HERITAGE IMPACT ASSESSMENT

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

FOR THE PROPOSED NORTHAM ZONDEREINDE 3 SHAFT, LIMPOPO PROVINCE

Type of development:

Mining Development

Client:

Prism EMS

Applicant:

Northam Platinum Limited

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Project Reference:

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October 2019
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APPROVAL PAGE

Project Name	Northam Zondereinde Platinum Mine 3 Shaft, Thabazimbi Local Municipality
Report Title	Heritage Impact Assessment Northam Zondereinde Platinum Mine 3 Shaft, Thabazimbi Local Municipality
Authority Reference Number	LP 30/5/1/2/3/2/1/(037) EM
Report Status	Final Report
Applicant Name	Northam Platinum Limited

	Name	**Qualifications and Certifications**	**Date**
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DOCUMENT PROGRESS

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Amendments on Document

Date	Report Reference Number	Description of Amendment
25 November 2019	Final Report	Addressing SAHRA Comments

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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 11
(b) Declaration that the specialist is independent in a form as may be specified by the competent authority	*Declaration of Independence*
(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
(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 9
(k) Mitigation measures for inclusion in the EMPr	Section 8 and 9
(I) Conditions for inclusion in the environmental authorisation	Section 8 and 9
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 8 and 9
(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 9.2
(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 11

Executive Summary

HCAC was appointed to conduct a Heritage Impact Assessment of the proposed Northam Zondereinde Shaft 3 to determine the presence of cultural heritage sites and the impact of the proposed development on these non-renewable resources. The study area was 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 development footprint.

During the survey a set of hills that contain Late Iron Age (LIA) settlements were noted that is located adjacent and to the east of the study area. This area is marked by a very extensive Iron Age stonewalled settlement that extends into the neighbouring properties where some sites were archaeologically excavated (van Schalkwyk 2004). In order to assess the anticipated impacts by the proposed development the study area is divided into high and medium significance areas. Areas of high significance contain features (middens and stone walled enclosures) and are located **outside** of the development footprint and will **not be directly impacted on**. The areas marked as of medium significance contain isolated artefacts without any visible surface features but could contain subsurface cultural deposit. A small section of this area will be directly impacted by the proposed layout and will have to be mitigated. A summary of key findings include the following:

- Two alternatives were assessed of which the Alternative layout is not acceptable due to high heritage impacts. The proposed layout is placed to preserve the Iron Age site *in-situ* and acceptable from a heritage point of view;
- High sensitive areas are mapped in order to provide a buffer zone of 30 meters as a minimum around features but in certain areas are up to 50 meters;
- The closest heritage feature in the high sensitivity area are located 46 meters away from the proposed surface infrastructure and the furthest 86 meters;
- At the time of the survey no visible surface features were recorded in medium significant areas. These areas are mapped as being of medium significance due to the close proximity to the recorded features and marked by the change of vegetation that is a result of landscape use by the inhabitants of the nearby Iron Age settlement;
- Due to the lack of heritage features in the medium significant areas, direct impacts by the proposed project are expected to be low. Mitigation measures proposed in the report is to mitigate against chance find in these areas.

The impact of the proposed project on heritage resources can be mitigated to an acceptable level and it is recommended that the proposed project can commence provided that the recommendations below are adhered to and based on approval from SAHRA.

- The high significant areas should be avoided and areas of medium sensitivity must be test excavated to test for subsurface deposits. These areas should be monitored during construction and a chance find procedure should be implemented for the project as well as a site development plan as part of the EMPr.

Declaration of Independence

Specialist Name	Jaco van der Walt
Declaration of Independence	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: • 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	10/10/2019

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.

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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 is contracted by Prism EMS to conduct a heritage impact assessment of the proposed development footprint for the Northam Zondereinde Shaft 3 development, Limpopo Province (Figure 1 -3). The report forms part of the Environmental Impact Assessment (EIA) and Environmental Management Programme Report (EMPR) for the proposed project.

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 a large Late Iron Age settlement was recorded. General site conditions and features 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, complied 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 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).

Table 2: Project Description

Size of development and farm portions	Approximately 15 Hectares on a part of the remainder of the Farm Elandsfontein 386 KQ and the remainder of the Farm Zondereinde 384 KQ
Magisterial District	Thabazimbi Municipality
1: 50 000 map sheet number	2427CD
Central co-ordinate of the development	24°50'52.47"S 27°18'40.62"E

Table 3: Infrastructure and project activities

Type of development	Mining Development
Project size	Development footprint approximately 15 hectares
Project Components	Due to Northam Platinum realising that it will be more feasible to sink an additional shaft for various reasons, the following shafts and surface infrastructure and associated activities are now required, which also requires environmental authorisation. The shafts will be positioned on two constructed terraces one for the up-cast ventilation shafts (Terrace 2) and one for the two access shafts and one downcast ventilation shaft (Terrace 1). The two terraces will require a servitude between them for services. The servitude will carry buried power cables from the main consumer substation to the ventilation shafts. A servitude will be required between the current Zondereinde Mine's current surface operations ("Existing Surface Area") and terrace. This servitude will carry service water, sewerage, backfill slurry, power cables and overhead power lines. Overhead power lines will be installed to connect terrace 1 to the adjacent Eskom high voltage overhead lines. A potable water line will be installed from the Magalies Water main pipeline adjacent to the R510 to terrace 1. The current paved road from the R510 to the current shaft and concentrator facility will be diverted around terrace 1 and an additional unpaved road will be required from the existing paved road to terrace 2. **Terrace 1** The purpose of Terrace 1 is to house a full shaft infrastructure that supports the downcast and access shafts. The terrace will be constructed by excavating and removing the heaving clay layer of approximately 2 m and filling and compacting graduated fill to provide a stable base for the mounting of the facilities. (The clay will be stored for rehabilitation on the existing topsoil storage facility and the fill material will be sourced from waste rock available on the mine site). A storm water collecting and evaporation dam will be provided adjacent to the terrace. The storm water will be collected from a series of storm water drains on and around the periphery of the terrace. The terrace will be secured with fencing and will have two entrance/exit points namely for pedestrians and for delivery and commercial vehicles. Personnel will enter the shaft complex from either the parking area or from the designated bus and taxi rank. Each of the entry points will be controlled from the main security gate house. In order to effectively utilise the two access shafts and the down cast ventilation shaft the following facilities will be provided for on the terrace: □ Shaft bank Area □ Two headgears □ 3 Shafts □ Transfer conveyor belt from headgear to silos □ Reef silo □ Waste silo □ Salvage yard □ Store yard □ Store building □ Explosive yard □ Compressor house □ Two winder houses □ Refrigeration plant □ Bulk air coolers – 3 off □ Potable water tank □ Service water tanks □ Storm water dam and drainage □ Parking □ Taxi/bus rank □ Gate house □ Office blocks □ Change houses □ Backfill remix tanks □ Engineering Workshop □ Lamp room □ Eskom yard □ Main consumer substation □ Emergency generators □ Terraced area □ Sewerage sump.

	The sections following provide a functional description of the infrastructure that will be installed on terrace 1. **NO 3 SHAFT** No 3 Shaft is a men and material hoisting shaft that will transport men and material to and from 3 level (1,320 m below collar) to surface. The shaft is 4.6 m diameter, equipped with a steel headgear, and will be lined with shotcrete and equipped with steel shaft guides. Hoisting will be done with a ground mounted double drum winder housed in a winder house adjacent to the shaft and headgear. The shaft will be equipped with a single conveyance and a counterweight and various mining services will be installed into the shaft. The shaft will be an intake shaft for ventilation and air will be cooled by passing it through a bulk air cooler via a ventilation duct into the shaft. **NO 3C SHAFT** No 3c shaft is a bald downcast shaft. The shaft is 4.6 m diameter and will be unlined. The shaft will be equipped with a cover connected to a ventilation duct. The shaft will be an intake shaft for ventilation and air will be cooled by passing it through a bulk air cooler via a ventilation duct into the shaft. **NO 4 SHAFT** No 4 Shaft is a rock hoisting shaft that will hoist rock from 4 level (1,380 m below collar) to surface. The shaft is 4.6 m diameter and will be lined with shotcrete and equipped with steel shaft guides. Various mining services will also be installed into the shaft. The shaft will be equipped with a steel headgear which allows for the discharge of rock from underground into a headgear bin from where it will be discharged onto an overland conveyor belt and transported to surface reef and waste silos. The ore and waste will be trucked from the silos to the existing concentrator and existing waste rock dump (No new waste rock dump will be required). Hoisting will be done with a ground mounted double drum winder housed in a winder house adjacent to the shaft and headgear. The shaft will be equipped with two conveyances mounted in bridles. The shaft will be an intake shaft for ventilation and air will be cooled by passing it through a bulk air cooler via a ventilation duct into the shaft. **Terrace 2** The purpose of Terrace 2 is to house the two up-cast ventilation shafts (3a and 3b shafts) each equipped with two ventilation fans. The shafts will be positioned 75 m apart. The ventilation shafts will be raise-bored, unlined and will be 4.6 m diameter hole once completed. The fans are connected to the shafts by means of steel ventilation ducts. The fans will discharge the underground air vertically from the fan chambers. The fan power will be fed from the main shaft consumer substation via buried cables to not interfere with the existing Eskom power lines. The terrace will be constructed by excavating and removing the heaving clay layer of approximately 2 m and filling and compacting graduated fill to provide a stable base for the mounting of the fans and substation (The clay will be stored for rehabilitation on the existing topsoil storage facility and the fill material will be sourced from waste rock available on the mine site). The terraced area will be secured with fencing and a gate to prevent unauthorised entry to the machinery. Access to the terrace will be by unpaved road from the existing mine paved road. The storm water runoff will be collected in a drain system and channelled along the access road to the main road storm water disposal drains.

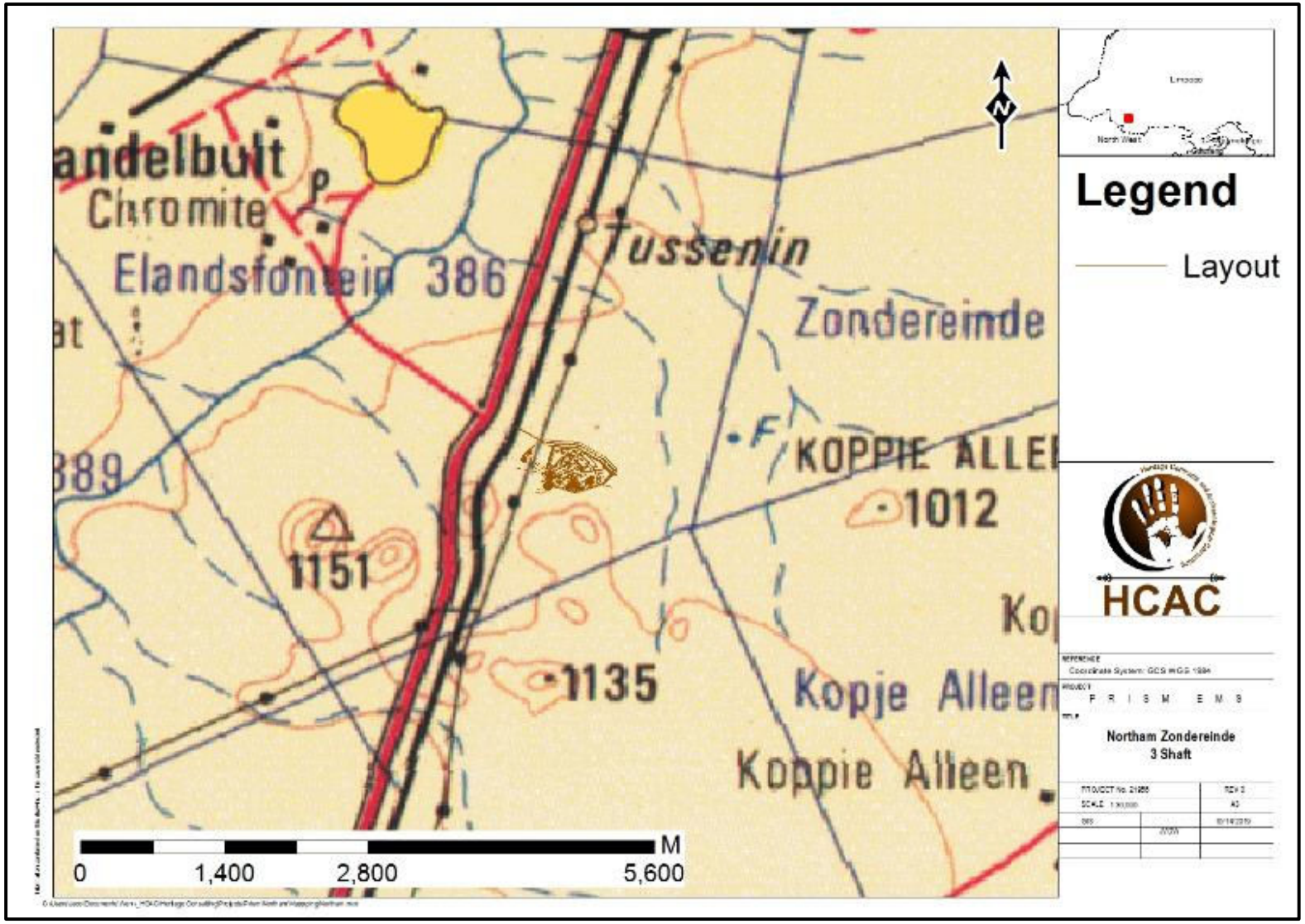


Figure 1. Provincial locality map (1: 250 000 topographical map)

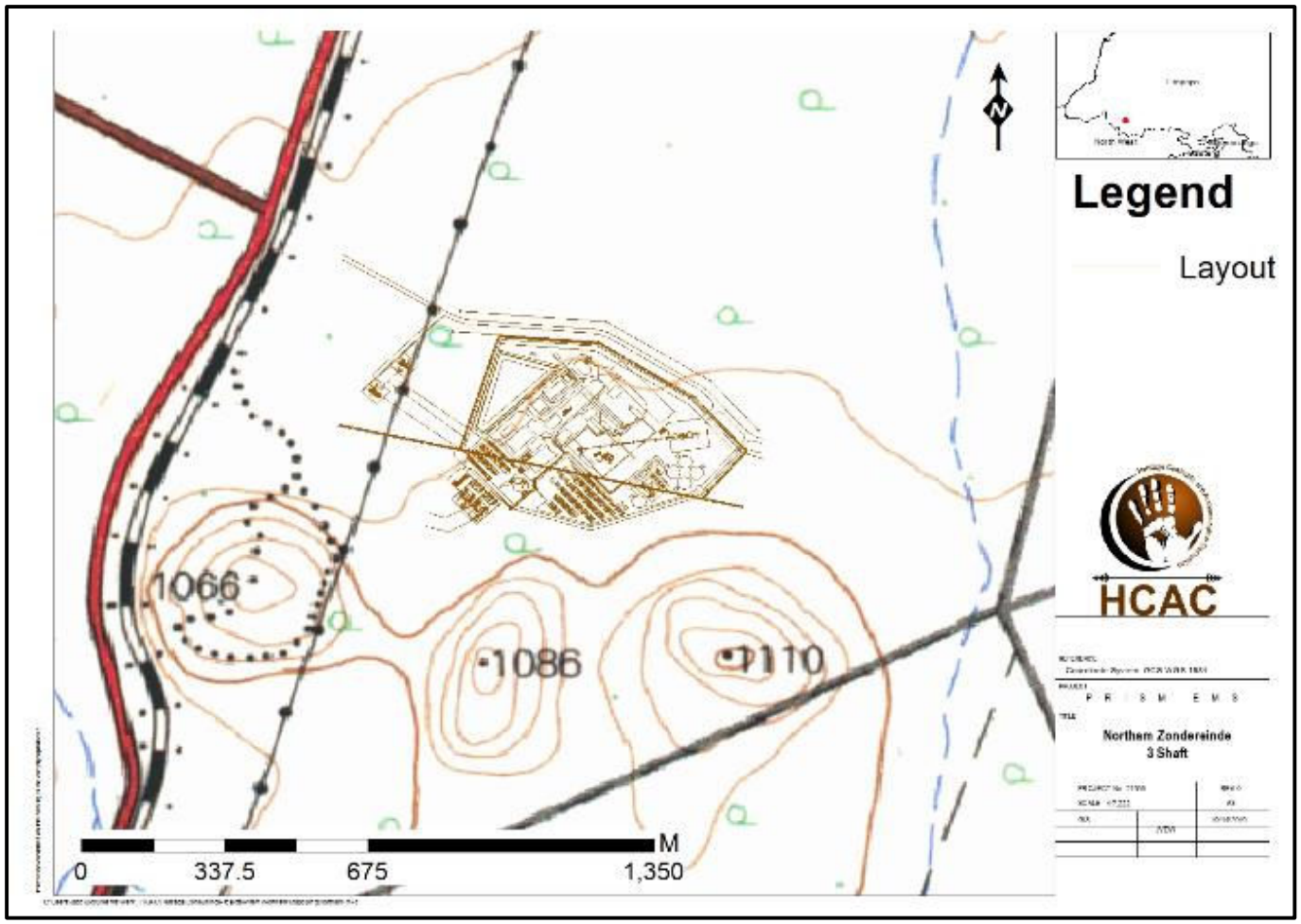


Figure 2: Regional locality map (1:50 000 topographical map).

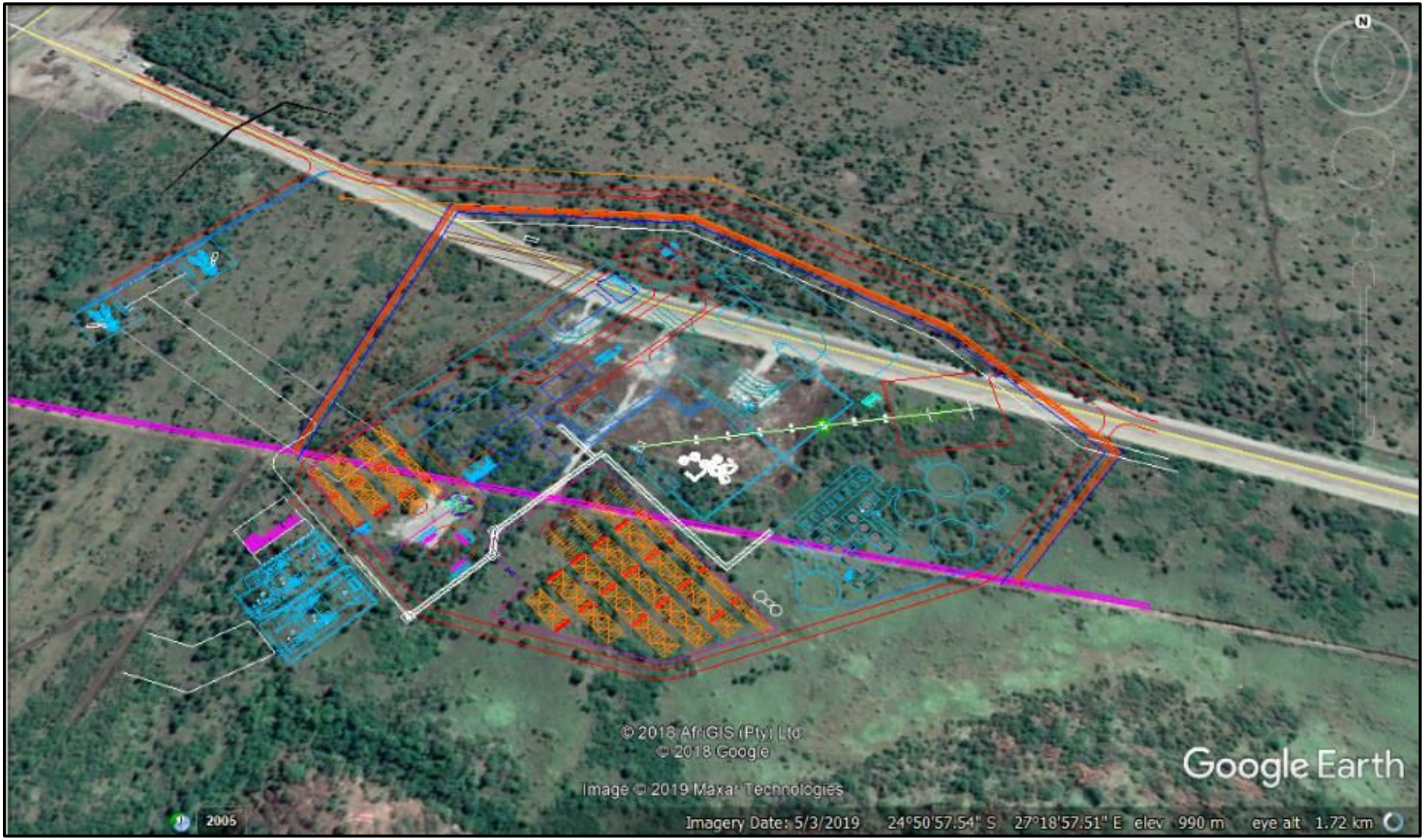


Figure 3. Satellite image with the proposed layout (Google Earth 2017).

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)
- The Kwazulu-Natal Heritage Act, No. 4 of 2008

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 EIA 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:

- Site Notices;
- Local Newspaper advertisement;
- Written Notifications to key stakeholders such as organs of state and landowners/occupiers and adjacent landowners;
- Liaison with Registered I&APs (via email).

Upon acceptance of the scoping report by DMR, the applicant/EAP will proceed and continue with the tasks contained in the plan of study. Subsequently an impact assessment report will be compiled and made available to all registered interested and affected parties and relevant organs of state for a period of 30 days. This comment period is planned for approximately **October 2019 – November 2019.**

Please note that public meetings will only be held if the level of interest in the project is justified. If there is only interest by a small group of I&AP's it may be beneficial to meet one on one, or to discuss via telephone.

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.

During the survey, a large Iron Age site was 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.

Table 4: Site Investigation Details

	Site Investigation
Date	6 December 2018 & 17 September 2019
Season	Summer and Spring - vegetation in the study area is high hampering archaeological visibility. The study area was however sufficiently covered (Figure 4) to adequately record the presence of heritage resources.

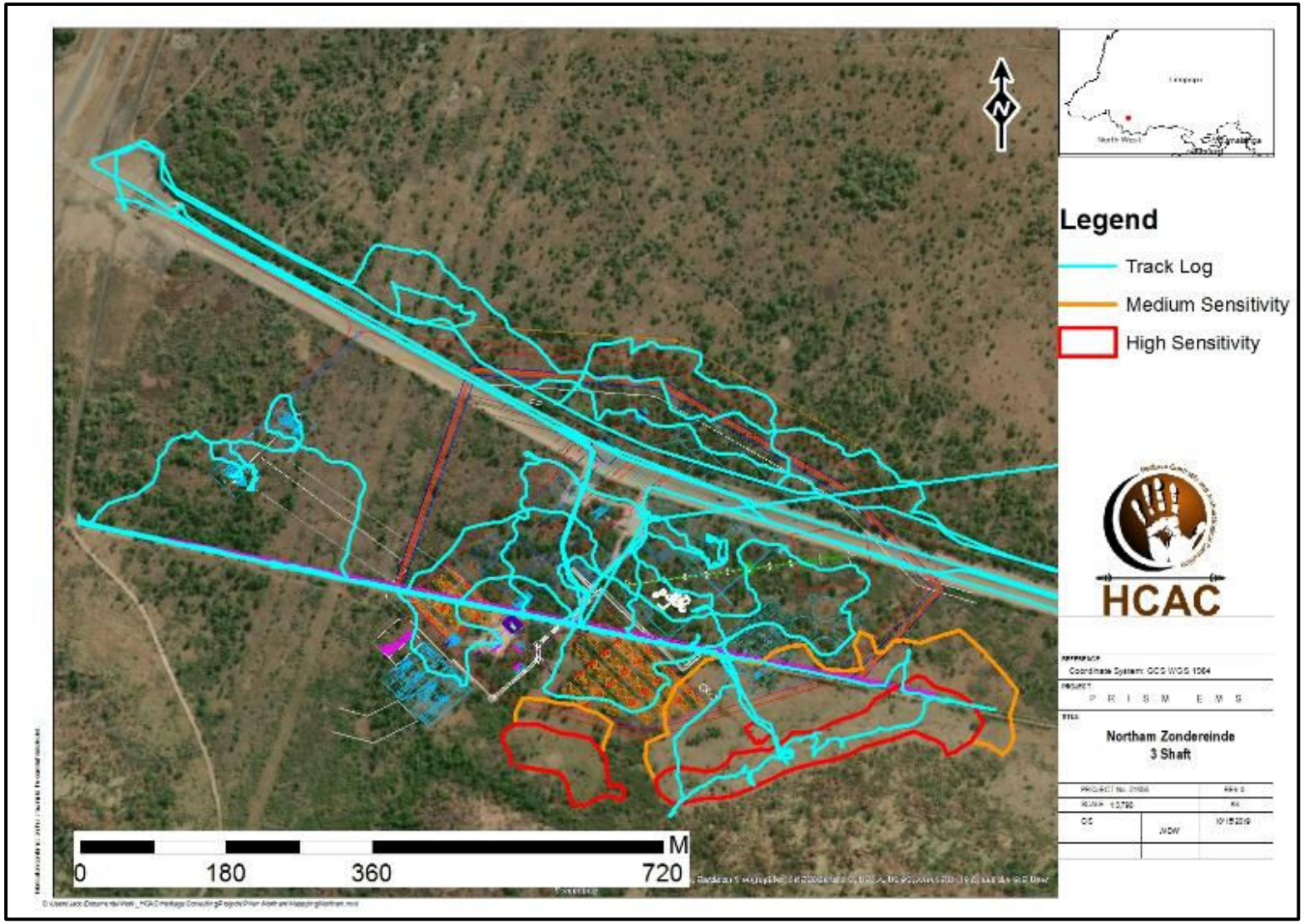


Figure 4: Track logs of the survey in cyan.

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 marked or unmarked graves and other cultural material cannot be excluded. Similarly, the depth of the deposit of heritage sites cannot be accurately determined due 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 Thabazimbi IDP indicates that "*Thabazimbi lies within the southern African bushveld eco region of Limpopo, renowned for cattle ranching and game farming. Platinum and iron ore mining are major contributors to the economy of the region. The total area of the Thabazimbi Local Municipality is approximately 986 264.85 ha. It consists mainly of commercial farms, game farming, etc. but a few towns and informal settlements are found in the area. There are no former homeland areas located within the municipal area*." The unemployment rate is at around 20%.

5 DESCRIPTION OF THE PHYSICAL ENVIRONMENT:

The study area where the shaft complex (including service infrastructure) is proposed is approximately 15 hectares in extent and the majority of the study area is already disturbed by previous activities like roads (tar and gravel) and powerlines (Figure 5 & 6). Temporary infrastructure was also established on site for drilling purposes (Figure 7). Apart from these invasive activities the area has been fallow for a number of years and is highly overgrown hampering archaeological visibility (Figure 8).

The prevailing vegetation type and landscape features of the area form part of the Dwaalboom Thornveld in the Savanna Biome. It is described as plains with a layer of scattered, low to medium high, deciduous trees and shrubs with a few broad-leaved tree species, and an almost continuous herbaceous layer dominated by grass species. *Acacia trotilis* and *A. nilotica* dominate on the medium clays (at least 21% clay in the upper soil horizon but high in the lower horizons). On particularly heavy clays (>55% clay in all horizons) most other woody plants are excluded and the diminutive *A. tenuispina* at a height of less than 1m above ground. On the sandy clay loam soils (with not more than 35% clay in the upper horizon but high in

the lower horizons) *A. erubescens* is the most prominent tree. The alternation of these substrate types creates a moziac of patches typically 1-5km across, for example in the unit west of Thabazimbi (Mucina & Rutherford, 2006).

Figure 5. Existing road in the study area.

Figure 6. Existing road in the study area.

Figure 7. Cleared area for drilling.

Figure 8. Thick vegetation cover hampering archaeological visibility.

6 RESULTS OF PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT:

Adjacent landowners and the public at large were informed of the proposed activity as part of the EIA process. Site notices and advertisements notifying interested and affected parties were placed at strategic points and in local newspapers as part of the process.

7 LITERATURE / BACKGROUND STUDY:

7.1 Literature Review

On the 1.50 000 map sheet 2427 CD several sites are on record for the larger study area at the Wits Archaeological database consisting of historic and LIA (Moloko) sites. Several Cultural Resource Management (CRM) surveys are also on record for the area e.g. van Schalkwyk (2004), Huffman (2006) and van der Walt (2009; 2014 and 2016), the relevant results of these studies are discussed below.

The National Cultural History Museum conducted archaeological mitigation of a Late Iron Age site on the farm Elandsfontein 386 KQ, approximately 1.2 km to the west of the current study area (van Schalkwyk 2004). The mitigation included the survey and mapping of sites in and around the Madeleine Robinson Nature Reserve of the Amandelbult Platinum Mine as part of the proposed extension of the mines operations into the area. From their survey, several stone walled sites conforming to the Central Cattle Pattern (CCP) were identified along the base and between the saddles of the hills. Sites contained central kraals, smaller livestock enclosures, lower grindstones and ceramic scatters. These sites form part of a larger settlement complex dating to the Late Iron Age (LIA). The LIA dates to AD 1300 – 1840 (Huffman 2007).

Mitigation of the Rhino Andalusite Mine to the north east of the study area by Archaeological Resources Management (ARM) (Huffman 2006) resulted in excavation and recording of several Early and Late Iron Age sites. Specifically, the Happy Rest and Mzonjani facies (EIA) and the Icon and Madikwe facies of the Moloko group (LIA) have been identified. Additionally, ancient mine workings for ochre have been identified. A Survey for the Cronimet Underground Mine and Process Plant (van der Walt & du Piesanie 2009) to the west of the study area recorded 37 sites ranging from historic dwellings, graves, MSA and Iron Age sites.

Other studies conducted in the wider area that was consulted is listed below:

Author	Year	Project	Findings
Van der Walt, J.	2018	Heritage Impact Assessment Northam Ext 20	No sites were identified
Van der Walt, J.	2016	AIA For the proposed additional underground and opencast mining, associated infrastructure and processing facilities at Thaba Cronimet Chrome Mine, Limpopo Province.	Stone age and Iron Age sites were identified.
Gaigher, S.	2016	Heritage Impact Assessment (HIA) Report for the Proposed Re-alignment of the Railway Line at the proposed 37 open pits, Amandelbult Mine, Limpopo Province	No sites were identified.
Ages EIA report	2014	Platinum EIA report	Structures
Hutten, M.	2010	HIA for the proposed residential township development, South of Northam.	No sites were identified

7.1.1 Genealogical Society and Google Earth Monuments

No known grave sites are indicated close to the study area.

7.2 General History of the area

7.2.1 Archaeology of the area

South Africa has one of the longest archaeological sequences in the world because humanity evolved in the area stretching from the Cape to Ethiopia. Most of this sequence covers the times when our ancestors used stone tools. It is worthwhile, thus, to review the archaeological record for southern Africa and to place in context the known occurrences. The archaeology of the area can be divided into the Stone Age, Iron Age and Historical timeframe. These can be divided as follows:

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.

Early Stone Age:

The Early Stone Age in southern Africa is defined by the Oldowan complex, primarily found at the sites Sterkfontein, Swartkrans and Kromdraai, situated within the Cradle of Humankind, just outside Johannesburg (Kuman, 1998). Within this complex, tools are more casual and expediently made and tools consist of rough cobble cores and simple flakes. The flakes were used for such activities as skinning and cutting meat from scavenged animals. This industry is unlikely to occur in the study area.

The second complex is that of the more common Acheulean, defined by large handaxes and cleavers produced by hominids at about 1.4 million years ago (Deacon & Deacon, 1999). Among other things these Acheulian tools were probably used to butcher large animals such as elephants, rhinoceros and hippopotamus that had died from natural causes. Acheulian artefacts are usually found near the raw material from where they were quarried, at butchering sites, or as isolated finds. No Acheulian sites are on record near the project area, but isolated finds are possible. However, isolated finds have little value. Therefore, the project is unlikely to disturb a significant site. The closest Stone Age terrain to the study area is located a small distance to the west thereof. This Early Stone Age terrain is situated near the Rooiberg Hill and the Blaauwberg Stone Age Terrain. (Bergh 1999: 4)

Middle Stone Age:

During the Middle Stone Age, significant changes start to occur in the evolution of the human species. These changes manifest themselves in the complexity of the stone tools created, as seen in the diversity of tools, the standardisation of these tools over a wide spread area, the introduction of blade technology, and the development of ornaments and art. What these concepts ultimately attest to is an increase or development of abstract thinking. By the beginning of the Middle Stone Age (MSA), tool kits included prepared cores, parallel-sided blades and triangular points hafted to make spears (Volman, 1984). MSA people had become accomplished hunters by this time, especially of large grazing animals such as wildebeest, hartebeest and eland.

These hunters are classified as early humans, but by 100,000 years ago, they were anatomically fully modern. The oldest evidence for this change has been found in South Africa, and it is an important point in debates about the origins of modern humanity. In particular, the degree to which behaviour was fully modern is still a matter of debate. The repeated use of caves indicates that MSA people had developed the concept of a home base and that they could make fire. These were two important steps in cultural evolution (Deacon & Deacon, 1999). Accordingly, if there are caves in the study area, they may be sites of archaeological significance. MSA artefacts are common throughout southern Africa, but unless they occur in undisturbed deposits, they have little significance. Some MSA sites are on record close to the study area.

Later Stone Age:

By the Late Stone Age, human beings are anatomically and culturally modern. Tools associated with this time period are specialised, and commonly associated with hunter-gatherer groups. It is also within this period that contacts with migrating groups occur throughout southern Africa. Initial contact was between hunter-gatherer groups and expanding Bantu farming societies, and secondly with the arrival of colonist along the coast.

San rock art has a well-earned reputation for aesthetic appeal and symbolic complexity (Lewis-Williams, 1981). Several rock art sites are on record to the north and east of the general project area.

In addition to art, LSA sites contain diagnostic artefacts, including microlithic scrapers and segments made from very fine-grained rock (Wadley, 1987). Spear hunting probably continued, but LSA people also hunted small game with bows and poisoned arrows. Sites in the open are usually poorly preserved and therefore have less value than sites in caves or rock shelters. If there are rock shelters or caves in the study area, they may contain LSA sites of significance.

Iron Age (general)

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: Most of the first millennium AD.
- The Middle Iron Age: 10th to 13th centuries AD
- The Late Iron Age: 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.

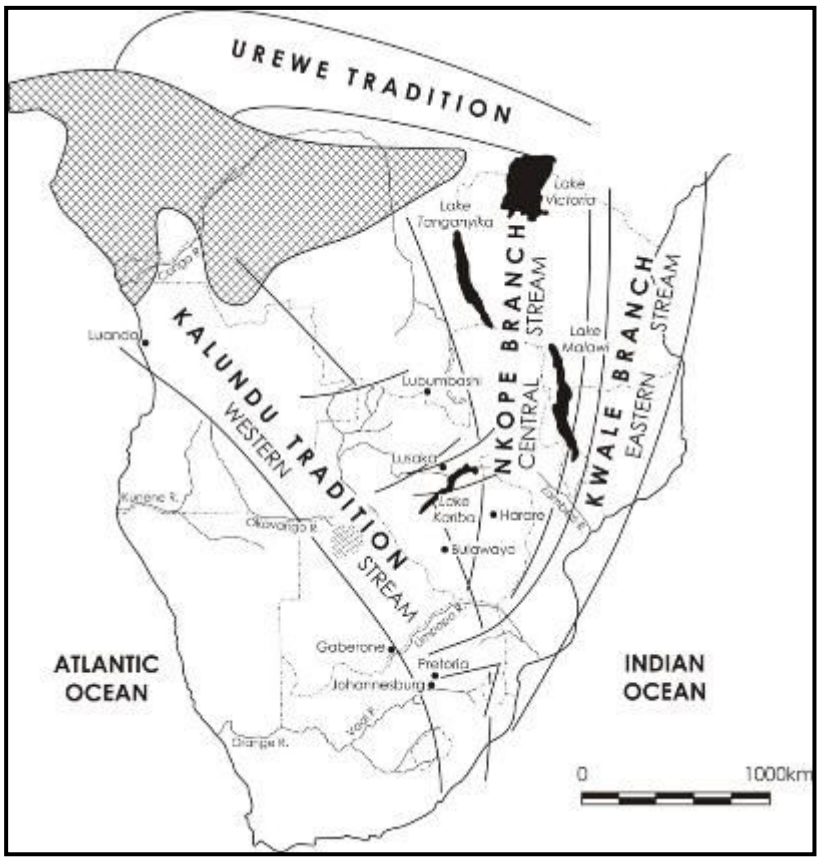


Figure 9: Movement of Bantu speaking farmers (Huffman 2007)

Early Iron Age

Early in the first millennium AD, there seem to be a significant change in the archaeological record of the greater part of eastern and southern Africa lying between the equator and Natal. This change is marked by the appearance of a characteristic ceramic style that belongs to a single stylistic tradition. These Early Iron Age people practised a mixed farming economy and had the technology to work metals like iron and copper. A meaningful interpretation of the Early Iron Age has been hampered by the uneven distribution of research conducted so far; this can be partly attributed to the poor preservation of these early sites.

Sites belonging to the EIA consisting of *Happy Rest and Mzonjani facies* have been recorded to the north of the project area. Happy Rest and Mzonjani pottery form part of two traditions (Kalundu and Urewe) that represent the spread of mixed farmers into southern Africa during the Early Iron Age (See Figure 9). This find is important as it provides evidence for early interaction between these groups. Later, by the 8th and 9th centuries, the two merged to form a new facies, *Doornkop*.

Middle Iron Age

No sites dating to this period are on record close to the study area.

Late Iron Age

For the area in question the history and archaeology of the Sotho Tswana are of interest. The ceramic sequence for the Sotho Tswana is referred to as Moloko and consists of different facies with origins in either the Icon facies or a different branch associated with Nguni speakers. Several sites belonging to the Madikwe and Olifantspoort facies (from Icon) have been recorded close to the project area. These sites date to between AD 1500 and 1700 and predate stone walling ascribed to Sotho-Tswana speakers. Sotho Tswana stonewalled sites with Uitkomst pottery have been found close to the study area and dates to the seventeenth to nineteenth centuries. Stone walled sites belonging to the LIA have also been identified next to the study area but so far have not been linked to a cultural group.

Late Iron Age peoples were attracted to the area because of the relatively fertile soils around the hills and valleys, and because of the iron ore and red ochre. Mining techniques associated with the ancient mine workings are the same as those found in the Rooiberg area some 30km from Thabazimbi (Huffman 2006). Three groups are found in the Rooiberg area, specifically Madikwe, Melora and Rooiberg groups. Stratigraphically, the relationship between Madikwe and Rooiberg is evident where the Madikwe site 20/85 lies underneath the Rooiberg site 11/85, suggesting that Rooiberg is the more recent (Mason 1986). Ceramic evidence suggests then that Sotho-Tswana people were mining at Rooiberg. The ceramic evidence from the Rhino Andalusite Mine shows that the Sotho-Tswana people living there were directly related to the miners at Rooiberg: both belonged to the Western Sotho-Tswana cluster. Therefore, the relationship, between the ochre mine and Madikwe settlements, is of importance. Associated with the Madikwe settlements, in addition to the ochre mine is the several maize grindstones found.

Trade connections for ochre and tin have a bearing on the presence of maize. Trade networks spanned a wide area, up to the Zimbabwe culture area in the north, and as far as Maputo in the east before the arrival of the Dutch (Friede & Steel 1976). Maize came to Maputo sometime after the early 16th century through Portuguese trade with the New World. The grindstones found at the site CB14 in the Rhino Andalusite Mine indicate that maize was grown in the Thabazimbi area during the 17th century (Huffman 2006). If one accepts the grindstone as diagnostic, then maize was cultivated some 150 years earlier than in Kwazulu-Natal.

Evidence for Iron Age activity will most likely be concentrated along water courses and rocky outcrops marked by ceramic clusters or dry-stone walling.

7.2.2 Cultural Landscape of the area

The area under investigation is located just to the east of the R510, to the west of Northam Platinum Mine and about 27 kilometres south of Thabazimbi in Limpopo Province. The area used to be characterised by farming activities but between 1981 and 2000 (Figure 11 & 12) are marked by extensive mining activities.

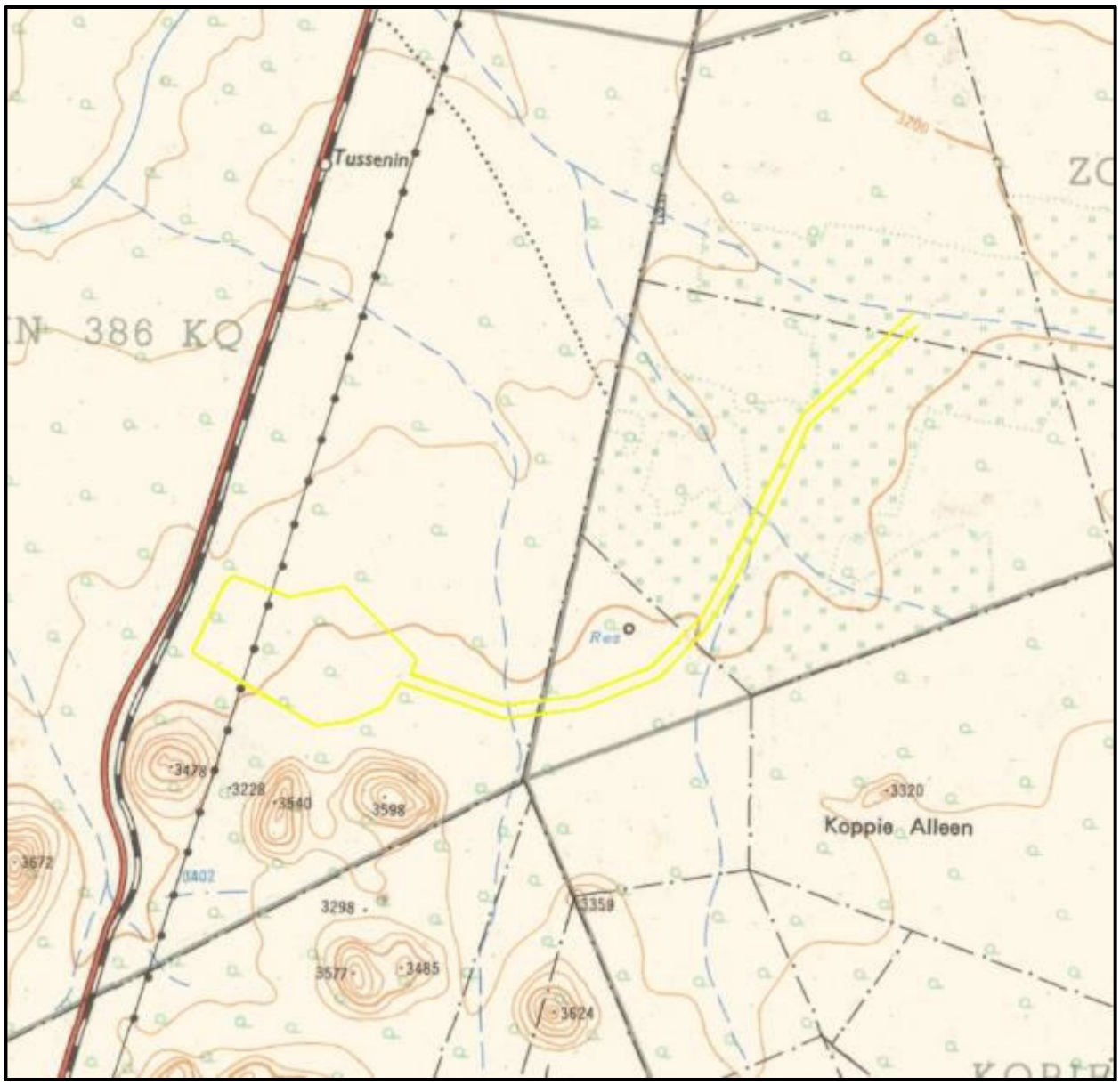


Figure 10. 1968 Topographical map of the site under investigation. The approximate study area is indicated with a yellow border that includes the existing access road. A power line went through the western part of the study area, and an eastern part of the site was used as cultivated lands. Four streams went through the area under investigation. (Topographical Map 1968)

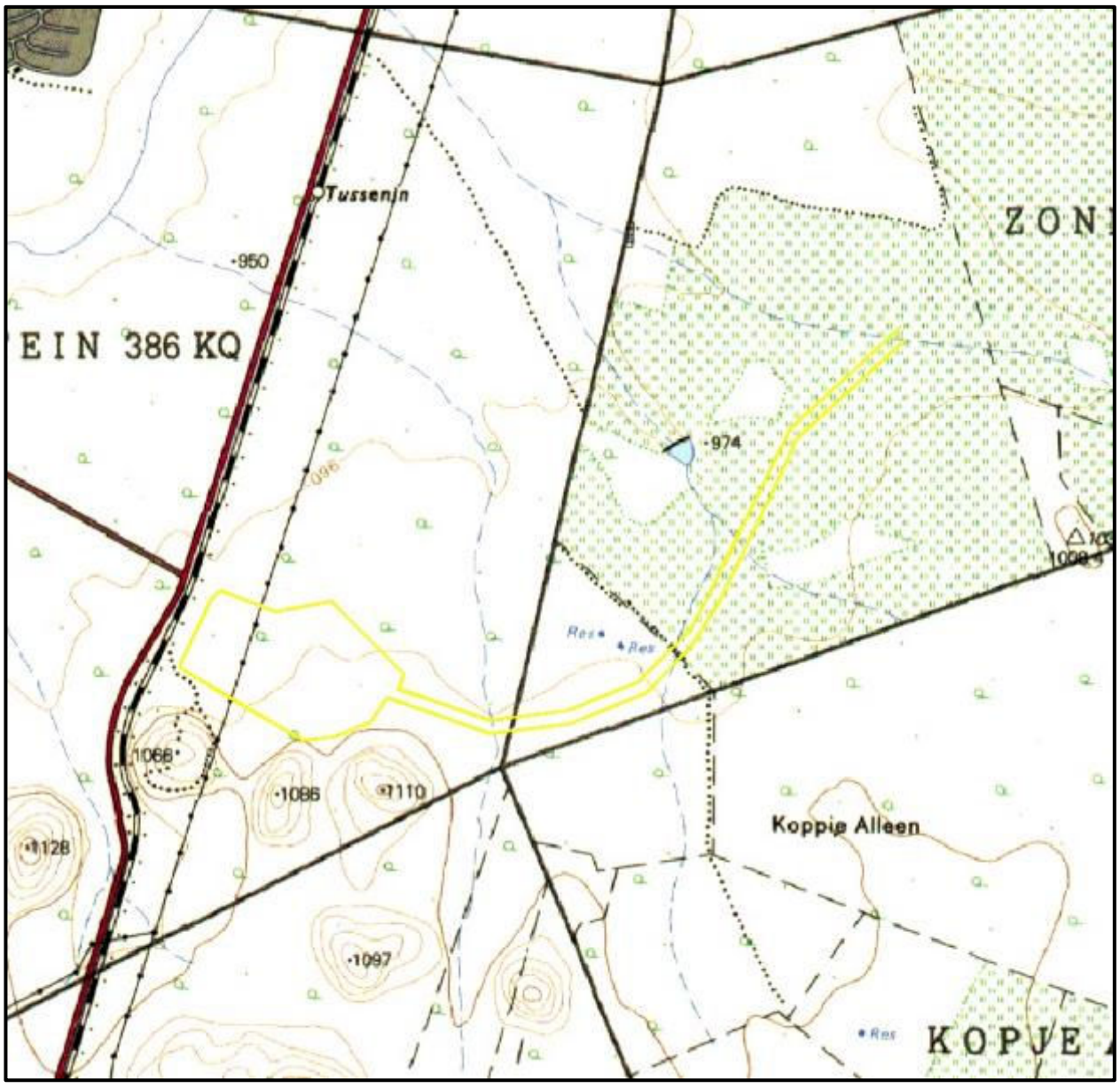


Figure 11. 1981 Topographical map of the site under investigation. The approximate study area is indicated with a yellow border. A power line went through the western part of the study area, and an eastern part of the site was used as cultivated lands. Four streams went through the area under investigation. (Topographical Map 1981)

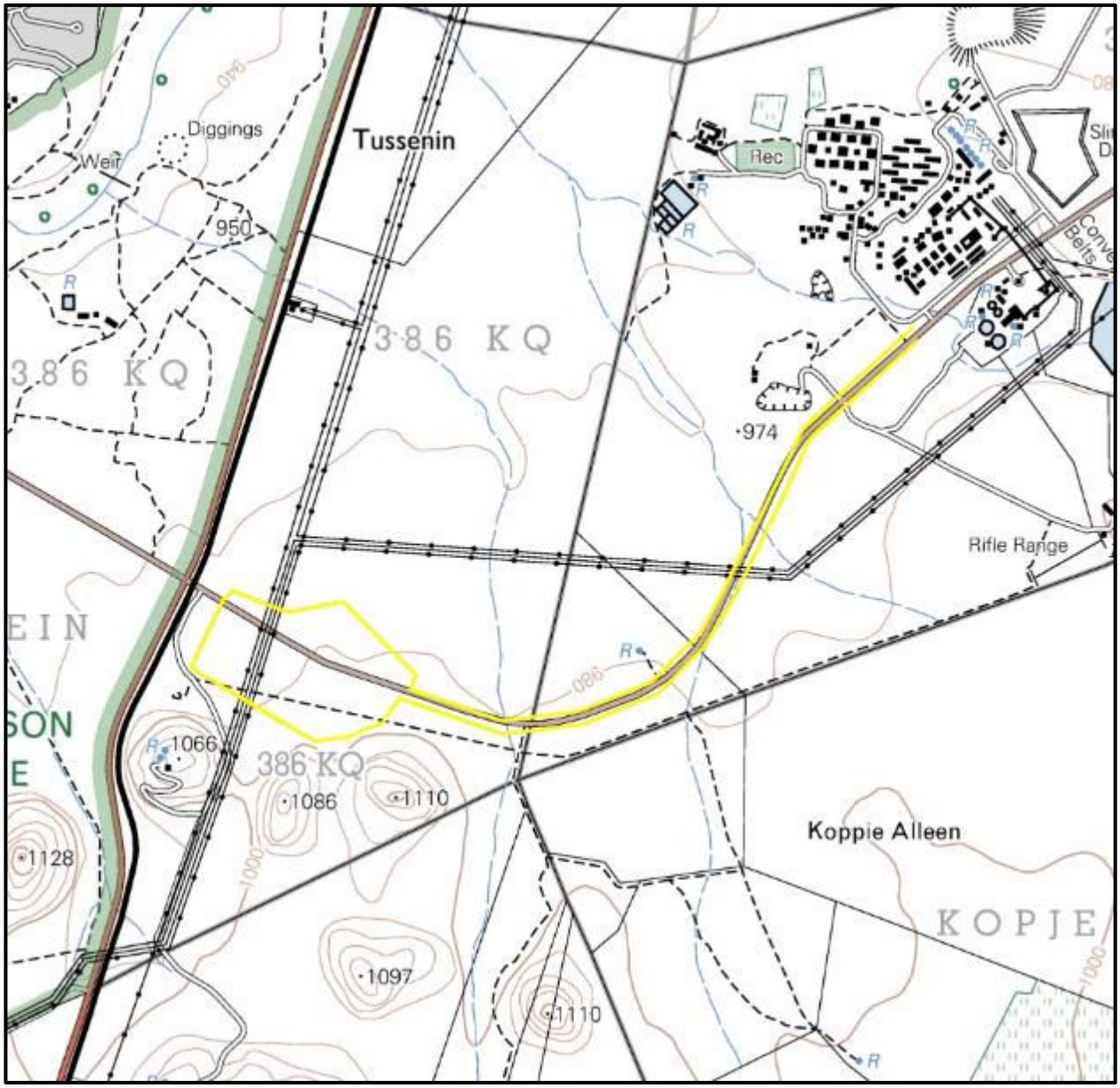


Figure 12. 2000 Topographical map of the site under investigation. The approximate study area is indicated with a yellow border. Four power lines went through a western part of the study area, and three power lines went through a more eastern part of the site. A track / footpath went through the western part of the site and a secondary road can be seen along the whole length of the study area. Four streams went through the area under investigation. (Topographical Map 2000)

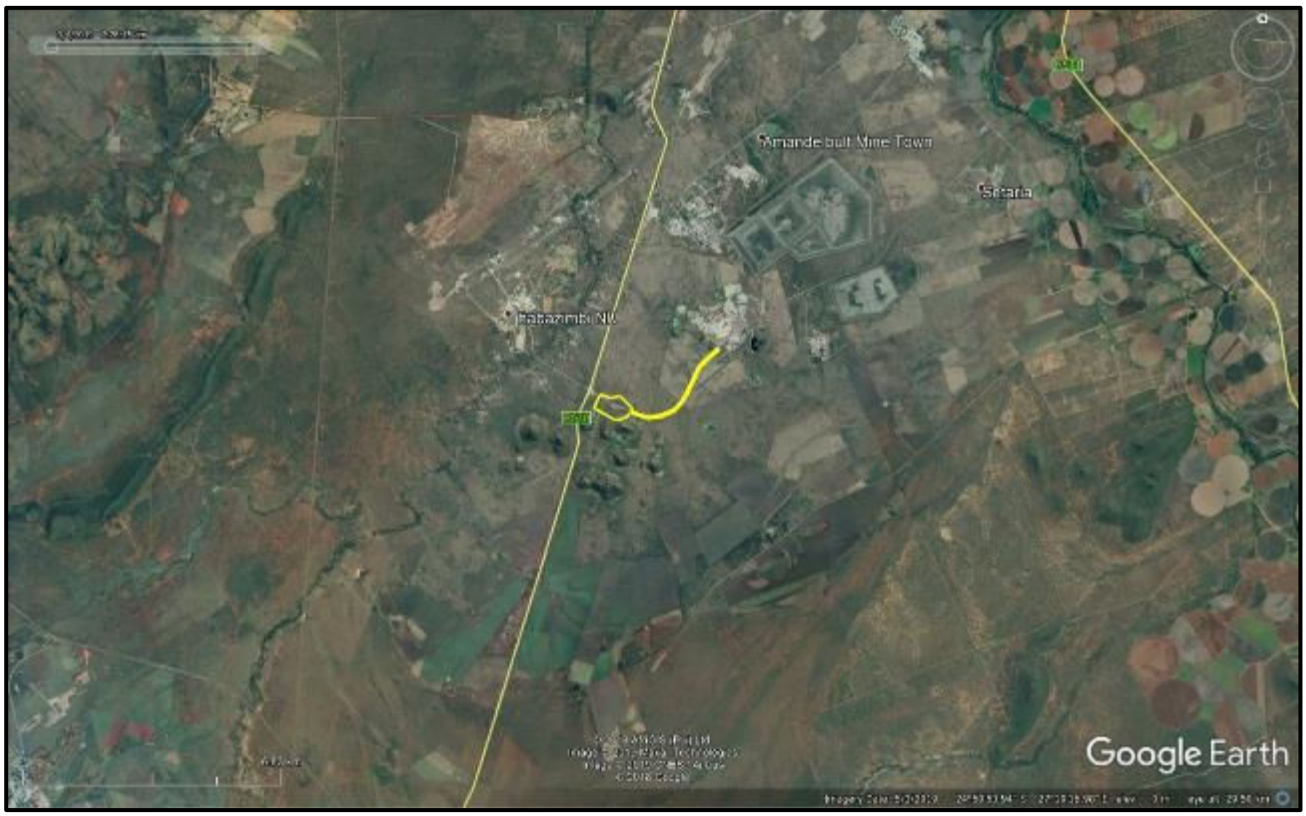


Figure 13. 2019 Google Earth image showing the study area in relation to the R510, Thabazimbi NU, Amandelbult Mine Town and other sites. (Google Earth 2019)

8 FINDINGS OF THE SURVEY

The proposed study area measures approximately 15 ha and is located to the east of the provincial road R510 on the farm Elandsfontein and Zondereinde and to the south of Amandelbult mine town. The study area is impacted on by gravel and tar roads, earthworks as part of exploration activities and transmission power lines. The study area has been fallow for a number of years resulting in dense vegetation that hampers archaeological visibility.

No major topographical features exist in the study area that would have attracted human occupation in antiquity however a set of hills that contain Late Iron Age (LIA) settlements occur adjacent and to the east of the study area. This area is highly overgrown and it is not possible to accurately determine the site extent or all the site features. The area is mostly void of trees with different grass cover than the surrounding area and is characteristic of vegetation on an Iron Age archaeological site in this area (Figure 14 & 15.

During the field survey, features (middens and stone walled enclosures) recorded were mapped as areas of high sensitivity, with a buffer zone with a minimum measurement of approximately 30 m. **Outside** of the areas marked as high sensitivity, lower grinding stones and undecorated ceramics were recorded. These artefacts are of low significance, relating to the wider landscape use by the Iron Age settlement and mapped as areas of medium sensitivity. A few isolated Middle Stone Age lithics were also recorded (Figure 16,17 & Table 5). These find spots do not constitute archaeological sites and are of no heritage significance apart from mentioning them in this report.

Although **no diagnostic ceramics** were recorded at the current site reported on, other sites in the area with decorated ceramics represent stamped ware and could possibly be related to the Rooiberg ceramic facies, although a bigger ceramic sample is needed to confirm this (van der Walt 2010). These sites are important because of the alternative stone walled settlement layout observed at these sites. These sites consist of several kraals clustered together without an outer wall. These sites have research potential that could clarify the new stone walled arrangement represented in the area that has not yet been identified and could hold clues to the interaction between the Uitkoms ceramic facies and Madikwe that formed Rooiberg. The recorded LIA settlement is assumed to conform to this pattern but due to the low archaeological visibility in the study area this assumption is tentative at least and the site is briefly described under section 8.2

Table 5. Co-ordinates of recorded find spots

Label	Description	Longitude	Latitude
Find Spot	Ceramics	27° 18' 27.9541" E	24° 50' 55.3956" S
Find Spot	Ceramics	27° 18' 42.2648" E	24° 50' 58.3908" S
Find Spot	End scraper	27° 18' 26.7839" E	24° 50' 55.2625" S
Find Spot	Pointed Flake	27° 18' 43.9763" E	24° 50' 57.0628" S
Find Spot	Upper Grinder	27° 18' 36.9872" E	24° 50' 57.4707" S

Figure 14. Vegetation on the archaeological site.

Figure 15. Vegetation marking extent of the archaeological site

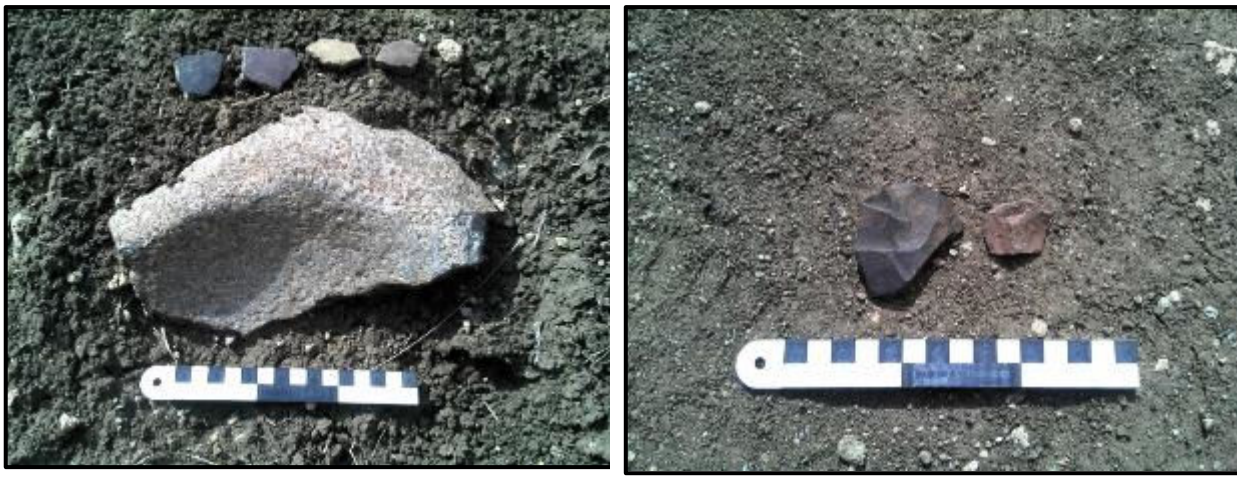


Figure 16. Undecorated ceramics and lower grinding stone on the left and Middle Stone Age flake and broken point on the right.

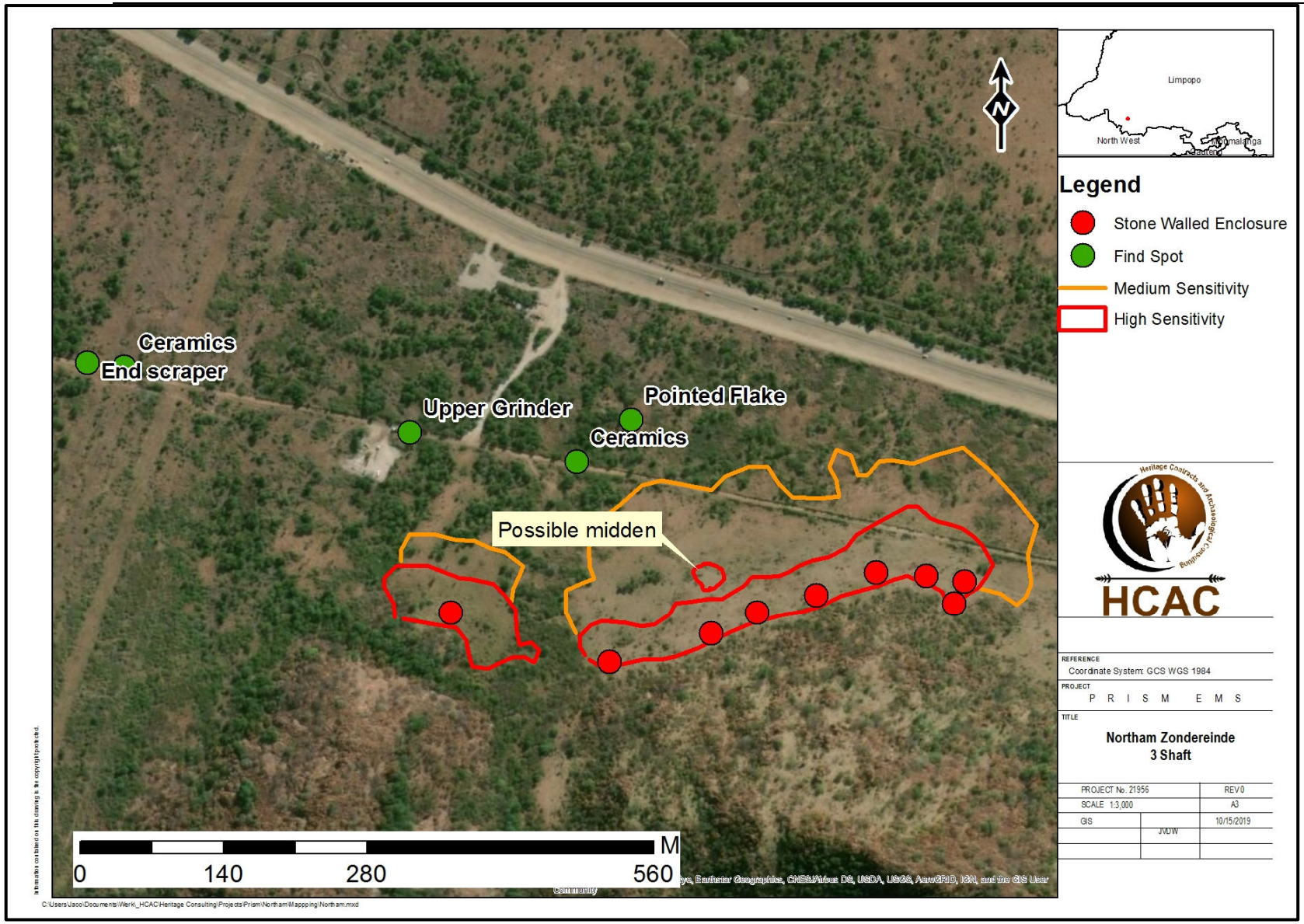


Figure 17. Sensitivity map indicating the extent of Late Iron Age site visible on areal imagery.

8.1.1 Built Environment (Section 34 of the NHRA)

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

8.1.2 Archaeological resources (Section 35 of the NHRA)

Site Number	Feature 1	**1:50 000 map nr**	2427CD
Description	Late Iron Age Site		
Longitude and Latitude	-24,8507 27,31347		
Topographical location	Base of a hill		
Site Condition	Site is overgrown, Visibility - Low		
Description of the site	Very extensive Iron Age stonewalled settlement marked by change in vegetation. The area has been fallow for a number of years and is totally overgrown. Site features are not visible due to the vegetation cover, but several stone packed kraals measuring approximately 20 meters in diameter were noted as well as widespread middens often deflated. Existing road cuts through the northern section of the site exposing kraal/ midden deposit in the road cutting.		
Artefacts	Bone, Midden, Stone Walling, Undiagnostic Ceramics		
Estimation or measurement of the extent	Spatially very large site. Refer to sensitivity maps for areas relevant to the development		
Depth and stratification of the site	Top stratum visible		
Impact	The site has been impacted on by road construction and future impact includes destruction due to mining activities. Impacts on the site by the proposed project will be direct and irreversible.		

Significance	Generally Protected A (GP. A) - High/medium significance. Mitigation before destruction
Recommendation and mitigation	The high significant areas should be avoided and areas of medium sensitivity must be test excavated to test for subsurface deposits. These areas should be monitored during construction and a chance find procedure should be implemented (as outlined below) for the project as well as a site development management plan.

Figure 18. Lower grinding stone

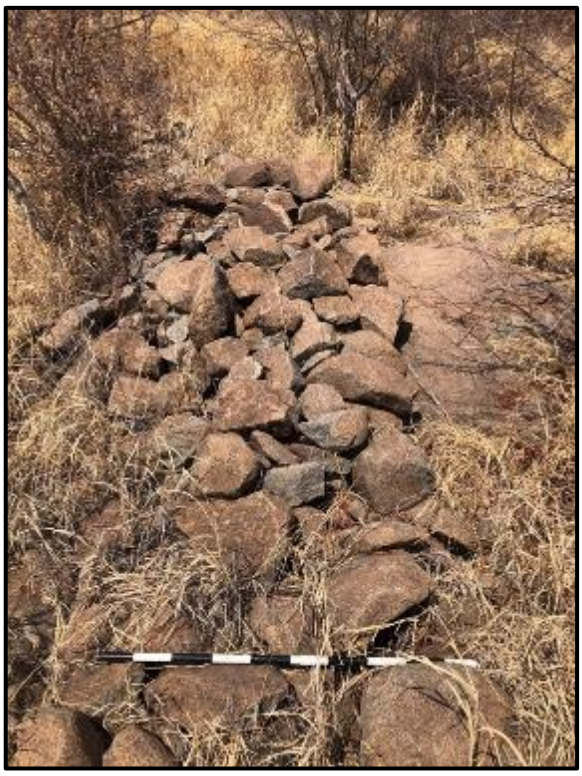


Figure 19. Stone walling

Figure 20. Undecorated ceramics.

Figure 21. Exposed midden/kraal deposit.

Figure 22. Midden/kraal deposit exposed in road cutting.

Figure 23.Grass cover on accumulated deposit within enclosure

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

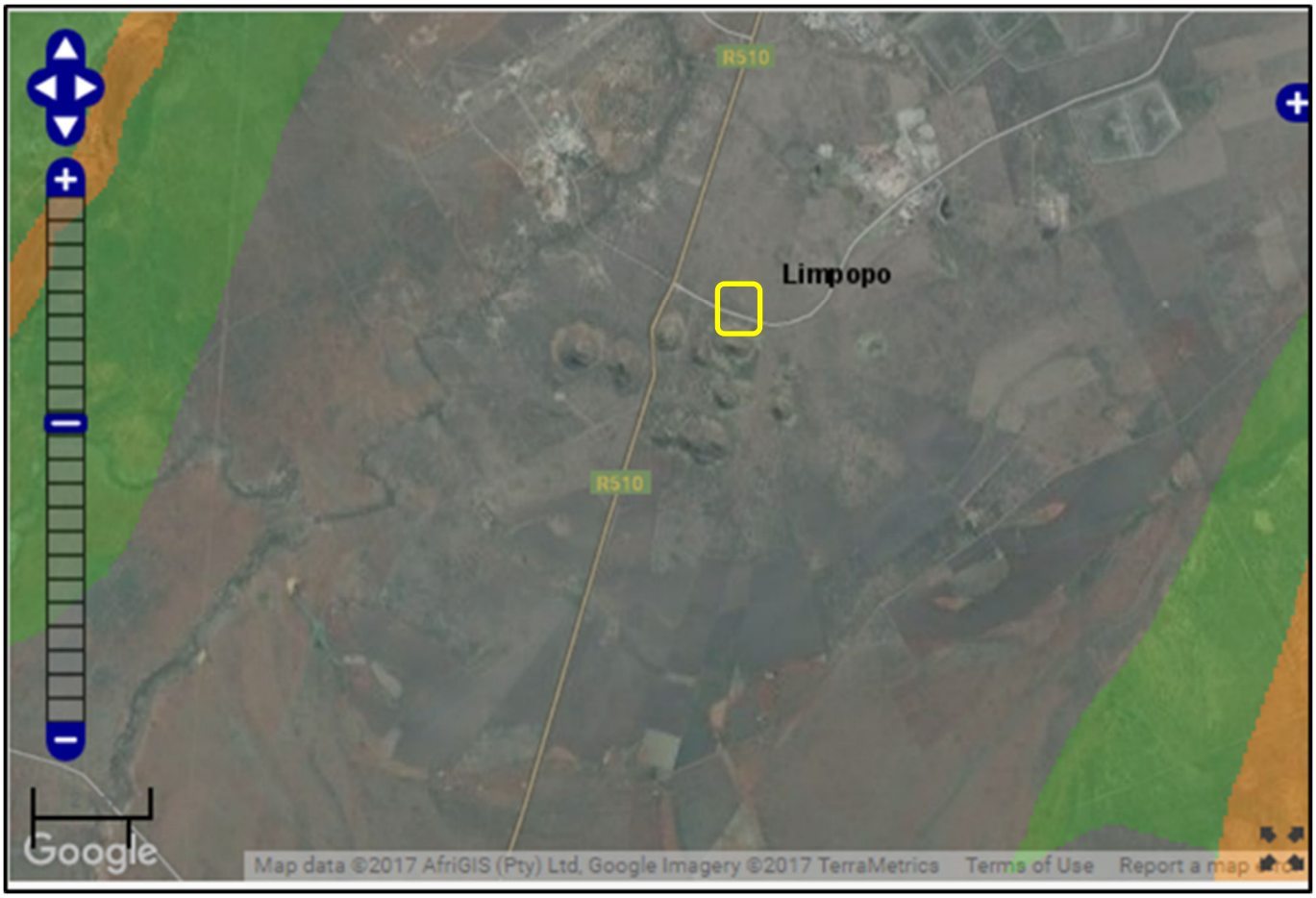
In terms of Section 36 of the Act no burial sites were recorded. If any graves are located in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation.

8.1.4 Cultural Landscapes, Intangible and Living Heritage.

The cultural landscape of the greater study area is characterised by mining developments and the project will not impact on significant viewscapes.

8.1.5 Paleontological Resources

According to the SAHRA paleonoltogical sensitivity map the study area is indicated as of insignificant significance and no further studies are required.



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 24. Approximate location of the study area (yellow polygon) indicated as insignificant paleontological sensitivity on SAHRIS palaeontological sensitivity map.

8.1.6 Battlefields and Concentration Camps

No Battlefield sites were identified in the study area.

8.2 Potential Impact

Two layout options were assessed consisting of the alternative layout and the proposed layout. The alternative layout impacted directly on the recorded heritage resources (Figure 25) and was deemed unacceptable and therefore the developer decided on the proposed lay out. The proposed lay out enables the protection of areas with high sensitivity (Figure 26) with a buffer zone and minimises the impact on the heritage site and features as recorded (Figure 27). The proposed layout overlaps with a small section of areas of medium sensitivity (Figure 28) and due to the lack of heritage features in these areas, direct impacts by the proposed project are expected to be low. The proposed layout is also located to preserve the recorded features marking the Iron Age site *in-situ* within areas of high sensitivity. Areas of high sensitivity are mapped in order to provide a buffer zone of 30 meters as a minimum around features but in certain areas are up to 50 meters (Figure 29). The closest heritage feature in the high sensitivity area is located 46 meters away from the proposed surface infrastructure and the furthest 86 meters (Figure 29).

8.2.1 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.

8.2.2 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.

8.2.3 Operation Phase:

No impact is envisaged for the recorded heritage resources during this phase with the implementation of a heritage management plan.

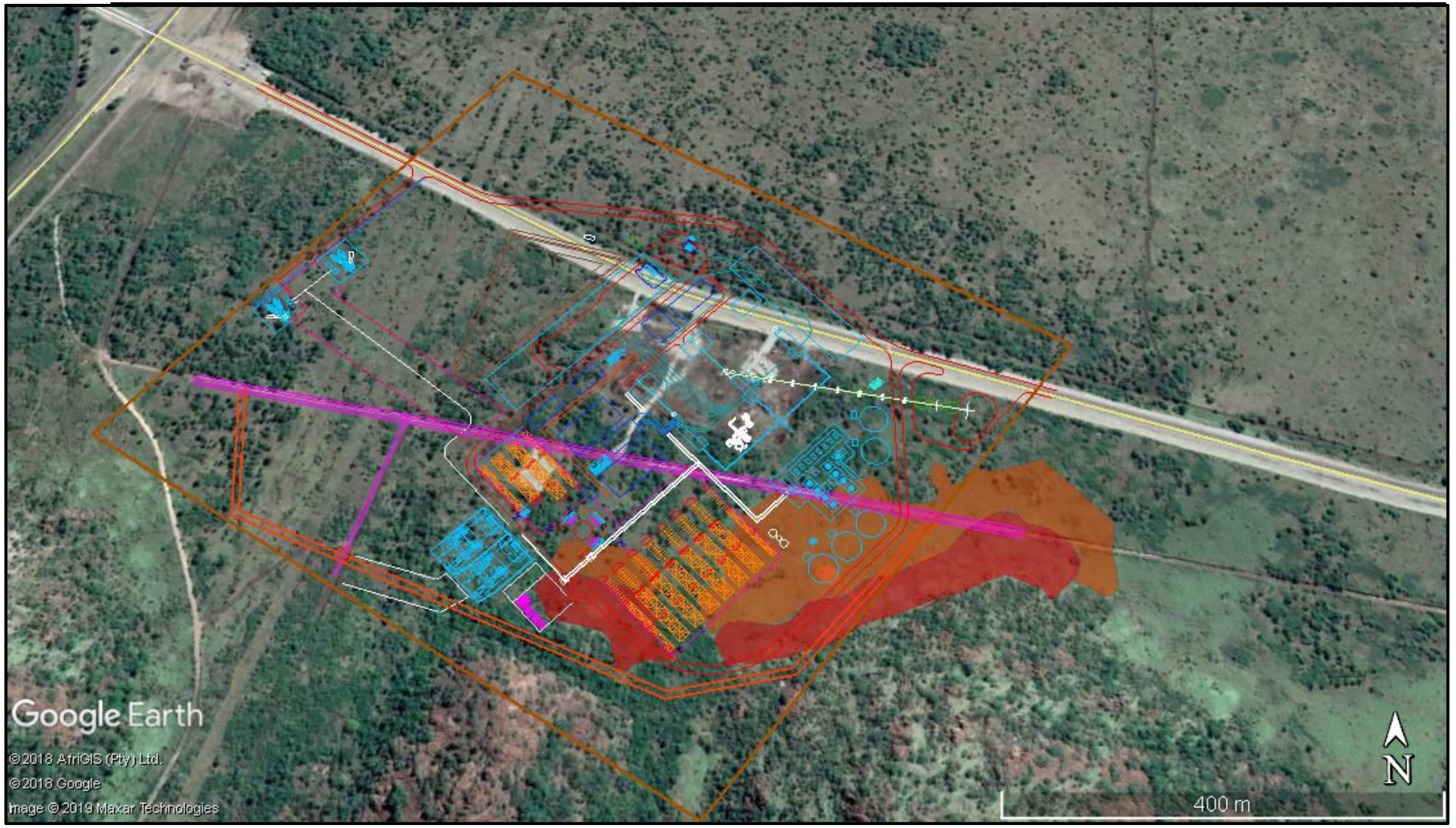


Figure 25: Alternative Layout.

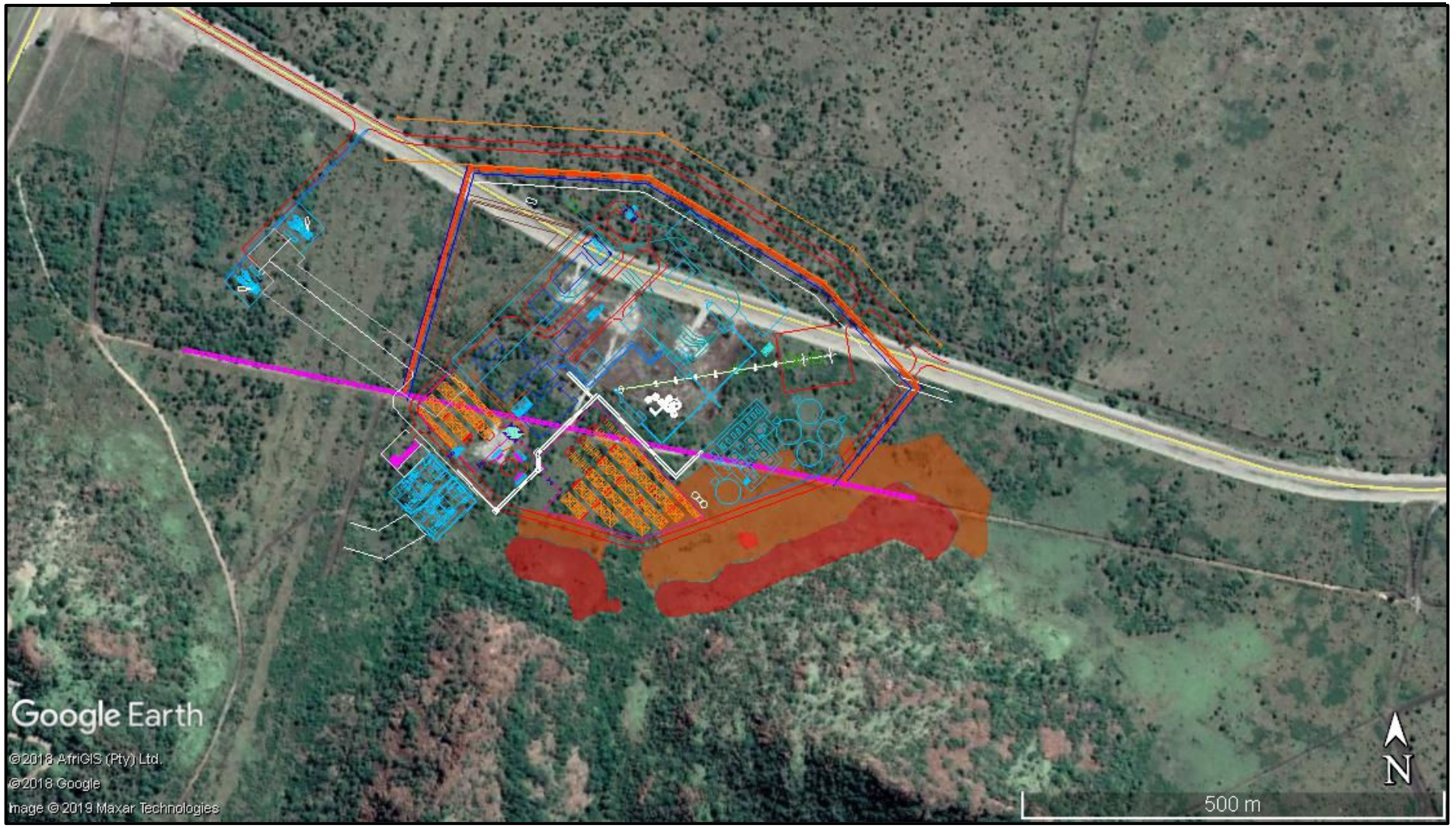


Figure 26: Proposed layout.

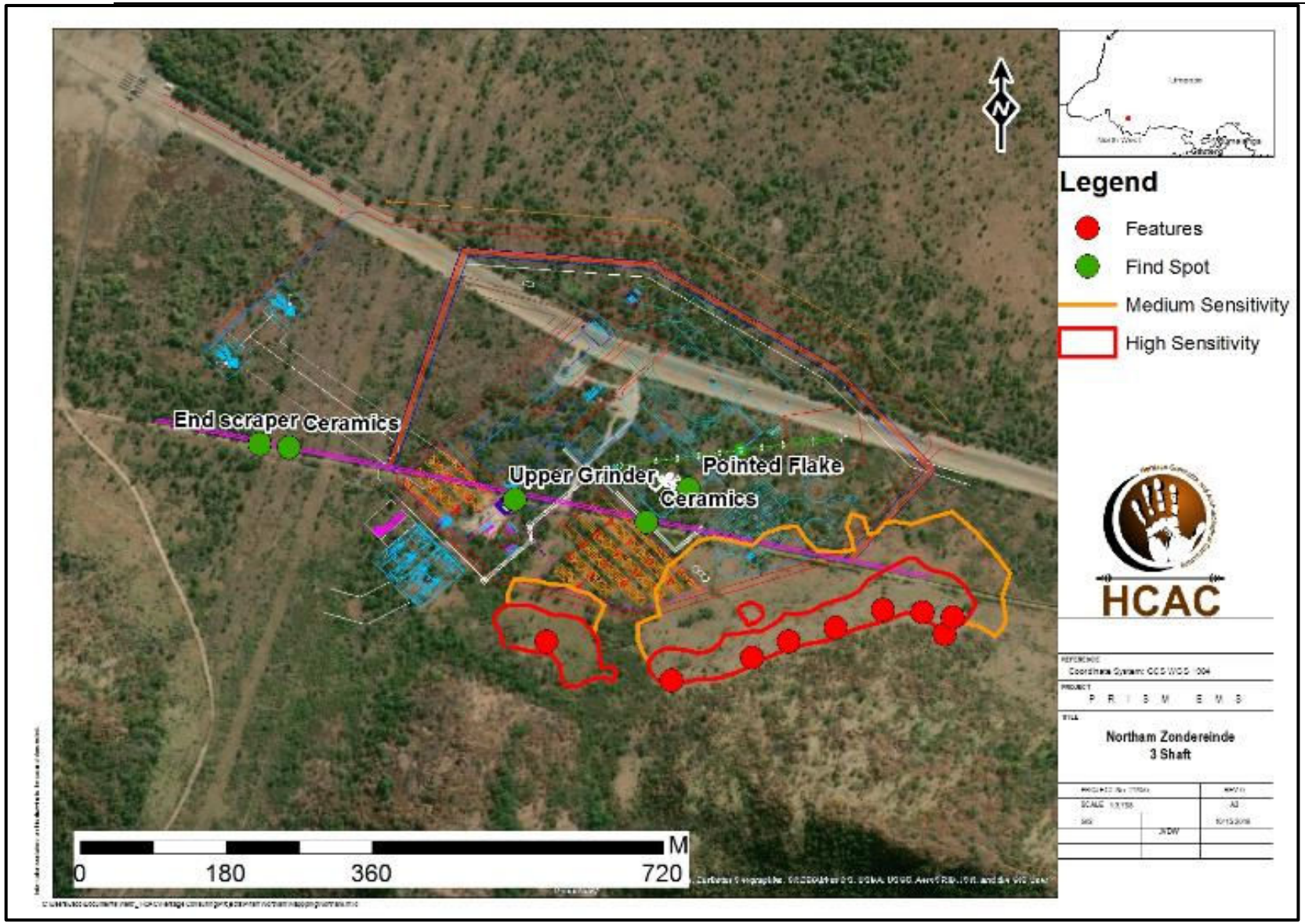


Figure 27. Recorded features and sensitivity mapping in relation to the development layout.

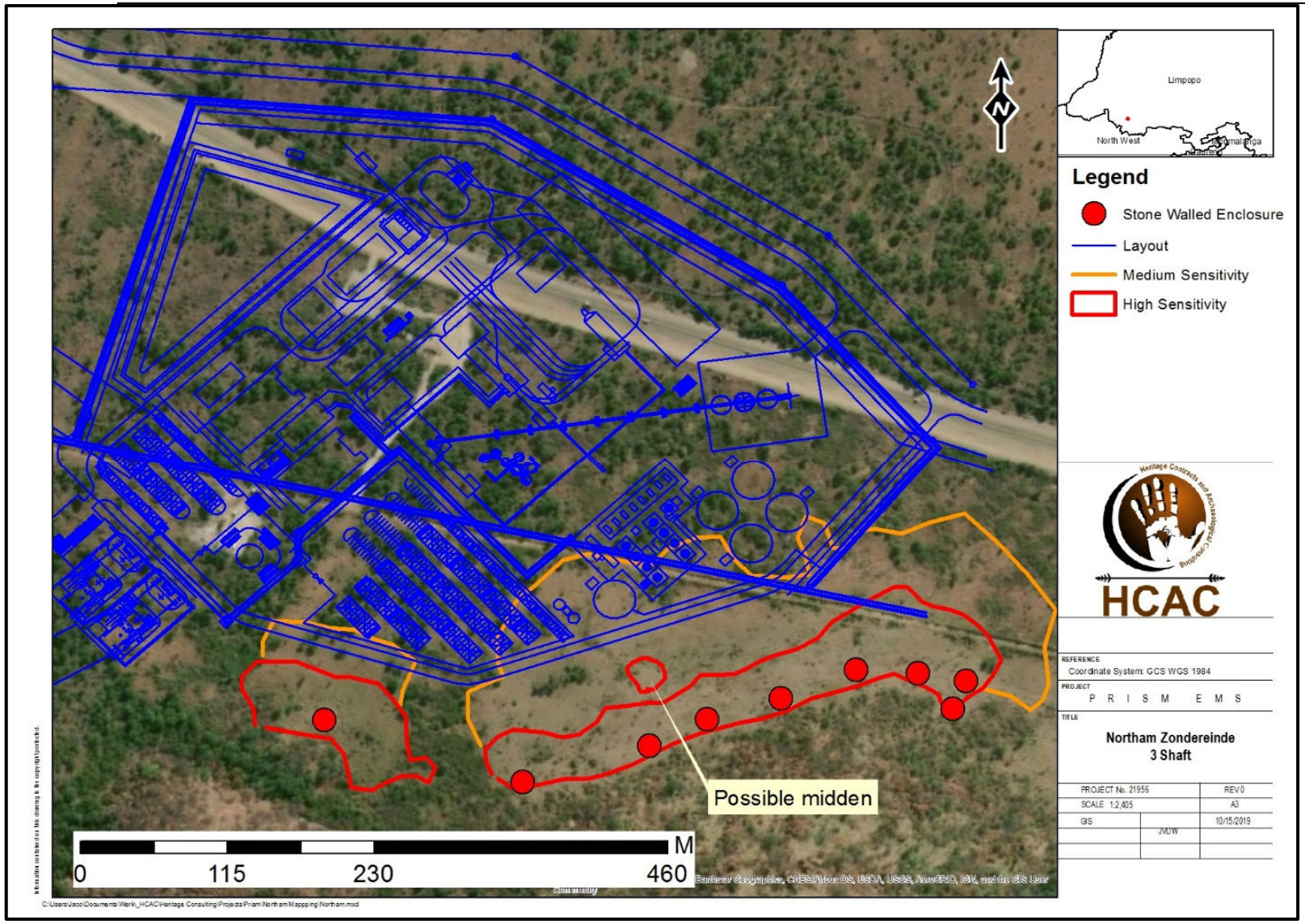


Figure 28. Lay out indicating the impact on areas of medium sensitivity.

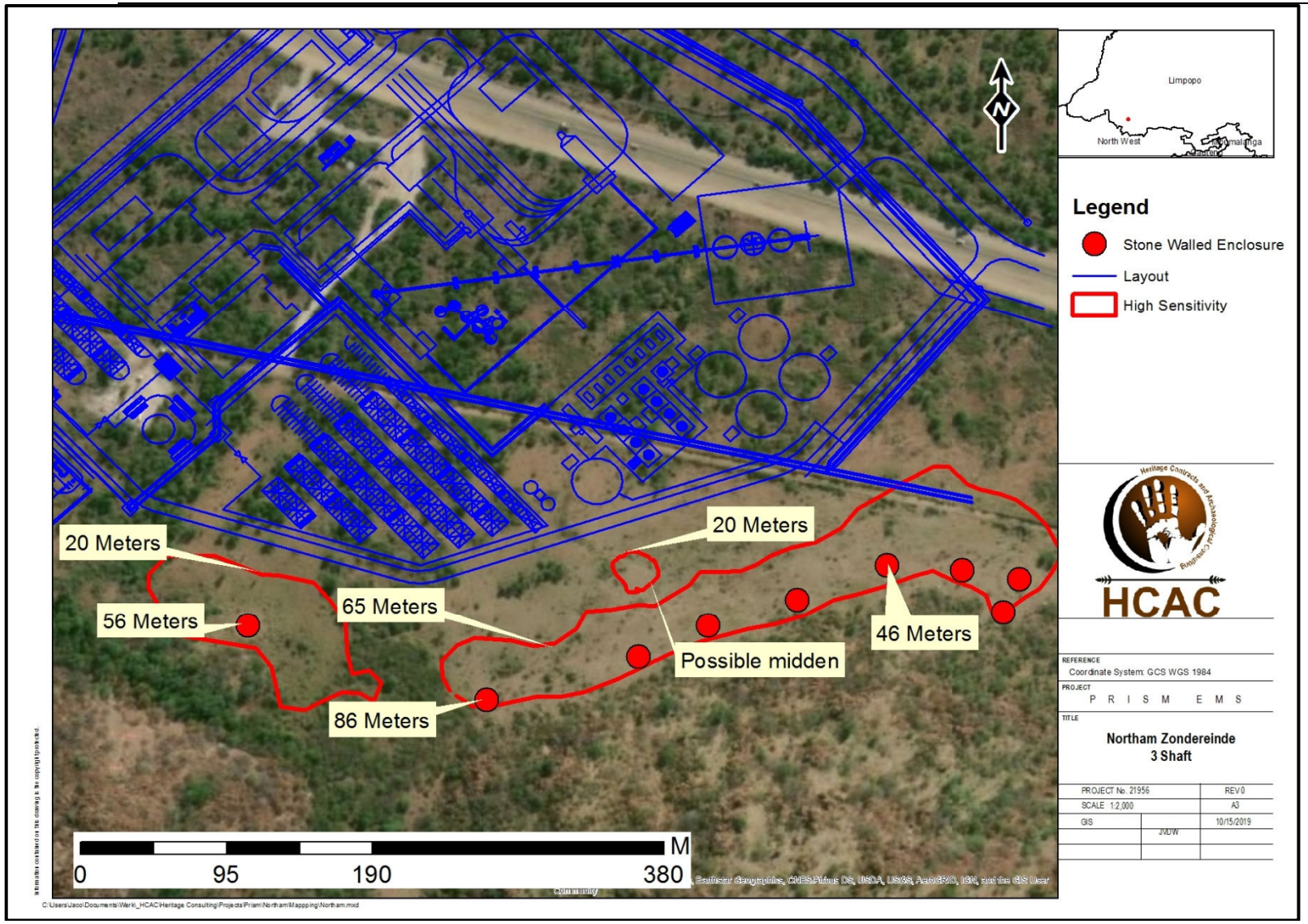


Figure 29. Map indicating the distance from areas of high sensitivity and recorded features to the closets point of the proposed layout. The site will not be directly impacted on by the development.

Table 6. Impact table – Archaeological heritage resources.

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	Regional (4)	Regional (4)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Low (3)
Probability	Probable (4)	Not Probable (2)
Significance	**52 (Medium to high)**	**24 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	No	Yes
Mitigation: The high significant areas should be avoided as per the proposed layout and areas of medium sensitivity must be test excavated to test for subsurface deposits. This is a precautionary measure to mitigate against chance finds. These areas should be monitored during construction and a chance find procedure should be implemented (as outlined below) for the project as well as a site development management plan		
Cumulative impacts: Other authorised projects (e.g., mining and pipeline projects) in the area could have a cumulative impact on the heritage landscape. The impact on physical heritage sites will be mitigated through preservation and phase 2 mitigation of the site.		
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.		

9 CONCLUSION AND RECOMMENDATIONS

No major topographical features exist in the study area that would have attracted human occupation in antiquity however a set of hills that contain Late Iron Age (LIA) settlements occur adjacent and to the east of the study area. This area is marked by a very extensive Iron Age stonewalled settlement and is directly linked to similar sites found at the base of hills and saddles on the same farm (van der Walt 2010) some of these sites were mitigated (van Schalkwyk 2004).

The area around these hills has been fallow for a number of years and is totally overgrown and site features and layout are not visible due to the vegetation cover, but several stone packed kraals measuring approximately 20 meters in diameter were noted as well as widespread middens often deflated. An existing road cuts through the northern section of the site exposing kraal/ midden deposit in the road cutting. Two alternatives were assessed of which the Alternative layout is not acceptable due to high heritage impacts. The proposed layout is placed to preserve the Iron Age site *in-situ* and acceptable from a heritage point of view

The section of the archaeological site relating to the development layout is divided into high and medium significance areas (Figure 17). Areas of high significance contain features (middens and stone walled enclosures) and is located **outside** of the development footprint and will not be directly impacted on. High sensitive areas are mapped in order to provide a buffer zone of 30 meters as a minimum around features but in certain areas are up to 50 meters. The closest heritage feature in the high sensitivity area is located 46 meters away from the proposed surface infrastructure and the furthest 86 meters.

At the time of the survey no visible surface features were recorded in medium significant areas. These areas are mapped as being of medium significance due to the close proximity to the recorded features and marked by the change of vegetation that is a result of landscape use by the inhabitants of the nearby Iron Age settlement. The areas marked as of medium significance could possibly contain subsurface cultural deposit and a small section of this area will be directly impacted by the proposed layout and will have to be mitigated. Due to the lack of heritage features in the medium significant areas, direct impacts by the proposed project are expected to be low. Mitigation measures proposed in the report is to mitigate against chance find in these areas

Outside of the areas marked as sensitive, isolated features such as lower grinding stones and undecorated ceramics were recorded, relating to the wider landscape use by the Iron Age settlement, a few isolated Middle Stone Age lithics were also recorded scattered through the area especially where vertic soils are present. Due to the movement associated with these soils these isolated artefacts are not *in-situ* and are considered to be of low significance. These find spots do not constitute archaeological sites and are of no heritage significance apart from mentioning them in this report.

According to the SAHRA palaeontological sensitivity map the study area is indicated as of insignificant significance and no further studies are required. In terms of the built environment of the area (Section 34 of the NHRA) no standing structures older than 60 years occur and no burial sites were recorded (Section 36 of the NHRA). 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 existing mining activities and the proposed development will not impact negatively on significant viewscapes as it will be in line with current land use of the area. During the public participation process conducted for the project no heritage concerns was raised.

The impact of the proposed project on heritage resources can be mitigated to an acceptable level and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented as part of the EMPr and based on approval from SAHRA.

• The high significant areas should be avoided and areas of medium sensitivity must be test excavated to test for subsurface deposits. These areas should be monitored during construction and a chance find procedure should be implemented (as outlined below) for the project as well as a site development management plan.

9.1 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.

9.2 Reasoned Opinion

The impact of the proposed project on heritage resources is considered medium to high but can be mitigated to an acceptable level if the recommendations in this report are adhered to and based on approval from SAHRA. Furthermore, the socio-economic benefits also outweigh the possible impacts of the development with the correct mitigation measures (i.e. chance find procedure and avoidance of sites) implemented for the project.

9.3 Potential Risks

Potential risks to the proposed project are the occurrence of unknown and unmarked graves. The possibility exists that the study area could contain graves of which surface indicators have been destroyed. Subsurface material could be uncovered during earth works. These risks can be mitigated to an acceptable level with monitoring and the implementation of a chance find procedure as outlined in Section 9.1.

10 REFERENCES

Archaeological Database. University of the Witwatersrand

Bergh, J.S. (red.) 1998. *Geskiedenisatlas van Suid Afrika. Die viernoordelike provinsies*. J.L. van Schaik: Pretoria.

Breutz, P. L. 1953. *Union of South Africa. Department of Native Affairs. Ethnological Publications No. 28. The Tribes of Rustenburg and Pilansberg Districts.* Pretoria: The Government Printer.

Coertze, R. D. 1971. *Die familie-, erf- en opvolgingsreg van die Bafokeng van Rustenburg: met verwysing na prosesregtelike aspekte*. Pretoria: Sabra.

Coetzee, N. A. 1997. *Die geskiedenis van Rustenburg ongeveer van 1840 tot 1940.* Pretoria: V&R Drukkery (Edms) Bpk.

Deacon, H.J., Deacon, J., 1999.*Human beginnings in South Africa*. David Philip, Cape Town.

Deeds office, Pretoria.Database information 1367526. Documents on Cultural Heritage Protection. 2002.

Friede, H. & Steel, R.H. 1986. Traditional smithing and forging of South African bloomery iron. *South African Archaeological Bulletin* **41**: 81-86.

Huffman, T.N. 2006. Archaeological Mitigation of the Rhino Mine. Unpublished report.

Huffman, T.N. 2007.*A Handbook to the Iron Age: The Archaeology of Precolonial Farming Societies in Southern Africa.*Pietermaritsberg: Kwazulu-Natal University Press

Kuman, K., 1998. The earliest South African Industries. In: *Lower Palaeolithic Settlement of the Old World*. Eds by M.D. Petraglia and R. Korisetter, pp 151-186. Routledge Press, London.

Lewis-Williams, J.D., 1981. *Believing and Seeing: Symbolic Meanings in southern San Rock Paintings*. Academic Press, London.

Lombard, M. 2011. Background to the Stone Age of the Kakamas/Keimoes area for CRM purposes. Unpublished report.

Mason, R.J. 1986. *Origins of Black People of Johannesburg and the Southern Western Central Transvaal AD 350-1880*. (Occasional Paper **16**) Johannesburg: University of the Witwatersrand Archaeological Research unit

Massie, R. H. 1905. *The Native tribes of Transvaal. Prepared for the General Staff War Office.* London: His Majesty's Stationery Office.

Readers Digest. 1992. Illustrated history of South Africa. The Real Story. Expanded second edition: completely updated. Cape Town: Readers Digest Association.

Rosenthal, E. 1979. *Rustenburg romance : the history of a Voortrekker town.* Johannesburg: Perskor.

Ross, R. 2002. *A concise history of South Africa*. Cambridge: Cambridge University Press.

Van der Walt, J. 2009. Archaeological Impact Assessment Chronimet Opencast/Underground Mine and Process Plant, Amandelbult, Limpopo Province.

Van der Walt, J. 2014. Archaeological Impact Assessment For the proposed Zwartkop Industrial Development, Amandelbult, Limpopo Province.

Van der Walt, J. 2018. Heritage Impact Assessment Northam Ext 20

Van der Walt, J. 2016. AIA For the proposed additional underground and opencast mining, associated infrastructure and processing facilities at Thaba Cronimet Chrome Mine, Limpopo Province.

Van Schalkwyk, J. 2004. . Unpublished report on The Surveying And Mapping Of Archaeological Sites On The Farm Elandsfontein 386 KQ, Amandelbult Platinum Mine Thabazimbi District, Limpopo Province

Volman, T.P., 1984. Early prehistory of southern Africa. In: Southern African Prehistory and Paleoenvironments. Ed by R.G. Klein, pp. 169-220. A.A. Balkema, Rotterdam.

Wadley, L., 1987. Later Stone Age Hunters and Gatherers of the southern Transvaal. BAR International Series 380, Oxford.

ARCHIVAL SOURCES (National Archive, Pretoria)

National Archives of South Africa. 1921. *2/234. Union of South Africa. Province of Transvaal. Magisterial District of Rustenburg.*

National Archives of South Africa. 1933. *SAB_URU_1376_2068. Issue of Crown Grant to J. S. Viljoen in respect of farm "Middellaagte" No. 997 Rustenburg.*
National Archives of South Africa. 1935-1944. *TAB_TED_2000_E419. Middellaagte School. Rustenburg. Establishment.*
National Archives of South Africa. 1937. *SAB_VWR_133_B645/203/460. Aansoek deur plaaseienaar Middellaagte. F. E. le Roux. Bywoner N. J. Le Roux.*
National Archives of South Africa. 1938. *SAB_VWR_134_B645/203/512. Aansoek deur plaaseienaar Middellaagte. J. N. van den Bergh. Bywoner J. N. van den Bergh.*
National Archives of South Africa. 1973. *SAB_BAO_2515_C31/3/1059/13. Enkelkwartiere. Rustenburg Platinum Mines Amandelbult, Thabazimbi.*
National Archives of South Africa. 1973. *SAB_BAO_2515_C31/3/1059/13. Enkelkwartiere. Rustenburg Platinum Mines Amandelbult.*
National Archives of South Africa. 1974-1980. *SAB_CDB_2225_PB/1/11/2/17. Plaaslike bestuur. Gemeenskapsvorming. Vrystelling t.o.v. dorpstigting. Amandelbult Myn op Amandelbult KQ en ander.*
National Heritage Resources Act 1999

MAPS
Topographical Map of the Middellaagte 382 KQ area. N/d.

Electronic Sources:
Anglo Platinum. 2011. *Operations review. Overview: mining. Amandelbult section.* [Online]. Available: http://www.angloplatinum.com/investors/reports/ar_03/b_rprt/pdf_files/page35.pdf. [Cited 16 December 2011].
Google Earth. 2011. 23°28'54.36 S 28°*00'49.14" elev 1073m.* [Online]. [Cited 18 December 2011].
SAHRIS [Cited 3 July 2015]

11 APPENDICES:

Curriculum Vitae of Specialist

Jaco van der Walt
Archaeologist

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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 Booysendal 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:

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