

HERITAGE IMPACT ASSESSMENT

(REQUIRED UNDER SECTION 38(8) OF THE NHRA (No. 25 OF 1999))

FOR KHUMANI IRON ORE MINE NEW WATER RETURN DAM, PIPELINES AND WATER CONTAINMENT FACILITY, SISHEN, NORTHERN CAPE

Type of development:

Mine infrastructure development

Client:

Envirogistics

Client info:

Tanja Bekker

E – mail: tanja@envirogistics.co.za

Developer: Assmang (Pty) Ltd



HCAC - Heritage Consultants

Private Bag X 1049

Suite 34

Modimolle

0510

Tel: 082 373 8491

Fax: 086 691 6461

E-Mail: jaco.heritage@gmail.com

Report Author:

Mr. J. van der Walt

Project Reference:

HCAC Project number 21923

Report date:

April 2019

APPROVAL PAGE

Project Name	Khumani Iron Ore Mine New Water Return Dam (WRD), pipelines and water containment facility, Sishen, Northern Cape
Report Title	Heritage Impact Assessment for the proposed Khumani Iron Ore Mine New Water Return Dam (WRD), pipelines and water containment facility, Sishen, Northern Cape
Authority Reference Number	TBC
Report Status	Final Report
Applicant Name	Assmang (Pty) Ltd

	Name	Qualifications and Certifications	Date
Archaeologist	Jaco van der Walt	MA Archaeology ASAPA #159	April 2019
Archival Specialist	Liesl Bester	BHCS Honours	April 2019
Palaeontologist	Marion Bamford	PhD	April 2019

DOCUMENT PROGRESS**Distribution List**

Date	Report Reference Number	Document Distribution	Number of Copies
15 April 2019	21923	Envirogistcs	Electronic Copy

Amendments on Document

Date	Report Reference Number	Description of Amendment

INDEMNITY AND CONDITIONS RELATING TO THIS REPORT

The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken and HCAC reserves the right to modify aspects of the report including the recommendations if and when new information becomes available from ongoing research or further work in this field, or pertaining to this investigation.

Although HCAC exercises due care and diligence in rendering services and preparing documents, HCAC accepts no liability, and the client, by receiving this document, indemnifies HCAC against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by HCAC and by the use of the information contained in this document.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

COPYRIGHT

Copyright on all documents, drawings and records, whether manually or electronically produced, which form part of the submission and any subsequent report or project document, shall vest in HCAC.

The client, on acceptance of any submission by HCAC and on condition that the client pays to HCAC the full price for the work as agreed, shall be entitled to use for its own benefit:

- The results of the project;
- The technology described in any report; and
- Recommendations delivered to the client.

Should the applicant wish to utilise any part of, or the entire report, for a project other than the subject project, permission must be obtained from HCAC to do so. This will ensure validation of the suitability and relevance of this report on an alternative project.

REPORT OUTLINE

Appendix 6 of the GNR 326 EIA Regulations published on 7 April 2017 provides the requirements for specialist reports undertaken as part of the environmental authorisation process. In line with this, Table 1 provides an overview of Appendix 6 together with information on how these requirements have been met.

Table 1. Specialist Report Requirements.

Requirement from Appendix 6 of GN 326 EIA Regulation 2017	Chapter
(a) Details of - (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae	Section a Section 12
(b) Declaration that the specialist is independent in a form as may be specified by the competent authority	<i>Declaration of Independence</i>
(c) Indication of the scope of, and the purpose for which, the report was prepared	Section 1
(cA) an indication of the quality and age of base data used for the specialist report	Section 3.4 and 7.1.
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	9
(d) Duration, Date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3.4
(e) Description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 8 and 9
(g) Identification of any areas to be avoided, including buffers	Section 9
(h) 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 8
(l) Description of any assumptions made and any uncertainties or gaps in knowledge	Section 3.7
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity including identified alternatives on the environment or activities;	Section 9
(k) Mitigation measures for inclusion in the EMPr	Section 9 and 10
(l) Conditions for inclusion in the environmental authorisation	Section 9 and 10
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 9 and 10
(n) Reasoned opinion - (i) as to whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 10.2
(o) Description of any consultation process that was undertaken during the course of preparing the specialist report	Section 6
(p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Refer to EIA report
(q) Any other information requested by the competent authority	Section 10

Executive Summary

EnviroGistics has been appointed by Assmang (Pty) Ltd: Khumani Iron Ore Mine to conduct an Environmental Authorisation (EA) Application for three proposed projects within the Khumani Iron Ore Mine, Northern Cape Province. HCAC was appointed to conduct a Heritage Impact Assessment of these three project components (new Return Water Dam (RWD) and King Water Containment Facility as well as two return water pipelines) to determine the presence of cultural heritage sites and the impact of the proposed development on these non-renewable resources. The study areas were assessed both on desktop level and by a field survey. The field survey was conducted as a non-intrusive pedestrian survey to cover the extent of the impact footprint.

The proposed projects are mostly located within areas entirely transformed by existing mining activities to the extent that from a heritage perspective, the impact areas has no heritage potential due to the extensive mechanical alteration of the topography. The Khumani mining area was previously assessed (Morris 2005) who recorded cemeteries and Stone Age sites however none of these sites are in close proximity to the current projects. A few undiagnostic Stone flakes mostly on CCS were noted during the survey but are of no heritage significance as they are out of context and could very well be pseudo tools as a result of heavy-duty machinery (see Bradfield & van der Walt 2018).

An independent Paleontological study (Bamford 2019) was conducted for the project that concluded that the proposed project can continue with a chance find procedure to be implemented as part of the EMPr. The study area is surrounded by existing mining developments and infrastructure and the proposed development will not impact negatively on significant cultural landscapes or viewsapes. During the public participation process conducted for the project no heritage concerns was raised.

Due to the lack of significant heritage resources in the study area the impact of the proposed projects on heritage resources is considered low and it is recommended that the projects can commence on the condition that the following recommendations are implemented as part of the EMPr and based on approval from SAHRA:

- Implementation of a chance find procedure.

Declaration of Independence

Specialist Name	Jaco van der Walt
Declaration of Independence	<p>I declare, as a specialist appointed in terms of the National Environmental Management Act (Act No 108 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations, that I:</p> <ul style="list-style-type: none"> • I act as the independent specialist in this application; • I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant; • I declare that there are no circumstances that may compromise my objectivity in performing such work; • I have expertise in conducting the specialist report relevant to this application, 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 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; • All the particulars furnished by me in this form are true and correct; and • I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.
Signature	
Date	18/04/2019

a) Expertise of the specialist

Jaco van der Walt has been practising as a CRM archaeologist for 15 years. He obtained an MA degree in Archaeology from the University of the Witwatersrand focussing on the Iron Age in 2012 and is a PhD candidate at the University of Johannesburg focussing on Stone Age Archaeology with specific interest in the Middle Stone Age (MSA) and Later Stone Age (LSA). Jaco is an accredited member of ASAPA (#159) and have conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, KZN as well as he Northern and Eastern Cape Provinces in South Africa.

Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, DRC Zambia and Tanzania. Through this he has a sound understanding of the IFC Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage.

TABLE OF CONTENTS

REPORT OUTLINE.....	4
EXECUTIVE SUMMARY	5
DECLARATION OF INDEPENDENCE.....	1
A) EXPERTISE OF THE SPECIALIST.....	1
ABBREVIATIONS.....	6
GLOSSARY.....	6
1 INTRODUCTION AND TERMS OF REFERENCE:.....	7
1.1 TERMS OF REFERENCE.....	7
2 LEGISLATIVE REQUIREMENTS.....	13
3 METHODOLOGY.....	15
3.1 LITERATURE REVIEW.....	15
3.2 GENEALOGICAL SOCIETY AND GOOGLE EARTH MONUMENTS.....	15
3.3 PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT:.....	15
3.4 SITE INVESTIGATION.....	15
3.5 SITE SIGNIFICANCE AND FIELD RATING.....	18
3.6 IMPACT ASSESSMENT METHODOLOGY.....	19
3.7 LIMITATIONS AND CONSTRAINTS OF THE STUDY	20
4 DESCRIPTION OF SOCIO ECONOMIC ENVIRONMENTAL.....	20
5 DESCRIPTION OF THE PHYSICAL ENVIRONMENT:.....	21
6 RESULTS OF PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT:.....	21
7 LITERATURE / BACKGROUND STUDY:.....	22
7.1 LITERATURE REVIEW.....	22
7.2 GENERAL HISTORY OF THE AREA	23
7.3. STONE AGE	23
7.4. IRON AGE	24
8 FINDINGS OF THE SURVEY.....	25
8.1 BUILT ENVIRONMENT (SECTION 34 OF THE NHRA).....	29
8.2 ARCHAEOLOGICAL AND PALAEOLOGICAL RESOURCES (SECTION 35 OF THE NHRA).....	29
8.3 BURIAL GROUNDS AND GRAVES (SECTION 36 OF THE NHRA).....	29
8.4 CULTURAL LANDSCAPES, INTANGIBLE AND LIVING HERITAGE.	29
8.5 BATTLEFIELDS AND CONCENTRATION CAMPS.....	30

9	POTENTIAL IMPACT	30
10	CONCLUSION AND RECOMMENDATIONS	31
10.1	CHANCE FIND PROCEDURES	31
9.	REFERENCES	33
10.	APPENDICES:.....	34
	CURRICULUM VITAE OF SPECIALIST	34

LIST OF FIGURES

FIGURE 1. PROVINCIAL LOCALITY MAP (1: 250 000 TOPOGRAPHICAL MAP).....	9
FIGURE 2: REGIONAL LOCALITY MAP (1:50 000 TOPOGRAPHICAL MAP).....	10
FIGURE 3. SATELLITE IMAGE OF THE PROPOSED PIPELINES AND RWD (GOOGLE EARTH 2019).....	11
FIGURE 4. PROPOSED WATER STORAGE FACILITY (GOOGLE EARTH 2019).....	12
FIGURE 5: TRACK LOGS OF THE SURVEY IN GREEN (PIPELINES).....	16
FIGURE 6. TRACK LOGS OF THE SURVEY OF THE RWD.....	17
FIGURE 7. KNOWN SITES IN RELATION TO THE PROPOSED PROJECTS.....	25
FIGURE 8: BERMS IN THE RWD AREA.....	26
FIGURE 9: LEVELLED AREA AT THE RWD.....	26
FIGURE 10: EXISTING PIPELINES IN THE RWD AREA.....	26
FIGURE 11: GENERAL VIEW OF THE PROPOSED RWD.....	26
FIGURE 12. EXISTING INFRASTRUCTURE WHERE THE NEW PROPOSED PIPELINES ARE LOCATED.....	27
FIGURE 13. EXISTING INFRASTRUCTURE WHERE THE NEW PROPOSED PIPELINES ARE LOCATED.....	27
FIGURE 14. EXISTING DEVELOPMENTS WHERE THE NEW PROPOSED PIPELINES ARE LOCATED.....	27
FIGURE 15. EXISTING INFRASTRUCTURE WHERE THE NEW PROPOSED PIPELINES ARE LOCATED.....	27
FIGURE 16. GENERAL SITE CONDITIONS.....	28
FIGURE 17. GENERAL SITE CONDITIONS.....	28
FIGURE 18. ISOLATED STONE AGE ARTEFACTS (RWD).....	29
FIGURE 19. STONE AGE ARTEFACT.....	29

LIST OF TABLES

TABLE 1. SPECIALIST REPORT REQUIREMENTS..... 4

TABLE 2: PROJECT DESCRIPTION 8

TABLE 3: INFRASTRUCTURE AND PROJECT ACTIVITIES 8

TABLE 4: SITE INVESTIGATION DETAILS 15

TABLE 5. IMPACT ASSESSMENT TABLE. 30

ABBREVIATIONS

AIA: Archaeological Impact Assessment
ASAPA: Association of South African Professional Archaeologists
BGG Burial Ground and Graves
BIA: Basic Impact Assessment
CFPs: Chance Find Procedures
CMP: Conservation Management Plan
CRR: Comments and Response Report
CRM: Cultural Resource Management
DEA: Department of Environmental Affairs
EA: Environmental Authorisation
EAP: Environmental Assessment Practitioner
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
EMP: Environmental Management Programme
ESA: Early Stone Age
ESIA: Environmental and Social Impact Assessment
GIS Geographical Information System
GPS: Global Positioning System
GRP Grave Relocation Plan
HIA: Heritage Impact Assessment
LIA: Late Iron Age
LSA: Late Stone Age
MEC: Member of the Executive Council
MIA: Middle Iron Age
MPRDA: Mineral and Petroleum Resources Development Act
MSA: Middle Stone Age
NEMA National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID Notification of Intent to Develop
NoK Next-of-Kin
PRHA: Provincial Heritage Resource Agency
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency

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

GLOSSARY

Archaeological site (remains of human activity over 100 years old)

Early Stone Age (~ 2.6 million to 250 000 years ago)

Middle Stone Age (~ 250 000 to 40-25 000 years ago)

Later Stone Age (~ 40-25 000, to recently, 100 years ago)

The Iron Age (~ AD 400 to 1840)

Historic (~ AD 1840 to 1950)

Historic building (over 60 years old)

1 Introduction and Terms of Reference:

HCAC (Heritage Contracts and Archaeological Consulting) is contracted by Envirogistics to conduct a heritage impact assessment of three new projects (Return Water Dam, two return water pipelines and the King Water Containment Facility) at the existing Khumani Mine. The report forms part of the Environmental Impact Assessment (EIA) and Environmental Management Programme Report (EMPR) for these additional activities at the Mine.

The aim of the study is to survey the proposed development footprint to identify cultural heritage sites, document, and assess their importance within local, provincial and national context. It serves to assess the impact of the proposed project on non-renewable heritage resources, and to submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner. It is also conducted to protect, preserve and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999). The report outlines the approach and methodology utilized before and during the survey, which includes: Phase 1, review of relevant literature; Phase 2, the physical surveying of the area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey, no significant heritage sites were identified. General site conditions and features on sites were recorded by means of photographs, GPS locations and site descriptions. Possible impacts were identified and mitigation measures are proposed in the following report. SAHRA as a commenting authority under section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) require all environmental documents, compiled in support of an Environmental Authorisation application as defined by NEMA EIA Regs section 40 (1) and (2), to be submitted to SAHRA. As such the Basic Assessment report and its appendices must be submitted to the case as well as the EMPr, once it's completed by the Environmental Assessment Practitioner (EAP).

1.1 Terms of Reference

Field study

Conduct a field study to: (a) locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources affected by the proposed development.

Reporting

Report on the identification of anticipated and cumulative impacts the operational units of the proposed project activity may have on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with the relevant legislation, SAHRA minimum standards and the code of ethics and guidelines of ASAPA.

To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999).

Table 2: Project Description

Magisterial District	Gamagara Local Municipality which forms part of the John Taolo Gaetsewe Districts Municipality
1: 50 000 map sheet number	2722DD
Central co-ordinate of the development area	-27.850700° 23.002166°

Table 3: Infrastructure and project activities

Type of development	Mining infrastructure developments
Project Components and size	1. RWD - Approximately 2.7 hectares 2. Water Pipelines Waste disposal return water pipeline - Approximately 4.45 km Parson return water pipeline - Approximately 1.8 km 3. King Water Containment Facility - This facility comprises 6 steel tanks of about 430m ³ each

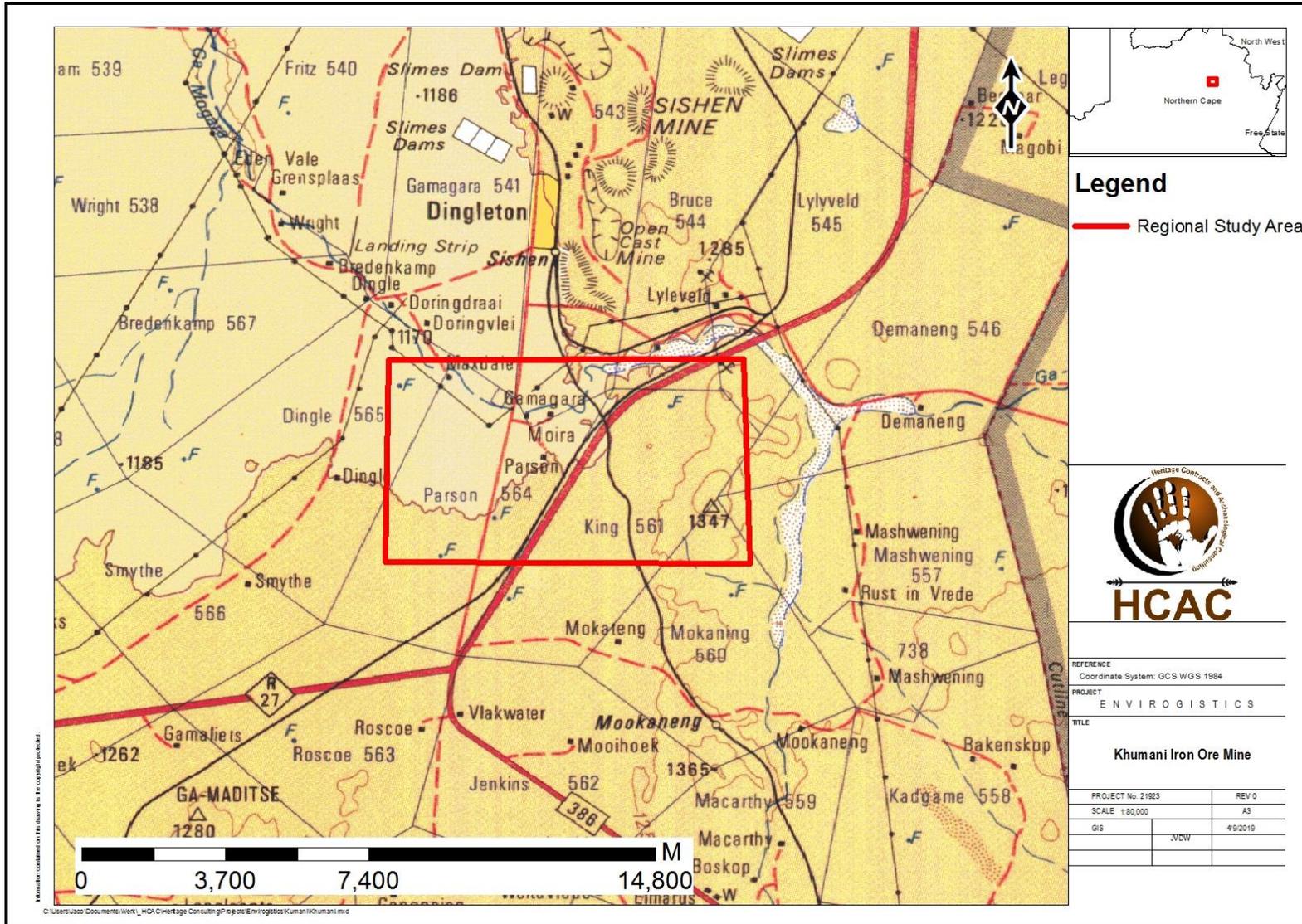


Figure 1. Provincial locality map (1: 250 000 topographical map)

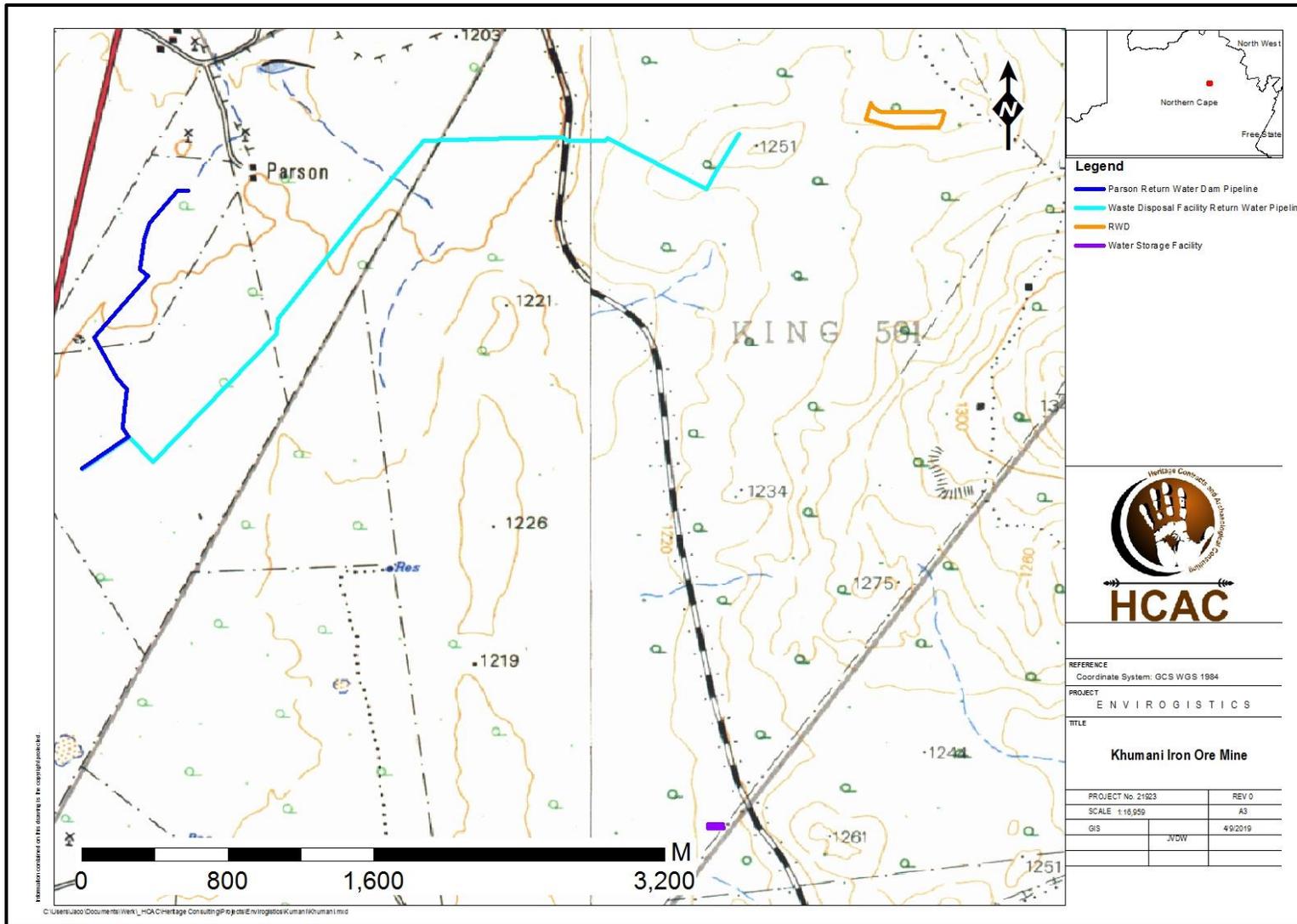


Figure 2: Regional locality map (1:50 000 topographical map).

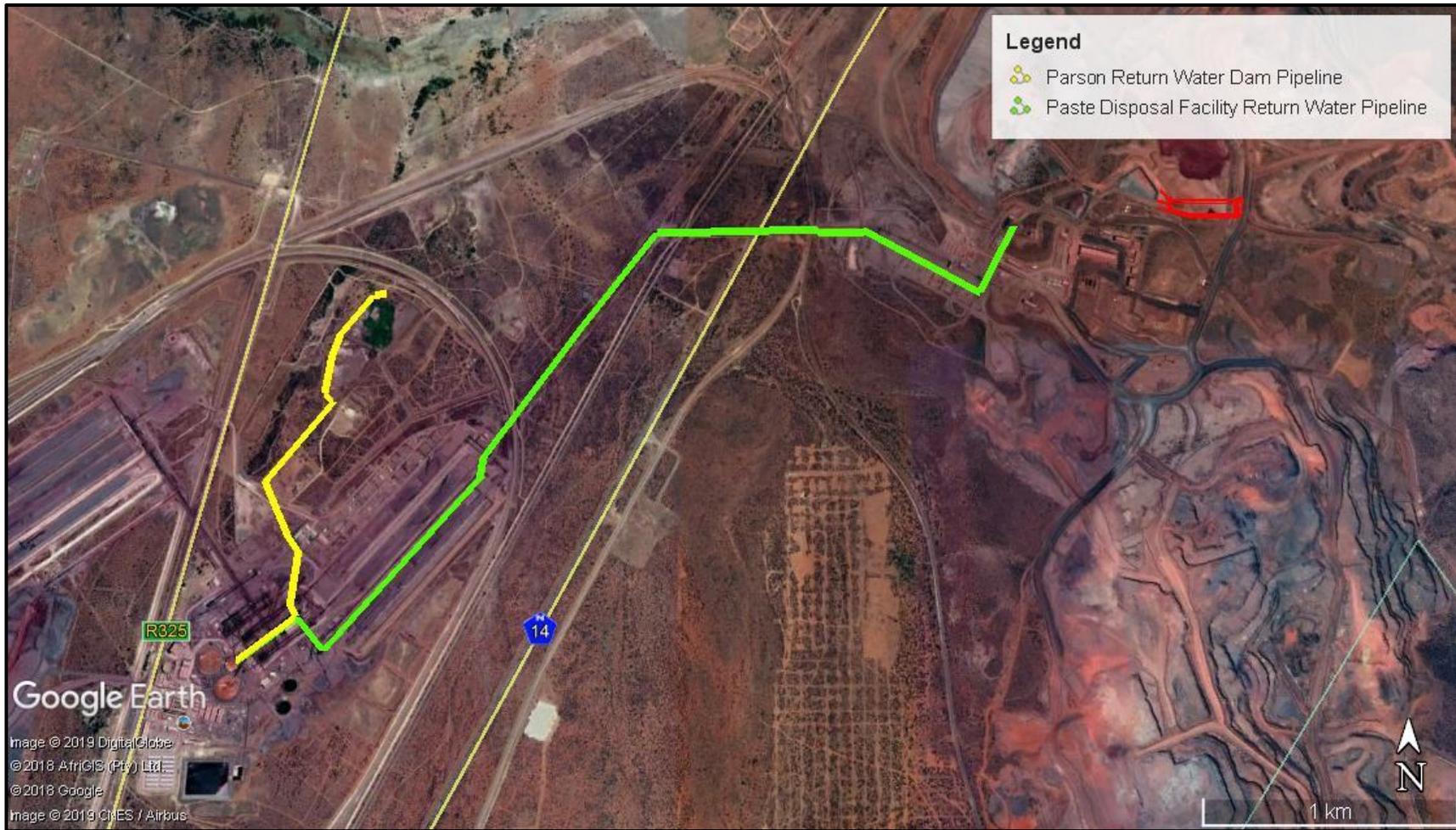


Figure 3. Satellite image of the proposed pipelines and RWD (Google Earth 2019).



Figure 4. Proposed Water Storage Facility (Google Earth 2019)

2 Legislative Requirements

The HIA, as a specialist sub-section of the EIA, is required under the following legislation:

- National Heritage Resources Act (NHRA), Act No. 25 of 1999)
- National Environmental Management Act (NEMA), Act No. 107 of 1998 - Section 23(2)(b)
- Mineral and Petroleum Resources Development Act (MPRDA), Act No. 28 of 2002 - Section 39(3)(b)(iii)

A Phase 1 HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of heritage specialist input is to:

- Identify any heritage resources, which may be affected;
- Assess the nature and degree of significance of such resources;
- Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- Assess the negative and positive impact of the development on these resources; and
- Make recommendations for the appropriate heritage management of these impacts.

The HIA should be submitted, as part of the impact assessment report or EMPr, to the PHRA if established in the province or to SAHRA. SAHRA will ultimately be responsible for the professional evaluation of Phase 1 AIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 AIA reports and additional development information, as per the impact assessment report and/or EMPr, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 AIA reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work.

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level). Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is based in South Africa, representing professional archaeology in the SADC region. ASAPA is primarily involved in the overseeing of ethical practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

Phase 1 AIA's are primarily concerned with the location and identification of heritage sites situated within a proposed development area. Identified sites should be assessed according to their significance. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Conservation or Phase 2 mitigation recommendations, as approved by SAHRA, are to be used as guidelines in the developer's decision making process.

Phase 2 archaeological projects are primarily based on salvage/mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations can only be conducted with a permit, issued by SAHRA to the appointed archaeologist. Permit conditions are prescribed by SAHRA and includes (as minimum requirements) reporting back strategies to SAHRA and deposition of excavated material at an accredited repository.

In the event of a site conservation option being preferred by the developer, a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement.

After mitigation of a site, a destruction permit must be applied for with SAHRA by the applicant before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999 is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning; or in some cases, the MEC for Housing and Welfare. Authorisation for exhumation and reinternment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

3 METHODOLOGY

3.1 Literature Review

A brief survey of available literature was conducted to extract data and information on the area in question to provide general heritage context into which the development would be set. This literature search included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS).

3.2 Genealogical Society and Google Earth Monuments

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located; these locations were marked and visited during the field work phase. The database of the Genealogical Society was consulted to collect data on any known graves in the area.

3.3 Public Consultation and Stakeholder Engagement:

Stakeholder engagement is a key component of any BAR process, it involves stakeholders interested in, or affected by the proposed development. Stakeholders are provided with an opportunity to raise issues of concern (for the purposes of this report only heritage related issues will be included). The aim of the public consultation process was to capture and address any issues raised by community members and other stakeholders during key stakeholder and public meetings. The process involved:

- Placement of advertisements and site notices
- Stakeholder notification (through the dissemination of information and meeting invitations);
- Stakeholder meetings undertaken with I&APs;
- Authority Consultation
- The compilation of a Basic Assessment Report (BAR).

Please refer to section 6 for more detail.

3.4 Site Investigation

Conduct a field study to: a) systematically survey the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources recorded in the project area.

Table 4: Site Investigation Details

	Site Investigation
Date	8 – 10 April 2019
Season	Early winter– vegetation in the study area is low and archaeological visibility is high. Large sections of the study areas are transformed by existing mining activities The impact area was sufficiently covered (Figure 5 - 6) to adequately record the presence of heritage resources.

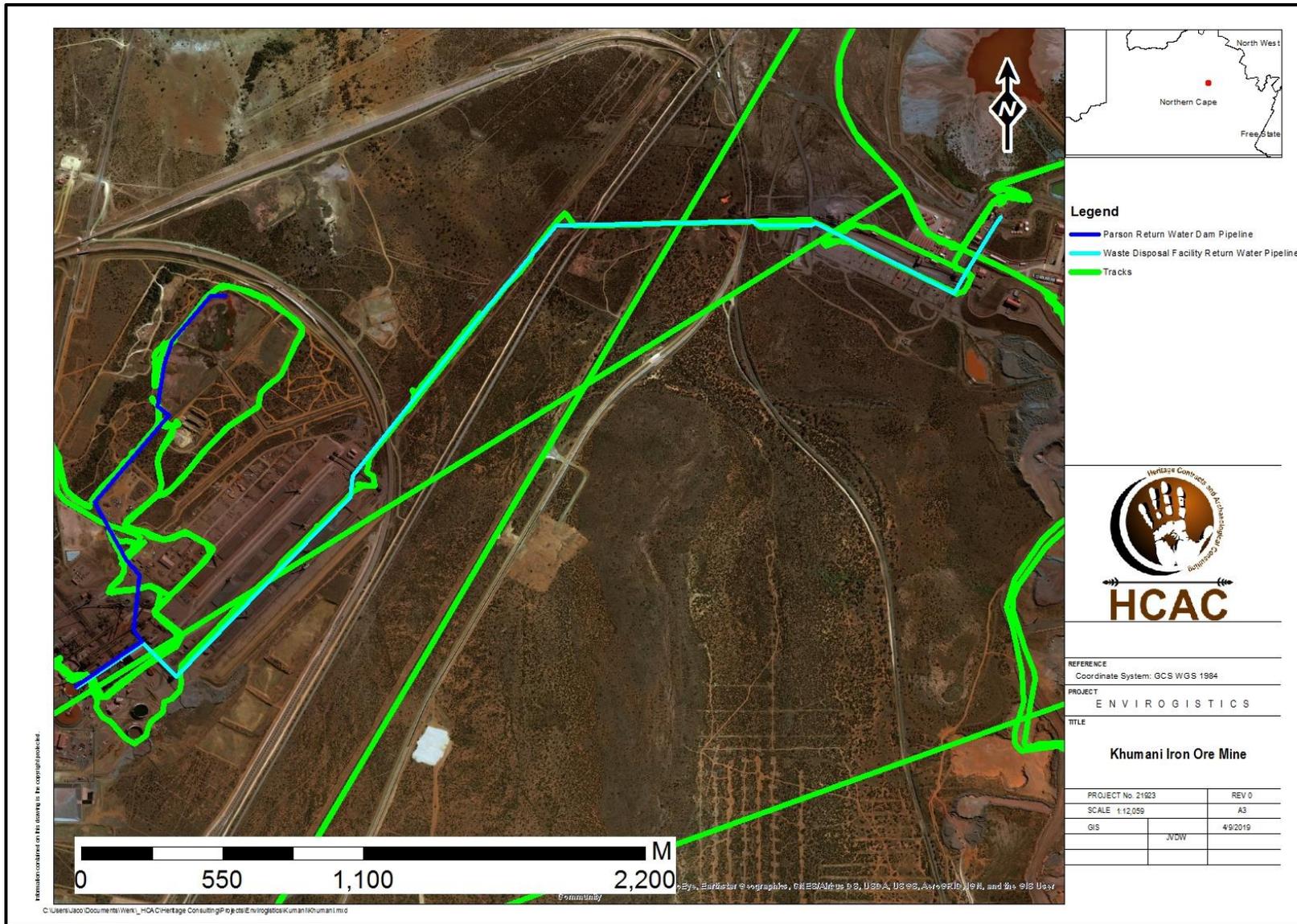


Figure 5: Track logs of the survey in green (Pipelines)

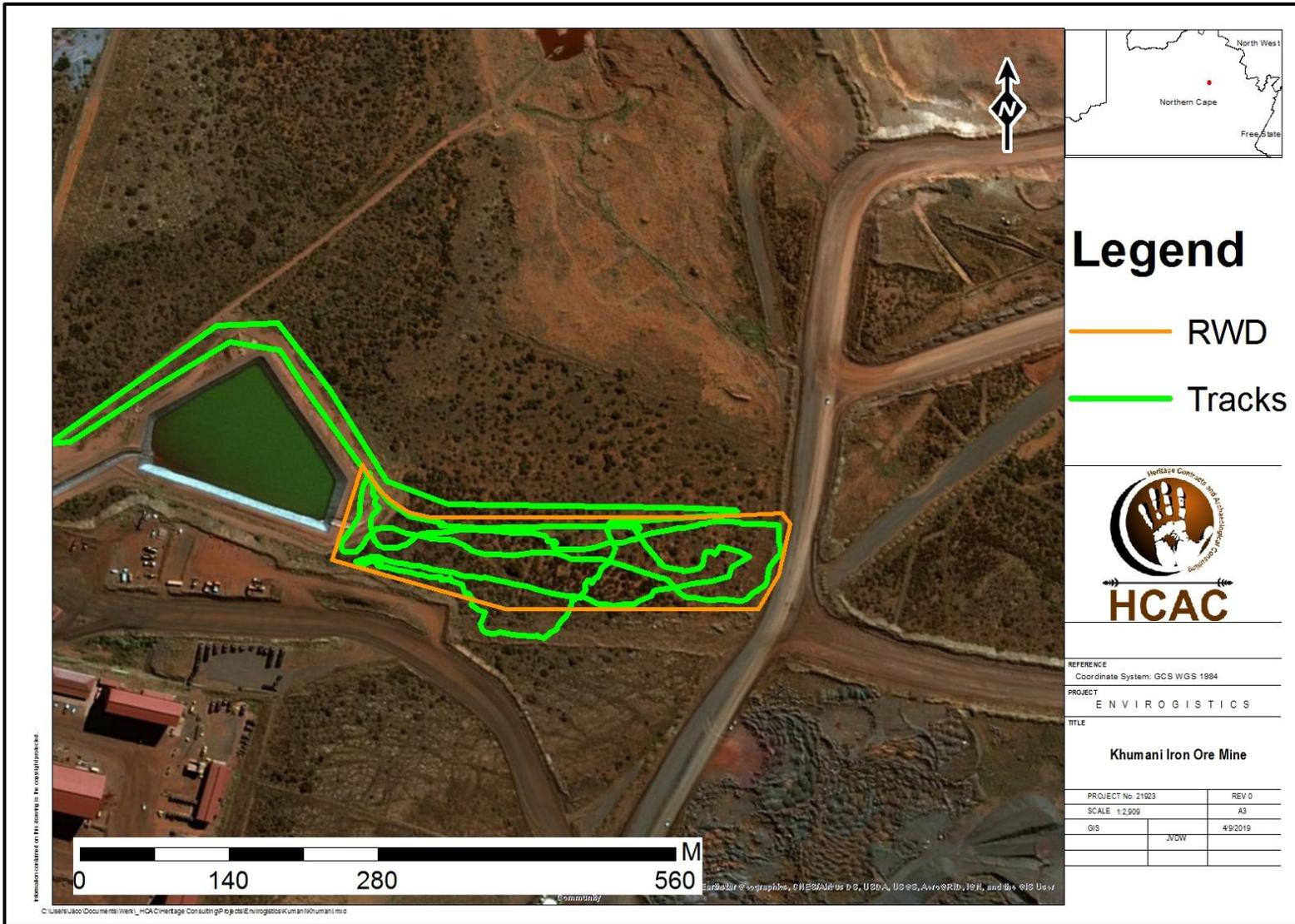


Figure 6. Track logs of the survey of the RWD.

3.5 Site Significance and Field Rating

Section 3 of the NHRA distinguishes nine criteria for places and objects to qualify as ‘part of the national estate’ if they have cultural significance or other special value. These criteria are:

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

The presence and distribution of heritage resources define a ‘heritage landscape’. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire project area, or a representative sample, depending on the nature of the project. In the case of the proposed project the local extent of its impact necessitates a representative sample and only the footprint of the areas demarcated for development were surveyed. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface. This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance with cognisance of Section 3 of the NHRA:

- The unique nature of a site;
- The integrity of the archaeological/cultural heritage deposits;
- The wider historic, archaeological and geographic context of the site;
- The location of the site in relation to other similar sites or features;
- The depth of the archaeological deposit (when it can be determined/is known);
- The preservation condition of the sites; and
- Potential to answer present research questions.

In addition to this criteria field ratings prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 10 of this report.

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP.A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

3.6 Impact Assessment Methodology

The criteria below are used to establish the impact rating on sites:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The **duration**, wherein it will be indicated whether:
 - * the lifetime of the impact will be of a very short duration (0-1 years), assigned a score of 1;
 - * the lifetime of the impact will be of a short duration (2-5 years), assigned a score of 2;
 - * medium-term (5-15 years), assigned a score of 3;
 - * long term (> 15 years), assigned a score of 4; or
 - * permanent, assigned a score of 5;
- The **magnitude**, quantified on a scale from 0-10 where; 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5 where; 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- the **status**, which will be described as either positive, negative or neutral.
- the degree to which the impact can be reversed.
- the degree to which the impact may cause irreplaceable loss of resources.
- the *degree* to which the impact can be mitigated.

The **significance** is calculated by combining the criteria in the following formula:

$$S=(E+D+M)P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

3.7 Limitations and Constraints of the study

The authors acknowledge that the brief literature review is not exhaustive on the literature of the area. Due to the subsurface nature of archaeological artefacts, the possibility exists that some features or artefacts may not have been discovered/recorded during the survey and the possible occurrence of unmarked graves and other cultural material cannot be excluded. Similarly, the depth of the deposit of heritage sites cannot be accurately determined due to its subsurface nature. This report only deals with the footprint area of the proposed development and consisted of non-intrusive surface surveys. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been highlighted through the public consultation process if relevant. It is possible that new information could come to light in future, which might change the results of this Impact Assessment.

4 Description of Socio Economic Environmental

The following information was obtained from an EIA conducted in 2015 by GCS:

Population and Household

The population size (persons) for the Gamagara District Municipality increased by 25.47% over the 1995 to 2011 time period, whereas the John Taolo Gaetsewe District Municipality only grew by 12.49% over the same period. Households have also grown over the 1995 to 2011 time period, with the Gamagara Local Municipality showing a 30.36% increase and the John Taolo Gaetsewe District Municipality by 27.23%.

Age

It is important to assess the age distribution of persons in order to determine both the current and future needs of an area. Age is an important indicator as it relates to education, skills and dependency. A young population may require an improved educational system, whereas an older society may need an accented focus on healthcare. The largest percentage of people in the Gamagara Local Municipality, 71.9% fall within the working age category (16-64 years of age). 25.5% of the population are between the age of 0 and 14. And the elderly population forms 2.5% of the municipality's population. (Statistics South Africa, census 2011) Persons younger than 15 years of age do not form part of the Economically Active Population (EAP) of the area.

Education

The largest percentage (89,5%) of the Gamagara Local Municipality population has obtained some form of primary schooling. 24.9% of the population has attained matric and a further 3.6% with higher education.

Employment and Labour

The largest sector of employment in the Local Municipality is the mining sector, supplying just over a third of the jobs in the area. Followed by wholesale and retail trade jobs, which make up around 12% of the total employment. The main reason for this distribution are mines, like Sishen and Khumani in the area that are the largest employers in the municipality. The main average income of households in the Gamagara Local Municipality is between R9,601 and R307,600 as derived from the census 2011 data. It should however be noted that around 10% of the population in the municipality do not earn an income."

5 Description of the Physical Environment:

The general area consists of three kinds of topographical elements: undulating plains; hills or prominent rocky outcrops; and non-perennial watercourses. The latter two being the most attractive in terms of human occupation in antiquity with archaeological visibility the lowest on the plains that are mantled with Aeolian sand and characterised by thornveld. The proposed activities are however located within areas entirely transformed by existing mining activities to the extent that none of the aforementioned elements are still intact apart from the proposed water retaining facility that is located in a Greenfields area.

The vegetation and landscape are described by Mucina and Rutherford (*The Vegetation of South Africa, Lesotho and Swaziland*, South African National Biodiversity Institute, Kirstenbosch, August 2006) as Kuruman Mountain Bushveld. The geological forms in the study area is described as Transvaal, Rooiberg and Griqualand-West

6 Results of Public Consultation and Stakeholder Engagement:

6.1.1 Stakeholder Identification

The current Stakeholder Database on the mine was utilised as a basis for the development of the consultation register for this project. In addition, relevant government departments, municipalities and affected ward councillors were contacted to inform them of the proposed project and to obtain their issues and comments in this regard. The following stakeholders were consulted as part of the project:

- DWS;
- DMR;
- NCDENC;
- Local Municipality;
- Districts Municipality;
- Ward Councillor;
- Surrounding Landowners; and
- Other Identified Stakeholders.

6.1.2 Notification

Stakeholders were notified by means of the following systems:

- Notices;
- Background Information Documents (BIDs); and
- Advertisements.

Proof of email submissions can be requested from the Environmental assessment Practitioner (EAP).

6.1.3 Site Notices

In order to inform surrounding communities and adjacent landowners of the proposed project, site notices were erected on site and at visible locations close to the site.

6.1.4 Background Information Documents

Background Information Documents were distributed via email to all parties on the database.

7 Literature / Background Study:

7.1 Literature Review

The following reports were conducted in the immediate vicinity of the study area and were consulted for this report:

Author	Year	Project	Findings
Van der Walt, J.	2017	Heritage Impact Assessment Khumani Mine	No sites of significance were identified.
Kruger, N.	2015	Sishen Iron Ore Company (SIOC): Proposed Lyleveld North Waste Rock Dump Expansion and Lyleveld South Haul Road Extension Project, Sishen Mine, Northern Cape Province	2 Stone Age occurrences and 1 site attributed to mechanical weathering.
Morris, D.	2005	Archaeological Impact assessment of mining areas on the farms Bruce, King, Mokaning and Parson between Postmasburg and Kathu in the Northern Cape.	4 Cemeteries and Stone Age sites were identified.
Beaumont, P.	2005	Heritage Assessment for an EMPR amendment relating to a proposed crusher at Sishen Iron Ore Mine near Kathu in the Northern Cape province.	No sites were identified.

7.1.1 Genealogical Society and Google Earth Monuments

No known grave sites are indicated in the study area.

7.2 General History of the area

7.2.1 Archaeology of the area

The archaeological record for the greater study area consists of the Stone Age and Iron Age.

7.3. Stone Age

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age, the Middle Stone Age and the Earlier Stone Age. Each of these phases contains sub-phases or industrial complexes, and within these we can expect regional variation regarding characteristics and time ranges. For Cultural Resources Management (CRM) purposes it is often only expected/ possible to identify the presence of the three main phases. Yet sometimes the recognition of cultural groups, affinities or trends in technology and/or subsistence practices, as represented by the sub-phases or industrial complexes, is achievable (Lombard 2011). The three main phases can be divided as follows;

- Later Stone Age; associated with Khoi and San societies and their immediate predecessors. Recently to ~30 thousand years ago.
- Middle Stone Age; associated with Homo sapiens and archaic modern humans. 30-300 thousand years ago.
- Earlier Stone Age; associated with early Homo groups such as Homo habilis and Homo erectus. 400 000-> 2 million years ago.

The larger study area has a wealth of pre-colonial archaeological sites (Morris & Beaumont 2004). Famous sites in the region include the world renowned Wonderwerk Cave to the north of the study area. Closer to Kuruman two shelters on the northern and southern faces of GaMohaana (in the Kuruman Hills north west of the town) contain Later Stone Age remains and rock paintings. Rock art is known to occur at Danielskuil to the north east and on Carter Block (Morris 2008). Middle Stone Age material is on record around the study area.

Archaeological surveys have shown rocky outcrops and hills, drainage lines, riverbanks and confluences to be prime localities for archaeological finds and specifically Stone Age sites, as these areas were utilized for settlement of base camps close to water and hunting ranges.

According to Morris (2005) in the immediate area to the north of the study area, the Earlier Stone Age is represented by 11 known sites (Bruce, Kathu, Uitkoms, Sishen, Demaneng, Lylyveld and Mashwening); the Middle Stone Age by 5 sites (all in the vicinity of Kathu); and the Later Stone Age by 10 sites (one on King, one at Mashwening and eight at Kathu). Rock engravings have been identified from Sishen and Bruce (the Bruce site was salvaged and recorded by Fock & Fock 1984), as well as Beeshoek, to the south (Fock & Fock 1984; Morris 1992; Beaumont 1998). Specularite sources are known on Demaneng and Lylyveld, and were mined in Stone Age times at a site on Doornfontein to the south (Beaumont 1973; Beaumont & Boshier 1974) and at Tsantsabane to the east of Postmasburg (Beaumont 1973; Thackeray et al. 1983): numerous other specularite workings have also been recorded (Beaumont 1973).

Stone Age artefacts are often recorded at industrial sites similar to the Khumani mine operations and the effects of heavy-duty earth moving machinery on the formation of lithic debitage at open-air Stone Age/Palaeolithic sites was examined by Bradfield and Van der Walt (2018) at a site close to Kathu. The experiment with heavy-duty machinery produced only one pseudo-formal tool, most of the debitage produced mimics that occasioned by knapping and this could attribute to some of the debitage/ artefacts identified on industrial sites.

7.4. Iron Age

Iron Age expansion southwards past Kuruman into the Ghaap plato and towards Postmasburg dates to the 1600's (Humphreys, 1976 and Thackeray, 1983). Definite dates for Tswana presence in the Postmasburg area are around 1805 when Lichtenstein visited the area and noted the mining activities of the Tswana (probably the Thlaping) tribes in the area. The Thlaro and Thlaping settled the area from Campbell in the east to Postmasburg and towards the Langeberg close to Olifantshoek in the north west before 1770 (Snyman, 1988). The Korana expansion after 1770 started to drive the Thlaro and Thlaping further north towards Kuruman (Shillington, 1985).); Morris (2005) indicated that 3 Iron Age sites close to the study area are on record (Demaneng, Lylyveld and Kathu).

7.4.1. Anglo-Boer War

There are no battlefields or concentration camp sites close to the study area.

7.4.2. Cultural Landscape

The Khumani mine was constructed from October 2006 (<http://www.assmang.co.za/content>), prior to this the area was undeveloped and characterised by sparse vegetation. The surrounding area is characterised by intensive mining activities. The pre-colonial landscape consists of widespread Stone Age occupation.

8 Findings of the Survey

The Khumani mining area was previously assessed (Morris 2005) who recorded cemeteries and Stone Age sites. None of these is in close proximity to the current projects assessed in this report (Figure 7). It is important to note that only the impact footprint of each project was surveyed. The areas that was assessed consists of the new RWD, King Water Containment Facility as well as two return water pipelines. These areas was surveyed in the company of a mine official and is discussed below.

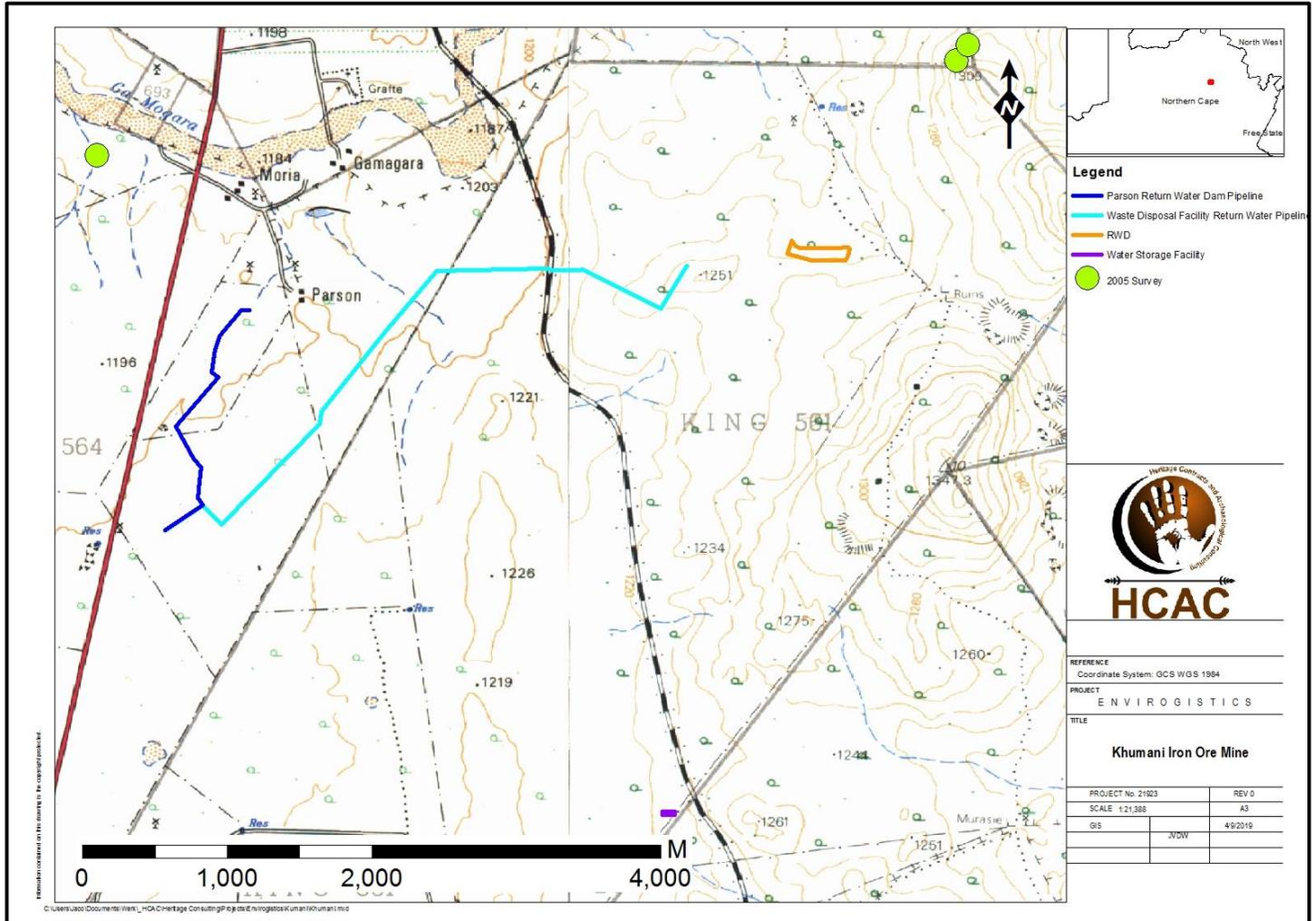


Figure 7. Known sites in relation to the proposed projects

1. RWD.

The proposed return water dam is located adjacent to existing sludge dams in an area that is totally transformed by mechanical excavations as part of the existing mining activities. The area has been dug out to an approximate depth of 3 meters and levelled with berms on the northern, eastern and southern boundaries of the proposed area (Figure 8 & 9). Existing water pipelines is located on the southern and northern boundary (Figure 10 & 11). From a heritage perspective, this area is of no heritage potential due to the extensive mechanical alteration of the topography. A few undiagnostic flakes on CCS were noted in this area but are of no heritage significance as they are out of context and could very well be pseudo tools as a result of heavy-duty machinery (see Bradfield & van der Walt 2018).



Figure 8: Berms in the RWD area



Figure 9: Levelled area at the RWD



Figure 10: Existing pipelines in the RWD area

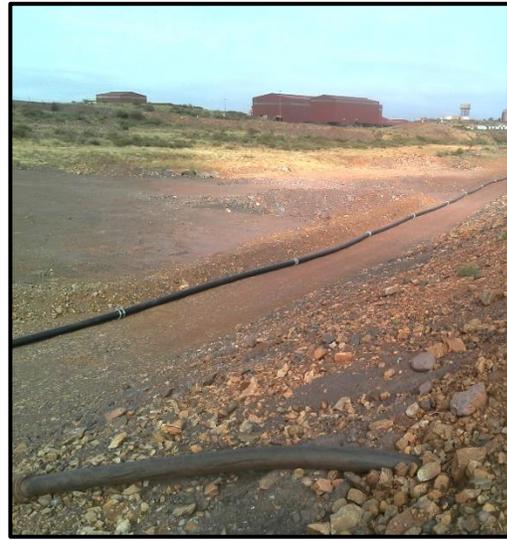


Figure 11: General view of the proposed RWD

2. Pipeline

The proposed return water pipelines follow existing infrastructure (e.g., roads, conveyor belts and existing pipelines) and traverse areas that are already disturbed by the existing mining activities (Figure 12-15). These areas are transformed to the extent that the area is of no heritage potential and will not impact on any surface indicators of heritage sites or features of significance.



Figure 12. Existing infrastructure where the new proposed pipelines are located.

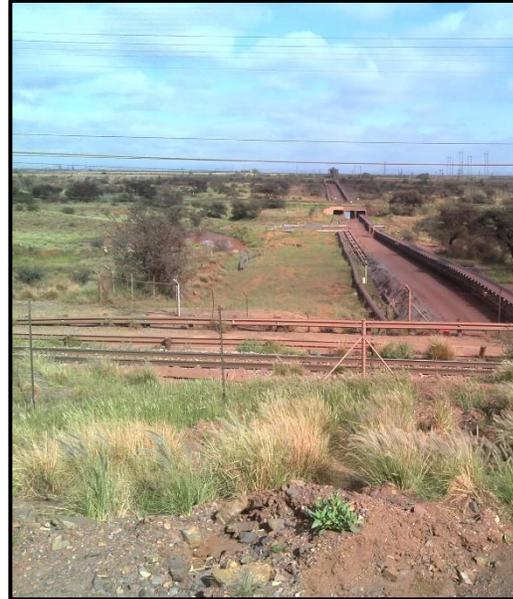


Figure 13. Existing infrastructure where the new proposed pipelines are located



Figure 14. Existing developments where the new proposed pipelines are located



Figure 15. Existing infrastructure where the new proposed pipelines are located

3. Water containment facility:

This is a Greenfields site located adjacent to existing opencast mining operations. The site is characterised by Aeolian sand with sparse grass cover and a few thorn trees (Figure 16 -17) with no raw material suitable for knapping of stone tools or any other focal points like pans etc. that would have attracted human occupation in antiquity.



Figure 16. General site conditions



Figure 17. General site conditions

In terms of the national estate as defined by the NHRA no sites of significance were found during the survey as described below.

8.1 Built Environment (Section 34 of the NHRA)

No standing structures older than 60 years occur in the study area.

8.2 Archaeological and palaeontological resources (Section 35 of the NHRA)

No archaeological sites or material of significance was recorded during the survey. A few undiagnostic flakes on CCS (Figure 18) were noted in this area earmarked for the RWD and could very well be pseudo tools as a result of heavy-duty machinery (see Bradfield & van der Walt 2018).

Another isolated pointed flake (possibly Middle Stone Age) were noted (Figure 19) along the proposed pipeline alignment. These artefacts are out of context and are scattered too sparsely to be of significance apart from mentioning them in this report. Therefore, no further mitigation prior to construction is recommended in terms of the archaeological component of Section 35 of the NHRA for the proposed development to proceed.



Figure 18. Isolated Stone Age artefacts (RWD)



Figure 19. Stone Age artefact

According to the SAHRIS palaeontological sensitivity map the study area is of palaeontological sensitivity and a Paleontological study was commissioned for the study area (Bamford 2019). This study concluded that: “*The proposed sites lie on the shales, quartzites and conglomerates of the ancient Gamagara Formation, Olifantshoek Supergroup. There are also some exposures of the Quaternary Kalahari sands. There is an extremely small chance that fossil bones or plant material would occur in Quaternary Kalahari sands where there might be pans or springs. None has been reported from this site.*” (Bamford 2019)

8.3 Burial Grounds and Graves (Section 36 of the NHRA)

In terms of Section 36 of the Act no burial sites were recorded.

8.4 Cultural Landscapes, Intangible and Living Heritage.

Long term impact on the cultural landscape is considered to be negligible as the surrounding area consists of an area that has been subjected to extensive mining activities from 2006 onwards. Visual impacts to scenic routes and sense of place are also considered to be low due to the extensive developments in the area.

8.5 Battlefields and Concentration Camps

There are no battlefields or concentration camp sites close to the study area.

9 Potential Impact

The chances of impacting unknown archaeological sites in the study area is considered to be negligible. Any direct impacts that did occur would be during the construction phase only and would be of very low significance. Cumulative impacts occur from the combination of effects of various impacts on heritage resources. The importance of identifying and assessing cumulative impacts is that the whole is greater than the sum of its parts. In the case of the development, it will, with the recommended mitigation measures and management actions, not impact any heritage resources directly. However, this and other projects in the area could have an indirect impact on the larger heritage landscape. The lack of any heritage resources in the immediate area and the extensive existing mining activities minimises additional impact on the landscape.

9.1.1 Pre-Construction phase:

It is assumed that the pre-construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure needed for the construction phase. These activities can have a negative and irreversible impact on heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources.

9.1.2 Construction Phase

During this phase, the impacts and effects are similar in nature but more extensive than the pre-construction phase. These activities can have a negative and irreversible impact on heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources.

9.1.3 Operation Phase:

No impact is envisaged for the recorded heritage resources during this phase.

Table 5. Impact Assessment table.

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological material or objects.		
	Without mitigation	With mitigation (Preservation/ excavation of site)
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (2)	Low (2)
Probability	Not probable (2)	Not probable (2)
Significance	16 (Low)	16 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	No resources were recorded	No resources were recorded.

Can impacts be mitigated?	Yes, a chance find procedure should be implemented.	Yes
Mitigation: Due to the lack of apparent significant archaeological resources no further mitigation is required prior to construction.		
Cumulative impacts: Due to the fact that no significant heritage sites were recorded and taking in consideration existing impacts by mining activities the cumulative impact is regarded as low.		
Residual Impacts: Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted but this cannot be quantified.		

10 Conclusion and recommendations

HCAC was appointed to conduct a Heritage Impact Assessment of three project components (new Return Water Dam, King Water Containment Facility as well as two pipelines) at Khumani Mine. The study areas were assessed both on desktop level and by a field survey. The Khumani mining area was previously assessed (Morris 2005) who recorded cemeteries and Stone Age sites. None of these recorded sites is in close proximity to the current projects assessed in this report.

The proposed projects are mostly located within areas entirely transformed by existing mining activities to the extent that from a heritage perspective, the impact areas has no heritage potential due to the extensive mechanical alteration of the topography. A few undiagnostic flakes mostly on CCS were noted but are of no heritage significance as they are out of context and could very well be pseudo tools as a result of heavy-duty machinery (see Bradfield & van der Walt 2018).

An independent Paleontological study for the project (Bamford 2019) recommended a chance find procedure to be implemented as part of the EMP. No burial sites were recorded during the survey however if any graves are located in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation.

The study area is surrounded by mining developments and infrastructure and the proposed development will not impact negatively on significant cultural landscapes or views. During the public participation process conducted for the project no heritage concerns was raised.

Due to the lack of significant heritage resources in the study area the impact of the proposed project on heritage resources is considered low and it is recommended that the proposed project can commence on the condition that the following chance find procedure are implemented as part of the EMP and based on approval from SAHRA

10.1 Chance Find Procedures

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

9. References

- Bamford, M. 2019. Palaeontological Impact Assessment for the proposed extension of the low grade ore Khumani Mine, Sishen, Northern Province
- Beaumont, P.B. 1998. Report on preliminary fieldwork on the farm Beeshoek 448, Postmasburg District, Northern Cape. Unpublished report, McGregor Museum.
- Beaumont, P.B. 2004a. Wonderwerk Cave. In Morris, D. & Beaumont, P.B. Archaeology in the Northern Cape: some key sites. Kimberley: McGregor Museum.
- Beaumont, P.B. 2004b. Kathu and Kathu Townlands/Uitkoms. In Morris, D. & Beaumont, P.B. Archaeology in the Northern Cape: some key sites. Kimberley: McGregor Museum.
- Beaumont, P. 2005. Heritage Assessment for an EMPR amendment relating to a proposed crusher at Sishen Iron Ore Mine near Kathu in the Northern Cape province.
- Beaumont, P.B. & Boshier, A.K. 1974. Report on test excavations in a prehistoric pigment mine near Postmasburg, Northern Cape. South African Archaeological Bulletin 29:41-59.
- Fock, G.J. & Fock, D.M.L. 1984. Felsbilder in Südafrika: Kinderdam und Kalahari. Köln: Böhlau Verlag.
- Morris, D. 1992. An archaeological impact assessment of a rock engraving site on the mining property at Beeshoek. Unpublished report to the National Monuments Council and Associated Manganese Mines of South Africa.
- Kruger, N. 2015. Sishen Iron Ore Company (SIOC): Proposed Lyleveld North Waste Rock Dump Expansion and Lyleveld South Haul Road Extension Project, Sishen Mine, Northern Cape Province
- Lombard, M. 2011. Background To The Stone Age Of The Kakamas/Keimoes Area For CRM Purposes. Unpublished report.
- Morris, D. 2000. Gamsberg Zinc Project environmental impact assessment specialist report: archaeology. Unpublished report to Anglo-American (McGregor Museum)
- Morris, D. 2002. Report on an archaeological impact assessment for Kumba Resources Ltd on properties south west of Postmasburg, Northern Cape. Unpublished report.
- Morris, D. 2005. Archaeological Impact assessment of mining areas on the farms Bruce, King, Mokaning and Parson between Postmasburg and Kathu in the Northern Cape.
- Morris, D. 2008. Archaeological and Heritage Impact Assessment on Remainder of Carter Block 458, near Lime Acres, Northern Cape. McGregor Museum.
- Morris, D. And Beaumont, P.B. 1994. Ouplaas 2: Rock engravings, Daniëlskuil. McGregor Museum
- Mucina, L. & Rutherford, M.C. 2006. The vegetation map of South Africa, Lesotho and Swaziland. SANBI, Pretoria.
- National Heritage Resources Act NHRA of 1999 (Act 25 of 1999)
- SAHRA Report Mapping Project Version 1.0, 2009
- Shillington, K. 1985. The Colonisation of the Southern Tswana, 1870-1900. Braamfontein: Ravan Press.
- Snyman, 1988. Daniëlskuil: van Griekwa-buitepos tot dienssentrum. Pretoria: HSRC
- South African Heritage Information System 2015
- Thackeray, A.I., Thackeray, J.F. & Beaumont, P.B. 1983. Excavations at the Blinkklipkop specularite mine near Postmasburg, Northern Cape. South African Archaeological Bulletin 38:17-25.
- Van Der Walt, J. and Bradfield, J., 2018. The effects of heavy-duty machinery on the formation of pseudo-knapping debitage in Stone Age cultural landscapes. *antiquity*, 92(366), pp.1429-1444.
- Van der Walt, J. Heritage Impact Assessment Khumani Mine. Unpublished report
<http://www.assmang.co.za/content.asp?pg=7>

10. Appendices:**Curriculum Vitae of Specialist**

Jaco van der Walt
Archaeologist

jaco.heritage@gmail.com
+27 82 373 8491
+27 86 691 6461

Education:

Particulars of degrees/diplomas and/or other qualifications:

Name of University or Institution: University of Pretoria
Degree obtained : BA Heritage Tourism & Archaeology
Year of graduation : 2001

Name of University or Institution: University of the Witwatersrand
Degree obtained : BA Hons Archaeology
Year of graduation : 2002

Name of University or Institution : University of the Witwatersrand
Degree Obtained : MA (Archaeology)
Year of Graduation : 2012

Name of University or Institution : University of Johannesburg
Degree : PhD
Year : Currently Enrolled

EMPLOYMENT HISTORY:

2011 – Present: **Owner – HCAC (Heritage Contracts and Archaeological Consulting CC).**
2007 – 2010 : **CRM Archaeologist**, Managed the Heritage Contracts Unit at the University of the Witwatersrand.
2005 - 2007: **CRM Archaeologist**, Director of Matakoma Heritage Consultants
2004: **Technical Assistant**, Department of Anatomy University of Pretoria
2003: **Archaeologist**, Mapungubwe World Heritage Site
2001 - 2002: **CRM Archaeologists**, For R & R Cultural Resource Consultants, Polokwane
2000: **Museum Assistant**, Fort Klapperkop.

Countries of work experience include:

Republic of South Africa, Botswana, Zimbabwe, Mozambique, Tanzania, The Democratic Republic of the Congo, Lesotho and Zambia.

SELECTED PROJECTS INCLUDE:

Archaeological Impact Assessments (Phase 1)

Heritage Impact Assessment Proposed Discharge Of Treated Mine Water Via The Wonderfontein Spruit Receiving Water Body Specialist as part of team conducting an Archaeological Assessment for the Mmamabula mining project and power supply, Botswana
Archaeological Impact Assessment Mmamethlake Landfill
Archaeological Impact Assessment Libangeni Landfill

Linear Developments

Archaeological Impact Assessment Link Northern Waterline Project At The Suikerbosrand Nature Reserve
Archaeological Impact Assessment Medupi – Spitskop Power Line,
Archaeological Impact Assessment Nelspruit Road Development

Renewable Energy developments

Archaeological Impact Assessment Karoshoek Solar Project

Grave Relocation Projects

Relocation of graves and site monitoring at Chloorkop as well as permit application and liaison with local authorities and social processes with local stakeholders, Gauteng Province.
Relocation of the grave of Rifle Man Maritz as well as permit application and liaison with local authorities and social processes with local stakeholders, Ndumo, Kwa Zulu Natal.
Relocation of the Magolwane graves for the office of the premier, Kwa Zulu Natal
Relocation of the OSuthu Royal Graves office of the premier, Kwa Zulu Natal

Phase 2 Mitigation Projects

Field Director for the Archaeological Mitigation For Booyseendal Platinum Mine, Steelpoort, Limpopo Province. Principle investigator Prof. T. Huffman
Monitoring of heritage sites affected by the ARUP Transnet Multipurpose Pipeline under directorship of Gavin Anderson.
Field Director for the Phase 2 mapping of a late Iron Age site located on the farm Kameelbult, Zeerust, North West Province. Under directorship of Prof T. Huffman.
Field Director for the Phase 2 surface sampling of Stone Age sites effected by the Medupi – Spitskop Power Line, Limpopo Province

Heritage management projects

Platreef Mitigation project – mitigation of heritage sites and compilation of conservation management plan.

MEMBERSHIP OF PROFESSIONAL ASSOCIATIONS:

- Association of Southern African Professional Archaeologists. Member number 159
Accreditation:
 - Field Director Iron Age Archaeology
 - Field Supervisor Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation
- Accredited CRM Archaeologist with SAHRA
- Accredited CRM Archaeologist with AMAFA
- Co-opted council member for the CRM Section of the Association of Southern African Association Professional Archaeologists (2011 – 2012)

PUBLICATIONS AND PRESENTATIONS

- A Culture Historical Interpretation, Aimed at Site Visitors, of the Exposed Eastern Profile of K8 on the Southern terrace at Mapungubwe.
 - J van der Walt, A Meyer, WC Nienaber
 - Poster presented at Faculty day, Faculty of Medicine University of Pretoria 2003
- 'n Reddingsondersoek na Anglo-Boereoorlog-ammunisie, gevind by Ifafi, Noordwes-Provinsie. South-African Journal for Cultural History 16(1) June 2002, with A. van Vollenhoven as co-writer.
- Fieldwork Report: Mapungubwe Stabilization Project.
 - WC Nienaber, M Hutten, S Gaigher, J van der Walt
 - Paper read at the Southern African Association of Archaeologists Biennial Conference 2004
- A War Uncovered: Human Remains from Thabantšho Hill (South Africa), 10 May 1864.
 - M. Steyn, WS Boshoff, WC Nienaber, J van der Walt
 - Paper read at the 12th Congress of the Pan-African Archaeological Association for Prehistory and Related Studies 2005
- Field Report on the mitigation measures conducted on the farm Bokfontein, Brits, North West Province .
 - J van der Walt, P Birkholtz, W. Fourie
 - Paper read at the Southern African Association of Archaeologists Biennial Conference 2007
- Field report on the mitigation measures employed at Early Farmer sites threatened by development in the Greater Sekhukhune area, Limpopo Province. J van der Walt
 - Paper read at the Southern African Association of Archaeologists Biennial Conference 2008
- Ceramic analysis of an Early Iron Age Site with vitrified dung, Limpopo Province South Africa.
 - J van der Walt. Poster presented at SAFA, Frankfurt Germany 2008

- Bantu Speaker Rock Engravings in the Schoemanskloof Valley, Lydenburg District, Mpumalanga (*In Prep*)
 - J van der Walt and J.P Celliers
- Sterkspruit: Micro-layout of late Iron Age stone walling, Lydenburg, Mpumalanga. W. Fourie and J van der Walt. A Poster presented at the Southern African Association of Archaeologists Biennial Conference 2011
- Detailed mapping of LIA stone-walled settlements' in Lydenburg, Mpumalanga. J van der Walt and J.P Celliers
 - Paper read at the Southern African Association of Archaeologists Biennial Conference 2011
- Bantu-Speaker Rock engravings in the Schoemanskloof Valley, Lydenburg District, Mpumalanga. J.P Celliers and J van der Walt
 - Paper read at the Southern African Association of Archaeologists Biennial Conference 2011
- Pleistocene hominin land use on the western trans-Vaal Highveld ecoregion, South Africa, Jaco van der Walt.
 - J van der Walt. Poster presented at SAFA, Toulouse, France. Biennial Conference 2016

REFERENCES:

1. Prof Marlize Lombard Senior Lecturer, University of Johannesburg, South Africa
E-mail: mlombard@uj.ac.za
2. Prof TN Huffman Department of Archaeology Tel: (011) 717 6040
University of the Witwatersrand
3. Alex Schoeman University of the Witwatersrand
E-mail: Alex.Schoeman@wits.ac.za