 1999) Section 35 Mitigations**

### **Archaeological Mitigations Report**

**Prepared for:**  
South African Radio Astronomy Observatory

**Project Number:**  
SAR6105




October 2020



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## 1 Introduction

The South African Radio Astronomy Observatory (SARAO) appointed Digby Wells Environmental (Digby Wells) to implement select specialist recommendations to ensure compliances with Statutory Comment issued by the South African Heritage Resources Agency (SAHRA).

This report constitutes the Archaeological Mitigation Report required to comply with the Section 35 Permit issued in terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) and NHRA Regulations, 2000 (GN R 548).

### 1.1. Project Background

Digby Wells completed a Heritage Resources Management (HRM) Process in support of the Square Kilometre Array (SKA) Project (the Project), located in the Northern Cape Province of South Africa. The HRM Process comprised the compilation and submission of a Heritage Impact Assessment (HIA) and Conservation Management Plan (CMP) contemplated in terms of the NHRA to SAHRA and Northern Cape Provincial Heritage Resources Authority (NC-PHRA) on 30 July 2018 (Case ID:12292<sup>1</sup>).

The outcomes resulted in specific recommendations made in relation to the known heritage resources. SAHRA issued Statutory Comment on 7 September 2018 that approved of the Project and endorsed the various specialist recommendations. For the purposes of this report, these included those presented in Table 1-1.

**Table 1-1: Specific Recommendations Relevant to Section 35 Resources**

Recommendation	Description
Detailed recording of identified archaeological resources	<p>Where new infrastructures that are not capable of realignment (i.e. antennas) are situated within the defined 50 m buffer, the identified heritage resources must be recorded in detail prior to the construction phase. This may include <i>inter alia</i>, distribution and density mapping, surface collection and test excavations subject to the approval of a Section 35 Permit.</p> <p>This recommendation is applicable to the following identified heritage resources: SA-005, SA-006, SA-012, SA-014, SA-015 and SA-017.</p>

<sup>1</sup>Available at <https://sahris.sahra.org.za/cases/nrf4874-sarao-ska-hia-and-conservation-management-plan>

Recommendation	Description
<p>Phase 2 Archaeological Mitigation</p>	<p>The heritage resource SA-016 is situated within the development footprint of antenna SKA-027. The assessor acknowledges that realignment of this infrastructure is not feasible in the context of the SKA Project, and preservation of the site <i>in situ</i> as a management measure being a challenge. In this instance, the identified impact cannot be removed or avoided, but the intensity of the impact to SA-016 can be reduced through adoption of the following recommendations:</p> <ul style="list-style-type: none"> <li>• SA-016 must be recorded in detail prior to the construction phase. This may include <i>inter alia</i>, distribution and density mapping, and test excavations subject to the approval of a Section 35 Permit; and</li> <li>• A Watching Brief undertaken by a suitably qualified and accredited archaeologist must be completed during earth moving activities to record all material cultural remains that may be exposed. The results of the Watching Brief must be compiled into a Watching Brief Report and submitted to SAHRA for noting.</li> </ul>

## 1.2. Project Description

The Project comprises two primary components, namely the ‘core’ (40 land parcels<sup>2</sup>) and three ‘spirals’ (72 land parcels) covering an approximate areal extent of 639 076 hectare (ha). This land makes provision for the SKA Radio Telescope site, KAT-7 radio telescope, MeerKAT, HIRAX and HERA instruments.

The Square Kilometre Array Organisation (SKAO) proposes to establish an additional 133 antennas. Of these, 112 antennas will be established in the core and the remaining 21 will be installed in three spiral arms (seven in each arm). These spiral arms are:

- The Brandvlei Spiral (Arm), comprising the western extent;
- The Carnarvon Spiral (Arm) comprising the eastern extent; and
- The Williston Spiral (Arm), comprising the southern extent of the site-specific study area.

Together with above-mentioned antennas, the SKAO proposes to install the following infrastructure:

- Access gravel roads to a width of 4 m;
- Upgrading up to 320 km of existing roads;
- Establishment of approximately 115 km new roads;
- Develop electrical infrastructure including:

<sup>2</sup>Land parcels refer to any plot or piece of land which has been demarcated and which has fixed boundaries. It includes farms, farm portions and erven.

- Approximately 240 km above and below ground power cables within a 22-30 m wide servitude; and
- Substations and electrical kiosks.
- Establishment of 20 borrow pits;
- Establishment of four stone quarries; and
- Establishment of two construction camps.

### 1.3. Project Location

The Project is in the Karoo region in the Northern Cape Province of South Africa, some 900 km, 650 km and 90 km from Johannesburg, Cape Town and Carnarvon respectively. The development footprint is situated within two district municipalities, namely the Namakwa and Pixley ka Seme District Municipality, which comprise the following local affected municipalities:

- Karoo Hoogland Local Municipality;
- Hantam Local Municipality; and
- Kareeberg Local Municipality.

The vast semi-arid landscape is characterised by abrupt ridges and conical hills scattered across extensive sandy and silty plains.

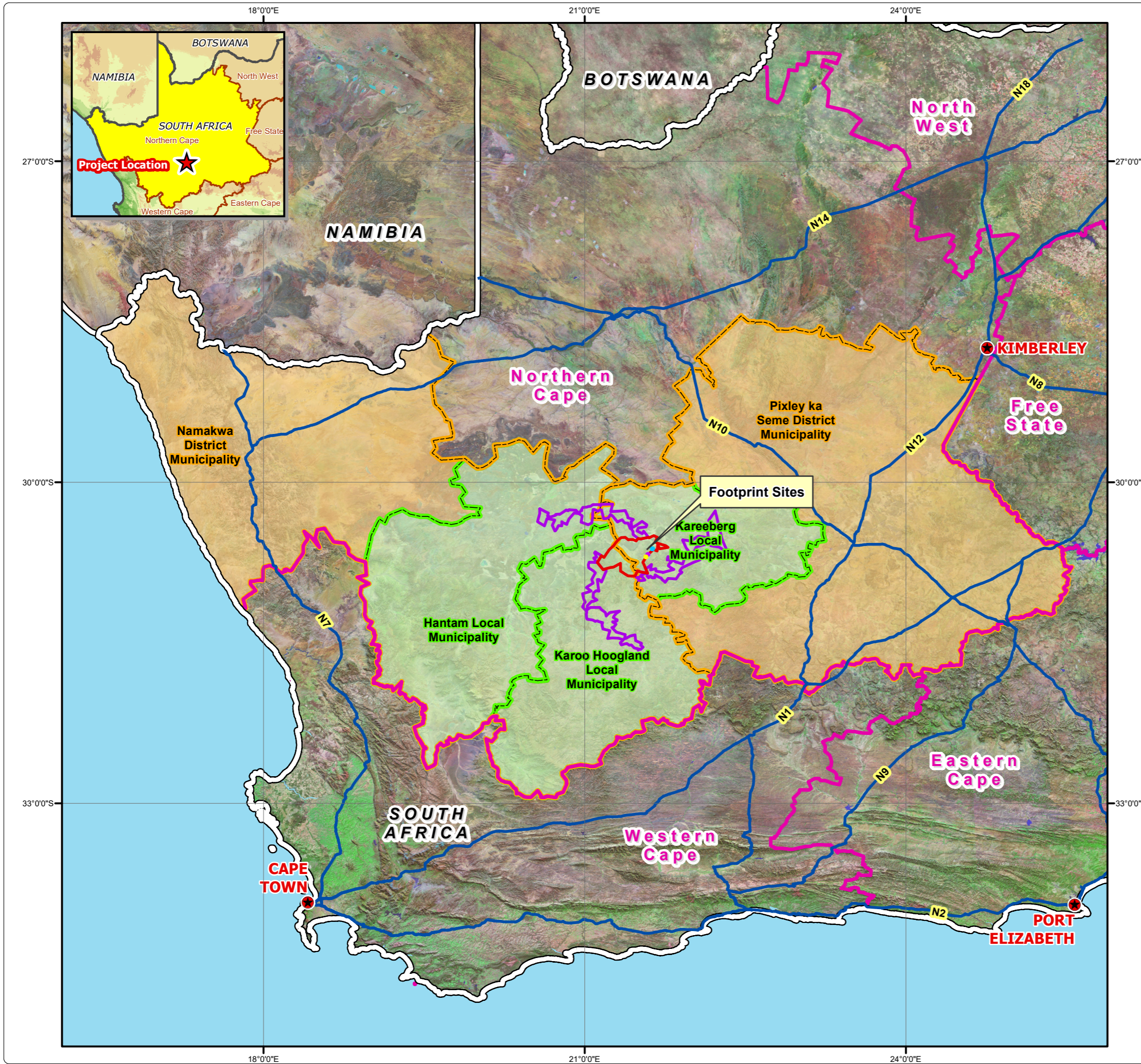
Plan 1 presents the location of the Project.



# SKA Project Regional Setting

## Legend

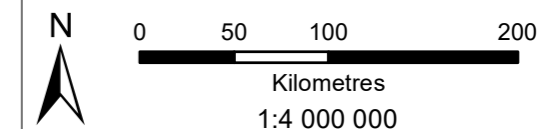
- SKA Phase 1 Core
- SKA Phase 1 Spiral Arms
- City
- National Road
- HIRAX Footprint
- Solar PV Farm Footprint
- Visserskloof Construction Camp Footprint
- Regional Study Area
- Local Study Area
- Provincial Boundary
- International Boundary



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Projection: Geographic	Ref #: amt.SAR6105.201912.052
Datum: WGS 1984	Revision Number: 3
Central Meridian: 21°E	Date: 17/12/2019



## 1.4. Terms of Reference

To complete the required specialist services to promote compliance with the Statutory Comments issued by the SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit in terms of Section 38(8) of the NHRA and the Section 35 Permit.

### 1.4.1. Permissions Granted

SAHRA issued an Excavation Permit (Permit ID: 3102) in terms of Section 35(4) of the NHRA. The permit authorised the authorised specialists to undertake density mapping and archaeological excavations as per the recommendations detailed in Table 1-1.

### 1.4.2. Summary of Permit Conditions

SAHRA issued with permit on the proviso of the following:

- The permit holder must be present during all activities;
- The stipulated methodologies provided in support of the permit application must be employed;
- A standard site record form must be lodged with the McGregor Museum;
- All archaeological material collected and excavated, as well as field notes and records, will be curated by the McGregor Museum;
- A final report is due on or before 31 March 2021;
- Reprints of all published papers or copies of theses and/or reports resulting from this work must be lodged with the heritage authority;
- If a published report has not appeared within three years of the lapsing of this permit, the report required in terms of the permit will be made available to researchers on request;
- The permit holder must obtain permission to access the properties from the landowner; and
- The permit holder is responsible for filling in of excavations and protection of the sites during and after excavations to the satisfaction of the heritage authority and landowner.

## 1.5. Scope of Work

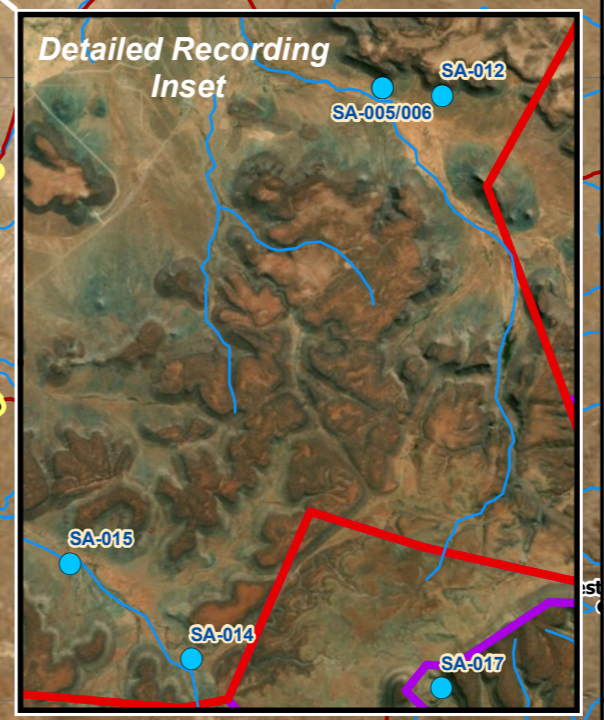
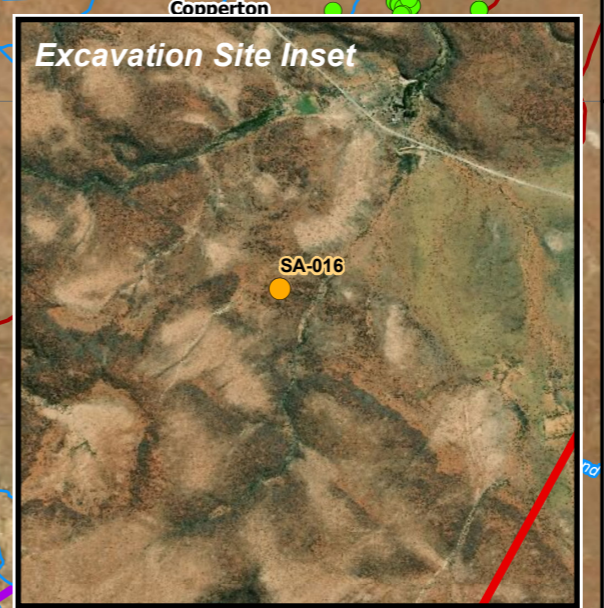
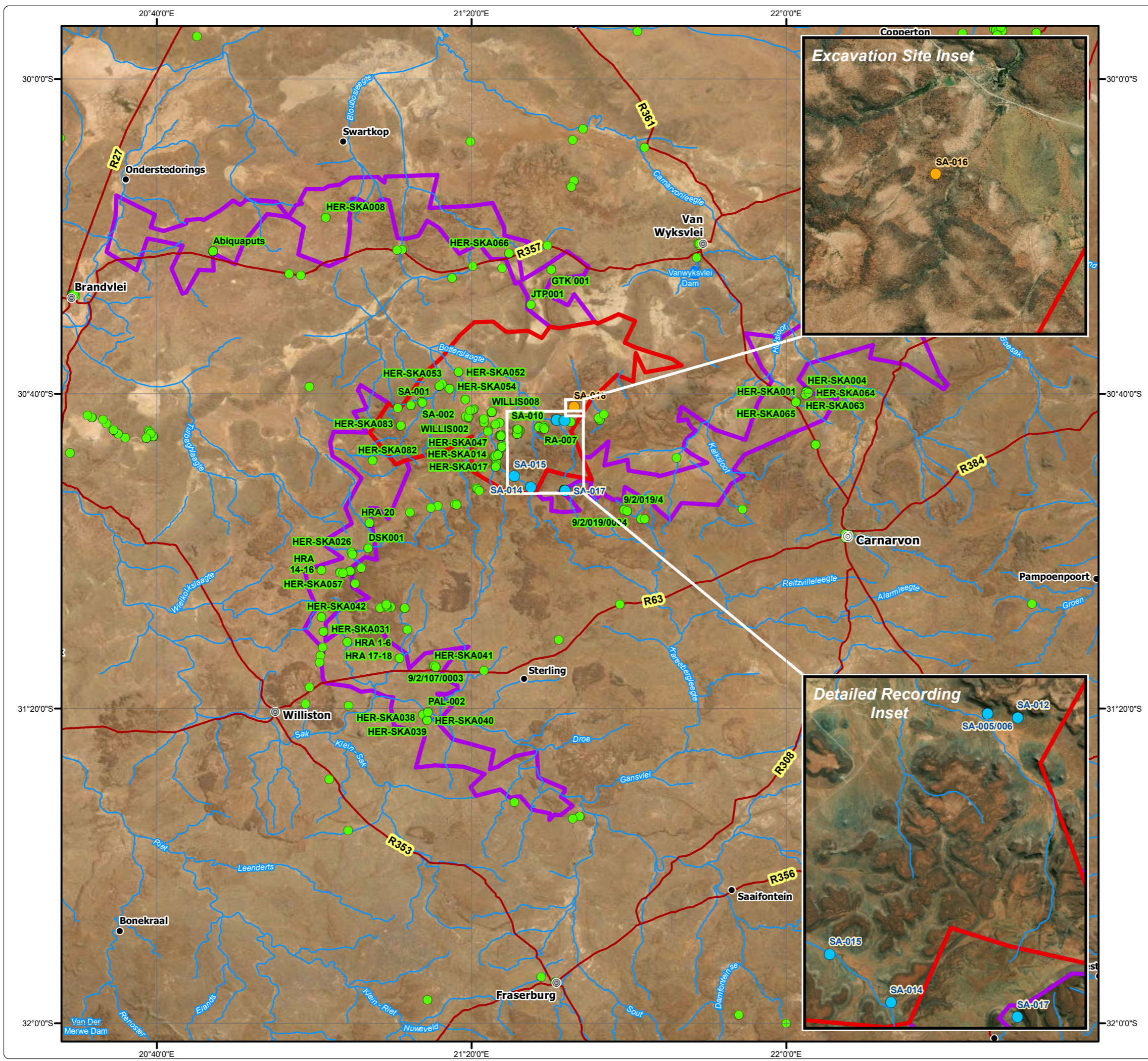
The Scope of Work (SoW) for the specialist HRM process included the undertaking of Phase 2 mitigations under the authority of the Section 35 Permit comprising:

- Density Mapping of Sites SA-005, SA-006, SA-012, SA-014, SA-015 and SA-017;
- Excavations of Site SA-016;
- Preliminary Analysis; and
- Curation and Reporting.

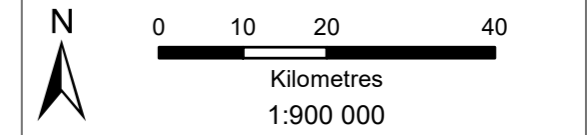
# SKA Project Distribution of Excavation and High Density Mapping Sites

## Legend

- SKA Phase 1 Core
- SKA Phase 1 Spiral Arms
- Archaeological Sites
- Detailed Recording
- Excavation Site
- Secondary Town
- Other Town
- Settlement
- Main Road
- Perennial Stream
- Dam



Projection: Geographic Datum: WGS 1984 Central Meridian: 21°E  
 Ref #: ajm.SAR6105.201911.154 Revision Number: 3 Date: 17/12/2019



## 1.6. Expertise of Specialists

The expertise of the HRM specialist is presented in Table 1-2:

**Table 1-2: Expertise of the Specialist**

Team Member	Bio Sketch
<p>Justin du Piesanie</p> <p>ASAPA Member 270</p> <p>AMAFA Registered ICOMOS Member 14274</p> <p>IAIAsa Member</p> <p>Years' Experience: 12</p>	<p>Justin is the Divisional Manager for Social and Heritage Services at Digby Wells. Justin joined the company in August 2011 as an archaeologist and was subsequently made HRM Manager in 2016 and Divisional Manager in 2018. He obtained his Master of Science (MSc) degree in Archaeology from the University of the Witwatersrand in 2008, specialising in the Southern African Iron Age. Justin also attended courses in architectural and urban conservation through the University of Cape Town's Faculty of Engineering and the Built Environment Continuing Professional Development Programme in 2013. Justin is a professional member of the Association of Southern African Professional Archaeologists (ASAPA), and accredited by the association's Cultural Resources Management (CRM) section. He is also a member of the International Council on Monuments and Sites (ICOMOS), an advisory body to the UNESCO World Heritage Convention. He has over 12 years combined experience in HRM in South Africa, including heritage assessments, archaeological mitigation, grave relocation, NHRA Section 34 application processes, and CMPs. Justin has gained further generalist experience since his appointment at Digby Wells in Botswana, Burkina Faso, Cameroon, the Democratic Republic of Congo, Liberia, Mali and Senegal on projects that have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. Furthermore, Justin has acted as a technical expert reviewer of HRM projects undertaken in Cameroon and Senegal. Justin's current focus at Digby Wells is to develop the HRM process as an integrated discipline following international HRM principles and standards. This approach aims to provide clients with comprehensive, project-specific solutions that promote ethical heritage management and assist in achieving strategic objectives.</p>
<p>Jaco van der Walt</p> <p>ASAPA Member 159</p> <p>AMAFA Registered APHP Member 114</p> <p>Years' Experience: 20</p>	<p>Jaco van der Walt has been practicing as a CRM archaeologist for 20 years. He obtained a Master of Arts (MA) degree in Archaeology from the University of the Witwatersrand focusing on the Iron Age in 2012 and is a PhD candidate at the University of Johannesburg focusing on Stone Age Archaeology with specific interest in the Middle Stone Age (MSA) and Later Stone Age (LSA). Jaco is a professional member of ASAPA, and accredited by the association's CRM section. He is also a member of the Association of Professional Heritage Practitioners (APHP). Jaco has a vast range of experience in impact assessments, archaeological mitigation, grave relocation, NHRA Section 34 application processes, and CMPs in all provinces of South Africa. He has also worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, DRC, Zambia and Tanzania. Through this he has a sound understanding of the IFC Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage.</p>

Team Member	Bio Sketch
Shannon Hardwick  ASAPA Member 451 AMAFA Registered  Years' Experience: 01	Shannon joined the Digby Wells team in May 2017 as a Heritage Management Intern, and has subsequently been appointed as an Assistant Heritage Resources Management Consultant. Shannon is an archaeologist who obtained a MSc degree from the University of the Witwatersrand in 2013, specialising in historical archaeobotany in the Limpopo Province. She is a published co-author of one paper in <i>Journal of Ethnobiology</i> . Since joining Digby Wells, Shannon attended courses in architectural and urban conservation through the University of Cape Town's Faculty of Engineering and the Built Environment Continuing Professional Development Programme in 2019. Her other experience includes compiling a Community Health, Safety and Security Management Plan (CHSSMP) and researching Artisanal and Small-Scale Mining for input into a Livelihood Restoration Framework (LRF). Shannon's experience in the field includes pre-disturbance surveys in South Africa and fieldwork in Malawi.

## 1.7. Structure of the Report

The remainder of the report is structured as follows:

- Chapter 2: Legislative and Policy Framework to frame the regulatory framework within which the Project was completed;
- Chapter 3: The various assumptions, constraints and limitations that influences the results of the mitigations completed;
- Chapter 4: Details the methodologies employed to complete the requisite scope;
- Chapter 5: Summarises the natural landscape within which the various sites are located and possibly influenced the interpretations of the collected data;
- Chapter 6: Summarises the cultural landscape that frames the context within which the heritage producers operated;
- Chapter 7: Provides the outcomes of the mitigations conducted;
- Chapter 8: Collates all applicable information into a coherent discussion of the findings within the context of the natural and cultural landscape; and
- Chapter 9: Concludes the report.

## 2. Legislative and Policy Framework

The national legislative framework governs the HRM process. This section provides an abbreviated description of the relevant legislation pertaining to the Phase 2 Mitigations for the Project.

Table 2-1 presents a summary of the applicable legislation and guidelines used to inform the implementation of the required SoW presented in subsection 1.5 above.

**Table 2-1: Applicable Legislation and Guidelines**

Legislation & Guidelines	Applicability
<p><b><u>National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)</u></b></p> <p>The NHRA is the overarching legislation that protects and regulates the management of heritage resources in South Africa, with specific reference to the following Sections:</p> <ul style="list-style-type: none"> <li>• 5. General principles for HRM; and</li> <li>• 35. Protection of palaeontological, archaeological and meteorite resources</li> </ul>	<p>Phase 2 mitigations were completed in respect of Section 35 under the authority of the issued Permit 3201.</p>
<p><b><u>National Heritage Resources Act, 1999 Regulations (NHRA Regulations) (GN R 548)</u></b></p> <p>SAHRA established regulations to the NHRA in terms of Section 25 of the Act. The requirements encapsulated within the NHRA are regulated by the provisions of GN R 548, with specific reference to the following Chapters:</p> <ul style="list-style-type: none"> <li>• II – General provisions for permit applications.</li> <li>• IV – Application for permit: Archaeological or palaeontological site or meteorite.</li> </ul>	<p>Phase 2 mitigations were completed in respect of Section 35 under the authority of the issued Permit 3201.</p> <p>The Permit 3201 was issued by the SAHRA APM Unit in accordance with Chapters II and IV of the NHRA Regulations.</p>

### 3. Assumptions, Constraints and Limitations

The following assumptions, constraints and limitations influenced the implementation of the archaeological mitigations:

- Recording spatial information through use of a Trimble R4 GNSS System with an average accuracy of ~20mm was not possible as it was not permitted under the Project Radio Frequency Interference (RFI) Policy. Alternative methods detailed in Section 4.1 were employed;
- Subsequent to the approval of the HIA and CMP, SARAO amended infrastructures to avoid identified impacts to select heritage resources. Consequently, the identified possible impacts to SA-017 are no longer applicable and *in-situ* conservation is achieved. The report therefore excludes detailed mapping and surface sampling of SA-017 authorised under Permit ID 3102;
- The proximity of SA-005 and SA-006 suggest the surface accumulations are associated with a single occupation. For the purposes of the archaeological mitigations, these were considered as a single site;

- Excavations of quadrants N16E6, N17E6 and N18E6 demonstrated surface artefacts were underlain by a hard silt layer. Test excavations beneath the hardpacked silt layer in these quadrants yielded no further artefacts. It was assumed this pattern would continue throughout the site;
- As the site comprised of surface accumulations, no soil samples were collected to facilitate potential optically stimulated luminescence dating, or phytolith and isotope analysis.

## 4. Methodology Statement

### 4.1. Density Mapping

Where identified heritage resources are located within a defined 50 m buffer area of associated Project infrastructure, Digby Wells recommended recording through density mapping and where necessary, sample collections. This recommendation was applicable to the identified heritage resources listed in Table 4-1.

**Table 4-1: Heritage Resources Requiring Density Mapping**

Site No.	Recommended Mitigation	Property
SA-005	Detailed Recording	Swartfontein 496 Ptn 2/496
SA-006	Detailed Recording	Swartfontein 496 Ptn 2/496
SA-012	Detailed Recording	Swartfontein 496 Ptn RE/497
SA-014	Detailed Recording	Blaauw Heuvel 96 Ptn RE/96
SA-015	Detailed Recording	Blaauw Heuvel 96 Ptn RE/96

The specialists completed a distribution and density mapping exercise to provide insight into the nature of the archaeological resources, spatial relationships of artefacts and modified areas, and the cultural significance of the site itself. At each site, the specialist completed a visual inspection to determine the approximate extent of surface accumulation clusters.

Due to radio frequency restrictions, the specialist could not use the proposed Trimble R4 GNSS System. To mitigate against this restriction, artefacts were sampled within a grid comprising 2 x 2 m squares to facilitate probabilistic recording of spatial distribution patterning and lithic densities within a controlled area. The grid system covered identified lithic assemblages, orientated from north to south. Surface accumulations were recorded from each square as created by the established grid system by the following:

- Artefact type;
- Raw material;
- Formal description;

- Relative density per two m<sup>2</sup> rated as either low (<20 lithics); medium (20 - 40 lithics) or high (>40 lithics).

A photograph of a representative sample of identified artefacts at each location was taken.

The specialists tabulated the results of the surface observations to inform the development of a density plan.

## 4.2. Phase 2 Mitigations

### 4.2.1. Excavation

The heritage resource SA-016 is situated within the development footprint of antenna SKA-027. In this instance, the identified impact to SA-016 cannot be removed or avoided through amendment of the Project development footprint. Therefore, mitigations were facilitated through archaeological excavation.

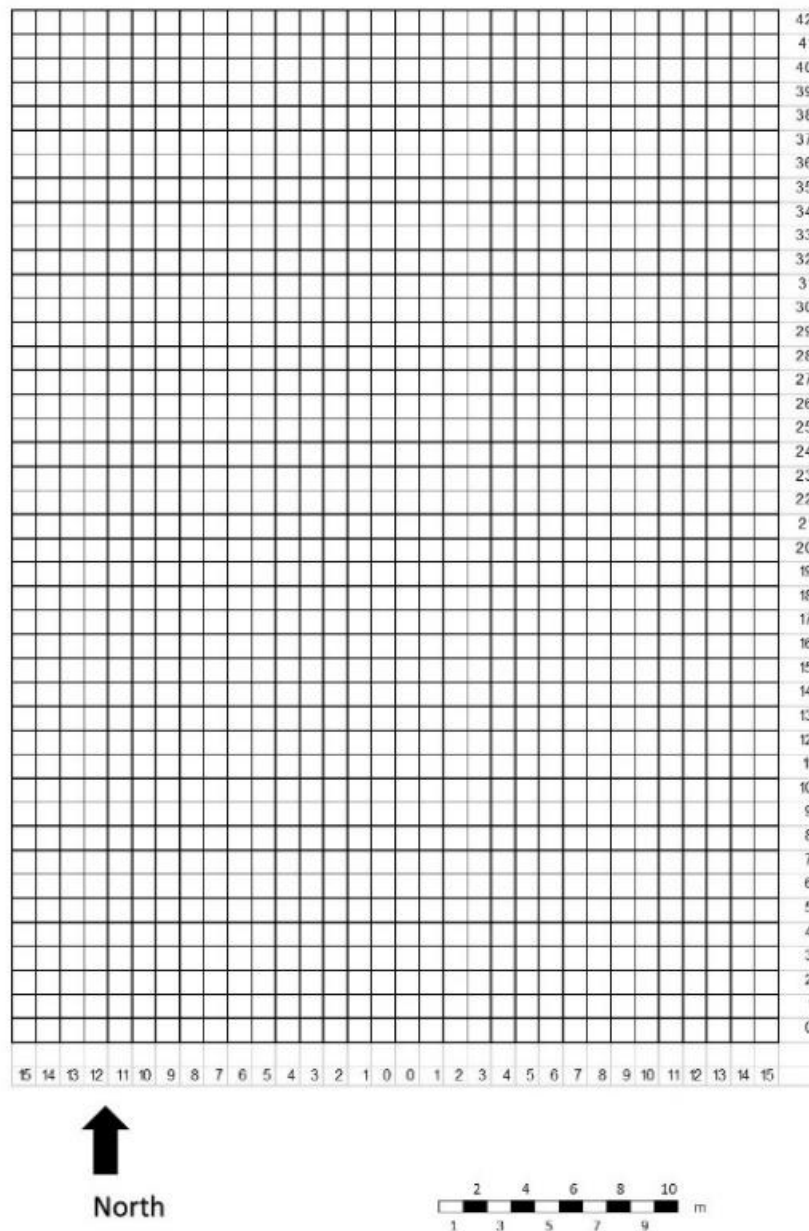
**Table 4-2: Heritage Resources Requiring Excavation**

Site No.	Recommended Mitigation	Property
SA-016	Excavation	Swartfontein 496 Ptn RE/496

The specialists completed the excavations between 20 - 28 July 2020. Standard archaeological excavation and recording techniques as outlined by applicable SAHRA guidelines and standards informed the mitigation techniques.

To commence with the mitigations, the specialists established a datum line orientated north to south to facilitate the placement of grid covering an areal extent of 1,344 m<sup>2</sup> over the site. This established a grid comprising of 1 x 1 m quadrants, each with a unique identifier, within which the excavations were carried out. Excavations were primarily undertaken as simple test pits and trenches, completed manually in controlled spits for recording purposes.





**Figure 4-1: Excavation Grid**

#### **4.2.2. Collections Management**

Accession of excavated material occurred on site, recording the provenance, types of artefact and location using the unique identifiers as reference.

Collected material culture was stored in paper bags. As part of this report, a site catalogue was created where descriptions to provenance and material type were recorded.

The McGregor Museum will continue off-site collections management of the excavated material as the legal repository as per the issued permit requirements.

### 4.3. Preliminary Analysis

Collected material culture remains are associated with the MSA through LSA periods. Most of the collected material culture comprised LSA lithics. A preliminary analysis of the LSA lithics followed the typology described by Parsons (2006; 2007) to facilitate regional comparison.

Other collected material culture consisted of ostrich eggshell (OES) fragments. The OES fragments were counted, weighed and examined for modification, such as decoration motifs or drilling as part of bead production.

## 5. Natural Landscape

The geological context of the regional study area is associated with sediments of the Karoo Supergroup of Early to Middle Permian age (Le Roux & Keyser, 1988; Viljoen, 1989; Prinsloo, 1989; Johnson, et al., 2006; Almond, 2016; Bamford, 2018).

The Ecca Group formations were laid down within or on the margins of a very extensive inland sea or lake on southwestern Gondwana, whereas the *Abrahamskraal Formation* of the Lower Beaufort Group was deposited on land by rivers and in the shallow floodplain ponds or lakes (Almond, 2016). During the Early Jurassic Period, the Drakensberg Basalt outpouring, i.e. doleritic magmas of the Karoo Dolerite Suite, created extensive sills and dykes that intrude the Karoo sediments. These dolerites weather to fragmented, patinated boulders.

Finally, Quaternary Sands and alluvium cover most of the study area. Generalised soil patterns suggest six soil types are present in the area under consideration, namely AR1; AR2<sup>3</sup>, FL<sup>4</sup>, LP2<sup>5</sup>, PL1<sup>6</sup>, R<sup>7</sup> and SC<sup>8</sup>. The Permian shales, mudstone and sandstone outcrops are, however, easily visible in the sparse vegetation (Bamford, 2018; CSIR, 2016). Similarly, the sparse vegetation promotes high-visibility of archaeological material on the surface.

The landscape of the local study area is characterised by abrupt ridges and conical hills scattered across extensive sandy and silty plains. Surface water systems comprise endorheic<sup>9</sup> water courses arising on the escarpment and off ridges and hills. These water courses flow in a predominantly northerly direction and discharge into pans where the water evaporates (CSIR, 2016). The archaeological sites considered in this assessment are located within proximity to these systems where sheet erosion is prevalent. The exception to this is SKA-016, which is situated on a higher lying area between dolerite boulders and LP2 soils.

Climatically, the area under consideration is arid with very little summer rainfall.

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<sup>3</sup> Red and yellow, well drained sandy soils

<sup>4</sup> Negligible to weak profile development, usually occurring on deep alluvial deposits

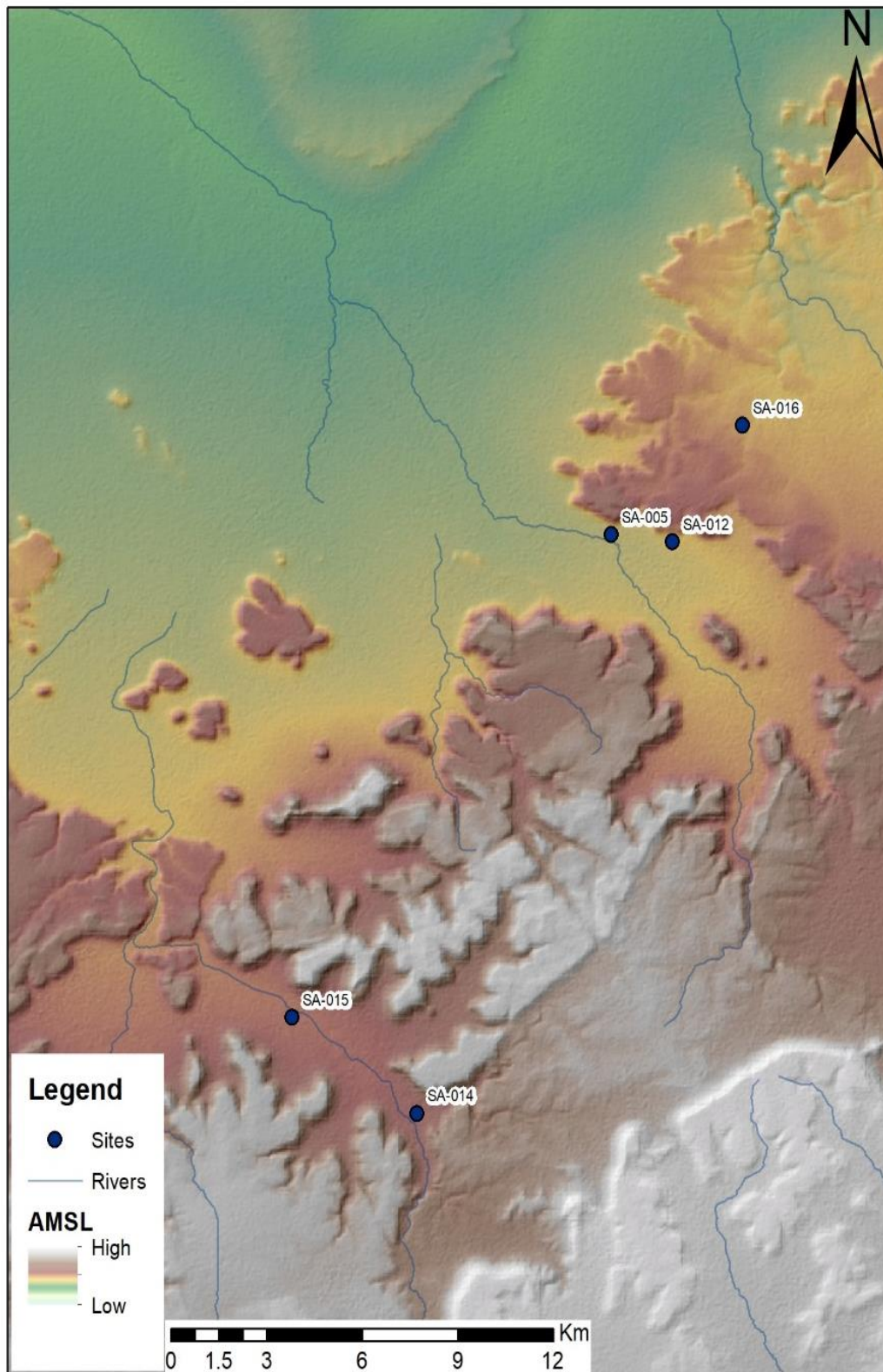
<sup>5</sup> Minimal development, usually shallow on hard or weathering rock, with or without intermittent diverse soils

<sup>6</sup> Marked clay accumulations, strongly structured and reddish in colour

<sup>7</sup> Rock with limited soils

<sup>8</sup> Strongly saline soils generally occurring in relatively deep deposits in low lying arid areas

<sup>9</sup> An endorheic system is a drainage basin that normally retains water and allows no outflow to other external bodies of water but converges instead into pans, permanent or seasonal, that equilibrate through evaporation.



**Figure 5-1: Distribution of Archaeological Sites within the Landscape**

## 6. Cultural Heritage Baseline

The study area is known to comprise tangible and intangible heritage resources ranging from palaeontological through to the historical period. For the purposes of this report, this section will provide an abbreviated description of the archaeological context. For a detailed baseline description, please refer to the HIA available on Case ID 12292<sup>10</sup>.

The archaeological landscape comprises *inter alia*:

- The archaeological record associated with Earlier (ESA) and Middle Stone Age (MSA) lithic artefacts;
- The archaeological record associated with Later Stone Age (LSA) artefacts attributed to the /Xam group;
- The archaeological record associated with Rock Art engravings attributed to various San groups, and the /Xam in particular;
- The archaeological record associated with LSA artefacts and pottery attributed to Khoekhoe groups; and
- The archaeological record associated with Rock Art paintings attributed to Khoekhoe groups.

In the context of this report, particular emphasis on the MSA and LSA is required. The South African Stone Age sequence is complex, spanning more than two million years (Mya). The MSA ranges between ~300 to 20 thousand years ago (kya), and the LSA ~40 kya to 1840. Regional variations in characteristics and time ranges are presented in Table 6-1.

**Table 6-1: South African Stone Age sequence (adapted from Lombard et al, 2012)**

Period	Techno-complex	Dates	Also known as (including regional variants)
Later Stone Age <40 kya	Ceramic Final LSA	<2 kya	Ceramic post-classic Wilton, Late Holocene with pottery (Doornfontein, Swartkop)
	Final LSA	4 – 0.1 kya	Post-classic Wilton, Holocene microlithic (Smithfield, Kabeljous, Wilton)
	Wilton	8 – 4 kya	Holocene microlithic
	Oakhurst	7 – 1 kya	Terminal Pleistocene / early Holocene non-microlithic (Albany, Lockshoek, Kuruman)
	Robberg	18 – 12 kya	Late Pleistocene microlithic

<sup>10</sup>Available at <https://sahris.sahra.org.za/cases/nrf4874-sarao-ska-hia-and-conservation-management-plan>

Period	Techno-complex	Dates	Also known as (including regional variants)
	Early LSA	40 – 18 kya	
Middle Stone Age >20 - <300 kya	Final MSA	40 – 20 kya	MSA IV at Klasies River, MSA 4 generally
	Sibudu	58 – 45 kya	Late MSA / post-Howieson's Poort or MSA III at Klasies and MSA 3 generally
	Howieson's Poort	66 – 58 kya	-
	Still Bay	77 – 70 kya	
	Pre-Still Bay	96 – 72 kya	
	Mossel Bay	105 – 77 kya	MSA II at Klasies River, MSA 2b generally (Pietersburg, Orangian)
	Klasies River	130 – 105 kya	MSA I at Klasies River, MSA 2a generally (Pietersburg)
	Early MSA	300 – 130 kya	-

Beaumont et al (1995) described the archaeology of the Northern Cape as rich and varied, manifesting as “*thousands of square kilometres of Bushmanland covered by a low density lithic scatter*”.

The MSA consists of high proportions of minimally modified blades, represented by the Levallois technique characterising the early MSA (Clark, 1982). In general however, the MSA is broadly defined by blades and points produced from good quality raw material, the use bone tools, ochre, beads and pendants (Deacon & Deacon, 1999).

In the Karoo, lithics occur widely over the landscape and can be considered as “background” scatter in that geological, rather than human action condition the fine-scale distribution (Orton, 2016). Thus, well researched MSA sites in this region of South Africa are uncommon. A noteworthy aspect of the Northern Cape archaeological record, however, is the frequent association of lithics associated with pans dispersed throughout the landscape (Beaumont, et al., 1995).

The LSA correlates to habitation of the landscape by:

- *Bona fide* hunter-gatherer groups, i.e. the San;
- Southerly migration of pastoralists, i.e. Khoekhoe into the region from ~2 kya (Brenton, et al., 2014; Sadr, 2015).

Lithics associated with the LSA are specialised: specific tools being created for specific purposes, and the inclusion of bone tools into the assemblages (Mitchell, 2002). LSA sites commonly contain diagnostic artefacts, such as microlithic scrapers and segments. In this

region of the Northern Cape, the LSA is commonly represented by expression of the Final LSA dating to ~4 – 0.1 kya and the latest LSA techno-complex, Ceramic Final LSA dating from ~<2 kya (See Table 6-1). These techno-complexes represent tangible material culture markers of different socio-economic identities associated with the San and Khoekhoe respectively. Archaeologically, these commonly correlate with the Swartkop (i.e. hunter-gatherer) and Doornfontein (i.e. pastoralist) variants (Beaumont & Vogel, 1984; Beaumont, et al., 1995; Parsons, 2003; 2006; 2008).

Swartkop assemblages are characterised by many blades / bladelets and backed blades (Lombard & Parsons, 2008) on Crypto-Crystalline Silicates (CCS<sup>11</sup>) (Beaumont, et al., 1995; Parsons, 2003). Ceramic samples consist of coarse undecorated potsherds, often with grass temper, and few iron objects. Sites dating to this period usually occur close to water sources like pans or stream-bed margins, bedrock depressions containing seasonal water (referred to as *!gorras*), hollows on dunes, and on the flanks or crests of koppies (Beaumont, et al., 1995; Parsons, 2008). Interestingly stone built structures, such as ovals or circles, are known to occur at Swartkop sites. These features may represent the bases of huts, windbreaks or hunter’s hides (Parsons, 2004; Jacobson, 2005; Lombard & Parsons, 2008). These sites are linked to the historic /Xam communities of the area who usually followed a hunter-gatherer economy (Deacon, 1986; 1988; Beaumont, et al., 1995).

Doornfontein sites are mostly confined to permanent water sources and are characterised by large samples of thin-walled ceramics with a large portion of necks and rims decorated. Lithics are often produced on quartz, and dominated by coarse irregular flakes with a small or absent retouched component (Beaumont, et al., 1995; Parsons, 2003; 2008; Lombard & Parsons, 2008). Later manifestations contain coarser potsherds with some grass temper, a higher number of iron or copper objects, and large ostrich eggshell beads (Jacobson, 1984; 2005). These assemblages are mostly associated with the Khoekhoe who usually followed a pastoralist economy (Beaumont, et al., 1995).

Digby Wells recorded a total of 28 archaeological features during the field assessment. Table 6-2 presents the identified archaeological resources applicable to Permit ID 3102, the attributed Cultural Significance (CS) and proposed Field Ratings (FR).

**Table 6-2: Identified Archaeological Resources**

Site Reference	Description	CS	FR
SA-005	Low density surface scatter (<10:1 sq. m) of what appear to be LSA lithics, including two bladelets.	Low	General Protection IV A
SA-006	Low density surface scatter (<10:1 sq. m) of what appear to be LSA lithics, including two bladelets.		

<sup>11</sup> CCS broadly refers to sedimentary rock that has been altered through metamorphic processes resulting extremely fine-grained or microscopic crystals built with a silicon and oxygen structure.

Site Reference	Description	CS	FR
SA-012	MSA low density surface scatter (<10:1 sq. m)	Low	
SA-014	Site: low complexity, multiple components <25 sq. m / 5 x 5 m		
SA-015	Low density surface scatter (10:1 sq. m) representing the ESA, MSA and LSA.		
SA-016	High density surface scatter (>20:1 sq. m) of Stone Age artefacts, some of which may be LSA.	High	Grade III B
SA-017	Low density LSA surface scatter (<10:1 sq. m).	Low	General Protection IV A

## 7. Mitigation Results

This section presents the analysis of the mitigation results. These are presented in two sections, namely the density mapping result of SA-005/006; SA-012; SA-014 and SA-015 under Section 7.1, and the excavation of SA-016 under Section 7.2.

### 7.1. Density Mapping

Density mapping took place at the aforementioned sites in the preceding sections, and Table 4-1. The lithics identified at these sites occurred within a deflated context, impacted on by sheet erosion and consequently, resulting in low density accumulations that did not warrant further excavations.

On this basis, the intent of the density mapping was to record the variability that may be evident amongst the surface versus excavated artefacts. This included consideration of raw material and artefact types, briefly discussed in subsequent sections.

Given the small sample size, it is believed the findings from these sites provide limited contributions to our understanding of the local Stone Age context. Furthermore, the specialists undertook no sampling from these sites rather opting for the mapping of artefacts within a 2 x 2 m grid and photographs of selected finds.

The findings from the individual sites are discussed separately in the following sub-sections.

#### 7.1.1. SA-005/006

SA-005/006 is an open-air site situated adjacent to a surface water system at the base of the ridge to the north (See Figure 5-1 & Figure 7-1). Identified artefacts (Figure 7-2) are scattered over a wide area due to sheet erosion / downslope alluvial wash. No discernible boundaries to the extent of the site could be determined. As such it remains unclear whether there is a change in occupation intensity over time, between units or across space.



The site comprised of lithics (mostly on Hornfells 37%), ostrich eggshell fragments and thin-walled ceramic pieces. The majority of lithics consisted of chunks, chips and flakes with few formal stone tools consisting of scrapers and a backed blade. No decorated or spouted ceramic pieces were identified. The specialists recorded 207 artefacts scattered over an area of 3,809 m<sup>2</sup> (Figure 7-3).



**Figure 7-1. SA-005/006 Site Photograph**





Figure 7-2. Selection of artefacts at SA-005/006

Figure 7-3

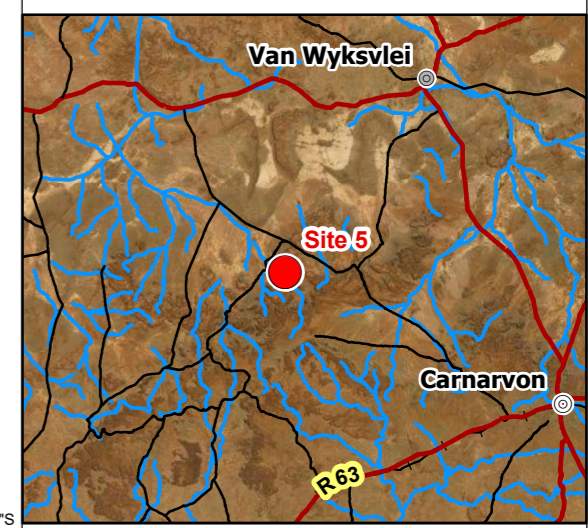
# SKA Project - Section 35 Permit Application Heat Density - Site 5

### Legend

- ⊙ Secondary Town
- Other Town
- Main Road
- Secondary Road
- +— Railway Line
- ⋯ Non-Perennial River/Stream
- Perennial River/Stream

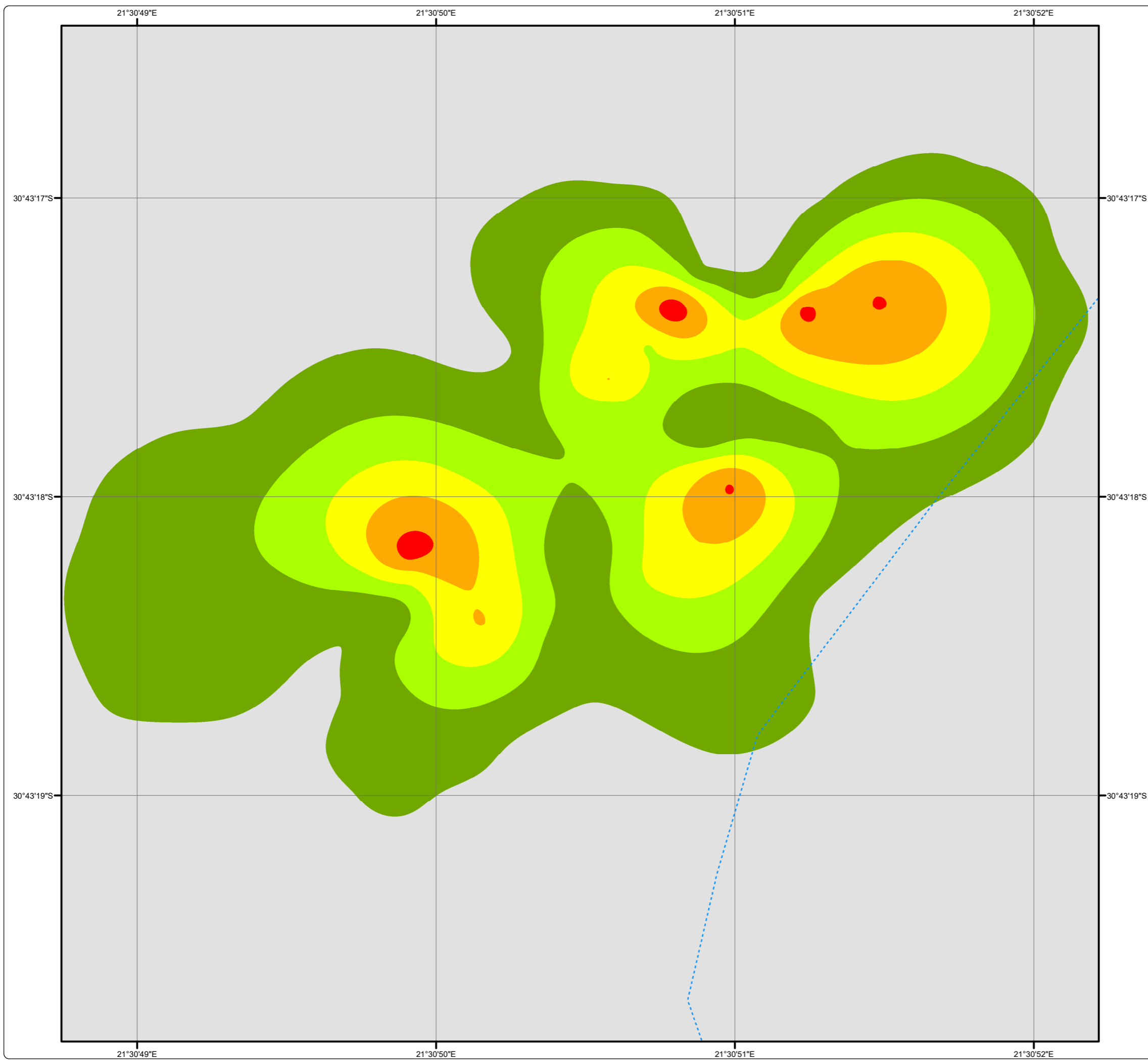
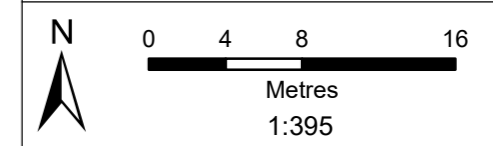
### Heat Density (Based on number of artefacts)

- Very Low
- Low
- Moderate
- High
- Very High



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Central Meridian: 21°E	Date: 05/10/2020



### 7.1.2. SA-012

SA-012 is an open-air site (Figure 7-4) situated adjacent to a surface water system at the base of the ridge to the north, to the east of Site SA-005/006 (See Figure 5-1). The site, marked by background scatters affiliated with the MSA (Figure 7-5) and to a lesser extent LSA, is highly deflated.

Recorded LSA artefacts are predominantly made from Hornfels, with a lack of patina. These characteristics allow for ease in recognition on the surface, compared to the weathered and patina seen on older MSA artefacts. The specialists recorded a low-density scatter of 84 artefacts over an area of 4,089 m<sup>2</sup> (Figure 7-6).



**Figure 7-4. SA-012 Site Photograph**



**Figure 7-5. Dorsal and ventral views of MSA lithics at Site SA-012**

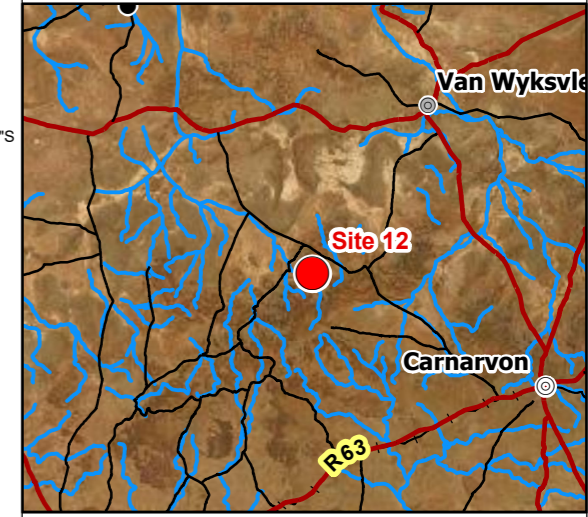
# SKA Project - Section 35 Permit Application Heat Density - Site 12

### Legend

- ⊙ Secondary Town
- ⊙ Other Town
- Settlement
- Main Road
- Secondary Road
- +— Railway Line
- ⋯ Non-Perennial River/Stream
- Perennial River/Stream

### Heat Density (Based on number of artefacts)

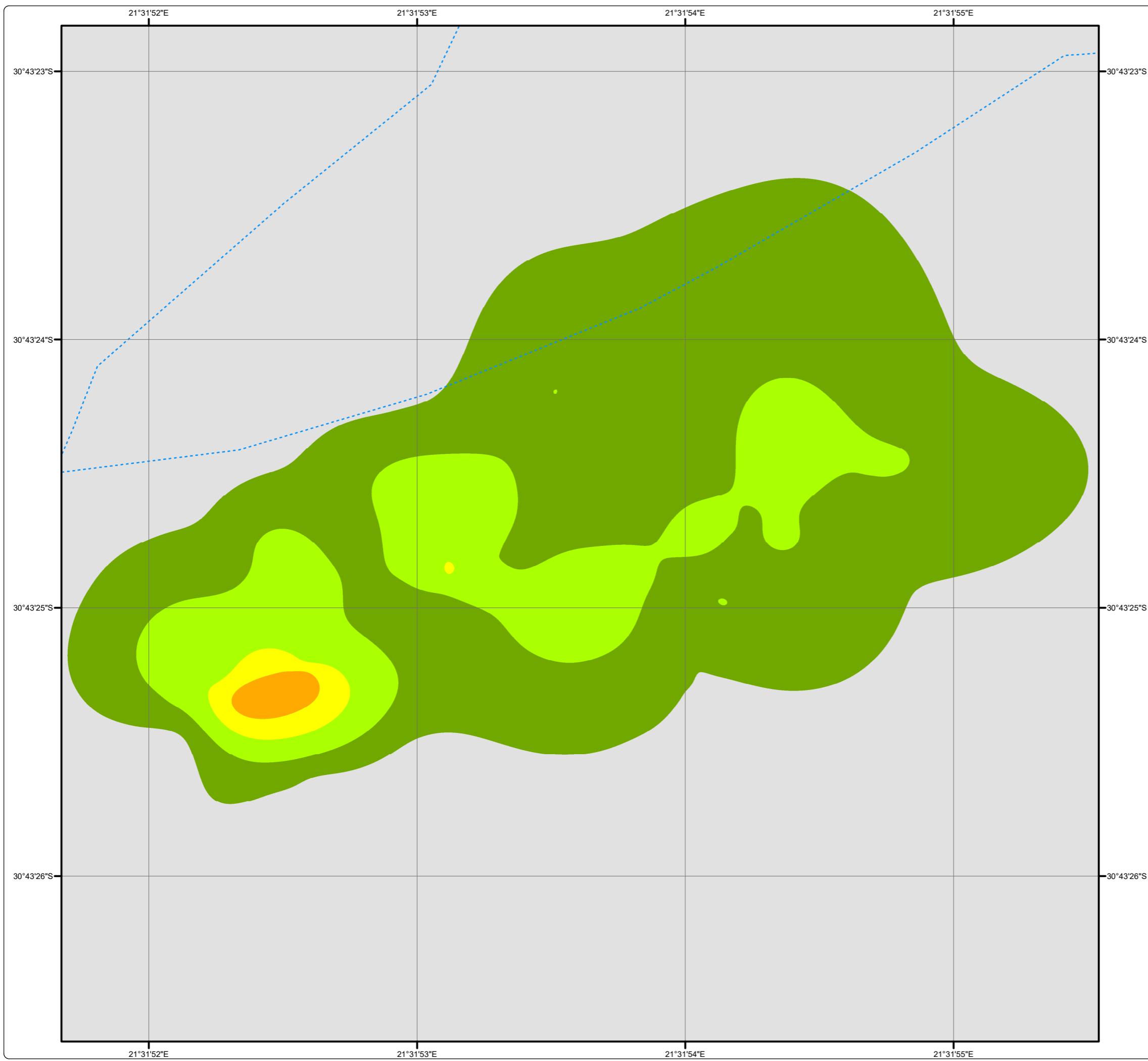
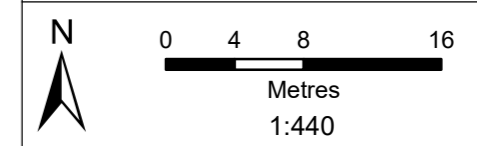
- Very Low
- Low
- Moderate
- High



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### 7.1.3. SA-014

SA-014 is an open-air site (Figure 7-7) situated adjacent to a surface water system to the north (See Figure 5-1). Erosion gully's cut through the site, consequently only a small section of the area considered for the density mapping remains intact.

Artefacts consisted of a low density scatter of 49 stone tools over an extent of 8,484 m<sup>2</sup> (Figure 7-9). Lithics are made from both Hornfells (46%) and to a lesser extend quartzite (16%) with a few undecorated ceramics (Figure 7-8) as well as few lower grinding stones alongside a red sand dune to the east of the ephemeral water course. Almost no formal tools were noted (Annexure A).



**Figure 7-7. SA-014 Site Photograph**



**Figure 7-8. Selected artefacts from Site SA-014**

Figure 7-9

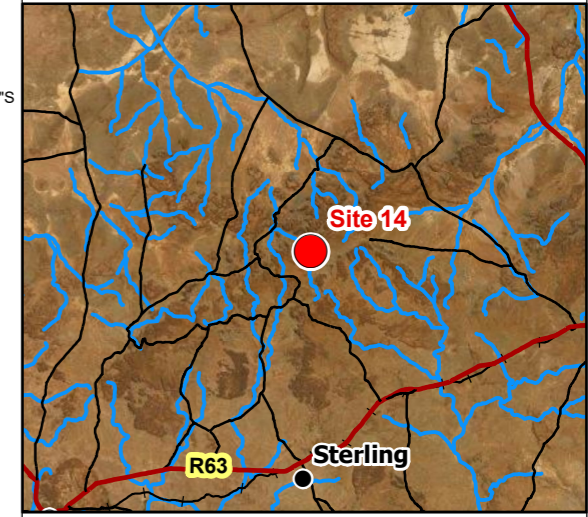
# SKA Project - Section 35 Permit Application Heat Density - Site 14

## Legend

- Settlement
- Main Road
- Secondary Road
- + + Railway Line
- ⋯ Non-Perennial River/Streams
- Perennial River/Stream

### Heat Density (Based on number of artefacts)

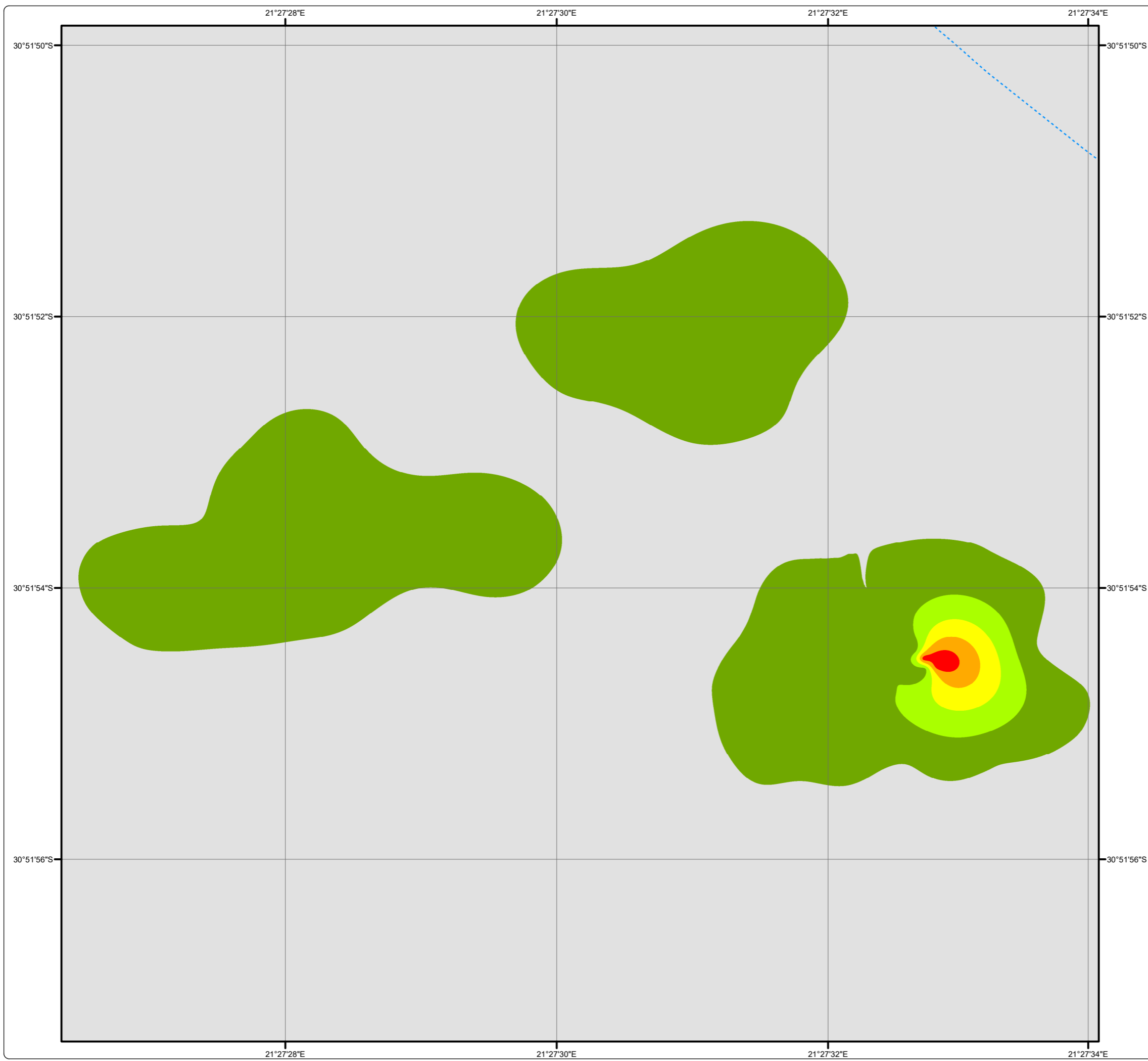
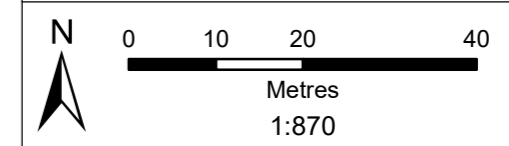
- Very Low
- Low
- Moderate
- High
- Very High



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Central Meridian: 21°E	Date: 05/10/2020







#### 7.1.4. SA-015

SA-015 is an open-air site (Figure 7-10) situated adjacent to a surface water system to the north west of SA-014 (See Figure 5-1). The site is on an exposed area on the banks of a river and prone to sheet erosion.

Artefacts consisted of a low-density scatter of 17 stone tools over an extent of 4,022 m<sup>2</sup>. No obvious LSA material was noted. In general, identified material appear to be associated with the MSA, as well as large ESA flakes outside of any discernable context (Figure 7-11).



**Figure 7-10. SA-015 Site Photograph**



**Figure 7-11. Selection of artefacts from Site SA-015**

Figure 7-12

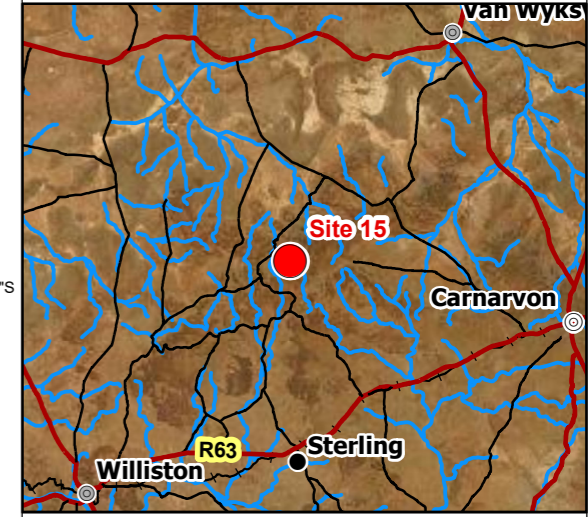
# SKA Project - Section 35 Permit Application Heat Density - Site 15

### Legend

- ⊙ Secondary Town
- ⊙ Other Town
- Settlement
- Main Road
- Secondary Road
- +— Railway Line
- Non-Perennial River/Stream
- Perennial River/Stream

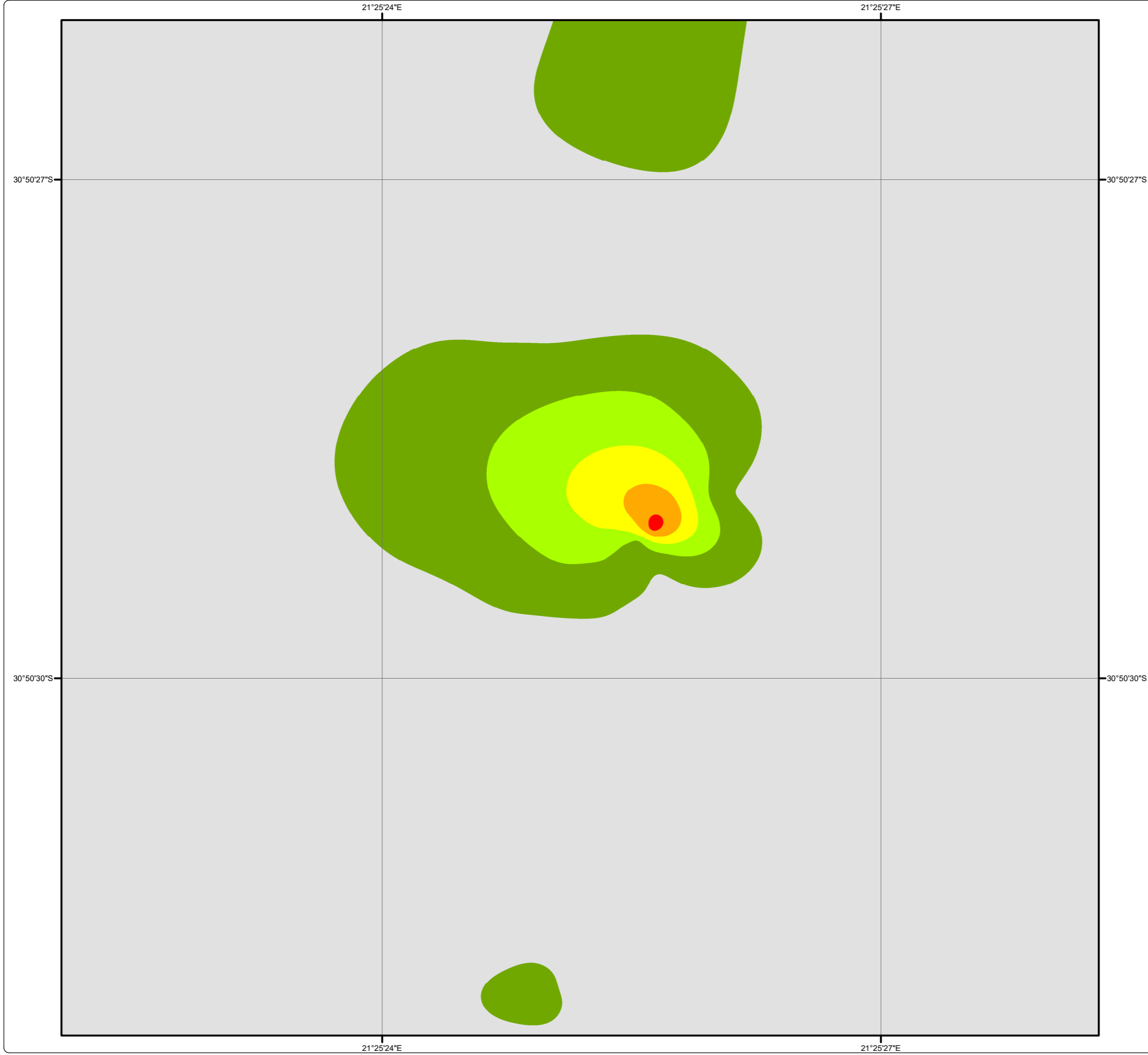
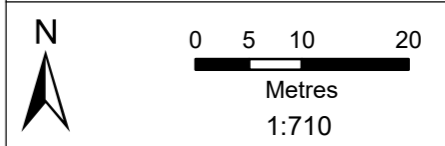
### Heat Density (Based on number of artefacts)

- Very Low
- Low
- Moderate
- High
- Very High



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Projection: Geographic Datum: WGS 1984 Central Meridian: 21°E  
 Ref #: SAR6105\_02\_H\_AMT\_v3 Revision Number: 3 Date: 05/10/2020





## 7.2. Excavations

As part of the HIA, the specialists identified the need to mitigate SA-016 through excavation under the authorisation of a Section 35 Excavation Permit (Permit ID: 3102). As part of this component of the greater heritage management of the Project, SA-016 is the largest site comprising a relatively large density scatter of lithics and ostrich eggshell fragments situated in a clear area, in-between between dolerite boulders on red Apedal soils (See Figure 7-13).



**Figure 7-13: SA-016 Site Photograph viewed South to North**

The excavation strategy consisted of a grid with baseline aligned north to south with excavations targeting densest artefact accumulations over an area of 1,344 m<sup>2</sup> (See Figure 7-14 and Figure 7-15). A primary activity area (based on artefact density) were noted in the south of the site in the vicinity of square N18E5 & N18E6. This activity area was surrounded with lower density scatters. Not all of this relatively clear area contained archaeological material and no artefacts were recorded in the following excavated squares:

- N26W0;
- N31E8; and
- N32E8.

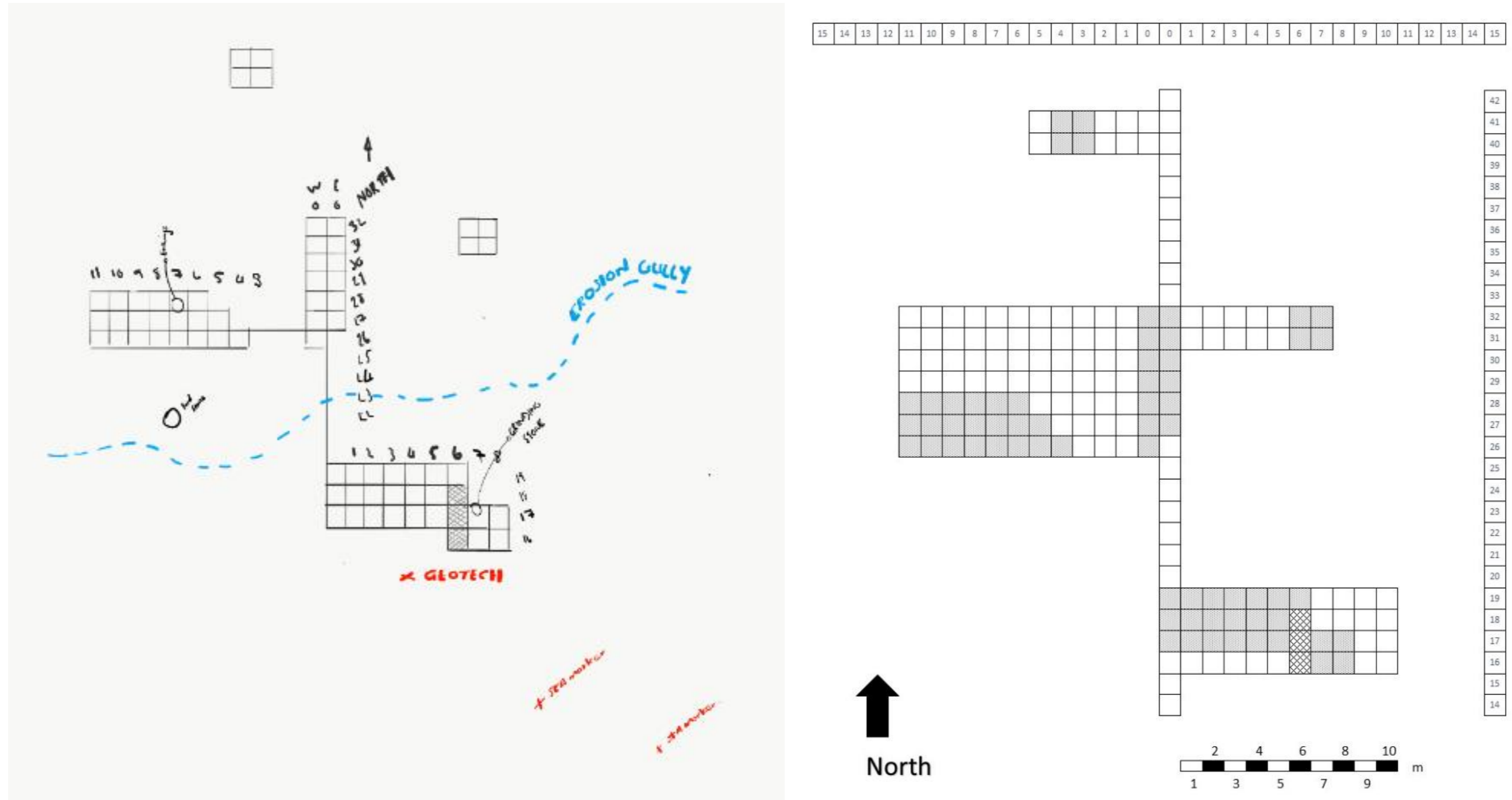


Figure 7-14: Site Layout Sketch & Plan



**Figure 7-15: Excavation Grid North Looking South**

A 3 and 1.5 mm sieve was used to screen the excavated material. A total of 647 stone artefacts were collected and analysed from a single stratigraphic unit of less than 5 cm on top of a harder compacted layer (See Figure 7-16). Test excavations were conducted through this hard layer to test for anthropogenic deposit but were found to be sterile. The recorded total of lithics excludes natural rocks that were recovered during the excavations. The majority of the stone tool artefacts originated from the following squares:

- N18E5: n = 37, 5.7%;
- N18E6: n = 34, 5.2%;
- N17E5: n = 26, 4.01%;
- N17E6: n = 20, 3%;
- N18E3: n = 20, 3%;
- N26W6: n = 19, 2.93%;
- N24W4: n = 19, 2.93%; and
- N17E7: n = 17, 2.62%.

A typological analysis in terms of stone tool categories and raw material is presented in Section 7.2.2. This data and the distribution of the material assists with understanding the

chronology and function of the site where higher concentrations may suggest possible activity areas as opposed to the marked surrounding lower density accumulations.



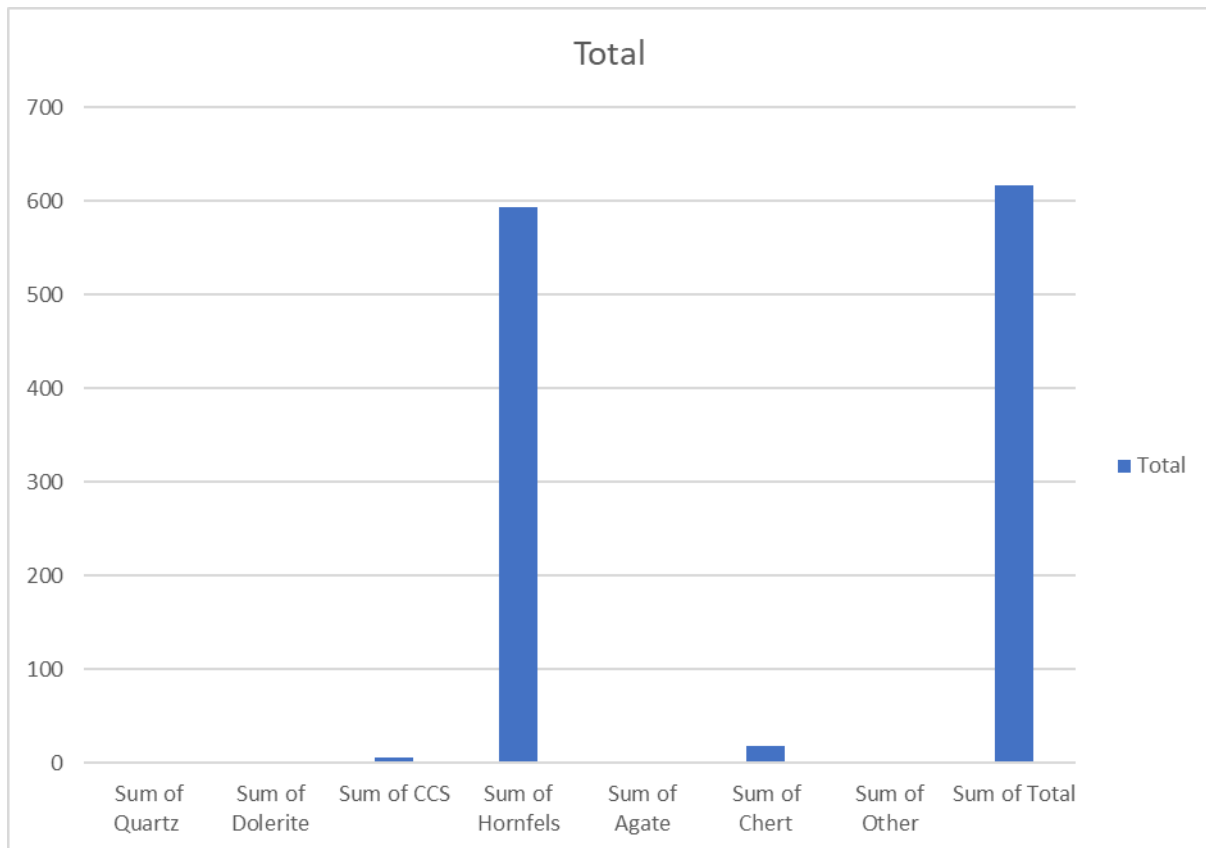
**Figure 7-16: Example of Harder Compacted Layer**

### 7.2.1. Raw Material

Raw material of stone tool artefacts comprised hornfels, chert and Crypto Crystalline Silica (CCS). These consisted of the following frequencies graphically represented in Figure 7-17:

- Hornfels: n = 623, 96.29%;
- Chert: n = 16, 2.78%; and
- CCS: n = 6, 0.92%.

Hornfels were favoured since it is freely available in clasts scattered around the site.



**Figure 7-17: Frequency of Raw Material at Site SA-016**

### 7.2.2. Typology

As demonstrated in subsection 7.2.1 above, the lithic assemblage is dominated by tools manufactured on hornfels. The typological analysis (Table 7-1) of the assemblage highlighted the high proportion of flakes, blades (>25 mm) and bladelets (<25 mm). Within the assemblage, there are very few retouched types, those identified consisting of backed bladelets and a few scrapers. Older patinated MSA tools with very few instances of reuse were noted. In addition to the flaked artefacts, the specialists also identified cores, including a single platform core, a broken bored stone and lower grindstone within SA-016. Of significance is the fact that no ceramics were recorded during the excavation. Figure 7-21 present examples of the stone tool artefacts collected from SA-016.



**Table 7-1: Inventory of Lithics from SA-016**

Debitage/Cores	Quartz	Dolerite	CCS	Hornfels	Agate	Chert	Shell	Total
Chips	0	0	2	149	0	5	0	156
Chunks	0	0	0	163	0	1	0	164
Blade core	0	0	0	1	0	1	0	2
Bladelet core	0	0	0	2	0	0	0	2
Irregular core	0	0	2	1	0	1	0	4
<b>Unretouched flakes</b>								
Whole irregular flake	0	0	2	54	0	0	0	56
Broken irregular flake	0	0	0	48	0	0	0	48
Whole blade	0	0	0	54	0	3	0	57
Whole bladelet	0	0	0	29	0	4	0	33
Broken blades and bladelets	0	0	0	72	0	2	0	74
<b>Retouched Pieces</b>								
Backed blade	0	0	0	2	0	0	0	2
Backed bladelet	0	0	0	1	0	0	0	1
Broken backed pieces	0	0	0	2	0	0	0	2
Miscellaneous backed pieces	0	0	0	2	0	0	0	2
Point unifacial lateral	0	0	0	4	0	0	0	4
Adze	0	0	0	3	0	1	0	4
Borer	0	0	0	1	0	0	0	1
Notched piece	0	0	0	1	0	0	0	1
Scraper	0	0	0	4	0	0	0	4
<b>Total</b>								<b>647</b>
<b>Other</b>								
MSA	0	0	0	30	0	0	0	30
OES - fragments	0	0	0	0	0	0	181	181
OES - half-made / broken beads	0	0	0	0	0	0	14	14
OES - complete beads	0	0	0	0	0	0	2	2
OES - total	0	0	0	0	0	0	197	197
<b>Total (excl. OES)</b>	0	0	6	623	0	18	0	647
<b>Total</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>623</b>	<b>0</b>	<b>18</b>	<b>197</b>	<b>844</b>

Figure 7-18 demonstrates the density of stone artefacts recorded during the excavations. From this, it is evident that most of the activity occurred in the southern portion of the area under investigation also see Figure 7-20. Artefacts from this area consist mostly of chips, chunks, blades & bladelets with formal tool marked by a notched piece and a scraper.

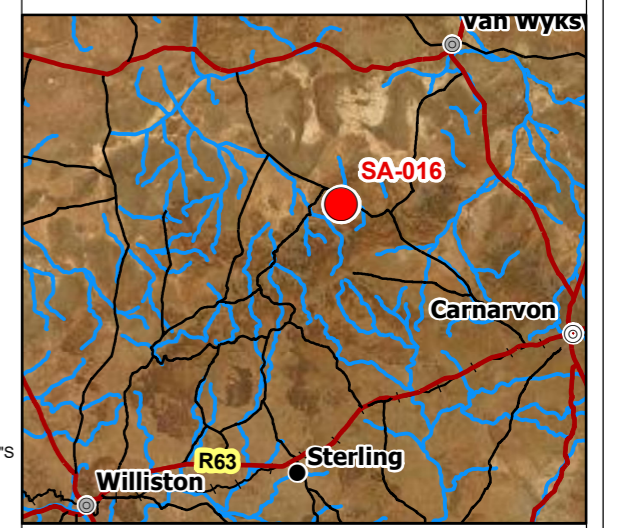
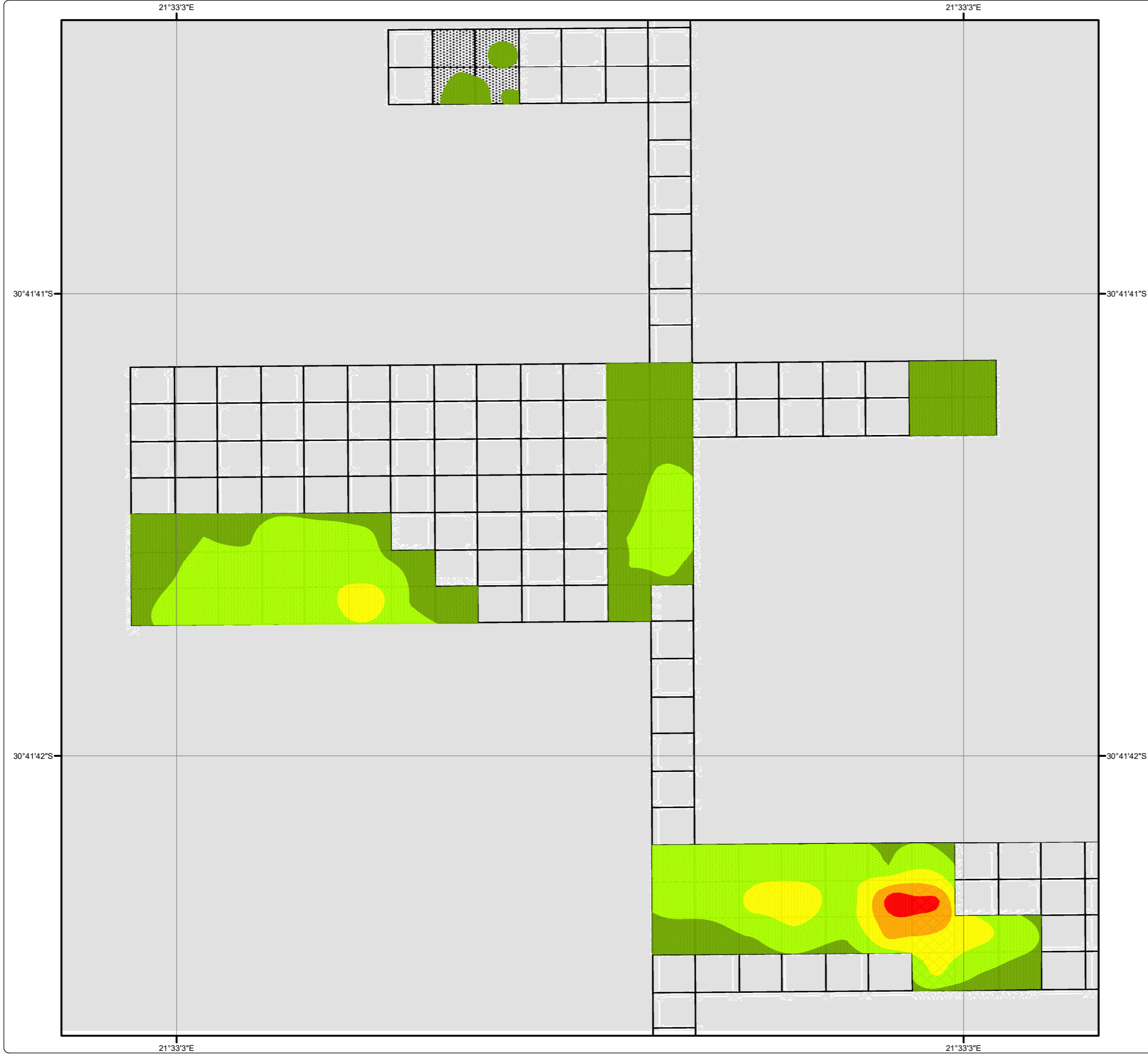
# SKA Project Section 35 Permit Application Heat Density - Site SA-016 (Lithic Artefacts)

### Legend

- ⊙ Secondary Town
- ⊙ Other Town
- Settlement
- Main Road
- Secondary Road
- Railway Line
- Non-Perennial River/Stream
- Perennial River/Stream
- Excavation Trenches and Squares

### Heat Density (Based on number of artefacts)

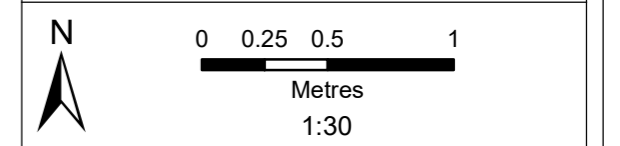
- Very Low
- Low
- Moderate
- High
- Very High



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### 7.2.3. Ostrich Eggshell

The specialists identified a large concentration of generally very small ostrich eggshell fragments within the Site SA-016. The concentration occurred within the southern portion of the site, clustered in the same activity area (N18E5 & N18E6) previously discussed (See Figure 7-20).

A total of 179 fragments were recorded, with a combined cumulative weight of 79 g. When compared to the average weight of a whole ostrich eggshell within the region being 230 to 250 g, the amount collected from SA-016 is relatively small (Kandel, 2004; Orton, 2008).

Sixteen fragments or whole beads (Figure 7-19) were recorded but are not further analysed here.



**Figure 7-19: Examples of Bead Manufacturing at Site SA-016**

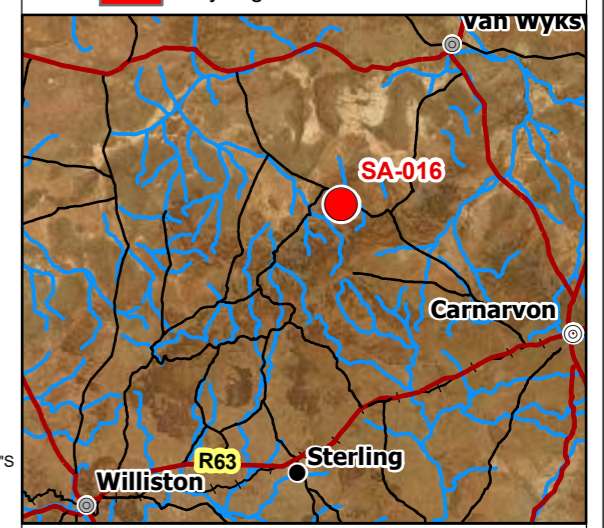
# SKA Project Section 35 Permit Application Heat Density - Site SA-016 (Ostrich Eggshells)

### Legend

- ⊙ Secondary Town
- ⊙ Other Town
- Settlement
- Main Road
- Secondary Road
- +— Railway Line
- ⋯ Non-Perennial River/Stream
- Perennial River/Stream
- Excavation Trenches and Squares

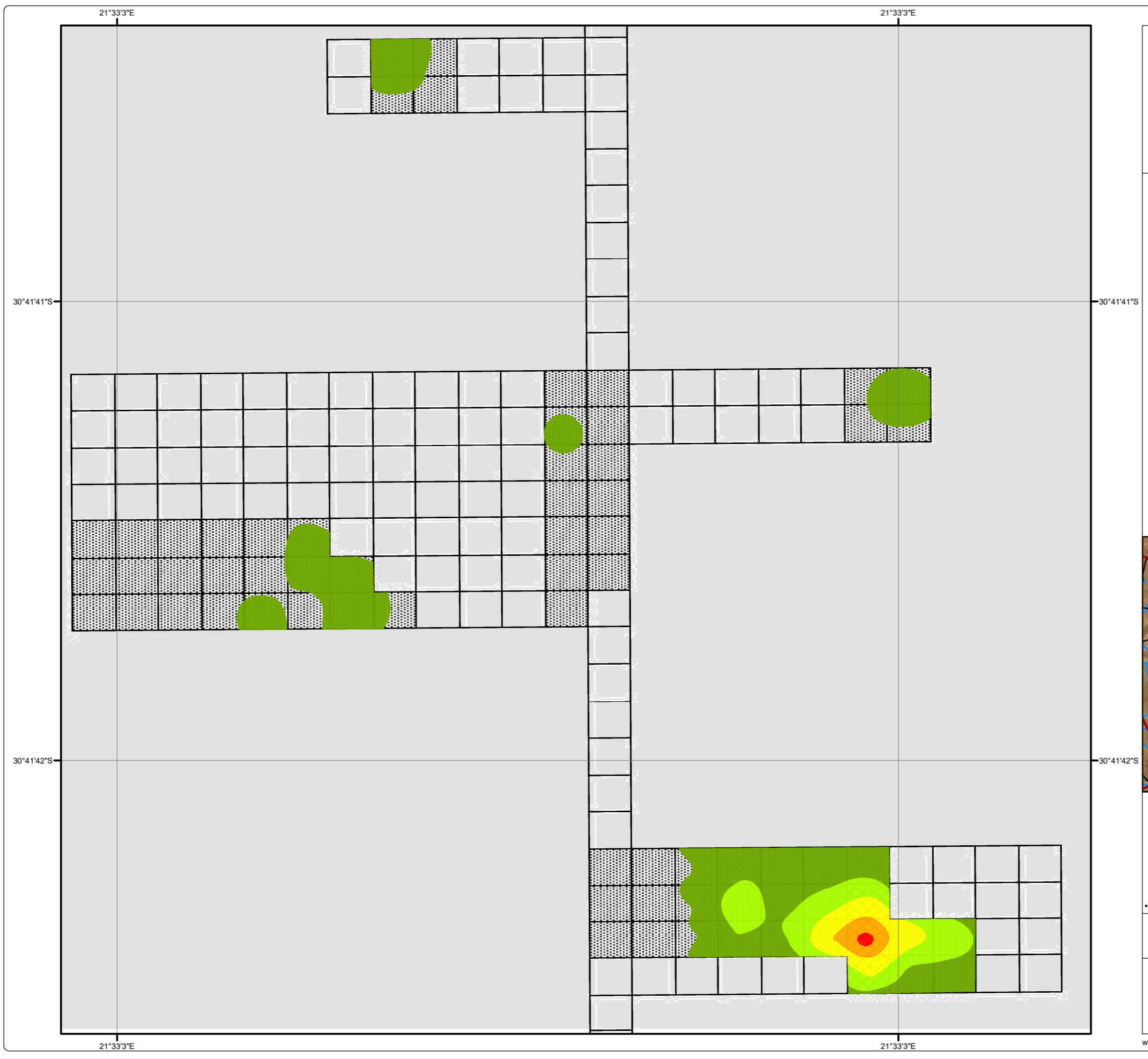
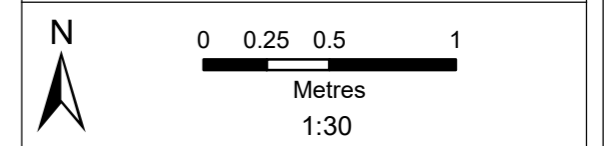
### Heat Density (Based on number of Ostrich Eggshell)

- Very Low
- Low
- Moderate
- High
- Very High



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 Ref #: SAR6105\_07\_H\_AMT\_v4 Revision Number: 4 Date: 06/10/2020



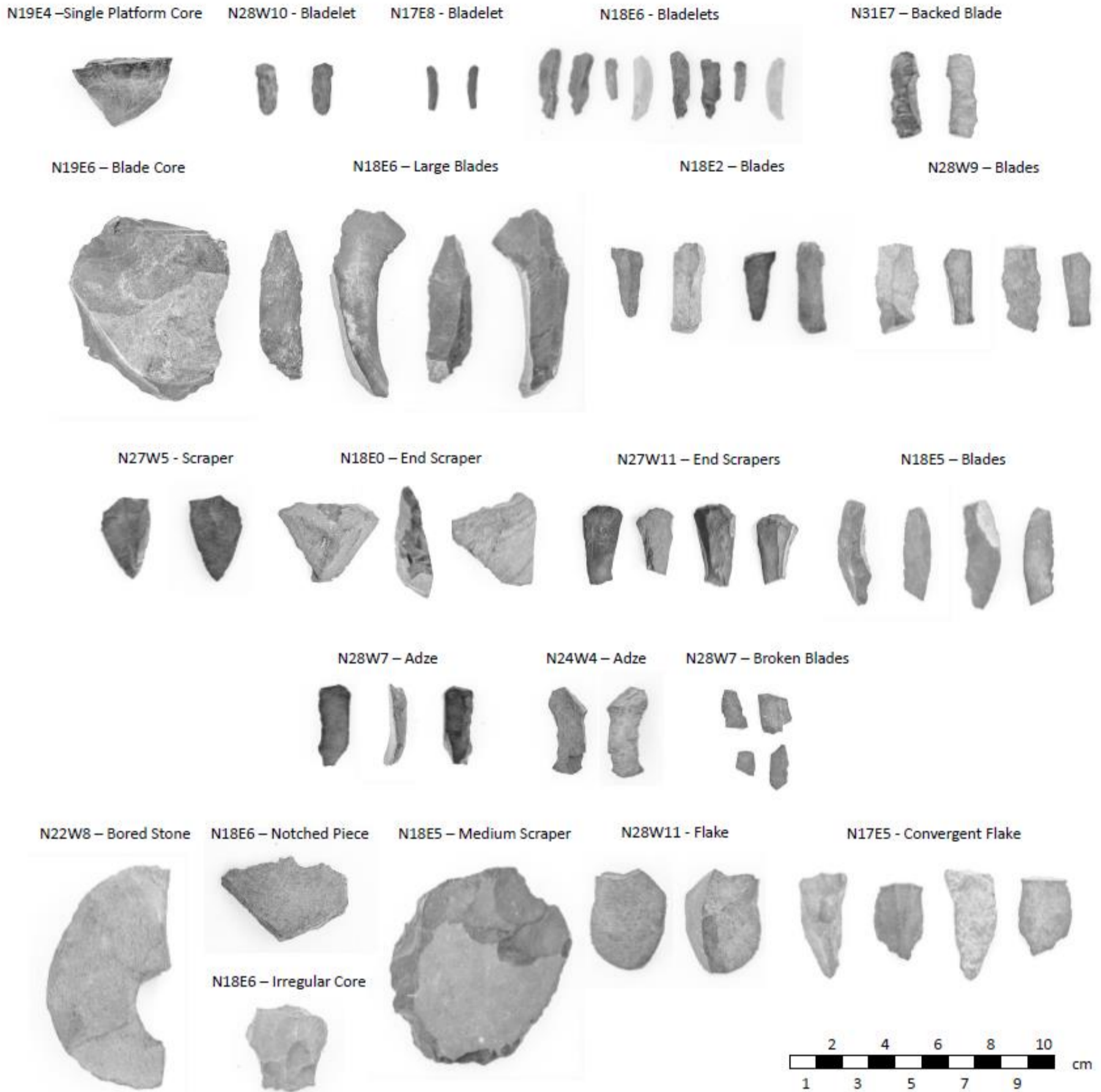


Figure 7-21: Examples of Collected Stone Tool Artefacts from Site SA-016



## 8. Discussion

Several aspects of the excavations and resulting findings merit some further discussion. Regarding methodology, consideration was given as to whether the density mapping made any material difference to the initial recommendation to focus excavations on Site SA-016. Plotting the ratio of artefacts for all the sites revealed that apart from Site SA-0016 the remaining four sites (SA 015, SA 012; SA 014 & SA 015), all had very low ratios (Table 8-1). These four sites had depositional and typologically similar characters. The last site (Site SA-016), however, had somewhat different characteristics and markedly different ratios of surface artefacts per m<sup>2</sup> (Table 8-1).

**Table 8-1: Lithics per m<sup>2</sup>**

Site Number	No. of Artefacts	m <sup>2</sup>	Artefacts / m <sup>2</sup>
SA-005	207	3809	0,054345
SA-012	84	4089	0,020543
SA-014	49	8484	0,005776
SA-015	17	4022	0,004227
SA-016	35	2	17,5

It has been noted that there is a 'background scatter' of lithics across much of Bushmanland. The density mapping described here have captured small samples of this scatter. Locally available Hornfels appear to have been the most favoured material with quartz second. The great variability in weathering (MSA artefacts are highly patinated and brown in colour while the LSA are fresh looking and black) amongst these artefacts shows that they relate to a relatively great period. Regionally speaking the LSA signature of the area consists of hunter-gatherers (Swartkop) and herder (Doornfontein) assemblages. The excavated assemblage (Site SA-016) show marked similarities with the Swartkop industry and is now briefly discussed.

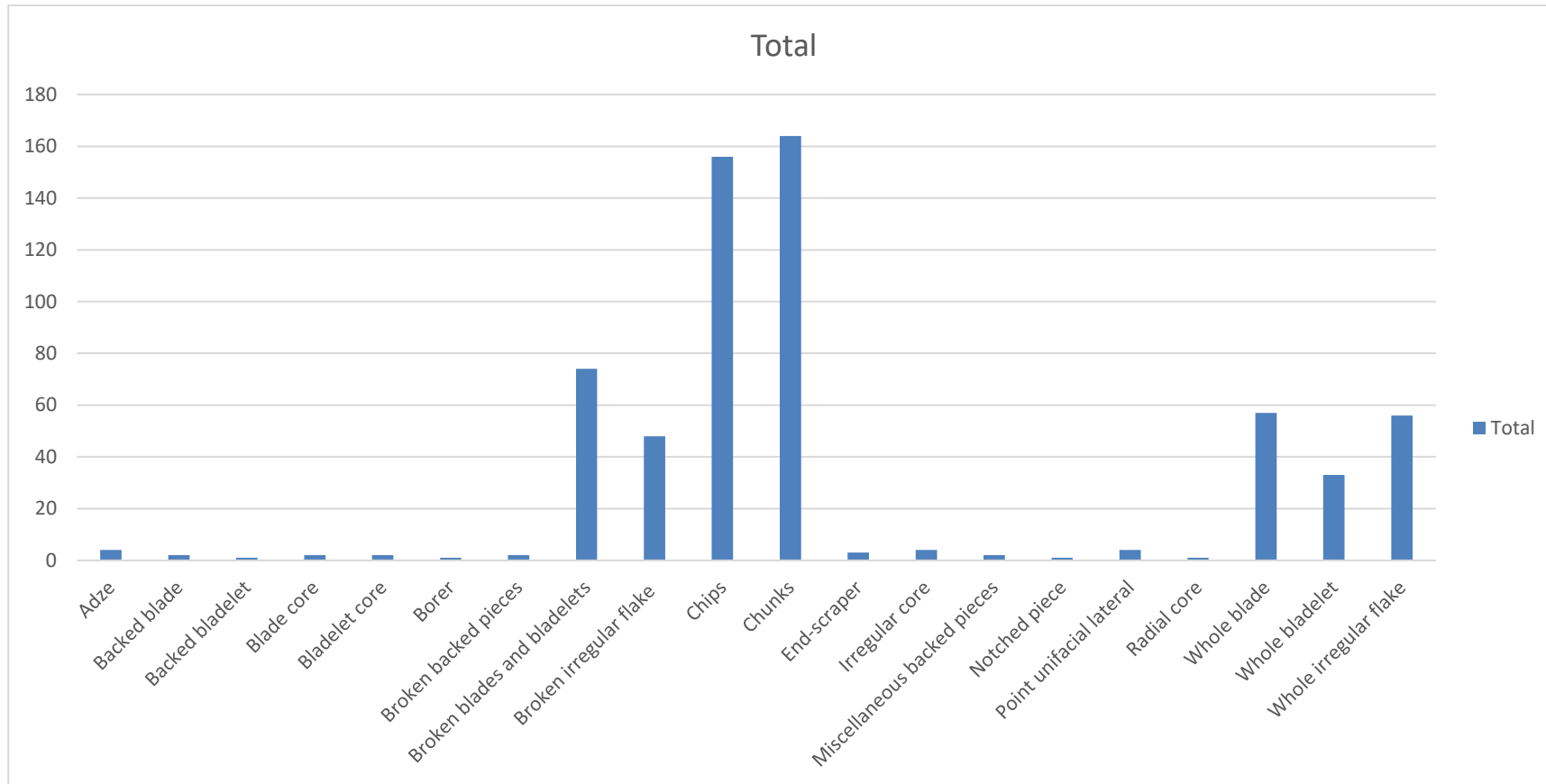
Two Swartkop Sites (Jagt Pan 7 and Vlermuigat) are located in close proximity to the study area, to the north and south east of Site SA-016 (Plan 3). Swartkop, is, broadly speaking, characterised by lithic artefacts mostly manufactured on hornfels and chert while some of these assemblages include large numbers of unretouched blades and bladelets (Parsons, 2006) like the finds from SA-016. The Jagt Pan 7 lithic component is dominated by blades and bladelets conforming with Beaumont *et al.*'s (1995) criteria for so-called Swartkop assemblages. Within the Jagt Pan 7 assemblage, there are also large numbers of macrolithic scrapers that are of bladelike proportions (Parsons, 2006) with a low incidence of backed pieces. The predominance of backed pieces had not yet fully developed at Jagt Pan 7 which partially predates the introduction of pottery, like the lack of ceramics at SA-016. The low ratio of retouch backed artefacts, scrapers, and adzes at Site SA-016 is of interest (Table 8-2). Based on the work of Parsons (2006; 2007) the expectation is that the most frequent

retouched tools in this area is to be backed bladelets. These backed artefacts could have been used as inserts into handles and used as knives or for arrow tips. The high incidence of blades and bladelets at Site SA-016 is also indicative of knapping as these are by products of any lithic reduction sequence.

**Table 8-2: Frequencies of Retouched Stone Tool Types Taken from Parsons (2007) with Percentage from Orton (2014)**

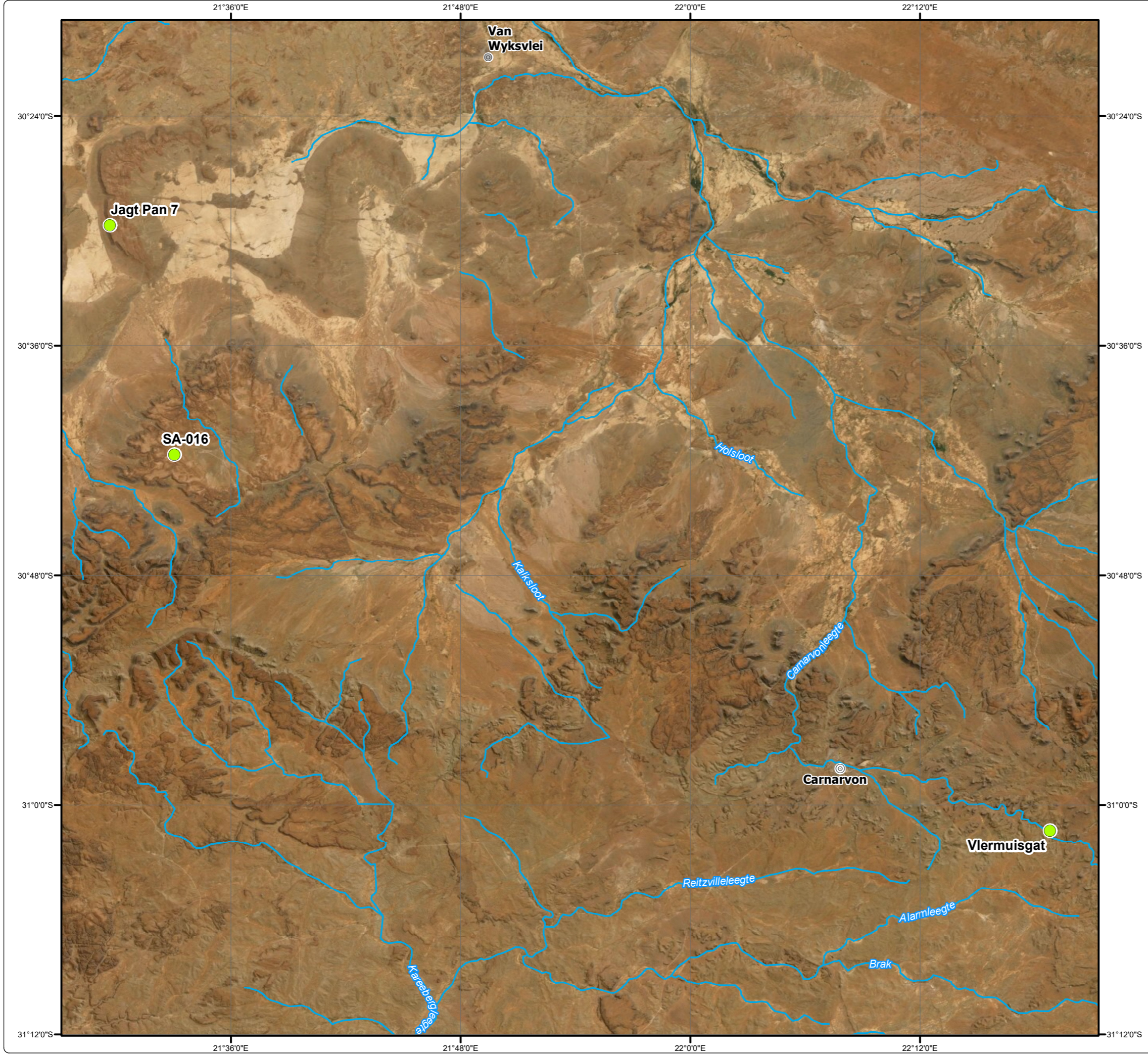
Site Name	Industry	Backed bladelets & points	Segments	Backed piece fragments	Scrapers	Scraper fragments	Adzes	%retouched artefacts	% blades of flakes & blades
SA-016	Swartkop	3		4	3		4	2.03	7.45
JP7	Swartkop	14	3	24	34		8	4	13.39
MB1	Doornfontein	5	2	4	10			2	1.68
BVM3	Doornfontein	1		1	2			0.5	9.77
BP2	Doornfontein	3		9	6			2	8.75
VMG	Swartkop	4		4	1			1	6.93





**Figure 8-1: Frequency of typological classes.**

# SKA Project - Section 35 Permit Application Local Setting (SA-016)



### Legend

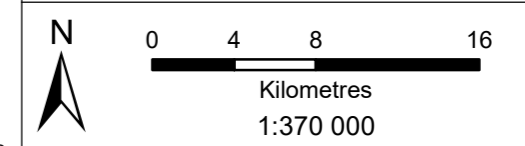
- Localities
- Secondary Town
- Other Town
- Perennial River



**DIGBY WELLS**  
ENVIRONMENTAL

• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

Projection: Geographic	Ref #: SAR6105_05_H_AMT
Datum: WGS 1984	Revision Number: 1
Central Meridian: 21°E	Date: 08/09/2020



Smith, et al., (1991) suggested that in hunter-gatherer sites higher frequencies of retouched artefacts occur than in herder sites. It is generally considered that ‘high’ means at least 2 %, while the low frequencies expected in herder sites would be less than about 1 % (Orton, 2014), with SA-016 clearly falling in the “high” category.

The low frequency of retouched tools at Site SA-016, suggests an ascription to the Swartkop Industry based on the work by Parsons (2007) and is further highlighted by the high incidence of blades and bladelets (Figure 8-1) that is also used to distinguish the two industries, although later Swartkop sites may have fewer blades present (Table 8-3). The blade frequency (including backed blades) of 27% at Site SA-016 is much higher than the blade frequency of 6.93% of the assemblage at Vlermuisgat ascribed to the Swartkop industry Parsons (2007) although Parsons (2006, p. 199) sees the two sets of characteristics (summarized in Table 8-3) said to describe the Swartkop and Doornfontein Industries as “a relatively flexible guideline, not as a blueprint”.

**Table 8-3: Characteristics of Swartkop<sup>12</sup> and Doornfontein<sup>13</sup> assemblages<sup>14</sup> (Parsons, 2006; 2007).**

<b>Swarkop</b>	<b>Dorrnfontein</b>
High frequencies of unretouched blades; decrease in blades after European incursion	High frequencies of irregular flakes.
Larger retouched components containing as much as 60% backed blades; decrease in backed blades after European incursion. Retouched pieces generally microlithic. Although present in considerable numbers, backed blades / bladelets represent <60% of formal components. Possibly fewer backed pieces in formative Swartkop assemblages.	Smaller or absent retouched components. Irregular flakes and retouched pieces generally microlithic. High relative frequencies of backed pieces
Raw material mostly hornfels and occasionally quartz; local raw materials more common on later sites	Raw material Quartz
Blades / bladelets present in high numbers in earlier components and in low numbers in later components	Blades / bladelets present in low numbers
Irregular flakes generally microlithic.	Irregular flakes and retouched pieces generally microlithic.
Large formal components on earlier sites and smaller formal components on later sites.	Small, rather than absent, formal components

<sup>12</sup> Cf. hunter-gatherer

<sup>13</sup> Cf. herder

<sup>14</sup> Based on work from Parsons 2006, Beaumont et al. (1995), Morris (1990a), and Beaumont and Vogel (1989)

With further study, the newly excavated LSA site SA-016 will make a valuable contribution to furthering our understanding of the late Holocene sequence in the region by enlarging the sample of assemblages available for study.

## 9. Conclusion

This mitigation project has sampled and described a series of four sites (MSA and LSA) and excavation and analysis of an LSA site. The sites contained stone artefacts, plain ostrich eggshell fragments and occasional potsherds. The excavated site show correlation to the Swartkop industry that yielded two dates in the 1st millennium BC (period falling between the early 9th and 3<sup>rd</sup> centuries BC, probably bridging the pre-ceramic and early ceramic LSA occupied between 3000 and 1000 years ago by hunter-gatherers (Parsons, 2006) and provided a valuable comparative data set which will help further the study of late Holocene sites in the area. The excavated material will be curated in the McGregor Museum, Kimberley, and will be available for further study by researchers.

With the excavation and analysis of Site SA-016, the development area is now considered to be successfully mitigated. This report fulfils the requirements of the SAHRA comments and permit conditions.

It is recommended that SAHRA accept this report as the final heritage requirement prior to construction of the proposed SKA-027 dish. It should be noted, however, that if any further *in situ* archaeological material (including human burials) is uncovered during development then work in the immediate area should be halted.

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## Appendix A: Definitions



**The definitions used within the report and analysis are based on those encapsulated in Parsons (2006). These are presented below:**

**Chips** By-products of the knapping process that measure <10mm and sometimes look like very small flakes, but on which striking platforms and bulbs of percussion are not discernable.

**Chunks** By-products of the knapping process measuring  $\geq 10$ mm; neither a positive or negative bulb of percussion is visible because these pieces broke during the knapping process; one or two flakes may have been removed from a chunk.

**Cores** Nodules of raw material from which a minimum of three flakes have been removed; irregular, blade, bladelet and single platform cores were distinguished in this project.

**Whole irregular flakes** Unbroken flakes that do not fall in the blade or bladelet classes, but with visible striking platforms and bulbs of percussion.

**Whole blades** Unbroken, parallel-sided or convergent flakes with visible striking platforms and bulbs of percussion and which are at least twice as long as they are wide; measure  $\geq 25$ mm.

**Whole bladelets** Unbroken, parallel-sided or convergent flakes with visible striking platforms and bulbs of percussion and which are at least twice as long as they are wide; measure <25mm.

**Broken irregular flakes** Fragments of flakes that do not fall into the blade or bladelet classes, but with visible striking platforms and/or bulbs of percussion.

**Broken blades/bladelets** Fragments of blades and bladelets, with visible striking platforms and/or bulbs of percussion; are at least twice as long as they are wide; further differentiation is not attempted due to the difficulty of determining original lengths of broken blades and bladelets.

**Possible blade/bladelet fragments** Proximal, medial or distal fragments of flakes that are not twice as long as they are wide, but which are morphologically similar to the various parts of a blade or bladelet, and generally oblong in shape, leading to the conclusion that they are likely to represent fragments of blades or bladelets.

**Backed pieces** Flakes with blunting or steep vertical retouch opposite a sharp cutting edge; comprise backed blades and bladelets.

**Scrapers** Flakes with relatively shallow to steep retouch along a convex or straight edge; broken down into subclasses, such as endscrapers, sidescrapers or end- and sidescrapers, depending on the position of the working edge.

**Adzes** Flakes or chunks with straight or concave lateral edges deliberately shaped by means of retouch on one or both edges.



**Borers** Blades or bladelets vertically retouched around a blunt point; used to produce OES beads.

**Notched pieces** Flakes of various shapes with retouch forming a clear notch.



## Appendix B: Specialist CV



Mr. Justin du Piesanie  
Divisional Manager  
Social and Heritage Services  
Digby Wells Environmental

## 1 Education

Date	Degree(s) or Diploma(s) obtained	Institution
2015	Continued Professional Development, Intermediate Project Management Course	PM.Ideas: A division of the Mindset Group
2013	Continued Professional Development Programme, Architectural and Urban Conservation: Researching and Assessing Local Environments	University of Cape Town
2008	MSc	University of the Witwatersrand
2005	BA (Honours) (Archaeology)	University of the Witwatersrand
2004	BA	University of the Witwatersrand
2001	Matric	Norkem Park High School

## 2 Language Skills

Language	Written	Spoken
English	Excellent	Excellent
Afrikaans	Proficient	Good

### 3 Employment

Period	Company	Title/position
2018 to present	Digby Wells Environmental	Divisional Manager: Social and Heritage Services
2016-2018	Digby Wells Environmental	Unit Manager: Heritage Resources Management
2011-2016	Digby Wells Environmental	Heritage Management Consultant: Archaeologist
2009-2011	University of the Witwatersrand	Archaeology Collections Manager
2009-2011	Independent	Archaeologist
2006-2007	Maropeng & Sterkfontein Caves UNESCO World Heritage Site	Tour guide

### 4 Experience

I joined the company in August 2011 as an archaeologist. Subsequently, Digby Wells appointed me as the Heritage Unit Manager and Divisional Manager for Social and Heritage Services in 2016 and 2018 respectively. I obtained my Master of Science (MSc) degree in Archaeology from the University of the Witwatersrand in 2008, specialising in the Southern African Iron Age. I further attended courses in architectural and urban conservation through the University of Cape Town's Faculty of Engineering and the Built Environment Continuing Professional Development Programme in 2013. I am a professional member of the Association of Southern African Professional Archaeologists (ASAPA), and accredited by the association's Cultural Resources Management (CRM) section. I am also a member of the International Council on Monuments and Sites (ICOMOS), an advisory body to the UNESCO World Heritage Convention. I have over 10 years combined experience in HRM in South Africa, including heritage assessments, archaeological mitigation, grave relocation, and NHRA Section 34 application processes. I gained further generalist experience since my appointment at Digby Wells in Botswana, Burkina Faso, Cameroon, the Democratic Republic of Congo, Liberia, Malawi, Mali, Senegal and Tanzania on projects that have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. Furthermore, I have acted as a technical expert reviewer of HRM projects undertaken in Cameroon and Senegal. As Divisional Manager for Social and Heritage Services at Digby Wells Environmental, I manage several large capital Projects and multidisciplinary teams placing me in the best position to identify and exploit points of integration between the HRM process and greater social landscape. This approach to HRM, as an integrated discipline, is grounded in

international HRM principles and standards that has allowed me to provide comprehensive, project-specific solutions that promote ethical heritage management and assist in achieving the strategic objectives of our clients, as well as maintain or enhance Cultural Significance of the relevant cultural heritage resources.

## 5 Project Experience

Please see the following table for relevant Project experience:

PROJECT	LOCATION	DATES		PROJECT TYPE		CLIENT
Matla Mine 1 GRP	Kriel, Mpumalanga, South Africa	2020	-	Grave Relocation		Exxaro Coal Mpumalanga (Pty) Ltd
Mafube RAP and GRP	Middelburg, Mpumalanga, South Africa	2019	-	Grave Relocation		Mafube Coal
SARAO SKA Project: Heritage Mitigations	Carnarvon, Northern Cape, South Africa	2019	-	Heritage Management Mitigation	and	SARAO
Kibali Kalimva & Ikamva Pit ESIA	Orientele Province, Democratic Republic of Congo	2019	2019	Heritage Assessment	Impact	Barrick Gold Corporation
Ergo City Deep HSMP	Johannesburg, Gauteng, South Africa	2019	2019	Heritage Management Plan	Site	Ergo (Pty) Ltd
Ergo RTSF Section 34 Process	Westonaria, Gauteng, South Africa	2019	-	Section Destruction Applications	34 Permit	Ergo (Pty) Ltd
Twyfelaar EIA	Ermelo, Mpumalanga, South Africa	2019	2019	Heritage Assessment	Impact	Dagsoom Coal Mining (Pty) Ltd
Sasol River Diversion	Sasolburg, Free State, South Africa	2019	2019	Heritage Assessment	Impact	Sasol Mining
Sun City EIA and CMP	Pilanesberg, North-West Province, South Africa	2018	2019	Heritage Assessment Conservation Management Plan	Impact and	Sun International
Exxaro Matla HRM	Kriel, Mpumalanga, South Africa	2017	2019	Heritage Assessment Conservation Management Plan	Impact and	Exxaro Coal Mpumalanga (Pty) Ltd

PROJECT	LOCATION	DATES		PROJECT TYPE		CLIENT
Exxaro Belfast GRP	Belfast, Mpumalanga, South Africa	2013	2019	Grave Relocation		Exxaro Coal Mpumalanga (Pty) Ltd
Eskom Northern KZN Strengthening	KwaZulu-Natal, South Africa	2016	2018	Heritage Assessment	Impact	ILISO Consulting
Thabametsi GRP	Lephalale, Limpopo Province, South Africa	2017	2018	Grave Relocation		Exxaro Resources Ltd
SKA HIA and CMP	Carnarvon, Northern Cape, South Africa	2017	2018	Heritage Assessment and Conservation Management Plan	Impact	SARAO
Grootegeeluk Watching Brief	Lephalale, Limpopo Province, South Africa	2017	2017	Watching Brief		Exxaro Resources Ltd
Matla HSMP	Kriel, Mpumalanga Province, South Africa	2017	2017	Heritage Management Plan	Site	Exxaro Coal Mpumalanga (Pty) Ltd
Ledjadja Coal Borrow Pits	Lephalale, Limpopo Province, South Africa	2017	2017	Heritage Assessment	Basic	Ledjadja Coal (Pty) Ltd
Exxaro Belfast Implementation Project PIA	Belfast, Mpumalanga, South Africa	2017	2017	Palaeontological Impact Assessment		Exxaro Coal Mpumalanga (Pty) Ltd
Lanxess Chrome Mine Archaeological Mitigation	Rustenburg, North West Province, South Africa	2017	2017	Phase 2 Excavations		Lanxess Chrome Mine (Pty) Ltd
Tharisa Apollo EIA Project	KwaZulu-Natal, South Africa	2017	2017	Heritage Assessment	Impact	GCS (Pty) Ltd
Queen Street Section 34 Process	Germiston, Johannesburg, Gauteng, South Africa	2017	2017	Section Destruction Applications	34 Permit	IDC Architects
Goulamina EIA Project	Goulamina, Sikasso Region, Mali	2017	2017	Heritage Assessment	Impact	Birimian Limited

PROJECT	LOCATION	DATES		PROJECT TYPE	CLIENT
Zuurfontein Residential Establishment Project	Ekurhuleni, Gauteng, South Africa	2017	2017	Notification of Intent to Develop	Shuma Africa Projects
Kibali Grave Relocation Training and Implementation	Oriental Province, Democratic Republic of Congo	2017	2017	Grave Relocation	Randgold Resources Limited
Massawa EIA	Senegal	2016	2017	Heritage Impact Assessment and Technical Reviewer	Randgold Resources Limited
Beatrix EIA and EMP	Welkom, Free State, South Africa	2016	2017	Heritage Impact Assessment	Sibanye Stillwater
Sun City Chair Lift	Pilanesberg, North-West Province, South Africa	2016	2017	Notification of Intent to Develop and Heritage Basic Assessment	Sun International
Hendrina Underground Coal Mine EIA	Hendrina, Mpumalanga, South Africa	2016	2017	Heritage Impact Assessment	Umcebo Mining (Pty) Ltd
Elandsfontein EMP Update	Clewer, Mpumalanga, South Africa	2016	2017	Heritage Impact Assessment	Anker Coal
Groningen and Inhambane PRA	Limpopo Province, South Africa	2016	2016	Heritage Basic Assessment	Rustenburg Platinum Mines Limited
Palmietkuilen MRA	Springs, Gauteng, South Africa	2016	2016	Heritage Impact Assessment	Canyon Resources (Pty) Ltd
Copper Sunset Sand Mining S.102	Free State, South Africa	2016	2016	Heritage Basic Assessment	Copper Sunset Sand (Pty) Ltd
Grootvlei MRA	Springs, Gauteng, South Africa	2016	2016	Notification of Intent to Develop	Ergo (Pty) Ltd
Lambda EMP	Mpumalanga, South Africa	2016	2016	Palaeontological Impact Assessment	Eskom Holdings SOC Limited
Kilbarchan Basic Assessment and EMP	Newcastle, KwaZulu-Natal, South Africa	2016	2016	Heritage Basic Assessment	Eskom Holdings SOC Limited
Grootegeluk Amendment	Lephalale, Limpopo	2016	2016	Notification of Intent to Develop	Exxaro Coal Resources (Pty) Ltd



PROJECT	LOCATION	DATES		PROJECT TYPE	CLIENT
	Province, South Africa				
Garsfontein Township Development	Pretoria, Gauteng, South Africa	2016	2016	Notification of Intent to Develop	Leungo Construction Enterprises
Louis Botha Phase 2	Johannesburg, Gauteng, South Africa	2016	2016	Phase 2 Excavations	Royal Haskoning DHV
Sun City Heritage Mapping	Pilanesberg, North-West Province, South Africa	2016	2016	Phase 2 Mapping	Sun International
Gino's Building Section 34 Destruction Permit Application	Johannesburg, Gauteng, South Africa	2015	2016	Heritage Assessment and Section 34 Destruction Permit Application	Bigen Africa Services (Pty) Ltd
EDC Block Refurbishment Project	Johannesburg, Gauteng, South Africa	2015	2016	Heritage Assessment and Section 34 Permit Application	Bigen Africa Services (Pty) Ltd
Namane IPP and Transmission Line EIA	Steenbokpan, Limpopo Province, South Africa	2015	2016	Heritage Assessment	Namane Resources (Pty) Ltd
Temo Coal Road Diversion and Rail Loop EIA	Steenbokpan, Limpopo Province, South Africa	2015	2016	Heritage Assessment	Namane Resources (Pty) Ltd
Sibanye WRTRP	Gauteng, South Africa	2014	2016	Heritage Assessment	Sibanye Stillwater
NTEM Iron Ore Mine and Pipeline Project	Cameroon	2014	2016	Technical Review	IMIC plc
NLGM Constructed Wetlands Project	Liberia	2015	2015	Heritage Assessment	Aureus Mining
ERPM Section 34 Destruction Permits Applications	Johannesburg, Gauteng, South Africa	2015	2015	Section 34 Destruction Permit Applications	Ergo (Pty) Ltd
JMEP II EIA	Botswana	2015	2015	Heritage Assessment	Jindal
Oakleaf ESIA Project	Bronkhorstspruit, Gauteng, South Africa	2014	2015	Heritage Assessment	Oakleaf Investment Holdings

PROJECT			LOCATION	DATES		PROJECT TYPE		CLIENT
Invula Project			Kriel, Mpumalanga, South Africa	2014	2015	Heritage Assessment	Impact	Ixia Coal
VMIC Project	Vanadium EIA		Mokopane, Limpopo, South Africa	2014	2015	Heritage Assessment	Impact	VM Investment Company
Everest Project	North Mining		Steelpoort, Mpumalanga, South Africa	2012	2015	Heritage Assessment	Impact	Aquarius Resources
Nzoro 2 Project	Hydro Power		Orientele Province, Democratic Republic of Congo	2014	2014	Social consultation		Randgold Resources Limited
Eastern Project	Basin AMD		Springs, Gauteng, South Africa	2014	2014	Heritage Assessment	Impact	AECOM
Soweto Reclamation Project	Cluster		Soweto, Gauteng, South Africa	2014	2014	Heritage Assessment	Impact	Ergo (Pty) Ltd
Klipspruit South Project			Ogies, Mpumalanga, South Africa	2014	2014	Heritage Assessment	Impact	BHP Billiton
Klipspruit Project	Extension: Weltevreden		Ogies, Mpumalanga, South Africa	2014	2014	Heritage Assessment	Impact	BHP Billiton
Ergo Pipeline Assessment	Rondebult Basic		Johannesburg, South Africa	2014	2014	Heritage Assessment	Basic	Ergo (Pty) Ltd
Kibali Project	ESIA Update		Orientele Province, Democratic Republic of Congo	2014	2014	Heritage Assessment	Impact	Randgold Resources Limited
GoldOne Consolidation			Westonaria, Gauteng, South Africa	2014	2014	Gap analysis		Gold One International
Yzermite PIA			Wakkerstroom , Mpumalanga, South Africa	2014	2014	Palaeontological Impact Assessment		EcoPartners
Sasol Assessment	Mooikraal Basic		Sasolburg, Free State, South Africa	2014	2014	Heritage Assessment	Basic	Sasol Mining

PROJECT	LOCATION	DATES	PROJECT TYPE	CLIENT
Rea Vaya Phase II C Project	Johannesburg, Gauteng, South Africa	2014 2014	Heritage Impact Assessment	ILISO Consulting
New Liberty Gold Project	Liberia	2013 2014	Grave Relocation	Aureus Mining
Putu Iron Ore Mine Project	Petroken, Liberia	2013 2014	Heritage Impact Assessment	Atkins Limited
Sasol Twistdraai Project	Secunda, Mpumalanga, South Africa	2013 2014	Notification of Intent to Develop	ERM Southern Africa
Kibali Gold Hydro-Power Project	Orientele Province, Democratic Republic of Congo	2012 2014	Heritage Impact Assessment	Randgold Resources Limited
SEGA Gold Mining Project	Burkina Faso	2013 2013	Technical Reviewer	Cluff Gold PLC
Consbrey and Harwar Collieries Project	Breyton, Mpumalanga, South Africa	2013 2013	Heritage Impact Assessment	Msobo Coal
Falea Uranium Mine Environmental Assessment	Falea, Mali	2013 2013	Heritage Scoping	Rockgate Capital
Daleside Acetylene Gas Production Facility	Gauteng, South Africa	2013 2013	Heritage Impact Assessment	ERM Southern Africa
SEGA Gold Mining Project	Burkina Faso	2012 2013	Socio Economic and Asset Survey	Cluff Gold PLC
Kibali Gold Project Grave Relocation Plan	Orientele Province, Democratic Republic of Congo	2011 2013	Grave Relocation	Randgold Resources Limited
Everest North Mining Project	Steelpoort, Mpumalanga, South Africa	2012 2012	Heritage Impact Assessment	Aquarius Resources
Environmental Authorisation for the Gold One Geluksdal TSF and Pipeline	Gauteng, South Africa	2012 2012	Heritage Impact Assessment	Gold One International
Platreef Burial Grounds and Graves Survey	Mokopane, Limpopo Province, South Africa	2012 2012	Burial Grounds and Graves Survey	Platreef Resources

PROJECT		LOCATION	DATES		PROJECT TYPE		CLIENT
Resgen Coal Mine	Boikarabelo	Limpopo Province, South Africa	2012	2012	Phase 2 Excavations		Resources Generation
Bokoni Platinum Road Watching Brief		Burgersfort, Limpopo Province, South Africa	2012	2012	Watching Brief		Bokoni Platinum Mine
Transnet NMPP Line		Kwa-Zulu Natal, South Africa	2010	2010	Heritage survey		Umlando Consultants
Archaeological Assessment – Witpoortjie Project	Impact	Johannesburg, Gauteng, South Africa	2010	2010	Archaeological Impact Assessment		ARM
Der Archaeological Excavations	Brochen	Steelpoort, Mpumalanga, South Africa	2010	2010	Phase 2 Excavations		Heritage Contracts Unit
De Booyensdal Archaeology Project	Brochen and	Steelpoort, Mpumalanga, South Africa	2010	2010	Site Mapping	Recording:	Heritage Contracts Unit
Eskom Electricity Network	Thohoyandou Master	Limpopo Province, South Africa	2010	2010	Heritage Statement		Strategic Environmental Focus
Bathako Expansion	Mine	North-West Province, South Africa	2010	2010	Phase 2 Mapping		Heritage Contracts Unit
Wenzelrust Excavations		Shoshanguve, Gauteng, South Africa	2009	2009	Phase 2 Excavations		Heritage Contracts Unit
University of the Witwatersrand LIA Shelter Project	Parys	Parys, Free State, South Africa	2009	2009	Phase 2 Mapping		University of the Witwatersrand
Archaeological Assessment Modderfontein Holdings	of AH	Johannesburg, Gauteng, South Africa	2008	2008	Heritage Assessment	Basic	ARM
Heritage Assessment of Rhino Mines		Thabazimbi, Limpopo Province, South Africa	2008	2008	Heritage Assessment	Impact	Rhino Mines
Cronimet Project		Thabazimbi, Limpopo Province, South Africa	2008	2008	Archaeological surveys		Cronimet

PROJECT	LOCATION	DATES		PROJECT TYPE	CLIENT
Eskom Thohoyandou SEA Project	Limpopo Province, South Africa	2008	2008	Heritage Statement	Eskom
Witbank Archaeological Assessment	Dam Impact Witbank, Mpumalanga, South Africa	2007	2007	Archaeological survey	ARM
Sun City Archaeological Site Mapping	Sun City, Pilanesberg, North West Province, South Africa	2006	2006	Site Mapping	Recording: Sun International
Klipriviersberg Archaeological Survey	Meyersdal, Gauteng, South Africa	2005	2006	Archaeological surveys	ARM

## 6 Professional Registration

Position	Professional Body	Registration Number
Member	Association for Southern African Professional Archaeologists (ASAPA); ASAPA Cultural Resources Management (CRM) section	270
Member	International Council on Monuments and Sites (ICOMOS)	14274
Member	Society for Africanist Archaeologists (SAfA)	N/A
Member	International Association of Impact Assessors (IAIA) South Africa	5494

## 7 Publications

Huffman, T.N. & du Piesanie, J.J. 2011. Khami and the Venda in the Mapungubwe Landscape. *Journal of African Archaeology* 9(2): 189-206

du Piesanie, J.J., 2017. Book Review: African Cultural Heritage Conservation and Management. *South African Archaeological Bulletin* 72(205)





Miss Shannon Hardwick  
 Heritage Resources Management Consultant  
 Social and Heritage Services  
 Digby Wells Environmental

## 1 Education

Date	Degree(s) or Diploma(s) obtained	Institution
2013	MSc (Archaeology)	University of the Witwatersrand
2010	BSc (Honours) (Archaeology)	University of the Witwatersrand
2009	BSc	University of the Witwatersrand
2006	Matric	Rand Park High School

## 2 Language Skills

Language	Written	Spoken
English	Excellent	Excellent
Afrikaans	Fair	Basic

## 3 Employment

Period	Company	Title/position
2019 to Present	Digby Wells Environmental	Heritage Resources Management Consultant
2017 to 2019	Digby Wells Environmental	Assistant Heritage Resources Management Consultant
2017 to 2017	Digby Wells Environmental	Social and Heritage Services Intern
2016 to 2017	Tarsus Academy	Facilitator
2011 to 2016	University of the Witwatersrand	Teaching Assistant
2011	University of the Witwatersrand	Collections Assistant

## 4 Experience

I joined the Digby Wells team in May 2017 as a Heritage Management Intern and has most recently been appointed as a Heritage Resources Management Consultant. I am an archaeologist and obtained a Master of Science (MSc) degree from the University of the Witwatersrand in 2013, specialising in historical archaeobotany in the Limpopo Province. I am a published co-author of one paper in *Journal of Ethnobiology*.

Since joining Digby Wells, I have gained generalist experience through the compilation of various heritage assessments, including Notification of Intent to Develop (NIDs), Heritage Scoping Reports (HSRs), Heritage Impact Assessment (HIA) reports, Heritage Basic Assessment Reports (HBARs) and permit applications to undertake permitted activities in terms of Sections 34 and 35 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). I have also obtained experience in compiling socio-economic documents, including a Community Health, Safety and Security Management Plan (CHSSMP) and social baselines and data analysis for Projects in South Africa, Malawi, Mali and Sierra Leone. My fieldwork experience includes heritage pre-disturbance surveys in South Africa, Malawi and the Democratic Republic of the Congo and social fieldwork in Malawi.

I am a registered member of the Association of Southern African Professional Archaeologists (ASAPA) and the International Council on Monuments and Sites (ICOMOS).

## 5 Project Experience

My project experience is listed in the table below.

**Project Experience**

Project Title	Name of Client	Project Location	Date of Completion	Project / Experience Description
Environmental Authorisation for the Dagsoom Coal Mining Project near Ermelo, Mpumalanga Province	Dagsoom Coal Mining (Pty) Ltd	Ermelo, Mpumalanga Province	Ongoing	Heritage Impact Assessment
Regional Tailings Storage Facility Heritage Mitigations	Ergo Mining (Pty) Ltd	Randfontein, Gauteng	Ongoing	Section 34 Permit Application Process
Weltervreden Mine Environmental Authorisation, Water Use Licence and Mining Right Application Project	Mbuyelo Group (Pty) Ltd	Belfast, Mpumalanga	Ongoing	Heritage Impact Assessment





Project Title	Name of Client	Project Location	Date of Completion	Project / Experience Description
Environmental Authorisation for the proposed Lephalale Pipeline Project, Limpopo Province	MDT Environmental (Pty) Ltd	Lephalale, Limpopo Province	2019	Notification of Intent to Develop
Heritage Resources Management Process Update for the Exxaro Matla Mine	Exxaro Coal Mpumalanga (Pty) Ltd	Kriel, Mpumalanga Province	2019	Heritage Site Management Plan Update
Environmental Authorisation for the proposed Musina-Makhado Special Economic Zone Development Project, Limpopo Province	Limpopo Economic Development Agency	Vhembe District Municipality, Limpopo Province	Ongoing	Heritage Impact Assessment Project Management
Songwe Hills Rare Earth Elements Project	Mkango Resources Limited	Phalombe District, Malawi	Ongoing	Heritage Impact Assessment
Elandsfontein Colliery Burial Grounds and Graves Chance Finds	Anker Coal and Mineral Holdings SA (Pty) Ltd Elandsfontein Colliery (Pty) Ltd	Clewer, Emalahleni, Mpumalanga Province	December 2018	Site Inspection Project Management
Environmental Authorisation Process to Decommission a Conveyor Belt Servitude, Road and Quarry at Twistdraai East Colliery	Sasol Mining (Pty) Ltd	Secunda, Mpumalanga Province	Ongoing	Notification of Intent to Develop
Environmental and Social Impact Assessment for the Bougouni Lithium Project, Mali	Future Minerals S.A.R.L.	Bougouni, Mali	Ongoing	Heritage Impact Assessment
Environmental Authorisation for the Nomalanga Estates Expansion Project, KwaZulu-Natal	Nomalanga Property Holdings (Pty) Ltd	Greytown, KwaZulu-Natal	Ongoing	Heritage Impact Assessment
Environmental Authorisation for the Temo Mine proposed Rail, Road and Pipeline Development, Limpopo Province	Temo Coal Mining (Pty) Ltd	Lephalale, Limpopo Province	Ongoing	Heritage Impact Assessment



<b>Project Title</b>	<b>Name of Client</b>	<b>Project Location</b>	<b>Date of Completion</b>	<b>Project / Experience Description</b>
Gorumbwa RAP Audit	Randgold Resources Limited	Kibali Sector, Democratic Republic of the Congo	December 2018	Resettlement Action Plan Audit
Sasol Sigma Defunct Colliery Surface Mitigation Project: Proposed Rover Diversion and Flood Protection Berms	Sasol Mining (Pty) Ltd	Sasolburg, Free State Province	November 2018	Notification of Intent to Develop
Basic Assessment and Regulation 31 Amendment / Consolidation for Sigma Colliery: Mooikraal and Sigma Colliery: 3 Shaft	Sasol Mining (Pty) Ltd	Sasolburg, Free State Province	Ongoing	Notification of Intent to Develop
Sasol Mining Sigma Colliery Ash Backfilling Project, Sasolburg, Free State Province	Sasol Mining (Pty) Ltd	Sasolburg, Free State Province	July 2018	Heritage Basic Assessment Report Update
Constructed Landfill Site for the Sierra Rutile Limited Mining Operation, Southern Province, Sierra Leone	Sierra Rutile Limited	Southern Province, Sierra Leone	May 2019	Social Impact Assessment
Environmental Impact Assessment for the Klipspruit Colliery Water Treatment Plant and associated pipeline, Mpumalanga	South32 SA Coal Holdings (Pty) Ltd	Ogies, Mpumalanga Province	Ongoing	Notification of Intent to Develop; Social baseline
Proposed construction of a Water Treatment Plant and associated infrastructure for the Treatment of Mine-Affected Water at the Kilbarchan Colliery	Eskom Holdings SOC Limited	Newcastle, KwaZulu-Natal Province	Ongoing	Heritage Impact Assessment
Belfast Implementation Project	Exxaro Coal Mpumalanga (Pty) Ltd	Belfast, Mpumalanga Province	Ongoing	Section 34 Permit Application

<b>Project Title</b>	<b>Name of Client</b>	<b>Project Location</b>	<b>Date of Completion</b>	<b>Project / Experience Description</b>
Newcastle Landfill Project	GCS Water and Environmental Consultants	Newcastle, KwaZulu-Natal	March 2019	Heritage Impact Assessment
NHRA Section 34 Permit Application process for the Davin and Queens Court Buildings on Erf 173 and 174, West Germiston, Gauteng Province	IDC Architects	Johannesburg, Gauteng Province	May 2018	Section 34 Permit Application Process
Basic Assessment and Environmental Management Plan for the Proposed pipeline from the Mballi Colliery to the Tweefontein Water Reclamation Plant, Mpumalanga Province	HCI Coal (Pty) Ltd Mballi Colliery	Ogies, Mpumalanga Province	February 2018	Heritage Basic Assessment Report
The South African Radio Astronomy Observatory Square Kilometre Array Heritage Impact Assessment and Conservation Management Plan Project	The South African Radio Astronomy Observatory (SARAO)	Carnarvon, Northern Cape Province	July 2018	Heritage Impact Assessment; Conservation Management Plan
Environmental Impact Assessment for the proposed Future Developments within the Sun City Resort Complex	Sun International (Pty) Ltd	Rustenburg, North West Province	Ongoing	Heritage Impact Assessment Conservation Management Plan Social Baseline
Environmental Fatal Flaw Analysis for the Mabula Filling Station	Mr van den Bergh	Waterberg, Limpopo Province	November 2017	Fatal Flaw Analysis
Environmental Impact Assessment for the Blyvoor Gold Mining Project near Carletonville, Gauteng Province	Blyvoor Gold Capital (Pty) Ltd	Carletonville, Gauteng	Ongoing	Notification of Intent to Develop; Social Baseline

<b>Project Title</b>	<b>Name of Client</b>	<b>Project Location</b>	<b>Date of Completion</b>	<b>Project / Experience Description</b>
Heritage Resources Management Process for the Exxaro Matla Mine	Exxaro Coal Mpumalanga (Pty) Ltd	Kriel, Mpumalanga Province	October 2018	Heritage Impact Assessment
Liwonde Additional Studies	Mota-Engil Africa	Liwonde, Malawi	June 2018	Community Health, Safety and Security Management Plan
Environmental Impact Assessment for the Millsite TSF Complex	Sibanye-Stillwater	Randfontein, Gauteng	December 2017	Heritage Impact Assessment
Heritage Resources Management Process for the Portion 296 of the farm Zuurfontein 33 IR Proposed Residential Establishment Project	Shuma Africa Projects (Pty) Ltd	Ekurhuleni (Johannesburg), Gauteng	June 2017	Notification of Intent to Develop
NHRA Section 35 Archaeological Investigations, Lanxess Chrome Mine, North-West Province	Lanxess Chrome Mine (Pty) Ltd	Rustenburg, North West Province	August 2017	Archaeological Phase 2 Mitigation
Environmental and Social Input for the Pre-Feasibility Study	Birimium Gold	Bougouni, Mali	October 2018	Pre-Feasibility Study; Heritage Impact Assessment

## 6 Professional Registration

<b>Position</b>	<b>Professional Body</b>	<b>Member Number</b>
Member	Association of Southern African Professional Archaeologists (ASAPA)	451
Member	International Council on Monuments and Sites (ICOMOS)	38048

## 7 Publications

Esterhuysen, A.B. & Hardwick, S.K. 2017. Plant remains recovered from the 1854 siege of the Kekana Ndebele, Historic Cave, Makapan Valley, South Africa. *Journal of Ethnobiology* 37(1): 97-119.

Jaco van der Walt  
Archaeologist

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+27 86 691 6461

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### Education:

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#### Particulars of degrees/diplomas and/or other qualifications:

**Name of University or Institution:** University of Pretoria  
**Degree obtained** : BA Heritage Tourism & Archaeology  
**Year of graduation** : 2001

**Name of University or Institution:** University of the Witwatersrand  
**Degree obtained** : BA Hons Archaeology  
**Year of graduation** : 2002

**Name of University or Institution** : University of the Witwatersrand  
**Degree Obtained** : MA (Archaeology)  
**Year of Graduation** : 2012

**Name of University or Institution** : University of Johannesburg  
**Degree** : PhD  
**Year** : Currently Enrolled

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### EMPLOYMENT HISTORY:

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2011 – Present: **Owner – HCAC (Heritage Contracts and Archaeological Consulting CC).**  
2007 – 2010 : **CRM Archaeologist**, Managed the Heritage Contracts Unit at the University of the Witwatersrand.  
2005 - 2007: **CRM Archaeologist**, Director of Matakoma Heritage Consultants  
2004: **Technical Assistant**, Department of Anatomy University of Pretoria  
2003: **Archaeologist**, Mapungubwe World Heritage Site  
2001 - 2002: **CRM Archaeologists**, For R & R Cultural Resource Consultants, Polokwane  
2000: **Museum Assistant**, Fort Klapperkop.

#### Countries of work experience include:

Republic of South Africa, Botswana, Zimbabwe, Mozambique, Tanzania, The Democratic Republic of the Congo, Lesotho and Zambia.

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**SELECTED PROJECTS INCLUDE:**

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**Archaeological Impact Assessments (Phase 1)**

Heritage Impact Assessment Proposed Discharge Of Treated Mine Water Via The Wonderfontein Spruit Receiving Water Body Specialist as part of team conducting an Archaeological Assessment for the Mmamabula mining project and power supply, Botswana  
Archaeological Impact Assessment Mmamethlake Landfill  
Archaeological Impact Assessment Libangeni Landfill

**Linear Developments**

Archaeological Impact Assessment Link Northern Waterline Project At The Suikerbosrand Nature Reserve  
Archaeological Impact Assessment Medupi – Spitskop Power Line,  
Archaeological Impact Assessment Nelspruit Road Development

**Renewable Energy developments**

Archaeological Impact Assessment Karoshoek Solar Project

**Grave Relocation Projects**

Relocation of graves and site monitoring at Chloorkop as well as permit application and liaison with local authorities and social processes with local stakeholders, Gauteng Province.  
Relocation of the grave of Rifle Man Maritz as well as permit application and liaison with local authorities and social processes with local stakeholders, Ndumo, Kwa Zulu Natal.  
Relocation of the Magolwane graves for the office of the premier, Kwa Zulu Natal  
Relocation of the OSuthu Royal Graves office of the premier, Kwa Zulu Natal

**Phase 2 Mitigation Projects**

Field Director for the Archaeological Mitigation For Booyendal Platinum Mine, Steelpoort, Limpopo Province.  
Principle investigator Prof. T. Huffman  
Monitoring of heritage sites affected by the ARUP Transnet Multipurpose Pipeline under directorship of Gavin Anderson.  
Field Director for the Phase 2 mapping of a late Iron Age site located on the farm Kameelbult, Zeerust, North West Province. Under directorship of Prof T. Huffman.  
Field Director for the Phase 2 surface sampling of Stone Age sites effected by the Medupi – Spitskop Power Line, Limpopo Province

**Heritage management projects**

Platreef Mitigation project – mitigation of heritage sites and compilation of conservation management plan.

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## MEMBERSHIP OF PROFESSIONAL ASSOCIATIONS:

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- Association of Southern African Professional Archaeologists. Member number 159  
Accreditation:
  - Field Director                      Iron Age Archaeology
  - Field Supervisor                  Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation
- Accredited CRM Archaeologist with SAHRA
- Accredited CRM Archaeologist with AMAFA
- Co-opted council member for the CRM Section of the Association of Southern African Association Professional Archaeologists (2011 – 2012)

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## PUBLICATIONS AND PRESENTATIONS

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- A Culture Historical Interpretation, Aimed at Site Visitors, of the Exposed Eastern Profile of K8 on the Southern terrace at Mapungubwe.
  - J van der Walt, A Meyer, WC Nienaber
  - Poster presented at Faculty day, Faculty of Medicine University of Pretoria 2003
- 'n Reddingsondersoek na Anglo-Boereoorlog-ammunisie, gevind by Ifafi, Noordwes-Provinsie. South-African Journal for Cultural History 16(1) June 2002, with A. van Vollenhoven as co-writer.
- Fieldwork Report: Mapungubwe Stabilization Project.
  - WC Nienaber, M Hutten, S Gaigher, J van der Walt
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2004
- A War Uncovered: Human Remains from Thabantšho Hill (South Africa), 10 May 1864.
  - M. Steyn, WS Boshoff, WC Nienaber, J van der Walt
  - Paper read at the 12<sup>th</sup> Congress of the Pan-African Archaeological Association for Prehistory and Related Studies 2005
- Field Report on the mitigation measures conducted on the farm Bokfontein, Brits, North West Province .
  - J van der Walt, P Birkholtz, W. Fourie
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2007
- Field report on the mitigation measures employed at Early Farmer sites threatened by



development in the Greater Sekhukhune area, Limpopo Province. J van der Walt

- Paper read at the Southern African Association of Archaeologists Biennial Conference 2008
- Ceramic analysis of an Early Iron Age Site with vitrified dung, Limpopo Province South Africa.
  - J van der Walt. Poster presented at SAFA, Frankfurt Germany 2008
- Bantu Speaker Rock Engravings in the Schoemanskloof Valley, Lydenburg District, Mpumalanga (*In Prep*)
  - J van der Walt and J.P Celliers
- Sterkspruit: Micro-layout of late Iron Age stone walling, Lydenburg, Mpumalanga. W. Fourie and J van der Walt. A Poster presented at the Southern African Association of Archaeologists Biennial Conference 2011
- Detailed mapping of LIA stone-walled settlements' in Lydenburg, Mpumalanga. J van der Walt and J.P Celliers
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2011
- Bantu-Speaker Rock engravings in the Schoemanskloof Valley, Lydenburg District, Mpumalanga. J.P Celliers and J van der Walt
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2011
- Pleistocene hominin land use on the western trans-Vaal Highveld ecoregion, South Africa, Jaco van der Walt.
  - J van der Walt. Poster presented at SAFA, Toulouse, France. Biennial Conference 2016

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**REFERENCES:**

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1. Prof Marlize Lombard      Senior Lecturer, University of Johannesburg, South Africa  
E-mail: mlombard@uj.ac.za
2. Prof TN Huffman      Department of Archaeology Tel: (011) 717 6040  
University of the Witwatersrand
3. Alex Schoeman      University of the Witwatersrand  
E-mail: Alex.Schoeman@wits.ac.za