

PHASE 1 HIA REPORT OMDRAAI/AFDRAAI PLOT 337 & PLOT 396 KAKAMAS-NORTH NORTHERN CAPE

PROPOSED AGRICULTURAL DEVELOPMENTS ON PLOT 337 AND PLOT 396,
KAKAMAS-NORTH, KAI !GARIB LOCAL MUNICIPALITY, Z.F. MGCAWU DISTRICT
MUNICIPALITY, NORTHERN CAPE.

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15 MAY 2021

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Declaration of independence:

We, Jan Engelbrecht and Heidi Fivaz, partners of UBIQUE Heritage Consultants, hereby confirm our independence as heritage specialists and declare that:

- we are suitably qualified and accredited to act as independent specialists in this application;
- we do not have any vested interests (either business, financial, personal or other) in the proposed development project other than remuneration for the heritage assessment and heritage management services performed;
- the work was conducted in an objective and ethical manner, in accordance with a professional code of conduct and within the framework of South African heritage legislation.



Signed:
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Date: 2021-05-15

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EXECUTIVE SUMMARY

Project description

UBIQUE Heritage Consultants were appointed by Eco Balance Planning Co. as independent heritage specialists in accordance with Section 38 of the NHRA and the National Environmental Management Act 107 of 1998 (NEMA) to conduct a cultural heritage assessment to determine the impact of the proposed agricultural development of Plot 337 and Plot 396 Kakamas-North of Kai !Garib Local Municipality, Z.F. Mgcawu District Municipality, Northern Cape, on any sites, features, or objects of cultural heritage significance.

Findings and Impact on Heritage Resources

A total of seven occurrences of isolated lithic material and low-density surface scatter of MSA/Early LSA was recorded across the two demarcated development footprints, Plot 337 and Plot 396. Raw material predominantly consists of cryptocrystalline silicates (CCS) and Banded Ironstone Formation (BIF). However, the sample sizes were small, without context, of low significance and will not be impacted by the agricultural development.

Three occurrences of lithic material were recorded across the development footprint on Plot 396 (PT397/007, PT396/009, PT396/010). The recorded lithic material included chunks and cores, a possible hammerstone, an upper grinder, lithic debris like chips, chunks, flakes, and points.

Three occurrences of lithic material were recorded across the development footprint on Plot 337 (PT337/001, PT337/002, PT337/003) and one occurrence just north of the project development footprint (PT337/004). The isolated surface finds consisted of chunks and cores, one bladelet and an upper grinder. PT337/003 is a possible small knapping site with a low-density surface scatter of some lithic debris like chips, chunks, flakes, and points.

The development footprint is underlain by the ancient Precambrian basement rocks of the Namaqua-Natal Province, mantled by sediments of the Gordonia Formation (Kalahari Group). A low Palaeontological Significance has been allocated to the proposed development as the Palaeontological Sensitivity of the Gordonia Formation is low. The ancient Precambrian basement rocks are zero (Butler 2021). These rocks are approximately one to two billion years old and completely unfossiliferous. Therefore, it is recommended that no further palaeontological heritage studies, ground-truthing, and/or specialist mitigation are required pending the discovery of newly discovered fossils (Butler 2021, Appendix A).

Recommendations

Based on the assessment of the potential impact of the development on the identified heritage, the following recommendations are made, taking into consideration any existing or potential sustainable social and economic benefits:

1. The cultural material recorded across Plot 396 and Plot 337 is considered low significance, and the impact of the agricultural development will be negligible. No further action or mitigation is recommended.

2. Due to the low palaeontological significance of the area, no further palaeontological heritage studies, ground-truthing and/or specialist mitigation are required. It is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area (Butler 2021). If fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol (Appendix A/11) must be implemented by the Environmental Control Officer (ECO) in charge of these developments. These discoveries ought to be protected, and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carried out by a palaeontologist (Butler 2020).

3. Although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the assessment. If during construction, any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490) must be alerted immediately as per section 36(6) of the NHRA. Depending on the nature of the finds, a professional archaeologist or palaeontologist must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA. UBIQUE Heritage Consultants and its personnel will not be held liable for such oversights or costs incurred as a result of such oversights.

TABLE OF CONTENTS

| | |
|--|----|
| EXECUTIVE SUMMARY | i |
| Project description | i |
| Findings and Impact on Heritage Resources | i |
| Recommendations..... | ii |
| TABLE OF FIGURES | iv |
| ABBREVIATIONS | v |
| GLOSSARY | v |
| 1. INTRODUCTION..... | 1 |
| 1.1 Scope of study..... | 1 |
| 1.2 Assumptions and limitations | 2 |
| 2. TERMS OF REFERENCE | 3 |
| 2.1. Statutory Requirements..... | 3 |
| 2.1.1 General | 3 |
| 2.1.2 National Heritage Resources Act 25 of 1999 | 3 |
| 2.1.3 Heritage Impact Assessments/Archaeological Impact Assessments..... | 4 |
| 2.1.4 Definitions of heritage resources..... | 4 |
| 2.1.5 Management of Graves and Burial Grounds..... | 5 |
| 3. STUDY APPROACH AND METHODOLOGY..... | 7 |
| 3.1 Desktop study | 7 |
| 3.1.1 Literature review..... | 7 |
| 3.2 Field study | 7 |
| 3.2.1 Systematic survey | 7 |
| 3.2.2 Recording significant areas | 8 |
| 3.2.3 Determining significance | 8 |
| 3.2.4 Assessment of development impacts..... | 10 |
| 3.3 Oral history | 11 |
| 3.4 Report..... | 12 |
| 4. PROJECT OVERVIEW..... | 13 |
| 4.1 Technical information | 13 |
| 4.2 Description of the affected environment..... | 15 |
| 5. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND..... | 18 |
| 5.1 Region..... | 18 |
| 5.1.1 Stone Age..... | 18 |
| 5.1.2 Iron Age..... | 20 |
| 5.1.3 Historical period | 21 |
| 5.2 Local | 25 |
| 5.2.1 Stone Age..... | 26 |

| | |
|--|----|
| 5.2.2 Iron Age..... | 31 |
| 5.2.3 Historical/Colonial period..... | 32 |
| 5.2.4 Graves/Burials | 35 |
| Recorded graves/burials/cemeteries in and around the areas of study..... | 36 |
| Northern Cape, KAKAMAS, NG Kerk, Muur van Herinnering | 36 |
| 6. IDENTIFIED RESOURCES AND HERITAGE ASSESSMENT..... | 37 |
| 6.1 Surveyed area | 37 |
| 6.2 Identified heritage resources | 37 |
| 6.3 Discussion | 39 |
| 6.3.1 Archaeological features..... | 39 |
| 6.3.2 Palaeontological resources..... | 42 |
| 7. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT | 42 |
| 8. RECOMMENDATIONS..... | 43 |
| 9. CONCLUSION | 44 |
| 10. BIBLIOGRAPHY..... | 44 |
| APPENDIX A | 52 |
| PALAEONTOLOGICAL DESKTOP ASSESSMENT FOR THE PROPOSED AGRICULTURAL DEVELOPMENT, ON PLOT 337 AND 396 ZF MGCAWU DISTRICT MUNICIPALITY, KAI !GARIB LOCAL MUNICIPALITY, NEAR KAKAMAS, IN THE NORTHERN CAPE..... | 52 |

TABLE OF FIGURES

| | |
|---|----|
| Figure 1 Regional locality of the development footprint, indicated on Google Earth Satellite imagery..... | 14 |
| Figure 2 Locality of the development footprint, indicated on 1: 50 000 2820CB and 2820DA maps..... | 15 |
| Figure 3 Views of the affected development area..... | 16 |
| Figure 4 1910-1911 Imperial Map of Kakamas and surrounds, with the wagon routes indicated. Image from UCT digital collections, https://digitalcollections.lib.uct.ac.za/ | 25 |
| Figure 5 Heritage Screening tool (https://screening.environment.gov.za/) indicating projected heritage sensitivity around the study area..... | 26 |
| Figure 6 Survey tracks across the development footprint..... | 37 |
| Figure 7 Distribution of identified heritage resources, Plot 396 and Plot 377, Kakamas-North. . | 39 |
| Figure 8 Photographic selection of the lithic material recorded on Plot 337..... | 40 |
| Figure 10 SAHRIS PalaeoSensitivity Map, indicating Moderate (green), Low (blue), Insignificant/Zero (grey), and Unknown (clear)) palaeontological significance in the study area, (https://sahris.sahra.org.za/map/palaeo)..... | 41 |
| Figure 9 Photographic selection of the lithic material recorded on Plot 396..... | 41 |

ABBREVIATIONS

| | |
|---------|--|
| AIA: | Archaeological Impact Assessment |
| ASAPA: | Association of South African Professional Archaeologists |
| BIA: | Basic Impact Assessment |
| CRM: | Cultural Resource Management |
| ECO: | Environmental Control Officer |
| EIA: | Environmental Impact Assessment* |
| EIA: | Early Iron Age* |
| EMP: | Environmental Management Plan |
| ESA: | Earlier Stone Age |
| GPS: | Global Positioning System |
| HIA: | Heritage Impact Assessment |
| LIA: | Late Iron Age |
| LSA: | Later Stone Age |
| MEC: | Member of the Executive Council |
| MIA: | Middle Iron Age |
| MPRDA: | Mineral and Petroleum Resources Development Act |
| MSA: | Middle Stone Age |
| NEMA: | National Environmental Management Act |
| NHRA: | National Heritage Resources Act |
| OWC: | Orange River Wine Cellars |
| PRHA: | Provincial Heritage Resource Agency |
| SADC: | Southern African Development Community |
| SAHRA: | South African Heritage Resources Agency |
| SAHRIS: | South African Heritage Resources Information System |

**Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations it must be read and interpreted in the context it is used.*

GLOSSARY

| | |
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| Archaeological: | <p>material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;</p> <ul style="list-style-type: none"> – rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and is older than 100 years (as defined and protected by the National Heritage Resources Act (NHRA) (Act No. 25 of 1999) including any area within 10 m of such representation; – wrecks, being any vessel or aircraft, or any part thereof, which were wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation; – features, structures and artefacts associated with military history, which are older than 75 years and the sites on which they are found. |
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| Stone Age: | The first and longest part of human history is the Stone Age, which began with the appearance of early humans between 3-2 million years ago. Stone Age people were hunters, gatherers and scavengers who did not live in permanently settled communities. Their stone tools preserve well and are found in most places in South Africa and elsewhere. |
| Earlier Stone Age: | >2 000 000 - >200 000 years ago |
| Middle Stone Age: | <300 000 - >20 000 years ago |
| Later Stone Age: | <40 000 - until the historical period |
| Iron Age: | (Early Farming Communities). Period covering the last 1800 years, when immigrant African farmer groups brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and herded cattle as well as sheep and goats. As they produced their own iron tools, archaeologists call this the Iron Age. Early Iron Age: AD 200 - AD 900 Middle Iron Age: AD 900 - AD 1300 Later Iron Age: AD 1300 - AD 1850 |
| Historic: | Period of arrival of white settlers and colonial contact. AD 1500 to 1950 |
| Historic building: | Structures 60 years and older. |
| Fossil: | Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment. |
| Heritage: | That which is inherited and forms part of the National Estate (historic places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999). |
| Heritage resources: | These mean any place or object of cultural significance, tangible or intangible. |
| Holocene: | The most recent geological period that commenced 10 000 years ago. |
| Palaeontology: | Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site that contains such fossilised remains or traces |
| Cumulative impacts: | “Cumulative Impact”, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities. |
| Mitigation: | Anticipating and preventing negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible. |
| A ‘place’: | a site, area or region; |

- a building or other structure which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure;
- a group of buildings or other structures which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures;
- an open space, including a public square, street or park; and
- in relation to the management of a place, includes the immediate surroundings of a place.

‘Public monuments and memorials’: mean all monuments and memorials—

- erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government; or
- which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual;

‘Structures’: any building, works, device or other facility made by people and which are fixed to land, and include any fixtures, fittings and equipment associated therewith.

1. INTRODUCTION

1.1 Scope of study

The project involves the development of Plot 337 and Plot 396 for agricultural purposes in Kakmas-North, Kai !Garib Local Municipality, Z.F. Mgcawu District Municipality, Northern Cape. UBIQUE Heritage Consultants were appointed by Eco Balance Planning Co. as independent heritage specialists in accordance with the National Environmental Management Act 107 of 1998 (NEMA), and in compliance with Section 38 of the National Heritage Resources Act 25 of 1999 (NHRA), to conduct a cultural heritage assessment (AIA/HIA) of the development area.

The assessment aims to identify and report any heritage resources that may fall within the development footprint; to determine the impact of the proposed development on any sites, features, or objects of cultural heritage significance; to assess the significance of any identified resources; and to assist the developer in managing the documented heritage resources in an accountable manner, within the framework provided by the National Heritage Resources Act (Act 25 of 1999) (NHRA).

South Africa's heritage resources are rich and widely diverse, encompassing sites from all periods of human history. Resources may be tangible, such as buildings and archaeological artefacts, or intangible, such as landscapes and living heritage. Their significance is based upon their aesthetic, architectural, historical, scientific, social, spiritual, linguistic, economic or technological values; their representation of a time or group; their rarity; and their sphere of influence.

The integrity and significance of heritage resources can be jeopardised by natural (e.g. erosion) and human (e.g. development) activities. In the case of human activities, a range of legislation exists to ensure the timeous and accurate identification and effective management of heritage resources for present and future generations.

The result of this investigation is presented within this heritage impact assessment report. It comprises the recording of heritage resources present/ absent and offers recommendations for the management of these resources within the context of the proposed development.

Depending on SAHRA's acceptance of this report, the developer will receive permission to proceed with the proposed development, taking into account any proposed mitigation measures.

1.2 Assumptions and limitations

It is assumed that the description of the proposed project, as provided by the client, is accurate. Furthermore, it is assumed that the public consultation process undertaken as part of the Environmental Impact Assessment (EIA) is comprehensive and does not have to be repeated as part of the heritage impact assessment.

The significance of the sites, structures and artefacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. The various aspects are not mutually exclusive, and the evaluation of any site is done with reference to any number of these aspects. Cultural significance is site-specific and relates to the content and context of the site.

All possible care has been taken during the comprehensive field survey and intensive desktop study to identify sites of cultural importance within the development areas. However, it is essential to note that some heritage sites may have been missed due to their subterranean nature or due to dense vegetation cover. No subsurface investigation (i.e. excavations or sampling) were undertaken since a permit from SAHRA is required for such activities. Therefore, should any heritage features and/or objects such as architectural features, stone tool scatters, artefacts, human remains, or fossils be uncovered or observed during construction, operations must be stopped, and a qualified archaeologist contacted for an assessment of the find. Observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to assess the significance of the site (or material) in question.

2. TERMS OF REFERENCE

An HIA/ AIA must address the following key aspects:

- the identification and mapping of all heritage resources in the area affected;
- an assessment of the significance of such resources in terms of heritage assessment criteria set out in regulations;
- an assessment of the impact of the development on heritage resources;
- 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;
- if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- plans for mitigation of any adverse effects during and after completion of the proposed development.

In addition, the HIA/AIA should comply with the requirements of NEMA, including providing the assumptions and limitations associated with the study; the details, qualifications and expertise of the person who prepared the report; and a statement of competency.

2.1. Statutory Requirements

2.1.1 General

The Constitution of the Republic of South Africa Act 108 of 1996 is the source of all legislation. Within the Constitution the Bill of Rights is fundamental, with the principle that the environment should be protected for present and future generations by preventing pollution, promoting conservation and practising ecologically sustainable development. With regard to spatial planning and related legislation at national and provincial levels the following legislation may be relevant:

- Physical Planning Act 125 of 1991
- Municipal Structures Act 117 of 1998
- Municipal Systems Act 32 of 2000
- Development Facilitation Act 67 of 1995 (DFA)

The identification, evaluation and management of heritage resources in South Africa are required and governed by the following legislation:

- National Environmental Management Act 107 of 1998 (NEMA)
- KwaZulu-Natal Heritage Act 4 of 2008 (KZNHA)
- National Heritage Resources Act 25 of 1999 (NHRA)
- Minerals and Petroleum Resources Development Act 28 of 2002 (MPRDA)

2.1.2 National Heritage Resources Act 25 of 1999

The NHRA established the South African Heritage Resources Agency (SAHRA) together with its Council to fulfil the following functions:

- coordinate and promote the management of heritage resources at national level;

- set norms and maintain essential national standards for the management of heritage resources in the Republic and to protect heritage resources of national significance;
- control the export of nationally significant heritage objects and the import into the Republic of cultural property illegally exported from foreign countries;
- enable the provinces to establish heritage authorities which must adopt powers to protect and manage certain categories of heritage resources; and
- provide for the protection and management of conservation-worthy places and areas by local authorities.

2.1.3 Heritage Impact Assessments/Archaeological Impact Assessments

Section 38(1) of the NHRA of 1999 requires **the responsible heritage resources authority to notify the person who intends to undertake a development that fulfils the following criteria to submit an impact assessment report if there is reason to believe that heritage resources will be affected by such event:**

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- the construction of a bridge or similar structure exceeding 50m in length;
- any development or other activity that will change the character of a site—
 - exceeding 5000m² in extent; or
 - involving three or more existing erven or subdivisions thereof; or
 - involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- the rezoning of a site exceeding 10 000m² in extent; or
- any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

2.1.4 Definitions of heritage resources

The NHRA defines a heritage resource as any place or object of cultural significance, i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. These include, but are not limited to, the following wide range of places and objects:

- living heritage as defined in the National Heritage Council Act No 11 of 1999 (cultural tradition; oral history; performance; ritual; popular memory; skills and techniques; indigenous knowledge systems; and the holistic approach to nature, society and social relationships);
- Ecofacts (non-artefactual organic or environmental remains that may reveal aspects of past human activity; definition used in KwaZulu-Natal Heritage Act 2008);
- places, buildings, structures and equipment;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features;

- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds;
- public monuments and memorials;
- sites of significance relating to the history of slavery in South Africa;
- movable objects, but excluding any object made by a living person; and
- battlefields.

Furthermore, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of—

- its importance in the community, or pattern of South Africa's history;
- its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons; and
- its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.

2.1.5 Management of Graves and Burial Grounds

- **Graves younger than 60 years** are protected in terms of Section 2(1) of the Removal of Graves and Dead Bodies Ordinance 7 of 1925 as well as the Human Tissues Act 65 of 1983.
- **Graves older than 60 years, situated outside a formal cemetery administered by a local Authority** are protected in terms of Section 36 of the NHRA as well as the Human Tissues Act of 1983. Accordingly, such graves are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36(5) of NHRA) is applicable to graves older than 60 years that are situated outside a formal cemetery administered by a local authority. Graves in the category located inside a formal cemetery administered by a local authority will also require the same authorisation as set out for graves younger than 60 years over and above SAHRA authorisation.

The **protocol for the management of graves older than 60 years situated outside a formal cemetery administered by a local authority** is detailed in Section 36 of the NHRA:

- (3) (a) No person may, without a permit issued by SAHRA or a provincial heritage resources authority—

(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; or

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

(4) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant and in accordance with any regulations made by the responsible heritage resources authority.

(5) SAHRA or a provincial heritage resources authority may not issue a permit for any activity under subsection (3)(b) unless it is satisfied that the applicant has, in accordance with regulations made by the responsible heritage resources authority—

(a) made a concerted effort to contact and consult communities and individuals who by tradition have an interest in such grave or burial ground; and

(b) reached agreements with such communities and individuals regarding the future of such grave or burial ground.

(6) Subject to the provision of any other law, any person who in the course of development or any other activity discovers the location of a grave, the existence of which was previously unknown, must immediately cease such activity and report the discovery to the responsible heritage resources authority which must, in cooperation with the South African Police Service and in accordance with regulations of the responsible heritage resources authority—

(a) carry out an investigation for the purpose of obtaining information on whether or not such grave is protected in terms of this Act or is of significance to any community; and

(b) if such grave is protected or is of significance, assist any person who or community which is a direct descendant to make arrangements for the exhumation and re-interment of the contents of such grave or, in the absence of such person or community, make any such arrangements as it deems fit.

3. STUDY APPROACH AND METHODOLOGY

3.1 Desktop study

The first step in the methodology was to conduct a desktop study of the heritage background of the area and the proposed development site. This entailed the scoping and scanning of historical texts/records as well as previous heritage studies and research around the study area.

The study area is contextualised by incorporating data from previous CRM reports in the area and an archival search. The objective of this is to extract data and information on the area in question, looking at archaeological sites, historical sites and graves in the area.

No archaeological site data was available for the project area. A concise account of the archaeology and history of the broader study area was compiled (sources listed in the bibliography).

3.1.1 Literature review

A survey of the literature was undertaken to obtain background information regarding the area. Through researching the SAHRA APM Report Mapping Project records and the SAHRIS online database (<http://www.sahra.org.za/sahris>), it was determined that several other archaeological or historical studies had been performed within the broader vicinity of the study area. Sources consulted in this regard are indicated in the bibliography.

3.2 Field study

Phase 1 (AIA/HIA) requires the completion of a field study to establish and ensure the following:

3.2.1 Systematic survey

A systematic survey of the proposed project area to locate, identify, record, photograph, and describe archaeological, historical or cultural interest sites were completed.

UBIQUE Heritage Consultants inspected the proposed development and surrounding areas on the 19th to 21st of April 2021 and completed a controlled-exclusive, pre-planned, pedestrian and vehicular survey. We conducted an inspection of the surface of the ground, wherever the surface was visible. This was done with no substantial attempt to clear brush, sand, deadfall, leaves or other material that may cover the surface and with no effort to look beneath the surface beyond the inspection of rodent burrows, cut banks and other exposures fortuitously observed.

The survey was tracked with a handheld Garmin global positioning unit (Garmin eTrex 10).

3.2.2 Recording significant areas

GPS points of identified significant areas were recorded with a handheld Garmin global positioning unit (Garmin eTrex 10). Photographs were taken with a Canon IXUS 185 20-megapixel camera. Detailed field notes were taken to describe observations. The layout of the area and plotted GPS points, tracks and coordinates, were transferred to Google Earth and QGIS and maps were created.

3.2.3 Determining significance

Levels of significance of the various types of heritage resources observed and recorded in the project area will be determined to the following criteria:

Cultural significance:

- Low A cultural object being found out of context, not being part of a site or without any related feature/structure in its surroundings.
- Medium Any site, structure or feature being regarded less important due to several factors, such as date and frequency. Likewise, any important object found out of context.
- High age Any site, structure or feature regarded as important because of its age or uniqueness. Graves are always categorised as of a high importance. Likewise, any important object found within a specific context.

Heritage significance:

- Grade I are Heritage resources with exceptional qualities to the extent that they are of national significance
- Grade II Heritage resources with qualities giving it provincial or regional importance although it may form part of the national estate
- Grade III Other heritage resources of local importance and therefore worthy of Conservation

Field ratings:

- i. National Grade I national significance should be managed as part of the estate

- | | | |
|------|------------------------------------|--|
| ii. | Provincial Grade II provincial | significance should be managed as part of the estate |
| iii. | Local Grade IIIA | should be included in the heritage register and not be mitigated (high significance) |
| iv. | Local Grade IIIB be | should be included in the heritage register and may be mitigated (high/ medium significance) |
| v. | General protection A (IV A) medium | site should be mitigated before destruction (high/ medium significance) |
| vi. | General protection B (IV B) | site should be recorded before destruction (medium significance) |
| vii. | General protection C (IV C) | phase 1 is seen as sufficient recording and it may be demolished (low significance) |

Heritage value, statement of significance:

- a. its importance in the community, or pattern of South Africa's history;
- b. its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- c. its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- d. its importance in demonstrating the principal characteristics of a particular class of south Africa's natural or cultural places or objects;
- e. its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- f. its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- g. its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- h. its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- i. sites of significance relating to the history of slavery in South Africa.

3.2.4 Assessment of development impacts

A heritage resource impact may be defined broadly as the net change, either beneficial or adverse, between the integrity of a heritage site with and without the proposed development. Beneficial impacts occur wherever a proposed development actively protects, preserves or enhances a heritage resource, by minimising natural site erosion or facilitating non-destructive public use, for example. More commonly, development impacts are of an adverse nature and can include:

- destruction or alteration of all or part of a heritage site;
- isolation of a site from its natural setting; and / or
- introduction of physical, chemical or visual elements that are out of character with the heritage resource and its setting.

Beneficial and adverse impacts can be direct or indirect, as well as cumulative, as implied by the examples. Although indirect impacts may be more difficult to foresee, assess and quantify, they must form part of the assessment process. The following assessment criteria have been used to assess the impacts of the proposed development on possible identified heritage resources:

| Criteria | Rating Scales | Notes |
|-----------|---------------|---|
| Nature | Positive | An evaluation of the type of effect the construction, operation and management of the proposed development would have on the heritage resource. |
| | Negative | |
| | Neutral | |
| Extent | Low | Site-specific affects only the development footprint. |
| | Medium | Local (limited to the site and its immediate surroundings, including the surrounding towns and settlements within a 10 km radius); |
| | High | Regional (beyond a 10 km radius) to national. |
| Duration | Low | 0-4 years (i.e. duration of construction phase). |
| | Medium | 5-10 years. |
| | High | More than 10 years to permanent. |
| Intensity | Low | Where the impact affects the heritage resource in such a way that its significance and value are minimally affected. |
| | Medium | Where the heritage resource is altered, and its significance and value are measurably reduced. |
| | High | Where the heritage resource is altered or destroyed to the extent that its significance and value cease to exist. |
| | Low | No irreplaceable resources will be impacted. |

| Criteria | Rating Scales | Notes |
|---|---------------|---|
| Potential for impact on irreplaceable resources | Medium | Resources that will be impacted can be replaced, with effort. |
| | High | There is no potential for replacing a particular vulnerable resource that will be impacted. |
| Consequence, (a combination of extent, duration, intensity, and the potential for impact on irreplaceable resources). | Low | A combination of any of the following: - Intensity, duration, extent and impact on irreplaceable resources are all rated low. - Intensity is low and up to two of the other criteria are rated medium. - Intensity is medium and all three other criteria are rated low. |
| | Medium | Intensity is medium and at least two of the other criteria are rated medium. |
| | High | Intensity and impact on irreplaceable resources are rated high, with any combination of extent and duration. Intensity is rated high, with all the other criteria being rated medium or higher. |
| Probability (the likelihood of the impact occurring) | Low | It is highly unlikely or less than 50 % likely that an impact will occur. |
| | Medium | It is between 50 and 70 % certain that the impact will occur. |
| | High | It is more than 75 % certain that the impact will occur, or it is definite that the impact will occur. |
| Significance (all impacts including potential cumulative impacts) | Low | Low consequence and low probability. Low consequence and medium probability. Low consequence and high probability. |
| | Medium | Medium consequence and low probability. Medium consequence and medium probability. Medium consequence and high probability. High consequence and low probability. |
| | High | High consequence and medium probability. High consequence and high probability. |

3.3 Oral history

Where possible, people from local communities would be interviewed to obtain information relating to the surveyed area.

3.4 Report

The results of the desktop research and field survey are compiled in this report. The identified heritage resources and anticipated direct, indirect, and cumulative impacts that the proposed project's development may have on the identified heritage resources will be presented objectively. Alternatives, should any significant sites be impacted adversely by the proposed project, are offered. All effort will be made to ensure that all studies, assessments and results comply with the relevant legislation and the code of ethics and guidelines of the Association of South African Professional Archaeologists (ASAPA). The report aims to assist the developer in managing the documented heritage resources in a responsible manner and protecting, preserving, and developing them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

4. PROJECT OVERVIEW

UBIQUE Heritage Consultants were appointed by Eco Balance Planning Co. as independent heritage specialists in accordance with Section 38 of the NHRA and the National Environmental Management Act 107 of 1998 (NEMA) to conduct a cultural heritage assessment to determine the impact of the proposed agricultural development of Omdraai/Afdraai Plot 337 and Plot 396, Kakamas-North of Kai !Garib Local Municipality, Z.F. Mgcawu District Municipality, Northern Cape, on any sites, features, or objects of cultural heritage significance.

The proposed project aims to develop Plot 337 and Plot 396 to cultivate grapes by the Afdraai/Omdraai Landgoed Trust. The size of the development on Plot 337 is 50 ha, and 25 ha on Plot 396.

4.1 Technical information

| Project description | |
|---------------------------------------|--|
| Project name | HIA for the proposed agricultural development on Plot 337 and 396 Afdraai |
| Description | Proposed vineyard development on Plot 337 and 396 near Kakamas |
| Developer | |
| Afdraai Boerdery Mr. Charl du Plessis | |
| Contact information | Email: charl@afdraai.co.za |
| Development type | Agriculture |
| Landowner | |
| Afdraai Boerdery Mr. Charl du Plessis | |
| Contact information | Email: charl@afdraai.co.za |
| Consultants | |
| Environmental | Eco Balance Planning Co. |
| Heritage and archaeological | UBIQUE Heritage Consultants |
| Paleontological | Banzai Environmental |
| Property details | |
| Province | Northern Cape |
| District municipality | Z.F. Mgcawu |
| Local municipality | Kai !Garib |
| Topo-cadastral map | 1:50 000 2820CB |
| Farm name | Plot 337 Afdraai/Omdraai Landgoed Trust and Plot 396 Afdraai/Omdraai Landgoed Trust |
| Closest town | Kakamas |
| GPS Co-ordinates | Plot 337: 28° 37' 48.5" South 20° 27' 16.1" East Plot 396: 28° 36' 41.7" South 20° 26' 30.7" East |
| Property size | Plot 337: 60 ha Plot 396: 50 ha |
| Development footprint size | Plot 337: 50 ha Plot 396: 25 ha |
| Land use | |
| Previous | Plot 337: Agriculture/grazing Plot 396: Game farming |

| | | |
|---|-----------------------------------|--------|
| Current | Agriculture/grazing/ Game farming | |
| Rezoning required | No | |
| Sub-division of land | No | |
| Development criteria in terms of Section 38(1) NHRA | | Yes/No |
| Construction of a road, wall, power line, pipeline, canal or other linear forms of development or barrier exceeding 300m in length. | | Yes |
| Construction of bridge or similar structure exceeding 50m in length. | | No |
| Construction exceeding 5000m ² . | | Yes |
| Development involving three or more existing erven or subdivisions. | | No |
| Development involving three or more erven or divisions that have been consolidated within the past five years. | | No |
| Rezoning of site exceeding 10 000m ² . | | No |
| Any other development category, public open space, squares, parks, recreation grounds. | | No |

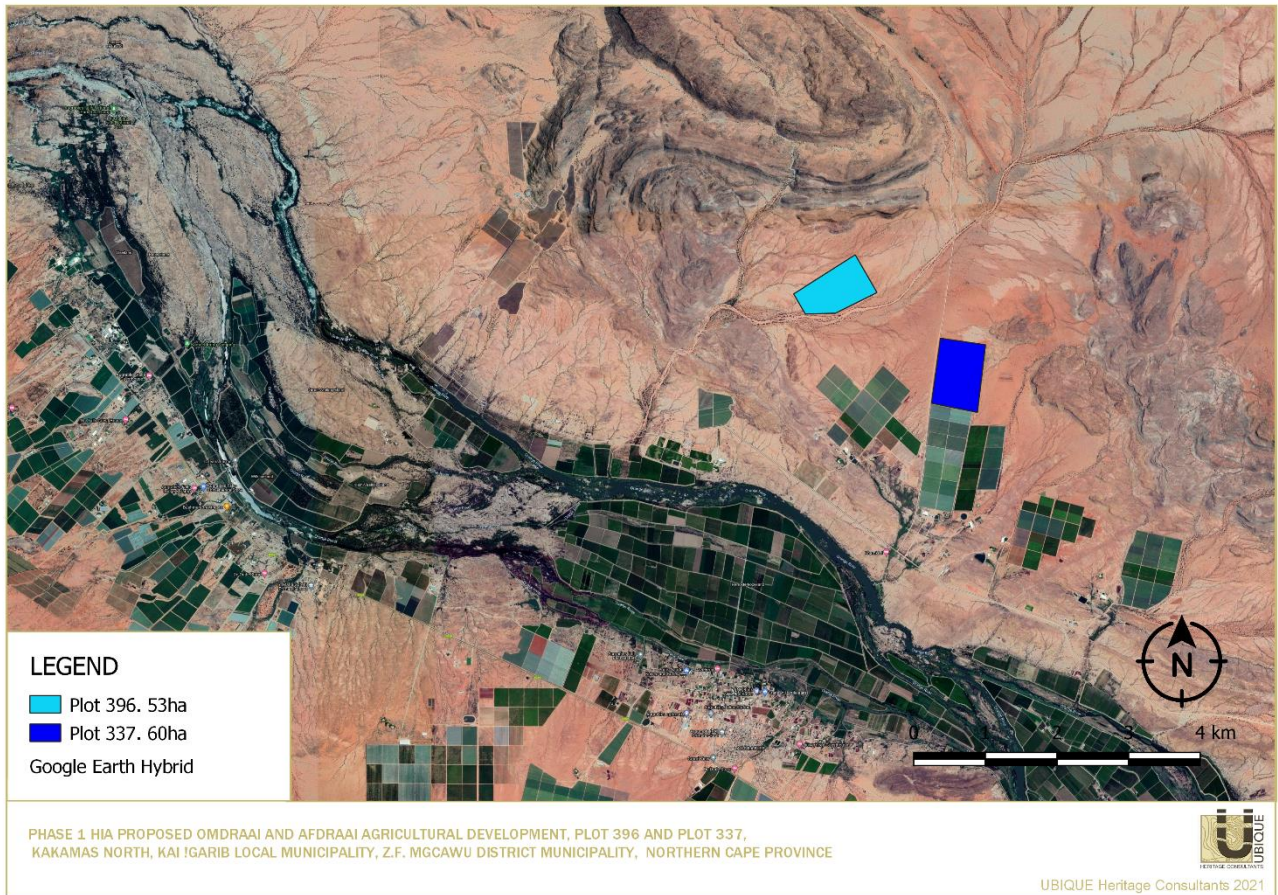


Figure 1 Regional locality of the development footprint, indicated on Google Earth Satellite imagery.

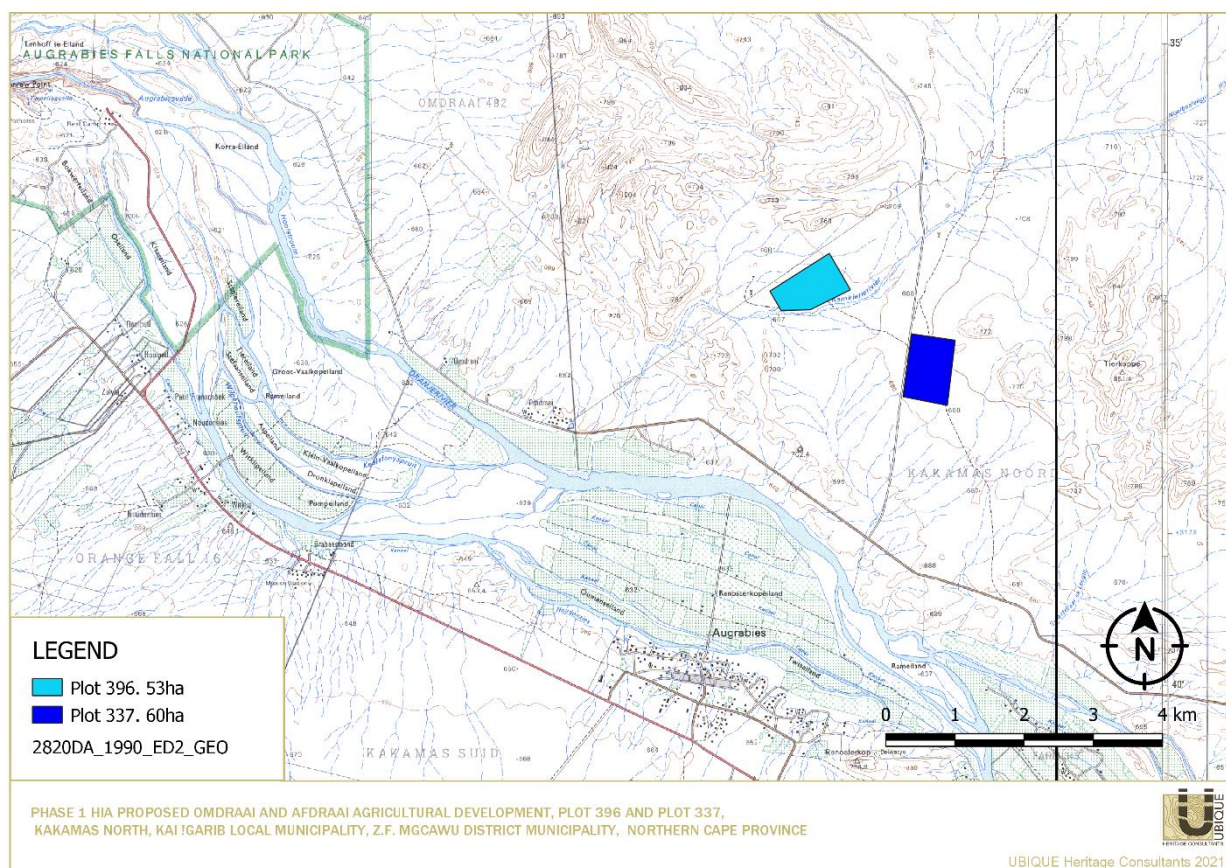


Figure 2 Locality of the development footprint, indicated on 1: 50 000 2820CB and 2820DA maps.

4.2 Description of the affected environment

The agricultural development in Kakamas-North falls within the Kalahari Karroid Shrubland vegetation type (SANBI 2021). The landscape is characterised by low karroid shrubland on flat, gravel plains. Karoo-related elements (shrubs) meet with northern floristic elements, indicating a transition to the Kalahari region and sandy soils (Mucina & Rutherford 2006). The following vegetation species were noticed on-site: *Boscia albitrunca* (Shepherds Tree), *Schmidtia kalahariensis* (Kalahari Sour Grass), *Setaria verticillate* (Bur Bristle Grass), *Stipagrostis obtusa* (Small Bushman Grass), *Stipagrostis uniplumis* (Silky Bushman Grass), *Anthepora pubescens* (Wool Grass), *Aristida adscensionis* (Annual Bristle Grass), *Acacia melifera* (Blackthorn acacia), *Rhigozum trichotomum* (Three-Thorn), *Acacia eriloba* (Camelthorn Tree), and *Aloe argenteicauda* (Rock Aloe), *Schinus molle* (Peppertree), and *Saersia lancea* (Karee tree).

The terrain in the study areas of Plot 337 and Plot 396 consists of flat sandy plains combined with klipveld. It is mountainous towards the northeastern parts of Plot 337 and outside the development footprint. The terrain has a slight slope towards the west and southwest. Quartz, quartzite and hornfels are visible on the surface combined with some dolomite outcrops. There are several waterways throughout Plot 337 and Plot 396, mostly flowing from the higher ground towards the southwest and west. These are all non-perennial small dry waterways. One

large and prominent dry riverbed in the south of Plot 396 run from northeast to southwest. Several minor tributaries connect to the main river from the north, northwest and south. Minor natural erosion is visible on the slopes of the mountainous areas; however, no significant erosion on the development footprints, apart from some alluvial disturbances along the more extensive waterways. Neighbouring farm fences bound the development footprints to the north, south, west and east.

Figure 3 Views of the affected development area.

PLOT 337



PLOT 396



5. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

5.1 Region

South Africa has a very long and varied history of human occupation (Deacon & Deacon 1999). This occupation has been dated to approximately 2mya (million years ago) (Mitchell 2002). Briefly, the archaeology of South Africa can be divided into three “major” periods, namely: the Stone Age, the Iron Age and the Historical period. Various archaeological and historical sites have been identified and documented throughout South Africa, including the Northern Cape Province.

The Northern Cape region was sparsely populated until the start of the 20th-century (De Jong 2010). Van Schalkwyk (2013) reported that the cultural landscape qualities of the larger region essentially consist of two components. First is a rural area in which human occupation is made up of a precolonial element (Stone Age) and a much later historical/colonial (farmer and industrial/mining) component. The second component is an urban landscape dating to the colonial period linked to the rural colonial landscape.

5.1.1 Stone Age

In southern Africa, the Stone Age can be divided into three periods. It is, however, critical to note that dates are relative and only provide a broad framework for interpretation. The division of the Stone Age, according to Lombard et al. (2012), is as follows:

- Earlier Stone Age (ESA): >2 000 000 - >200 000 years ago
- Middle Stone Age (MSA): <300 000 - >20 000 years ago
- Later Stone Age (LSA): <40 000 - until the historical period

In short, the Stone Age refers to humans that mainly utilised stone as their technological marker. Each sub-division is formed by industries where the assemblages share attributes or common traditions (Lombard et al., 2012). The history of the Northern Cape is reflected in a rich archaeological landscape with a wealth of pre-colonial archaeological sites. These sites yield some of the richest Stone Age scatters (Beaumont & Morris 1990; Kruger 2018; Lombard et al. 2012; Morris & Beaumont 2004). Numerous sites have been identified and documented across the region. These sites have been dated to the Earlier, Middle and ESA are characterised by flakes produced from pebbles, cobbles and percussive tools, and objects created later during this period such as large hand axes, cleavers and other bifacial tools (Klein 2000). The MSA is associated with small flakes, blades and points. The aforementioned is generally suggested to have been made and utilised for hunting activities and had numerous functions (Wurz 2013).

Furthermore, the LSA is characterised by microlithic stone tools, scrapers and flakes (Binneman 1995; Lombard et al. 2012). The LSA is also associated with rock art. Numerous LSA rock art sites, mainly rock engravings and paintings, have been identified in the Northern Cape (Beaumont 2008c; Kruger 2018; Morris 1988). These sites are commonly found on slopes, hilltops, rocky outcrops and occasionally in river beds (Kruger 2018). Banded ironstone occurs on several sites throughout the Northern Cape. It would appear to have been a favoured

raw material for making stone tools due to its superior flaking qualities (Kaplan 2012b). Beaumont et al. (1995) states, regarding the LSA, that “virtually all the ‘Bushmanland’ sites so far located appear to be ephemeral occupation by small groups in the hinterland on both sides of the [Orange] river”. This is believed to be in sharp contrast to the substantial herder encampments along the Orange River floodplain itself (Morris 2013a, b, c, d, e, & f). It has been noted by Beaumont et al. (1995:240-241) that a widespread low density of stone artefacts scatters from the Pleistocene age appears across areas of ‘Bushmanland’ to the south. Here, raw materials, mainly quartzite cobbles, were derived from the Dwyka glacial (Morris 2013a, b, c, d, e, & f). According to Morris (2013b & c), substantial MSA sites are relatively uncommon in Bushmanland. However, several sites have been recorded but yielded small samples.

Although the Northern Cape region seems to have been relatively sparsely populated by humans in the past (Kruger 2015a and b), the archaeological sites in this landscape are not scattered randomly (Kruger 2018). Previously conducted surveys have revealed signs of human occupation “mainly in the shelter of granite inselbergs (koppies) on red dunes which provided clean sand for sleeping, or around the seasonal pans” (Beaumont et al. 1995:264). Archaeological sites and MSA and LSA scatters and quarries frequently occur in low lying areas on plains between dune straights and outcrops along the Orange River; in other words, near water. They can likewise be found close to local sources of highly-prized raw materials such as previously mentioned banded iron formations (BIF), as well as jaspilite and specularite (Morris 2012; Kruger 2015; 2018).

According to Beaumont et al. (1995), thousands of square kilometres of Bushmanland are covered by low-density lithic scatters. Most of the studies and surveys that have been conducted throughout the Northern Cape have recorded Stone Age sites, and surface scatters of Stone Age artefacts (ranging from the ESA, MSA and LSA) throughout the Northern Cape. These include the districts of Groblershoop, Griekwastad, Hotazel, Kenhardt, Pofadder, Marydale, and Upington (Dreyer 2006, 2008a, 2008d, 2012, 2013; Engelbrecht & Fivaz 2019; Kaplan 2008, 2012, 2013 a & b; Kruger 2015; Morris 2012, 2013; Rossouw 2013; Van Ryneveld 2007; Van Vollenhoven 2014 and Webley 2013). Large rubbing stones, Acheulean hand axes (with secondary retouch) and scatters of core flakes have been found during previous investigations throughout the broader region (Dreyer 2008b & c, 2013 Revised, 2014). Van Ryneveld (2007) had documented low densities of MSA artefact scatters at several Quartz outcrops on the farm Bokspuits 118. An ancient specularite working site was recorded on the eastern side of Postmasburg, Doornfontein (Van Vollenhoven 2014). Associated Ceramic Later Stone Age material and older transitional ESA/MSA Fauresmith sites were documented at Lyly Feld, King, Mashwening, Demaneng, Rus & Vrede, Gloucester, Paling and Mount Huxley (Engelbrecht & Fivaz 2019). Moreover, MSA and LSA tools, along with rock engraving were found at Putsonderwater, Beeshoek and Bruce (Engelbrecht & Fivaz 2019). Numerous Stone Age sites have been identified, documented and excavated in the surrounding areas near Kathu, the Doornlaagte ESA site, and at the Wonderwerk Caves (Van Vollenhoven 2014; Dreyer 2015). The Stone Age sites and artefacts found and documented near the Kathu pans represent one of the most extended preserved Stone Age sequences in South Africa. They are yielding artefacts and sites from the ESA, MSA and LSA with evidence of 500 000-year-old hafted stone points (Engelbrecht & Fivaz 2019).

5.1.2 Iron Age

The Iron Age (IA) is characterised by the use of metal (Coertze & Coertze 1996: 346). There is some controversy about the periods within the IA. Van der Ryst & Meyer (1999) have suggested that there are two phases within the IA, namely:

- Early Iron Age (EIA) 200 – 1000 A.D
- Late Iron Age (LIA) 1000 – 1850 A.D

However, Huffman (2007) suggests instead that there are three periods within the Iron Age, these periods are:

- Early Iron Age (EIA) 250 – 900 A.D
- Middle Iron Age (MIA) 900 – 1300 A.D
- Late Iron Age (LIA) 1300 – 1840 A.D

Thomas Huffman believes that a Middle Iron Age should be included within this period; his dates have been widely accepted in the IA field of archaeology.

The South African Iron Age is generally characterised by farming communities that had domesticated animals, cultivated plants, manufactured and made use of ceramics and beads, smelted iron for weapons and manufactured tools (Hall 1987). Iron Age people were often mixed farmers/agropastoralists. These agropastoralists generally chose to live in areas with sufficient water for domestic use along with arable soil that could be cultivated with an iron hoe. Most Iron Age (IA) settlements built by agropastoralists were permanent settlements (with a few exceptions, of course), consisting of features such as houses, raised grain bins, storage pits, and animal kraals/byres. This is in contrast to the temporary camps of pastoralists and hunter-gatherers (Huffman 2007). It is evident in the archaeological record that IA groups had migrated with their material culture (Huffman 2002).

The majority of the IA groups in southern Africa preferred to occupy the central and eastern parts of southern African from about 200 AD. The San and Khoi remained in the western and southern parts (Huffman 2007; Van Vollenhoven 2014); it is, thus, very rare, but not uncommon, to find IA sites in the Northern Cape.

The expansion of early farmers/agropastoralists occurred in this region between 400 AD and 1100 AD. These early farmers settled in semi-permanent settlements (De Jong 2010). According to De Jong (2010), the EIA continued in the Lowveld until the 15th-century. However, it ended by 1100 AD on the escarpment. From the 15th-century onwards, the Highveld became active again, on account of the gradually warmer and wetter climate. This later phase (the LIA) was accompanied by extensive stone walled settlements, such as the Thlaping capital Dithakong, approximately 40 km north of Kuruman (De Jong 2010). The Sotho-Tswana and Nguni speaking societies are the descendants of the LIA mixed farming communities. They found that the region was already sparsely inhabited by LSA Khoisan groups (the “first people”). De Jong (2010) comments that many of them were eventually assimilated by LIA communities. Only a few had managed to survive. Some of the surviving groups included the

Korana and the Griqua. However, it should be mentioned that this contact period has often been referred to as the Ceramic LSA. It is often represented by sites such as the earlier mentioned Blinkklipkop specularite mine near Postmasburg and found cultural material at the Kathu Pan (De Jong 2010).

IA sites have been recorded in the northeastern part of the province. However, according to Kruger (2018), environmental factors delegated that the spread of IA farming westwards from the 17th-century was constrained mainly to the areas east of the Langeberg Mountains. Nevertheless, there has been evidence of an IA presence as far as the Upington area in the 18th-century (Kruger 2018). LIA people had briefly utilised the area close to the Orange River, as they had mined copper in the Northern Cape (Van Vollenhoven 2014).

5.1.3 Historical period

During the colonial frontier period, place names started becoming fixed, specifically in a cadastral sense, on maps and in farm names. Numerous names have Khoekhoegowab origin and, as Morris (2017) states, encapsulates vestiges of precolonial/indigenous social geography. Interestingly, Morris (2017) also states that genocide against the indigenous people is documented in the wider area. Certain mountainous areas (e.g. Gamsberg near Aggeneys and Namies) are likely to be massacre sites (Morris 2017).

The development of a rich colonial frontier can be seen in the archaeological record (Kruger 2018). It was not until relatively recently (because of its distance from the Cape Colony) that this arid part of South Africa's interior was colonised. The Historical period of the Northern Cape coincides with the incursion of white traders, hunters, explorers, and missionaries into the interior of South Africa (Engelbrecht & Fivaz 2019). The historical period started with the first recorded oral histories (Van Vollenhoven 2014). The documented records of this region dating from the 18th- and 1- centuries mainly pertain to areas south of and along the Orange River (Morris 2018a, b & c). Hendrick Wikar and Robert Gordon, who, according to Morris (2018a, b & c) and Morris & Beaumont (1991), were two of the earliest travellers, had followed the river as far as and even beyond the region during the 1770s. Wikar and Gordon provided descriptions of the terrain and the communities living along the river (Morris 2018a, b & c; Morris & Beaumont 1991). Some of the other early travellers, traders, and missionaries, who had arrived in the region during the 19th century, include PJ Truter, William Somerville, Cowan, Donovan, Burchell and Campbell (De Jong 2010). The London Mission Society (LMS) station near Kuruman was established in 1817 by James Read (De Jong 2010; Van Vollenhoven 2014). Various buildings and structures that have been documented and recorded can be associated with early travellers, traders, and missionaries. There is also evidence of the settlements of the first white farmers and towns in the Northern Cape. These historical buildings and structures have been captured on the SAHRIS database in areas such as Kakamas, Kenhardt, Keimoes and Upington.

The surveying, division and transference of Government-owned land to farmers mark the initial distribution of land to colonial farmers from the 1880s onward (De Jong 2010). It is believed that most of the farms were still government farms and were leased to farmers in 1875. The farms were only later sold to individuals (Van Vollenhoven 2014). During the late 1920s, more

permanent and large-scale settlements and possibly some of the first farmsteads started to appear in the region.

The region has been the backdrop to various incidents of conflict. Numerous factors such as population growth, increasing pressure on natural resources, the emergence of power blocs, attempts to control trade and the emergence of the Griquas, and penetration of the Korana and early white communities from the southwest resulted in a period of instability in South Africa. With the introduction of loan farms, in the second half of the 18th century, an influx of newcomers such as trekboers, European game hunters and livestock thieves contributed to the volatility and sociocultural stress and transformation in the region (Mlilo 2019).

The period known as the *Difaqane/Mfecane* began in the late 18th-century and effectively ended with the settlement of white farmers in the interior (De Jong 2010; Mlilo 2019). The *Difaqane/Mfecane* period also affected the Northern Cape Province around the 1820s, which was relatively later than the rest of southern Africa (De Jong 2010). This period was prompted by the incursion of displaced refugees associated with the Fokeng, Tlokwa, Hlakwana and Phuting groups (De Jong 2010).

Moreover, during the 1830s, the Voortrekkers had started migrating northwards from the Cape Colony. This migration was due to their dissatisfaction with British rule (Eldredge 1987). The Voortrekkers' migration is known as the "Groot Trek" (Great Trek). The Voortrekkers had come into conflict with Tswana groups and missionary groups who had settled near Bechuanaland and Griqualand West (Van Vollenhoven 2014). A series of wars and battles between the Voortrekkers, Zulu's and Sotho-Tswana communities eventually arose due to the migrations (De Bruyn 2019).

Between 1879-1880 the region was also caught up in the Koranna War. Further military activity in the area included the rise of the 'rebels' during the Anglo-Boer War and again in 1915 with the incursion of German troops (Morris 2018a, b & c). Numerous graves can be linked to the battles fought during the 1914 Rebellion (Engelbrecht & Fivaz 2019). It is believed that any military settlement, specifically those related to the Koranna Wars, would have been located closer to the Orange River (Webley & Halkett 2014).

It is known that San hunter-gatherers utilised the landscape for thousands of years, and Khoi herders moved into South Africa with their cattle and sheep approximately 2000 years ago. With the arrival of the Dutch settlers in the Cape in the mid-17th century, clashes between the Europeans and Khoi tribes in the Cape Peninsula resulted in the Goringhaiqua and Goraxouqua migrating north towards the Gariep/Orange River in 1680. These tribes became collectively known as the Korannas, living as small tribal entities in separate areas (Penn 2005).

Bushmanland was one of the last regions of the Cape Province to be settled by early European farmers. This was because the region was very arid, and it was situated quite far from Cape

Town and the produce markets. Many of the farms in the Bushmanland area were only allocated after the introduction of the windpump to South Africa in the 1870s. In other words, the windpump made the arid lands accessible and suitable for grazing (Webley & Halkett 2012b). Historical literature also confirms that San hunter-gatherers occupied Bushmanland during the early part of the 19th century. During the 19th century, *Basters* of mixed descent lived around the salt pans in Bushmanland. They were, however, driven away from the land as the farms were surveyed and made available to European farmers (Webley & Halkett 2012b). In the late 18th and early 19th centuries, with the introduction and implementation of the commando system, the Karoo 'Bushmen' were eventually destroyed or indentured into farm labour (ACRM 2015).

Several finds have been recorded at sites in the Northern Cape region. These include but are not limited to: 20th-century glass bottles and a rusted enamel basin (Orton 2015a); some colonial-era stonewalling (Morris 2013b); glass and porcelain fragments (Beaumont 2007; Morris 2013a & b); colonial farmsteads (Morris 2013; Van Ryneveld 2017a and b); heavily soldered Anglo-Boer War (1899-1902) food containers (Dreyer 2006; Beaumont 2007) and fired rifle cartridge shells (Dreyer 2014; Beaumont 2007); and numerous man-moved and stacked boulders (possibly representative of Boer positions during the Siege of Kimberly (Beaumont 2007).

Apart from a few exceptions, the archaeology along the Orange River has mainly focused on two areas; the Middle Orange River and the Richtersveld (Orton & Webley 2012). The Middle Orange River was densely inhabited during pre and proto colonial times (Mlilo 2019). The area is made up of several islands. Herders often chose to live on these islands due to their natural protection from stock thieves and wild animals. Small-stock farmers mainly occupied the vicinity along the Orange River. It was during the 1930s that the first great influx of people had started. These people had developed an extensive network of irrigation channels that supplied water for the development of vineyards and other cash crops (e.g. grain crops), cultivated in a narrow band along the Orange River leading to the region known as the Green Kalahari. Van Schalkwyk (2019) comments that this had resulted in numerous smaller hamlets and villages. These hamlets/villages had churches, cemeteries and shops.

According to Ross (1975), the first descriptions of the population of the Middle Orange River can be credited to the Swedish traveller Hendrick Wikar. Wikar started his long journey from Cape Town and eventually reached the middle and lower reaches of the Orange River. Wikar is believed to have been a deserter from the service of the Dutch East India Company. Thus, Wikar remained within the area for several years and compiled a report of his experiences in exchange for a pardon (Ross 1975). He recorded his encounters with the Khoisan groups who called themselves *Einiqua* or River People. The *Einiqua* were divided into three "kraals", namely the *Namnykoa* near the Augrabies Falls, the *Aukokoa* of Kanoneiland and the *Kaukoa* on islands west of Keimoes and other islands to the east (Engelbrecht & Fivaz 2020). Their kraals consisted of numerous sheep and cattle. The *Einiqua* had also hunted game, gathered plants, and cultivated dagga, but according to Wikar, no other crops (Ross 1975). The *Anoe e's* people, whom Wikar characterised as "Bushmen", were among the pastoralist groups living on the islands. As they had no domestic stock, these people had subsisted on fishing, game-trapping, hunting, and plant foods gathering (Morris & Beaumont 1991). However, Colonel

Robert Jacob Gordon, who visited the region in 1779, remarked that they were *Einiqua* who had lost their cattle because of an argument with the *Namneiqua* village (Morris & Beaumont 1991). The San and Khoekhoe hunter-gatherers in the region had reached a form of stability by the early 18th century (Mlilo 2019). The area west of the Langeberg and east of Upington was occupied by IA groups such as the BaTlaping. Their influence had reached as far down the river as Upington (Morris 1992).

De Jong (2010) classifies the cultural landscape along the Gariep/Orange River as predominantly historic farmland. From the 1880s onwards, irrigation of the Orange River played a central role in the economy of the area in the vicinity of Upington (Legassick 1996). Hunter-gatherers had shared the river's resources (Morris 1992). The beginning of irrigation in this area has been attributed to the *Basters*. By the 18th century, the *Basters* had focused on the Orange River (and Namaqualand) as a sanctuary from colonial rule (Mlilo 2019; Van der Walt 2015). They were regarded as "primitive pastoral people" who had "crude" ways to divert the river to their "little gardens" (Van der Walt 2015). The term "*Basters*" characterises a group of people of mixed percentage (white and Khoekhoe or slave and Khoekhoe). According to Van der Walt (2015), the term also implies an economic category that implies the possession of property and who is culturally European.

The construction and development of canal systems were vital for the irrigation of extensive vineyards and orchards and the expansion of major agricultural enterprises in the region (Engelbrecht & Fivaz 2018). The credit for formalising and extending the irrigation system belongs to Reverend C.H.W. Schröder, a missionary from the Dutch Reformed Church (DRC) and Special Magistrate for the Northern Border John H. Scott. By the time Schröder came to Upington in July 1883, there were people already living in the area of Keimoes who had planted fields and utilised irrigation. The irrigation scheme of the *Basters* can be attributed to Abraham September's innovation. Abraham September was born in slavery and became part of the *Baster* people of South Africa. It is interesting to note that Schröder and Scott had begun the canal from the very place Abraham September had selected. Legassick (1996) commented that "the small, white-painted, stone house where Abraham September lived when he undertook this work survives to this day, though the house and the land upon which it stands have long passed from the hands of the September family".

In 1882, the first 81 farms to be given out to the north of the Orange River from Kheis (opposite the present Groblershoop) to the Augrabies Falls were allocated almost exclusively to *Basters* (Morris 1992). The further division of these farms had commenced when the irrigation canal was completed. These farms were divided into "water-erven" for irrigation and "dry-erven" for establishing buildings (Van der Walt 2015). More white settlers started moving to the Gordonia region during the late 19th century. By the turn of the century, approximately 13 Afrikaner families had settled at Keimoes (De Beer 1992; Van der Walt 2015). Many farmers moved to new areas due to the aftermath of the scorched earth policy of the Anglo-Boer War. These farmers searched for greener pastures. Settlements next to the Gariep/Orange River provided adequate irrigation for crops (Engelbrecht & Fivaz 2020).

The Gariep/Orange River was referred to by Portuguese sailors as the St Antonio, and on the maps from 1685, Simon van der Stel marked it as the Vigiti Magna. In 1760, Jacobus Coetzee,

the elephant hunter, named the river: “de Groote Rivier” (the Great River). In 1761, land surveyor Carel Brink noted that the river is known to the local island inhabitants as the Tyen Gariep (Our River). The London Missionary Society’s (LMS) John Campbell spoke of the Gariep, Gareeb, and Garib as the name the Korannas used. The river’s contemporary name (Orange River) can be accredited to Robert Gordon. Gordon took his rowboat out to the middle of the river on the evening of the 17th of August 1779. He raised and toasted the Netherland’s flag and proclaimed the river in the name of the Prince van Oranje. From this day forward, the river was known (and indicated on maps) as the Orange River. However, the river is often referred to as the Gariep or Grootrivier (Engelbrecht & Fivaz 2020).

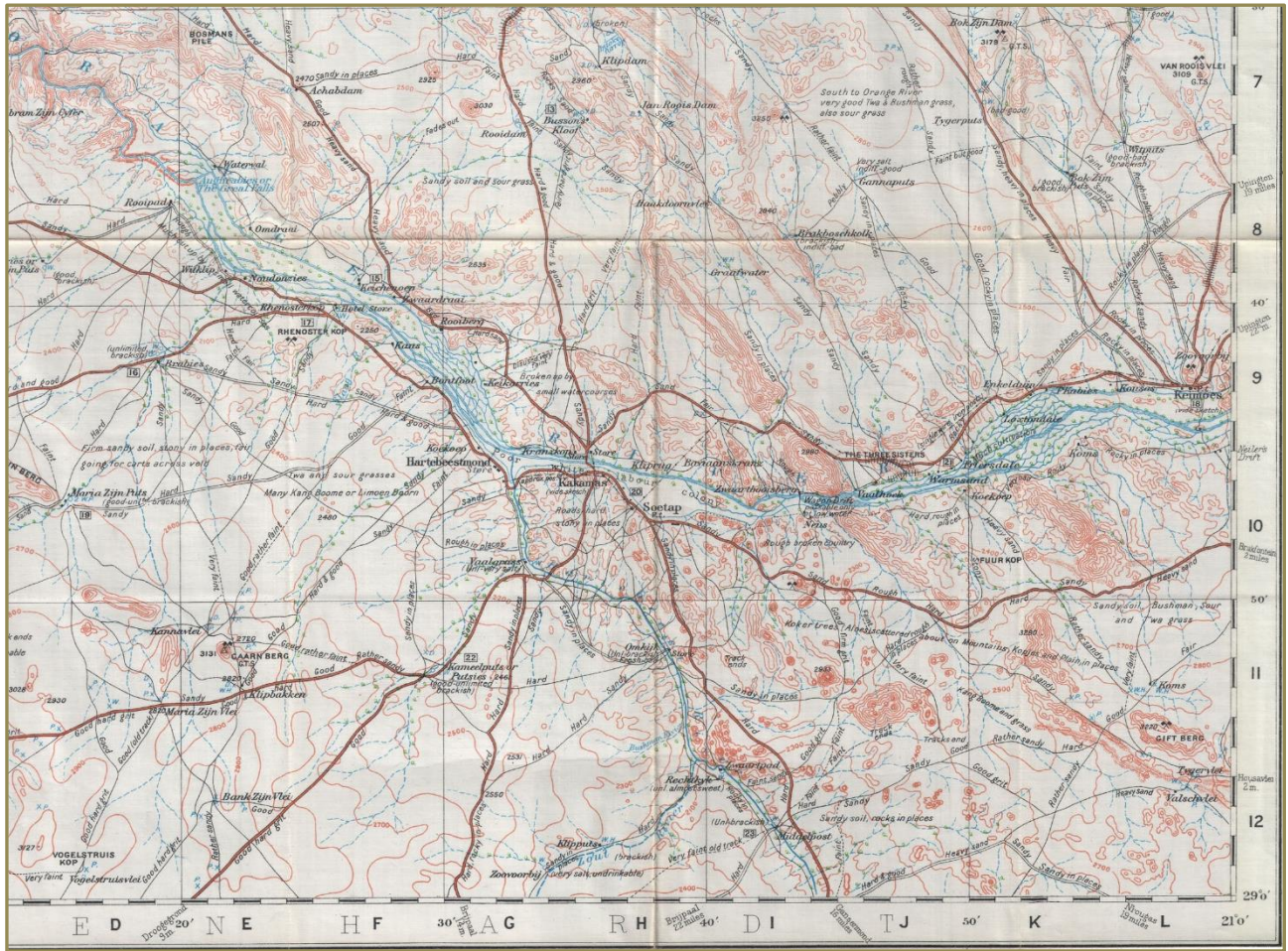


Figure 4 1910-1911 Imperial Map of Kakamas and surrounds, with the wagon routes indicated. Image from UCT digital collections, <https://digitalcollections.lib.uct.ac.za/>

5.2 Local

The desktop study revealed that no CRM work had been done directly on the proposed area for development. However, two studies were undertaken by ACRM (2020a and c) in close proximity to the area proposed development area. These two studies were done on farms located at the southern border(s) (both west and east of the borders) of the current study site.

Several reports have also been done on surrounding farms such as Padrooi 13, Rooipad, Orange Fall 16, Zwart Boois Berg, Riemvasmaak, Cnydas East 439, to name a few (Kaplan 2018; Orton 2012; Orton et al. 2013; Pelsler 2012; Rossouw 2019; Van Ryneveld 2007; van Schalkwyk 2013c). The majority of the reports recorded stone artefacts, with a few historical sites/artefacts and graves. It should also be mentioned that several studies often encountered no archaeological materials/remains (e.g. ACRM 2020 b; 2020 b; Dreyer 2008b; 2010; 2013a and b; Engelbrecht & Fivaz 2019c; Van Schalkwyk 2013b, c, d and e; 2016).

The Heritage Screening tool (<https://screening.environment.gov.za/>) was used to complement the study area's heritage sensitivity assessment. The heritage screening map indicates that apart from a very few tiny sections of medium to high significance (indicated in red), the area surrounding the current study area has low heritage sensitivity, consistent with most assessment reports.

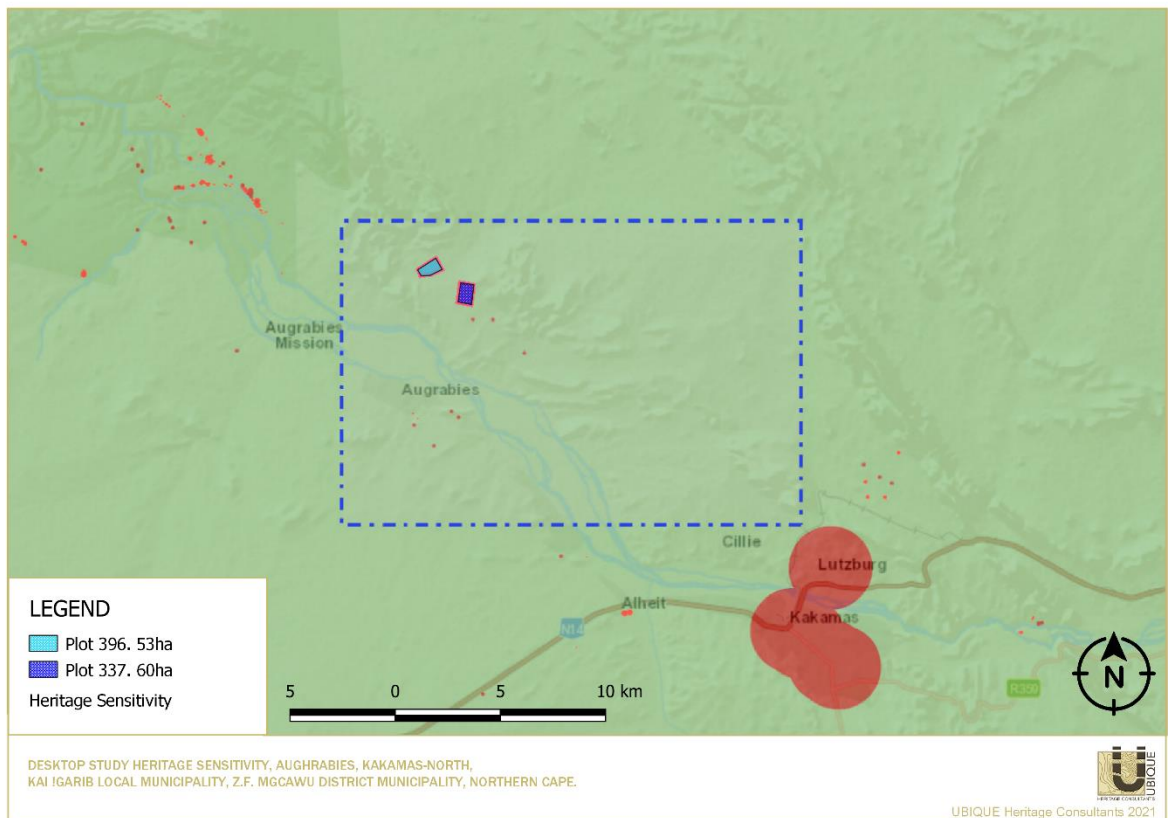


Figure 5 Heritage Screening tool (<https://screening.environment.gov.za/>) indicating projected heritage sensitivity around the study area.

5.2.1 Stone Age

Scatters of stone artefacts around Augrabies and Kakamas have been recorded by but not limited to ACRM (2016; 2017; 2018; 2020), Beaumont (2008 a and b), Engelbrecht & Fivaz (2018; 2019 a, b, c, e), Kaplan (2012; 2013c; 2016; 2017), Kruger (2015 a; 2017), Morris

(2011; 2012; 2017), Orton (2012), Orton et al. (2013), Orton and Webley (2012), Rossouw (2017; 2019), Van Schalkwyk (2010; 2011; 2013). The majority of the stone scatters, and implements can be ascribed to the MSA and LSA with a few occurrences of ESA implements. The incidences of lithics generally have little to no context and are primarily described as poor preservation and low heritage significance. ACRM (2012) noted that 95% of the tools documented are made from locally available, fine-grained banded ironstone, favoured raw material on many sites in the Northern Cape. The remainder is generally indurated shale, chert, quartzite and quartz, and hornfels.

The survey undertaken by ACRM (2020a) in 2019 for the AIA on the existing and proposed new vineyard development on Farm 355 Tierkop yielded artefacts located approximately 200 m away from the southernmost border of the current proposed development area, and the furthest being about 3 km south-southeast of the border. During this survey, ACRM (2020a) found marginal scatters and several stone tools and lithics dating to the LSA and MSA. The stone tools mainly comprise a few round quartz cores, flakes and chunks in quartz, quartzite, indurated shale, silcrete, and banded ironstone. They also noted several weathered flake tools (ACRM 2020a). Another survey was undertaken in 2020 by ACRM (2020c) for the agricultural development and proposed new vineyard development on Farm Oorkant. Here, ACRM (2020c) recorded a few isolated MSA and LSA stone tools, a small cobble hammerstone and a small piece of indigenous clay pottery. ACRM (2020c) recorded scatters of MSA and LSA implements on patches of quartz gravels alongside the drainage channel in the western portion of the survey area. They found a banded ironstone chunk approximately 72 m west from the southern portion of the current proposed development area (about 400 m north-northwest from the southernmost point).

On the Farm Orange Falls 16, located approximately 13 km southwest of the current study area, Rossouw (2019) and Kaplan (2018) undertook two different impact assessments. Rossouw (2019) reported a few singular, isolated and weathered lithics as surface occurrences. Kaplan (2018) recorded several archaeological resources, such as a minor scattering of *in situ* implements located on washed gravels between two small drainage channels. Most of the findings comprised single, isolated occurrences in a disturbed and secondary context. These were dated to the LSA and MSA. Kaplan (2018) noted only a few formal tools, including a broken tip of an MSA unifacial point, a flaked adze, two scrapers and a hammerstone. He observes a large number of cortex flakes, seven MSA blade tools and a quartz crystal bladelet core. According to Kaplan (2018), the large number of cortex flakes may be related to the widespread primary flaking and possibly other domestic activities around drainage channels during wetter periods when game may have been available. During an assessment of a portion of Farm Cnydas East 439, situated approximately 35 km north-east of the current study area, Van Ryneveld (2007) recorded various MSA artefacts' varying densities and lithics. The artefacts recorded were primarily produced from quartz, with a few made from raw materials such as fine-grained dolerite and jasperlite.

On the farm Zwart Boois Berg Annex 475, which is located approximately 19 km west of the current study area, Orton et al. (2013) undertook archaeological mitigation of artefact scatters. Orton et al. (2013) recovered a total of 559 lithic artefacts. Their analysis of the artefacts

reveals that the majority of the artefacts can be dated to the MSA. They also note that the presence of chopper cores and platform cores suggest an older component from the ESA. At the same time, occasional artefacts with very little patination on their surface may be much younger (Orton et al., 2013).

During Pelsers's (2012) survey for the HIA for the proposed PV solar power generation plant on the Farm Padrooi 13, he recorded several sites dating to the Stone Age near Augrabies Falls. These sites are represented by reasonably dense to minimal scatters of stone tools, dense scatters of quartz, and stone tools manufactured on the quartz. The tools were generally manufactured from materials such as felsite, hornfels and other materials types. According to Pelsers (2012), the scatters can be dated to the MSA and LSA, with the possibility of ESA scatters. Interestingly, he recorded a single hand axe (possibly dating to the ESA) during his survey. During Orton's (2012) survey for the proposed Augrabies solar energy facility on the Farm Rooipad 15/9, he recorded several MSA and LSA scatters of stone artefacts. Orton (2012) notes that higher concentrations of LSA artefacts were found in some locations, which could indicate LSA campsites. Orton (2012) recorded a large scatter of artefacts focused around the slopes of a small rocky koppie. Orton (2012) remarks that although they are in low density, the size of the scatter may have some research value.

Roughly 20 km southeast of the proposed development site, Engelbrecht & Fivaz (2019a) recorded several ESA, MSA and LSA materials, such as chunks, scrapers, blades, cores, chips and flakes. They also found local ceramic sherds dating to the LSA. Furthermore, Engelbrecht & Fivaz (2019b) recorded several MSA/LSA artefacts, possible retouched flakes, cores, lithics, scraper, flakes, and banded ironstone concave side scraper during the survey for the proposed agricultural development on Plot 1178. Southeast of the current development area at Rozynen Bosch No. 104, Engelbrecht & Fivaz (2019e) found several MSA and LSA artefacts such as scrapers, notched scrapers, chips, flakes, and a bladelet.

David Morris had reported archaeological sites in the Riemvasmaak area, which included several significant fishbone and pottery rich sites located close to the river. They appear to be similar to the herder sites excavated by Webley and others in the Lower Orange River (Pelsers 2012). Beaumont (2008a) recorded seven un-diagnostic quartzite artefacts during his survey for the areas flanking the Vredesvallei settlement at Riemvasmaak (approximately 28 km northwest away from the current area). He noted that on a low schist rise on the south edge of the valley, there was a 5 m wide circle of quartz slabs with a gap on its north side, possibly representing an old goat kraal base. Unfortunately, he does not know the age of the kraal (Beaumont 2008a). Rossouw (2017) reported surface scatters of Stone Age material during the HIA of the proposed new Koppie Riemvasmaak Residential development in Postmasburg. During Orton and Webley's (2012) survey for the proposed hydroelectric facilities near Riemvasmaak, they reported no ESA sites were found during their survey. However, during an earlier survey of the National Park, several isolated ESA artefacts and one scatter of such artefacts were present. They did record several MSA artefacts and surface scatters, noting that the majority are relatively light scatters often associated with naturally occurring pebbles of banded ironstone. They also comment that some of the MSA sites/scatters are denser and may require mitigation. They also recorded several LSA sites close to or beneath trees on the

silty plains along the river margins. These sites likely belong to the Khoekhoen. Some of the material they recorded includes OES and OES beads, flaked stone, pottery, quartz, flaked fine-grained black rock. They also note that a few rock shelters are present in the broader study area. Moreover, they recorded a lower grindstone with multiple grooves, five grinding hollows, and upper grindstones (Orton & Webley 2012).

During Kruger's (2015) AIA for the proposed PV power plant development on portion 40 of Farm Eenduin approximately 40 km east from the current study area, he found single MSA lithics (e.g. a broken point, a retouched side scraper and a flake tool) as well as a low density of MSA lithic occurrences (e.g. adzes, scrapers, blades, points and worked chunks and flakes). Kruger (2012) remarks that although there may be a few lithics from the LSA, lithics from the MSA appear to be the most prominent. Kruger's (2017) assessment for the proposed Sonfin Oseiland 1MWp PV Plant Development Project footprint area revealed that it is situated in surrounds that have been sterilised of potential heritage resources due to site clearing. However, Kruger (2017) does note that MSA lithics (such as two broken blades, a point and a flake tool) were documented in the areas surrounding the cleared footprint area.

Morris and Beaumont (1991) excavated two Stone Age sites at Renosterkop, east of the town of Augrabies. At Renosterkop 1, they found an open scatter of stone artefacts, OES beads, pottery and other materials. The lithics were predominantly informal, with a few retouched items such as scrapers and backed tools. Grindstones occurred and included one stone similar to those described by Webley (1990) for scraping skins. Renosterkop 2 was a small rock shelter where they had excavated two square metres and found that more recent material was evident in the upper deposits.

In contrast, material similar to Renosterkop 1 was present in lower deposits. A collection of MSA artefacts was found at the base, but the interface between the LSA and MSA was indeterminate, and the deposits were poorly stratified. Compared with other sites, the LSA material may relate to a later phase of herder occupation (Orton 2012).

During van Schalkwyk's (2013a) assessment for the proposed township development on the farm Kakamas Suid 28, he had identified a low density of stone tools dating to the MSA. In 2016, ACRM (2016) undertook a foot survey for the proposed vineyard development on Farm 1726 Renosterkop, Farm 1290 and Farm 1537. ACRM (2016) observed numerous archaeological resources, but they were spread unevenly and sparsely over the surrounding landscape and comprised single, isolated finds. The stone tools recorded by ACRM (2016) date to the LSA, with several MSA flakes, blade tools and points made from indurated shale, banded ironstone and quartzite. ACRM (2016) also found a possible quartz point and an anvil. They note, however, that there were no hammerstones or grindstones found near the anvil.

Moreover, ACRM (2016) found two small fragments of weathered ostrich eggshell (OES) (ACRM 2016). In 2017 ACRM (2017) surveyed the proposed citrus development at the Renosterkop Extension (Kakamas South Settlement No. 2185 & 2193). ACRM (2017) only recorded small

traces of archaeological resources spread sparsely over the surrounding landscape. The majority of the implements comprise single, isolated finds, which constitutes an extremely low density scatter of precolonial resources. The majority of the stone tools observed by ACRM (2017) are assigned to the LSA and a few to the MSA.

Additionally, they recorded three possible scrapers and remark that many of the flakes display secondary (scraper) retouch and are best described as unstandardised utilitarian tools. They also found one step-flaked piece on an older MSA flake as well as an anvil and a broken/split hammerstone. ACRM (2017) remarks that the anvil and a broken/split hammerstone could indicate low stone tool knapping levels across the affected landscape. Beaumont (2008b) recorded (lightly smoothed and fresh) stone artefacts of grey quartzite and banded ironstone during the survey on Kakamas South Farm 2092. According to Beaumont (2008b), the material is best referred to as two widely-spaced phases of the Acheulean. However, this interpretation is only speculative, given the almost complete absence of formal tools apart from the single exception (a relatively coarse straight-edged side-scraper based on a fresh flake).

On agricultural lot 2371 Kakamas South Settlement, Morris (2017d) reports the unexpected occurrence of a rock gong on a rocky granite-gneiss outcrop. Rock gongs (or lithophones) are rocks that ring when struck and are characterised by beating marks that reflect ancient use (Morris 2017 d). According to Morris (2017d), the find is significant as it is the first rock gong to be identified from this part of the Northern Cape and on granite-gneiss. They are often found in association with rock art and are a feature of the LSA, with alleged ritual connotations (Morris 2017d).

Another interesting prehistoric find in the greater vicinity was two kite-like features 22km north of Keimoes (Van der Walt & Lombard 2018). The prominent funnel-shaped features of undetermined age were constructed and shaped by organising local dolerite stones, sometimes incorporating in-situ dolerite outcrops/boulders. Kites are widely accepted as being utilised as hunting traps (Holzer et al. 2010 in Van der Walt & Lombard 2018). The ethnohistorical records documented various kinds of hunting traps used by San hunter-gatherers, but the use of these funnel-shaped stone features by Stone Age herding communities (who also hunted) cannot be conclusively discounted (Van der Walt & Lombard 2018).

Although the current proposed development area has received little attention, the area immediately west of Augrabies Falls has been subject to archaeological research by Professor Andrew Smith. Prof. Smith conducted informal surveys within the National Park and on river-bordering farms in the Kakamas area. He also excavated several caves (Zoovoorbij, Droegrond, Waterval), which produced MSA and LSA material (Pelser 2012). Smith (1995) recovered at Zoovoorbij (some 64 km east of Augrabies) a collection of MSA flakes stone artefacts from the lower levels of the excavation. The upper levels contained LSA material and artefacts such as bone and OES beads and a few potsherds. According to Pelser (2012), it was evident to Prof. Smith that the Khoekhoen herders were dependent on being close to the

Orange River, rich in resources. Prof. Smith's research also revealed that San hunter-gatherers lived in refuge situation deeper in the hinterland (Pelser 2012). Smith (1986; 1995) recorded pottery, sheep bones, informal stone artefact assemblage, retouches pieces, beads, a decorated flask mouth fragment at Waterval 1, near Augrabies Falls. The site was dated to 760 ± 40 BP (Pta-3847) and has been occupied by herders (Orton 2012). Assemblages that have been excavated from sites (Biesje Poort 2 and Bokvasmaak 3) in the Augrabies Falls area by Peter Beaumont have been analysed by Parsons (2007). The two sites were dated to around 1390 ± 70 BP (Pta-4772) and 120 ± 50 (Pta-4872) by Beaumont et al. (1995). Biesje Poort 2 yielded numerous retouched items. Beaumont et al. (1995) ascribed both sites to herders, but Parsons' (2007) analyses showed the relevant characteristics to be unclear and unreliable (Orton 2012).

5.2.1.1 Rock Art

None of the AIA/HIAs done in the vicinity of the proposed development area reported any rock art/engravings on the inspected sites. Rock art in the region is somewhat scarce, but it is not unheard of (Kaplan 2013). Kaplan (2013) (through personal observations) and Morris (1998) have reported that rock engravings occur along the Orange River. De Kock (2012) remarks that rock engravings may generally be located on flat rocky outcrops along the river.

However, the desktop study revealed that there are two known rock art sites recorded on the SAHRA database near Augrabies. The first (Augrabies sites RVM19 historical engravings) is located approximately 25 km northwest of the current study area. The second site (Augrabies sites RVM3 LSA engravings) is approximately 26 km north-northwest of the current study area (SAHRA 2021).

| Full Site Name | Site ID | Site Reference | Province | Site Type | Coordinates | NiD |
|---|---------|----------------|---------------|-----------|--------------------------|--------|
| Augrabies sites RVM19 historical engravings | 93896 | RVM19 | Northern Cape | Rock Art | -28.464711, 20.287494 | 361597 |
| Augrabies sites RVM3 LSA engravings | 93893 | RVM3 | Northern Cape | Rock Art | -28.395425, 20.386838 | 361594 |

5.2.2 Iron Age

It is rare, but not uncommon, to find sites associated with the 'Iron Age' of southern Africa in the Northern Cape. One such find was recorded by Rossouw (2017) during the HIA of the proposed new Koppie Riemvasmaak Residential development in the Postmasburg survey. Rossouw (2017) found a large concentration of open mining pits during the survey, located on and around an iron-rich koppie situated southeast of the Boichoko Township. Rossouw (2017)

notes that these mining pits may be related to the 18th-century interaction of the BaTlaping with groups along the Orange River. The dates coincide with Huffman's (2007) dates for the South African 'Later Iron Age'.

5.2.3 Historical/Colonial period

Unfortunately, very little information exists regarding the history of the Augrabies town. The Augrabies Falls National Park (established in 1966) overshadows the history of the town. Augrabies Falls is believed to have been named by the earlier mentioned Swedish traveller Hendrik Jakob Wilkar when he moved through the area in 1799 (Broberg 2016). The name "Augrabies" originally comes from the Nama (Khoe) word "Aukroerebis". "Aukroerebis" means a "Place of Great noise", referring to the thundering of the water downwards for 60 m to the base of the gorge (SA Venues 2012; Sanparks 2021; SAHO 2021; SA HAFNP 2021). The Upington Publicity Association petitioned the National Parks Board in 1954 to designate the waterfall as a National Park. However, the Department of Water Affairs objected to the proclamation of a National Park, even after its approval in 1955. Augrabies Falls National Park was later established on the 5th of August 1966, after negotiations (Eishsa 2010).

The town of Kakamas was laid out in 1931 and attained full municipal status in 1964 (Van Schalkwyk 2013). The name Kakamas originated with the Einiqua. However, there are several theories about the meaning of the word:

- **Bad Grazing:** before the canals and irrigation schemes were developed, the area was notorious for its poor grazing pastures.
- **Angry/Charging Cow/Chasing Cows:** this may derive from the Korana word *kagamas*, which could have become associated with the place because the river banks nearby had sloping banks making it an easy crossing place for cattle herds. Most herds were reluctant to enter the river and would turn on their herdsmen.
- **Thakemas,** meaning drink place. This would refer to the ease with which livestock could be herded to the area to drink
- **Swimming water:** Possibly the San word, given to the place because it was possible to swim across the river at this point (De Jong 2010).

The Kakamas area's water-related infrastructure was essential for agricultural development. Several water wheels and excavated tunnels, and irrigation furrows have been declared Provincial Heritage Sites. The hand-dug tunnels were remarkable engineering feats for the early 20th-century (Orton 2012). The town of Kakamas originated out of an irrigation scheme established by the community in 1898 for farmers that were left destitute by severe drought (1895-1897). Led by Rev. Schroder, the irrigation scheme included canals dug by hand, beginning at the upper end of Neus Island (Hopkins 1978; Van Vuuren 2011). The development of canal systems played an essential role in irrigating extensive vineyards and orchards within the region and developing substantial agricultural initiatives within the area. The Kakamas settlement is also known for its pioneering development of a hydroelectric power

generator, brought into operation in 1924 (Hopkins 1978). The building, which housed the old transformer in Voortrekker Street, was ear-marked as a museum (Morris 2010; 2017; SAHRA database).

De Jong (2010) classifies the cultural landscape of Kakamas as predominantly historic farmland. The affected area consists of working (operating) irrigation and grazing farms located in a typical Lower Orange River environment. These farms display heritage features that typically occur in the district, such as their large size, irrigation furrows and pipelines, fences, tracks, farmsteads, and irrigated fields. Farmsteads are clustered close to rivers and primary roads (De Jong 2010). According to De Jong (2010), this landscape class is of relatively low heritage sensitivity because it can absorb adverse effects of new development through some mitigation.

Very few HIA and AIAs reported on artefacts/sites associated with the Historical/Colonial period. During the assessment of a portion of the farm Cnydas East 439, Van Ryneveld (2007) recorded a historical complex and observed two historic structures, a kraal, wind pump, dam, and associated workers unit. Van Ryneveld (2007) comments that the two historical structures probably represent early farming occupation and activity at Cnydas East 439. The general area was devoid of associated historical artefacts. Furthermore, Van Ryneveld (2007) mentions that the associated stone kraal is still in use. The windpump and dam, situated near the two historic structures, are of more recent origin and associated with earlier prospecting activities on the property, post-dating 60 years of age and implication not protected by the NHRA (1999). In contrast, the workers' unit and its associated historical artefacts (such as metal, porcelain and glass) pre-date 60 years (Van Ryneveld 2007).

Pelser (2012) recorded a low stone wall (single row of stones) in front of a section of the outcrop during his survey on Padrooi 13. He found glass and metal such as tins in the vicinity of the stone feature. Pelser (2012) explains that they are unsure of the age and function of this feature and that it may be relatively recent and could have been used by herd boys. Orton (2012) recorded a 28 m by 6 m flat-roofed farm building that was most likely built in the early to the mid-20th century. The structure, however, has since then been added on and altered several times over the years. Orton (2012) also noted that the outbuildings were made of poles and reeds and a sheep dip, which is, however, of more recent age. These outbuildings have also been added to and altered.

Orton and Webley (2012) reported that an abundant amount of historical remains were found at Riemvasmaak. Unfortunately, according to Orton and Webley (2012), most of the remains are younger than 100 years of age and are thus not legally protected by the NHRA. Nevertheless, the sites related to the ancestors of the Riemvasmaak community. They were forcibly removed from the land in 1973 and 1974 during the Apartheid regime. Orton and Webley (2012) recorded ruins of structures, stone features (with indeterminate function), and artefacts such as metal objects, glass bottles, and a plastic bead. The majority of historical artefacts are quite recent (mid-20th century), but occasional ceramic fragments were undoubtedly originally of late 19th-century origin. However, they state that it is likely that these materials were only deposited during the early to the mid-20th century.

Kinahan (2003) had conducted fieldwork in Augrabies Falls. However, it was limited to the gorge where the archaeological material was infrequent. Kinahan (2003) noted that various historical remains (related to the Anglo-Boer war and the rebellion lead by Manie Maritz) dating to the late 19th and early 20th centuries are well preserved within the Falls. Situated in the western part of the Park is the Manie Maritz Fort. The fort is made up of piled stones. Unfortunately, it is still unclear whether the fort can be associated with Maritz (Orton 2012).

Beaumont (2008b) found a minor scatter of undiagnostic tin and glass fragments and what seemed to be some minor levelling of the ground surface. He remarks that these vestiges could likely be where a small group of people camped for a short time during the early 20th century while digging for diamonds nearby. Thus, leaving behind pieces of a spade and some sieve mesh (Beaumont 2008b).

During Engelbrecht and Fivaz's (2019a) survey of Plot 1763, Plot 2372, and Plot 2363, various surface scatters of material relating to the historical/colonial period, such as a hole-in-cap tin lid with lead solder and a tin can with folded/cramped hand-soldered seam, and cast-iron potsherds, a broken horseshoe, green and weathered clear glass, whiteware ceramics, and tin can with folded/crimped hand-soldered seam was recorded. At Rozyne Bosch No. 104, Engelbrecht and Fivaz (2019e) recorded surface scatters such as historical fuel/oil tin with machine soldered seams with trademarks, a historical green liquor bottle, the partial base of a bottle, a historical fired shotgun cartridge, and a metal casing 12 BR.

Just outside the town of Kakamas North on Lot 189 is a monument that commemorates First World War German troops killed in a battle against South African Union forces on the 4th of February 1915. Union troops assembled near Upington to launch an attack on German South-West Africa, while the German forces prepared an attack on Kakamas. A heavy battle ensued between two unevenly matched forces at Kakamas that resulted in seven dead, six wounded and sixteen prisoners of war amongst the Germans. The memorial was erected by the '*Volksbund Deutschen Kriegs-graberflrsorge*' (SAHRA database).

Heritage sites in and around the Augrabies and Kakamas landscape documented on the SAHRA database:

| Site/Object Name | Coordinates | Archive Status | Declaration Type | Site type | Site Reference | Site ID |
|--|--------------------------|-------------------|---------------------|---|----------------|---------|
| North Furrow, Kakamas, Gordonia District | -28.785592; 20.639647 | National monument | Provincial heritage | Building | 9/2/032/0005 | 28797 |
| Battlefield, Kakamas, Gordonia District | -28.743329; 20.635730 | National monument | Provincial heritage | Battlefield, Monuments & Memorials, Burial Grounds & Graves | 9/2/032/0006 | 28798 |

| Site/Object Name | Coordinates | Archive Status | Declaration Type | Site type | Site Reference | Site ID |
|--|--------------------------|-------------------|---------------------|-----------|----------------------|---------|
| Water wheel, near DR Church Parsonage, South Furrow, Kakamas | -28.772950; 20.622203 | National monument | Provincial heritage | Building | 9/2/032/0008 | 28799 |
| Water wheel No. 2, Plot 103, South Furrow, Kakamas | -28.783353; 20.635208 | | | Building | 9/2/032/0009 /001 | 28793 |
| Water wheel No. 2, Plot 103, South Furrow, Kakamas | -28.783353; 20.635208 | National monument | Provincial heritage | Building | 9/2/032/0009 /001 | 28793 |
| Water Wheel No. 1, Plot 103, South Furrow, Kakamas | -28.783504; 20.635524 | National monument | Provincial heritage | Building | 9/2/032/0009 /004 | 28794 |
| Water wheel, Plot 1057, North Furrow, Kakamas | -28.785597; 20.640039 | National monument | Provincial heritage | Building | 9/2/032/0009 /005 | 28792 |
| Water wheel, Plot 68, North Furrow, Kakamas | -28.785335; 20.638437 | National monument | Provincial heritage | Building | 9/2/032/0009 /006 | 28791 |
| Water Wheel, Plot 1467, South Furrow, Kakamas | -28.783988; 20.636358 | National monument | Provincial heritage | Building | 9/2/032/0009 /009 | 28788 |
| Kakamas Museum, Voortrekker Street, Kakamas | -28.770215; 20.617134 | National monument | Provincial heritage | Building | 9/2/032/0010 | 28789 |

5.2.4 Graves/Burials

During Orton's (2012) survey, he recorded a single historic grave dating to 1955. At the time, the site was younger than 60 years and thus not protected under the NHRA. However, it should be noted that it is now older than 60 years and should therefore be protected under the NHRA. Orton (2012) also reported a large pile of rocks, seemingly placed on top of the degraded bedrock. Orton (2012) comments that although a burial on bedrock exposure is very unlikely, there have been reports of burial shafts dug into degraded bedrock covered with a cairn. He thus explains that the cairn is assumed to be similar to the other burial sites found within the region (Orton 2012). Nicholas Wiltshire (2018) recorded a possible gravesite on the soft, red sands at the base of Renosterkop Peak. According to Wiltshire (2018), the stones were deliberately arranged. He recorded no head or footstone, suggesting that this grave is not a Christian burial. ACRM (2019) also made a note of the grave mentioned above in their report.

Orton and Webley (2012) found several features likely to be graves during their survey for the proposed hydroelectric facilities near Riemvasmaak. However, they remark that they cannot

be certain about this interpretation without subsurface testing since these features could likely be historical features (constructed for various reasons) during the 20th century. They also found a memorial with an inscription: “*Eerste Landsdienskom Dept v Landbou 21.6.52 – 5.?.52*”. During Beaumont’s (2008a) survey, he examined a graveyard. There were about 50-60 burials. This graveyard was adequately fenced and contained headstones ranging from 2009 to 1959 with some unmarked interments that could still be older. Rossouw (2017) mentions that a large graveyard is located on the southern outskirts of the Boichoko Township

A collection of burials from the Kakamas area was excavated and analysed by Prof. Allan Morris. He had analysed the materials he collected in 1984 and 56 individuals exhumed by Dreyer and Meiring in 1936. The burial cairns and other information suggested that they belong to the Khoekhoen people, specifically the Einiqua. According to Pelser (2012), the historical data indicates that most graves to date to the 18th and early 19th centuries. The graves contained items such as trade beads and red ochre (Pelser 2012).

Recorded graves/burials/cemeteries in and around the areas of study

| Name | Cemetery ID | Site Type | Coordinates | URL Reference link |
|---|-------------|----------------|---------------------------|---|
| Northern Cape, KAKAMAS, NG Kerk, Muur van Herinnering | | Graves/Burials | -28 46.494, 20 37.207 | https://graves-at-eggssa.org/main.php?g2_itemId=2741778 |
| Northern Cape, KAKAMAS, Soetap cemetery | 3339 | Graves/Burials | -28 46 55.19, 20 37 35.12 | https://graves-at-eggssa.org/main.php?g2_itemId=406386 |
| Northern Cape, KAKAMAS, Van Rensburg cemetery | 4214 | Graves/Burials | -28 47.459, 20 39.403 | https://graves-at-eggssa.org/main.php?g2_itemId=1879921 |
| Northern Cape, AUGRABIES, cemetery | 3825 | Graves/Burials | -28 40.200, 20 25.452 | https://graves-at-eggssa.org/main.php?g2_itemId=1264697 |

6. IDENTIFIED RESOURCES AND HERITAGE ASSESSMENT

6.1 Surveyed area

The area surveyed for the impact assessment was dictated by the Google Earth map of the development footprints provided by the client. The proposed agricultural plots were surveyed by vehicle and on foot by a two-person team. The pedestrian survey was conducted in predominantly 30-50 m transects.

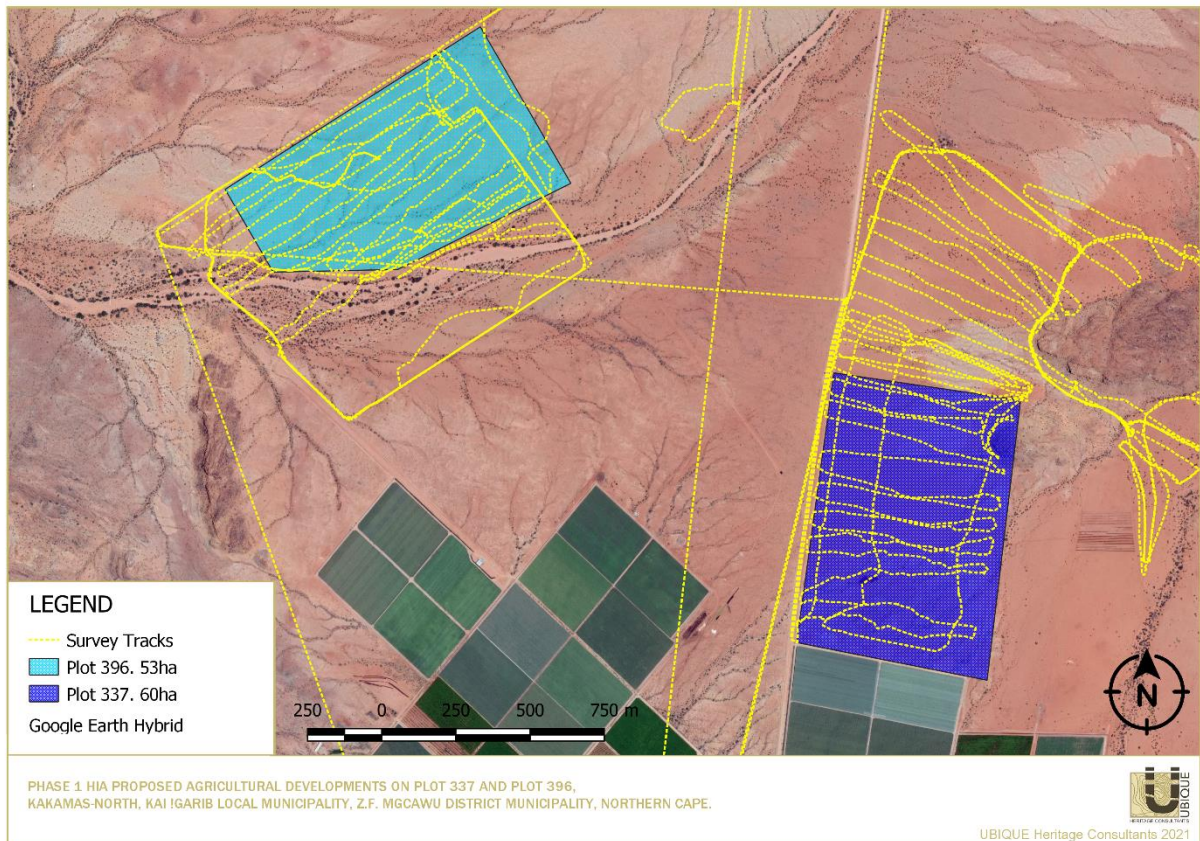


Figure 6 Survey tracks across the development footprint.

6.2 Identified heritage resources

| Point ID & Site # | Description | Period | Location | Field rating/ Significance/ Recommended Mitigation | |
|-----------------------|-----------------------|----------------------------------|-------------------|--|---|
| PT337/001 Plot 337 | Type lithic/s | Core/chunk and possible bladelet | MSA/ Early LSA | 28° 37' 41.7" S 20° 27' 16.1" E | Field Rating IV C Low significance No Mitigation Required |
| | Raw material | BIF | | | |
| | N in m ² . | 2/500m ² | | | |
| | Context | Surface scatter. No context | | | |
| Additional | N/A | | | | |

| Point ID & Site # | Description | Period | Location | Field rating/ Significance/ Recommended Mitigation | |
|-------------------------------|-----------------------|--|-------------------|--|---|
| PT337/002 Plot 337 | Type lithic/s | Core/chunk | MSA/ Early LSA | 28° 37' 30.6" S 20° 27' 40.2" E | Field Rating IV C Low significance No Mitigation Required |
| | Raw material | CCS | | | |
| | N in m ² . | 2/500m ² | | | |
| | Context | Surface scatter. No context | | | |
| | Additional | N/A | | | |
| PT337/003 Plot 337 | Type lithic/s | Chips, chunks, points and flakes | MSA/ Early LSA | 28° 37' 21.8" S 20° 27' 32.5" E | Field Rating IV C Low significance No Mitigation Required |
| | Raw material | CCS and BIF | | | |
| | N in m ² . | 10/100m ² | | | |
| | Context | Surface scatter | | | |
| | Additional | Possible micro knapping site. | | | |
| PT337/004 Plot 337 | Type lithic/s | Upper grinder | MSA/ Early LSA | 28° 37' 17.8" S 20° 27' 41.5" E | Field Rating IV C Low significance No Mitigation Required |
| | Raw material | CCS | | | |
| | N in m ² . | 1/500m ² | | | |
| | Context | Surface scatter/random/no context | | | |
| | Additional | Patina visible | | | |
| PT396/007 Plot 396 | Type lithic/s | Small core/chunk | MSA/ Early LSA | 28° 36' 48.5" S 20° 26' 30.7" E | Field Rating IV C Low significance No Mitigation Required |
| | Raw material | BIF | | | |
| | N in m ² . | 1/500m ² | | | |
| | Context | Surface scatter. No context | | | |
| | Additional | N/A | | | |
| PT396/009 Plot 396 | Type lithic/s | Core/chunk, upper grinder and possible chisel/hammer | MSA/ Early LSA | 28° 37' 04.2" S 20° 26' 07.8" E | Field Rating IV C Low significance No Mitigation Required |
| | Raw material | BIF, CCS and fine-grained sedimentary rock | | | |
| | N in m ² . | 3/500m ² | | | |
| | Context | Surface scatter. No context | | | |
| | Additional | Breakage could resemble a tool | | | |
| PT396/010 Plot 396 | Type lithic/s | Flakes, chips and possible points | MSA/ Early LSA | 28° 37' 01.3" S 20° 26' 28.4" E | Field Rating IV C Low significance No Mitigation Required |
| | Raw material | BIF | | | |
| | N in m ² . | 4/500m ² | | | |
| | Context | Surface scatter. No context | | | |
| | Additional | N/A | | | |

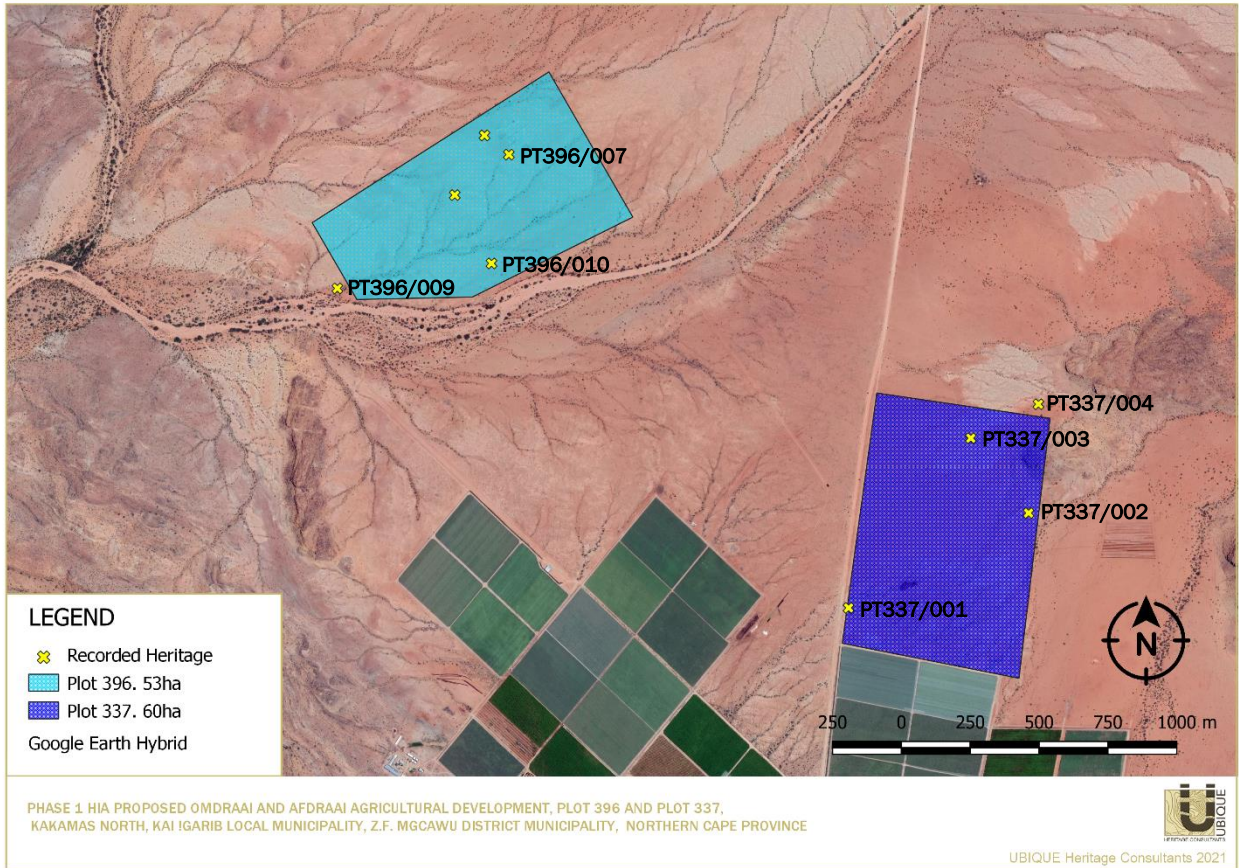


Figure 7 Distribution of identified heritage resources, Plot 396 and Plot 337, Kakamas-North.

6.3 Discussion

6.3.1 Archaeological features

6.3.1.1 Prehistorical

PLOT 337

Three occurrences of lithic material were recorded across the development footprint on Plot 337 (PT337/001, PT337/002, PT337/003) and one occurrence just north of the project development footprint (PT337/004). The isolated surface finds consisted of chunks and cores, one bladelet and an upper grinder from cryptocrystalline silicates (CCS) and Banded Ironstone Formation (BIF). PT337/003 is a possible small knapping site with a low-density surface scatter of some lithic debris like chips, chunks, flakes, and points. The lithic material is predominantly MSA and some Early LSA.

The lithic material shows various degrees of weathering and is without substantial archaeological context or matrix, and is therefore deemed of minor scientific importance and not conservation worthy (NCW). It is also situated outside the designated project area.

The material is given a 'General' Protection C (Field Rating IV C). This means that it has been sufficiently recorded (in Phase 1). It requires no further action.



Figure 8 Photographic selection of the lithic material recorded on Plot 337.

PLOT 396

Three occurrences of lithic material were recorded across the development footprint on Plot 396 (PT397/007, PT396/009, PT396/010). The MSA and Early LSA lithic material were scattered in low densities in isolated areas. The recorded lithic material included chunks and cores, a possible hammerstone, an upper grinder, lithic debris like chips, chunks, flakes, and points. Raw material predominantly consists of cryptocrystalline silicates (CCS) and Banded Ironstone Formation (BIF).

The lithic material shows various degrees of weathering and is without substantial archaeological context or matrix, and is therefore deemed of minor scientific importance and not conservation worthy (NCW). It is also situated outside the designated project area.

The material is given a 'General' Protection C (Field Rating IV C). This means that it has been sufficiently recorded (in Phase 1). It requires no further action.



Figure 10 Photographic selection of the lithic material recorded on Plot 396.

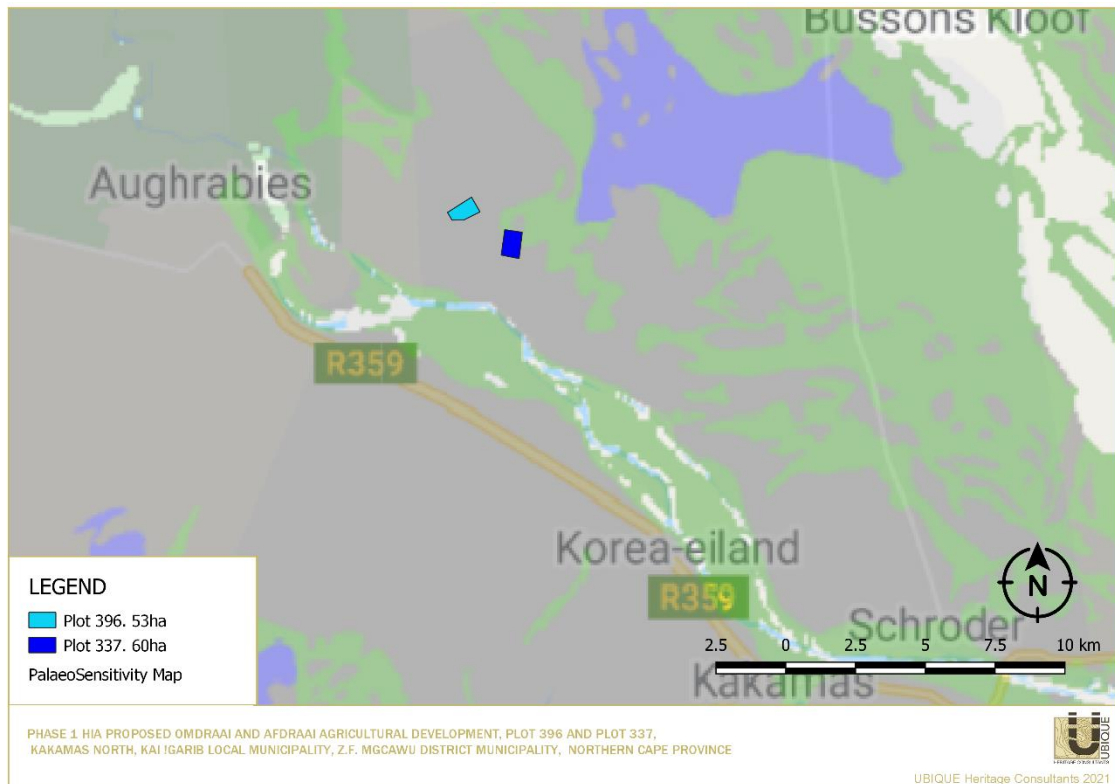


Figure 9 SAHRIS PalaeoSensitivity Map, indicating Moderate (green), Low (blue), Insignificant/Zero (grey), and Unknown (clear) palaeontological significance in the study area, (<https://sahris.sahra.org.za/map/palaeo>).

6.3.2 Palaeontological resources

The development footprint is underlain by the ancient Precambrian basement rocks of the Namaqua-Natal Province, mantled by sediments of the Gordonia Formation (Kalahari Group). A low Palaeontological Significance has been allocated to the proposed development as the Palaeontological Sensitivity of the Gordonia Formation is low. The ancient Precambrian basement rocks are zero. These rocks are approximately one to two billion years old and completely unfossiliferous (Butler 2021).

Elize Butler from Banzai Environmental conducted a desktop study of the development footprint (see Appendix A).

7. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

| Description | Development Impact | Mitigation | Field rating/ Significance | |
|---|---|------------|-------------------------------|---------------------------------------|
| Archaeological | | | | |
| 1. Three occurrences of lithic material recorded across the development footprint on Plot 337 (PT337/001, PT337/002, PT337/003) and one occurrence just north of the project development footprint (PT337/004). | Nature | Neutral | No mitigation required. | Field Rating IV C Low significance |
| | Extent | Low | | |
| | Duration | Low | | |
| | Intensity | Low | | |
| | Potential of impact on irreplaceable resource | Low | | |
| | Consequence | Low | | |
| | Probability of impact | Low | | |
| | Significance | Low | | |
| 2. Three occurrences of lithic material recorded across the development footprint on Plot 396 (PT397/007, PT396/009, PT396/010). | Nature | Neutral | No mitigation required. | Field Rating IV C Low significance |
| | Extent | Low | | |
| | Duration | Low | | |
| | Intensity | Low | | |
| | Potential of impact on irreplaceable resource | Low | | |
| | Consequence | Low | | |
| | Probability of impact | Low | | |
| | Significance | Low | | |
| Paleontological | | | | |
| 3. The Palaeontological Sensitivity of the Gordonia Formation (Kalahari Group) is low, and the sensitivity of the ancient Precambrian basement rocks are zero | Nature | Neutral | No mitigation required. | N/A |
| | Extent | Low | | |
| | Duration | Low | | |
| | Intensity | Low | | |
| | Potential of impact on irreplaceable resource | Low | | |
| | Consequence | Low | | |
| | Probability of impact | Low | | |
| | Significance | Low | | |

The significance of the lithic material recorded on Plot 396 and Plot 337 is considered as low and not conservation worthy. Therefore, in the unlikely event that impact should occur, the negative impact is negligible.

With regards to the impact on palaeontological resources, the scarcity of fossil heritage at the proposed development footprint indicates that the impact of the development footprint will be of low significance in palaeontological terms. Therefore, it is considered that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological reserves of the area (Butler 2021).

8. RECOMMENDATIONS

Based on the assessment of the potential impact of the development on the identified heritage, the following recommendations are made, taking into consideration any existing or potential sustainable social and economic benefits:

1. The cultural material recorded across Plot 396 and Plot 337 is considered low significance, and the impact of the agricultural development will be negligible. No further action or mitigation is recommended.
2. Due to the low palaeontological significance of the area, no further palaeontological heritage studies, ground-truthing and/or specialist mitigation are required. It is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area (Butler 2020). If fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol (Appendix A/11) must be implemented by the Environmental Control Officer (ECO) in charge of these developments. These discoveries ought to be protected, and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carried out by a palaeontologist (Butler 2020).
3. Although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the assessment. If during construction, any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit

(Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490) must be alerted immediately as per section 36(6) of the NHRA. Depending on the nature of the finds, a professional archaeologist or palaeontologist must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA. UBIQUE Heritage Consultants and its personnel will not be held liable for such oversights or costs incurred as a result of such oversights.

9. CONCLUSION

This HIA identified no significant heritage resources that may be impacted negatively by the proposed development. The development of Plot 396 and Plot 337, Kakmas-North, Kai !Garib Local Municipality, Z.F. Mgcauwu District Municipality, Northern Cape may continue, provided the recommendations stipulated within this report, and the subsequent decision by SAHRA, are followed.

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APPENDIX A

PALAEONTOLOGICAL DESKTOP ASSESSMENT FOR THE PROPOSED AGRICULTURAL DEVELOPMENT, ON PLOT 337 AND 396 ZF MGCAWU DISTRICT MUNICIPALITY, KAI !GARIB LOCAL MUNICIPALITY, NEAR KAKAMAS, IN THE NORTHERN CAPE



**PALAEONTOLOGICAL DESKTOP ASSESSMENT FOR THE PROPOSED
AGRICULTURAL DEVELOPMENT, ON PLOT 337 AND 396 ZF MGCAWU DISTRICT
MUNICIPALITY, KAI !GARIB LOCAL MUNICIPALITY, NEAR KAKAMAS, IN THE
NORTHERN CAPE**

**Compiled for:
UBIQUE Heritage Consultants**

Prepared by
Banzai Environmental
May 2021

Declaration of Independence

I, Elize Butler, declare that –

General declaration:

- I act as the independent palaeontological specialist in this application.
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant.
- I declare that there are no circumstances that may compromise my objectivity in performing such work.
- I have expertise in conducting palaeontological impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity.
- I will comply with the Act, Regulations and all other applicable legislation.
- I will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application.
- I have no, and will not engage in, conflicting interests in the undertaking of the activity.
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority.
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties are facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application.
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not.
- All the particulars furnished by me in this form are true and correct.
- I will perform all other obligations as expected a palaeontological specialist in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realise that a false declaration is an offense in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

Disclosure of Vested Interest

I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations.

PALAEONTOLOGICAL CONSULTANT:

Banzai Environmental (Pty) Ltd

CONTACT PERSON:

Elize Butler

Tel: +27 844478759

Email: elizebutler002@gmail.com

SIGNATURE:

A handwritten signature in black ink, appearing to read 'Elize Butler', is positioned to the right of the 'SIGNATURE:' label.

The heritage impact assessment report has been compiled considering the National Environmental Management Act 1998 (NEMA) and Environmental Impact Regulations 2014 as amended, requirements for specialist reports, Appendix 6, as indicated in the table below.

Table 1: NEMA Table

| Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017 | Relevant section in report | Comment where not applicable. |
|--|--|--------------------------------------|
| 1.(1) (a) (i) Details of the specialist who prepared the report | Page ii and Section 2 of Report – Contact details and company and Appendix A | - |
| (ii) The expertise of that person to compile a specialist report including a curriculum vita | Section 2 – refer to Appendix A | - |
| (b) A declaration that the person is independent in a form as may be specified by the competent authority | Page ii of the report | - |
| (c) An indication of the scope of, and the purpose for which, the report was prepared | Section 4 – Objective | - |
| (cA) An indication of the quality and age of base data used for the specialist report | Section 5 – Geological and Palaeontological history | - |
| (cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change; | Section 9 | - |
| (d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment | Section 1 and 10 | |
| (e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used | Section 7 Approach and Methodology | - |
| (f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives; | Section 1 and 10 | |
| (g) An identification of any areas to be avoided, including buffers | Section 1 and 10 | |
| (h) A map superimposing the activity including the associated structures and infrastructure on the | Section 5 – Geological and | |

| Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017 | Relevant section in report | Comment where not applicable. |
|--|--|--|
| environmental sensitivities of the site including areas to be avoided, including buffers; | Palaeontological history | |
| (i) A description of any assumptions made and any uncertainties or gaps in knowledge; | Section 7.1 – Assumptions and Limitation | - |
| (j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment | Section 1 and 10 | |
| (k) Any mitigation measures for inclusion in the EMPr | None | |
| (l) Any conditions for inclusion in the environmental authorisation | None | |
| (m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation | None | |
| (n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and | Section 1 and 10 | |
| (n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and | | |
| (n)(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan | Section 1 and 10 | - |
| (o) A description of any consultation process that was undertaken during the course of carrying out the study | N/A | Not applicable. A public consultation process will be conducted as part of the EIA and EMPr process. |
| (p) A summary and copies if any comments that were received during any consultation process | N/A | |
| (q) Any other information requested by the competent authority. | | Not applicable. |

| Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017 | Relevant section in report | Comment where not applicable. |
|---|--|--------------------------------------|
| (2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply. | Section 3 compliance with SAHRA guidelines | |

EXECUTIVE SUMMARY

Banzai Environmental was appointed by UBIQUE Heritage Consultants to conduct the Palaeontological Desktop Assessment to assess the proposed vineyard and game farm development on Plot 337 and 396 of the Afdraai/Omdraai Landgoed Trust, near Kakamas in the Northern Cape. To comply with the National Heritage Resources Act (No 25 of 1999, section 38) (NHRA), this Palaeontological Impact Assessment is necessary to confirm if fossil material is present in the planned development and to evaluate the impact of the proposed development on the Palaeontological Heritage.

The development footprint is underlain by the ancient Precambrian basement rocks of the Namaqua-Natal Province, mantled by sediments of the Gordonia Formation (Kalahari Group). A low Palaeontological Significance has been allocated to the proposed development as the Palaeontological Sensitivity of the Gordonia Formation is low, while that of the ancient Precambrian basement rocks are zero. These rocks are approximately one to two billion years old and completely unfossiliferous. It is therefore recommended that no further palaeontological heritage studies, ground-truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. It is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area.

If fossil remains are discovered during any phase of construction, either on the surface or below, the ECO in charge of these developments must be alerted immediately. These discoveries should be protected (if possible, *in situ*), and the ECO must report to SAHRA so that appropriate mitigation can be carried out by a professional palaeontologist. SAHRA Contact details: South African Heritage Resources Agency, 111 Harrington Street, PO Box 4637, Cape Town 8000, South Africa. Email: Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509 Web: www.sahra.org.za)

Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be housed in an approved collection (museum or university), and all fieldwork and reports should meet the minimum standards for palaeontological impact studies developed by SAHRA.

TABLE OF CONTENT

1 INTRODUCTION 1

2 QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR 6

3 LEGISLATION..... 6

3.1 National Heritage Resources Act (25 of 1999) 6

4 OBJECTIVE..... 7

5 GEOLOGICAL AND PALAEOLOGICAL HISTORY 8

6 GEOGRAPHICAL LOCATION OF THE SITE 2

7 METHODS 2

7.1 Assumptions and Limitations 2

8 ADDITIONAL INFORMATION CONSULTED..... 3

9 IMPACT ASSESSMENT METHODOLOGY..... 3

9.1 Summary of Impact Tables 7

10 FINDINGS AND RECOMMENDATIONS 7

11 REFERENCES 8

List of Figures

Figure 1: Locality Map. 3

Figure 2: Project Layout. 4

Figure 3: Topographical Map of the proposed development. 5

Figure 4: Extract of the 1:250 000 2820 Upington Geological Map (Council of Geoscience, Pretoria) indicating the locality of the proposed vineyard and game farm on Plot 337 and 396 near Kakamas in the Northern Cape. Legend: White with yellow dashes (Qg) - Gordonia Formation of the Kalahari Group and outcrops of the Riemvasmaak granite-gneiss (pink, Mrm) of the Namaqua-Natal Metamorphic Province. 9

Figure 5: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences) indicating the location of the proposed development. 1

List of Tables

Table 1: NEMA Table iv

Table 2: Technical Information 1

Table 3: Legend to Map and surrounding geology (Modified from the 1:250 000 2820 Upington Geological Map (1988) (Council for Geosciences, Pretoria). 1

Table 4: The Rating System- 4

Appendix A: CV

» **INTRODUCTION**

The owner of Afdraai Boerdery (Mr C du Plessis) proposes the development of a vineyard and game farm on Plot 337 and 396 near Kakamas in the Northern Cape (Figure 1-3). The proposed development is currently utilised as Agriculture/grazing/ and game farming.

Table 2: Technical Information

| PROJECT PARTICULARS | |
|---|--|
| Technical information | |
| Project description | |
| Project name | HIA for the proposed agricultural development on Plot 337 and 396 Afdraai |
| Description | Proposed vineyard and game farm development on Plot 337 and 396 near Kakamas |
| Developer | |
| Afdraai Boerdery | |
| Contact information | Email: charl@afdraai.co.za |
| Development type | Agriculture |
| Landowner | |
| | |
| Contact information | Email: charl@afdraai.co.za |
| Consultants | |
| Environmental | Eco Balance Planning Co. |
| Heritage and archaeological | UBIQUE Heritage Consultants |
| Paleontological | Banzai Environmental |
| Property details | |
| Province | Northern Cape |
| District municipality | Z.F. Mgcawu |
| Local municipality | Kai !Garib |
| Topo-cadastral map | 1:50 000 2820CB |
| Farm name | Plot 337 Afdraai/Omdraai Landgoed Trust and Plot 396 Afdraai/Omdraai Landgoed Trust |
| Closest town | Kakamas |
| GPS Co-ordinates | Plot 337: 28°37' 48.5" South 20° 27' 16.1" East Plot 396: 28°36' 41.7" South 20° 26' 30.7" East |
| Property size | Plot 337: 60 ha Plot 396: 50 ha |
| Development footprint size | Plot 337: 50 ha Plot 396: 25 ha |
| Land use | |
| Previous | Plot 337: Agriculture/grazing Plot 396: Game farming |
| Current | Agriculture/grazing/ Game farming |
| Rezoning required | No |
| Sub-division of land | No |
| Development criteria in terms of Section 38(1) NHRA | Yes/No |

| | |
|---|-----|
| Construction of a road, wall, power line, pipeline, canal or other linear forms of development or barrier exceeding 300m in length. | Yes |
| Construction of bridge or similar structure exceeding 50m in length. | No |
| Construction exceeding 5000m ² . | Yes |
| Development involving three or more existing erven or subdivisions. | No |
| Development involving three or more erven or divisions that have been consolidated within the past five years. | No |
| Rezoning of site exceeding 10 000m ² . | No |
| Any other development category, public open space, squares, parks, recreation grounds. | No |

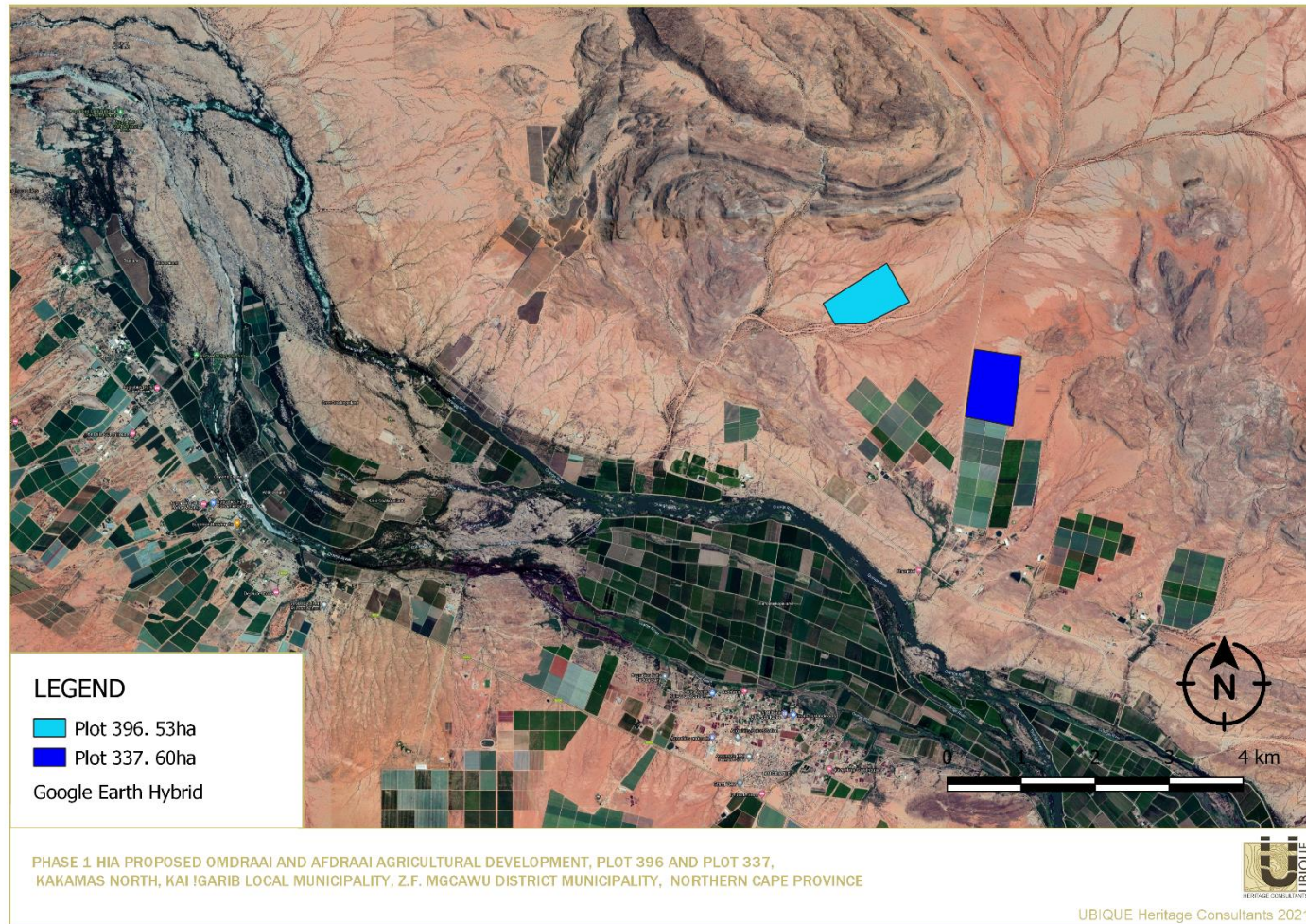


Figure 11:Locality Map.



Figure 12: Project Layout.

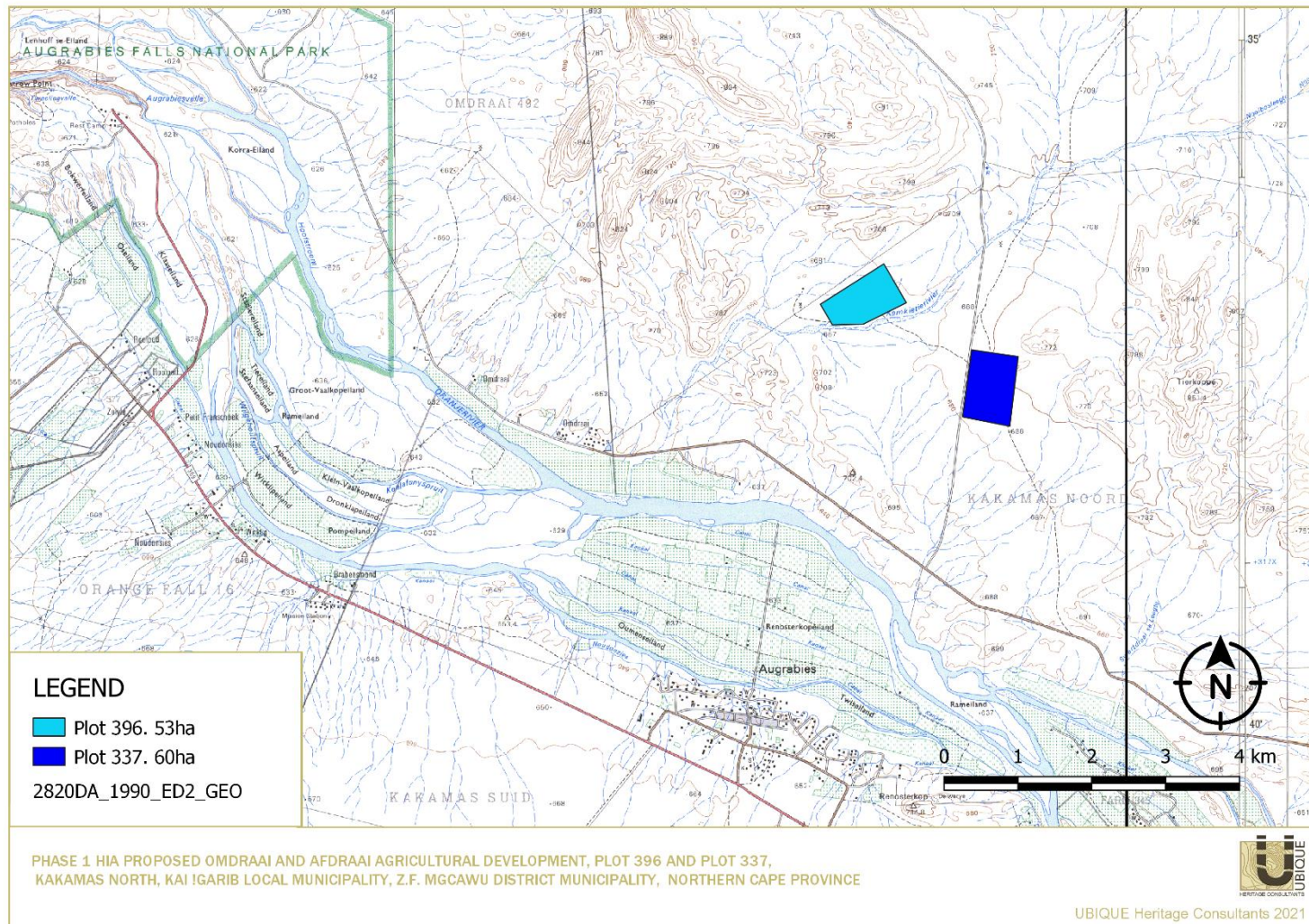


Figure 13: Topographical Map of the proposed development.

» QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

This present study has been conducted by Mrs Elize Butler. She has conducted approximately 300 palaeontological impact assessments for developments in the Free State, KwaZulu-Natal, Eastern, Central, and Northern Cape, Northwest, Gauteng, Limpopo, and Mpumalanga. She has an MSc (*cum laude*) in Zoology (specialising in Palaeontology) from the University of the Free State, South Africa and has been working in Palaeontology for more than twenty-five years. She has experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the Karoo Basin. She has been a member of the Palaeontological Society of South Africa (PSSA) since 2006 and has been conducting PIAs since 2014.

» LEGISLATION

○ National Heritage Resources Act (25 of 1999)

Cultural Heritage in South Africa, which includes all heritage resources, is protected by the National Heritage Resources Act (Act 25 of 1999) (NHRA). Heritage resources as defined in Section 3 of the Act include **“all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens”**.

Palaeontological heritage is unique and non-renewable and is protected by the NHRA. Palaeontological resources may not be unearthed, broken moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

This Palaeontological Impact Assessment forms part of the Heritage Impact Assessment (HIA) and adhere to the conditions of the Act. According to **Section 38 (1)**, a HIA is required to assess any potential impacts to palaeontological heritage within the development footprint where:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- the construction of a bridge or similar structure exceeding 50m in length;
- any development or other activity which will change the character of a site—
 - a. (exceeding 5 000 m² in extent; or
 - b. involving three or more existing erven or subdivisions thereof; or
 - c. involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - d. the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority
 - e. the re-zoning of a site exceeding 10 000m² in extent;

or any other category of development provided for in regulations by SAHRA or a Provincial heritage resources authority.

» **OBJECTIVE**

The objective of a Palaeontological Impact Assessment (PIA) is to determine the impact of the development on potential palaeontological material at the site.

According to the “SAHRA APM Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports” the aims of the PIA are: 1) to **identify** the palaeontological status of the exposed as well as rock formations just below the surface in the development footprint 2) to estimate the **palaeontological importance** of the formations 3) to determine the **impact** on fossil heritage; and 4) to recommend how the developer ought to protect or mitigate damage to fossil heritage.

The terms of reference of a PIA are as follows:

General Requirements:

Adherence to the content requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations 2014, as amended.

Adherence to all applicable best practice recommendations, appropriate legislation and authority requirements.

Submit a comprehensive overview of all appropriate legislation, guidelines.

Description of the proposed project and provide information regarding the developer and consultant who commissioned the study.

Description and location of the proposed development and provide geological and topographical maps.

Provide Palaeontological and geological history of the affected area;

Identification sensitive areas to be avoided (providing shapefiles/kmls) in the proposed development.

Evaluation of the significance of the planned development during the Pre-construction, Construction, Operation, Decommissioning Phases and Cumulative impacts. Potential impacts should be rated in terms of the direct, indirect and cumulative:

- f. **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity.
- g. **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity.
- h. **Cumulative impacts** are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities.

Fair assessment of alternatives (infrastructure alternatives have been provided).

Recommend mitigation measures to minimise the impact of the proposed development; and
Implications of specialist findings for the proposed development (such as permits, licenses etc).

» **GEOLOGICAL AND PALAEOONTOLOGICAL HISTORY**

The proposed development of a vineyard and game farm on Plot 337 and 396 near Kakamas in the Northern Cape is depicted on the 1:250 000 2820 Upington Geological Map (1988) (Council of Geoscience) (Figure 4). Plot 396 and the middle and north-west portion of Plot 337 is mantled by the Gordonia Formation (Qg) of the Kalahari Group while the north-eastern and south-eastern portion of Plot 337 is underlain by outcrops of the Riemvasmaak granite-gneiss (Mrm). The latter belongs to the Namaqua-Natal Province which is Mid Proterozoic/Mokolian in age (Cornell et al. 2006, Moen 2007). These rocks are about one to two billion years old and totally unfossiliferous (Almond & Pether 2008).

The youngest formation of the Kalahari group is the Gordonia Formation which is generally termed Kalahari sand and comprises of red aeolian sands that cover most of the Kalahari Group sediments. The pan sediments of the area originated from the Gordonia Formation and contain white to brown fine-grained silts, sands and clays. Some of the pans consist of clayey material mixed with evaporates that shows seasonal effects of shallow saline groundwaters. Quaternary alluvium, aeolian sands, surface limestone, silcrete, and terrace gravels are also included in the Kalahari Group (Kent 1980). The Cenozoic sands and calcretes of the Kalahari Group range in thickness from a few metres to more than 180m (Partridge et al., 2006).

Partridge *et al.* (2006) describe numerous types of superficial deposits of Late Cenozoic (Miocene to Pliocene to Recent) age throughout the Karoo Basin. Sands and gravel in the development footprint have a possible fluvial origin. These fossils represent terrestrial plants and animals with a close resemblance to living forms. Fossil assemblages include bivalves, diatoms, gastropod shells, ostracods and trace fossils. The palaeontology of the Quaternary superficial deposits has been relatively neglected in the past. Late Cenozoic calcrete may comprise of bones, horn cores as well as mammalian teeth. Tortoise remains have also been uncovered as well as trace fossils which includes termite and insect's burrows and mammalian trackways. Amphibian and crocodile remains have been uncovered where the depositional settings in the past were wetter.

Almond and Pether 2008 allocated a low significance to the Kalahari Group because fossil assemblages are generally rare and low in diversity and occur over a wide-ranging geographic area. In the past palaeontologists did not focus on Cenozoic superficial deposits although they sometimes comprise of significant fossil biotas.

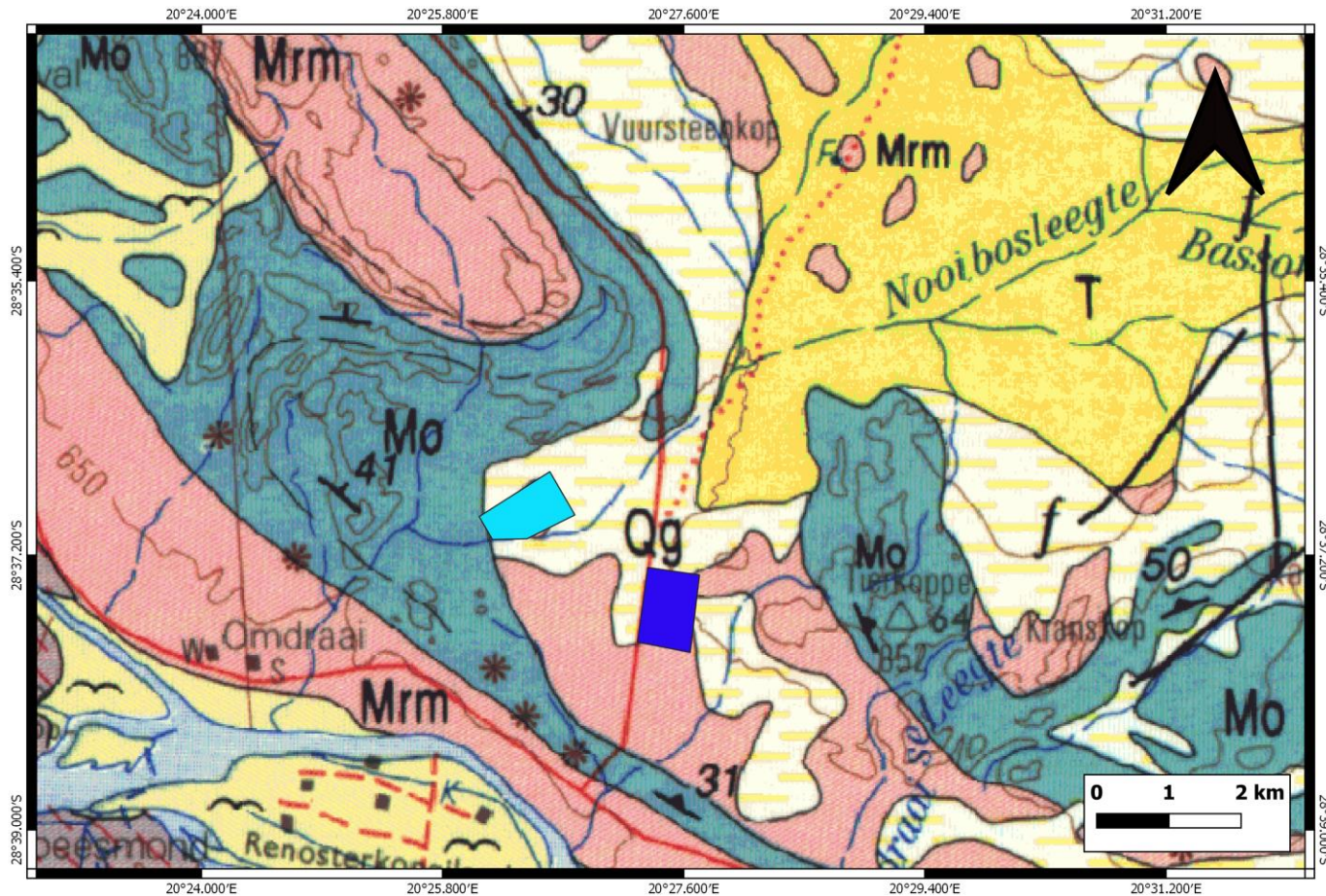


Figure 14: Extract of the 1:250 000 2820 Upington Geological Map (Council of Geoscience, Pretoria) indicating the locality of the proposed vineyard and game farm on Plot 337 and 396 near Kakamas in the Northern Cape. Legend: White with yellow dashes (Qg) - Gordonia Formation of the Kalahari Group and outcrops of the Riemvasmaak granite-gneiss (pink, Mrm) of the Namaqua-Natal Metamorphic Province.

Legend to 1:250 000 2820 Uptington Geological Map

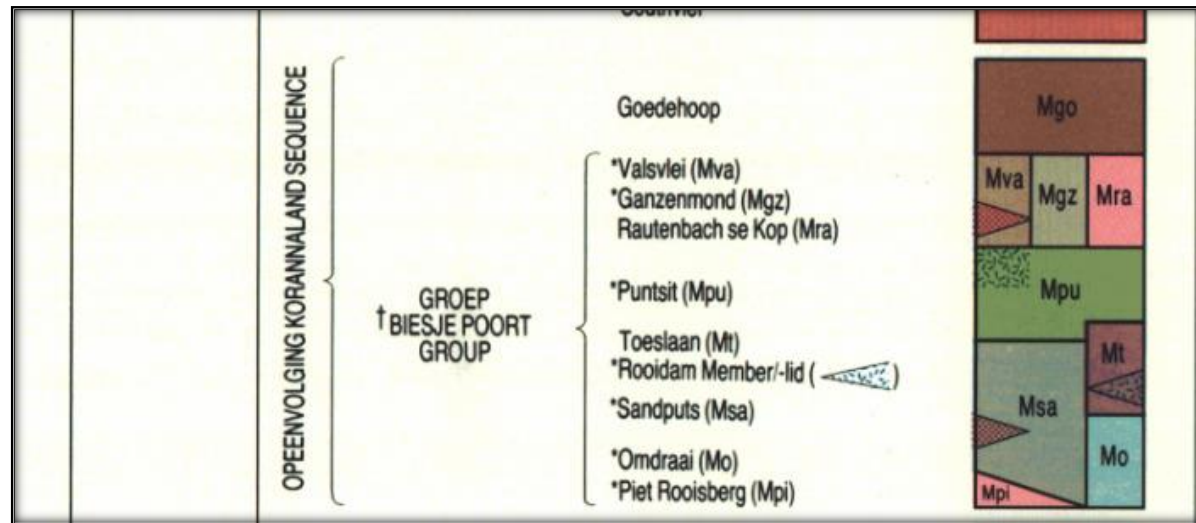
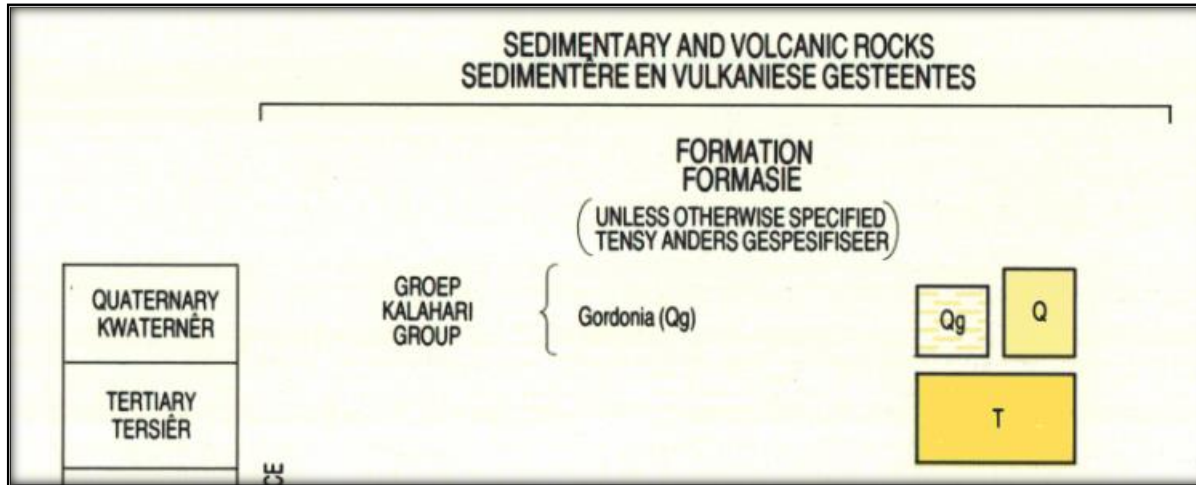



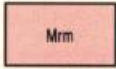


Table 3: Legend to Map and surrounding geology (Modified from the 1:250 000 2820 Upington Geological Map (1988) (Council for Geosciences, Pretoria).

| Symbol | Lithology | Stratigraphy | Age |
|---|--|--|--------------------|
|  | Red-brown, wind-blown sand and dunes | Gordonia Formation, Kalahari Group | Quaternary |
|  | Calcrete | | Tertiary |
|  | Leucocratic, quartz-microcline gneiss, amphibole gneiss, quartzite | Omdraai Formation (Mo) of the Biesjespoort Group | Mokolian and older |
|  | Pink-weathering granite gneiss with a granular or augen texture | Riemvasmaak granite gneiss | |

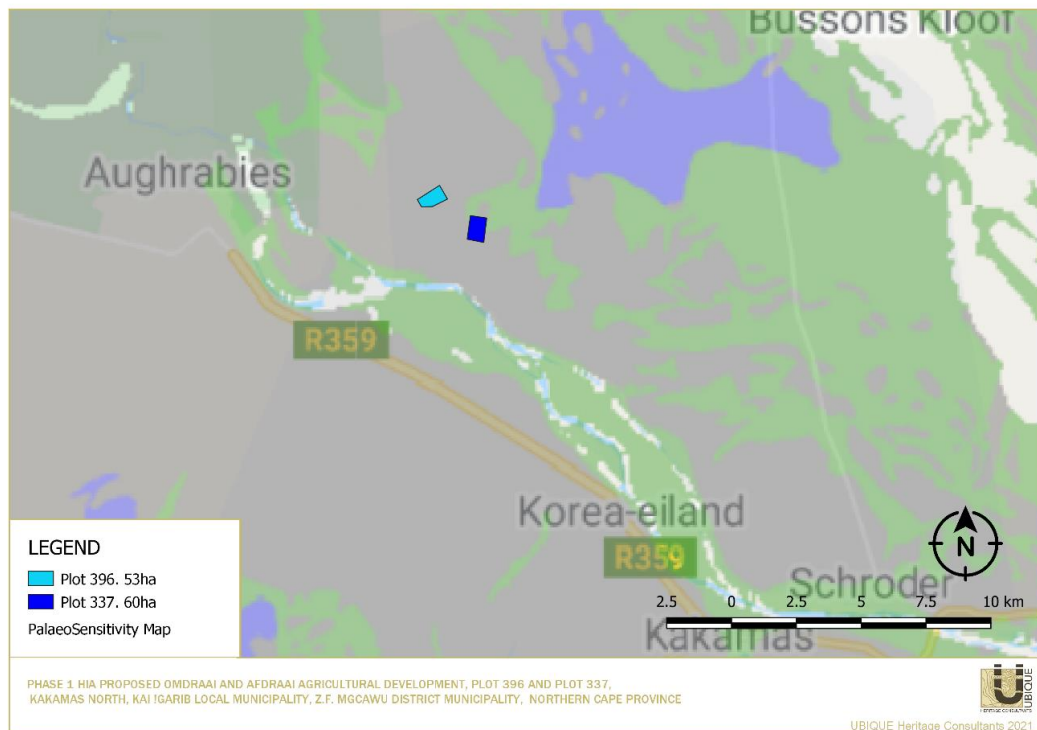


Figure 15: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences) indicating the location of the proposed development.

| Colour | Sensitivity | Required Action |
|---------------|---------------------------|---|
| RED | VERY HIGH | Field assessment and protocol for finds is required |
| ORANGE/YELLOW | HIGH | desktop study is required and based on the outcome of the desktop study, a field assessment is likely |
| GREEN | MODERATE | desktop study is required |
| BLUE | LOW | no palaeontological studies are required however a protocol for finds is required |
| GREY | INSIGNIFICANT/ZERO | no palaeontological studies are required |
| WHITE/CLEAR | UNKNOWN | these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map. |

According to the SAHRIS palaeo sensitivity map (Figure 4) there is a zero chance of finding fossils in the grey area (Plot 396), a moderate chance in the green area (areas of Plot 337). The grey area is unfossiliferous.

» **GEOGRAPHICAL LOCATION OF THE SITE**

The proposed development comprises of (Figure 1-3)

Plot 337: 28°37' 48.5" South 20° 27' 16.1" East and the development is 50 ha in extent.

And

Plot 396: 28°36' 41.7" South 20° 26' 30.7" East and the development is 25 ha in extent.

» **METHODS**

The aim of a desktop study is to evaluate the risk to palaeontological heritage in the proposed development. This include all trace fossils and fossils. All available information is consulted to compile a desktop study and includes: Palaeontological Impact Assessment reports in the same area; aerial photos and Google Earth images, topographical as well as geological maps.

○ **Assumptions and Limitations**

The focal point of geological maps is the geology of the area and the sheet explanations were not meant to focus on palaeontological heritage. Many inaccessible regions of South Africa have never been reviewed by palaeontologists and data is generally based on aerial photographs alone.

Palaeontological Desktop Assessment to assess the proposed vineyard and game farm development on Plot 337 and 396 near Kakamas in the Northern Cape

Locality and geological information of museums and universities databases have not been kept up to date or data collected in the past have not always been accurately documented.

Comparable Assemblage Zones in other areas is sourced to provide information on the existence of fossils in an area which was not documented in the past. When using similar Assemblage Zones and geological formations for Desktop studies it is generally **assumed** that exposed fossil heritage is present within the footprint. **A field-assessment will thus improve the accuracy of the desktop assessment.**

» **ADDITIONAL INFORMATION CONSULTED**

In compiling this report the following sources were consulted:

Geological map 1:100 000, Geology of the Republic of South Africa (Visser 1984),
1: 250 000 2820 Upington (1988) Geological map (Council of Geoscience, Pretoria),
A Google Earth map with polygons of the proposed development was obtained from Unique Heritage Consultants.

» **IMPACT ASSESSMENT METHODOLOGY**

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the following project phases:

- Construction;
- Operation; and
- Decommissioning.

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact, the following criteria is used:

Table 4: The Rating System-

| NATURE | | |
|---|----------------------------|---|
| The Nature of the Impact is the possible destruction of fossil heritage | | |
| GEOGRAPHICAL EXTENT | | |
| This is defined as the area over which the impact will be experienced. | | |
| 1 | Site | The impact will only affect the site. |
| 2 | Local/district | Will affect the local area or district. |
| 3 | Province/region | Will affect the entire province or region. |
| 4 | International and National | Will affect the entire country. |
| PROBABILITY | | |
| This describes the chance of occurrence of an impact. | | |
| 1 | Unlikely | The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence). |
| 2 | Possible | The impact may occur (Between a 25% to 50% chance of occurrence). |
| 3 | Probable | The impact will likely occur (Between a 50% to 75% chance of occurrence). |
| 4 | Definite | Impact will certainly occur (Greater than a 75% chance of occurrence). |
| DURATION | | |
| This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity. | | |
| 1 | Short term | The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years). |
| 2 | Medium term | The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years). |
| 3 | Long term | The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years). |
| 4 | Permanent | The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur |

| | | |
|---|-------------------------------|--|
| | | in such a way or such a time span that the impact can be considered indefinite. |
| INTENSITY/ MAGNITUDE | | |
| Describes the severity of an impact. | | |
| 1 | Low | Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible. |
| 2 | Medium | Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity). |
| 3 | High | Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation. |
| 4 | Very high | Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation. |
| REVERSIBILITY | | |
| This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity. | | |
| 1 | Completely reversible | The impact is reversible with implementation of minor mitigation measures. |
| 2 | Partly reversible | The impact is partly reversible but more intense mitigation measures are required. |
| 3 | Barely reversible | The impact is unlikely to be reversed even with intense mitigation measures. |
| 4 | Irreversible | The impact is irreversible and no mitigation measures exist. |
| IRREPLACEABLE LOSS OF RESOURCES | | |
| This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity. | | |
| 1 | No loss of resource | The impact will not result in the loss of any resources. |
| 2 | Marginal loss of resource | The impact will result in marginal loss of resources. |
| 3 | Significant loss of resources | The impact will result in significant loss of resources. |

| | | |
|--|------------------------------|--|
| 4 | Complete loss of resources | The impact is result in a complete loss of all resources. |
| CUMULATIVE EFFECT | | |
| This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question. | | |
| 1 | Negligible cumulative impact | The impact would result in negligible to no cumulative effects. |
| 2 | Low cumulative impact | The impact would result in insignificant cumulative effects. |
| 3 | Medium cumulative impact | The impact would result in minor cumulative effects. |
| 4 | High cumulative impact | The impact would result in significant cumulative effects |
| SIGNIFICANCE | | |
| Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity. The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating. | | |
| Points | Impact significance rating | Description |
| 6 to 28 | Negative low impact | The anticipated impact will have negligible negative effects and will require little to no mitigation. |
| 6 to 28 | Positive low impact | The anticipated impact will have minor positive effects. |
| 29 to 50 | Negative medium impact | The anticipated impact will have moderate negative effects and will require moderate mitigation measures. |
| 29 to 50 | Positive medium impact | The anticipated impact will have moderate positive effects. |
| 51 to 73 | Negative high impact | The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact. |
| 51 to 73 | Positive high impact | The anticipated impact will have significant positive effects. |
| 74 to 96 | Negative very high impact | The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws". |
| 74 to 96 | Positive very high impact | The anticipated impact will have highly significant positive |

(Extent (1) + probability (2) + reversibility (4) + irreplaceability (4) + duration (4) + cumulative effect) (1) x magnitude/intensity (1) = 16

- **Summary of Impact Tables**

Loss of fossil heritage will be a negative impact. Only the site will be affected by the proposed development. The expected duration of the impact is assessed as potentially permanent to long term. In the absence of mitigation procedures, the damage or destruction of any palaeontological materials will be permanent. Impacts on palaeontological heritage during the construction phase could potentially occur and are regarded as having a negatable probability. The magnitude of the impact on the fossil heritage will be low. The significance of the impact occurring will be low.

» **FINDINGS AND RECOMMENDATIONS**

The development footprint is underlain by the ancient Precambrian basement rocks of the Namaqua-Natal Province, mantled by sediments of the Gordonia Formation (Kalahari Group). A low Palaeontological Significance has been allocated to the proposed development as the Palaeontological Sensitivity of the Gordonia Formation is low, while that of the ancient Precambrian basement rocks are zero. These rocks are approximately one to two billion years old and entirely unfossiliferous. It is consequently recommended that no further palaeontological heritage studies, ground-truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. It is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area.

If fossil remains are discovered during any phase of construction, either on the surface or below, the ECO in charge of these developments must be alerted immediately. These discoveries should be protected (if possible, *in situ*), and the ECO must report to SAHRA so that appropriate mitigation can be carried out by a professional palaeontologist. SAHRA Contact details: South African Heritage Resources Agency, 111 Harrington Street, PO Box 4637, Cape Town 8000, South Africa. Email: Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509 Web: www.sahra.org.za

Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be housed in an approved collection (museum or university), and all fieldwork and reports should meet the minimum standards for palaeontological impact studies developed by SAHRA.

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PRESENTATION

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INTERNATIONAL VISITS

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