

HERITAGE IMPACT ASSESSMENT

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

**PROJECT 1 - PROPOSED UPGRADE TO THE NORTH MINE STORM WATER CHANNEL;
PROJECT 2 - PROPOSED VENTILATION SHAFT, ELECTRICITY GENERATION AND
DISTRIBUTION INFRASTRUCTURE, AS WELL AS A UNDERGROUND FUEL DISTRIBUTION
FACILITY AT THE DWARSRIVIER CHROME MINE, NEAR STEELPOORT, LIMPOPO PROVINCE.**

Type of development:

Mining

Client:

Envirologistics

Developer:

Dwarsrivier Chrome Mine (Pty) Ltd

Report prepared by:



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APPROVAL PAGE

Project Name	DCM Ventilation Shaft and Trench
Report Title	Heritage Impact Assessment for Project 1 - Proposed Upgrade To The North Mine Storm Water Channel; Project 2 - Proposed Ventilation Shaft, Electricity Generation And Distribution Infrastructure, As Well As A Underground Fuel Distribution Facility At The Dwarsrivier Chrome Mine, Near Steelpoort, Limpopo Province
Authority Reference Number	DMR REFERENCE: LP 30/5/1/2/3/2/1 (179) EM ENVIROGISTICS REF.: PROJECT 1: 202227; PROJECT 2: 202304 TBC
Report Status	Draft Report
Applicant Name	Dwarsrivier Chrome Mine (Pty) Ltd

Responsibility	Name	Qualifications and Certifications	Date
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Date	Report Reference Number	Description of Amendment

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REPORT OUTLINE

Appendix 6 of the GNR 326 Environmental Impact Assessment (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, 7 and 8.
(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 site plan identifying site alternatives;	Section 8 and 9
(g) Identification of any areas to be avoided, including buffers	Section 8 and 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
(I) 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 1.3
(k) Mitigation measures for inclusion in the EMPr	Section 10.1
(l) Conditions for inclusion in the environmental authorisation	Section 10. 1.
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 10. 5.
(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 10.3
(o) Description of any consultation process that was undertaken during the course of preparing the specialist report	Section 5
(p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Refer to BAR report
(q) Any other information requested by the competent authority	N.A

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 (NEMA) (Act No 107 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations (as amended), that I:</p> <ul style="list-style-type: none"> • I act as an 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 49 A of the Act. of regulation 48 and is punishable in terms of section 24F of the Act.
Signature	
Date	23/03/2023

a) Expertise of the specialist

Jaco van der Walt has been practising as a Cultural Resource Management (CRM) archaeologist for 15 years. Jaco is an accredited member of the Association of South African Professional Archaeologists (ASAPA) (#159) and APHP #114 and have conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, Kwa Zulu Natal (KZN) as well as the Northern and Eastern Cape Provinces in South Africa.

Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, Democratic Republic of the Congo (DRC) Zambia, Guinea, Afghanistan, Nigeria and Tanzania. Through this, he has a sound understanding of the International Finance Corporations (IFC) Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage

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BEYOND HERITAGE

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Executive Summary

Envirologistics (Pty) Ltd was appointed as the Environmental Assessment Practitioner (EAP) by Dwarsrivier Chrome Mine (Pty) Ltd (DCM) to undertake the required Environmental Authorisation Process for the following two Projects.

- **Project 1:** DCM plans to upgrade of the stormwater channel at the North Shaft to accommodate the expanded mining infrastructure at North Shaft
- **Project 2:** DCM plans to implement additional Ventilation Shafts at South Mine. This latter project will also involve the construction of a fuel distribution area for the South Mine underground operations, a substation, 4 generators and a diesel tank. Lastly this project will include two new 33kV powerlines from the generators to the Beneficiation Plant area.

Beyond Heritage was appointed to conduct a Heritage Impact Assessment (HIA) for the Projects and the study area was assessed on a desktop level and by a non-intrusive pedestrian field survey. Key findings of the assessment include:

- The study area is characterised by extensive mining activities that transformed the Project footprint and the development footprint is considered to be of low heritage potential;
- This was confirmed during the survey that recorded no heritage resources in the Project area although several heritage sites are known to occur in the DCM surface rights boundary ranging from burial sites and intangible heritage sites to artefacts and sites dating to the Stone Age and Iron Age;
- None of the known sites will be affected by the Projects;
- The study area is of insignificant and low paleontological sensitivity and no further studies are required for this aspect.

The impact on heritage resources is low, and the Projects can commence provided that the recommendations in this report are adhered to, based on the South African Heritage Resource Authority (SAHRA) 's approval.

Recommendations:

- Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during the course of construction;

ABBREVIATIONS

ASAPA: Association of South African Professional Archaeologists
BGG Burial Ground and Graves
CFPs: Chance Find Procedures
CMP: Conservation Management Plan
CRR: Comments and Response Report
CRM: Cultural Resource Management
DFFE: Department of Fisheries, Forestry and Environment,
EA: Environmental Authorisation
EAP: Environmental Assessment Practitioner
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EAP Environmental Assessment Practitioner
EMPr: 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, 2002 (Act No. 28 of 2002)
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)

Earlier 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:

Beyond Heritage was appointed to conduct a HIA for two proposed Projects at DCM in the Limpopo Province. Project 1: DCM plans to upgrade of the stormwater channel at the North Shaft to accommodate the expanded mining infrastructure at North Shaft and Project 2: DCM plans to implement additional Ventilation Shafts at South Mine. This latter project will also involve the construction of a fuel distribution area for the South Mine underground operations, a substation, 4 generators and a diesel tank. Lastly this project will include two new 33kV powerlines from the generators to the Beneficiation Plant area (Figure 1.1 to 1.3). The report forms part of the Basic Assessment (BA) and Environmental Management Programme Report (EMPr) for the developments.

The aim of the study is to survey the proposed development footprint to understand the heritage character of the study area, and if any sites are encountered assess their importance within local, provincial, and national context. It serves to assess the impact of the proposed Projects 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 heritage sites were recorded. 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 Regulations section 40 (1) and (2), to be submitted to SAHRA for commenting. Upon submission to SAHRA the Project will be automatically given a case number as reference. As such the EIA 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).

1.2 Project Description

Project components and the location of the proposed Projects are outlined under Table 2 and 3.

Table 2: Project Description

Project area	The proposed new mining activities are located on portion RE of the Farm Dwarsrivier 372KT.
Magisterial District	Fetakgomo/Greater Tubatse Local Municipality, within the boundaries of the Sekhukhune District Municipality.
Central co-ordinate of the development	Dwarsrivier mine is located at 24°56'4.36"S & 30° 7'22.08"E
Topographic Map Number	2430 CC

Table 3: Infrastructure and Project activities

Type of development	Mining Development
Project Components	<p>Project 1</p> <p>The proposed project relating to the current Environmental Authorisation process involves the upgrade of the stormwater channel at the Dwarsrivier Chrome Mine North Shaft to accommodate the expanded mining infrastructure at North Shaft. The purpose of the stormwater trench at the North Shaft operational area is to facilitate the separation/ diversion of clean stormwater away from the mine's operational areas. The channel will be an earth channel. The separation and management of clean and dirty stormwater is an operational requirement for all mining operations within South Africa. The diverted clean stormwater will be discharged south of North Shaft. The channel will be approximately 0.6 kilometres (km) (610 metres [m]) in length and will be surrounded by an earth berm which varies in width (i.e. 10m to 30m) across its length.</p> <p>Project 2</p> <p>Dwarsrivier Mine has been mining chromite ore from the LG6 seam since 1999. Between 1999 and 2005, ore was mined using opencast methods. The six (6) opencast pits have subsequently been mined out and backfilled, with the exception of the South and North Pit portals from which access is gained to the underground workings. The current mine plan extends the life of the operations to the year 2042. The proposed project relating to the current Environmental Authorisation process involves the construction and operation of following:</p> <ul style="list-style-type: none"> • Two (2) Ventilation Shafts (surface area of approximately 0.2ha each); • Fuel Distribution Area (Emulsion, Oil and Diesel) (approximately 0.1ha); • Substation, including four (4) generators with transformers and a Diesel Tank (surface area of approximately 0.5ha); • Two (2) 33kV Powerlines (approximately 200m and 500m respectively).

1.3 Alternatives

No alternatives were provided, but the area assessed allows for siting of the development to avoid impacts to heritage resources.

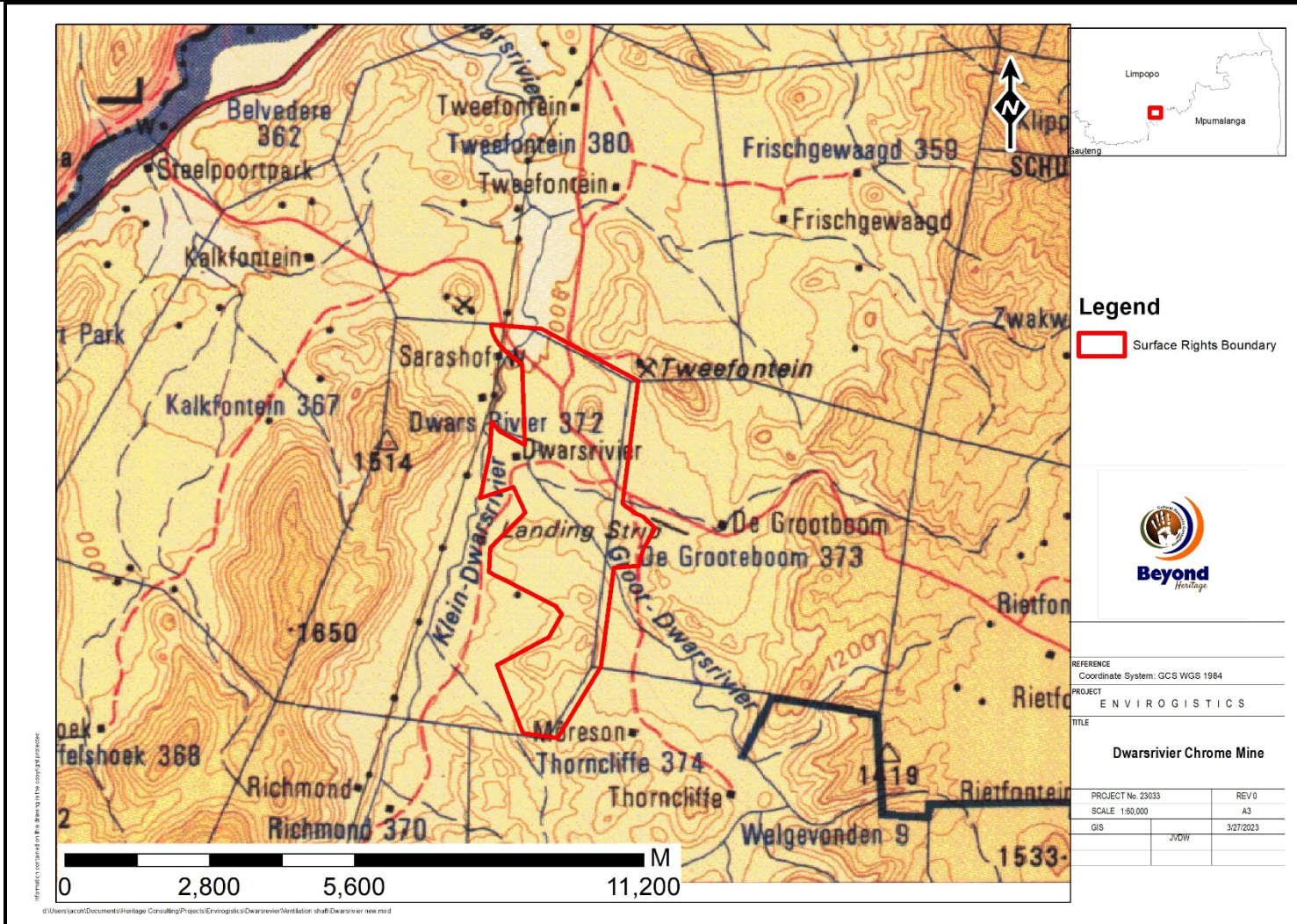


Figure 1.1. Regional setting of the Project (1: 250 000 topographical map) showing the surface rights boundary of DCM.

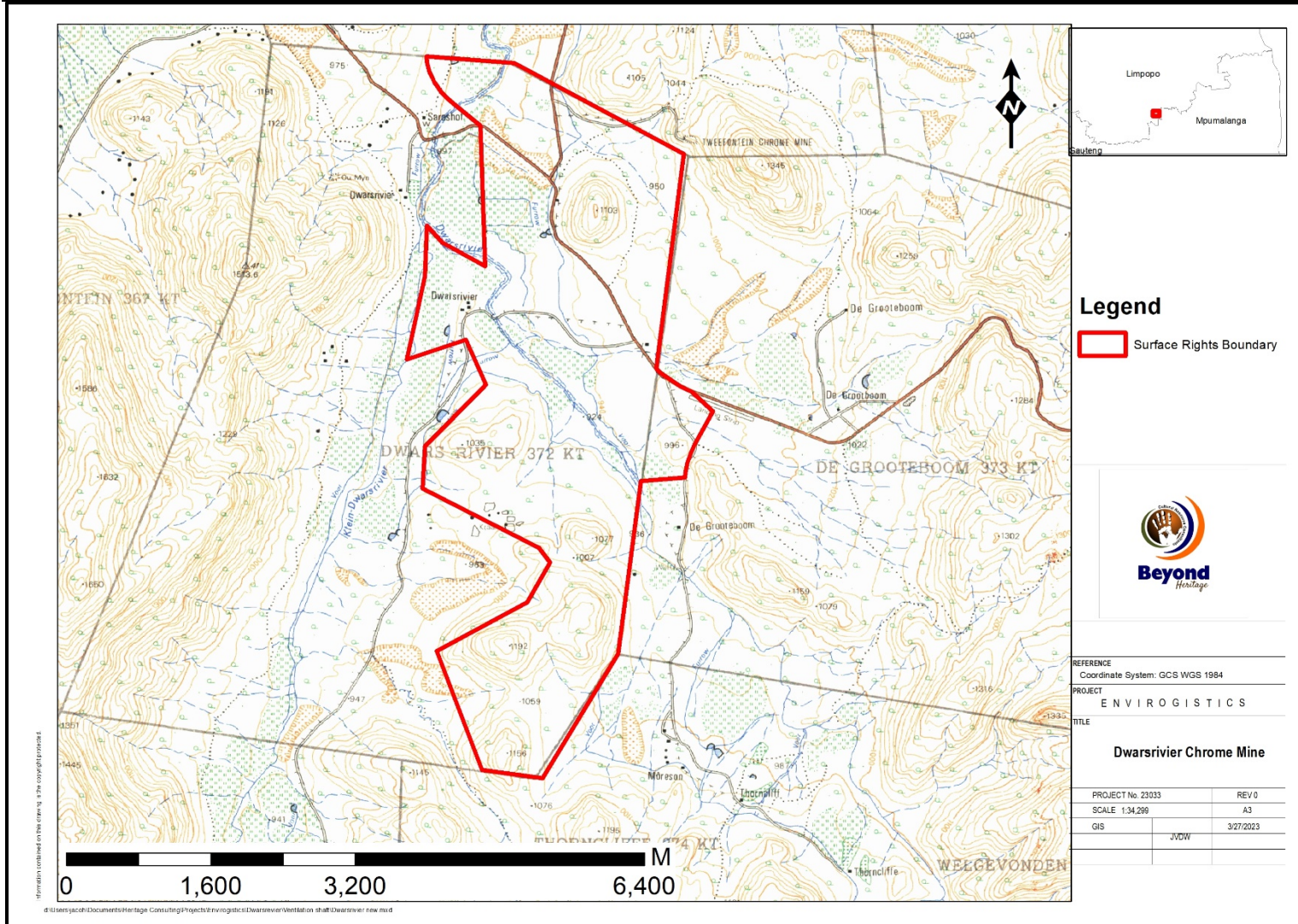


Figure 1.2. Local setting of the Project (1: 50 000 topographical map) showing the surface rights boundary of DCM.

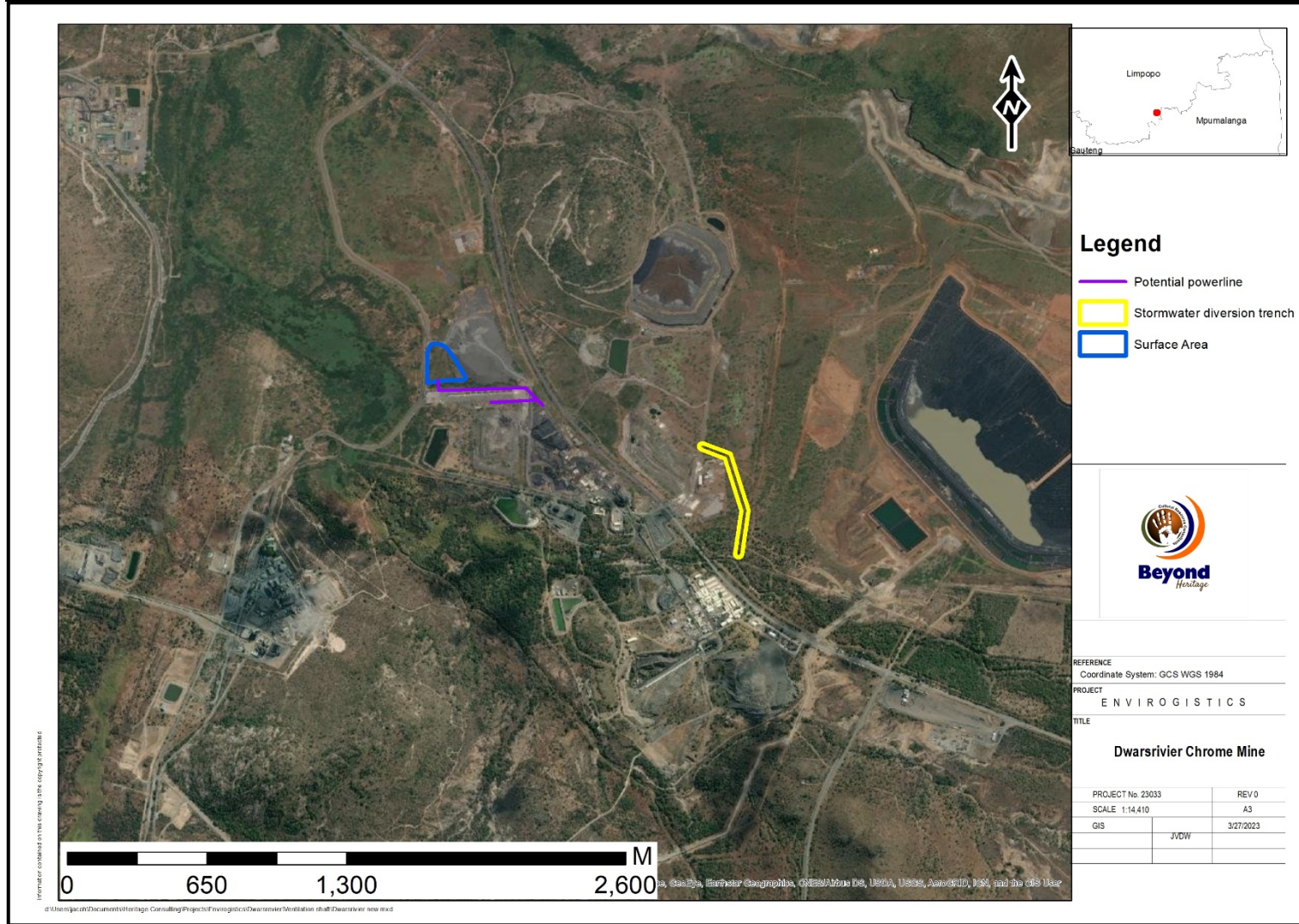


Figure 1.3. Aerial image of the Project components.

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))

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 (or avoidance) of these impacts.

The HIA should be submitted, as part of the impact assessment report or EMPr, to the Provincial Heritage Resource Agency (PHRA) or to SAHRA. SAHRA will ultimately be responsible for the evaluation of Phase 1 HIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 HIA 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 HIA 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 Southern African Development Community (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 HIA'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 include (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 and GNR 548 as well as the SAHRA BGG Policy 2020. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (NHRA), as well as the National Health Act of 2003 and are under 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) re-instituted by Proclamation 109 of 17 June 1994 and implemented by CoGHSTA as well as the National Health Act of 2003 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. . 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 the National Health Act of 2003.

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 fieldwork 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 EA 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 (conducted by the EAP) process was to capture and address any issues raised by community members and other stakeholders during key stakeholder and public meetings.

3.4 Site Investigation

The aim of the site visit was to:

- a) survey the proposed Project area to understand the heritage character of the development footprint (focussing on the current layout);
- 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	The week of 28 Feb 2023
Season	Summer – The time of year did influence the survey as the vegetation was dense across the Project area due to high rainfall. The development footprint was however sufficiently covered to understand the heritage character of the area (Figure 3.1).

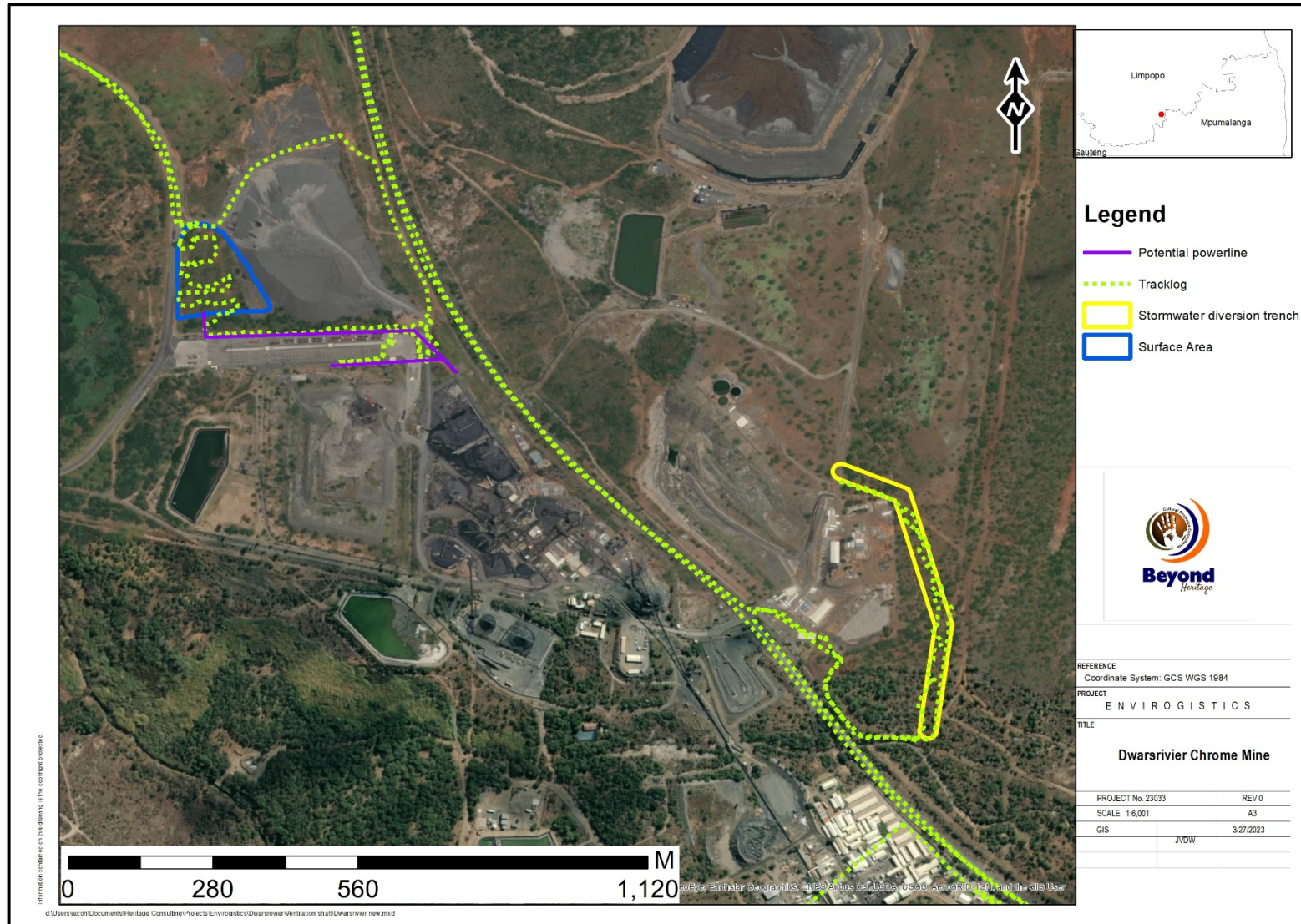


Figure 3.1. Tracklog of the survey path in green.

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 (2007), 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.

Table 5: Heritage significance and field ratings

<i>FIELD RATING</i>	<i>GRADE</i>	<i>SIGNIFICANCE</i>	<i>RECOMMENDED MITIGATION</i>
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 Assumptions, 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 heritage resources, the possibility of discovery of heritage resources during the construction phase cannot be excluded. Dense and overgrown vegetation after recent rainfall affected ground visibility. This limitation is successfully mitigated with the implementation of a chance find procedure and monitoring of the study area by the ECO. This report only deals with the current layout of the proposed development and consisted of non-intrusive surface surveys that focussed on tangible resources. 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.

Field data were recorded by handheld GPS and Mobile GPS applications. It must be noted that during the process of converting spatial data to final drawings and maps the accuracy of spatial data may be compromised. Printing or other forms of reproduction might also distort the spatial distribution in maps. Due care has been taken to preserve accuracy. 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 Environment

According to StatsSA the population of the Greater Tubatse Municipality is 335 676. The population in the municipality is constituted by 97,8% black African, 1,6% white people, with other population groups making up the remaining 0,7. The sex ratio in the municipality is 88, meaning that for every 100 women there are 88 men. Languages spoken in the municipality include Sepedi (78,6%), Tsonga (6,9%), isiNdebele (3,8%), isiZulu (2,1%) and other languages make up 8,6%. Of those aged 20 years and older, 22,6% have completed matric and 6,6% have some form of higher education. The municipality has a weak economic base and high poverty levels. The Burgersfort town in the municipality has been identified as a growth point in the province because of its mining activities. A potential to grow the economic base in the municipality, through tourism, has been brought by the availability of natural resources. Poverty alleviation projects implemented by the municipality have improved the socio-economic conditions.

5 Results of Public Consultation and Stakeholder Engagement:

5.1.1 Stakeholder Identification

Adjacent landowners and the public at large were informed of the proposed activity as part of the BA process by the EAP. Site notices and advertisements notifying interested and affected parties were placed at strategic points and in local newspapers as part of the process. No heritage concerns have been raised thus far. A site visit in April 2022 that was facilitated by Beyond Heritage and attended by Ms Annlin Matabane accompanied community members to the DCM surface right area also indicated no known sites within the current Project footprint.

6 Contextualising the study area:

6.1 Literature Review (SAHRIS)

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where archaeological and historical sites might be located.

In anticipation of other mining activities in the greater study area, archaeologists have completed numerous heritage surveys including Huffman & Schoeman 2001, 2002 a and b; van Schalkwyk 2005; Roodt 2003a, 2003b, 2003c, 2005, 2008a, 2008b; Van der Walt & Fourie 2006; Van der Walt & Celliers 2009; Van der Walt 2009; 2016 and Pistorius 2007, 2010, 2011 for various Environmental Impact Assessment Reports (EIAs) and Environmental Management Programmes (EMPs). These studies provide a good understanding

of the archaeology of the area and use of the wider landscape. Since 2001, heritage surveys have recorded more than 240 sites in the greater study area, ranging from the Middle Stone Age (MSA) to the recent households of farm labourers. The following Cultural Resource Management (CRM) studies (Table 6) were conducted in the immediate area and were consulted for this report:

Table 6. Heritage Reports conducted close to the study area.

Author	Year	Project	Findings
Huffman, T. N. and Schoeman, A.	2002	Archaeological Assessment of The Der Brochen Project, Mpumalanga	25 sites or occurrences, ranging from the Middle Stone Age to the Iron Age and Historic Pedi.
Roodt, F.	2003	Phase 1 Heritage Impact Assessment Der Brochen Tailings Dams Farms: Helena and St. George Mpumalanga Province	39 sites were recorded ranging from the Iron age to burial sites.
Van der Walt, J. and Fourie, W.	2007	Mining development for Mareesburg 8JT Mpumalanga, Archaeological Impact Assessment	3 Iron Age sites
Matoho, E.	2012	Preliminary Report of The Investigation of The Late Iron Age Stone Wall Enclosure Site Identified On The Farm Schaapkraal 42jt, Mpumalanga Province	Iron Age features and burial sites.
Du Piesanie, J and Higgitt, N.	2012	Heritage Impact Assessment for the Everest North Mining 2530 AA, Vygenhoek 10JT, Mpumalanga.	50 Sites recorded ranging from Stone Age, Iron Age and burial sites as well as historical features.
Coetzee, T.	2018	Phase 1 Archaeological Impact Assessment for Environmental Assurance (Pty) Ltd for the Construction of the Mareesburg Haul Road near Boschfontein, Mpumalanga	Seven historical sites consisting of angular stone walling, as well as buildings constructed from bricks and cement; 10 LIA / Farmer sites consisting of linear stone walling and stone-walled enclosures; six stone cairns that might be grave sites; two formal graveyards and two modern sites.
Van der Walt, J.	2018	Heritage Impact Assessment for the establishment of various projects and the expansion of the exploration programme at Dwarsrivier Chrome Mine, Steelpoort, Limpopo Province	Graves, Iron Age Sites, and structural remains.
Van der Walt, J.	2021	Heritage Impact Assessment for the proposed pipeline (SE2) between Spitskop Pump Station and Mototolo Mine, located near Steelpoort, Limpopo Province	Three burial sites and an Iron Age site.

6.1.1 Google Earth and The Genealogical Society of South Africa (Graves and burial sites)

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where archaeological and historical sites might be located. The database of the Genealogical Society of South Africa indicated no known grave sites within the study area.

6.2 Archaeological Background

The archaeology of the area spans across the Stone Age, Iron Age, and Historical period.

6.2.1 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 (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. The three main phases can be divided as follows;

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

Middle Stone Age isolated artefacts are found scattered over the landscape. Finds typically include radial cores, triangular points and flakes. These artefacts are scattered too sparsely to be of any significance (Van der Walt 2016).

6.2.2 Iron Age

Bantu-speaking people moved into Eastern and Southern Africa about 2,000 years ago (Mitchell 2002). These people cultivated sorghum and millets, herded cattle and small stock and manufactured iron tools and copper ornaments. Because metalworking represents a new technology, archaeologists call this period the Iron Age. Characteristic ceramic styles help archaeologists to separate the sites into different groups and time periods. The Iron Age as a whole represents the spread of Bantu speaking people and includes both the Pre-Historic and Historic periods. It can be divided into three distinct periods:

- » The Early Iron Age (EIA): Most of the first millennium AD.
- » The Middle Iron Age (MIA): 10th to 13th centuries AD.
- » The Late Iron Age (LSA): 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living. Most of the decorated pottery found in the study area belongs to the stylistic facies known as *Eiland*. This style dates to between 1550 AD and 1750 AD and was made by Sotho-Tswana people (Huffman 2007: 186-189). These Middle Iron Age Sites do not have any stone walling associated with them and is found close to cultivatable soil. Some stylistic *Marateng* pottery were also recorded presumably in association with Late Iron Age stone walled settlements. *Marateng* pottery dates to between 1650 AD and 1840 AD (Huffman 2007: 207).

6.2.3. Historical Period

European occupation began in 1845 when trekkers established Ohrigstad and then Lydenburg a few years later. Originally, the trekkers were interested in ivory, but they also needed land and labour for agriculture. Tensions with African communities over these needs rose to such a point that the Trekkers attacked the Pedi capital in 1852. They failed, however, to destroy Pedi authority. Somewhat later, they negotiated a peace with Sekwati and traded cattle for land. Boers then started to establish farms in the region. GS Maree, for example, settled on Mareesburg in 1871. Tensions over land and labour increased again until the ZAR attacked the Pedi capital in 1876: this battle also failed to break Pedi resistance.

This brief historical outline helps to date some other sites in the study area. In particular, a number of settlements located around high meadows probably date from 1860 to 1880, when tensions were high but before major European occupation of local farms.

7 Description of the Physical Environment

The study area is situated approximately 60km northwest of Lydenburg, 25km south of Steelpoort and 63km northeast of Roosenekal in the Limpopo Province. The study area forms part of the Dwarsrivier Valley part of the Bushveld Igneous Complex. The greater area has been transformed over the years firstly by agricultural fields and more recently by mining related activities like roads water pipelines and power lines. The study area is characterised by dense grass cover outside of areas affected by mining activities. (Figure 7.1 – 7.3).



Figure 7.1. General view of the western portion of the project area - Image showing the thick ground vegetation.



Figure 7.2. Existing waste rock dumps situated near the western portion of the project area



Figure 7.3. General view of the overgrown vegetation outside of the areas affected by mining.



Figure 7.4. Mining developments characterise the majority of the Project area.

8 Findings of the Survey

The project area is divided into two separate areas east and west of the Dwarsrivier plant. The western portion of the project area is a small section of highly disturbed ground near a large waste rock dump. The eastern section of the project area is a linear feature following an existing fence.

The surrounding environment is dominated by large scale mining activities with the vast majority of the study areas affected by the continuous mining activities in the area. These activities transformed the study area and no sites or features of heritage significance were noted.

8.1 Cultural Landscape

The cultural landscape is characterised by an area that was largely undeveloped but has been transformed into an industrial setting (Figure 8.1 – 8.4).

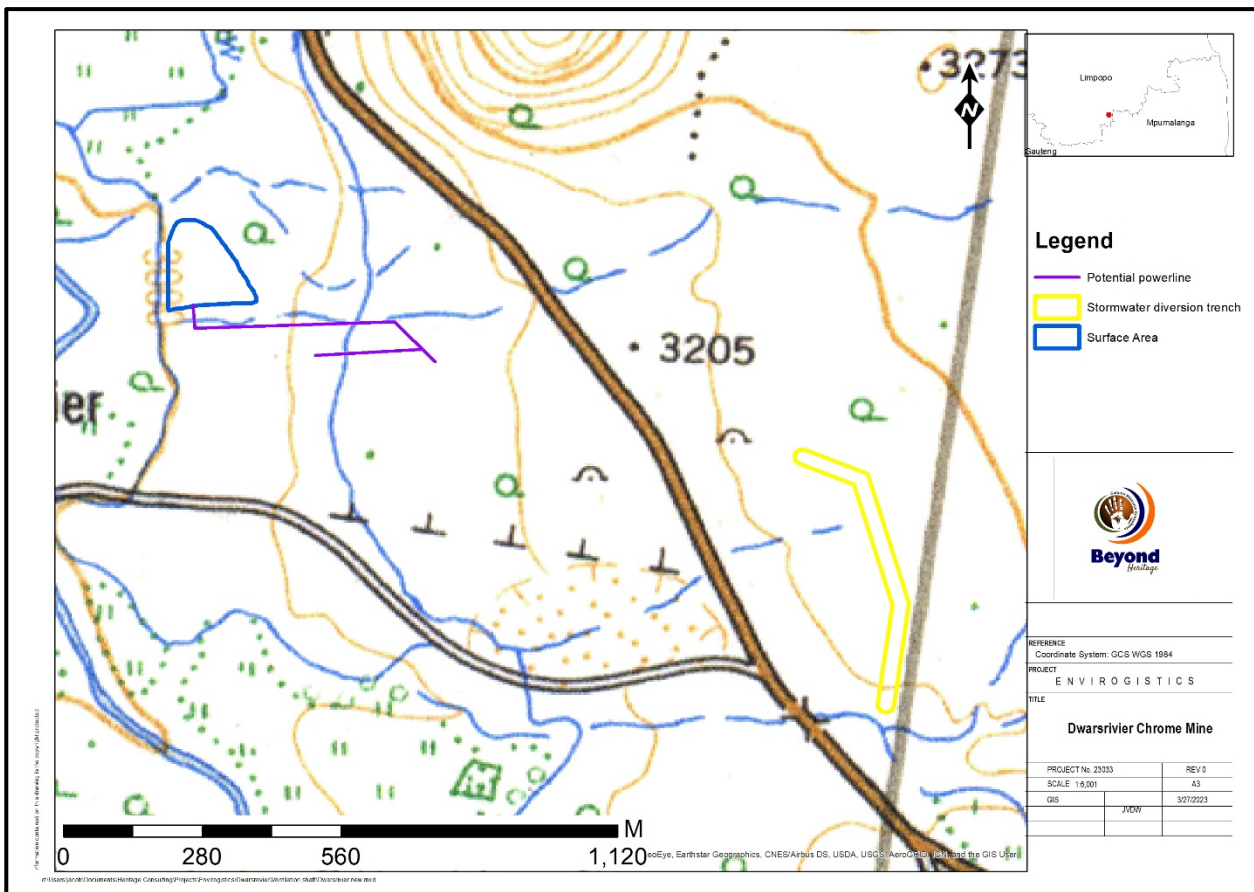


Figure 8.1. 1963 Topographic map indicating the proposed developments. No developments are seen in the study areas.

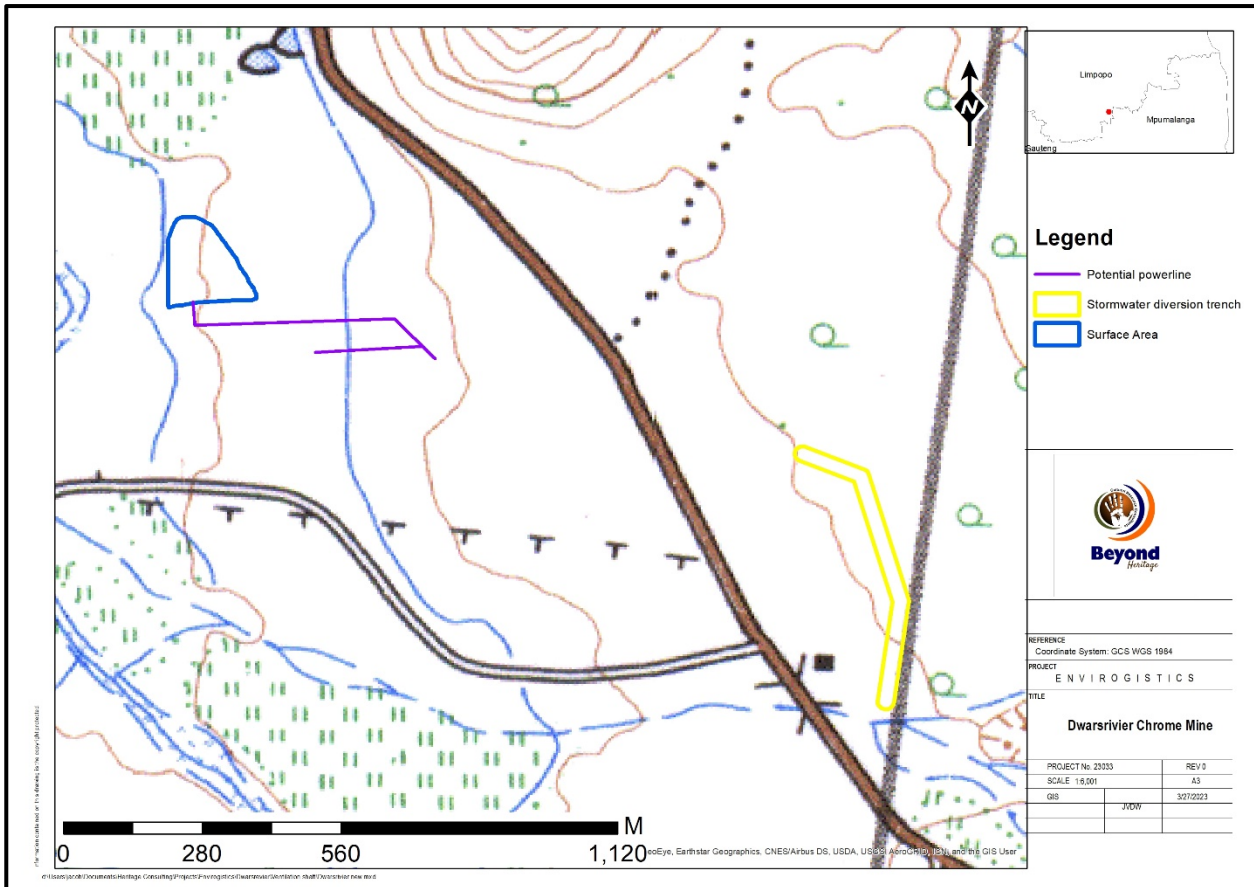


Figure 8.2. 1976 Topographic map indicating no developments in the proposed Project areas.

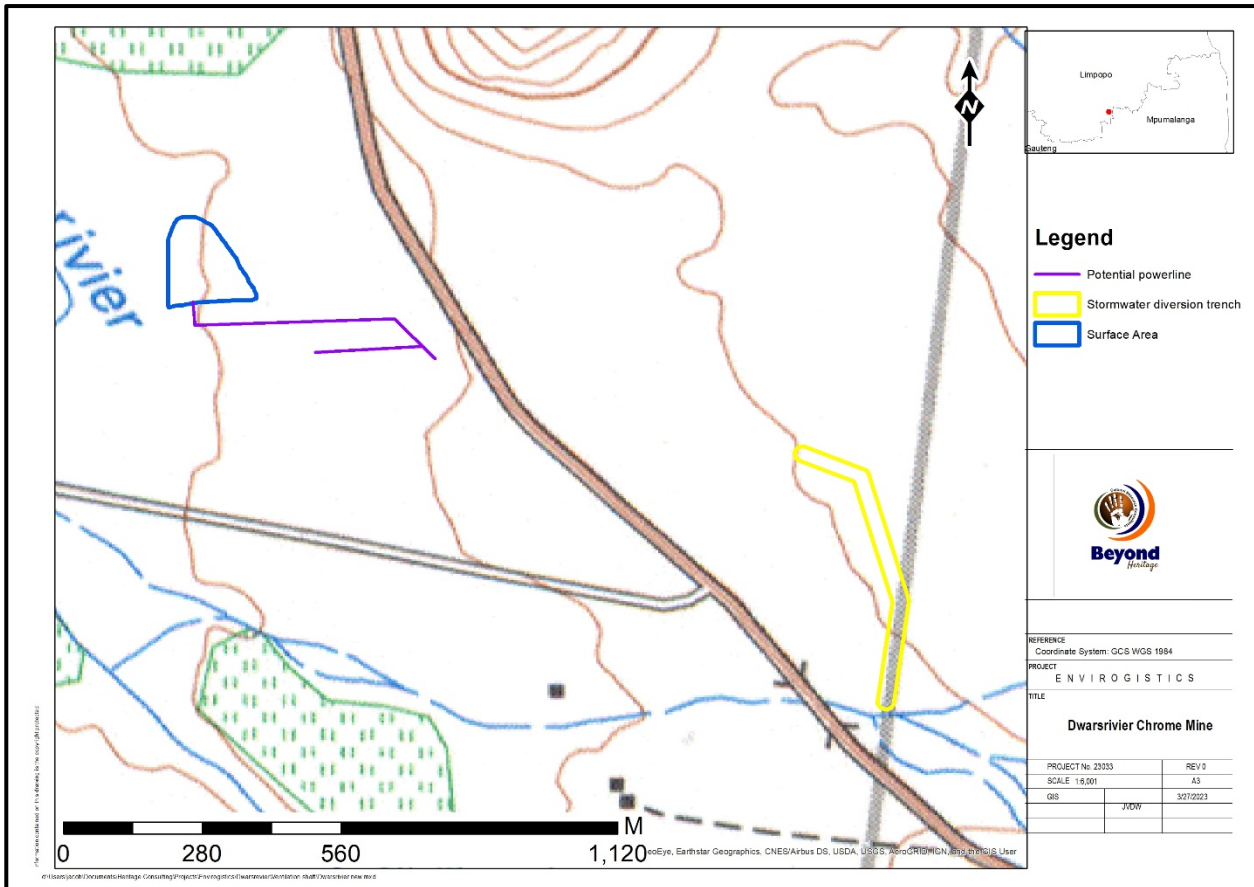


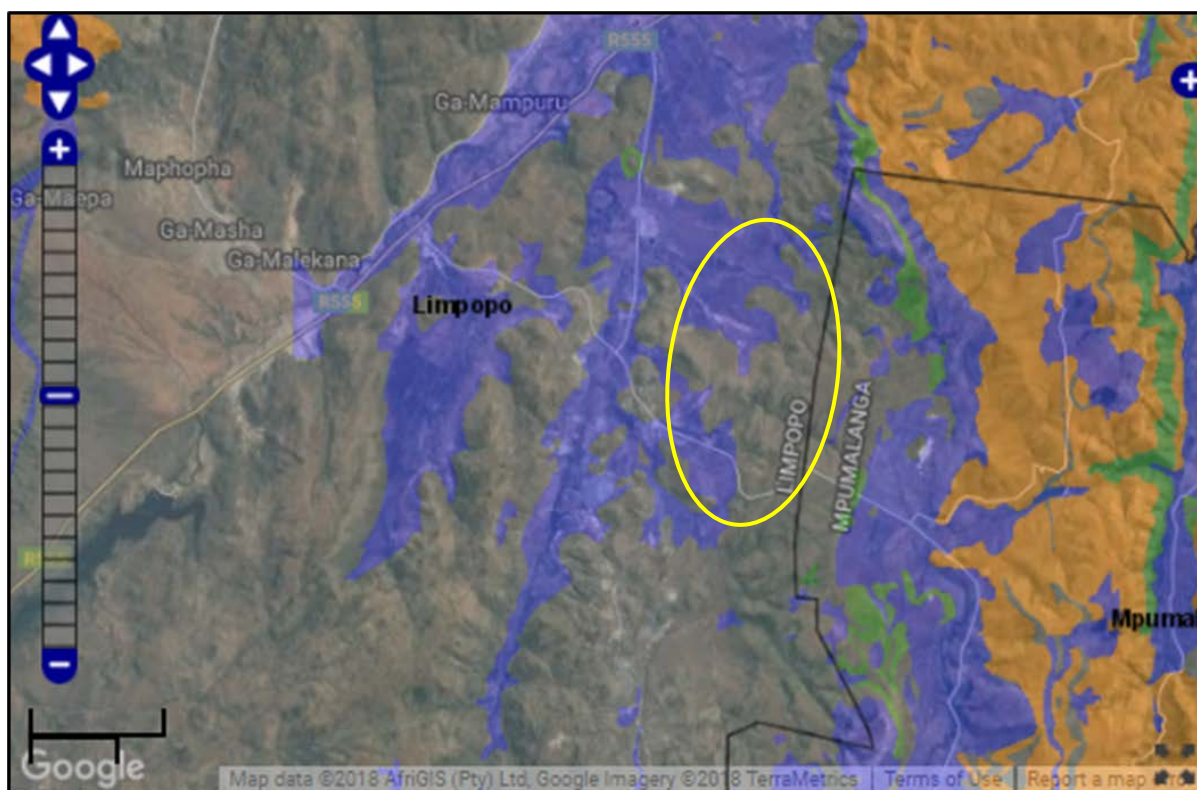
Figure 8.3. 1997 Topographic map indicating no developments in the proposed Project areas.



Figure 8.4. 2002 Topographic map indicating large scale mining developments adjacent to the project areas.

8.2 Paleontological Heritage

According to the paleontological sensitivity of the study area indicated as insignificant and low on the SAHRA Paleontological map (Figure 8.5) and no further studies are required in this regard.



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

Figure 8.5. Paleontological sensitivity of the study area as indicated on the SAHRA Palaeontological sensitivity map.

9 Potential Impact

Impacts to heritage resources without mitigation within the project footprint will be permanent and negative and occur during the pre-construction and construction activities. It is assumed that the pre-construction and construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure. These activities can impact on heritage features and impacts include destruction or partial destruction of non-renewable heritage resources. Impacts during the operation phase is considered to affect the cultural landscape and sense of place.

The main cause of impacts to heritage resources is physical disturbance of the material itself and its context during removal of topsoil and vegetation as well as the excavations associated with the establishment of infrastructure. In terms of this project the main source of impacts will happen during the following activities.

- Establishment of new roads and upgrade of existing roads;
- Earthworks for temporary infrastructure including laydown areas;
- Excavation and levelling of the development footprint;
- Trenches for cables and erection of powerlines;
- Excavations during construction of infrastructure.

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. These activities can have a negative and irreversible impact on heritage features if any occur. 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. Potential impacts include destruction or partial destruction of non-renewable heritage resources.

9.1.3 Operation Phase

No impacts are expected during the operation phase.

9.1.4 Impact Assessment for the Project

Table 7. Impact assessment on the Project area during the pre-construction and construction phase.

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 and paleontological material or objects.		
	Without mitigation	With mitigation (Preservation/ excavation of site)
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	27 (Low)	18 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	NA	NA
Mitigation:		
<ul style="list-style-type: none"> Monitoring of the project area by the ECO during pre-construction and construction phases to implement the Chance Find Procedure for the project as outlined under Section 10.2 if previously unrecorded heritage finds are encountered. 		
Cumulative impacts:		
The proposed project will have a low cumulative impact as no significant heritage resources will be adversely affected.		
Residual Impacts:		
Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted on, but this cannot be quantified.		

10 Conclusion and recommendations

The study area is characterised by extensive mining activities that transformed the Project footprint and the development footprint is considered to be of low heritage potential. This was confirmed during the survey that recorded no heritage resources in the Project area although several heritage sites are known to occur in the DCM surface rights boundary ranging from burial sites and intangible heritage sites to artefacts and sites dating to the Stone Age and Iron Age. A site visit in April 2022 with community members to the DCM surface right area also indicated no known sites within the current Project footprint.

The paleontological sensitivity of the study area is indicated as insignificant and low on the SAHRA Paleontological map (Figure 8.1) and no further studies are required in this regard.

It is recommended that the Project can commence on the condition that the following recommendations (Section 10) are implemented as part of the EMP and based on approval from SAHRA.

10.1 Recommendations for condition of authorisation

The following recommendations for Environmental Authorisation apply and the Project may only proceed based on approval from SAHRA:

Recommendations:

- Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during the course of construction;

10.2 Chance Find Procedures**10.2.1 Heritage Resources**

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 therefore chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below and monitoring guidelines applicable to the Chance Find procedure is discussed below and monitoring guidelines for this procedure are provided in Section 10.5.

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.

10.3 Reasoned Opinion

The overall impact of the Project is considered to be low and residual impacts can be managed to an acceptable level through implementation of the recommendations made in this report. The socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project.

10.4 Potential risk

Potential risks to the proposed Project are the occurrence of intangible features, unrecorded cultural material and burial sites. This can cause delays during construction, as well as additional costs involved in mitigation, as well as possible layout changes.

10.5 Monitoring Requirements

Day to day monitoring can be conducted by the Environmental Control Officers (ECO). The ECO or other responsible persons should be trained along the following lines:

- *Induction training:* Responsible staff identified by the developer should attend a short course on heritage management and identification of heritage resources.
- *Site monitoring and watching brief:* As most heritage resources occur below surface, all earth-moving activities need to be routinely monitored in case of accidental discoveries. The greatest potential impacts are from pre-construction and construction activities. The ECO should monitor all such activities daily. If any heritage resources are found, the chance finds procedure must be followed as outlined above.

Table 8. Monitoring requirements for the project

Heritage Monitoring					
Aspect	Area	Responsible for monitoring and measuring	Frequency	Proactive or reactive measurement	Method
Cultural Resources Chance Finds	Entire project area	ECO	Weekly (Pre construction and construction phase)	Proactively	<ul style="list-style-type: none"> • If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented: <ol style="list-style-type: none"> 1. Cease all works immediately; 2. Report incident to the Sustainability Manager; 3. Contact an archaeologist/ palaeontologist to inspect the site; 4. Report incident to the competent authority; and 5. Employ reasonable mitigation measures in accordance with the requirements of the relevant authorities.

Heritage Monitoring					
Aspect	Area	Responsible for monitoring and measuring	Frequency	Proactive or reactive measurement	Method
					<ul style="list-style-type: none"> Only recommence operations once impacts have been mitigated.

10.6 Management Measures for inclusion in the EMP

Table 9. Heritage Management Plan for EMP implementation

Area	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Target	Performance indicators (Monitoring tool)
General project area	Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage resources (outlined in Section 10.2) in case heritage resources are uncovered during construction;	Construction	Throughout the project	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report

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