SISHEN WESTERN WASTE DUMPS: SISHEN IRON ORE MINE, KGALAGADI DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE

Phase 1 Archaeological Impact Assesment Report

2012-01-05

Document version 1.0
Compiled by N. Kruger

AGES
Purpose with Passion

Proudly Supporting
TOUCHING AFRICA

Prepared by

AGES

Purpose with Passion

ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) OF DEMARCATED SURFACE AREAS ON THE FARMS GAMAGARA 541, ONVERWACHT 540 (FRITZ 540 PORTION 1) AND NOOITGEDACHT 469 (WOON 469), SISHEN IRON ORE MINE, KGALAGADI DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE

January 2012

Conducted on behalf of:

Sishen Iron Ore Company
AGES Gauteng

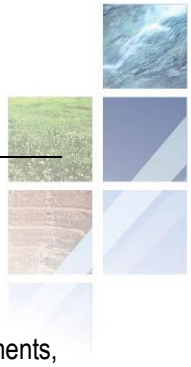
Compiled by:

Nelius Kruger (BA, BA Hons. Archaeology Pret.)

Reviewed by:

Catherine de Camara (BSc. Hons. Environmental Sciences)

GAUTENG PROVINCE: 356 Zwavelpoort, Lynnwood Pretoria, Postnet no 74, Private Bag X07, Arcadia, 0007
Tel: +27-12 751 2160 Fax: +27 (0) 86 607 2406 www.ages-group.com



Although AGES (Pty) Ltd exercises due care and diligence in rendering services and preparing documents, AGES (Pty) Ltd accepts no liability, and the client, by receiving this document, indemnifies Africa Geo-Environmental Services (Pty) Ltd and its directors, managers, agents and employees against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by AGES (Pty) Ltd and by the use of the information contained in this document.

AGES (Pty) promotes the conservation of sensitive archaeological and heritage resources and therefore uncompromisingly adheres to relevant Heritage Legislation (National Heritage Resources Act no. 25 of 1999, Human Tissue Act 65 of 1983 as amended, Removal of Graves and Dead Bodies Ordinance no. 7 of 1925, Excavations Ordinance no. 12 of 1980). In order to ensure best practices and ethics in the examination, conservation and mitigation of archaeological and heritage resources, AGES (Pty) follows the Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment as set out by the South African Heritage Resources Agency (SAHRA) and the CRM section of the Association for South African Professional Archaeologists (ASAPA).

NOTATIONS AND TERMS

Absolute dating:
Absolute dating provides specific dates or range of dates expressed in years.

Archaeology:
The study of the human past through its material remains.

Archaeological record:
The archaeological record minimally includes all the material remains documented by archaeologists. More comprehensive definitions also include the record of culture history and everything written about the past by archaeologists.

Artefact:
Entities whose characteristics result or partially result from human activity. The shape and other characteristics of the artifact are not altered by removal of the surroundings in which they are discovered. In the southern African context examples of artefacts include potsherds, iron objects, stone tools, beads and hut remains.

Assemblage:
A group of artefacts recurring together at a particular time and place, and representing the sum of human activities.

^{14}C or radiocarbon dating:
The ^{14}C method determines the absolute age of organic material by studying the radioactivity of carbon. It is reliable for objects not older 70 000 years by means of isotopic enrichment. The method becomes increasingly inaccurate for samples younger than ±250 years.

Ceramic Facies:
In terms of the cultural representation of ceramics, a facies is denoted by a specific branch of a larger ceramic tradition. A number of ceramic facies thus constitute a ceramic tradition.

Ceramic Tradition:
In terms of the cultural representation of ceramics, a series of ceramic units constitutes as ceramic tradition.

Context:
An artefact's context usually consists of its immediate *matrix*, its *provenience* and its *association* with other artefacts. When found in *primary context*, the original artefact or structure was undisturbed by natural or human factors until excavation and if in *secondary context,* disturbance or displacement by later ecological action or human activities occurred.

Culture:
A contested term, "culture" could minimally be defined as the learned and shared things that people have, do and think.

Cultural Heritage Resource:
The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

Cultural landscape:
A cultural landscape refers to a distinctive geographic area with cultural significance.

Cultural Resource Management (CRM):
A system of measures for safeguarding the archaeological heritage of a given area, generally applied within the framework of legislation designed to safeguard the past.

Ecofact:
Non artifactual material remains that has cultural relevance which provides information about past human activities. Examples would include remains or evidence of domesticated animals or plant species.

Excavation:
The principal method of data acquisition in archaeology, involving the systematic uncovering of archaeological remains through the removal of the deposits of soil and the other material covering and accompanying it.

Feature:
Non-portable artifacts, in other words artifacts that cannot be removed from their surroundings without destroying or altering their original form. Hearths, roads, and storage pits are examples of archaeological features

GIS:
Geographic Information Systems are computer software that allows layering of various types of data to produce complex maps; useful for predicting site location and for representing the analysis of collected data within sites and across regions.

Historical archaeology:
Primarily that aspect of archaeology which is complementary to history based on the study of written sources. In the South African context it concerns the recovery and interpretation of relics left in the ground in the course of Europe's discovery of South Africa, as well as the movements of the indigenous groups during, and after the "Great Scattering" of Bantu-speaking groups – known as the *mfecane* or *difaqane*.

Iron Age:
Also known as "Farmer Period", the "Iron Age" is an archaeological term used to define a period associated with domesticated livestock and grains, metal working and ceramic manufacture.

Lithic:
Stone tools or waste from stone tool manufacturing found in on archaeological sites.

Matrix:
The material in which an artefact is situated (sediments such as sand, ashy soil, mud, water, etcetera). The matrix may be of natural origin or human-made.

Megalith:
A large stone, often found in association with others and forming an alignment or monument, such as large stone statues.

Midden:
Refuse that accumulates in a concentrated heap.

Microlith:
A small stone tool, typically knapped of flint or chert, usually about three centimetres long or less.

Monolith:
A geological feature such as a large rock, consisting of a single massive stone or rock, or a single piece of rock placed as, or within, a monument or site.

Oral Histories:
The historical narratives, stories and traditions passed from generation to generation by word of mouth.

Pre-Phase 1 CRM Assessment:
An initial pre-assessment (scoping) phase, where the specialist establishes the scope of the project and terms of reference for the developer.

Phase 1 CRM Assessment:
An Impact Assessment which identifies archaeological and heritage sites, assesses their significance and comments on the impact of a given development on the sites. Recommendations for site mitigation or conservation are also made during this phase.

Phase 2 CRM Study:
In-depth studies which could include major archaeological excavations, detailed site surveys and mapping / plans of sites, including

historical / architectural structures and features. Alternatively, the sampling of sites by collecting material, small test pit excavations or auger sampling is required. Mitigation / Rescue involves planning the protection of significant sites or sampling through excavation or collection (in terms of a permit) at sites that may be lost as a result of a given development.

Phase 3 CRM Measure:

A Heritage Site Management Plan (for heritage conservation), is required in rare cases where the site is so important that development will not be allowed and sometimes developers are encouraged to enhance the value of the sites retained on their properties with appropriate interpretive material or displays.

Prehistoric archaeology:

That aspect of archaeology which concerns itself with the development of humans and their culture before the invention of writing. In South Africa, prehistoric archaeology comprises the study of the Early Stone Age, the Middle Stone Age and the greater part of the Later Stone Age and the Iron Age.

Probabilistic Sampling:

A sampling strategy that is not biased by any person's judgment or opinion. Also known as statistical sampling, it includes systematic, random and stratified sampling strategies.

Provenience

Provenience is the three-dimensional (horizontal and vertical) position in which artefacts are found. Fundamental to ascertaining the provenience of an artefact is *association,* the co-occurrence of an artefact with other archaeological remains; and *superposition,* the principle whereby artefacts in lower levels of a matrix were deposited before the artefacts found in the layers above them, and are therefore older.

Random Sampling:

A probabilistic sampling strategy whereby randomly selected sample blocks in an area are surveyed. These are fixed by drawing coordinates of the sample blocks from a table of random numbers.

Relative dating:

The process whereby the relative antiquity of sites and objects are determined by putting them in sequential order but not assigning specific dates.

Remote Sensing:

The small or large-scale acquisition of information of an object or phenomenon, by the use of either recording or real-time sensing device(s) that is not in physical or intimate contact with the object (such as by way of aircraft, spacecraft or satellite). Here, ground-based geophysical methods such as Ground Penetrating Radar and Magnetometry are often used for archaeological imaging.

Rock Art Research:

Rock art can be "decoded" in order to inform about cultural attributes of prehistoric societies, such as dress-code, hunting and food gathering, social behaviour, religious practice, gender issues and political issues.

Sensitive:

Often refers to graves and burial sites although not necessarily a heritage place, as well as ideologically significant sites such as ritual / religious places. *Sensitive* may also refer to an entire landscape / area known for its significant heritage remains.

Site (Archaeological):

A distinct spatial clustering of artefacts, features, structures, and organic and environmental remains, as the residue of human activity. These include surface sites, caves and rock shelters, larger open-air sites, sealed sites (deposits) and river deposits. Common functions of archaeological sites include living or habitation sites, kill sites, ceremonial sites, burial sites, trading, quarry, and art sites,

Slag:

The material residue of smelting processes from metalworking.

Stone Age:

An archaeological term used to define a period of stone tool use and manufacture.

Stratigraphy:
This principle examines and describes the observable layers of sediments and the arrangement of strata in deposits

Stratified Sampling:
A probabilistic sampling strategy whereby a study area is divided into appropriate zones – often based on the probable location of archaeological areas, after which each zone is sampled at random.

Systematic Sampling:
A probabilistic sampling strategy whereby a grid of sample blocks is set up over the survey area and each of these blocks is equally spaced and searched.

Tradition:
Artefact types, assemblages of tools, architectural styles, economic practices or art styles that last longer than a phase and even a horizon are describe by the term *tradition*. A common example of this is the early Iron Age tradition of Southern Africa that originated ± 200 AD and came to an end at about 900 AD.

Tuyère:
A ceramic blow-tube used in the process of iron smelting / reduction.

LIST OF ABBREVIATIONS

Abbreviation	Description
ASAPA	Association for South African Professional Archaeologists
AIA	Archaeological Impact Assessment
BP	Before Present
BCE	Before Common Era
EIA	Early Iron Age (also Early Farmer Period)
EIA	Environnemental Impact Assessment
EFP	Early Farmer Period (also Early Iron Age)
ESA	Earlier Stone Age
GIS	Geographic Information Systems
HIA	Heritage Impact Assessment
K2/Map	K2/Mapungubwe Period
LFP	Later Farmer Period (also Later Iron Age)
LIA	Later Iron Age (also Later Farmer Period)
LSA	Later Stone Age
MIA	Middle Iron Age (also Early later Farmer Period)
MRA	Mining Rights Application
MSA	Middle Stone Age
NHRA	National Heritage Resources Act No.25 of 1999, Section 35
SAHRA	South African Heritage Resources Association
SIOC	Sishen Iron Ore Company
YCE	Years before Common Era (Present)

Table of contents

1 EXECUTIVE SUMMARY

This report details the results of an Archaeological Impact Assessment (AIA) study of surface portions of the farms Gamagara 541, Onverwacht 540 (Fritz 540 Portion 1) and Nooitgedacht 469 (Woon 469) subject to an Environmental Impact Assessment (EIA) for the Sishen Iron Ore Company in the Northern Cape Province. The study was requested for the further development of additional waste rock dumps for the Sishen Mine. The report includes background information on the area's archaeology, its representation in southern Africa, and the history of the larger area under investigation, survey methodology and results as well as heritage legislation and conservation policies. A copy of the report will be supplied to the South African Heritage Resources Agency (SAHRA) and recommendations contained in this document will be reviewed in order to consider the conservation priority of sites located in the area.

A number of archaeological and historical studies have been conducted in the Sishen area. These studies all infer a rich and diverse archaeological landscape. Similarly, 4 areas of archaeological potential were located during the pedestrian and automobile survey of the area totalling approximately 2700ha. These areas are generally located within close proximity of sources of water such as dams and pans.

Stone Age Remains:

A few Middle Stone Age (MSA) artefacts, generally made from fine grained specularite and jaspilite, were recorded at three locations around small water pans in the area. These lithics include only rough core and flake artefacts with smoothed surfaces, and no formal stone tools were observed. However, larger amounts of Earlier and Middle Stone Age artefacts including handaxes, cores and flakes were noted in one area near a manmade dam and borehole. Previous research by the McGregor Museum in Kimberly, attributed related occurrences in the area to the Earlier Stone Age, specifically the Fauresmith – Acheulean timespan at about 600 000 years ago, and the Middle Stone Age.

Recommendations

The MSA surface scatters documented around water pans in the study area are of limited scientific value due to the mixing of artefacts as well as the low density of the occurrences. In addition, such MSA scatters are not unique to the area and they occur widely across in the landscape, especially around water sources such as the Gamagara River and Kathu Pan. No further action is therefore recommended for the occurrences but care should be taken when disturbing any water sources or pans as Stone Age sites generally occur in the proximately these resources in the area. However, the Earlier and Middle Stone Age scatters documented at the manmade dam in the area is of scientific value and it is recommended that a limited Phase 2 Specialist Study be considered for these occurrences. Such a study should minimally include the systematic documentation of surface material by a qualified Stone Age specialist.

This report details the methodology, limitations and recommendations relevant to these heritage areas, as well as areas of proposed development. It should be noted that mitigation measures are valid for the duration of the development process, and mitigation measures might have to be implemented on additional features of heritage importance not detected during this Phase 1 assessment (e.g. uncovered during the construction process).

2 BACKGROUND

2.1 Scope and Motivation

AGES was appointed by the Sishen Iron Ore Company for an Archaeological Impact Assessment (AIA) Study of demarcated surface portions of the farms Gamagara 541, Onverwacht 540 (Fritz 540 Portion 1) and Nooitgedacht 469 (Woon 469) subject to an EIA for the Sishen Iron Ore Mine Western Waste Dumps project in the Kgalagadi District Municipality of the Northern Cape Province. The SIOC are planning an expansion of waste dump facilities for the mine (see Figures 2-1). The rationale of the AIA study was to determine the presence of heritage resources such as archaeological and historical sites and features, graves and places of religious and cultural significance; to consider the impact of the proposed project on such heritage resources, and to submit appropriate recommendations with regard to the cultural resources management measures that may be required at affected sites / features.

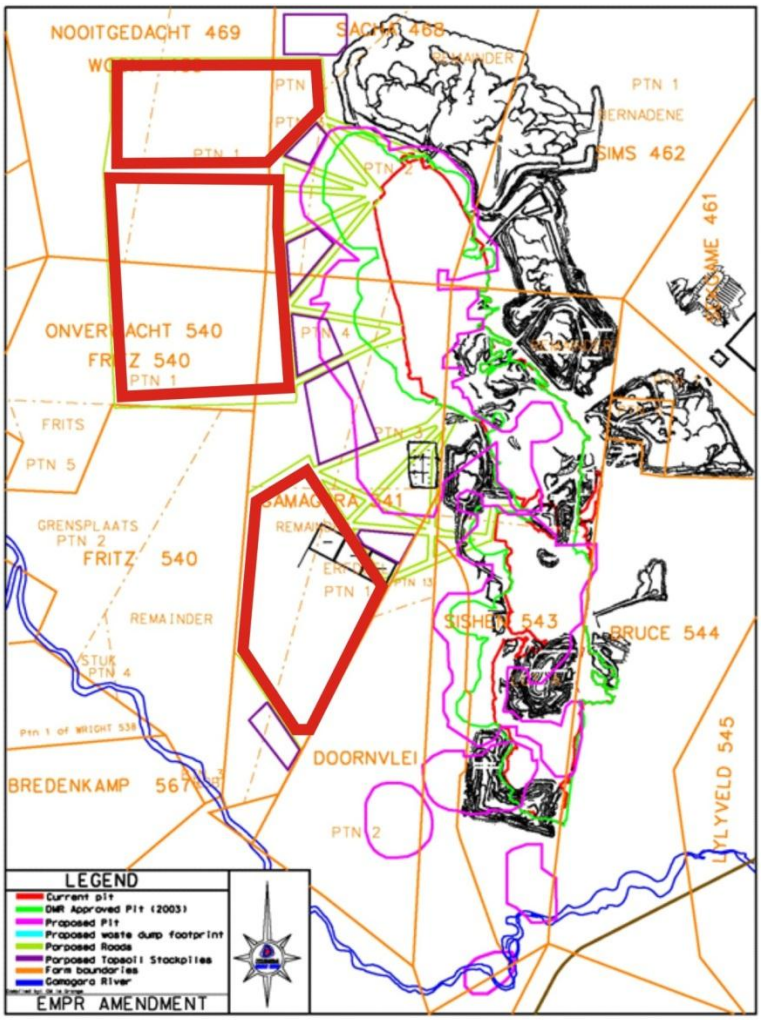


Figure 2-1: Map indicating the location of the project area subject to the Sishen Western Waste Dumps project (Courtesy of SIOC).

2.2 Project Direction

AGES's expertise ensures that all projects be conducted to the highest international ethical and professional standards. As archaeological specialist for AGES, Mr Neels Kruger acted as field director for the project; responsible for the assimilation of all information, the compilation of the final AIA report and recommendations in

terms of heritage resources on the demarcated project areas. Mr Kruger is an accredited archaeologist and Culture Resources Management (CRM) practitioner with the Association of South African Professional Archaeologists (ASAPA), a member of the Society for Africanist Archaeologists (SAFA) and the Pan African Archaeological Association (PAA) as well as a Master's Degree candidate in archaeology at the University of Pretoria.

2.3 Terms of Reference

Environmental Impact Assessments (EIA's) should, in all cases, include the assessment of Heritage Resources. The heritage component of the EIA is provided for in the **National Environmental Management Act, (Act 107 of 1998)** and endorsed by section 38 of the **National Heritage Resources Act (NHRA - Act 25 of 1999)**. In addition, the NHRA protects all structures and features older than 60 years (see Section 34), archaeological sites and material (see Section 35) and graves as well as burial sites (see Section 36). The objective of this legislation is to enable and to facilitate developers to employ measures to limit the potentially negative effects that the development could have on heritage resources.

Based hereon, this project functioned according to the following **terms of reference:**

- *Provide a detailed description of all archaeological artefacts, structures (including graves) and settlements, if any.*
- *Estimate the level of significance/importance of the archaeological remains within the area.*
- *Assess any possible impact on the archaeological and historical remains within the area emanating from the proposed development activities.*
- *Propose possible mitigation measures provided that such action is necessitated by the development.*
- *Liaise and consult with the South African Heritage Resources Agency (SAHRA).*

2.4 CRM: Legislation, Conservation and Heritage Management

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

2.4.1 Legislation regarding archaeology and heritage sites

The South African Heritage Resources Agency (SAHRA) and their provincial offices aim to conserve and control the management, research, alteration and destruction of cultural resources of South Africa. It is therefore vitally important to adhere to heritage resource legislation at all times.

- *National Heritage Resources Act No 25 of 1999, section 35*

According to the National Heritage Resources Act of 1999 a historical site is "any identifiable building or part thereof, marker, milestone, gravestone, landmark or tell older than 60 years." This clause is commonly known as the "60-years clause". Buildings are amongst the most enduring features of human occupation, and this definition therefore includes all buildings older than 60 years, modern architecture as well as ruins, fortifications and Iron Age settlements. "Tell" refers to the evidence of human existence which is no longer above ground level, such as building foundations and buried remains of settlements (including artefacts).

The Act identifies heritage objects as:

- objects recovered from the soil or waters of South Africa including archaeological and palaeontological objects, meteorites and rare geological specimens
- visual art objects
- military objects
- numismatic objects
- objects of cultural and historical significance
- objects to which oral traditions are attached and which are associated with living heritage
- objects of scientific or technological interest
- any other prescribed category

With regards to activities and work on archaeological and heritage sites this Act states that:

"No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority." (34. [1] 1999:58)

and

"No person may, without a permit issued by the responsible heritage resources authority-

(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;

(b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

(c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or

(d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites. (35. [4] 1999:58)."

And:

"No person may, without a permit issued by SAHRA or a provincial heritage resources agency-

(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority;

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals (36. [3] 1999:60)."

- *Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925*

Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act and the Human Tissues Act of 1983. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and the Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial MEC as well as the relevant Local Authorities.

2.4.2 Background to HIA and AIA Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'Generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. Heritage sites are frequently threatened by development projects and both the environmental and heritage legislation require impact assessments (HIAs & AIAs) that identify all heritage resources in areas to be developed. Particularly, these assessments are required to make recommendations for protection or mitigation of the impact of the sites. HIA's and AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources including archaeological and palaeontological sites that might occur in areas of developed and (b) make recommendations for protection or mitigation of the impact on the sites.

The National Heritage Resources Act (Act No. 25 of 1999, section 38) provides guidelines for Cultural Resources Management and prospective developments:

***"38.** (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as:*

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) the construction of a bridge or similar structure exceeding 50 m in length;

(c) any development or other activity which will change the character of a site:

(i) exceeding 5 000 m^2 in extent; or

(ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10 000 m^2 in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development."

And:

"The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

(a) The identification and mapping of all heritage resources in the area affected;

(b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;

(c) an assessment of the impact of the development on such heritage resources;

(d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;

(e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;

(f) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and

(g) plans for mitigation of any adverse effects during and after the completion of the proposed development (38. [3] 1999:64)."

Consequently, section 35 of the Act requires Heritage Impact Assessments (HIAs) or Archaeological Impact Assessments (AIAs) to be done for such developments in order for all heritage resources, that is, all places or objects of aesthetics, architectural, historic, scientific, social, spiritual, linguistic or technological value or significance to be protected. Thus any assessment should make provision for the protection of all these heritage components, including archaeology, shipwrecks, battlefields, graves, and structures older than 60 years, living heritage, historical settlements, landscapes, geological sites, palaeontological sites and objects.

3 REGIONAL CONTEXT

3.1 Area Location

The study area for the Sishen Western Waste Dumps project is located on the western outskirts of the Sishen Iron Ore Mine on the farms Gamagara 541, Onverwacht 540 (Fritz 540 Portion 1) and Nooitgedacht 469 (Woon 469) in the Kgalagadi District of the Northern Cape Province. The town of Kathu occurs east of the study area. The Sishen Iron Ore Mine Complex is situated more or less 5km south-west of the town of Kathu and approximately 180km north-east of the Northen Cape town of Upington.

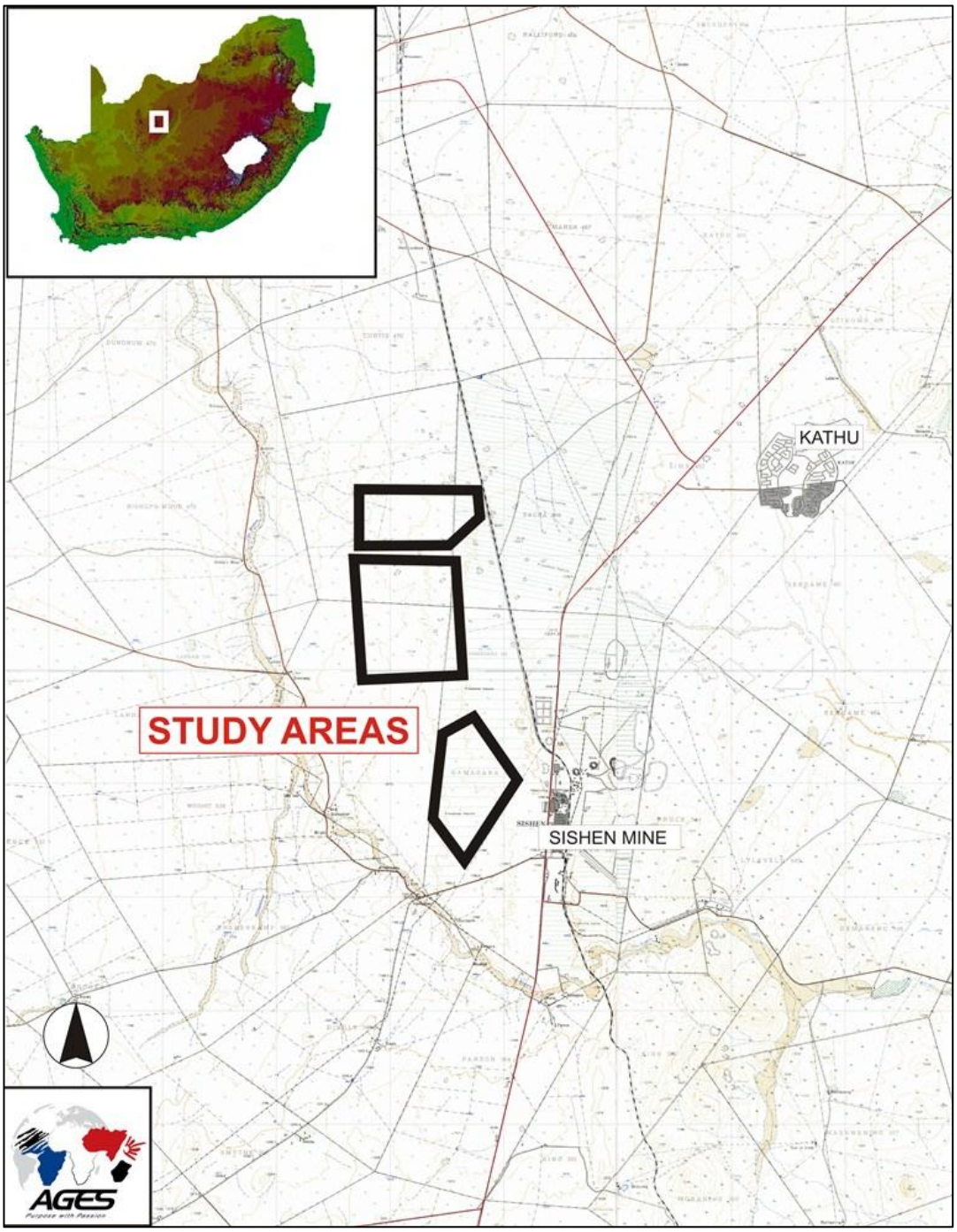


Figure 3-1: 1:50 00 Map representation of the Sishen Western Waste Dumps project location (2722DD).

3.2 Area Description: Receiving Environment

The Northern Cape area around Kathu and the Sishen Iron Ore Mine receives around 200-400 mm of rain in the summer months. The local vegetation is classified as Karroid Bushveld where a transition occurs between trees in a mixed grassveld, typical to the Bushveld complex, to a Karoo landscape with more open grasslands and succulents (Acocks 1988). The geology of the region is underlain by rocks older than 1000 million years and the overburden consists mainly of geologically recent Kalahari sand, which in turn is un-fossiliferous. Some quartzites also occur on area on the landscape. Previous studies in the area indicated that the area is underlain more specifically by Proterozoic-aged rocks belonging to the Asbestos Hills Subgroup of the Transvaal Supergroup (Beaumont 2009). The Gamagara River, a major non-perennial waterway transects the landscape south and west of the Sishen Iron Ore Mine.

Figure 3-2: General surroundings of the northern portion of the study area looking east.

Figure 3-3: General surroundings of the central portion of the study area looking north-east.

3.3 Site Description

The project area subject to the Sishen Western Waste Dumps EIA comprises three areas to the west of the Sishen Iron Ore Mine where waste rock dumps are planned (see Figure 3-4 to 3-6). Surface areas in certain parts of this area have been altered as a result of past mining activities, agriculture and natural agents such as erosion. However, extensive surface disturbances across the larger landscape do not occur (see Section 4.2.2).

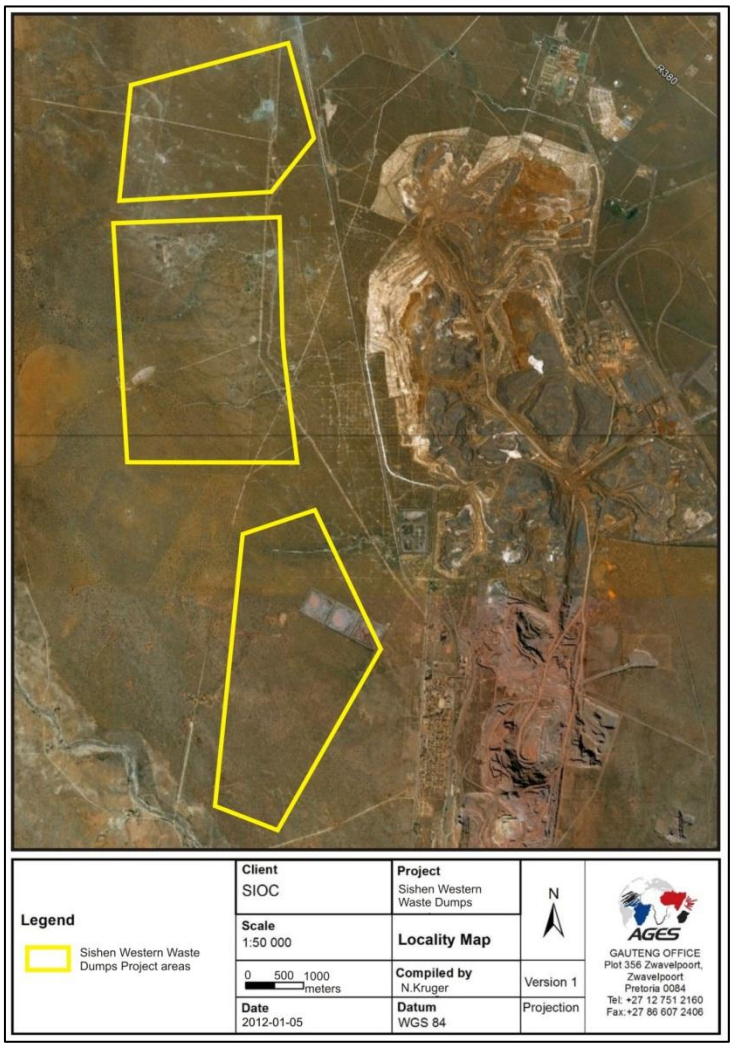


Figure 3-4: Regional setting of the Sishen Iron Ore Mine, indicating the Sishen Western Waste Dumps project areas and general situation of the base case for the waste dumps.

Three alternatives are considered for the proposed waste dumps in terms of layout and dimensions:

- A base case, which generally follows the design of the footprints of the study area (Figure 3-4).
- A second “narrower/higher” alternative, comprised of higher G80 benches up to 160 m with a narrower footprint than the base case (Figure 3-5).
- A third “wider/lower” alternative, consisting of similar higher G80 benches up to 160m, but with a wider footprint (Figure 3-6).

These physical variations in options considered for waste dumps have no implication for the AIA as all alternatives fall within the boundaries of the Sishen Western Waste Dumps project and the AIA study area.

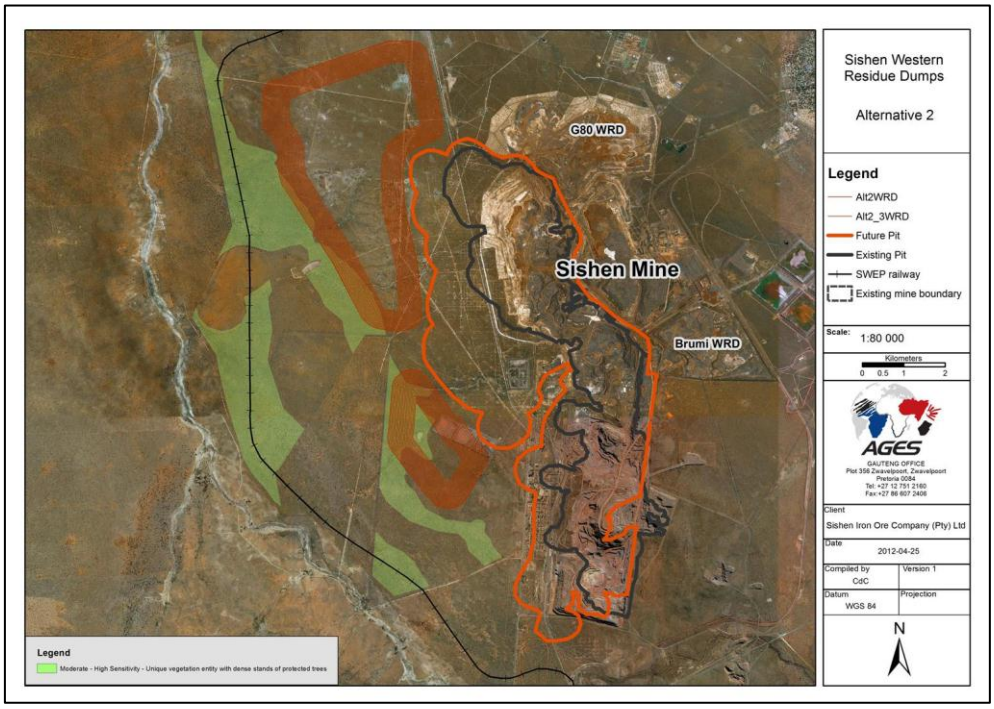


Figure 3-5: Map indicating the Sishen Western Waste Dumps project areas and general situation of Alternative 1 for the waste dumps.

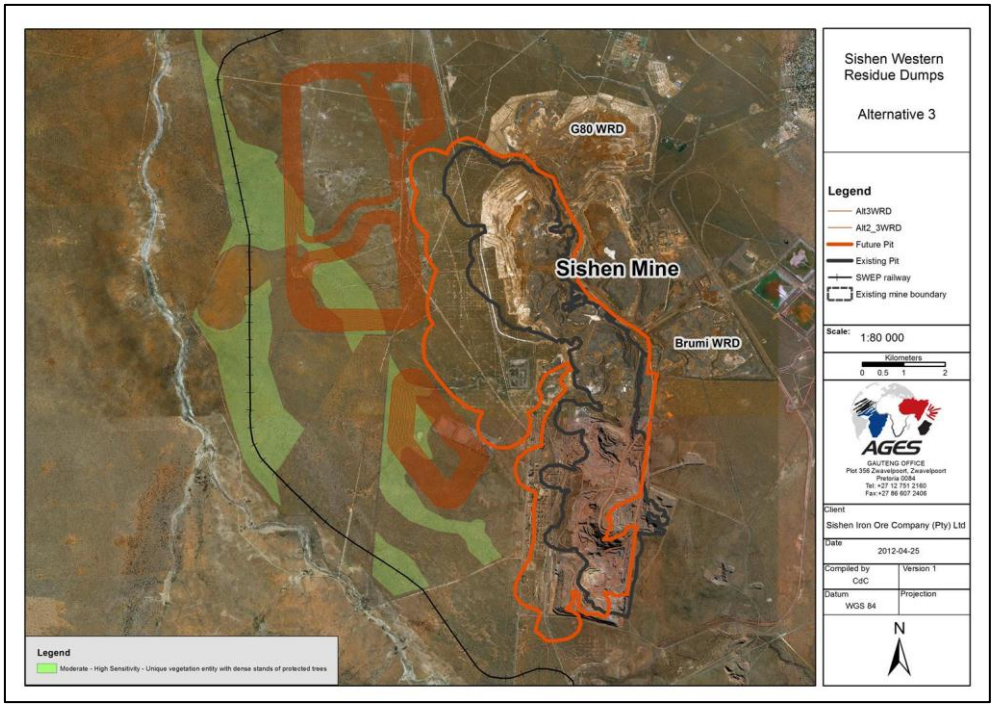


Figure 3-5: Map indicating the Sishen Western Waste Dumps project areas and general situation of Alternative 2 for the waste dumps.

4 METHOD OF ENQUIRY

4.1 Sources of Information

4.1.1 Desktop Study

A desktop study was prepared in order to contextualize the proposed project within a larger historical milieu. The study focused on relevant previous studies, archaeological and archival sources, aerial photographs, historical maps and local histories, all pertaining to the Kathu area and the larger landscape of this section of the Northern Cape Province.

4.1.2 Aerial Representations and Survey

Aerial photography is often employed to locate and study archaeological sites, particularly where larger scale area surveys are performed. This method was applied to aid the pedestrian and vehicular survey of the 2700ha project area, where contour lines of elevations, depressions, variation in vegetation, soil marks and landmarks were examined. Specific attention was given to shadow sites (shadows of walls or earthworks which are visible early or late in the day), crop mark sites (crop mark sites are visible because disturbances beneath crops cause variations in their height, vigour and type) and soil marks (e.g. differently coloured or textured soil (soil marks) might indicate ploughed-out burial mounds). Attention was also given to moisture differences, as prolonged dampening of soil as a result of precipitation frequently occurs over walls or embankments. By superimposing high frequency aerial photographs with images generated with Google Earth, potential sensitive areas were subsequently identified. These areas served as referenced points from where further transect surveys were carried out.

Figure 4-1: Aerial representation indicating areas identified as possible archaeological sites / disturbances prior to site survey.

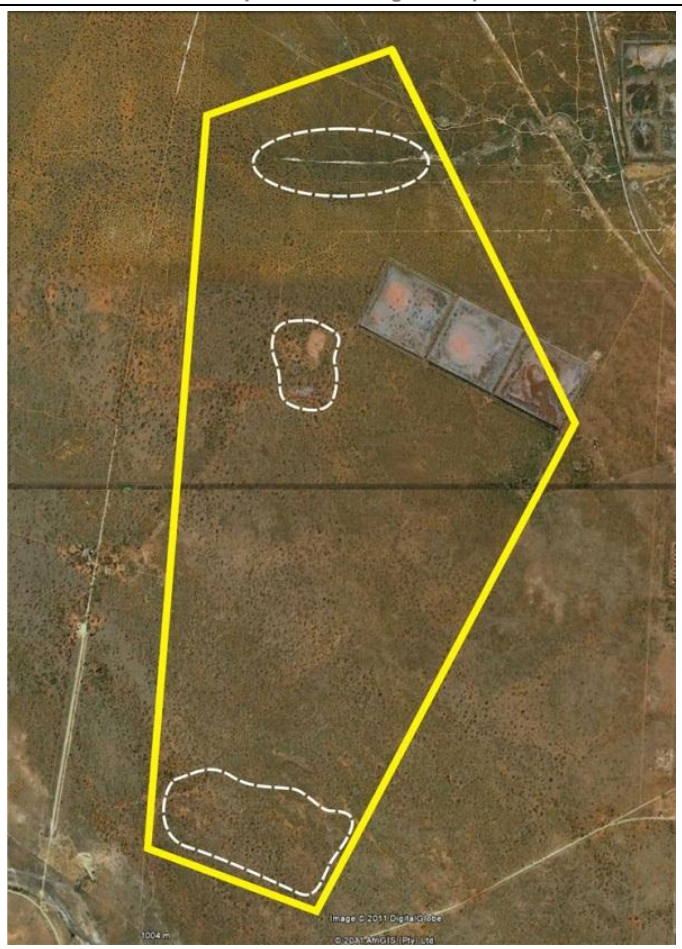


Figure 4-2: Aerial representation indicating areas identified as possible archaeological sites / disturbances prior to site survey.

4.1.3 Field Survey

Archaeological survey implies the systematic procedure of the identification of archaeological sites. An archaeological survey of the Sishen Western Waste Dumps project area was done by means of a systematic pedestrian and vehicular survey in accordance with standard archaeological practise by which heritage resources are observed and documented. In order to sample surface areas systematically and to ensure a high probability of site recording, a transect grid system at a frequency of between 50m and 100m was digitally superimposed on maps of the infrastructure development areas. This system was then applied as guide for the pedestrian survey. Moving along the transect grid with a Garmin E-trex Legend GPS, objects and structures of archaeological / heritage value were recorded and photographed with a Canon 450D Digital camera. The pedestrian and vehicular survey also focused around potentially sensitive areas identified during the aerial survey (see Figure 4-1) as well as areas of higher site catchment probability – for example around water sources such as pans, drainage lines and soils suitable for prehistoric agriculture. Real time aerial orientation, by means of a mobile Google Earth application was also employed to investigate possible disturbed areas during the survey (see Figure 4-2). As most archaeological material occur in single or multiple stratified layers beneath the soil surface, special attention was given to disturbances, both man-made such as roads and clearings, as well as those made by natural agents such as burrowing animals and erosion.

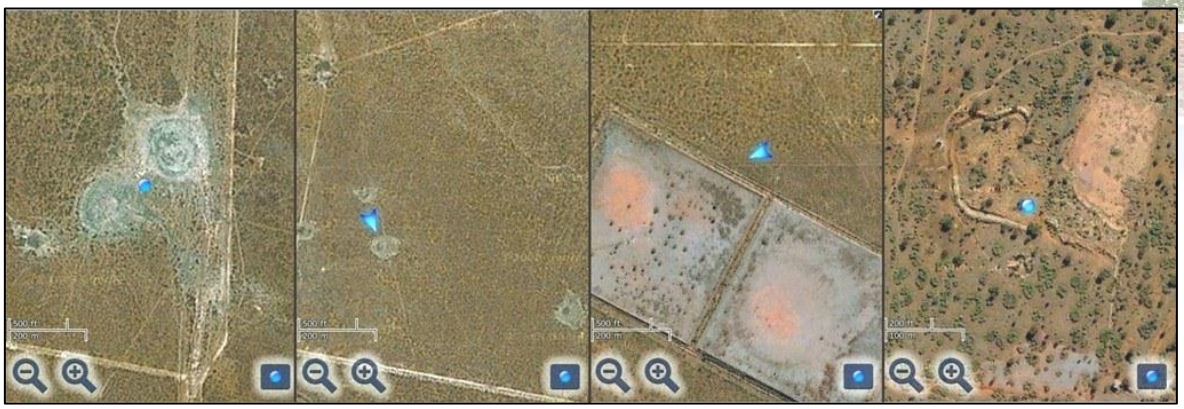


Figure 4-3: Captured screen contents of real time mobile aerial orientation representations employed during the field survey, current location indicated by blue marker.

4.2 Limitations

4.2.1 Access

Access control is applied to all the farms relevant to this assessment but no restrictions were encountered during site visits as the author of this report was accompanied by an official from Kumba. Here, farm service roads provided access to all portions of these farms, and all areas relevant to the study were easily reachable.

4.2.2 Visibility

The surrounding vegetation in the Sishen area is mostly comprised out of mixed grasslands and scattered trees with the occurrence of semi-arid succulents in places. The general visibility at the time of the initial AIA survey (November 2011) ranged between moderate to high visibility in areas to the north and south, and moderate to low visibility in places in central to the study area (see Figures 4-1 to 4-4). In single cases during the survey sub-surface inspection was possible. Where applied, this revealed no archaeological deposits.

Figure 4-4: View of Springbok Pan in the northern portion of the study area, looking north.

Figure 4-5: General surroundings of the northern portion of the study area looking north-east.

Figure 4-6: General surroundings of the central portion of the study area looking east.

Figure 4-7: General surroundings of the central portion of the study area looking east.

Figure 4-8: General surroundings of the southern portion of the study area looking east.

Figure 4-9: Surface disturbance in the southern portion of the study area adjacent to the old mine slimes dams, looking north-east.

4.2.3 Constraints

Generally, time restrictions in terms of the site survey proved to be a constraint due to the vast surface extent of the larger project area. Also, in accordance with Sishen site policy, the author of this report was accompanied by an official from Kumba during visits to all farms which somewhat restricted survey time and free movement on site. Therefore, pedestrian site surveys focused around areas tentatively identified as sensitive (i.e. along drainage lines and pans and those noted during the aerial survey). Vehicular surveys were applied at all other areas. Maintaining due cognisance of the integrity and accuracy of the archaeological survey, it should be stated that the heritage resources identified during the study do not necessarily represent *all* the heritage resources present on the property. The subterranean nature of some archaeological sites, dense vegetation cover and visibility constraints sometimes distort heritage representations and any additional heritage resources located during consequent development phases must be reported to the Heritage Resources Authority or an archaeological specialist.

5 RESULTS: ARCHAEOLOGICAL SURVEY

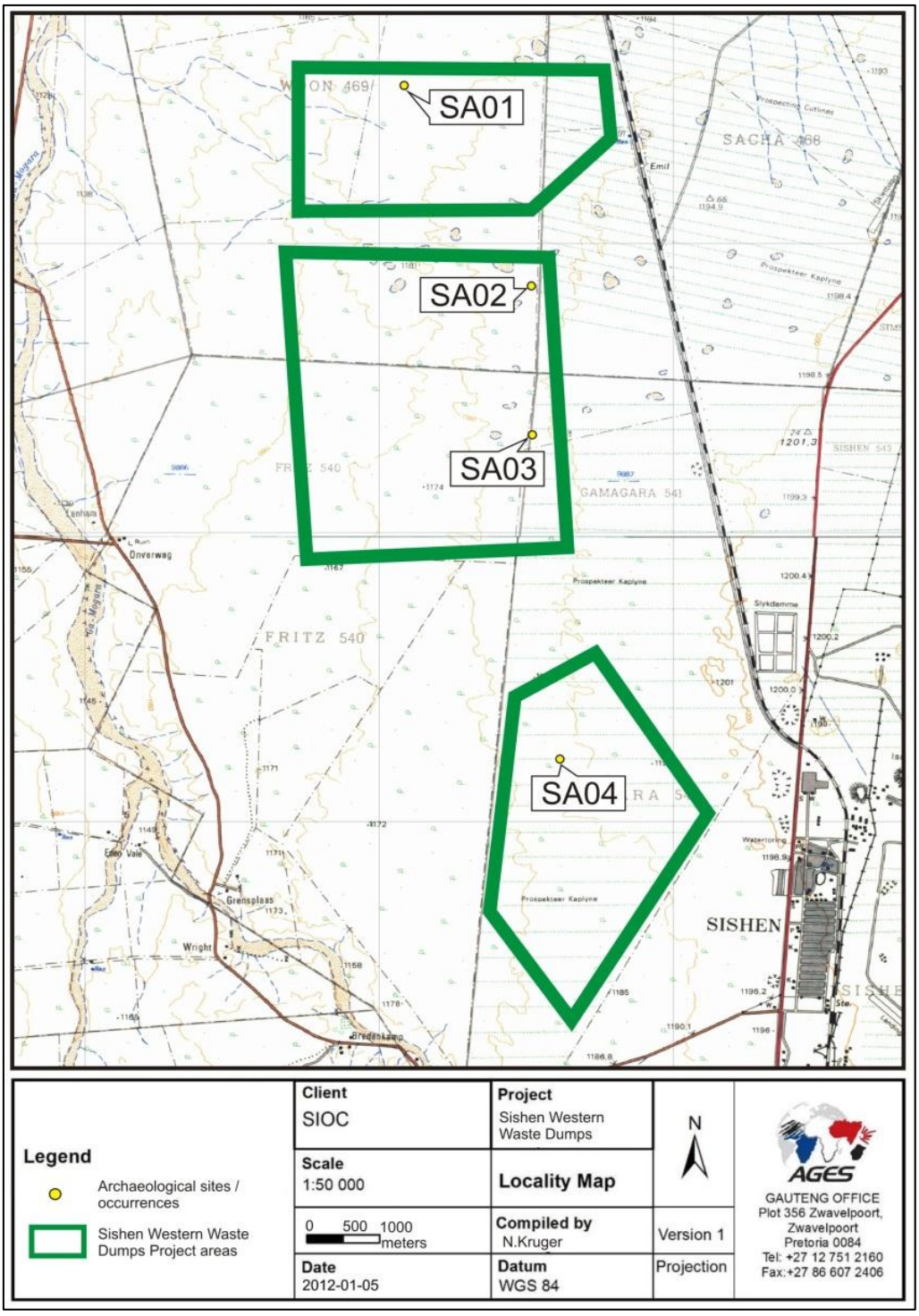


Figure 5-1: Map of the survey area, indicating the location of sites of interest discussed in the text.

5.1 The Stone Age

During the survey, low density Stone Age Scatters were identified in three areas in the study area. Another site with larger amounts of Earlier and Middle Stone Age material was documented at a man-made dam and borehole on the farm Fritz 540 (see Figure 5-1 and Section 7.3):

Site SA01 (S27°41'51" E22°56'20.6"): Single MSA lithics on the farm Woon 469.

Site SA03 (S27°44'16.1" E22°57'13.2"): Single MSA lithics on the farm Woon 469.

Site SA04 (S27°46'30.6" E22°57'24.3"): Single MSA lithics on the farm Gamagara 541

Single MSA lithics were documented at three sites near water pans in the area. The location of these scatters corresponds with a general Stone Age site distribution pattern in the area where archaeological sites in the landscape occur near water sources such as rivers and pans. Amongst the lithics observed, were lightly smoothed jasper artefacts, cores with some peripheral preparation and scattered debris. However, no formal tools or distinctive tool-types were observed. The occurrence is probably of limited scientific value due to the low density of the material and the frequent occurrence of such MSA assemblages in the general landscape.

Figure 5-2: Flaked MSA lithics from sites SA01, SA03 and SA04.

Site SA02 (S27°43'13.7" E22°57'12.7"): ESA & MSA lithic scatter on the farm Fritz 540

ESA and MSA lithic scatters were documented next to a man-made dam and borehole on the farm Frits. Amongst the lithics observed, were ESA hand axes and cleavers, lightly smoothed jasper artefacts, MSA cores with some peripheral preparation and scattered debris. Previous research by the McGregor Museum in Kimberly, attributed related occurrences in the area to the Earlier Stone Age, specifically the Fauresmith – Acheulean timespan at about 600 000 years ago, and the Middle Stone Age (e.g. Beaumont & Morris 1990). The occurrence has scientific potential due to the presence of formal stone tools, and the occurrence of less widespread ESA material at this site.

Figure 5-3: Site SA02 is situated at a man-made catchment dam and borehole.

Figure 5-4 ESA hand axe and cleaver (left) and MSA flaked lithics (right) from site SA02.

5.2 The Iron Age (Farmer Period)

No Iron Age (Farmer Period) occurrences were observed in the survey area.

5.3 Historical / Colonial Period and recent times

No Historical / Colonial Period occurrences were observed in the survey area.

5.4 Graves

No graves / burial places were observed in the survey area.

5.5 Other: Palaeontology

No palaeontologocal occurrences were documented in the survey area. Geological scoping studies in the area concludes that the basement rocks in the area are extensively overlain by superficial sediments such as alluvial sands and calcretes of Quaternary age. These superficial sediments are generally only sparsely fossiliferous to unfossiliferous. It is therefore improbable that palaeontological features will be impacted by mining activities.

6 ARCHAE0-HISTORICAL CONTEXT

6.1 The archaeology of Southern Africa

Archaeology in southern Africa is typically divided into two main fields of study, the **Stone Age** and the **Iron Age** or **Farmer Period**. The following table gives a concise outline of the chronological sequence of periods in Southern African history:

Period	Epoch	Associated cultural groups	Typical Material Expressions
Early Stone Age 2.5m – 250 000 YCE	Pleistocene	Early Hominins: *Australopithecines* *Homo habilis* *Homo erectus*	Typically large stone tools such as hand axes, choppers and cleavers.
Middle Stone Age 250 000 – 25 000 YCE	Pleistocene	First *Homo sapiens* species	Typically smaller stone tools such as scrapers, blades and points.
Late Stone Age 20 000 BC – present	Pleistocene / Holocene	*Homo sapiens sapiens* including San people	Typically small to minute stone tools such as arrow heads, points and bladelets.
Early Iron Age / Early Farmer Period 300 – 900 AD	Holocene	First Bantu-speaking groups	Typically distinct ceramics, bead ware, iron objects, grinding stones.
Middle Iron Age (Mapungubwe / K2) / early Later Farmer Period 900 – 1350 AD	Holocene	Bantu-speaking groups, ancestors of present-day groups	Typically distinct ceramics, bead ware and iron / gold / copper objects, trade goods and grinding stones.
Late Iron Age / Later Farmer Period 1400 AD -1850 AD	Holocene	Various Bantu-speaking groups including Venda, Thonga, Sotho-Tswana and Zulu	Distinct ceramics, grinding stones, iron objects, trade objects, remains of iron smelting activities including iron smelting furnace, iron slag and residue as well as iron ore.
Historical / Colonial Period ±1850 AD – present	Holocene	Various Bantu-speaking groups as well as European farmers, settlers and explorers	Remains of historical structures e.g. homestead, missionary schools etc. as well as, glass, porcelain, metal and ceramics.

6.1.1 The Stone Ages

- **The Earlier Stone Age (ESA)**

Earlier Stone Age deposits typically occur on the flood-plains of perennial rivers and may date to between 2 million and 250 000 years ago. These ESA open sites sometimes contain stone tool scatters and manufacturing debris ranging from pebble tool choppers to core tools such as handaxes and cleavers. These stone tools were made by the earliest hominins. These groups seldom actively hunted and relied heavily on the opportunistic scavenging of meat from carnivore fill sites.

- **The Middle Stone Age (MSA)**

The majority of Middle Stone Age (MSA) sites occur on flood plains and sometimes in caves and rock shelters. Sites usually consist of large concentrations of knapped stone flakes such as scrapers, points and blades and associated manufacturing debris. Tools may have been hafted but organic materials, such as those used in hafting, seldom remain preserved in the archaeological record. Limited drive-hunting activities are also associated with the MSA.

- **The Later Stone Age (LSA)**

Sites dating to the Later Stone Age (LSA) are better preserved in rock shelters, although open sites with scatters of mainly stone tools can occur. Well-protected deposits in shelters allow for stable conditions that result in the preservation of organic materials such as wood, bone, hearths, ostrich eggshell beads and even bedding

material. By using San (Bushman) ethnographic data a better understanding of this period is possible. South African rock art is also associated with the LSA.

6.1.2 The Iron Age (Farmer Period)

- **Early Iron Age (Early Farming Communities)**

The Early Iron Age (also Early Farmer Period) marks the movement of Bantu speaking farming communities into South Africa at around 200 A.D. These groups were agro-pastoralists that settled in the vicinity of water in order to provide subsistence for their cattle and crops. Artefact evidence from Early Farmer Period sites is mostly found in the form of ceramic assemblages and the origins and archaeological identities of this period are largely based upon ceramic typologies and sequences, where diagnostic pottery assemblages can be used to infer group identities and to trace movements across the landscape. Early Farmer Period ceramic traditions are classified by some scholars into different "streams" or trends in pot types and decoration that, over time emerged in southern Africa. These "streams" are identified as the Kwale Branch (east), the Nkope Branch (central) and the Kalundu Branch (west). More specifically, in the northern regions of South Africa at least three settlement phases have been distinguished for prehistoric Bantu-speaking agropastoralists. The first phase of the Early Iron Age, known as Happy Rest (named after the site where the ceramics were first identified), is representative of the Western Stream of migrations, and dates to AD 400 - AD 600. The second phase of Diamant is dated to AD 600 - AD 900 and was first recognized at the eponymous site of Diamant in the western Waterberg. The third phase, characterised by herringbone-decorated pottery of the Eiland tradition, is regarded as the final expression of the Early Iron Age (EIA) and occurs over large parts of the North West Province, Northern Province, Gauteng and Mpumalanga. This phase has been dated to about AD 900 - AD 1200. Early Farmer Period ceramics typically display features such as large and prominent inverted rims, large neck areas and fine elaborate decorations. The Early Iron Age continued up to the end of the first millennium AD.

- **Middle Iron Age / K2 Mapungubwe Period (early Later Farming Communities)**

The onset of the middle Iron Age dates back to ±900 AD, a period more commonly known as the Mapungubwe / K2 phase. These names refer to the well known archaeological sites that are today the pinnacle of South Africa's Iron Age heritage. The inhabitants of K2 and Mapungubwe, situated on the banks of the Limpopo, were agriculturalists and pastoralists and were engaged in extensive trade activities with local and foreign traders. Although the identity of this Bantu-speaking group remains a point of contestation, the Mapungubwe people were the first state-organized society southern Africa has known. A considerable amount of golden objects, ivory, beads (glass and gold), trade goods and clay figurines as well as large amounts of potsherds were found at these sites and also appear in sites dating back to this phase of the Iron Age. Ceramics of this tradition take the form of beakers with upright sides and decorations around the base (K2) and shallow-shouldered bowls with decorations as well as globular pots with long necks. (Mapungubwe). The site of Mapungubwe was deserted at around 1250 AD and this also marks the relative conclusion of this phase of the Iron Age.

- **Later Iron Age (Later Farming Communities)**

The late Iron Age of southern Africa marks the grouping of Bantu speaking groups into different cultural units. It also signals one of the most influential events of the second millennium AD in southern Africa, the difaqane. The difaqane (also known as "the scattering") brought about a dramatic and sudden ending to centuries of stable society in southern Africa. Reasons for this change was essentially the first penetration of the southern African interior by Portuguese traders, military conquests by various Bantu speaking groups primarily the ambitious Zulu King Shaka and the beginning of industrial developments in South Africa. Different cultural groups were scattered over large areas of the interior. These groups conveyed with them their customs that in the archaeological record manifest in ceramics, beads and other artefacts. This means that distinct pottery typologies can be found in the

different late Iron Age groups of South Africa.

6.1.3 Historical and Colonial Times and Recent History:

The Historical period in southern Africa encompass the course of Europe's discovery of South Africa and the spreading of European settlements along the East Coast and subsequently into the interior. In addition, the formation stages of this period are marked by the large scale movements of various Bantu-speaking groups in the interior of South Africa, which profoundly influenced the course of European settlement. Finally, the final retreat of the San and Khoekhoen groups into their present-day living areas also occurred in the Historical period in southern Africa.

6.2 Sishen Iron Mine Surroundings: Specific Themes

The history of the Northern Cape Province is reflected in a rich archaeological landscape, mostly dominated by Stone Age occurrences. Numerous sites, documenting Earlier, Middle and Later Stone Age habitation occur across the province, mostly in open air locales or in sediments alongside rivers or pans. In addition, a wealth of Later Stone Age rock art sites, most of which are in the form of rock engravings are to be found in the larger landscape. These sites occur on hilltops, slopes, rock outcrops and occasionally in river beds. Sites dating to the Iron Age occur in the north eastern part of the Province but environmental factors delegated that the spread of Iron Age farming westwards from the 17th century was constrained mainly to the area east of the Langeberg Mountains. However, evidence of an Iron Age presence as far as the Upington area in the eighteenth century occurs in this area. Moving into recent times, the archaeological record reflects the development of a rich colonial frontier, characterised by, amongst others, a complex industrial archaeological landscape such as mining developments at Kimberley, which herald the modern era in South African history.

6.2.1 Palaeontology and Early History

As previously noted, the Kathu area is underlain by rocks older than 1000 million years, which makes them too old to contain hard-bodied fossils (Beaumont 2009). This overburden consists mainly of un-fossiliferous Kalahari sand, which is relatively recent in geological age. An indurated calcareous layer frequently occurs at the interface of the sandy overburden and the rock beneath. This layer may contain fossil remains in more suitable localities, although none have been reported from such contexts in this area.

6.2.2 The Early and Middle stone Ages in the Northern Cape

The landscape around the town of Kathu is rich in archaeological material dating to Earlier and Middle Stone Ages. Sites such as Wonderwerk Cave, Kathu Pan and Kathu Townlands have yielded significant Stone Age assemblages that all inform on our general understanding of the technological sequences of the Stone Age in the Northern Cape (e.g. see Beaumont 2008; Morris 2006; Morris 2007; Dreyer 2007). In addition, a large amount of Middle and Later Stone Age sites have been documented across the landscape on calcrete lined pans and road cuttings

6.2.3 Significant Stone Age Sites in the Kathu area

Archaeological sites in the vicinity of the Sishen Iron Ore Mine Complex are not randomly scattered within the landscape and they occur either near water or close to local source of two highly-prized raw materials, specularite and jaspilite. Besides the Gamagara River where numerous low density artefact scatters occur, another regional water source occurs below superficial sands on the bedrock plains around Kathu, where water was contained at times that gradually filled up with stratified sediments often containing massive calcretes of

Tertiary age. Large tracts are far more widespread, where archaeological traces are almost non-existent with very occasional specimens of the Later Stone Age on the sand surface and thin scatters of specimens from the Early Stone Age on calcrete below.

Rock engravings previously occurred on the farms Bruce and Sishen, but as these were located in land that was to be mined, personnel of the McGregor Museum removed them prior to mining developments.

At least two archaeological sites of note occur in the general landscape around the town of Kathu.

- Kathu Pan

This site, situated near the town of Kathu, is a shallow water pan about 30ha in extent. The site was extensively studied from 1974 to 1990 by Humpreys and Beaumont, amongst others. Kathu Pan is an extremely significant site as it represents the major industries of the Stone Age, more specifically two phases of the Earlier Stone Age, two phases of the Middle Stone Age, and more or less the entire Later Stone Age (Beaumont 1990). The site yielded large amounts of hand axes and faunal remains, including the concentrated remains of large mammal remains. The abundance of Stone Age material at Kathu Pan can probably be attributed to the presence of a permanent water source at the pan.

Figure 6-1: Early Stone Age (Acheul) handaxe from the Kathu Pan site (http://www.museumsnc.co.za).

- Kathu Townlands

This Provincial Heritage Site, covering an estimated area of 250 000 m^2 is located away from the Kathu pan on the outskirts of the town of Kathu. The site, excavated in 1982 and 1990, primary displays a large Earlier Stone Age horizon in deposits up to a metre below surface. This deposit dates to the Acheul phase of the Earlier Stone Age. It is estimated that in total, the site holds more than 2 billion artefacts. This abundance of lithic debris could be ascribed to the protracted use of the high-grade banded ironstone outcrop in the area, as a raw material source (Beaumont 1990).

- Other sites around the Sishen area

Studies by the McGregor Museum in Kimberley have recorded Earlier and Later Stone Age sites on e.g. the farm

Lylyveld 545 along the Gamagara River and Earlier Stone Age plus Iron Age material from around specularite pits on the hillside (Beaumont 2009 & 1990). These studies also mention pecked engravings on off – white Gamagara Shale located on the farms Sishen 543 and Bruce 544. In addition, another Acheul quarry of similar extent to the Kathu Towlands Site occurs on the crest of Kathu Hill close to the town of Kathu.

7 STATEMENT OF SIGNIFICANCE

7.1 Heritage resources management and conservation

Archaeological sites, as previously defined in the National Heritage Resources Act (Act 25 of 1999) are places in the landscape where people have lived in the past – generally more than 60 years ago – and have left traces of their presence behind. In South Africa, archaeological sites include hominid fossil sites, places where people of the Earlier, Middle and Later Stone Age lived in open sites, river gravels, rock shelters and caves, Iron Age sites, graves, and a variety of historical sites and structures in rural areas, towns and cities. Palaeontological sites are those with fossil remains of plants and animals where people were not involved in the accumulation of the deposits. The basic principle of cultural heritage conservation is that archaeological and other heritage sites are valuable, scarce and *non-renewable.* Many such sites are unfortunately lost on a daily basis through development for housing, roads and infrastructure and once archaeological sites are damaged, they cannot be re-created as site integrity and authenticity is permanently lost. Archaeological sites have the potential to contribute to our understanding of the history of the region and of our country and continent. By preserving links with our past, we may not be able to revive lost cultural traditions, but it enables us to appreciate the role they have played in the history of our country.

7.2 Categories of significance

Rating the significance of archaeological sites, and consequently grading the potential impact on the resources is linked to the significance of the site itself. The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences. The guidelines as provided by the NHRA (Act No. 25 of 1999) in Section 3, with special reference to subsection 3 are used when determining the cultural significance or other special value of archaeological or historical sites. In addition, ICOMOS (the Australian Committee of the International Council on Monuments and Sites) highlights four cultural attributes, which are valuable to any given culture:

- *Aesthetic value:*

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria include consideration of the form, scale, colour, texture and material of the fabric, the general atmosphere associated with the place and its uses and also the aesthetic values commonly assessed in the analysis of landscapes and townscape.

- *Historic value:*

Historic value encompasses the history of aesthetics, science and society and therefore to a large extent underlies all of the attributes discussed here. Usually a place has historical value because of some kind of influence by an event, person, phase or activity.

- *Scientific value:*

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality and on the degree to which the place may contribute further substantial information.

- *Social value:*

Social value includes the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a certain group.

With reference to the evaluation of sites, the certainty of prediction is definite, unless stated otherwise and if the significance of the site is rated high, the significance of the impact will also result in a high rating. The same rule applies if the significance rating of the site is low.

The significance of archaeological sites is generally ranked into the following categories.

Significance	Rating Action
No significance: sites that do not require mitigation.	None
Low significance: sites, which may require mitigation.	2a. Recording and documentation (Phase 1) of site; no further action required 2b. Controlled sampling (shovel test pits, augering), mapping and documentation (Phase 2 investigation); permit required for sampling and destruction
Medium significance: sites, which require mitigation.	3. Excavation of representative sample, C14 dating, mapping and documentation (Phase 2 investigation); permit required for sampling and destruction [including 2a & 2b]
High significance: sites, where disturbance should be avoided.	4a. Nomination for listing on Heritage Register (National, Provincial or Local) (Phase 2 & 3 investigation); site management plan; permit required if utilised for education or tourism
High significance: Graves and burial places	4b. Locate demonstrable descendants through social consulting; obtain permits from applicable legislation, ordinances and regional by-laws; exhumation and reinterment [including 2a, 2b & 3]

A fundamental aspect in assessing the significance and protection status of a heritage resource is often whether or not the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and mitigated in order to gain data / information, which would otherwise be lost. Such sites must be adequately recorded and sampled before being destroyed. These are generally sites graded as of low or medium significance.

7.3 Evaluation of Results

Previous studies conducted in the larger Sishen area, coupled with finds noted in this report suggest a rich and diverse archaeological landscape (e.g. Kathu Pan and Stone Age occurrences along the Gamagara River) and cognisance should be taken of archaeological material that might be present in surface and sub-surface deposits along drainage lines and at water pans.

The following significance rating applies to Stone Age material located in the Sishen Western Waste Dumps project area:

- Stone Age material dating to the **Middle Stone Age** occurs at three locations the study area. However, these lithic scatters occur in low densities in single horizons within calcrete formations. They are not unique as an abundance of related Stone Age sites occur in the surrounding landscape and on the banks of Gamagara River. These occurrences are therefore of low significance.
- Larger amounts of **Earlier and Middle Stone Age** artefacts including handaxes, cores and flakes are present near a man-made dam in the area. The occurrence is significant as formal ESA lithics are less widespread in the area.

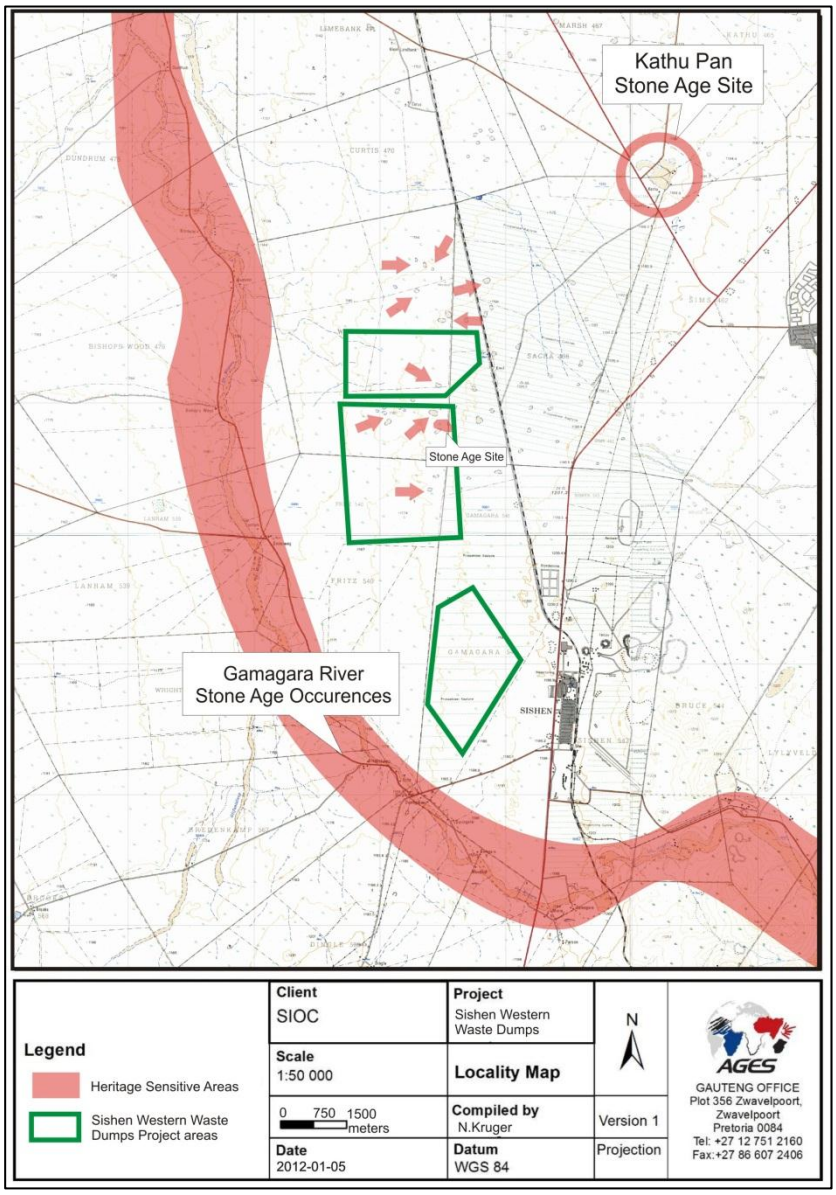


Figure 7-1: Heritage sensitivity map of the Sishen Western Waste Dumps Project Area and surroundings. The arrows indicate the positions on natural pans and associated possible Stone Age occurrences.

7.3.1 Earlier and Middle Stone Age Site (SA02)

1. SITE DESCRIPTION :				
1.1 General Site Description				
ESA and MSA lithic scatter				
1.2 Site features / artefacts / Other				
Site Location				
Province / Dsitrict	**Northern Cape Province**	Map Number	**2722DD**	
Farm Name	**Fritz 540**	Co-ordinates	**S27°43'13.7"**	**E22°57'12.7"**
Site Type				
Surface sites	**X**	Caves and rock shelters		
Larger open-air sites	**X**	Sealed sites (deposits		

River deposits		Other	

Site Function			
Living / habitation		Kill	
Ceremonial		Burial	
Trading / Barter		Art	
Quarry / Mining / Smelting		Other	**X – debris / scatter site**

Site Placement							
Valley floor		Hill top		Vlei/swamp		River Mouth	
Dam		River Bank		Slope		Plains	**X**
Other / Comments							

Vegetation							
Riverine forest		Bushveld		Savannah		Mountain forest	
Thornveld	**X**	Grassland	**X**	Cultivated	**X**	Other	

Age Classification							
Stone Age	**X**	Early Iron Age		Middle Iron Age		Later Iron Age	
Historical		Other					

Material Culture							
Midden		House Remains		Stone Walling		Stone Structures	
Granary		Grinding Stone (L)		Grinding Stone (U)		Granary Stand	
Metal		Ceramics (Pottery)		Ceramics (Porcelain)		Stone (non-lithic)	
Metal slag		Tuyere		Fauna		Bead (Glass)	
Bead (OES / Shell)		Glass		Lithics	**X**	Smelting Residues	
Other:				Other:			

1.3 Site Condition

The site integrity has been compromised by the mixing of artefacts and disturbance of site.

2. SITE EVALUATION

2.1 HERITAGE VALUE (NHRA, Section 2 [3])	High	Medium	Low
It has importance to the community or pattern of South Africa's history or pre-colonial history.		**X**	
It possesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage.			**X**
It has potential to yield information that will contribute to an understanding of South Africa's natural and cultural heritage.		**X**	
It is of importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects.		**X**	
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.			**X**
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.		**X**	
It has marked or special association with a particular community or cultural group for social, cultural or spiritual reasons (sense of place).			**X**
It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.			**X**
It has significance through contributing towards the promotion of a local sociocultural identity and can be developed as a tourist destination.			**X**
It has significance relating to the history of slavery in South Africa.			**X**
It has importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation.		**X**	

FIELD REGISTER RATING

National/Grade 1 [should be registered, retained]	
Provincial/Grade 2 [should be registered, retained]	
Local/Grade 3A [should be registered, mitigation not advised]	
Local/Grade 3B [High significance; mitigation, partly retained]	
Generally Protected A [High/Medium significance, mitigation]	
Generally protected B [Medium significance, to be recorded]	X
Generally Protected C [Low significance, no further action]	

C. SPHERE OF SIGNIFICANCE	High	Medium	Low
International			
National			
Provincial			
Local		X	
Specific community			

E. GENERAL STATEMENT OF SITE SIGNIFICANCE	
Low	
Medium	X
High	

F. RATING OF POTENTIAL IMPACT OF DEVELOPMENT	
None	
Peripheral	
Destruction	X
Uncertain	

G. RECOMMENDED MITIGATION

If further impact is envisaged:

- **General recording of site.**

H. APPLICABLE LEGISLATION AND LEGAL REQUIREMENTS

- **National Heritage Resources Act (Act no. 25 of 1999)**

8 RECOMMENDATIONS

Low densities of MSA material occur around pans and other water sources in the study area. Such MSA scatters are not unique to the area and they occur widely across in the landscape. Higher MSA occurrences, as well as the presence of ESA hand axes and cleavers are more significant and have scientific potential. Therefore, the author of this report proposes the following recommendations, based on findings contained in this Phase 1 AIA Report:

- Cognisance should be taken of the larger natural and archaeological horizon and the representation and position of the Sishen / Kathu area in the landscape's heritage. As such, care should be taken when disturbing any water sources or pans as Stone Age sites generally occur in the proximately these resources in the area
- The Middle Stone Age surface scatters observed at three sites around pans in the area is probably of limited scientific value and no significant impact on these resources is foreseen. Therefore no further actions are recommended.
- The ESA and higher density MSA scatters on the farm Fritz are of scientific value and a limited Phase 2 Specialist Study is recommended. Such a study should include the systematic documentation of surface

material by a qualified Stone Age specialist in order to record the lithic occurrence prior to the possible alteration of the site.

- A careful watching brief monitoring process is recommended for any future developments at the site. Should any subsurface paleontological / archaeological material be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately
- It should be noted that mitigation measures are valid for the duration of the development process, and mitigation measures might have to be implemented on additional features of heritage importance not detected during this Phase 1 assessment (e.g. uncovered during the construction process).

9 GENERAL COMMENTS AND CONDITIONS

This Phase 1 AIA report serves to confirm the extent and significance of archaeological material in study areas in the Sishen Western Waste Dumps project area. Apart from heritage remains in the study area , the Kathu and larger Sishen Area encompasses a rich and diverse archaeological landscape and cognisance should be taken of archaeological material that might be present in surface and sub-surface deposits.

Such material might include:

- Formal Earlier Stone Age stone tools such as handaxes, choppers and cleavers.
- Formal Middle Stone Age stone tools such as points, blades and scrapers.
- Formal Later Stone Age stone tools such a microlithic blades, points and scrapers.
- Lithic residues and debris such as stone cores and flakes.
- Decorated and undecorated potsherds.
- Iron objects.
- Beads made from ostrich eggshell and glass.
- Ash middens and cattle dung deposits and accumulations.
- Animal bones and faunal remains.
- Human remains/graves.
- Stone walling or any sub-surface structures.
- Fossils.

If such site were to be encountered or impacted by any proposed developments, recommendations contained in this report, as well as endorsement of mitigation measures as set out by SAHRA, the National Resources Act and the CRM section of ASAPA will be required. Please note that this report is a Phase 1 archaeological heritage impact assessment/investigation only and does not include or exempt other required heritage impact assessments.

It must be emphasised that the conclusions and recommendations expressed in this archaeological heritage sensitivity investigation are based on the visibility of archaeological sites/features and may not therefore, represent the area's complete archaeological legacy. Many sites/features may be covered by soil and vegetation and might only be located during sub-surface investigations. If subsurface archaeological deposits, artefacts or skeletal material were to be recovered in the area during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately **(*cf.* NHRA (Act No. 25 of 1999)**, Section 36 (6)).

It must also be clear that Archaeological Specialist Reports (AIAs) will be assessed by the relevant heritage resources authority. The final decision rests with the heritage resources authority, which should give a permit or a formal letter of permission for the destruction of any cultural sites.

10 BIBLIOGRAPHY

Beaumont, P & Morris, D. 1990. Guide to archaeological sites in the Northern Cape. *McGregor Museum, Kimberley*

Beaumont, P. 2009. Phase 1 Archaeological Impact Assessment report on a portion of the farm Lylyveld 545 near Kathu, Kagalagadi District Municipality, Northern Cape province. McGregor Museum, Kimberley

Bergh,J.S.1999. Geskiedenisatlas van Suid-Afrika: die vier noordelike provinsies. Pretoria: J.L. van Schaik

Deacon,J. 1996.Archaeology for Planners, Developers and Local Authorities. National Monuments Council. Publication no. P021E.

Deacon, J.1997. Report: Workshop on Standards for the Assessment of Significance and Research Priorities for Contract Archaeology. In: Newsletter No 49, Sept 1998. Association for Southern African Archaeologists.

Hall, M. 1987. The Changing Past :Farmers, Kings & Traders in Southern Africa 200 – 1860 Cape Town, Johannesburg: David Philip

Hall, M. 1996. Archaeology Africa. Cape Town, Johannesburg: David Philip

Phillipson, D.W. 1985. African Archaeology (second edition). Cambridge: Cambridge University Press

Renfrew, C & Bahn, P. 1991. Archaeology: Theories, Methods and Practice USA: Thames & Hudson

Sharer, A.J & Ashmore, W 1979. The Nature of Archaeological Data California: Benjamin/Cummings Publishing

Swanepoel, N. et al (Eds.) 2008. Five hundred years rediscovered. Johannesburg: Wits University Press

Soriano, S, Villa, P & Wadley, L. 2007. Blade technology and tool forms in the Middle Stone Age of South Africa: the Howiesons Poort and post-Howiesons Poort at Rose Cottage Cave. *Journal of Archaeological Science* 34:681-703.

Wadley, L. 2001. What is cultural modernity. A general view and a South African perspective from Rose Cottage. *Cambridge Archaeological Journal* 11(2):201-221.

Human Tissue Act and Ordinance 7 of 1925, Government Gazette, Cape Town

National Resource Act No.25 of 1999, Government Gazette, Cape Town

www.csg.dla.gov.za *accessed 2011-05-02*