



PHASE 1 HIA REPORT HOUSING DEVELOPMENT, LETHABO PARK, KIMBERLEY, NORTHERN CAPE

PROPOSED NEW TOWNSHIP DEVELOPMENT, LETHABO PARK,
ON THE REMAINDER OF THE FARM ROODEPAN NO.70, ERF 17725, AND ERF 15089,
ROODEPAN KIMBERLEY, SOL PLAATJE LOCAL MUNICIPALITY,
FRANCES BAARD DISTRICT, NORTHERN CAPE

PREPARED FOR:
ENVIROAFRICA

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31 MAY 2019

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For this project, Mr Engelbrecht was responsible for the field survey of the development footprint, identification of heritage resources, and recommendations. Ms Fivaz was responsible for research and report compilation. Desktop research completed by Sky-Lee Fairhurst.

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:
J.A.C. Engelbrecht & H. Fivaz
UBIQUE Heritage Consultants

Date: 2019-05-31

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EXECUTIVE SUMMARY

Technical summary

Project description	
Project name	Housing development, Lethabo Park, Kimberley, Northern Cape.
Description	Proposed housing development of Lethabo Park, on the Remainder of the Farm Roodepan No.70, Erf 17725, and Erf 15089, Roodepan, Kimberley, Sol Plaatjie Local Municipality, Northern Cape Province.
Developer	
Sol Plaatjie Local Municipality	
Consultants	
Environmental	EnviroAfrica cc.
Heritage and archaeological	UBIQUE Heritage Consultants
Paleontological	Banzai Environmental
Property details	
Province	Northern Cape
District municipality	Frances Baard
Local municipality	Sol Plaatjie
Topo-cadastral map	2824DA 1:50 000
Farm name	Remainder of Roodepan No. 70, Erf 17725, and Erf 15089
Closest town	Kimberley
GPS Co-ordinates	28° 39' 13.50" S; 24° 42' 37.70" E
Development footprint size	90 ha

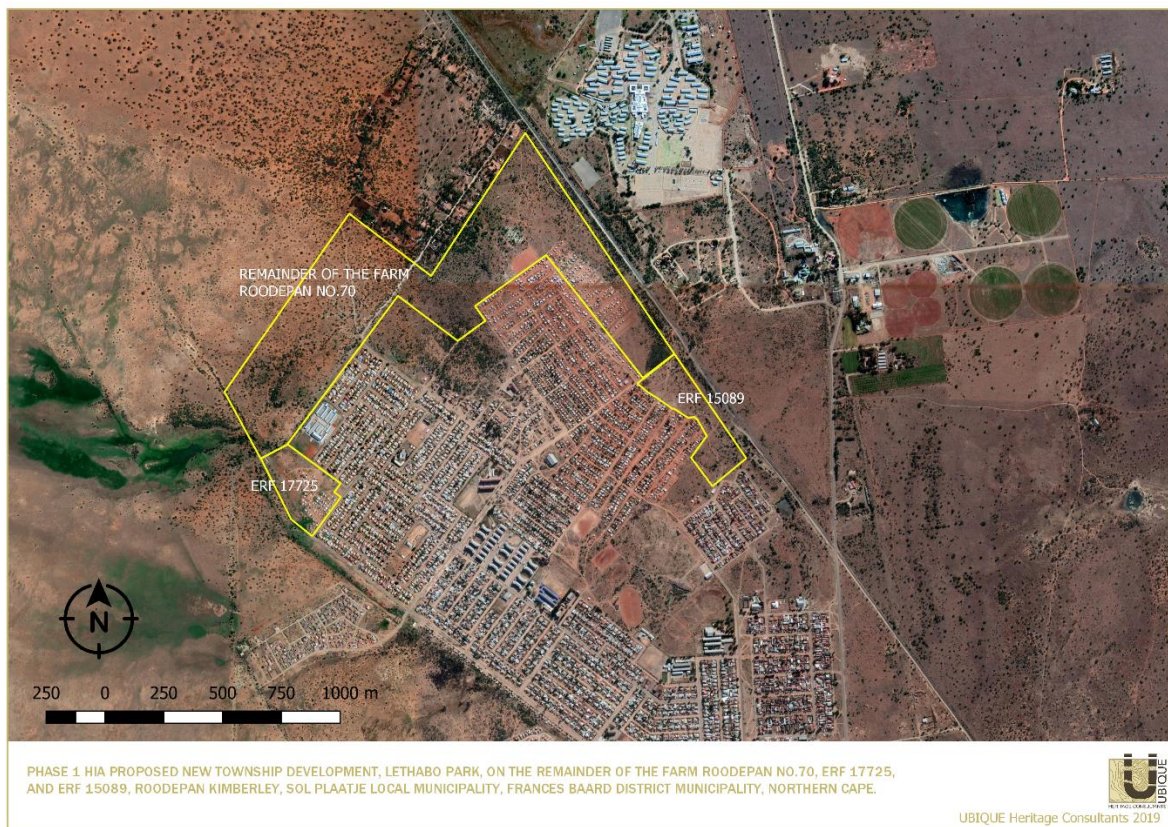


Figure 1 Project footprint, indicated with a yellow outline on Google Earth Satellite Image.

Project description

UBIQUE Heritage Consultants were appointed by EnviroAfrica cc. 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 housing development on Remainder of the Farm Roodepan No.70, Erf 17725, and Erf 15089, Roodepan, Kimberley on any sites, features, or objects of cultural heritage significance. The site is located approximately 10km north, north-west of the CBD of Kimberley, in the Sol Plaatje Local Municipality, Frances Baard District Municipality, Northern Cape.

Findings and Impact on Heritage Resources

Description	Development Impact		Mitigation	Field rating/ Significance
Archaeological and Historical				
1. Only two incidences of low-density surface scatter with Stone Age material of low significance were recorded on the Remainder of the Farm Roodepan No. 70 and Erf 15089.	Nature	Negative	No mitigation required. Resources sufficiently recorded during Phase 1.	Field Rating IV C Low significance
	Extent	Low		
	Duration	High		
	Intensity	High		
	Potential of impact on irreplaceable resource	High		
	Consequence	High		
	Probability of impact	High		
2. No archaeological or historical heritage resources were identified on Erf 17725.	Significance	High		
Graves				
3. No formal or informal graves were identified within the development footprint.	Nature	N/A	No mitigation required.	N/A
	Extent	N/A		
	Duration	N/A		
	Intensity	N/A		
	Potential of impact on irreplaceable resource	N/A		
	Consequence	N/A		
	Probability of impact	N/A		
Significance	N/A			
Paleontological				
4. The area has low palaeontological significance.	Nature	Negative	No mitigation required.	N/A
	Extent	Low		
	Duration	High		
	Intensity	Low		
	Potential of impact on irreplaceable resource	High		
	Consequence	Low		
	Probability of impact	Low		
	Significance	Low		

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. No significant heritage resources were identified. Therefore, no further mitigation is required, and from a heritage point of view, we recommend that the proposed development can continue.
2. Due to the low palaeontological significance of the area, 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 proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. In the event that fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments (Butler 2019).
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 possible discovery of finds such as stone tool scatters, artefacts, human remains, or fossils are made, the operations must be stopped, and the ECO in charge of these developments ought to be alerted immediately. These discoveries ought to be protected (preferably in situ), and the ECO must report to SAHRA so that appropriate mitigation (e.g. recording, collection) can be carried out by a professional archaeologist or 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). UBIQUE Heritage Consultants and its personnel will not be held liable for such oversights or costs incurred as a result of such oversights.

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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

**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

Archaeological:	material remains, resulting from human activity, which is in a state of disuse and is in or on land and is older than 100 years, including artefacts, human and hominid remains and artificial features and structures; <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.
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). The 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 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 the 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; <ul style="list-style-type: none"> – 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 proposed housing development on Remainder of the Farm Roodepan No.70, Erf 17725, and Erf 15089, Roodepan, Kimberley, Sol Plaatjie Local Municipality, Frances Baard District Municipality, Northern Cape Province. It includes activities listed in terms of the NEMA EIA Regulations 2014, and UBIQUE Heritage Consultants were appointed by EnviroAfrica cc 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 aim of the assessment is 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 both 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 are determined using 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 concerning any number of these aspects. Cultural significance is site-specific and relates to the content and context of the site.

Although 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, 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 as to 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.

Also, 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:

- co-ordinate 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 development:**

- 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 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.

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 is 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) applies 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 co-operation 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 site of the proposed development. The desktop study entails the scoping and scanning of historical texts/records as well as previous heritage studies and research around the study area.

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

3.1.1 Literature review

A survey of the literature was undertaken to obtain background information regarding the area. 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 sites of archaeological, historical or cultural interest, was completed.

UBIQUE Heritage Consultants inspected the proposed development and surrounding areas on the 6th, 7th, and 8th of May 2019 and completed a controlled-exclusive, pre-planned, pedestrian survey. We conducted an inspection of the surface of the ground, wherever the surface was visible. The archaeological survey was done with no substantial attempt to clear brush, sand, deadfall, leaves or other material that may cover the surface and with no attempt 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), and Android Locus Maps application on Samsung Galaxy S9.

3.2.2 Recording significant areas

GPS points of identified significant areas were recorded with a handheld Garmin global positioning unit (Garmin eTrex 10) and Android Locus Maps application on Samsung Galaxy S9. Photographs were taken with a Samsung Galaxy S9. Detailed field notes were taken to describe observations. The layout of the area and plotted by GPS points, tracks and coordinates, were transferred to Google Earth and QGIS and maps were created.

3.2.3 Determining significance

Levels of the 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 as less important due to several factors, such as date and frequency. Likewise, any important object found out of context.
- High Any site, structure or feature regarded as important because of its age or uniqueness. Graves are always categorised as of high importance. Likewise, any principal object found within a specific context.

Heritage significance:

- Grade I 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 significance should be managed as part of the national estate
- ii. Provincial Grade II significance should be managed as part of the provincial estate
- iii. Local Grade IIIA should be included in the heritage register and not be mitigated (high significance)
- iv. Local Grade IIIB should be included in the heritage register and may be mitigated (high/ medium significance)

- | | | |
|------|-----------------------------|--|
| v. | General protection A (IV A) | 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 unique association with a particular community or cultural group for social, cultural or spiritual reasons;
- h. its strong or unique 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 adverse 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.
Potential for impact on irreplaceable resources	Low	No irreplaceable resources will be impacted.
	Medium	Resources that will be impacted can be replaced, with effort.
	High	There is no potential for replacing a particularly 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.

Criteria	Rating Scales	Notes
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 were 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 and cumulative impacts that the development of the proposed project 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 responsibly managing the documented heritage resources, and to protect, preserve, and develop 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 EnviroAfrica cc. 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 housing development on Remainder of the Farm Roodepan No.70, Erf 17725, and Erf 15089, Roodepan, Kimberley, on any sites, features, or objects of cultural heritage significance. The site is located approximately 10km north, north-west of the CBD of Kimberley, in the Sol Plaatje Local Municipality, Frances Baard District Municipality, Northern Cape.

The proposed project involves the development a new township development, consisting of low- and middle-income housing, at Lethabo Park (Ivory Park Extension), with associated infrastructure such as roads, and water, stormwater, effluent and electricity reticulation. Approximately 2000 low-income erven with an average size of 300m²; approximately 100 middle-income erven of 500-600m² in size and CRU (Community Residential Units) units (number and size yet to be determined). The total area to be developed measures 90 ha.

4.1 Technical information

Project description	
Project name	Housing development, Lethabo Park, Kimberley, Northern Cape.
Description	Proposed housing development of Lethabo Park, on the Remainder of the Farm Roodepan No.70, Erf 17725, and Erf 15089, Roodepan, Kimberley, Sol Plaatjie Local Municipality, Northern Cape Province.
Developer	
Sol Plaatjie Local Municipality	
Development type	Civil: Township and Housing Development
Landowner	
Consultants	
Environmental	EnviroAfrica cc.
Heritage and archaeological	UBIQUE Heritage Consultants
Paleontological	Banzai Environmental
Property details	
Province	Northern Cape
District municipality	Frances Baard
Local municipality	Sol Plaatjie
Topo-cadastral map	2824DA 1:50 000
Farm name	<ul style="list-style-type: none"> • The Remainder of the Farm Roodepan No. 70 (approx. 75 ha); • Erf 17725, Kimberley (approx. 7 ha); • Erf 15089, Kimberley (approx. 8 ha).
Closest town	Kimberley
GPS Co-ordinates	28° 39' 13.50" S; 24° 42' 37.70" E
Property size	90 ha
Development footprint size	90 ha

Land use	
Previous	Unknown
Current	None, except for a few existing informal houses. .Agricultural activities to the north and northeast of the footprint.
Rezoning required	Yes
Sub-division of land	Yes
Development criteria in terms of Section 38(1) NHRA	
	Yes/No
Construction of a road, wall, power line, pipeline, canal or other linear form 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.	Yes
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 .	Yes
Any other development category, public open space, squares, parks, recreation grounds.	Yes

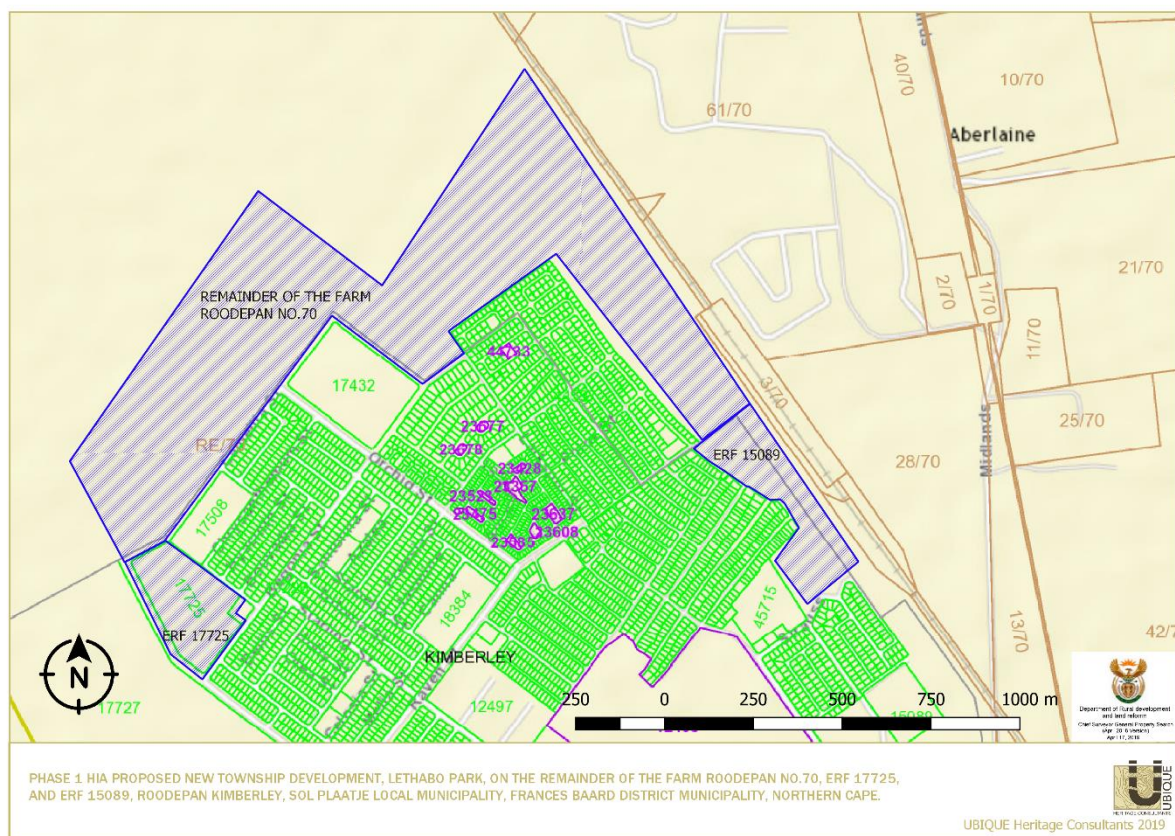


Figure 2 Project footprint, represented by a blue polygon, indicated on Chief Surveyor-General Property Search ArcGIS Web Map.

(<https://csg.esrisouthafrica.com/portal/apps/webappviewer/index.html?id=34ec3dcf8d8642bb9ed7f795cbfe8faf#>)

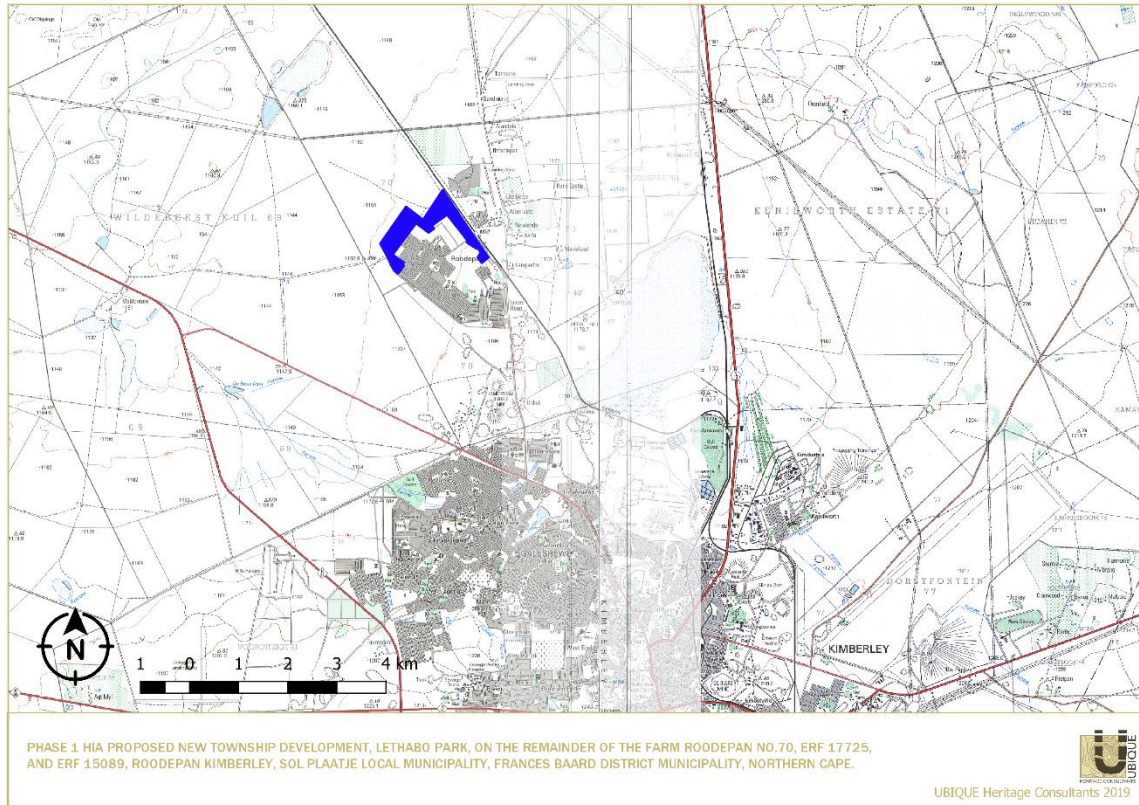


Figure 3 Locality of proposed low-cost housing development on the Remainder of the Farm Roodepan No.70, Erf 17725, and Erf 15089, Kimberley. 1:50 000 Topo-cadastral map 2824DA and 2824DB, Chief Surveyor General.

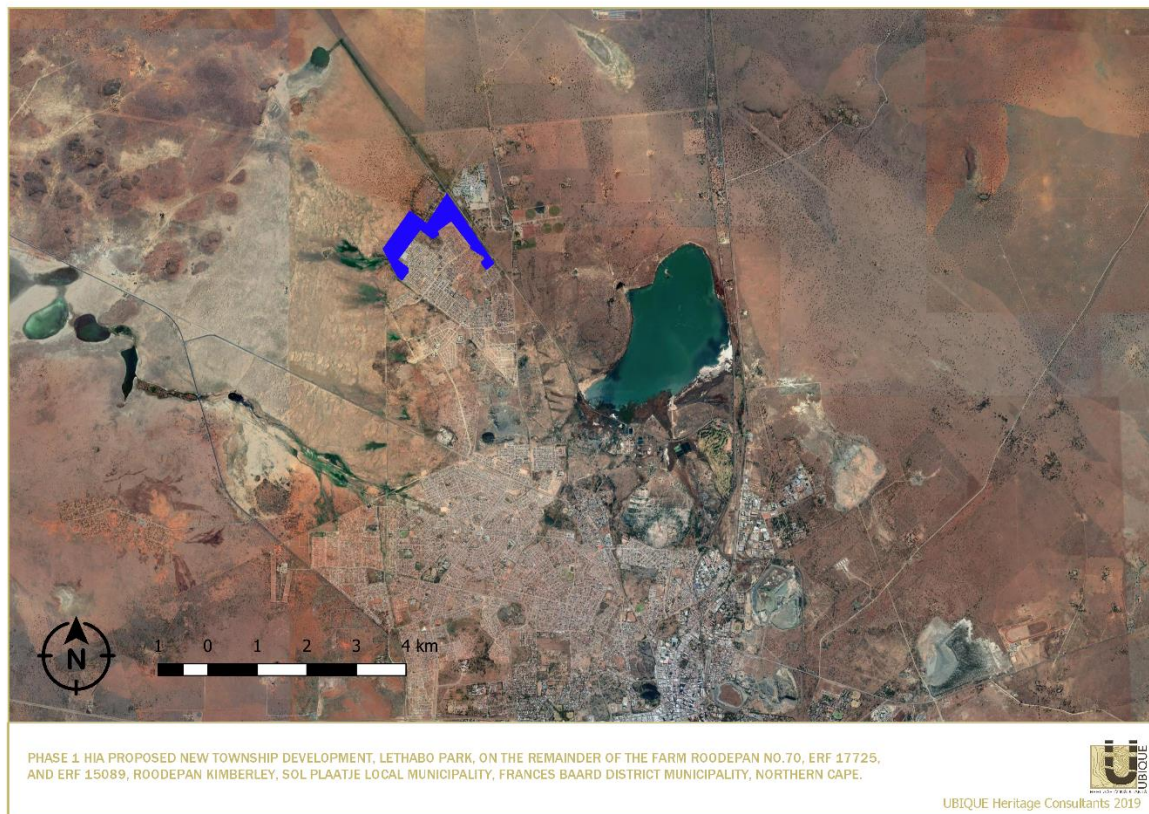


Figure 4 Locality of proposed low-cost housing development on the Remainder of the Farm Roodepan No.70, Erf 17725, and Erf 15089, Kimberley. Google Earth Satellite image.

4.2 Description of the affected environment

The Sol Plaatjie Local Municipality lies within the Savanna Biome (Mucina & Rutherford 2006), and the vegetation type in the study area is typical Kimberley Thornveld, with Vaalbos Rocky Shrubland towards the south and west of the study area. The area is characterised with slight irregular, undulating sandy plains with intermittent grass layers, as well as a well-developed tree layer with *Acacia erioloba*, *A. tortilis*, *A. karroo* and *Boscia albitrunca* and a well-developed shrub layer with occasional dense stands of *Tarchonanthus camphoratus* and *A. mellifera* (Mucina & Rutherford 2006).

The development footprint is adjacent to an existing residential settlement on Farm Roodepan No. 70. Anthropogenic disturbances predominantly occur closer to the residential area, with less disturbance visible north of the settlement. Disruptions were mainly caused by construction machinery, railway works, house building, sewage overflow, refuse dumping and agricultural activities. Informal houses have been erected to the east and west of the footprint. No prominent waterways are present on the footprint, except for wet over-saturated areas formed by effluent overflow and leaks at certain places. The study area is bounded to the east by the railway line, to the north and west by open veld, and to the south with the existing settlement. Access to the site was gained from Midway road to the south and the railway service road to the east.







Figure 5. Views of the affected development area.

5. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

5.1 Region

The Northern Cape is rich in archaeological sites and landscapes that reflect the complex South African heritage from the Stone Age to Colonial history.

5.1.1 Stone Age

The Stone Age is the period in human history when lithic material was mainly used to produce tools (Coertze & Coertze 1996). In South Africa, the Stone Age can be divided into three periods. It is, however, important 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: >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.

Each of the sub-divisions is formed by a group of industries where the assemblages share attributes or common traditions (Lombard et al. 2012). Prominent sites that exemplify these periods in the Nama-Karoo Biome are Rooidam and Bundu Farm (Earlier Stone Age and Middle Stone Age), and Biesje Poort 2, Bokvasmaak 3, Melkboom 1, Vlermuisgat, and Jagtpan 7 (Later Stone Age) (Lombard et al. 2012).

Within the region, Stone Age sites and complexes have been, and are still being investigated in some detail. Areas like the landscape near Kathu, where numerous Stone Age sites have been documented and excavated. These represent the longest preserved lithostratigraphic and archaeological sequence of human occupation at the pan through the ESA, MSA, and LSA and with evidence for 500 000-year-old hafted stone points; ancient specularite working (and mining) on the eastern side of Postmasburg, Doornfontein; and associated Ceramic Later Stone Age material, and also the older transitional ESA/MSA Fauresmith sites at Lyly Feld, Demaneng, Mashwening, King, Rust & Vrede, Paling, Gloucester and Mount Huxley (Beaumont 2004; Beaumont 2013; Beaumont & Morris 1990; Beaumont & Vogel 2006; Morris 2005; Morris & Beaumont 2004; Porat et al. 2010; Thackeray et al. 1983; Walker et al. 2014; Wilkins et al. 2012).

Beaumont et al. (1995) commented that thousands of square kilometres of Bushmanland are covered by low-density lithic scatters. It is therefore not surprising that Stone Age sites and lithic scatters were identified by CRM practitioners between the Garona substation and the Gariep/Orange River in numerous surveys conducted during the recent years. Scatters of MSA material have been recorded close to Griekwastad, Hotazel, Postmasburg and Kenhardt, Pofadder, Marydale, and in the Upington district (Dreyer 2006, 2012, 2014; Pelsler & Lombard 2013; PGS Heritage 2009, 2010; Webley 2013). MSA and LSA tools, as well as rock engravings, were also found at Putsonderwater, Beeshoek and Bruce (Morris 2005; Snyman 2000; Van Vollenhoven 2012b; Van Vollenhoven 2014).

Archaeological surveys have shown rocky outcrops and hills, drainage lines, riverbanks and confluences to be prime localities for archaeological finds and specifically Stone Age sites since these areas were utilised for base camps close to water and hunting ranges. If any such features occur in the study area, Stone Age manifestations can be anticipated (Lombard 2011).

5.1.2 Historical period

The historical period within the region coincides with the incursion of white traders, hunters, explorers, and missionaries into the interior of South Africa. Buildings and structures associated with the early missionaries, travellers, and traders' arrival during the 19th century, and the settlement of the first white farmers and towns, are still evident in the Northern Cape. Early colonists include PJ Truter's and William Somerville (arriving in 1801), Donovan, Burchell and Campbell, James Read (arriving around 1870) William Sanderson, John Ryan and John Ludwig's (De Jong 2010; Snyman 2000) Numerous heritage reports that provide a synthesis of the incursions of travellers, missionaries and the early European settlers have been captured on the SAHRIS database.

San hunter-gatherer groups 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 their separate areas (Penn 2005).

According to Breutz (1953, 1954), and Van Warmelo (1935), several Batswana tribes, including the different Thlaping and Thlaro sections as well as other smaller groups, take their 18th and 19th century roots back to the area around Groblershoop, Olifantshoek, the Langeberg (Majeng) and Korannaberg ranges in the western part of the region. After Britain annexed Bechuanaland in 1885, the land of the indigenous inhabitants was limited to a few reserves. In 1895, when British Bechuanaland was incorporated into the Cape Colony, the land inside the reserves remained the property of the Tswana and could only be alienated with the consent of the British Secretary of State.

Because of its distance from the Cape Colony, this arid part of South Africa's interior was generally not colonised until relatively recent. According to history, the remote northern reaches of the Cape Colony were home to cattle rushers, gun-runners, river pirates and various manner of outlaws. Distribution of land to colonial farmers only occurred from the 1880s onwards when Government-owned land was surveyed, divided into farms, and transferred to farmers. More permanent large-scale settlement however only started in the late 1920s, and the first farmsteads were possibly built during this period. The region remained sparsely populated until the advent of the 20th century (De Jong 2010, Penn 2005).

The region has been the backdrop to various incidents of conflict. The arrival of large numbers of Great Trek Boers from the Cape Colony to the borders of Bechuanaland and Griqualand West in 1836 caused friction with many Tswana groups and the missionaries of the London Mission Society. The conflict between Boer and Tswana communities escalated in the 1860s and 1870s

when the Korana and Griqua communities and the British government became involved. The Northern Cape was critical in the South African War (Anglo-Boer War) (1899-1902), and significant battles took place within 120 km of Kimberley, including the battle of Magersfontein. Boer guerrilla forces roamed the entire Northern Cape region and skirmishes between Boer and Brits were regular occurrences. Furthermore, many graves in the region tell the story of battles fought during the 1914 Rebellion (Hopkins 1978).

5.2 Local

Many Stone Age sites and lithic assemblages, rock engraving sites, significant palaeontological areas and glacial pavements have been recorded near Kimberley and in the broader vicinity of the Northern Cape. Historical sites and structural remnants dating back to the Kimberley Diamond Rush of the 1870s and the Anglo Boer War have also been documented (Becker 2012; Rossouw 2018). The early diamond diggers' exploitation of the Vaal River Gravels, as well as the resulting development of infrastructure in the Kimberley region, has exposed a wide variety of archaeological sites (Rossouw 2018). The archaeological record of this region reflects the long span of human prehistory from the Early Stone Age (ESA), Middle Stone Age (MSA) and Later Stone Age (LSA). The last 2000 years was a period of increased social complexity, along with the appearance of farming and foraging, and ceramic and metallurgical technologies together with an older trajectory of stone tool making (Morris 2006; 2008). Various heritage managers and archaeologists have conducted numerous HIA, and AIA reports in and around the Kimberley area. These reports include, but are not limited to, studies involving the development and construction of 132kV Powerlines, Photovoltaic (PV) Power Plants, and Carodex Solar Parks (Fourie 2012; 2013; Hutten 2013; Morris 2010; 2011; 2014; 2018); the development of new lattice telecommunications (Rossouw 2018); development of a proposed clay quarry at Roodepan 7 (Morris 2006) as well as other studies for prospecting (Coetzee 2017; Matenga 2017; Morris 2008) and mining rights applications (Dreyer 2005; Matenga 2017).

5.2.1 Stone Age

Some of the reports revealed that the scatters of stone implements are widely distributed and do not generally appear to be concentrated in any specific locations. According to Rossouw (2018), Stone Age sites in and around the Kimberley region are usually associated with, and mostly restricted to a variety of lacustrine contexts as well as the alluvial gravel terraces of the Vaal River. Scatters of stone artefacts in and around the areas under study have been documented and recorded by, but not limited to: Beaumont (2005; 2007), Dreyer (2005); Fourie (2011; 2012; 2013), Morris (2006; 2008; 2010; 2011; 2014; 2015; 2018); Rossouw (2018); and Van Ryneveld (2005; 2007). Lithic surface scatters are predominantly of low significance, as they are often without archaeological context.

Rossouw (2018) listed a variety of previously recorded finds in an approximate 40-60km radius of Kimberley in his Heritage Impact Assessments. Between 1930 and 1955 ESA and MSA stone tools were uncovered during mining operations at Pniel (Power Site) near Nooitgedacht. There is an extraordinary amount of Fauresmith and Acheulian artefact assemblages found at Nooitgedacht near The Bend on the Vaal in an andesite cobble and worn exotics matrix capped by a thick layer of red sand. An abundance of Acheulian artefact assemblages is situated in thick calcrete deposits

at Doornlaagte (a declared national monument), some 20km east of Schmidtsdrif. A large number of Fauresmith bifaces have been recorded *in situ* within the Quaternary-age surface deposits at Kromrand, 22km southwest of Boshof. A considerable amount of ESA stone tools and MSA lithics have also been recorded and recovered from the underlying bedrock and within the layer of red sands overlying the terrain at Canteen Kopje (Canteen Koppie). Canteen Koppie is the location of the first alluvial diamond diggings in South Africa (Rossouw 2018). According to Miller (2017), early human presence is visible in the region at Taung to the north, but there are no major ESA sites present around Kimberley itself. Beaumont (2007) does, however, note that various ESA artefacts may be found at numerous locations along the Vaal River. Unfortunately, it is very seldom that there are stratified deposits that could assist in adding to dated data.

Morris (2006) observed a very sparse distribution of stone artefacts (hornfels), in a section at the side of the existing quarry of Roodepan 7. Roodepan 7 is approximately 4-5km southeast from the areas under study (the remainder of the Farm Roodepan No. 70; Erf 17725, Kimberley; Erf 15089, Kimberley). The lithic assemblages mainly comprised of MSA and Fauresmith, as well as LSA artefacts which included a freshly patinated end scraper. During Fourie's (2012) survey of Droogfontein (about 28km northeast from Roodepan along the N12 road), four archaeological sites were noted. Classified as 'find spots', these Stone Age sites contained scatters of stone implements such as a broken blade, utilised flakes, and a core, in the quarries. Morris (2014) noted several LSA sites, specifically on the farm Benfontein (Alexandersfontein) as well as on Wag'nbiokiespan. Several assemblages that can be associated with the Pleistocene, Earlier and Middle Stone Age, including the Fauresmith industry are known to occur in the area. Morris (2014) states that these commonly occur within and at the base of the red Hutton Sands overlying calcrete or dolerite. Predominantly low-density occurrences have been documented. However, there have been some recorded occurrences of higher density and significance, on the fringes of the Alexandersfontein Pan (Morris 2014).

Furthermore, MSA/LSA surface scatters were recorded at Platfontein (southwest of Roodepan and northwest of Kimberley) (Van Ryneveld 2007), Paardeberg 154 (Van Ryneveld 2005), and on the Farm Slypklip North 32 (Dreyer 2005). Lithics were predominantly knapped from quartzite or dolerite. Van Ryneveld (2007) found lithics hewn from shale, a rarely used primary raw material, and remarked that the dolerite assemblage recorded in Area C, Platfontein, gives the impression of a factory-related site. On the farm, Slypklip North 32, (about 45km north of Kimberley) Dreyer (2005) recorded a circular stone structure; unfortunately, its origin and context unknown, and the area near/surrounding the structure did not produce any associated cultural material (Dreyer 2005).

Finally, Beaumont (2005) recorded thin scatters of LSA artefacts, such as thumbnail scrapers, on the surface of the andesite outcrops, on the Farm Zoutpansfontein No. 34 (3km north of Kimberley). Stone tools associated with the Wilton Lithic Industry was discovered in the gullies, and some implements attributed to the MSA was unearthened. Beaumont (2005) carefully examined what he believed to be possible younger gravel vestiges. These possible younger gravel vestiges yielded a few courser flakes and one cleaver, which can be attributed to the Acheulean (Beaumont 2005).

Rock art sites in the vicinity of Kimberley occur on rocky outcrops such as at Wildebeest Kuil as well as various Fauresmith localities, such as Roseberry Plain 1 on the Samaria road (Beaumont

2007; Morris 2006). The rock art engravings at Wildebeest Kuil rock art site are estimated to be 1000 to 2000 years old (Becker 2012). The National Monument Nooitgedacht Rock Art Site situated on the farm Nooitgedacht, adjacent to the farm Droogfontein. This site contains three sections of glaciated pavement with over 250 Khoe and San rock engravings (Fourie 2011; 2012; 2013). Rock engravings and surface scatters of stone tools have also been identified at sites such as Tafelkop (about 20km northeast of Kimberley) and Olifantsfontein/Suzanna (approximately 21km southeast of Kimberley) (Morris 2014).

5.2.2 Historical period

The town of Kimberley was initially a small digger settlement called New Rush situated on the farm Vooruitzicht. The government secretary, John Blades Currey, renamed the burgeoning town after Lord Kimberley, who as a member of Gladstone's first cabinet served as Secretary for the Colonies from 1870. His appointment coincided with the discovery of diamonds in the area, and he became a prominent figure in the dispute over the ownership of Griqualand West, and the negotiations for its annexation as British territory. The new name was proclaimed on 5 July 1873.

In the Kimberley region, several alluvial diamond diggings had taken place. However, it appears that Canteen Koppie, approximately 30-33km northeast of Roodepan, was one of the first. Mining activity started at Canteen Koppie in 1869 and continued until 1927 (Coetzee 2017). In 1871 miners from the Old De Beers mines discovered, on the farm of Johannes Nicholas De Beer, what would become the most productive diamond mine in the world, the Kimberley Mine (Matenga 2017; Rossouw 2018). According to Matenga (2017), mining activity radically increased within the first twelve months, which in turn attracted a labour population of approximately 50 000 men. Competing claims for the diamond fields, from the various South African governments existing at the time, lead to an increase in political stakes. For more than a decade many operators staked claims for the valuable mineral in "cut-throat competition" until the historic amalgamation in March 1888 took place between Cecil Rhodes's De Beers Mine and Barney Barnato's Kimberley Central Mining Company which in turn created the De Beers Consolidated Mines Ltd (Coetzee 2017; Matenga 2017). All the smaller diggings were eventually absorbed by the amalgamated company (Coetzee 2017).

During the South African war, also known as the Anglo Boer War, the Boers laid siege on Kimberley from 14 October 1899 to 15 February 1900 (Matenga 2017; Fourie 2013). British general Methuen successfully fought the Boers at Graspan, Modder River and Belmont in November 1899. Nevertheless, in December 1899, the Boers defeated the British forces at Magersfontein, approximately 25km southwest of Kimberley (Matenga 2017; Rossouw 2018). This defeat became known as Britain's 'Black Week' (Matenga 2017). Furthermore, during the four-month siege at Kimberley, the Boers placed the town on a complete lockdown until it was relieved by General French on the 15th of February 1900. The Boer forces constructed numerous redoubts and encampments around the townscape to control access in and out of the town (Fourie 2013).

It is interesting to note that the South African railway system is one of the largest in the African continent and dates back to the 1860s. During 1867, with the discovery of diamonds in Kimberley and surrounds, plans to extend the Cape Town to Wellington line was undertaken when the need for faster transport to and from the diamond fields became a necessity (Gibbs 2015: 3). Financed

primarily by British loans, the Cape Government Railways' (CGR) railway network aimed to connect prime agricultural, industrial and commercial centres in the Colony, which in turn, determined the trajectory of the rail routes towards the diamond fields (Gibbs 2015: 3). The railway reached Beaufort West in 1880, De Aar in 1884 where it connected with the branch line from Port Elizabeth, and finally in 1885, Kimberley (De Jong et al. 1988: 32; Nock 1971: 20; Williams 1921: 423). Evidence of historical railway structures has been documented at Heuningskloof, Graspan, Belmont and Witput. According to Becker (2012), various incidents related to the Anglo Boer War can be linked to railway infrastructure along the historic rail line.

Other historic technological advances include a tramway that connected Kimberley with Beaconsfield, in 1882, the first electric lights in South Africa illuminated the streets of Kimberley (Coetzee 2017). For an in-depth timeline of the Kimberley area and the discovery of diamonds as well as a brief history of central historical figures during this period such as Cecil John Rhodes, see Gaigher (2014: 21-31).

Several heritage resources associated with mining and military activities have been recorded around the Kimberley area, as well as sites attributed to early town development (Beaumont 2007, Fourie 2012, Hutton 2013, Matenga 2017, Morris 2014, Morris & Kaplan 2001, Rossouw 2018, Van Ryneveld 2005).

The remains of a Historic Mining Village, older than 100 years and related to mining activities at Theron's Diamond Mine, were identified as Site RDP01 on Portion 1, Roode Pan 146 (Van Ryneveld 2005). The history of the small settlement is potentially significant, not only with regards to the history of Theron's Diamond Mine but also the earlier diamond mining period in South Africa. A total of three houses were recorded (Van Ryneveld 2005). The architectural remains consisted of clay brick ruins and calcrete mixed floor slabs and were surrounded by historic metal, glass and decorated porcelain. Some of the other features include a possible Burial area (identified cacti often found at old burial places); a 3x3m dam; three circular 'rondavel' (hut) calcrete mixed floor slabs; as well as a rectangular feature (approximately 17x12m) of stone and calcrete mixed cement foundations, and a 2x2m well (Van Ryneveld 2005). Matenga's (2017) investigation of Portion 1 Farm Vooruitzicht 81, found several significant heritage sites worth preserving. These include two middens yielding mixed industrial and household waste; the foundation of buildings that could date to the first mining phase; broken components of mine plant/processing machine; and part of the relict ramp and concrete floor at the bottom connected to the mineral screening process during the second mining phase. Rossouw (2018) documented artefacts dating between the 19th and 20th centuries at a refuse midden attributed to historical mining camps located east of Wesselton mine.

At the dolerite hillside overlooking Kimberley on the south side of the property, Farm Eureka 200 (approximately 27km south of Roodepan), Beaumont (2007) recorded quite a few man-moved and stacked boulders, with old bully-beef tin and an Anglo Boer War-age bullet. He believes that these represent Boer positions during the Siege of Kimberley. Furthermore, Beaumont (2007) found a modest concentration of ca. century-old porcelain and glass pieces close to an old railway track. Faceted dolerite debitage, located on the site, suggest that stones were dressed here and utilised in the construction of culverts along the rail line (Beaumont 2007).

On the farm Karreeboom 1716, East of Kimberley, Morris (2014) identified what he believes to be the OFS Custom House. A limestone-walled feature, a possible small kraal, clear rectangular building foundations, most likely representing the actual custom post, as well as middens. Some of the debris found at and near the OFS Custom House includes a nail, window glass, bottle glass and part of a mouth organ (Morris 2014). Morris & Kaplan (2001) identified a century-old historic municipal midden at the location of a proposed borrow pit, in the vicinity of the Kimberley Golf Course, Kamfersdam. Cultural material such as glass, porcelain, earthenware, metal items and well-preserved faunal remains were recorded. Small finds like buttons, glass beads, a toy lead soldier, a white clay bisque-fired bonnet-doll, a brass medallion, part of a cup from the Grand Hotel, a pipe bowl, carbon rods, as well as parts of a leather shoe, different portions of “Codd” mineral water bottles, and horseshoes were mentioned by Morris & Kaplan (2001).

During Civil services provisions for 982 Erven in Diamond Park, Greenpoint, Kimberley, graves were inadvertently disturbed. It is likely that these graves are more than 100 years old. The graves appear to be very shallow (about half a meter), with no clear evidence of coffins or grave goods. Morris (2014) notes that there is a possibility that these graves may be the “missing” Bultfontein Cemetery (known to have existed between 1898-1906) which has been “missing” for 108+ years, but this remains unconfirmed.

In and around the Kimberley area are numerous monuments and declared heritage sites. These include sites of decisive battles relating to the Anglo Boer war, such as Siege of Kimberley in 1899 with the famous “Long Cecil” cannon on display, as well as the battlefield site of Magersfontein which became a field museum and monument in 1971 (Matenga 2017; <https://www.sahistory.org.za/places/kimberley>). Located in the centre of the city is a footprint of a kimberlite pipe excavation from the 19th century, known as The Big Hole. This site has been preserved as a National Monument and is believed to epitomise the diamond “rush”, as well as the lasting impact of minerals in the history of South Africa (Matenga 2017). Approximately 185 buildings have been declared as Heritage Register and Provincial Heritage sites (National Monuments) in the Kimberley area. Archaeological sites such as Canteen Koppie was declared a National Monument in 1948 (Coetzee 2017; Rossouw 2018), while Doornlaagte 97 in the Kimberley District which was declared a Provincial Heritage site in 1965. Other Provincial Heritage sites include the Glacial pavements at Nooitgedacht, the Grave of Solomon T Plaatje located in the West End Cemetery, Kimberley, while the Belgravia Conservation Area and the Carrington Road Conservation Area are designated Heritage Areas, and the Cape Police Memorial on Lodge Road is noted on the Heritage Register (<https://sahris.sahra.org.za/declaredsites>).

5.2.3 Oral history

No interviews with locals were conducted regarding the history of the area.

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 footprint provided by the client. The site was approached from the northeast and surveyed in transects of approximately 30m. Developed areas were only scoped due to disturbances.

6.2 Identified heritage resources

Description		Period	Location	Field rating/ Significance	
Stone Age					
1.	Type lithic/s	Flakes and possible upper grinder	ESA?/ LSA	28° 39'27.36" S 24° 43'24.97" E	Field Rating IV C
	Raw material	Dolerite			
	N in m ² .	4 per 200 m ²			
	Context	Surface scatter, no context			
	Additional	Located on Erf 15089. Possible track ballast from the railway line.			Low significance
2.	Type lithic/s	Flakes, chips and scraper debris	MSA	28° 39'22.81" S 24° 42'26.84" E	Field Rating IV C
	Raw material	BIS and dolerite			
	N in m ² .	5 per 500 m ²			
	Context	Surface scatter, no context.			
	Additional	Located on the western section of the Remainder of Farm Roodepan No 70.			Low significance
Historical					
	Type of feature	Surface scatter	1850-1880s	28° 38'58.90" S 24° 42'25.70" E	Field Rating IV C
	Material	Tin can with folded/ crimped hand-soldered seam			
	N in m ² .	1 per 1000 m ²			
	Context	None.			
	Additional	Located outside development footprint, to the north of the Remainder of Farm Roodepan No. 70.			Low significance
Graves					
	Grave markers	N/A			N/A
	Inscription	N/A			
	Orientation	N/A			
	Additional	None within the development footprint.			

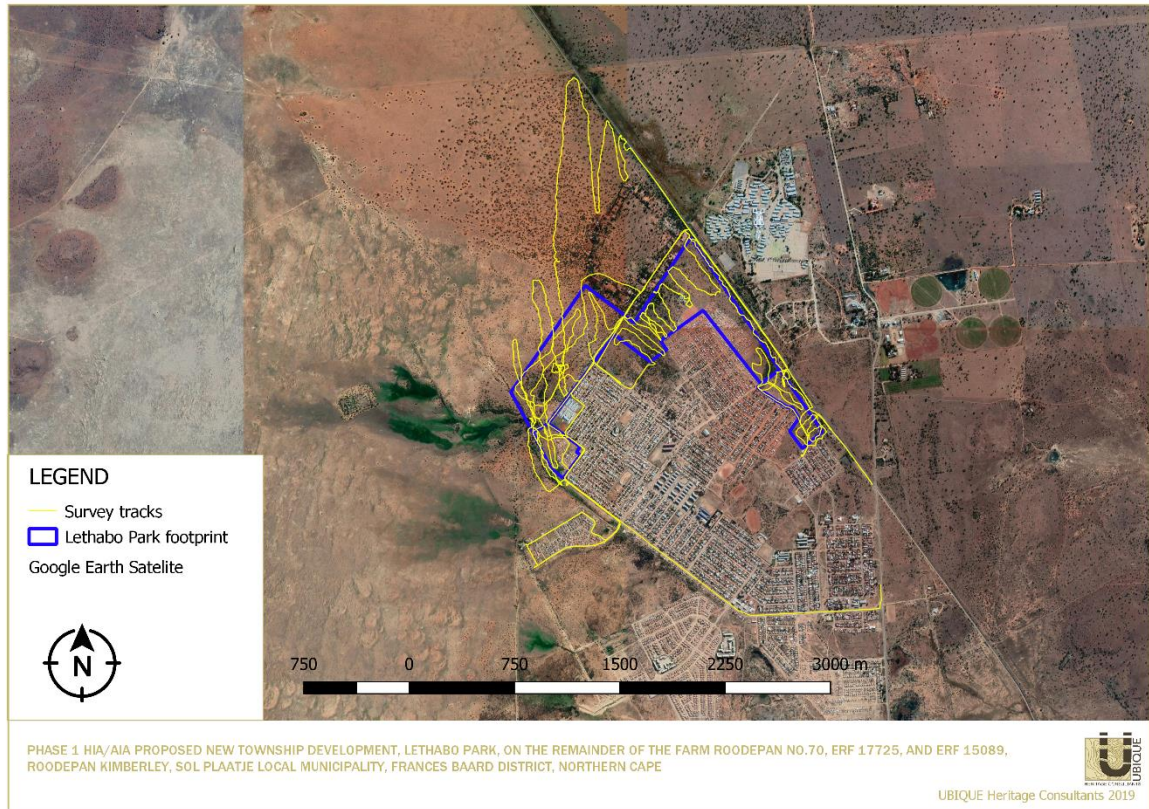


Figure 6 Google Earth image showing survey track for a housing development project, Lethabo Park, Kimberley.

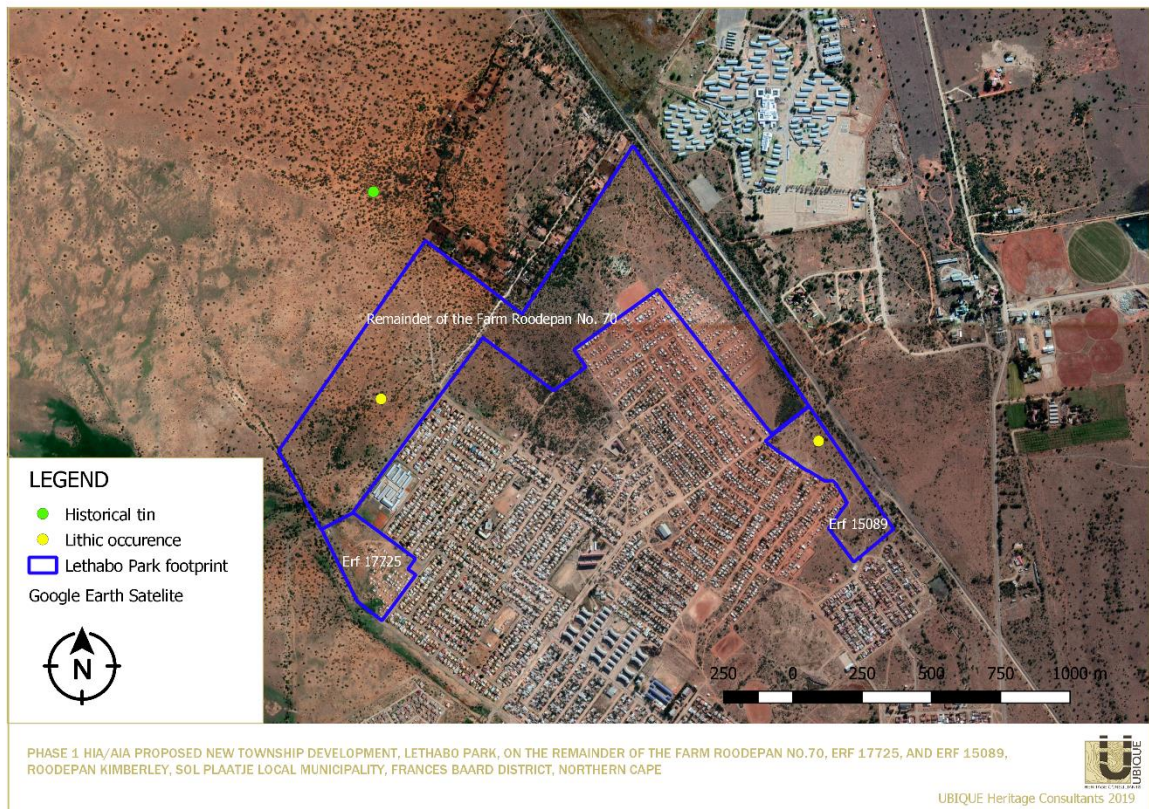


Figure 7 Recorded heritage within, and adjacent study area.

6.3 Discussion

6.3.1 Archaeological features

6.3.1.1 Stone Age finds

Two occurrences of stone age archaeological material were found within the development footprint. In the northeast section of Erf 15089, four lithics were recorded, which include flakes and upper grindstone. The large fragmented flakes with sharp edges could be the result of stone crushed for the track ballast of the rail line. Research has shown that some of the debitage produced by heavy-duty earth moving machines can mimic characteristics of lithics produced by knapping activity (Van der Walt & Bradfield 2018). The lithics are without archaeological context, and the proximity of this material to the railway line and railway equipment does substantiate this probability.

In the north-western section of Remainder of the Farm Roodepan No. 70, a low-density surface scatter of lithics that include MSA/Early LSA scraper and flakes and chips were recorded. The identified archaeological materials are of low significance, as the archaeological sample is small and without context, and therefore of little scientific value.

These Stone Age heritage finds are given a 'General' Protection C (Field Rating IV C). This means these sites have been sufficiently recorded (in the Phase 1). It requires no further action.



Figure 8 Lithic occurrence on Erf 15089, with flakes and upper grindstone.



Figure 9 Lithic occurrence on the Remainder of the Farm Roodepan No. 70. Scraper, and flakes.

6.3.1.2 Historical Finds

No historical period artefacts were identified within the boundaries of the study area. A tin can with folded/ crimped hand soldered seam (dated 1850-1880s) were recorded to the north of the Remainder of the Farm Roodepan No. 70, outside the development footprint. The development impact on these resources is, therefore, inconsequential.

These Stone Age heritage finds are given a 'General' Protection C (Field Rating IV C). This means these sites have been sufficiently recorded (in the Phase 1). It requires no further action.



Figure 10 Historical hand-soldered tin recorded outside the development footprint.

6.3.2 Historical features

No significant historical features were identified within the study area.

6.3.3 Graves

No formal or informal graves were identified within the development footprint. The local municipal cemetery is situated towards the south of the existing Lethabo Park settlement and therefore lies well outside the impact zone for this development.



Figure 11 Local municipal cemetery.

6.3.4 Palaeontological resources

The proposed development footprint is entirely underlain by the Lower Permian sediments of the Ecca Group (Prins Albert Formation) of the Karoo Basin. According to the SAHRIS PalaeoMap, the palaeontological sensitivity of the Prince Albert Formation is rated as high.

A site-specific field survey of the development footprint was conducted by Elize Butler (Banzai Environmental (PTY) Ltd, and no visible evidence of fossiliferous outcrops was found. For this reason, an overall **low palaeontological sensitivity** rating has been allocated to the development footprint, and the impact of the development on the Fossil heritage is considered to be low (Butler 2019). For the full Paleontological Impact Assessment, see Appendix 1.

7. 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:

4. No significant heritage resources were identified. Therefore, no further mitigation is required, and from a heritage point of view, we recommend that the proposed development can continue.
5. Due to the low palaeontological significance of the area, 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 proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. In the event that fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments (Butler 2019).
6. 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 possible discovery of finds such as stone tool scatters, artefacts, human remains, or fossils are made, the operations must be stopped, and the ECO in charge of these developments ought to be alerted immediately. These discoveries ought to be protected (preferably in situ), and the ECO must report to SAHRA so that appropriate mitigation (e.g. recording, collection) can be carried out by a professional archaeologist or 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). UBIQUE Heritage Consultants and its personnel will not be held liable for such oversights or costs incurred as a result of such oversights.

8. CONCLUSION

This HIA has identified no significant heritage resources on Remainder of the Farm Roodepan No.70, Erf 17725, and Erf 15089, Roodepan, Kimberley in the Sol Plaatje Local Municipality, Frances Baard District Municipality, Northern Cape, as set out in the report. In the development footprint are no archaeological, historical or cultural sites, or paleontological resources of high significance that will be impacted negatively by the proposed development.

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APPENDIX A

PALAEONTOLOGICAL IMPACT ASSESSMENT OF THE PROPOSED NEW TOWNSHIP DEVELOPMENT, LETHABO PARK, ON REMAINDER OF FARM ROODEPAN NO 70, ERF 17725 AND ERF 15089, ROODEPAN KIMBERLEY, SOL PLAATJIES LOCAL MUNICIPALITY, FRANCES BAARD DISTRICT MUNICIPALITY, NORTHERN CAPE.

**PALAEONTOLOGICAL IMPACT ASSESSMENT OF THE PROPOSED NEW TOWNSHIP
DEVELOPMENT, LETHABO PARK, ON REMAINDER OF FARM ROODEPAN NO 70, ERF 17725
AND ERF 15089, ROODEPAN KIMBERLEY, SOL PLAATJIES LOCAL MUNICIPALITY, FRANCES
BAARD DISTRICT MUNICIPALITY, NORTHERN CAPE.**

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26 May 2019

Prepared by:

BANZAI ENVIRONMENTAL (PTY) LTD

Declaration of Independence

General declaration:

- I, Elize Butler, declare that –
- I act as the independent Palaeontologist 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 is 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 from a heritage practitioner in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realise that a false declaration is an offence 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:



The Palaeontological Impact Assessment report has been compiled, taking into account the NEMA Appendix 6 requirements for specialist reports as indicated in the table below.

Table 1:Nema Requirements

NEMA Regs (2014) - Appendix 6	Relevant section in report
1. (1) A specialist report prepared in terms of these Regulations must contain-	
a) details of- <ul style="list-style-type: none"> i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae; 	Page ii of Report – Contact details and company and Appendix 1
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page ii-iii
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 1 and Section 11
d) the date, duration and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 1 and Section 11
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 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 Section 11
g) an identification of any areas to be avoided, including buffers;	Section 1 and Section 11
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 5
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 or activities;	Section 1 and Section 11
k) any mitigation measures for inclusion in the EMPr;	Section 1 and Section 11

l) any conditions for inclusion in the environmental authorisation;	N/A
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	N/A
n) a reasoned opinion- i. as to whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and 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 11– Conclusion
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Not applicable.
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Not applicable. To date, no comments regarding heritage resources that require input from a specialist have been raised.
q) any other information requested by the competent authority.	Not applicable.
2) Where a government notice <i>gazetted</i> 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.	Refer to section 2 and 3 compliance with SAHRA guidelines

EXECUTIVE SUMMARY

EnviroAfrica CC appointed UBIQUE Heritage Consultants to conduct the Heritage Impact Assessment (HIA) for the proposed Lethabo Park township development, on the remainder of Farm Roodepan no 70, Erf 17725 and Erf 15089, Roodepan Kimberley. Banzai Environmental (Pty) Ltd was in turn appointed to undertake the Palaeontological Impact Assessment (PIA) assessing the palaeontological impact of the proposed development. The National Heritage Resources Act (No 25 of 1999, section 38) (NHRA), states that a Palaeontological Impact Assessment (PIA) is key to detect the presence of fossil material within the planned development footprint. This study is thus necessary to evaluate the effect of the construction on the palaeontological resources.

The proposed Lethabo Park township development footprint is entirely underlain by the Lower Permian sediments of the Ecca Group (Prins Albert Formation) of the Karoo Basin. The development footprint as a whole is a fairly flat-lying terrain with grassy vegetation cover in places as well as a few thorn trees. According to the SAHRIS PalaeoMap, the palaeontological sensitivity of the Prince Albert is rated as high.

A site-specific field survey of the development footprint was conducted on foot and by a motor vehicle on 25th May 2019. No visible evidence of fossiliferous outcrops was found. This area has also been highly disturbed by human activities. For this reason, an overall **low palaeontological sensitivity** is allocated to the development footprint. The scarcity of fossil heritage at the proposed development footprint indicates that the Lethabo township development will be of a **low significance** in palaeontological terms. It is therefore considered that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. Thus, the **construction of the development may be authorised in its whole extent**, as the development footprint is not considered sensitive in terms of palaeontological resources.

In the event that fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations, the **Chance Find Protocol** must be implemented by the ECO in charge of these developments. These discoveries ought to be protected (if possible, *in situ*) 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 correct mitigation (e.g. recording and collection) can be carried out by a palaeontologist.

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

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1 INTRODUCTION

The Sol Plaatje Local Municipality in the Northern Cape proposes the development of the Lethabo Park township development, on the remainder of Farm Roodepan no 70, Erf 17725 and Erf 15089, Roodepan Kimberley (Figure 1-3). This development will comprise of about 2000 low-income erven with an average size of 300m²; nearly 100 middle-income erven of 500-600m² in size and Community Residential Units (size and number still to be established) as well as associated infrastructure such as water, stormwater and roads and effluent and electricity reticulation. The proposed project will be 90 ha in extent.

EnviroAfrica CC was appointed by the Municipality as the independent environmental assessment practitioner (EAP) to undertake the relevant EIA and the Public Participation Process required in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA).

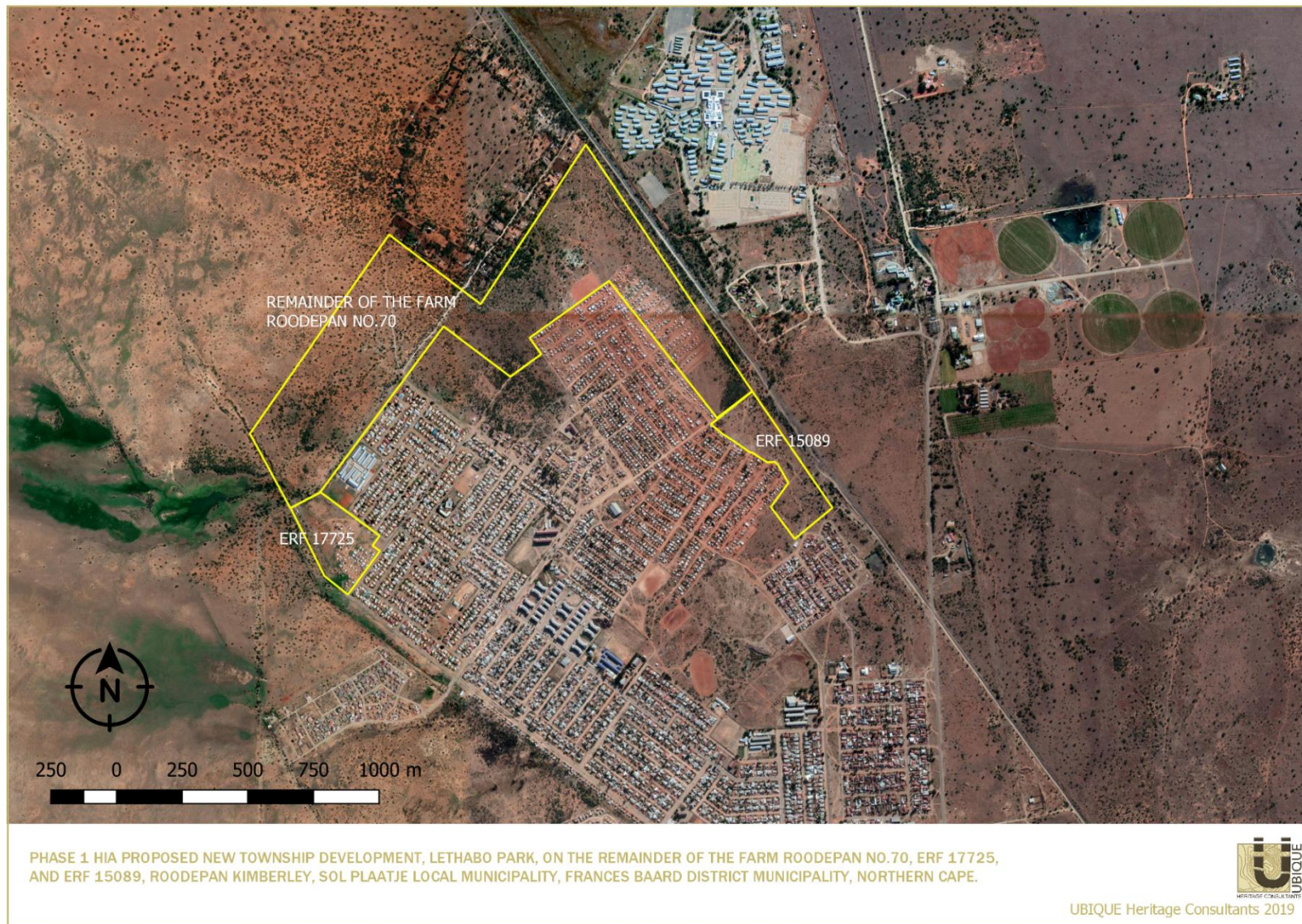


Figure 12: Proposed new township development, Lethabo Park, on the remainder of Farm Roodepan no 70, Erf 17725 and Erf 15089, Roodepan Kimberley, Sol Plaatjies Local Municipality, Frances Baard District Municipality, Northern Cape. Map provided by Ubiqque Heritage Consultants.

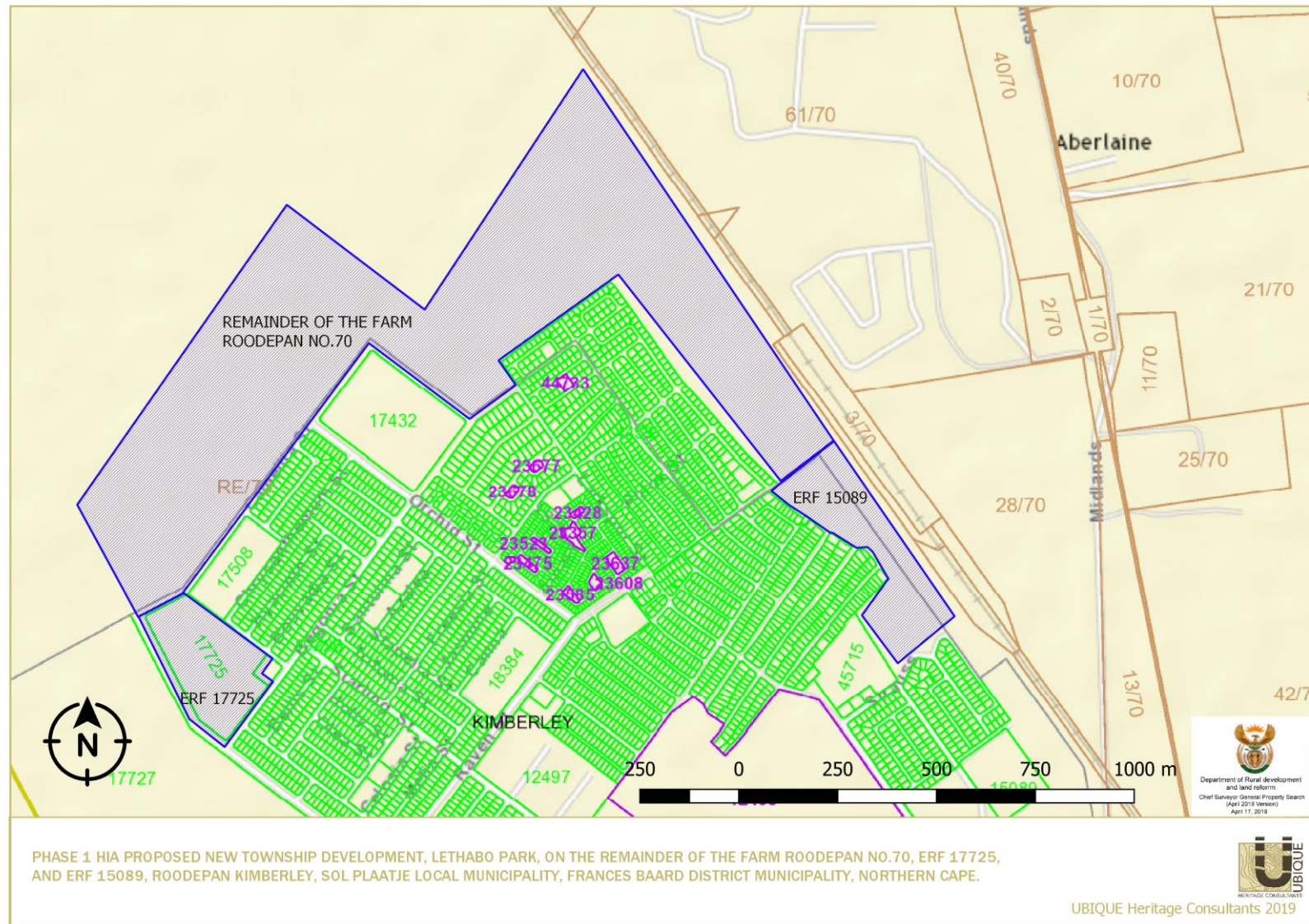


Figure 13: Proposed new township development, Lethabo Park, on the remainder of Farm Roodepan no 70, Erf 17725 and Erf 15089, Roodepan Kimberley, Sol Plaatjies Local Municipality, Frances Baard District Municipality, Northern Cape. Map provided by Ubiqum Heritage Consultants.

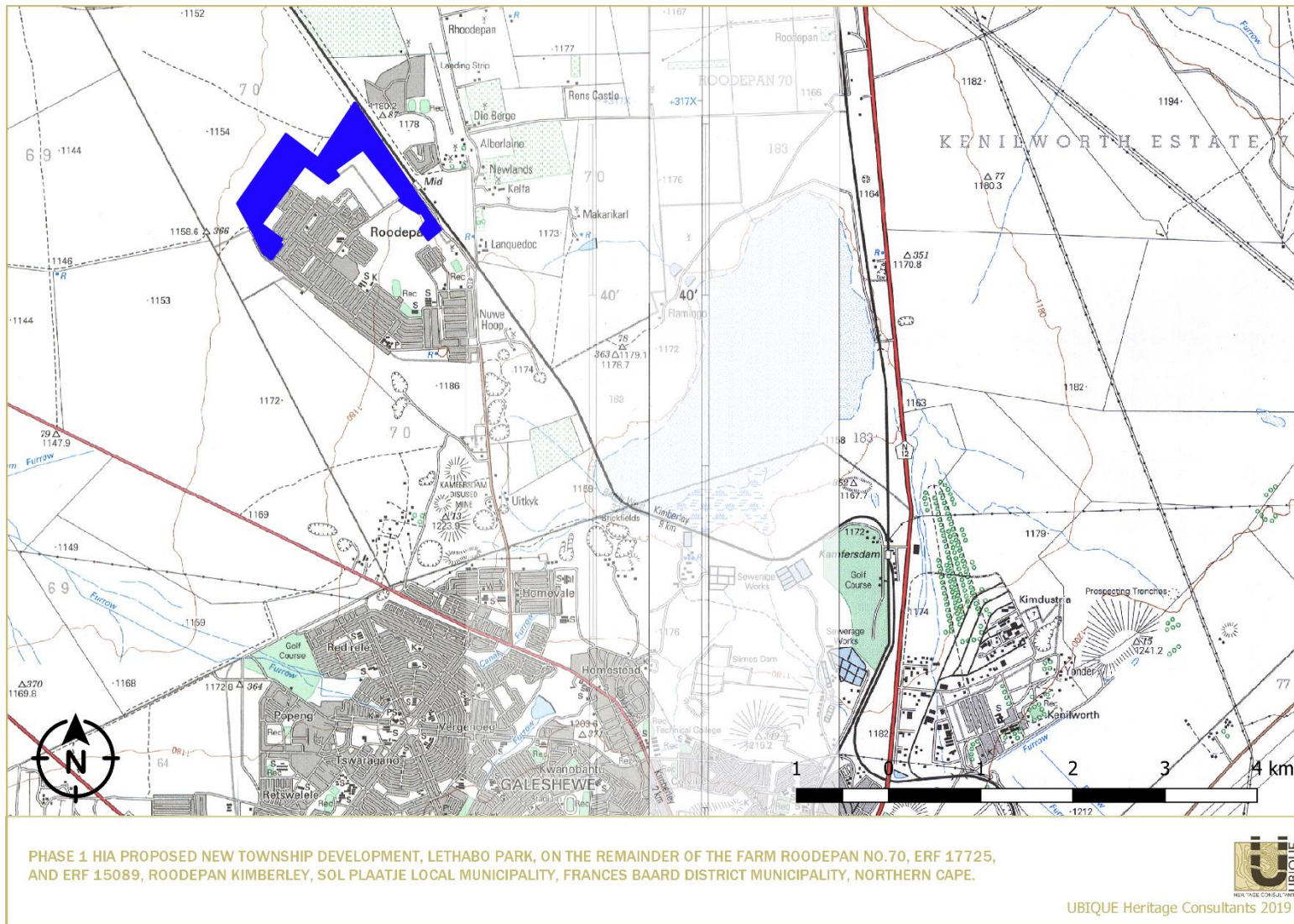


Figure 14: Topographical map of the proposed new township development, Lethabo Park, on the remainder of Farm Roodepan no 70, Erf 17725 and Erf 15089, Roodepan Kimberley, Sol Plaatjies Local Municipality, Frances Baard District Municipality, Northern Cape. Map provided by Ubuque Heritage Consultants.

2 QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

The author (Elize Butler) has an MSc in Palaeontology from the University of the Free State, Bloemfontein, South Africa. She has been working in Palaeontology for more than twenty-four years. She has extensive 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 for 13 years. She has been conducting PIAs since 2014.

3 LEGISLATION

3.1 National Heritage Resources Act (25 of 1999)

Cultural Heritage in South Africa, 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 DIA forms part of the Heritage Impact Assessment (HIA) and adhere to the conditions of the Act. According to **Section 38 (1)**, an 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 300 m in length;
- the construction of a bridge or similar structure exceeding 50 m in length;
- any development or other activity which will change the character of a site—
- (exceeding 5 000 m² 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 re-zoning of a site exceeding 10 000 m² in extent;
- alternatively, any other category of development provided for in regulations by SAHRA or a Provincial heritage resources authority.

4 OBJECTIVE

The objective of a DPIA 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:
 - a. **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.
 - b. **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity.
 - c. **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).

5 GEOLOGICAL AND PALAEOLOGICAL HERITAGE

The geology of the proposed development footprint is entirely underlain by the Lower Permian sediments of the Ecca Group (Prins Albert Formation) of the Karoo Basin (Figure 4). The Ecca Group consists of 16 formations of which the Prins Albert and Whitehill formations are the most extensive. The Prins Albert Formation is limited to the southwestern half of the Karoo Basin and in the past known as “Upper Dwyka Shales.”

The Prince Albert Formation consists of marine to hyposaline basin plain mudrocks that occur with minor volcanic ashes, ironstones and phosphates. Post-glacial mudrocks is present at the base of the Prince Albert Formation. These sediments generally appear dark on satellite images because the outcrop is mantled in gravels rich in ferromanganese minerals (gravel clasts have a shiny-black discolouration).

The fossil assemblage of the Prince Albert Formation is known for its rich assemblages of plant fossils known as the *Glossopteris* flora. This includes petrified wood, palynomorphs and roots. Very rarely body fossils of insects have been recovered. Moderately diverse trace fossil assemblages may be present of which many may be allocated to fish or non-marine arthropod groups like crustaceans, king crabs and predatory water scorpions. These specimens could have reached lengths of two meters or more.

This trace fossil assemblage of the non-marine *Mermia* Ichnofacies is dominated by the ichnogenera *Umfolozia* (arthropod trackways) and *Undichna* (fish swimming trails). Fish coprolites have also been described from this formation. A low diversity marine invertebrate (bivalves, brachiopods and nautiloids), palaeoniscoid fish, sharks and protozoans have been uncovered. There is also a possibility that stromatolites and oolites are preserved. Well-preserved skeletons of the well-known aquatic mesosaurids have been uncovered while amphibians are also recorded from the uppermost Ecca beds.

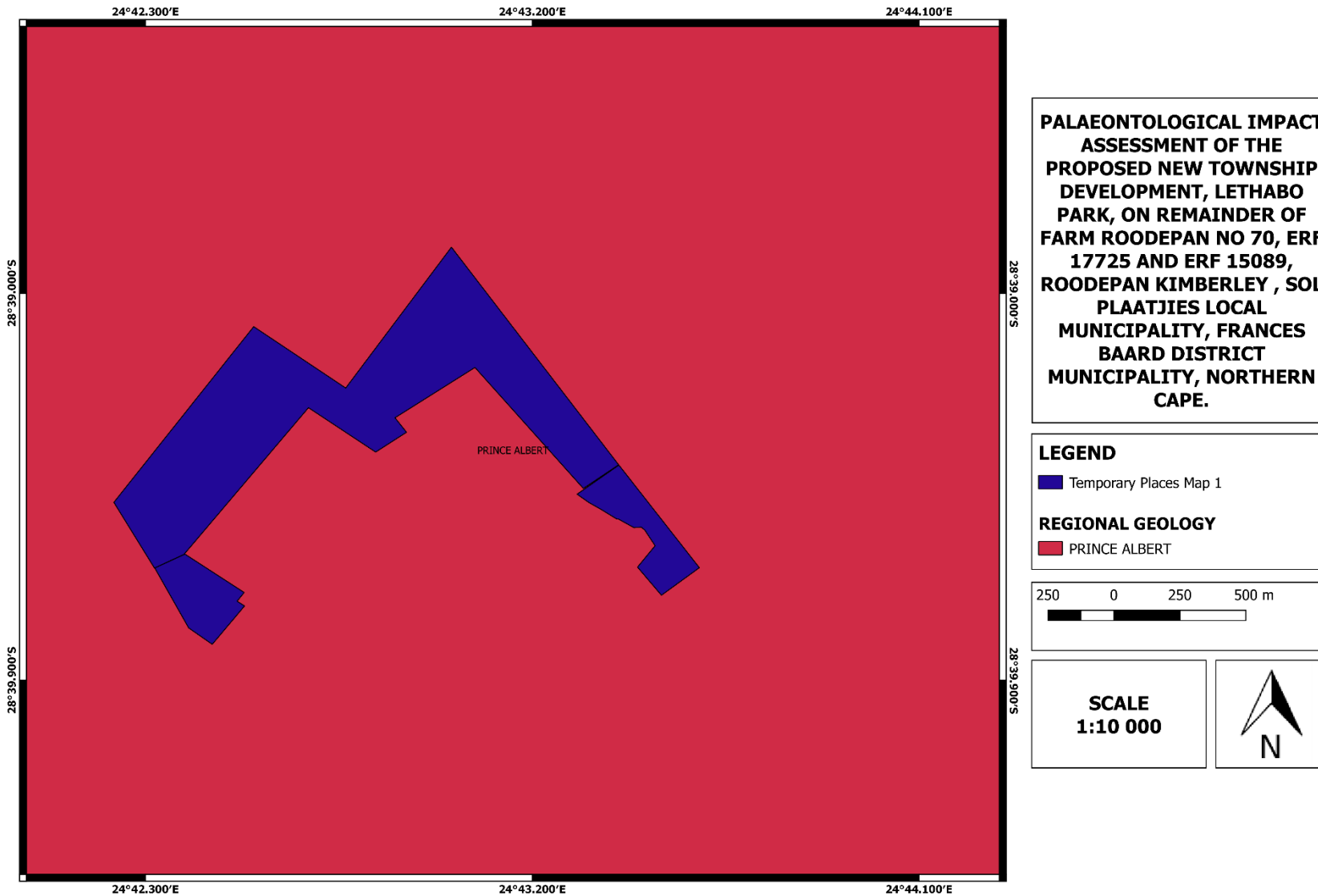


Figure 15: Surface geology of the proposed new township development, Lethabo Park, on remainder of Farm Roodepan no 70, Erf 17725 and Erf 15089, Roodepan Kimberley , Sol Plaatjies Local Municipality, Frances Baard District Municipality, Northern Cape The proposed development is completely underlain by the Lower Permian sediments of the Eccca Group (Prins Albert Formation) of the Karoo Basin. Map was drawn QGIS Desktop 2.18.18. Map was drawn QGIS Desktop 2.18.18.

6 GEOGRAPHICAL LOCATION OF THE SITE

The proposed new township development of Lethabo Park is approximately 10km north, north-west of the CBD of Kimberley and located on remainder of Farm Roodepan no 70, Erf 17725 (c. 7 ha) and Erf 15089 (c. 8 ha), Roodepan Kimberley , Sol Plaatjies Local Municipality, Frances Baard District Municipality, Northern Cape.

7 METHODS

As part of the Palaeontological Impact Assessment, a field-survey of the development footprint was conducted on the 25 May 2019 to assess the potential risk to palaeontological material (fossil and trace fossils) in the proposed footprint of the development. A physical field-survey was conducted on foot within the proposed development footprint. The results of the field survey, the author's experience, aerial photos (using Google Earth, 2019), topographical and geological maps and other reports from the same area were used to assess the proposed development footprint. No consultations were undertaken for this Impact Assessment.

7.1 Assumptions and limitations

The accuracy of DIA is reduced by several factors which may include the following: the databases of institutions are not always up to date, and relevant locality and geological information were not accurately documented in the past. Various remote areas of South Africa have not been assessed by palaeontologists and data is based on aerial photographs alone. Geological maps concentrate on the geology of an area, and the sheet explanations were never intended to focus on palaeontological heritage.

Similar Assemblage Zones, but in different areas is used to provide information on the presence of fossil heritage in an unmapped area. Desktop studies of similar geological formations and Assemblage Zones generally **assume** that exposed fossil heritage is present within the development area. The accuracy of the Palaeontological Impact Assessment is thus improved considerably by conducting a field-assessment.

8 ADDITIONAL INFORMATION CONSULTED

In compiling this report, the following sources were consulted:

- The Palaeosensitivity Map from the SAHRIS website.
- 2824 DA Topographical map
- Geological Map 1: 250 000 Kimberley.
- A Google Earth map with polygons of the proposed development was obtained from *Ubique Heritage*.
- Lethabo BID compiled by Reneilwe Consulting and Planners
- Final Scoping report of the Lethabo housing development compiled by EnviroAfrica CC

9 SITE VISIT

The following photographs were taken during the site visit to the proposed new township development, Lethabo Park, on remainder of Farm Roodepan no 70, Erf 17725 and Erf 15089, Roodepan Kimberley, Sol Plaatjies Local Municipality, Frances Baard District Municipality, Northern Cape No fossiliferous outcrop was identified during the site investigation (Figure 5-10).



Figure 16: Grassy vegetation and evidence of human activities on the proposed development. No outcrops. 28°39'34.02"S 24°43'31.10"E



Figure 17: Grassy vegetation with isolated thorn trees and evidence of human activities on the proposed development. 28°39'34.97"S 24°43'29.73"E



Figure 18: Existing residential area to the left of the photo. Roodepan 70. 28°39'21.17"S
24°43'13.72"E



Figure 19: Disturbed area with thorn trees in the background. 28° 39' 17" S 24° 42' 52" E



Figure 20: Short grassy vegetation and thorn trees in the background. No outcrop. 28° 39' 40" S 24° 42' 23" E



Figure 21: Grassy vegetation and higher thorn trees in the background. No outcrop. 28° 39' 16" S 24° 42' 52" E

10 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
- 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 are used:

Table 2: The rating system

NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity. 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 year), 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 are 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 results 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

11 FINDINGS AND RECOMMENDATIONS

The proposed Lethabo Park township development is entirely underlain by the Prins Albert Formation of the Ecca Group (Karoo Supergroup). According to the PalaeoMap of South African Heritage Resources Information System, the Palaeontological Sensitivity of the Prins Albert Formis High while the Ecca has a moderate Palaeontological Sensitivity (Almond and Pether 2008, SAHRIS website).

A site-specific field survey of the development footprint was conducted on foot and by a motor vehicle on 25th May 2019. No visible evidence of fossiliferous outcrops was found. This area has also been extensively utilised by agriculture activities during the past. For this reason, an overall **low palaeontological sensitivity** is allocated to the development footprint. The scarcity of fossil heritage at the proposed development footprint indicates that the impact of Kangala Extension Project will be of a **low significance** in palaeontological terms. It is therefore considered that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. Thus, the **construction of the development may be authorised in its whole extent**, as the development footprint is not considered sensitive in terms of palaeontological resources.

In the event that fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations, the **Chance Find Protocol** must be implemented by the ECO in charge of these developments. These discoveries ought to be protected (if possible, *in situ*) 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 correct mitigation (e.g. recording and collection) can be carried out by a palaeontologist.

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

1 CHANCE FINDS PROTOCOL

The following procedure will only be followed in the event that fossils are uncovered during excavation.

1.1 Legislation

Cultural Heritage in South Africa (includes all heritage resources) is protected by the **National Heritage Resources Act (Act 25 of 1999) (NHRA)**. According to Section 3 of the Act, all Heritage resources 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 and are the property of the State. It is thus the responsibility of the State to manage and conserve fossils on behalf of the citizens of South Africa. Palaeontological resources may not be excavated, 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.

1.2 Background

A fossil is the naturally preserved remains (or traces) of plants or animals embedded in rock. These plants and animals lived in the geologic past millions of years ago. Fossils are extremely rare and irreplaceable. By studying fossils, it is possible to determine the environmental conditions that existed in a specific geographical area millions of years ago.

1.3 Introduction

This informational document is intended for workers and supervisors on construction sites. It describes the actions to be taken when mining or construction activities accidentally uncover fossil material.

It is the responsibility of the Environmental Control Officer (ECO) of the project to train the workmen and supervisors in the procedure to follow when a fossil is accidentally uncovered. In the absence of the ECO, a member of the staff must be appointed to be responsible for the proper implementation of the chance to find protocol as not to compromise the conservation of fossil material.

1.4 Chance Find Procedure

- If a chance find is made the person responsible for the find must immediately **stop working** and all work must cease in the immediate vicinity of the find.
- The person who made the find must immediately **report** the find to his/her direct supervisor, which in turn must report the find to his/her manager and the ECO or site manager. The ECO must report the find to the relevant Heritage Agency (South African Heritage Research Agency, 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. The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS coordinates.

- A preliminary report must be submitted to the Heritage Agency within **24 hours** of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS coordinates.
- Photographs (the more, the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.

Upon receipt of the preliminary report, the Heritage Agency will inform the ECO (site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.

- The site must be secured to protect it from any further damage. **No attempt** should be made to remove material from their environment. The exposed finds must be stabilised and covered by a plastic sheet or sandbags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- In the event that the fossil cannot be stabilised the fossil may be collected with extreme care by the ECO (site manager). Fossils finds must be stored in tissue paper and an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- Once Heritage Agency has issued the written authorisation, the developer may continue with the development.

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Appendix: 1: CV

ELIZE BUTLER

PROFESSION: Palaeontologist
YEARS' EXPERIENCE: 25 years in Palaeontology

EDUCATION: B.Sc Botany and Zoology, 1988
University of the Orange Free State

B.Sc (Hons) Zoology, 1991
University of the Orange Free State

Management Course, 1991
University of the Orange Free State

M. Sc. *Cum laude* (Zoology), 2009
University of the Free State

Dissertation title: The postcranial skeleton of the Early Triassic non-mammalian Cynodont *Galesaurus planiceps*: implications for biology and lifestyle

Registered as a PhD fellow at the Zoology Department of the UFS

2013 to current

Dissertation title: A new gorgonopsian from the uppermost *Daptocephalus Assemblage Zone*, in the Karoo Basin of South Africa

MEMBERSHIP

Palaeontological Society of South Africa (PSSA) 2006-currently

EMPLOYMENT HISTORY

Part-time Laboratory assistant Department of Zoology & Entomology
University of the Free State Zoology 1989-1992

Part-time laboratory assistant Department of Virology
University of the Free State Zoology 1992

Research Assistant National Museum, Bloemfontein 1993 – 1997

Principal Research Assistant
and Collection Manager

National Museum, Bloemfontein
1998–currently

TECHNICAL REPORTS

Butler, E. 2014. Palaeontological Impact Assessment of the proposed development of private dwellings on portion 5 of farm 304 Matjesfontein Keurboomstrand, Knysna District, Western Cape Province. Bloemfontein.

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Butler, E. 2018. Palaeontological Impact Assessment of the authorisation and amendment processes for Manangu mine near Delmas, Victor Khanye local municipality, Mpumalanga. Bloemfontein.

- Butler, E. 2018.** Palaeontological Desktop Assessment for the proposed Mashishing township establishment in Mashishing (Lydenburg), Mpumalanga Province. Bloemfontein.
- Butler, E. 2018.** Palaeontological Desktop Assessment for the Proposed Mlonzi Estate Development near Lusikisiki, Ngquza Hill Local Municipality, Eastern Cape. Bloemfontein.
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- Butler, E. 2018.** Palaeontological Desktop Assessment for the proposed electricity expansion project and Sekgame Switching Station at the Sishen Mine, Northern Cape Province. Bloemfontein.
- Butler, E. 2018.** Palaeontological field assessment of the proposed construction of the Zonnebloem Switching Station (132/22kV) and two loop-in loop-out power lines (132kV) in the Mpumalanga Province. Bloemfontein.
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- Butler, E. 2018.** Palaeontological Desktop Assessment of the proposed Villa Rosa development In the Buffalo City Metropolitan Municipality, East London. Bloemfontein.
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- Butler, E. 2018.** Palaeontological desktop assessment of the proposed housing development on portion 237 of farm Hartebeestpoort 328. Bloemfontein.
- Butler, E. 2018.** Palaeontological desktop assessment of the proposed New Age Chicken layer facility located on holding 75 Endicott near Springs in Gauteng. Bloemfontein.
- Butler, E. 2018** Palaeontological Desktop Assessment for the development of the proposed Leslie 1 Mining Project near Leandra, Mpumalanga Province. Bloemfontein.
- Butler, E. 2018.** Palaeontological field assessment of the proposed development of the Wildealskloof mixed-use development near Bloemfontein, Free State Province. Bloemfontein.
- Butler, E. 2018.** Palaeontological Field Assessment of the proposed Megamor Extension, East London. Bloemfontein.
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