



# PGS HERITAGE

**THE PROPOSED NEW CULTIVATION (PIVOT) AREAS ON THE REMAINDER OF  
THE FARM OLIE RIVIER 170, DOUGLAS, SOL PLAATJE LOCAL MUNICIPALITY,  
FRANCES BAARD DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE**

**Heritage Impact Assessment**

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## Declaration of Independence

I, Wouter Fourie, declare that –

### General declaration:

- I act as the independent heritage practitioner 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 heritage 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;

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**CONTACT PERSON:**

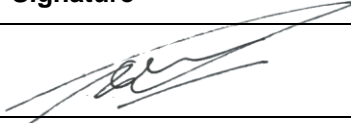
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**ACKNOWLEDGEMENT OF RECEIPT**

<b>Report Title</b>	<b><i>THE PROPOSED NEW CULTIVATION (PIVOT) AREAS ON THE REMAINDER OF THE FARM OLIE RIVIER 170, DOUGLAS, SOL PLAATJE LOCAL MUNICIPALITY, FRANCES BAARD DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE</i></b>		
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**CLIENT:** Environmental Impact Management Services (Pty) Ltd

**CONTACT PERSON:**

Tel:

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## **EXECUTIVE SUMMARY**

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services (Pty) Ltd (EIMS) to undertake a Heritage Impact Assessment (HIA) which will serve to inform the Environmental Impact Assessment Report (EIA) and Environmental Management Programme (EMPr) for the proposed new Cultivation (Pivot) Areas on the Remainder of the farm Olie Rivier 170, Douglas, Sol Plaatje Local Municipality, Frances Baard District Municipality, Northern Cape Province

This report focusses on the three (3) areas proposed for the development of irrigation areas and an irrigation pipeline.

Heritage resources are unique and non-renewable and as such, any impact on such resources must be seen as significant. The HIA has shown that the study area and surrounding area has some heritage resources situated within the proposed development boundaries. Through data analysis and a site investigation, the following issues were identified from a heritage perspective.

### **Heritage Sites**

Intensive field surveys of the study area were undertaken on foot by comprising one field archaeologist and a technician on 28 November 2020. No archaeological sites or burial grounds and graves were identified during the fieldwork.

### **Impact Assessment**

Despite an intensive walkthrough of the project area, no evidence for any archaeological or heritage sites could be identified. As a result, low to no impact is expected from the proposed development on heritage.

### **Mitigation Measures**

With no impact expected on heritage, no further mitigation is required. Refer Chapter 8 of this report.

### **General**

It is the author's considered opinion that the overall impact on heritage resources is Low. Provided that the recommended mitigation measures are implemented, the impact would be acceptably Low or could be totally mitigated to the degree that the project could be approved from a heritage perspective.

## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
1.1	Scope of the Study	1
1.2	Specialist Qualifications	1
1.3	Assumptions and Limitations	1
1.4	Legislative Context	2
1.4.1	<i>Notice 648 of the Government Gazette 45421</i>	2
1.4.2	<i>NEMA – Appendix 6 requirements</i>	2
1.4.3	<i>The National Heritage Resources Act</i>	4
<b>2</b>	<b>SITE LOCATION AND DESCRIPTION</b>	<b>5</b>
2.1	Locality and Site Description (provided by GSW)	5
2.2	Project description (provided by EIMS)	7
<b>3</b>	<b>METHODOLOGY</b>	<b>8</b>
3.1	Site Significance	8
<b>4</b>	<b>CURRENT STATUS QUO</b>	<b>11</b>
4.1	Site Description	11
4.1.1	<i>General Site</i>	11
4.2	Archaeological Background to the Study Area and Surroundings	12
4.3	Previous Archaeological and Heritage Studies in and around the Study Area	14
4.4	Archival/historical maps	15
4.5	Findings of the historical desktop study	16
4.5.1	<i>Heritage Screening</i>	16
4.5.2	<i>Heritage Sensitivity</i>	16
<b>5</b>	<b>FIELDWORK AND FINDINGS</b>	<b>18</b>
5.1	Sensitivity assessment outcome	18
<b>6</b>	<b>IMPACT ASSESSMENT</b>	<b>20</b>
6.1	Determination of Environmental Risk	20
6.2	Impact Prioritisation	22
6.3	Heritage Impacts	24
6.4	Management recommendations and guidelines	26
6.4.1	<i>Construction phase</i>	26
6.4.2	<i>Chance find procedure</i>	26
6.4.3	<i>Possible finds during construction</i>	26
6.5	Timeframes	27
6.6	Heritage Management Plan for EMPr implementation	28
<b>7</b>	<b>CONCLUSIONS</b>	<b>29</b>
7.1	Heritage Sites	29

7.2	Impact Assessment	29
7.3	Mitigation measures	29
7.4	General	29
<b>8</b>	<b>REFERENCES</b>	<b>30</b>

## List of Figures

<i>Figure 1 – Human and Cultural Timeline in Africa.....</i>	<i>xii</i>
<i>Figure 2 - Locality map showing proposed development.....</i>	<i>6</i>
<i>Figure 3 – General view of the study area with sparse grass land .....</i>	<i>11</i>
<i>Figure 4 – View of the western most pivot area with previous bush clearing evident.....</i>	<i>11</i>
<i>Figure 5 – View of western pivot area .....</i>	<i>11</i>
<i>Figure 7 - (Khoi)San Engraving of and Eland on glacial pavement at Nooitgedacht (<a href="http://commons.wikimedia.org/wiki/File:Rock_Art_at_Nooitgedacht.jpg">http://commons.wikimedia.org/wiki/File:Rock_Art_at_Nooitgedacht.jpg</a>).....</i>	<i>13</i>
<i>Figure 8 - First Edition 2824CC Topographic Sheet dating to 1969 showing the study area .</i>	<i>17</i>
<i>Figure 13 - Fieldwork tracklogs .....</i>	<i>19</i>

## List of Tables

Table 1 – List of abbreviations used in this report.....	xi
Table 2 - Reporting requirements for GN648 .....	2
Table 3 - Reporting requirements as per NEMA Appendix 6 for specialist reports.....	2
Table 4 - Rating system for archaeological resources .....	8
Table 5 - Rating system for built environment resources .....	9
Table 6: Summary of archival data found on the area in general .....	12
Table 7 -Tangible heritage sites in the study area .....	16
Table 8 - Landform type to heritage find matrix.....	16
Table 9 - Criteria for Determining Impact Consequence.....	20
Table 10 - Probability Scoring .....	21
Table 11 - Determination of Environmental Risk.....	21
Table 12 - Significance Classes .....	22
Table 13 - Criteria for Determining Prioritisation .....	22
Table 14 - Determination of Prioritisation Factor.....	23
Table 15 - Final Environmental Significance Rating.....	24
Table 16 - Impact rating for heritage resources .....	25
Table 17 - Lead times for permitting and mobilisation.....	27
Table 18 - Heritage Management Plan for EMPr implementation.....	28

## List of Appendices

A	Project team CV's
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## TERMINOLOGY AND ABBREVIATIONS

### Archaeological resources

This includes:

- material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- 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 which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, 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; and
- features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

### Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

### Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- carrying out any works on or over or under a place;
- subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- constructing or putting up for display signs or boards;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil

### Early Stone Age

The archaeology of the Stone Age between 700 000 and 3 300 000 years ago.

### 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 (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

### **Heritage resources**

This means any place or object of cultural significance and can include (but not limited to) as stated under Section 3 of the NHRA,

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, and
- sites of significance relating to the history of slavery in South Africa;

### **Holocene**

The most recent geological time period which commenced 10 000 years ago.

### **Late Stone Age**

The archaeology of the last 30 000 years associated with fully modern people.

### **Late Iron Age (Early Farming Communities)**

The archaeology of the last 1000 years up to the 1800's, associated with iron-working and farming activities such as herding and agriculture.

### **Middle Iron Age**

The archaeology of the period between 900-1300AD, associated with the development of the Zimbabwe culture, defined by class distinction and sacred leadership.

### **Middle Stone Age**

The archaeology of the Stone Age between 30 000-300 000 years ago, associated with early modern humans.

### **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 which contains such fossilised remains or trace.

*Table 1 – List of abbreviations used in this report*

<b>Abbreviations</b>	<b>Description</b>
AIA	Archaeological Impact Assessment
APHP	Association of Professional Heritage Practitioners
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EIAs practitioner	Environmental Impact Assessment Practitioner
ESA	Earlier Stone Age
GAE	GA Environmental (Pty) Ltd
GN	Government Notice
GPS	Global Positioning System
HIA	Heritage Impact Assessment
IAIASA	International Association for Impact Assessment South Africa
I&AP	Interested & Affected Party
LIA	Late Iron Age
LSA	Late Stone Age
MIA	Middle Iron Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act, 1998 (Act No 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No 25 of 1999)
NCW	Not Conservation Worthy
PDA	Palaeontological Desktop Assessment
PGS	PGS Heritage (Pty) Ltd
PHRA	Provincial Heritage Resources Authority
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

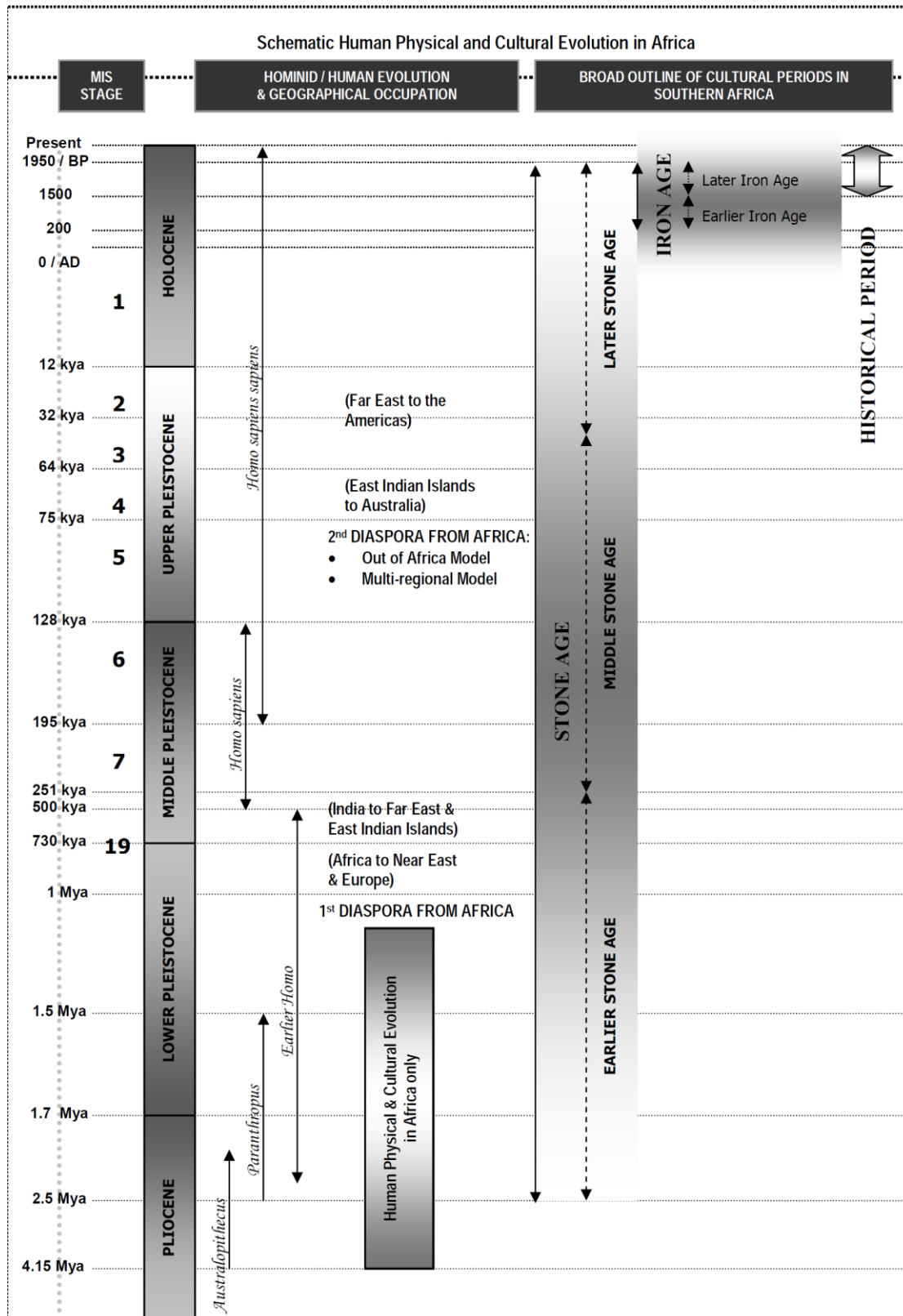


Figure 1 – Human and Cultural Timeline in Africa

# **1 INTRODUCTION**

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services (Pty) Ltd (EIMS) to undertake a Heritage Impact Assessment (HIA) which will serve to inform the Environmental Impact Assessment Report (EIA) and Environmental Management Programme (EMPr) for the proposed new Cultivation (Pivot) Areas on the Remainder of the farm Olie Rivier 170, Douglas, Sol Plaatje Local Municipality, Frances Baard District Municipality, Northern Cape Province.

## **1.1 SCOPE OF THE STUDY**

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed development area. The HIA aims to inform the EIA in the development of a comprehensive EMPr to assist the project applicant in responsibly managing the identified heritage resources in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act (Act 25 of 1999) (NHRA).

## **1.2 SPECIALIST QUALIFICATIONS**

This HIA was compiled by PGS.

The staff at PGS have a combined experience of nearly 90 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Wouter Fourie, the Project Coordinator, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP).

## **1.3 ASSUMPTIONS AND LIMITATIONS**

Not detracting in any way from the comprehensiveness of the research undertaken, it is necessary to realise that the heritage resources located during the desktop research and fieldwork do not necessarily represent all the possible heritage resources present within the area.

Such 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 make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well.

## 1.4 LEGISLATIVE CONTEXT

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

- Notice 648 of the Government Gazette 45421- general requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified
- National Environmental Management Act (NEMA), Act 107 of 1998 – Appendix 6
- National Heritage Resources Act (NHRA), Act 25 of 1999

### 1.4.1 NOTICE 648 OF THE GOVERNMENT GAZETTE 45421

Although minimum standards for archaeological (2007) and palaeontological (2012) assessments were published by SAHRA, GN.648 requires sensitivity verification for a site selected on the national web-based environmental screening tool for which no specific assessment protocol related to any theme has been identified. The requirements for this Government Notice (GN) are listed in **Table 2** and the applicable section in this report noted.

*Table 2 - Reporting requirements for GN648*

<b>GN 648</b>	<b>Relevant section in report</b>	<b>Where applicable in this report</b>	<b>not applicable in this report</b>
2.2 (a) a desktop analysis, using satellite imagery;	section 4.3		
2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web-based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.	section 4.1	-	
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web-based environmental screening tool;	section 4.1	-	
2.3(b) contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	section 4.1	-	

### 1.4.2 NEMA – APPENDIX 6 REQUIREMENTS

The HIA report has been compiled considering the NEMA Appendix 6 requirements for specialist reports as indicated in the table below. For ease of reference, the table below provides cross-references to the report sections where these requirements have been addressed. It is important to note, that where something is not applicable to this HIA, this has been indicated in the table below.

*Table 3 - Reporting requirements as per NEMA Appendix 6 for specialist reports*

<b>Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017</b>	<b>Relevant section in report</b>	<b>Comment where not applicable.</b>
1.(1) (a) (i) Details of the specialist who prepared the report	Page 2 of Report – Contact details and company	-
(ii) The expertise of that person to compile a specialist report including a curriculum vita	Section 1.2 – refer to <b>Appendix B</b>	-
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report	-
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 2.1	-
(cA) An indication of the quality and age of base data used for the specialist report	Section 3	-
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 6	-
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3	-
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3	-
(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 5	
(g) An identification of any areas to be avoided, including buffers	Section 4.6	
(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;	Figure 8	
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3	-
(j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 7	
(k) Any mitigation measures for inclusion in the EMPr	Section 6.6	
(l) Any conditions for inclusion in the environmental authorisation		None required
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 6.6	
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 7	
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and		
(n)(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 7	-
(o) A description of any consultation process that was undertaken during the course of carrying out the study		Not applicable. A public consultation process was

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
		handled as part of the EIA and EMP process.
(p) A summary and copies if any comments that were received during any consultation process		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 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.	NEMA Appendix 6 and GN648	

### 1.4.3 THE NATIONAL HERITAGE RESOURCES ACT

- NHRA Act 25 of 1999
  - Protection of Heritage Resources – Sections 34 to 36; and
  - Heritage Resources Management – Section 38

The NHRA is utilized as the basis for the identification, evaluation and management of heritage resources and in the case of Cultural Resource Management (CRM) those resources specifically impacted on by development as stipulated in Section 38 of NHRA. This study falls under s38(8) and requires comment from the relevant heritage resources authority.



## 2 SITE LOCATION AND DESCRIPTION

### 2.1 LOCALITY AND SITE DESCRIPTION (PROVIDED BY EIMS)

The Oierivier Irrigation project is located approximately 24km east of the town of Douglas, within the Sol Plaatje Local Municipality, Frances Baard District Municipality, Northern Cape Province (**Figure 2**).

<b>Study Area central Coordinate</b>	E24.01770 S28.97173
<b>Location</b>	The study area is located within the Sol Plaatje Local Municipality, Frances Baard District Municipality, Northern Cape Province
<b>Property</b>	Remainder of Olie Rivier 170

# Olierivier Centre Pivot Expansion Locality Map

PGS Heritage (Pty) Ltd  
Heritage Management  
Unit

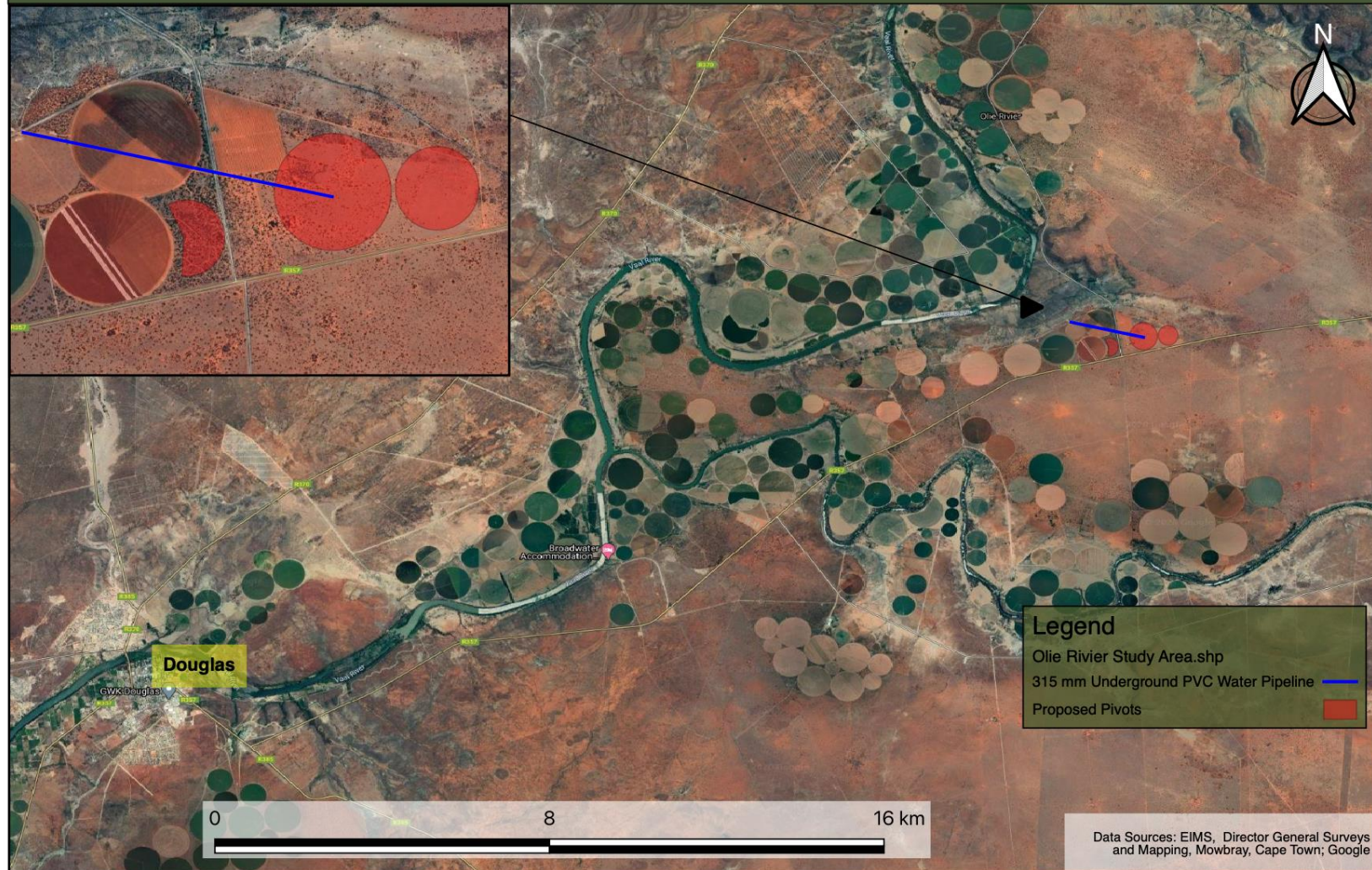


Figure 2 - Locality map showing proposed development

## 2.2 PROJECT DESCRIPTION (PROVIDED BY EIMS)

The proposed project involves the clearance of approximately 70 hectares of indigenous vegetation for the purposes of creating new cultivation (pivot) areas (**Figure 2**).

### 3 METHODOLOGY

The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999), the NEMA (no 107 of 1998). The HIA process consisted of three steps:

Step I – Literature Review and sensitivity analysis<sup>1</sup>: The background information to the field survey relies greatly on previous studies completed for the project to determine known sensitivities, as well as the heritage background research completed for this report.

Step II – Physical Survey: A physical survey was conducted by vehicle through the proposed project area by a qualified heritage specialist. The survey was conducted on 28 November 2020, aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

Step III – The final step involved the recording and documentation of relevant archaeological resources, the assessment of resources in terms of the HIA criteria and report writing, as well as mapping and constructive recommendations.

#### 3.1 SITE SIGNIFICANCE

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA for archaeological impact assessments. An update classification and rating system as developed by Heritage Western Cape (2016) is implemented in this report.

Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016) based on SAHRA guidelines, were used for the purpose of this report (**Table 4** and **Table 5**).

*Table 4 - Rating system for archaeological resources*

<b>Grading</b>	<b>Description of Resource</b>	<b>Examples of Possible Management Strategies</b>	<b>Heritage Significance</b>
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Langebaanweg (West Coast Fossil Park), Cradle of Humankind	May be declared as a National Heritage Site managed by SAHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Highest Significance
II	Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current examples: Blombos, Paternoster Midden.	May be declared as a Provincial Heritage Site managed by HWC. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Exceptionally High Significance
III	Heritage resources that contribute to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not		

<sup>1</sup> According to Notice 648 of the Government Gazette 45421

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
	fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. Current examples: Varschedrift; Peers Cave; Brobartia Road Midden at Bettys Bay	Resource must be retained. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.	Resource must be retained where possible where not possible it must be fully investigated and/or mitigated.	Medium Significance
IIIC	Such a resource is of contributing significance.	Resource must be satisfactorily studied before impact. If the recording already done (such as in an HIA or permit application) is not sufficient, further recording or even mitigation may be required.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant or the consultant and approved by the authority.	No research potential or other cultural significance

Table 5 - Rating system for built environment resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island	May be declared as a National Heritage Site managed by SAHRA.	Highest Significance
II	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House	May be declared as a Provincial Heritage Site managed by HWC.	Exceptionally High Significance
II	Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they	High Significance

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
		should receive maximum protection at local level.	
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.	Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level.	Medium Significance
IIIC	Such a resource is of contributing significance to the environs. These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e. in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant and approved by the authority. Section 34 can even be lifted by HWC for structures in this category if they are older than 60 years.	No research potential or other cultural significance



## 4 CURRENT STATUS QUO

### 4.1 SITE DESCRIPTION

#### 4.1.1 GENERAL SITE

The study area is a portion of the Olie Rivier farm situated about 24km east of Douglas along the R357. The study area is situated on an extremely flat environment that is almost completely devoid of any changes of elevation such as small hills and ridges. The area is mostly categorised by a thick layer of red sand that covers the entire landscape.

The vegetation across the landscape is completely dominated by a patched layer of grass growing on the sandy layer with scattered thorn trees dispersed across the area. Visibility on site was very high due to the dispersed nature of the present vegetation as well as the flat topography of the landscape.

The study area is mainly being used as grazing field for wildlife.



*Figure 3 – General view of the study area with sparse grass land*



*Figure 4 – View of the western most pivot area with previous bush clearing evident*



*Figure 5 – View of western pivot area*


## 4.2 ARCHAEOLOGICAL BACKGROUND TO THE STUDY AREA AND SURROUNDINGS

The archival research focused on available information sources (published literature and historical maps) that were used to compile a background history of the study area and surrounds. This data then informed the possible heritage resources to be expected during the initial field surveying.

*Table 6: Summary of archival data found on the area in general*

DATE	DESCRIPTION
2.5 million to 250 000 years ago	<p>The Earlier Stone Age is the first and oldest phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these technological phases is known as the Oldowan, which is associated with crude flakes and hammer stones and dates to approximately 2 million years ago. Examples of such tools have been excavated from the sites of Wonderwerk Cave in Kuruman and Canteen Kopje in Barkly West, near Kimberley.</p> <p>The second technological phase in the earlier stone age of Southern Africa is known as the Acheulian and comprises more refined and better made stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates back to approximately 1.5 million years ago and examples of this phase have been found at Wonderwerk Cave (Berna et al. 2012). This site is of particular importance because its excavations have provided some of the first evidence of the controlled use of fire by hominins dating to approximately 1 million years ago (Berna et al. 2012). Other archaeological sites associated with the Earlier Stone Age from the general vicinity of the study area, is Canteen Kopje, Kathu Pan and Rooidam which has yielded many invaluable artefacts primarily associated with the Acheulian, this particular period of Earlier Stone Age (Herries, 2011).</p>
250 000 to 40 000 years ago	<p>The Middle Stone Age is the second oldest phase identified in South Africa's archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called 'prepared core' technique. Examples of such artefacts have been found at the Bundu Farm, Kathu Pan and Wonderwerk Cave sites (Lombard et al. 2012). It is also widely argued that this time period saw the advent of "modern human behaviour".</p>
40 000 years ago to the historic past	<p>The Later Stone Age is the third oldest phase identified in South Africa's archaeological history. This phase in human history is associated with an abundance of very small stone artefacts known as microliths and is characterised by a hunter-gatherer way of life. Other types of heritage associated with this time period and therefore hunter-gatherers are OES (ostrich eggshell) beads, thin-walled ceramics, bone implements and rock art (painted and engraved) (Forssman et al. 2010). A large number of Later Stone Age sites are known in the Northern Cape Province. Some of these include those sites found in the Seacow Valley (Sampson, 1988) and Little Witkrans, Powerhouse Cave, and Blinkklipkop (Humphreys &amp; Thackeray, 1983). And the more famous sites such as Wonderwerk Cave in Kuruman and Canteen Kopje in Barkley West, near Kimberley (Forssman et al. 2010).</p> <p>Canteen Kopje exhibits evidence of a very rich cultural history in the later periods of the Later Stone Age where the hunter-gatherers would interact with Khoekhoe herders that moved into the region, which we can tell from excavated domesticated animal remains such as sheep and goats (Forssman et al. 2010). These communities even entered a network of cultural exchange within the last 2000 years. Similar evidence has also been recovered from Wonderwerk Cave (Forssman et al. 2010).</p> <p><i>Nooitgedacht Rock Art Site</i></p>



	<p>This National Monument is situated on the farm Nooitgedacht adjacent to the farm Droogfontein and contains 3 sections of glaciated pavement with over 250 Bushman and Khoe rock engravings (<b>Figure 6</b>)</p>  <p><i>Figure 6 - (Khoi)San Engraving of and Eland on glacial pavement at Nooitgedacht</i> (<a href="http://commons.wikimedia.org/wiki/File:Rock_Art_at_Nooitgedacht.jpg">http://commons.wikimedia.org/wiki/File:Rock_Art_at_Nooitgedacht.jpg</a>)</p>
AD 1650 – AD 1700	<p>Historical records combined with ‘Type Z’ walling and archaeological evidence from Postmasburg show that Bantu-speaking farmers occupied the area from around AD 1650 to AD 1700. The typical archaeology that is associated with these Iron Age farmers are the well-known stone-walled settlements (or ‘Kraals’) and their thick-walled, decorated ceramics. However there is not much evidence of farmers or herders South and to the West of this area, with the evidence showing that most of this land was left unoccupied possibly because of its characteristically arid conditions (Forssman et al. 2010).</p>
AD 1700 - AD 1850	<p>Hearsay and eyewitness accounts have placed Tswana (more specifically Tshlaping) farming settlements North of present-day Kuruman however, a lack of archaeological evidence from the area as well as what we know about the lack of rainfall in the area, corroborates the previous point that this point of South Africa was not well inhabited by Iron Age farmers (Humphreys, 1976). The 18<sup>th</sup> century is also characterised by the conflict between the Griqua, Korana and white settlers who were competing for availability of land, which gave rise to the occurrence of the <i>Mfecane</i> as a direct result of the influx of all these different peoples (Becker, 2013)</p>
1899 - 1902	<p>A series of fortifications and encampments can still be found today surrounding Kimberley as a result of the siege of Kimberley between 1899 and 1900, during the Anglo-Boer War (Becker, 2013). The Kimberley area was also privy to the “Western Campaign” during the war, with regards to the Battles of Belmont, Graspan, Modder River and Magersfontein (Morris 2000). It also saw the base of operations for the subsequent incursions into the Cape Colony by De Wet, Hertzog and Naude, as well as the development of British military bases and hospitals (Morris 2000).</p>

### 4.3 PREVIOUS ARCHAEOLOGICAL AND HERITAGE STUDIES IN AND AROUND THE STUDY AREA

A scan of the SAHRIS database has revealed the following studies conducted in and around the study area of this report. These studies are summarised below in ascending date order:

- Beaumont, P. B. 2012. Phase 1 Archaeological Impact Assessment Report on mining zones 0-24 and abutting areas on the remaining extent of farm Schmitdsdrift 248, Pixley Ka Seme District Municipality, Northern Cape. **The large-scale survey identified 45 burial grounds, 32 stone walled sites all recent historic. 16 artefact sites ranging from MSA to LSA.**
- Millo, Trust. 2019. Phase 1 Archaeological Impact Assessment report for mining right of Maxwill Opencast Alluvial Diamond Mine and associated infrastructure, Northern Cape Province under the jurisdiction of Pixely Ka Seme District Municipality in the Northern Cape Province. **The field survey identified scatters of Middle Stone Age (MSA) and Later Stone Age (LSA) stone/lithic artefacts, scatters of glass, porcelain, metal knife, metal hook, terracing platforms and house platforms. But the MSA and LSA stone tools are a secondary deposition because they could be as a result of flooding.**
- Kruger, Nelius. 2018. Heritage Scoping Study (HS) for the proposed At Last Prospecting Project on a portion of the farm At Last 232 in the Frances Baard District Municipality, Northern Cape Province. **The study identified that draining lines holds significance for lithic material finds, while slopes are associated with Iron Age settlements.**
- Millo, Trust. 2018. Phase 1 Archaeological Impact Assessment report for mining right Millo, Trust. 2019. Phase 1 Archaeological Impact Assessment report for mining right of Maxwill Opencast Alluvial Diamond Mine and associated infrastructure, Northern Cape Province under the jurisdiction of Pixely Ka Seme District Municipality in the Northern Cape Province. **No major finds were identified.**
- Van Ryneveld, K. 2005. Cultural Resources Management Impact Assessment. Portions of Leeuwpoort 161, Kimberley District, Northern Cape. **Finds included historical burial grounds and lithics artefacts on a basal layered shale deposit.**
- Rossouw, L. 2017. Phase 1 Heritage Impact Assessment of proposed installation of new irrigation pivots and associated infrastructure on the farm Zulani 167 near Douglas, Northern Cape Province. **The terrain as a whole is capped by a thick mantle of aeolian sand that appears to be superficially sterile in terms of Stone Age cultural remains with no perceived impact.**
- Rossouw, L. 2017. Phase 1 Heritage Impact Assessment of proposed installation of new irrigation pivots and associated infrastructure on the farm Banks Drift 163 near Douglas, Northern Cape Province. **The terrain as a whole is capped by a thick mantle of aeolian sand that appears to be superficially sterile in terms of Stone Age cultural remains with no perceived impact.**
- Morris, D. 2007. Archaeological Impact Assessment at Taaiboschfontein near Plooyburg, Northern Cape. **A low density scatter of lithics at the base of the soil unit over laying calcrete was identified.**

- Morris, D. 2005. Archaeological Impact Assessment at Abrahamosfontein near Plooyburg, Northern Cape. **No heritage features identified.**

#### 4.4 ARCHIVAL/HISTORICAL MAPS

The examination of historical data and cartographic resources represents a critical tool for locating and identifying heritage resources and in determining the historical and cultural context of the study area. Relevant topographic maps and satellite imagery were studied to identify structures, possible burial grounds or archaeological sites present in the footprint area.

Topographic maps (1:50 000) for various years (1969) were assessed to observe the development of the area, as well as the location of possible historical structures and burial grounds. The maps were also used to assess the possible age of structures located, to determine whether they could be considered as heritage sites. Map overlays were created showing the possible heritage sites identified within the areas of concern, as can be seen below (**Figure 7**).

The relevant topographical maps include:

- First Edition 2824CC Uityk Topographic Sheet surveyed in 1969 and drawn in 1971 by the Trigonometrical Survey Office. Published by the Government Printer in 1971.

It can be seen that all the map sheets consulted depict the project area with no infrastructure in the footprint area.

## 4.5 FINDINGS OF THE HISTORICAL DESKTOP STUDY

### 4.5.1 HERITAGE SCREENING

A Heritage Screening Report was compiled using the Department of Environment, Forestry and Fisheries National Web-based Environmental Screening Tool as required by Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended . According to the Heritage screening report, the directly affected area has no archaeological and cultural heritage sensitivity.

**This has been confirmed by the field work that identified no heritage resources.**

### 4.5.2 HERITAGE SENSITIVITY

The sensitivity maps were produced by overlying:

- Satellite Imagery;
- Current Topographical Maps; and
- First edition Topographical Maps dating to 1968-70.

By superimposition and analysis, it was possible to rate these structure/areas according to age and thus their level of protection under the NHRA. Note that these structures refer to possible tangible heritage sites as listed in **Table 7**.

*Table 7 -Tangible heritage sites in the study area*

Name	Description	Legislative protection
Archaeology - Iron Age Sites	Older than 100 years	NHRA Sect 3 and 35
Architectural Structures	Possibly older than 60 years	NHRA Sect 3 and 34
Graves and Burial Grounds	60 years or older	NHRA Sect 3 and 36

Additionally, evaluation of satellite imagery has indicated the following areas that may be sensitive from a heritage perspective. The analysis of the studies conducted in the area assisted in the development of the following landform type to heritage find matrix in **Table 8**.

*Table 8 - Landform type to heritage find matrix*

LANDFORM TYPE	HERITAGE TYPE
Crest and foot hill	LSA and MSA scatters, LIA settlements
Crest of small hills	Small LSA sites – scatters of stone artefacts, ostrich eggshell, pottery and beads
Watering holes/pans/rivers	ESA, MSA and LSA sites, LIA settlements
Farmsteads	Historical archaeological material
Ridges and drainage lines	LSA sites, LIA settlements



Figure 7 - First Edition 2824CC Topographic Sheet dating to 1969 showing the study area

## **5 FIELDWORK AND FINDINGS**

A controlled surface survey was conducted on foot and by a vehicle by an archaeologist from PGS. The fieldwork was conducted between 28 November 2020. During the fieldwork, hand-held GPS devices were used to record tracklogs. These recorded track logs show the routes followed by the fieldwork team on site. The tracklogs (in yellow) for the survey are indicated in **Figure 8**.

No heritage artefacts or resources were identified.

### **5.1 SENSITIVITY ASSESSMENT OUTCOME**

No other heritage sites were identified during the survey of the project area.





Figure 8 - Fieldwork tracklogs

## 6 IMPACT ASSESSMENT

The impact significance rating methodology, as provided by EIMS, is guided by the requirements of the NEMA EIA Regulations 2014 (as amended). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. This determines the environmental risk. In addition, other factors, including cumulative impacts and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S). The impact assessment will be applied to all identified alternatives. Where possible, mitigation measures will be recommended for the impacts identified.

### 6.1 DETERMINATION OF ENVIRONMENTAL RISK

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER). The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. The consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and reversibility (R) applicable to the specific impact.

For the purpose of this methodology, the consequence of the impact is represented by:

$$C = \frac{(E+D+M+R) \times N}{4}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in **Table 9** below.

*Table 9 - Criteria for Determining Impact Consequence*

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site)
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).



Aspect	Score	Definition
<b>Magnitude/ Intensity</b>	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
<b>Reversibility</b>	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact

Once the C has been determined, the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/ scored as per Error! Reference source not found.9.

*Table 10 - Probability Scoring*

<b>Probability</b>	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur)

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

$$ER = C \times P$$

*Table 11 - Determination of Environmental Risk*

<b>C<sub>ons</sub></b>	5	5	10	15	20	25
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	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
	0	1	2	3	4	5
	<b>Probability</b>					

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in **Table 12**.

*Table 12 - Significance Classes*

<b>Environmental Risk Score</b>	
<b>Value</b>	<b>Description</b>
<b>&lt; 9</b>	Low (i.e. where this impact is unlikely to be a significant environmental risk).
<b>≥9 - &lt;17</b>	Medium (i.e. where the impact could have a significant environmental risk),
<b>≥17</b>	High (i.e. where the impact will have a significant environmental risk).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post-implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/mitigated.

## 6.2 IMPACT PRIORITISATION

Further to the assessment criteria presented in the section above, it is necessary to assess each potentially significant impact in terms of:

1. Cumulative impacts; and
2. The degree to which the impact may cause irreplaceable loss of resources.

To ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented.

*Table 13 - Criteria for Determining Prioritisation*

<b>Cumulative Impact (CI)</b>	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely
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		that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/ definite that the impact will result in spatial and temporal cumulative change.
<b>Irreplaceable Loss of Resources (LR)</b>	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 5. The impact priority is therefore determined as follows:

$$\text{Priority} = \text{CI} + \text{LR}$$

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (Refer to **Table 14**).

*Table 14 - Determination of Prioritisation Factor*

<b>Priority</b>	<b>Ranking</b>	<b>Prioritisation Factor</b>
2	Low	<b>1</b>
3	Medium	<b>1.125</b>
4	Medium	<b>1.25</b>
5	Medium	<b>1.375</b>
6	High	<b>1.5</b>

In order to determine the final impact significance, the PF is multiplied by the ER of the post-mitigation scoring. The ultimate aim of the PF is an attempt to increase the post-mitigation environmental risk rating by a full ranking class if all the priority attributes are high (i.e. if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

Table 15 - Final Environmental Significance Rating

Environmental Significance Rating	
Value	Description
≤ -20	High negative (i.e. where the impact must have an influence on the decision process to develop in the area).
> -20 ≤ -10	Medium negative (i.e. where the impact could influence the decision to develop in the area).
> -10	Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area).
0	No impact
<10	Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥ 10 < 20	Medium positive (i.e. where the impact could influence the decision to develop in the area).
≥ 20	High positive (i.e. where the impact must have an influence on the decision process to develop in the area).

The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

### 6.3 HERITAGE IMPACTS

Despite an intensive walkthrough of the footprint area, no evidence for any significant archaeological or heritage sites could be identified. As a result, a low impact is expected from the proposed development on heritage. Refer to **Table 16**.

Table 16 - Impact rating for heritage resources

IMPACT DESCRIPTION				Pre-Mitigation							Post Mitigation							Priority Factor Criteria				
Identifier	Impact	Alternative	Phase	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Pre-mitigation on ER	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Post-mitigation on ER	Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score
10.1.1	Impact on heritage resources		Construction	-1	1	5	2	5	2	-6,5	-1	1	5	1	1	1	-2	High	1	1	1,00	-2

## **6.4 MANAGEMENT RECOMMENDATIONS AND GUIDELINES**

### **6.4.1 CONSTRUCTION PHASE**

The project will encompass the removal of vegetation and the digging of trenches for the establishment of the irrigation pivots.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction and as such must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, however, foundation holes do offer a window into the past and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project and these must be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following chance find procedure should be implemented.

### **6.4.2 CHANCE FIND PROCEDURE**

- An appropriately qualified heritage practitioner/archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted.
- The qualified heritage practitioner/archaeologist will then need to come out to the site and evaluate the Heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner/archaeologist.

### **6.4.3 POSSIBLE FINDS DURING CONSTRUCTION**

The study area occurs within a greater historical and the archaeological site as identified during the desktop and fieldwork phase. Soil clearance for infrastructure as well as the proposed reclamation activities could uncover the following:

- High-density concentrations of a stone artefact
- unmarked graves

## 6.5 TIMEFRAMES

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. **Table 17** gives guidelines for lead times on permitting.

*Table 17 - Lead times for permitting and mobilisation*

<b>Action</b>	<b>Responsibility</b>	<b>Timeframe</b>
Preparation for field monitoring and finalisation of contracts	The contractor and service provider	1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and SAHRA	3 months
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and SAHRA	2 weeks
Relocation of burial grounds or graves in the way of construction	Service provider – Archaeologist, SAHRA, local government and provincial government	6 months

## 6.6 HERITAGE MANAGEMENT PLAN FOR EMPR IMPLEMENTATION

Table 18 - Heritage Management Plan for EMPr implementation

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
<b>General project area</b>	Implement chance find procedures in case where possible heritage finds are uncovered.	Construction and operation	During construction and operation	Applicant ECO Heritage Specialist	ECO (monthly / as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34-36 and 38 of NHRA	ECO Monthly Checklist/Report



## **7 CONCLUSIONS**

PGS was appointed by EIMS to undertake a HIA for the proposed new Cultivation (Pivot) Areas on the Remainder of the farm Olie Rivier 170, Douglas, Sol Plaatje Local Municipality, Frances Baard District Municipality, Northern Cape Province.

Heritage resources are unique and non-renewable and as such, any impact on such resources must be seen as significant. The HIA has shown that the study area and surrounding area has some heritage resources situated within the proposed development boundaries. Through data analysis and a site investigation, the following issues were identified from a heritage perspective.

### **7.1 HERITAGE SITES**

Intensive field surveys of the study area were undertaken on foot by comprising two field archaeologists on 20-22 September 2020. No archaeological sites or burial grounds and graves were identified during the fieldwork.

### **7.2 IMPACT ASSESSMENT**

Despite an intensive walkthrough of the project area, no evidence for any archaeological or heritage sites could be identified. As a result, low to no impact is expected from the proposed development on heritage.

### **7.3 MITIGATION MEASURES**

With no impact expected on heritage, no further mitigation is required. Refer Chapter 6 of this report.

### **7.4 GENERAL**

It is the author's considered opinion that the overall impact on heritage resources is Low. Provided that the recommended mitigation measures are implemented, the impact would be acceptably Low or could be totally mitigated to the degree that the project could be approved from a heritage perspective.

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**WOUTER FOURIE**

**Professional Heritage Specialist and Professional Archaeologist and Director PGS Heritage**

**Summary of Experience**

Specialised expertise in Archaeological Mitigation and excavations, Cultural Resource Management and Heritage Impact Assessment Management, Archaeology, Anthropology, Applicable survey methods, Fieldwork and project management, Geographic Information Systems, including *inter alia* -

Involvement in various grave relocation projects (some of which relocated up to 1000 graves) and grave "rescue" excavations in the various provinces of South Africa

Involvement with various Heritage Impact Assessments, within South Africa, including -

- Archaeological Walkdowns for various projects
- Phase 2 Heritage Impact Assessments and EMPs for various projects
- Heritage Impact Assessments for various projects
  - Iron Age Mitigation Work for various projects, including archaeological excavations and monitoring
  - Involvement with various Heritage Impact Assessments, outside South Africa, including -
- Archaeological Studies in Democratic Republic of Congo
- Heritage Impact Assessments in Mozambique, Botswana and DRC
- Grave Relocation project in DRC

**Key Qualifications**

BA [Hons] (Cum laude) - Archaeology and Geography - 1997

BA - Archaeology, Geography and Anthropology - 1996

Professional Archaeologist - Association of Southern African Professional Archaeologists (ASAPA) - Professional Member

Accredited Professional Heritage Specialist – Association of Professional Heritage Practitioners (APHP)

CRM Accreditation (ASAPA) -

- Principal Investigator - Grave Relocations
- Field Director – Iron Age
- Field Supervisor – Colonial Period and Stone Age
- Accredited with Amafa KZN

**Key Work Experience**

2003- current - Director – Professional Grave Solutions (Pty) Ltd

2007 – 2008 - Project Manager – Matakoma-ARM, Heritage Contracts Unit, University of the Witwatersrand

2005-2007 - Director – Matakoma Heritage Consultants (Pty) Ltd

2000-2004 - CEO– Matakoma Consultants

1998-2000 - Environmental Coordinator – Randfontein Estates Limited. Randfontein, Gauteng

1997-1998 - Environmental Officer – Department of Minerals and Energy. Johannesburg, Gauteng

Worked on various heritage projects in the SADC region including, Botswana, Mozambique, Malawi, Mauritius, Zimbabwe and the Democratic Republic of the Congo