



PGS HERITAGE

Heritage Impact Assessment report for the proposed Glencore Rhovan Solar Photovoltaic Facility

Farm portions include Portion 0 of the Farm Leeuwpen 403 JQ, portion 0 of the Farm Beestkraal 397 JQ and RE of portion 2 of Farm Losperfontein 405 JQ within the Rustenburg Local Municipality, Bojanala Platinum District, North West Province

Heritage Impact Assessment

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Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page ii

REVISION HISTORY

Version	Issue Date	Description of Changes
1.0	15 November 2022	First draft
2.0	30 November 2022	Corrected Executive Summary

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page iii

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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Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page iv

ACKNOWLEDGEMENT OF RECEIPT

Report Title	Heritage Impact Assessment report for the proposed Glencore Rhovan PV Facility – Farm portions include Portion 0 of the Farm Leeuwpen 403 JQ, portion 0 of the Farm Beestkraal 397 JQ and RE of portion 2 of Farm Losperfontein 405 JQ within the Rustenburg Local Municipality, Bojanala Platinum District, North West Province		
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Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page v

The Heritage Impact Assessment Report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA): Appendix 6 of the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended, 2017) requirements for specialist reports as indicated in the table below.

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report
1.(1) (a) (i) Details of the specialist who prepared the report	Page ii 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 Appendix C
(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 1.1
(cA) An indication of the quality and age of base data used for the specialist report	N/A
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 5
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 4.4
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Appendix A and B
(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 4
(g) An identification of any areas to be avoided, including buffers	Section 4
(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 4.3
(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 4
(k) Any mitigation measures for inclusion in the EMPr	Section 6
(l) Any conditions for inclusion in the environmental authorization	Section 6
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorization	Section 6
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 6 and 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 6
(o) A description of any consultation process that was undertaken during the course of carrying out the study	Informal consultation in fieldwork.
(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.	No protocols or minimum standards for HIAs or PIAs

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page vi

EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd was appointed by Environmental Impact Management Services (EIMS) (Pty) Ltd to undertake a Heritage Impact Assessment (HIA) that forms part of the Environmental Impact Assessment (EIA) for the proposed Glencore Rhovan Photo Voltaic (PV) on Farm portions that include Portion 0 of the Farm Leeuwpen 403 JQ, portion 0 of the Farm Beestkraal 397 JQ and RE of portion 2 of Farm Losperfontein 405 JQ within the Rustenburg Local Municipality, Bojanala Platinum District, North West Province.

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

Heritage Resources

The fieldwork for the HIA identified three sites (**RPVF-01 – 03**) containing archaeological resources were identified during the fieldwork. All three were overgrown, with only sections of stone walling visible (**Figure 11** and **Figure 12**). It is possible that the identified stone structures and stonewalling are part of an extensive settlement or settlement. Due to other similar structures in the Rhovan mine area, these three sites have medium heritage significance and are provisionally graded as 3B. The three sites are situated within the footprint area of alternative 1. Due to the vegetation cover, it was impossible to delineate the extent of the stonewalling. Due to the vegetation cover, it was impossible to delineate the extent of the stonewalling.

Impact Statement

The pre-mitigation impact on the identified heritage resources located within the footprint of alternative 1 is calculated as MEDIUM negative and only focused during the construction of the PV facility. Implementation of the recommended mitigation measures will reduce the impact to LOW negative.

Mitigation measures

A phase II field assessment that will include vegetation clearance of the structures to determine the extent of the site and test excavation where deposits or midden areas are identified during the vegetation clearing must be conducted. This will aim to identify the cultural affinity, temporal depth, and settlement layout. The Phase 2 study can only be conducted after a permit is issued to the competent archaeologist under s35 of the NHRA.

Upon completion of the Phase 2 study, a permit for destruction can be lodged with SAHRA with the backing of the Phase 2 report as completed by the archaeological specialist.

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page vii

Conclusion

It is the combined considered opinion that the overall impact on heritage resources after the implementation of mitigation is low. Provided that the recommended mitigation measures are implemented, the impact would be acceptably Low or could be mitigated to the degree that the project could be approved from a heritage perspective.

Considering the type and implementation of the mitigation measures, we consider alternatives 1 and 2 as both viable options from a heritage perspective.

The management and mitigation measures as described in section 6 of this report, have been developed to minimise the project's impact on heritage resources. The implementation of recommended mitigation measures will reduce the overall impact on heritage resources to acceptable levels during the project activities.

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page viii

TABLE OF CONTENTS

1	INTRODUCTION.....	1
1.1	Scope of the Study	1
1.2	Specialist Qualifications	1
1.3	Assumptions and Limitations	2
1.4	Legislative Context	2
1.4.1	<i>Notice 648 of the Government Gazette 45421.....</i>	<i>2</i>
1.4.2	<i>NEMA – Appendix 6 requirements.....</i>	<i>3</i>
1.4.3	<i>The National Heritage Resources Act.....</i>	<i>3</i>
2	TECHNICAL DETAILS OF THE PROJECT.....	3
2.1	Locality	3
2.2	Technical Project Description	4
2.2.1	<i>Project description.....</i>	<i>4</i>
3	ASSESSMENT METHODOLOGY.....	7
3.1	Methodology for Assessing Heritage Site significance	7
3.1.1	<i>Site Significance.....</i>	<i>7</i>
3.2	Methodology used in determining the significance of environmental impacts	10
4	CURRENT STATUS QUO.....	10
4.1	Site Description	10
4.2	Overview of the study area and surrounding landscape	11
4.2.1	<i>Archival and historical maps.....</i>	<i>17</i>
4.2.2	<i>First Edition Topographical map 2527BD Jericho.....</i>	<i>18</i>
4.2.3	<i>Second Edition Topographical map 2527DA Wolhuterskop.....</i>	<i>18</i>
4.2.3.1	<i>Previous heritage impact assessment reports from the study area and surroundings.....</i>	<i>19</i>
4.2.4	<i>Heritage screening.....</i>	<i>22</i>
4.2.5	<i>Heritage sensitivity.....</i>	<i>22</i>
4.3	Fieldwork findings	23
5	IMPACT ASSESSMENT.....	27
5.1	Details of all alternatives considered	27
5.2	Impact assessment summary table	27
6	MANAGEMENT RECOMMENDATIONS AND GUIDELINES.....	29
6.1	Construction and operational phases	29
6.2	Chance finds procedure	29
6.3	Possible finds during construction	30

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page ix

6.4	Timeframes	30
6.5	Heritage Management Plan for EMPr implementation	31
7	CONCLUSIONS AND RECOMMENDATIONS	33
7.1	Mitigation measures	33
7.2	General	33
8	REFERENCES	34

List of Figures

<i>Figure 1 – Human and Cultural Timeline in Africa</i>	<i>xiv</i>
<i>Figure 2 - Locality Map of the proposed study area (Provided by EIMS).</i>	<i>6</i>
<i>Figure 3 – General view of the conditions in the alternative 1 assessment area</i>	<i>11</i>
<i>Figure 4 - Locality of various chiefdoms in the Central Bankeveld (Pistorius, 2013)</i>	<i>14</i>
<i>Figure 5 - Section of the First Edition 2527DA Wolhuterskop</i>	<i>18</i>
<i>Figure 6 - Section of the Second Edition 2527DA Wolhuterskop</i>	<i>19</i>
<i>Figure 7 - Archaeological sites identified during previous studies</i>	<i>20</i>
<i>Figure 8 - Documentation of site LIA2 as completed by Pistorius in 2013</i>	<i>21</i>
<i>Figure 9 - Documentation of site LIA2 as completed by Pistorius in 2013</i>	<i>21</i>
<i>Figure 10 - Screening tool map indicating a low sensitivity rating for archaeology and heritage in the proposed study area (Source: DFFE).</i>	<i>22</i>
<i>Figure 11 - View of a section of stone walling at site RPVF-01</i>	<i>24</i>
<i>Figure 12 - View of thick vegetation cover at RPVF-02</i>	<i>24</i>
<i>Figure 13 - Fieldwork tracklogs</i>	<i>25</i>
<i>Figure 14 - Identified archaeological sites within the PV area.</i>	<i>26</i>

List of Tables

<i>Table 1: Reporting requirements for GN648</i>	<i>3</i>
<i>Table 2: Locality details</i>	<i>4</i>
<i>Table 3: Rating system for archaeological resources</i>	<i>8</i>
<i>Table 4: Rating system for built environment resources</i>	<i>9</i>
<i>Table 5: Tangible heritage site in the study area</i>	<i>23</i>
<i>Table 6: Landform type to heritage find matrix</i>	<i>23</i>
<i>Table 7: Impact rating for heritage resources</i>	<i>28</i>
<i>Table 8: Lead times for permitting and mobilisation</i>	<i>30</i>
<i>Table 18 - Heritage Management Plan for EMPr implementation</i>	<i>31</i>

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page x

List of Appendices

- A *Environmental Impact Assessment Methodology (EIMS)*
- B *Project team CV's*
- C *Site Documentation Matrix*

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page xi

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;
- 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

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page xii

Early Stone Age

The archaeology of the Stone Age between 700 000 and 2 500 000 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 Stone Age

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

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page xiii

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.

Abbreviations	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
BA	Basic Environmental Assessment
CRM	Cultural Resource Management
ECO	Environmental Control Officer
EFC	Early Framing Communities
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHS	Provincial Heritage Site
PSSA	Palaeontological Society of South Africa
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

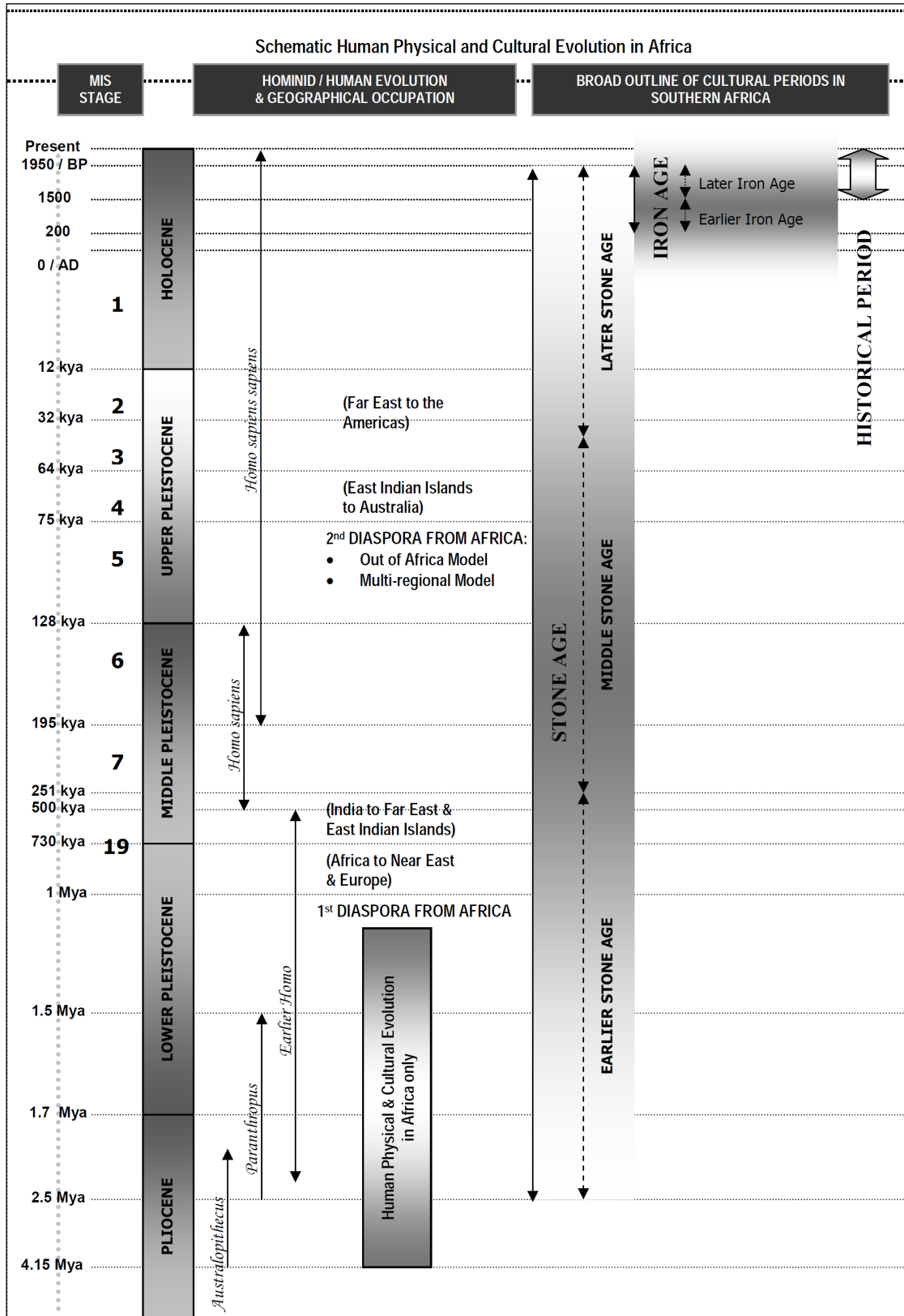


Figure 1 – Human and Cultural Timeline in Africa

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 1

1 INTRODUCTION

PGS Heritage (Pty) Ltd was appointed by Environmental Impact Management Services (EIMS) (Pty) Ltd to undertake a Heritage Impact Assessment (HIA) that forms part of the Environmental Impact Assessment (EIA) for the proposed Glencore Rhovan Photo Voltaic (PV) on Farm portions that include Portion 0 of the Farm Leeuwpen 403 JQ, portion 0 of the Farm Beestkraal 397 JQ and RE of portion 2 of Farm Losperfontein 405 JQ within the Rustenburg Local Municipality, Bojanala Platinum District, North West Province.

1.1 Scope of the Study

The study aims to identify heritage sites and finds that may occur in the proposed project area. The HIA aims to inform the BA to assist the developer in responsibly managing the discovered heritage resources, to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

1.2 Specialist Qualifications

PGS compiled this HIA Report.

The staff at PGS has a combined experience of nearly 70 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work with the relevant expertise and experience to undertake that work competently.

Wouter Fourie, the author and archaeologist, 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). He is also one of the Directors of PGS Heritage.

Nikki Mann, the field archaeologist, graduated with her Master's degree (MSc) in Archaeology and is registered as a Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA).

Wynand van Zyl, the field archaeologist, holds a BA (Hons) in Archaeology.

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 2

1.3 Assumptions and Limitations

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and existing vegetation cover.

It should be noted that sections of the surveyed area are covered with grass and shrubs that hampered the evaluation and grading of heritage features.

Therefore, should any heritage features and/or objects be located or observed outside the identified heritage-sensitive areas during the construction activities, a heritage specialist must be contacted immediately. 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 assess as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. If any graves or burial places are located during the development, the procedures and requirements about graves and burials will apply as set out below.

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 199

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 1** and the applicable section in this report noted.

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 3

Table 1: Reporting requirements for GN648

GN 648	Relevant section in report	Where not applicable in this report
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.

1.4.3 The National Heritage Resources Act

- 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 TECHNICAL DETAILS OF THE PROJECT

2.1 Locality

Table 2 provides a description of the property details and size of the proposed PV facility footprint as well as the distance to the nearest towns. The proposed project will be located within the mine area. See **Figure 2** for the locality of the proposed PV facility.

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 4

Table 2: Locality details

Property	The potentially affected properties include Portion 0 of the Farm Leeuwpen 403 JQ, portion 0 of the Farm Beestkraal 397 JQ and RE of portion 2 of Farm Losperfontein 405
Property ownership	National Government of the Republic of South Africa (Land ownership for affected properties is held in a trust for the Bakwena Ba-Mogopa tribe and leased by Rhovan. Mineral Lease K18/1992).
21-digit Surveyor General Code	T0JQ0000000040300000 T0JQ0000000039700000 T0JQ0000000040500002
Application Area (Ha)	The directly affected properties comprise an area of 83 ha for Site Alternative S1 and 39 ha for Site Alternative S2. The footprint of the PV facility infrastructure will be confirmed in the EIA phase.
Magisterial District	Rustenburg Local Municipality (Ward 29), Bojanala Platinum District, North West Province.
Distance and direction from nearest towns	The geographic coordinates at the centre of the Site Alternative S1 are approximately: 25°34'29.33"S and 27°34'9.75"E. The geographic coordinates at the centre of the Site Alternative S2 are approximately: 25°34'5.57"S and 27°34'31.81"E. The town of Bethanie is located approximately 1km to the northeast of the project area. Barseba town and Modikwe towns are located approximately 4km to the west of the project area.
Surrounding land uses	The area immediately surrounding the proposed PV development footprint is all part of the Rhovan Vanadium mine and can be described as heavily disturbed due to existing mining activities. See for a map of the landcover in and around the proposed development sites.

2.2 Technical Project Description

2.2.1 Project description

The applicant proposes the development of a PV Energy Generation Facility. The generation capacity will be up to 25MW and cover an area of up to 83ha. Two sites are being considered. Site alternative S1 is located at the centre of the mine area, is currently undeveloped, and is not being utilised. Site alternative S2 is located on top of the existing tailings storage facility at the mine. The proposed facility will include the following infrastructure:

- PV Panels;
- Power line connection (11kV);
- Access roads;
- On-site substation / switching station; and
- Possibly an on-site battery storage facility.

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 5

Further detail as to the exact infrastructure proposed will be described in the EIA report once this information becomes available. More detailed infrastructure layouts should be available at the EIA stage, and potential alternative layout options may be assessed.

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	1.0	30/11/2022	Page 6

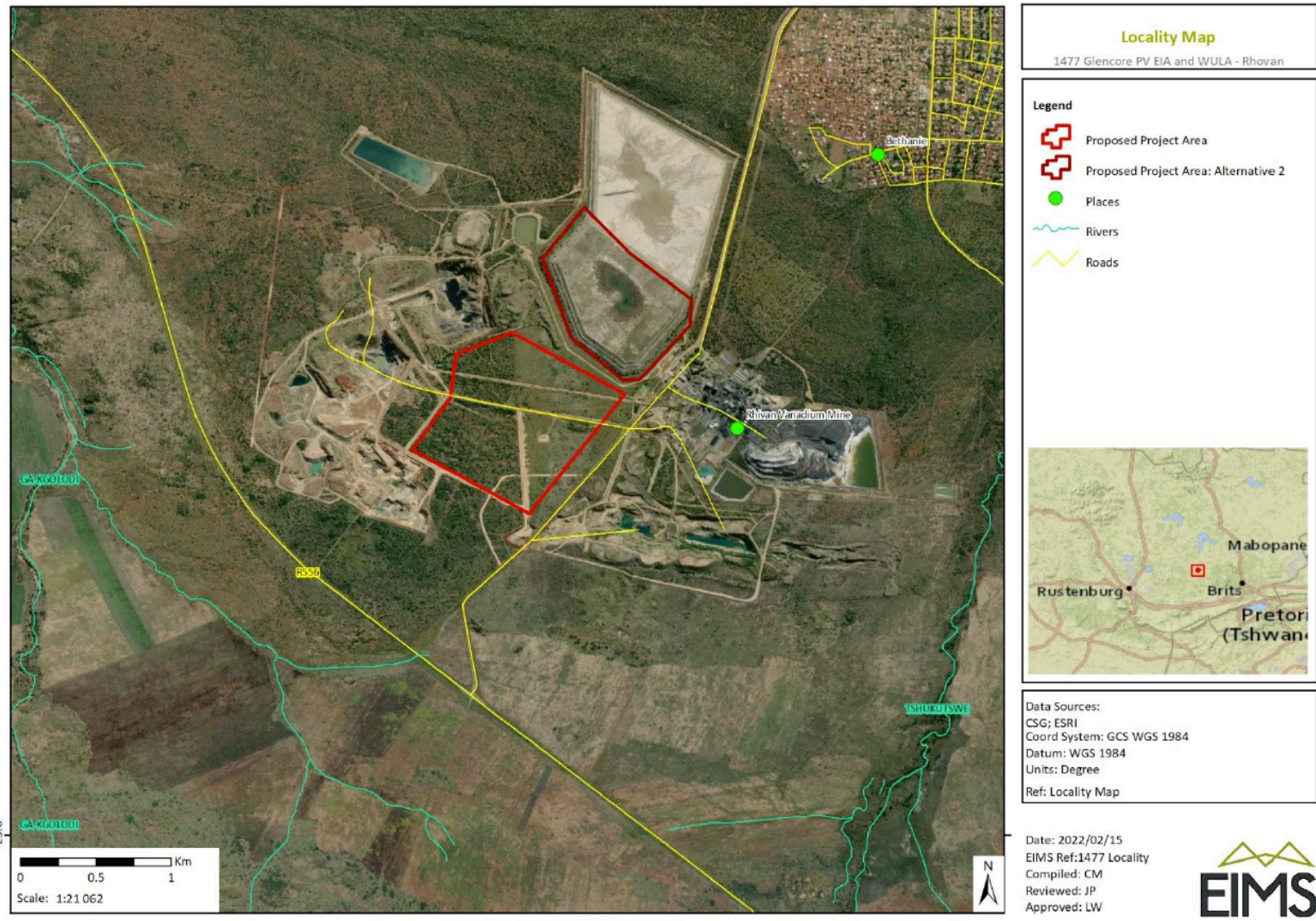


Figure 2 - Locality Map of the proposed study area (Provided by EIMS).

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 7

3 ASSESSMENT METHODOLOGY

The section below outlines the assessment methodologies utilised in the study.

3.1 Methodology for Assessing Heritage Site Significance

PGS compiled this HIA report for the proposed Rhovan PV project. The applicable maps, tables and figures are included, as stipulated in the NHRA (no 25 of 1999) and the National Environmental Management Act (NEMA) (No. 107 of 1998). The HIA process consists of three steps:

Step I – Literature Review and initial site analysis: The background information to the field survey relies greatly on Heritage Background Research, which was undertaken through archival research and evaluation of satellite imagery and topographical maps of the study area.

Step II – Physical Survey: A physical survey was conducted by vehicle and pedestrian access through the proposed project area by two qualified heritage specialists (on 11 November 2022), to locate and document sites within and adjacent to the proposed development footprint.

Step III – The final step involved recording and documenting relevant heritage resources identified in the physical survey, assessing these resources in terms of the HIA criteria and report writing, mapping, and constructive recommendations.

The significance of heritage sites is based on four main criteria:

- Site integrity (i.e., primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter)
 - Low - <10/50m²
 - Medium - 10-50/50m²
 - High - >50/50m²
- Uniqueness; and
- Potential to answer present research questions.

Impacts on these sites by the development will be evaluated as follows:

3.1.1 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. The update classification and rating system as developed by Heritage Western Cape (2021) is implemented in this report

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 8

Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (**Table 3** and **Table 4**).

Table 3: Rating system for archaeological 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: 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 Provincial Heritage Authority. 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 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

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 9

Table 4: 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 Provincial Heritage Authority.	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 should receive maximum protection at local level.	High Significance
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	Low Significance

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 10

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
		alterations should not necessarily be regulated.	
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

3.2 Methodology used in determining the significance of environmental impacts

The methodology used to determine the environmental impact significance was provided by Environmental Impact Management Services (EIMS) and is explained in **Appendix B**.

4 CURRENT STATUS QUO

4.1 Site Description

The study areas are situated within the Rhovan Mining Complex footprint area, just southwest of the town of Bethanie. The preferred option is situated in the centre of the mine area. It is characterised by an eastern section previously used for dry land agriculture and a western section covered in grassy bushveld. Alternative 2 is situated on top of the existing tailings storage facility (TSF).

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 11



Figure 3 – General view of the conditions in the alternative 1 assessment area

4.2 Overview of the study area and surrounding landscape

Date	Description
The Study Area and Surroundings during the Stone Age	
The South African Stone Age is the longest archaeologically-identified phase identified in human history and lasted for millions of years.	
2.5 million to 250 000 years ago	<p>The Earlier Stone Age is the first and oldest phase identified in Southern Africa's archaeological history and comprises two technological phases. The earliest of these technological phases is known as Oldowan which is associated with crude flakes and hammer stones and dates to approximately 2 million years ago. 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 handaxe. The Acheulian phase dates back to approximately 1.5 million years ago.</p> <p>No Earlier Stone Age sites are known from the study area or its immediate surroundings.</p>
250 000 to 40 000 years ago	The Middle Stone Age (MSA) dates to between 250 000 to 40 000 years BP. MSA dates of around 250 000 BP originate from sites such as Leopards Kopje in Zambia, while the late Pleistocene (125 000 BP) yields a number of important dated sites

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 12

Date	Description
	<p>associated with modern humans (Deacon & Deacon, 1999). The MSA is characterised by flake and blade industries, the first use of grindstones, wood and bone artefacts, personal ornaments, use of red ochre, circular hearths and a hunting and gathering lifestyle.</p> <p>A number of Middle Stone Age lithics were identified during an archaeological survey undertaken in the general surroundings of the study area by Huffman (1991).</p>
40 000 years ago, to the historic past	<p>The Later Stone Age is the third phase identified in South Africa's archaeological history. It is associated with an abundance of very small stone artefacts known as microliths. In Southern Africa, the Later Stone Age is characterised by the appearance of rock art in the form of paintings and engravings.</p> <p>The Magaliesberg Mountains located a short distance south of the study area is well known for its Stone Age history, and especially so the Later Stone Age (Carruthers, 2000). A number of researchers have undertaken excavations of these sites, including Professor Revil mason, Mr Robbie Steel and Dr Lyn Wadley. The Later Stone Age sites from this area include open sites such as Xanadu as well as rock shelter and cave sites such as Kruger Cave and Jubilee Shelter (Bergh, 1999). Additionally, Later Stone Age lithics were identified in the general surroundings of the study area during an archaeological survey undertaken by Van der Walt (2009).</p>
The Study Area and Surroundings during the Iron Age – Early Farming Communities	
<p>The arrival of early farming communities (EFC) during the first millennium, heralded in the start of the Iron Age for South Africa. The Iron Age is that period in South Africa's archaeological history associated with pre-colonial farming communities who practiced cultivation and pastoralist farming activities, metal working, cultural customs such as lobola and whose settlement layouts show the tangible representation of the significance of cattle (known as the Central Cattle Pattern) (Huffman, 2007).</p> <p>The tangible remains of the EFC during the Iron Age are frequently identified in the general surroundings of the study area, and these may include potsherds, stonewalled settlements, grinding stones and metal smelting and forging sites. During the period between AD 1650 and AD 1900 the area north of the Magaliesberg Mountains, from Rustenburg in the west to Onderstepoort in the east, was characterised by thousands of stonewalled settlements located along the bases of the granite outcrops of the area. These settlements represented the spheres of influence of various Sotho-Tswana chiefdoms, including the Kgatla, Po, Kwena and Fokeng (Nienaber & Steyn, 2002).</p> <p>An assessment of the different histories of these groups suggest that it was especially the Bakwena ba Mogôpa and Bapo ba Mogale who were associated with the surroundings of the study area.</p>	
Early Iron Age AD150-AD750	<p>Two Early Iron Age ceramic facies can be identified within the vicinity of Brits. Firstly, the Bambata ceramic facies was identified at the site known as Jubilee shelter in the Magaliesberg which dates to between AD150 - AD750 and is associated with the Kalundu tradition though no settlements were ever found relating to this facies within the region (Wadley 1996). Secondly the Mzonjani ceramic facies associated with the Urewe tradition which can be found at the site known as Broederstroom which is a settlement located in the Magalies Valley which dates to between AD450 – AD750 (Huffman 2007, Manson 1981, Wadley 1996).</p>
Middle Iron Age	<p>The Middle Iron Age in the surrounding area is represented by the Eiland ceramic facies which dates to between AD 1000 – AD 1300 and is associated with the Kalundu</p>

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 13

Date	Description
AD1000- AD1300	tradition (Evers 1988, Huffman 2007). Eiland ceramics can also be found on the settlements of communities in the Limpopo valley that produce Mapungubwe facies ceramics. This hints to regional trade occurring across the Soutpansberg mountain range at sites like Mapungubwe and Mutamba (Antonites 2012, Calabrese 2007: 24). Hall (1981) has also identified the Eiland facies at Rooikrans in the Boschoffsberg valley and at Rhenosterkloof 3 in the Sand River Valley. While a variation of the Eiland facies can also be found in southeastern Botswana and is known as the Broadhurst facies (Denbow 1981, Biemond 2017)
AD 1600 – AD 1750	<p>The origins of the Bakwena ba Mogôpa can be traced back to a place named Rathatheng, near the junction of the Marico and Crocodile (Odi or Oori) Rivers, where the Bakwena ba Mogôpa were known to have settled as early as AD 1600.</p> <p>During the mid-seventeenth century, the Bakwena ba Mogôpa moved from Rathateng to Lokwadi (Zandrivierspoort) near the foot of the Phalane Mountains.</p> <p>During the first half of the eighteenth century, the Bakwena ba Mogôpa moved to the Mabjanamatswane Hills, north-east of modern-day Brits. While these hills are located approximately 10km southeast of the present study area, the sphere of influence of the Bakwena ba Mogôpa during this time stretched from the Crocodile River in the west to the Apies River in the east, and from the Pienaars River in the north to the Hennops River in the south (Breutz, 1953) (Mogapi, 1996).</p>
AD 1700	<p>The Bapo ba Mogale, an early Nguni migrant group, resided along the banks of the Crocodile (Odi or Oori) river during this time (Breutz, 1953).</p> <p>Their settlements along the banks of this river would likely have been in the general surroundings of the present study area, albeit more likely along the western bank of the river than the eastern bank.</p> <p>Within a few years, the Bapo ba Mogale moved in a western direction to the area known as Makolokwe (either the present-day farm Wolwekraal or the present-day farm Kareepoort) (Breutz, 1953).</p>
AD 1750 – Early 1800s	<p>During the middle of the eighteenth century, the Bakwena ba Mogôpa moved from the Mabjanamatswane Hills in an eastern direction to settle at Mangwatladi (or Lengwatladi) east of the Apies River.</p> <p>They stayed here for a number of years moving back to the Mabjanamatswane Hills. Bakwena ba Mogôpa later settled in this same area at Mamogaleskraal (Gwate) at the foot of a hill named Thaba ya Morena (Breutz, 1953) (Mogapi, 1996).</p> <p>As mentioned above, the Mabjanamatswane Hills are located approximately 10km southeast of the present study area.</p>
AD 1770 – Early 1800s	<p>During this time, the Bapo ba Mogale settled along the northern slopes and foot of Tlhogokgolo (Wolhuterskop). The kgosi of the Bapo during this time was Moerane (Breutz, 1953). Wolhuterskop is located approximately 14km south-east of the present study area.</p> <p>This period is remembered in the Bapo oral traditions as a time of great wealth when large herds of cattle were owned by the Bapo ba Mogale.</p>

Date	Description
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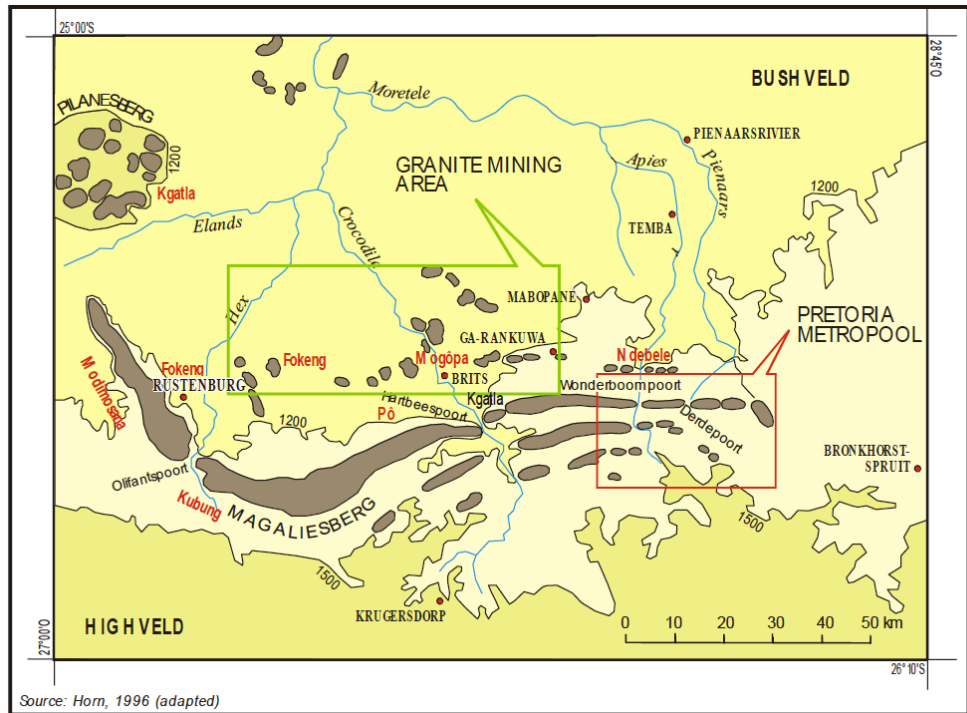


Figure 4 - Locality of various chiefdoms in the Central Bankeveld (Pistorius, 2013)

**AD 1817 -
AD 1823**

A Pedi force under Maleleku invaded the areas surrounding the Magaliesberg Mountains. After an unsuccessful attack against the Bakwena ba Mogôpa near the Apies River, the Pedi attacked the Bapo in the vicinity of Wolhuterskop. Although they were defeated as well, the Pedi managed to retire from the battle with a large number of captured cattle as well as women and children who were enslaved during the battle.

The heir to the Po throne, Mohale Mohale, was a child at the time and although he was also almost captured in the battle, he was hidden in a kloof and managed to escape discovery. The name of the Magaliesberg Mountains is derived from Mohale Mohale's name (Breutz, 1953) (Carruthers, 2000).

**AD 1827 -
AD 1832**

The Khumalo Ndebele (Matabele) of Mzilikazi moved from their settlements along the Vaal River into the surroundings of the study area and started attacking the communities who were residing here (Bergh, 1999). They crossed over the Magaliesberg Mountain at present-day Commandonek, and according to Carruthers (2000) first attacked the Bakwena ba Mogôpa settlement located near present-day Zilkaatsnek. Although the Kwena defended themselves against the Matabele onslaught over the course of three separate battles, they were defeated in the end. Their surrender to Mzilikazi came at a very high cost, with their chief More and his son Segwati both executed and all the Kwena cattle confiscated. Additionally, the Kwena men were forced to join the ranks of the Matabele army, and those who refused were "...impaled on stakes or had their ears and eyes removed." (Carruthers, 2000:240).

Mzilikazi then attacked the Po at Wolhuterskop, and dispersed them (Breutz, 1953).

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 15

Date	Description
	<p>After the defeat of these and other groups living along the northern foot of the Magaliesberg Mountains, Mzilikazi and his Khumalo Ndebele settled themselves along these parts between 1827 and 1832. He had three royal residences built along the mountain range, their localities providing an estimate of the area controlled and settled by the Matabele during these five years. The three Matabele royal residences were built at Kungwini (at the foot of the Wonderboom Mountain), Hlahlandlela (near present-day Rustenburg) and Dinaneni (near present-day Zilkaatsnek).</p> <p>Zilkaatsnek, where the main settlement of the Bakwena ba Mogôpa and one of three Matabele royal residences were located, is situated approximately 5km south-east of the present study area.</p> <p>As a result of the Matabele invasion of the period between 1827 and 1832, both the Bakwena ba Mogôpa and Bapo ba Mogale were scattered across the landscape, and in some cases across Southern Africa.</p>
The Study Area and Surroundings during the Historical Period	
	<p>The Historical Period within the study area and surroundings commenced with the arrival of newcomers to this area. The first arrivals would almost certainly have been travellers, traders, missionaries, hunters and fortune seekers. However, with time, this initial trickle was replaced by a mass flood of white immigrants during the 1830s, when a mass migration of roughly 2 540 Afrikaner families (comprising approximately 12 000 individuals) from the frontier zone of the Cape Colony to the interior of Southern Africa took place. The people who took part in this Great Trek were later to be known as Voortrekkers (Visagie, 2011).</p> <p>As the Historical Period carried on, the general surroundings of the study area underwent significant changes and development during the twentieth century, including extensive development in the form of granite and iron mining, railway and transportation development as well as the establishment of nearby towns such as Brits.</p>
1836	The first Voortrekker parties started crossing over the Vaal River (Bergh, 1999).
1840	The first Voortrekker to establish himself permanently in the general vicinity of the study area, did so in 1840. His name was Albert Venter and the farm on which he settled was De Kroon, in the direct vicinity of present-day Brits. Another known early Voortrekker who established himself in this area, was P.J. Fourie (De Beer, 1975).
1840s - 1850s	<p>Increasing numbers of Voortrekkers started establishing themselves permanently in the general vicinity of the study area during this time (De Beer, 1975). During this period the first contacts between these new arrivals and the black people residing in this wider area took place. According to Bergh (2005), in particular with regards to the Rustenburg District located west of the study area, these early contacts resulted in the setting aside of land by the Voortrekker leadership for some of the black groups such as the Bafokeng. Mbenga (1997) also indicates that the relationship between the Voortrekkers and the Bakgatla were initially similarly amicable.</p> <p>However, within a short period the relationship between the Voortrekkers and the black groups living in these areas became increasingly strained. For example, Bergh (2005) states that the Bafokeng were eventually dispossessed of their farms. The system of unpaid labour enforced by the Voortrekkers on the local black groups would certainly have deteriorated the relationship further. See for example Morton (1992).</p>

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 16

Date	Description
	The permanent settlement of white farmers in the area, resulted in the proclamation of individual farms and the establishment of permanent farmsteads.
c. 1850	<p>In approximately 1850, the Bakwena ba Mogôpa moved to present-day Lesotho (Mogapi, 1996). This significant movement away from the surroundings of the study area, can almost certainly be attributed to their defeat at the hands of the Matabele two decades or so before as well as the establishment of permanent settlement and government in these parts.</p> <p>Similarly, the Bapo ba Mogale under their Kgosi Mogale Mogale also moved to present-day Lesotho (Carruthers, 2000).</p>
1857	The Pretoria District was established in this year. The study area was to fall within the Pretoria District for the next 71 years. It was only in 1928, with the establishment of the Brits District, that the study area fell in a different district (Bergh, 1999).
1862	Kgosi Mogale Mogale returned from Basutoland and bought the farm Boschfontein. This created focal point for the Bapo to re-establish themselves after the disastrous Matabele invasion roughly three decades before (Breutz, 1953).
1868	In 1868 the Bakwena ba Mogôpa returned from Basutoland to what was by then the Zuid-Afrikaansche Republiek. At first, they returned to the areas north-east of Brits, but shortly thereafter they moved to Mantabole (Bethanie) and Makolokwe (Wolwekraal). These two areas are to this day still associated with the Bakwena ba Mogôpa (Mogapi, 1996).
1899 – 1902	<p>On 11 October 1899 war broke out between Britain and the two Boer republics of the Orange Free State and Transvaal (Zuid-Afrikaansche Republiek). The Magaliesberg Mountains had strategic significance to both sides because of its closeness to Pretoria (and Krugersdorp) as well as the fact that the main access routes between Pretoria and the western part of the old Zuid-Afrikaansche Republiek (including the town of Rustenburg) passed through its valleys. As a result, a number of skirmishes and battles took place in the wider surroundings, including the Battle of Dwarsvlei (11 July 1900), the First Battle of Silkaatsnek (11 July 1900), the Battle of Nooitgedacht (13 December 1900) as well as the Second Battle of Silkaatsnek (2 August 1900) (Copley & Panagos, 1998) (Van Vollenhoven & Van der Walt, 2002). The two battles of Silkaatsnek took place approximately five kilometres south-east of the present study area and represent the closest known battles to the present study area during the course of the war.</p> <p>As part of the so-called 'scorched earth' policy initiated by Lord Kitchener, many Boer farmhouses were destroyed. This would certainly also have been true for the surroundings of the study area as well. Another aspect characteristic of the 'scorched earth' policy was the system of concentration camps (also referred to as refugee camps) in which Boer as well as Black women and children were held. The closest of any of these camps to the present study area, was the one at Modimolle and which was in existence from May 1901 to March 1902. This camp was established by the British authorities and used for the keeping of Boer women and children, resulted in the death of 525 persons, 429 of whom were under the age of 15 years (www.angloboerwar.com).</p>

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 17

Date	Description
	The Anglo-Boer War came to an end with the signing of the Peace Treaty of Vereeniging in May 1902.
1906 - 1910	The railway line between Pretoria North and Rustenburg was constructed during this time (Bergh, 1999). At its closest point this railway line is located approximately 4.5km north of the study area.
April 1923	Construction on the Hartebeestpoort Dam was completed in this year (Brits Town Council, 1974).
23 October 1923	The establishment of the town of Brits was published in the government gazette on this day (Brits Town Council, 1974).
1927	Construction of the Hartebeespoort Dam irrigation system comprising a network of canals and furrows commenced in 1921 and was completed in 1927 (Brits Town Council, 1974). It is known that both the construction of the dam and canal system provided work for semi-literate white people (Carruthers, 2007). Once completed, the canal system provided significant stimulation for the growth of the agricultural sector of the Brits district and surrounding area.
1928	The Brits district was established in this year. The study area now fell within this district (Bergh, 1999).

4.2.1 Archival and historical maps

An assessment of available archival and historical maps was undertaken to establish a historic layering for the study area. These historic maps are also valuable in identifying possible heritage sites and features within the study area. Topographic maps (1:50 000) for various years (1943 and 1968) 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.

The relevant topographical maps include:

- First Edition 2527DA Wolhuterskop Topographic Sheet, surveyed and drawn by the Trigonometrical Survey Office in 1943.
- Second Edition 2527DA Wolhuterskop Topographic Sheet published by the Chief Director of Surveys and Mapping. Printed by the Government Printer in 1968.

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 18

4.2.2 First Edition Topographical map 2527BD Jericho

The figures below depict a section of First Edition 2527DA Wolhuterskop Topographic Sheet, surveyed and drawn by the Trigonometrical Survey Office in 1943 (**Figure 5**).

From the map, the project area and surrounding area were most probably just grazing area. No heritage features are located within the project area.

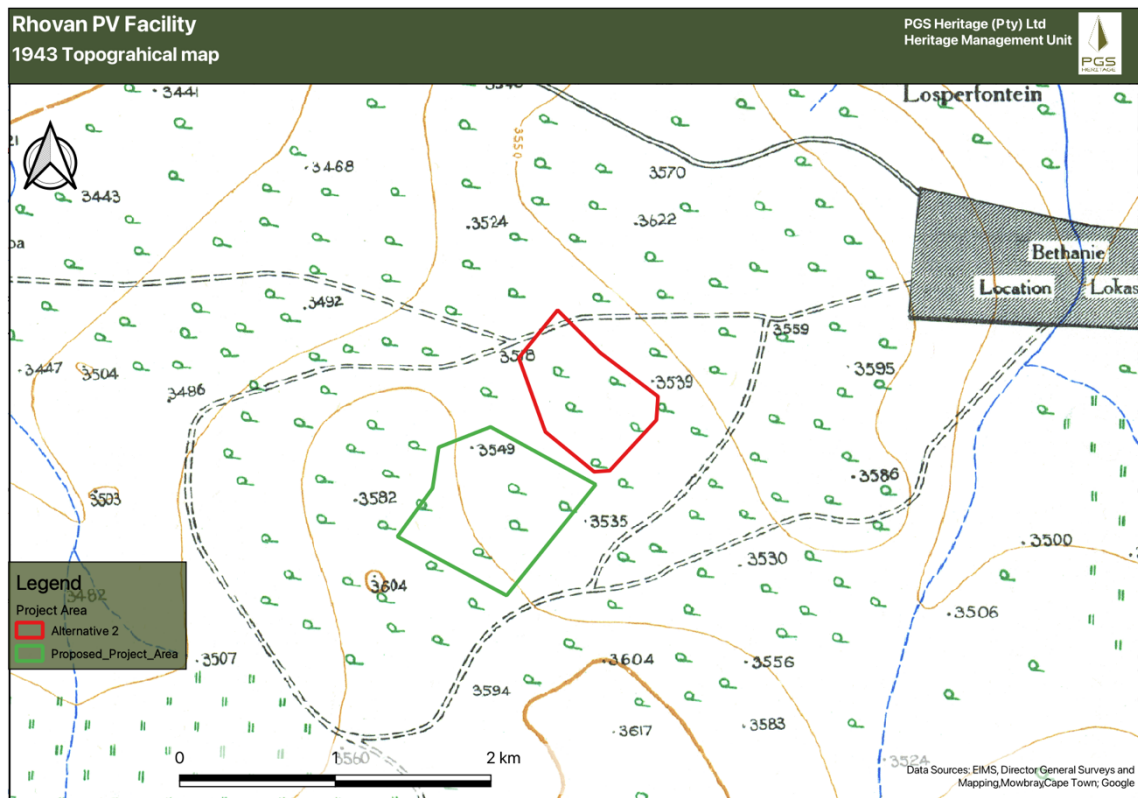


Figure 5 - Section of the First Edition 2527DA Wolhuterskop

4.2.3 Second Edition Topographical map 2527DA Wolhuterskop

The figures below depict a section of the Second Edition 2527DA Wolhuterskop Topographic Sheet published by the Chief Director of Surveys and Mapping. Printed by the Government Printer in 1968 (**Figure 6**).

An analysis of the map shows no structures in the study area. Some general tilled and planted areas can be discerned from the map.

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 19

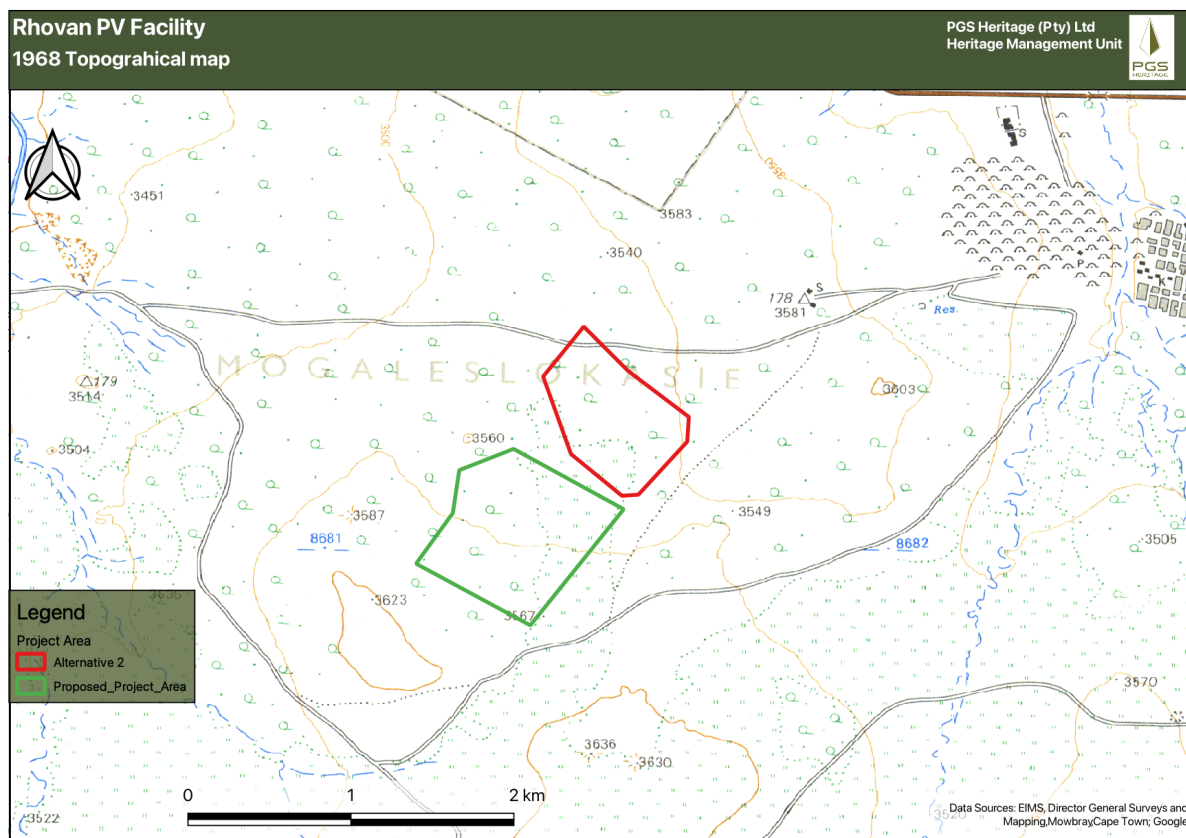


Figure 6 - Section of the Second Edition 2527DA Wolhuterskop

4.2.3.1 Previous heritage impact assessment reports from the study area and surroundings

A Heritage assessment was undertaken for Rhovan mine in 2013 (Pistorius, 2013). The Phase I HIA study for Rhovan revealed the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act within the mine area (**Figure 7**):

- Various Late Iron Age (EFC) structures and stone-walled settlements were identified;
- Pistorius (2013) rated the sites Site LIA01, Site LIA02 and Site LIA05 of high significance and recommended that these sites should be conserved. Site LIA04 was rated as of medium significance, and Site LIA06 and Site LIA07 were rated as low significance. All three of the latter sites are expendable or can be destroyed by developmental projects as they have been adequately documented, according to the HIA (2013).
- The various sites identified are separately described by Pistorius:
 - A single, isolated stone-walled enclosure may date from the Late Iron Age (Site LIA01) (**Figure 8**).
 - Approximately thirty seven hut foundations consisted of upright stones spatially organised on a circular ground plan (Site LIA02) (**Figure 9**).

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 20

- A midden that dates from the Middle and/or Late Iron Age (Site MIA/LIA03) with possible associated sites. Since the original survey was done in 2005, it was found during the 2013 survey that the site had collapsed as part of a wall of an open cast pit.
- Three Late Iron Age sites were located between granite knolls on the southern perimeter of the mining area (Site LIA04, Site LIA05 and Site LIA06), whilst a seventh LIA site was discovered during the 2013 survey and coined Site LIA07.

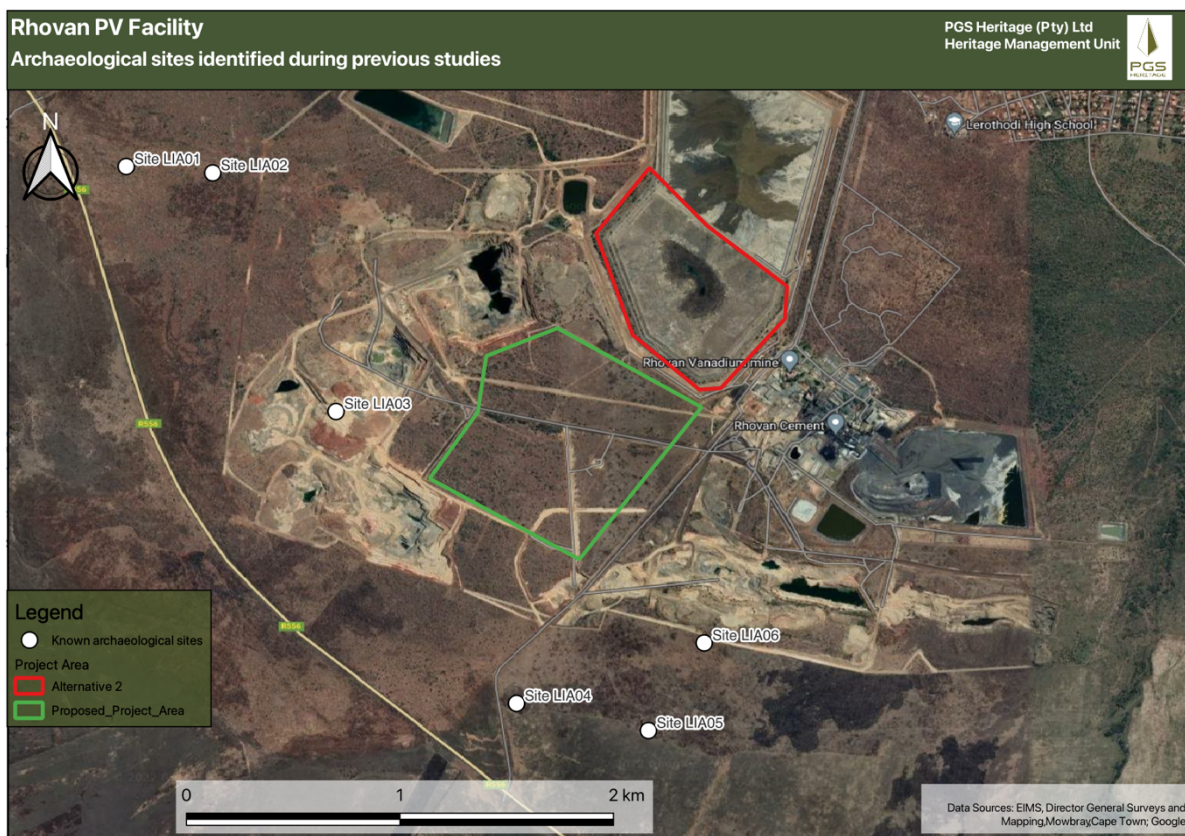


Figure 7 - Archaeological sites identified during previous studies

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 21

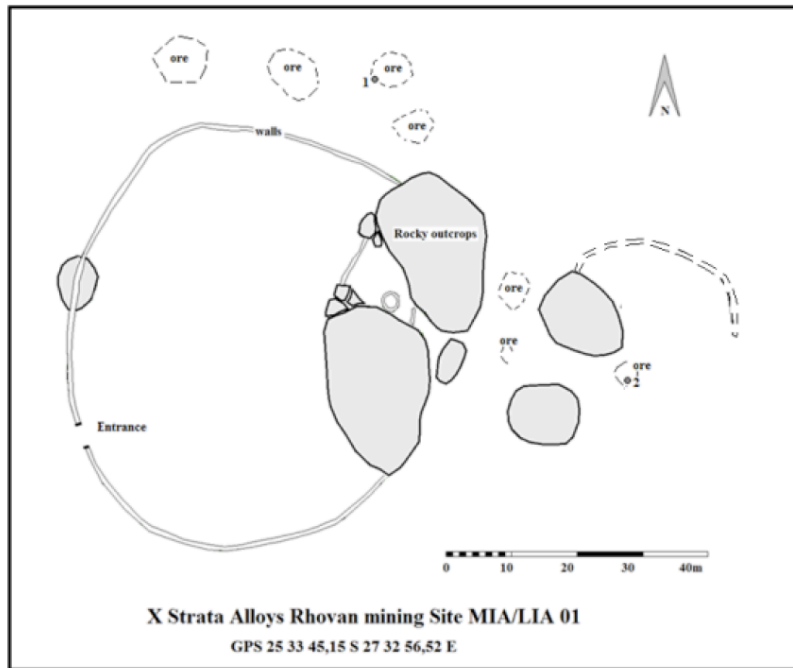


Figure 8 - Documentation of site LIA2 as completed by Pistorius in 2013

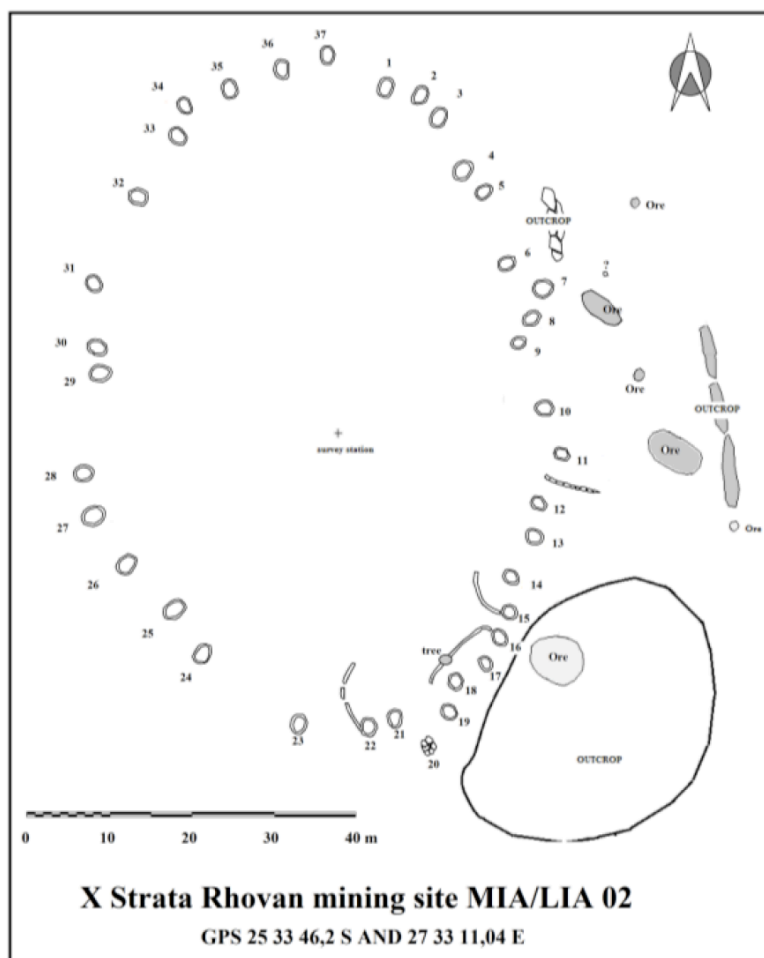


Figure 9 - Documentation of site LIA2 as completed by Pistorius in 2013

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 22

4.2.4 Heritage screening

A heritage screening report was compiled using the Department of Forestry, Fisheries and Environmental Affairs (DFFE) 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 project area has a Low Heritage Sensitivity (**Figure 10**).



Archaeological and Cultural Heritage Theme

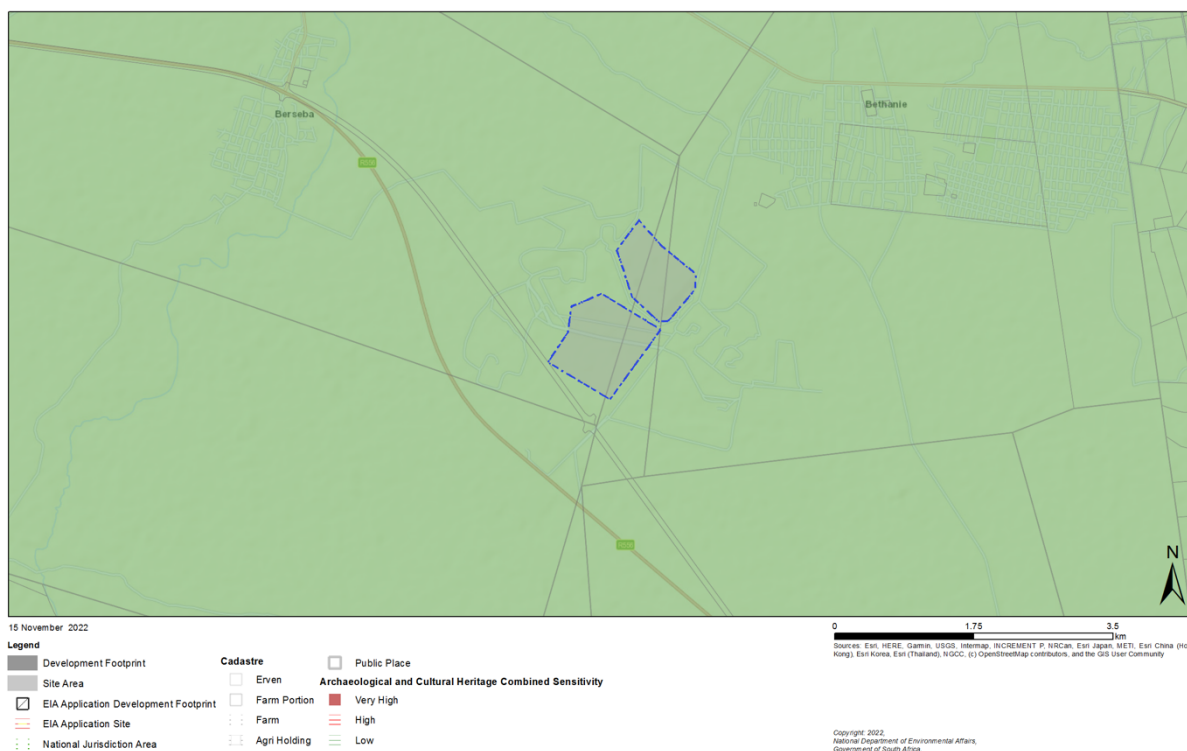


Figure 10 - Screening tool map indicating a low sensitivity rating for archaeology and heritage in the proposed study area (Source: DFFE).

In the greater assessment area, this screening rating is incorrect. Numerous archaeological sites have been identified during surveys in the assessment area.

4.2.5 Heritage sensitivity

Analysis of maps and satellite imagery enabled the identification of possible heritage sensitive areas. By superimposition and analysis, it was possible to rate these structures according to age and thus their level of protection under NHRA. **Table 5** lists the possible tangible heritage sites identified in the vicinity of the study area and the relevant legislative protection.

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 23

Table 5: Tangible heritage site in the study area.

Name	Description	Legislative protection
Archaeology	Older than 100 years	NHRA Sections 3 and 35
Structures	Possibly older than 60 years	NHRA Sections 3 and 34
Burial grounds	Graves	NHRA Sections 3 and 36 and MP Graves Act

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 (**Table 6**).

Table 6: 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
Water holes/pans/rivers	MSA and LSA sites, LIA settlements
Farmsteads	Historical archaeological material
Ridges and drainage lines	LSA sites, LIA settlements

4.3 Fieldwork findings¹

A controlled surface survey was conducted on foot and by a vehicle by two archaeologists (Nicole Mann and Wynand van Zyl) from PGS Heritage. The fieldwork was conducted on 11 November 2022. 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 for the survey are indicated in **Figure 13**.

Three sites (**RPVF-01 – 03**) containing archaeological resources were identified during the fieldwork (**Figure 14**). All three were overgrown, with only sections of stone walling visible (**Figure 11** and **Figure 12**). It is possible that the identified stone structures and stone walling are part of a large settlement or settlements. Due to the vegetation cover, it was impossible to delineate the extent of the stonewalling.

Due to other similar structures in the Rhovan mine area, these three sites have medium heritage significance and are provisionally graded as 3B. A phase II field assessment that will include vegetation clearance of the structures to determine the extent of the site and test excavation where deposits or midden areas are identified during the vegetation clearing must be conducted. This will aim to identify the cultural affinity, temporal depth, and settlement layout. The Phase 2 study can only be conducted after a permit is issued to the competent archaeologist under s35 of the NHRA.

¹ Site in this context refers to a place where a heritage resource is located and not a proclaimed heritage site as contemplated under s27 of the NHRA.

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 24

Upon completion of the Phase 2 study, a permit for destruction can be lodged with SAHRA with the backing of the Phase 2 report as completed by the archaeological specialist



Figure 11 - View of a section of stone walling at site RPVF-01



Figure 12 - View of thick vegetation cover at RPVF-02

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 25

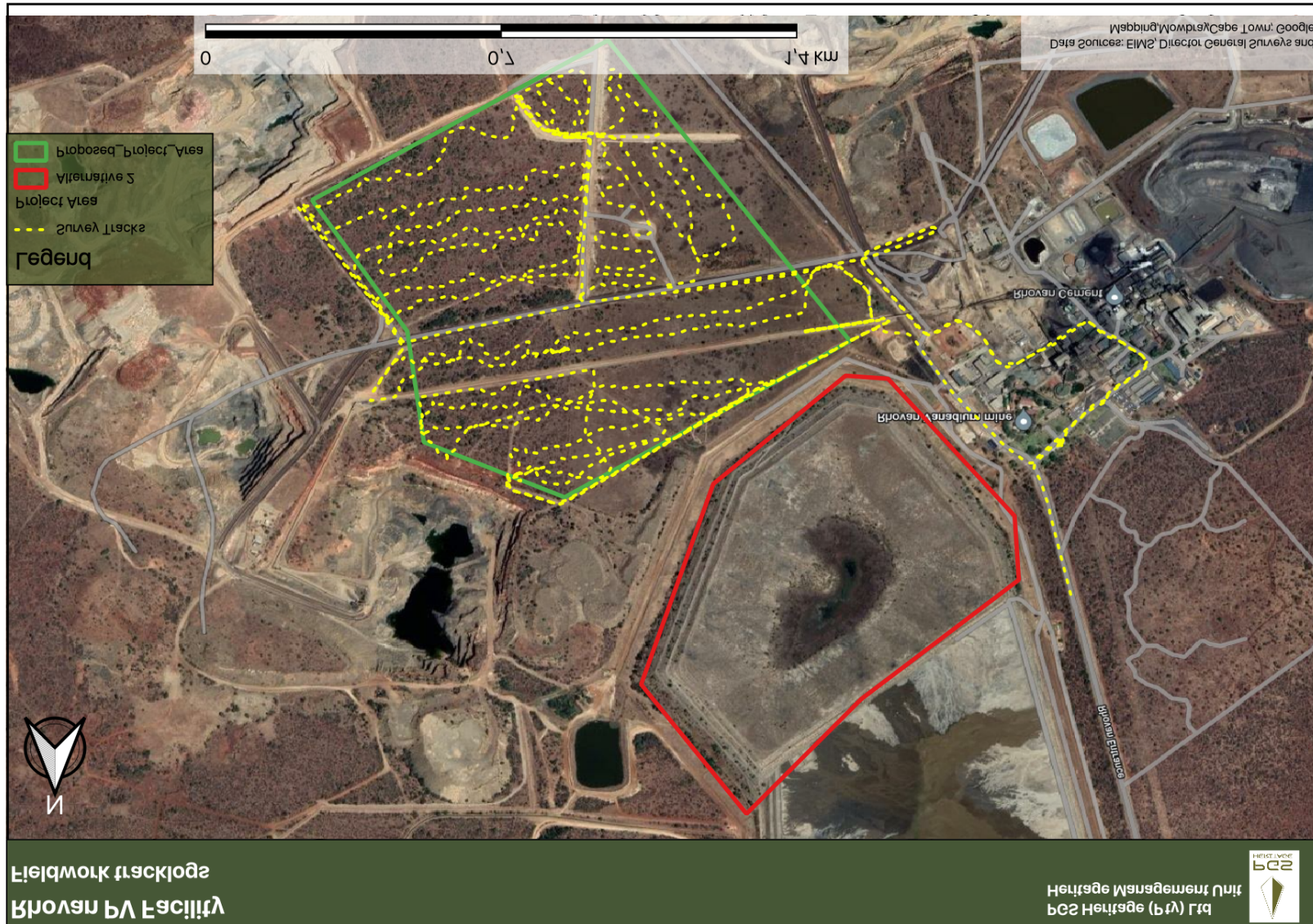


Figure 13 - Fieldwork tracklogs

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 26



Figure 14 - Identified archaeological sites within the PV area. .

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 27

5 IMPACT ASSESSMENT

The impact assessment rating is based on the rating scale as contained in **Appendix B**.

The following section provides an analysis of the impact of the proposed project on heritage resources identified within the proposed PV facility footprint.

5.1 Details of all alternatives considered

This section describes alternative means of carrying out the operation and the consequences of not proceeding with the proposed project.

The two alternatives considered are both seen as largely disturbed with alternative 2 being on top of a TSF where no heritage resources are present. Alternative one consists of sections previously disturbed while the western section contains pockets of undisturbed vegetation.

The “no-go” alternative refers to the option of not going ahead with the proposed project. This will entail maintaining the current status quo with no impact from the project.

5.2 Impact assessment summary table

Implementing the impact assessment methodology as supplied by the Environmental Impact Management Services (EIMS), **Table 7** provides a quantitative assessment of the impacts of the proposed PV Facility.

The pre-mitigation impact on the identified heritage resources located within the footprint of alternative 1 is calculated as MEDIUM negative and only focused during the construction of the PV facility. Implementation of the recommended mitigation measures will reduce the impact to LOW negative.

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	1.0	30/11/2022	Page 28

Table 7: Impact rating for heritage resources

IMPACT DESCRIPTION				Pre-Mitigation						Post Mitigation						Priority Factor Criteria		Prior	Fin			
Identifier	Impact	Alternative	Phase	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Pre-mitigation ER	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Post-mitigation ER	Confidence	Cumulative Impact	Irreplaceable loss	Factor	Score
10.1.1	Archaeological sites	Alternative 1	Construction	-1	2	5	3	5	4	-15	-1	1	5	1	5	1	-3	High	1	2	1,13	-3,375
10.1.2	Archaeological sites	Alternative 2	Construction	-1	1	1	1	1	1	-1	1	1	1	1	1	1	1	High	1	1	1,00	1

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 29

6 MANAGEMENT RECOMMENDATIONS AND GUIDELINES

6.1 Construction and operational phases

The project will encompass a range of activities during the construction phase, including ground clearance, establishment of construction camp areas and small-scale infrastructure development associated with the project.

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. Temporary infrastructure developments, such as construction camps and laydown areas, are often changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to 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.

6.2 Chance finds procedure

- An appropriately qualified heritage practitioner/archaeologist must be identified to be called upon if 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 extent and importance of 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 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.

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 30

6.3 Possible finds during construction

The study area occurs within a greater historical and 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:

- Archaeological structures and foundations
- unmarked burial grounds and graves

6.4 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 8** gives guidelines for lead times on permitting.

Table 8: Lead times for permitting and mobilisation

Action	Responsibility	Timeframe
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 the development	Service provider – Archaeologist, SAHRA, local government and provincial government	6 months

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 31

6.5 Heritage Management Plan for EMPr implementation

Table 9 - Heritage Management Plan for EMPr implementation

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target
General project area	<ul style="list-style-type: none"> Implement a chance to find procedures in case possible heritage finds are uncovered. 	Construction and operation	During construction and operation	Applicant Heritage Specialist	During bush clearing	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34-36 and 38 of NHRA
Archaeological Structures	<ul style="list-style-type: none"> A phase II field assessment that will include vegetation clearance of the structures to determine the extent of the site and test excavation where deposits or midden areas are identified during the vegetation clearing must be conducted. This will aim to identify the cultural affinity, temporal depth, and settlement layout. The Phase 2 study can only be conducted after a permit is issued to the competent archaeologist under s35 of the NHRA. Upon completion of the Phase 2 study, a permit for destruction can be lodged with SAHRA with the backing of the Phase 2 report as completed by the archaeological specialist An application for destruction will then need to be submitted to SAHRA by the developer with the backing of the report emanating from the documentation work 	Pre-Construction	Pre-construction	Applicant Archaeologist	Until destruction	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 32

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target
	<ul style="list-style-type: none"> Upon issuing of the destruction permit the specific site can be destroyed and bush clearing continue in those specific areas 					

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 33

7 CONCLUSIONS AND RECOMMENDATIONS

The fieldwork for the HIA identified three sites (**RPVF-01 – 03**) containing archaeological resources were identified during the fieldwork. All three were overgrown, with only sections of stone walling visible (**Figure 11** and **Figure 12**). It is possible that the identified stone structures and stone walling are part of a large settlement or settlements. Due to other similar structures in the Rhovan mine area, these three sites have medium heritage significance and are provisionally graded as 3B. The three sites are situated within the footprint area of alternative 1. Due to the vegetation cover it was not possible to delineate the extent of the stone walling. Due to the vegetation cover it was not possible to delineate the extent of the stone walling.

The pre-mitigation impact on the identified heritage resources located within the footprint of alternative 1 is calculated as MEDIUM negative and only focused during the construction of the PV facility. Implementation of the recommended mitigation measures will reduce the impact to LOW negative.

7.1 Mitigation measures

A phase II field assessment that will include vegetation clearance of the structures to determine the extent of the site and test excavation where deposits or midden areas are identified during the vegetation clearing must be conducted. This will aim to identify the cultural affinity, temporal depth, and settlement layout. The Phase 2 study can only be conducted after a permit is issued to the competent archaeologist under s35 of the NHRA.

Upon completion of the Phase 2 study, a permit for destruction can be lodged with SAHRA with the backing of the Phase 2 report as completed by the archaeological specialist.

7.2 General

It is the combined considered opinion that the overall impact on heritage resources after the implementation of mitigation is low. Provided that the recommended mitigation measures are implemented, the impact would be acceptably Low or could be mitigated to the degree that the project could be approved from a heritage perspective.

Considering the type and implementation of the mitigation measures, we consider alternatives 1 and 2 as both viable options from a heritage perspective.

The management and mitigation measures as described in section 6 of this report, have been developed to minimise the project's impact on heritage resources. The implementation of

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 34

recommended mitigation measures will reduce the overall impact on heritage resources to acceptable levels during the project activities.

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Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 35

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Historical Topographic Maps

All the historic topographical maps used in this report were obtained from the Directorate: National Geospatial Information of the Department of Rural Development and Land Reform in Cape Town.

Internet

www.sanbi.org

<https://screening.environment.gov.za/screeningtool/#/pages/welcome>

Google Earth

At least some of the aerial depictions of the study area were obtained using Google Earth

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 36

APPENDIX A
ENVIRONMENTAL IMPACT METHODOLOGY

ENVIRONMENTAL IMPACT MANAGEMENT SERVICES (EIMS): IMPACT ASSESSMENT METHODOLOGY

TITLE:	ENVIRONMENTAL IMPACT ASSESSMENT RATING PROCEDURE	DOC No:	PRO 106	REV:	00	Page 2 of 7
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1. Purpose

The purpose of this procedure is to guide the undertaking of an impact and risk assessment process, as required under the regulations promulgated under the National Environmental Management Act (Act 107 of 1998 - NEMA).

2. Scope

This procedure provides the methodology to be applied to environmental impacts and risks identified during the Environmental Impact Assessment Process. The methodology ensures that consistent impact assessment rating is carried out that is legally compliant and aligned with EIMS's objective of providing a quality service.

3. References

GNR. 982 National Environmental Management Act (Act No. 107 of 1998): Environmental Impact Assessment Regulations, 2014 – hereafter referred to as the Regulations.

4. Additional Guidelines and References

Guidelines and Reference Docs (not exhaustive – please verify with the applicable competent authority).	
Compulsory Compliance: GNR. 982 National Environmental Management Act (Act No. 107 of 1998 - NEMA): Environmental Impact Assessment Regulations, 2014.	National
Companion Guideline for Implementation: Environmental Management Assessment Regulations, 2010 - GN 805/2012 (NEMA)	National
DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5, Department of Environmental Affairs and Tourism (DEAT), Pretoria	National

5. Definitions and Abbreviations

Refer to Chapter 1 of the Regulations.

6. Procedure

The impact significance rating methodology, as presented herein and utilised for all EIMS Impact Assessment Projects, 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. The ER is determined for the pre- and post-mitigation scenario. 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.

a. 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. 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:

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

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 1 below.

Table 1: Criteria for Determining Impact Consequence

Aspect	Score	Definition
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Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 37

TITLE:	ENVIRONMENTAL IMPACT ASSESSMENT RATING PROCEDURE	DOC No:	PRO 106	REV:	00	Page 3 of 7
---------------	---	----------------	---------	-------------	----	-------------

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 (15-65 years, the impact will cease after the operational life span of the project)
	5	Permanent (>65 years, no mitigation measure of natural process will reduce the impact after construction)
Magnitude/ Intensity	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, moderate improvement for +ve impacts)
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease, high improvement for +ve impacts)
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease, substantial improvement for +ve impacts)
Reversibility	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 Table 2.

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 38

TITLE:	ENVIRONMENTAL IMPACT ASSESSMENT RATING PROCEDURE	DOC No:	PRO 106	REV:	00	Page 4 of 7
--------	--	---------	---------	------	----	-------------

Table 2: Probability Scoring

Probability	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 3: Determination of Environmental Risk

Consequence	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
Probability						

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 4.

Table 4: Environmental Risk Scores

ER Score	Description
<9	Low (i.e. where this impact is unlikely to be a significant environmental risk/ reward).
≥9 ≤17	Medium (i.e. where the impact could have a significant environmental risk/ reward),
>17	High (i.e. where the impact will have a significant environmental risk/ reward).

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.

b. 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

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 39

TITLE:	ENVIRONMENTAL IMPACT ASSESSMENT RATING PROCEDURE	DOC No:	PRO 106	REV:	00	Page 5 of 7
--------	--	---------	---------	------	----	-------------

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 5: Criteria for Determining Prioritisation

Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely 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.
Irreplaceable Loss of Resources (LR)	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:

$$Priority = CI + LR$$

The result is a priority score which ranges from 2 to 6 and a consequent PF ranging from 1 to 1.5 (Refer to Table 6).

Table 6: Determination of Prioritisation Factor

Priority	Prioritisation Factor
2	1
3	1.125
4	1.25
5	1.375
6	1.5

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 factor of 0.5, if all the priority attributes are high (i.e. if an impact comes out with a high 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).

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 40

TITLE:	ENVIRONMENTAL IMPACT ASSESSMENT RATING PROCEDURE	DOC No:	PRO 106	REV:	00	Page 6 of 7
---------------	--	----------------	---------	-------------	----	-------------

Table 7: Final Environmental Significance Rating

Significance Rating	Description
<-17	High negative (i.e. where the impact must have an influence on the decision process to develop in the area).
≥-17, ≤-9	Medium negative (i.e. where the impact could influence the decision to develop in the area).
>-9, < 0	Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area).
0	No impact
>0, <9	Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥9, ≤17	Medium positive (i.e. where the impact could influence the decision to develop in the area).
>17	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.

7. Responsibilities

It is the responsibility of each EIMS employee and each external Specialist appointed by EIMS to ensure that this procedure is carried out as described. All the personnel within the organization have the responsibility to report any deviations/changes from the procedures to management. This is to ensure that the necessary changes are documented after approval.

It is the responsibility of the senior/ junior consultant (as applicable) assigned with the task of report compilation to ensure that this methodology/ procedure is strictly applied. It is the responsibility of the assigned Senior Consultant or Quality Reviewer to review and verify that the procedure has been complied with, and such documented at the specified quality check intervals.

8. Records

RECORD	STORAGE LOCATION	STORAGE SYSTEM	RESPONSIBLE PERSON	RETENTION PERIOD
Significance Rating Input Spreadsheet	Project File - /Server/assignments/ Job#/Records	Electronic-Scanned PDF	Project Manager	10 Years

9. Record of Changes, Revisions and Cancellations

RECORD OF CHANGES, REVISIONS AND CANCELLATIONS		
DATE	NATURE / DETAIL OF CHANGE	REV No.

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 41

APPENDIX B
PGS TEAM CVS

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

MPhil – Conservation of the Built Environment, University of Cape Town - Current
 BA [Hons] (Cum laude) - Archaeology and Geography, University of Pretoria - 1997
 BA - Archaeology, Geography and Anthropology , University of Pretoria – 1996

Professional Membership

Professional Archaeologist - Association of Southern African Professional Archaeologists (ASAPA) - Professional Member – No41

Accredited Professional Heritage Practitioner – 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

Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 42

Key Work Experience

- 2021 – current: Executive Director – PGAS Heritage Lda, Portugal
- 2018 – current: Director - PGS Heritage Mozambique Lda
- 2017 – current: Director - PGS Heritage (Pty) Ltd Lesotho
- 2003 – current: Director - PGS Heritage (Pty) Ltd
- 2006 – 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, Mauritius, Malawi, Zambia, Mozambique, and the Democratic Republic of the Congo


Document	Project	Revision	Date	Page Number
662HIA - 001	Glencore Rhovan PV	2.0	30/11/2022	Page 43


APPENDIX C
SITE DOCUMENTATION MATRIX


SITE SURVEY REPORT


PROJECT: 662HIA Rohvan PV

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
RPVF-03	-25.57805	27.5701	<p>General Landscape Characteristics Flat lying area, Bushy/Shrubby vegetation, Grassy vegetation</p> <p>Site Conditions Overgrown/ limited visibility</p> <p>Time Period Iron Age</p> <p>Site Type Stonewall</p> <p>Site Extent 10m x 10m</p> <p>Notes Section of stone wall situated among thick vegetation. Possibly part of a larger complex however access to the area was difficult due to thick vegetation.</p>		Grade 3 - C (IIIC)

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
RPVF-02	-25.57274	27.56528	<p>General Landscape Characteristics Flat lying area, Bushy/Shrubby vegetation, Grassy vegetation</p> <p>Site Conditions Overgrown/ limited visibility</p> <p>Time Period Iron Age</p> <p>Site Type Stonewall</p> <p>Site Extent 20m x 20m, 30x20</p>		Grade 3 - C (IIIC)

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			<p>Notes Section of stone walling situated among thick vegetation. Possibly part of a larger complex however access to the area was difficult due to thick vegetation.</p>		
					

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
RPVF-01	-25.57359	27.5692	<p>General Landscape Characteristics Flat lying area, Bushy/Shrubby vegetation, Grassy vegetation</p> <p>Site Conditions Overgrown/ limited visibility</p> <p>Time Period Iron Age</p> <p>Site Type Stonewall</p> <p>Site Extent 20m x 20m, 50x50</p>		Grade 3 - B (IIB)

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			<p>Notes Stone walled cluster: series of stone walled enclosures and walling situated among thick vegetation. Possibly part of a larger complex however access to the area was difficult due to thick vegetation. No other material culture observed.</p>		
					

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					