GLENCORE EASTERN MINES: PROPOSED GLENCORE EASTERN MINES EXPANSION PROJECT, STEELPOORT AREA, GREATER FETAKGOMO TUBATSE LOCAL MUNICIPALITY, LIMPOPO PROVINCE

Archaeological Impact Assessment

An EOH Company

Prepared for: **Glencore Eastern Mines**

Prepared by: **Exigo Sustainability**

Email info@exigo3.com
Tel +27 012 751 2160
Fax +27 086 607 2406

Eulophia Corner Building 1,
38 Gen Van Reyneveld St,
Persequor Park,
Pretoria, 0020

Postnet Suite 74,
Private Bag X07,
Arcadia, 0007

Vat nr: 4910184854
Registration nr: 2006/011434/07

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www.exigo3.com

ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) ON PORTIONS OF THE FARMS THORNCLIFFE 374 KT, HELENA 6 JT, DE GROOTEBOOM 373 KT AND ST GEORGE 2 JT FOR THR PROPOSED GLENCORE EASTERN MINES EXPANSION PROJECT, STEELPOORT AREA, GREATER FETAKGOMO TUBATSE LOCAL MUNICIPALITY, LIMPOPO PROVINCE

Conducted on behalf of:

Glencore Eastern Mines
Exigo Sustainability

Compiled by:

Nelius Kruger (BA, BA Hons. Archaeology Pret.)

Reviewed by:

Reneé Kruger (Exigo Sustainability)
Herman Gildenhuys (Exigo Sustainability)

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Email info@exigo3.com
Tel +27 012 751 2160
Fax +27 086 607 2406

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DECLARATION

I, Nelius Le Roux Kruger, declare that –

- I act as the independent specialist;
- I am conducting any work and activity relating to the proposed Glencore Eastern Mines Expansion Development in an objective manner, even if this results in views and findings that are not favourable to the client;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have the required expertise in conducting the specialist report and I will comply with legislation, including the relevant Heritage Legislation (National Heritage Resources Act no. 25 of 1999, Human Tissue Act 65 of 1983 as amended, Removal of Graves and Dead Bodies Ordinance no. 7 of 1925, Excavations Ordinance no. 12 of 1980), the Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment (SAHRA, AMAFA and the CRM section of ASAPA), regulations and any guidelines that have relevance to the proposed activity;
- I have not, 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 declaration are true and correct.

_____

Signature of specialist
Company: Exigo Sustainability
Date: 30 October 2017

EXECUTIVE SUMMARY

This report details the results of an Archaeological Impact Assessment (AIA) study on portions of the farms Thorncliffe 374 KT, Helena 6 JT,De Grooteboom 373 KT and St George 2 JT, subject to an Environmental Basic Assessment (BA) process for the proposed Glencore Eastern Mines Expansion Development in the Steelpoort area of the Greater Fetakgomo Tubatse Local Municipality, Greater Sekhukhune District Municipality, Limpopo Province. The project entails the development of infrastructures associated with the proposed underground mining operations unto the farms Richmond and St George, including a new Tailings Disposal Facility, Waste Rock Dump, Ventilation Shafts and storm water infrastructure. The report includes background information on the area's archaeology, its representation in Southern Africa, and the history of the larger area under investigation, survey methodology and results as well as heritage legislation and conservation policies. A copy of the report will be supplied to the South African Heritage Resources Agency (SAHRA) and recommendations contained in this document will be reviewed.

A number of academic archaeological and historical studies have been conducted in this section of the Limpopo Province and these studies all infer a rich and diverse archaeological landscape, representative of most phases of human and cultural development in Southern Africa. The cultural landscape of the Sekhukhune region encompasses a period of time that spans millions of years, covering human cultural development from the Stone Ages up to recent times. It depicts the interaction between the first humans and their adaptation and utilization to the environment, the migration of people, technological advances, warfare and contact and conflict. Contained in its archaeology are traces of conquests by Bantu-speakers, Europeans and British imperialism encompassing the struggle for land, resources and political power. Sekhukhune is rich in archaeological sites, dating from the Early Iron Age (800AD) to the Pedi occupation of the area. This is most probably due to the safety the valley offered from outside attacks, but also as a result of the deep and rich sedimentary soils of the low-lying area. It is also of historical importance due to the activities of the Berlin Missionary Society who entered the area in the time of Chief Sekwati.

A number of sites of heritage potential were noted in the Glencore Eastern Mines Expansion Development, specifically at the site demarcated for the Thorncliffe TSF. The absence of heritage sites in other areas might be attributed to the fact that the surroundings at the Glencore Eastern Mines have been transformed throughout by mining, prospecting and related infrastructure developments. The following heritage management recommendations are made based on general observations in the proposed project area:

- According to the South African Heritage Resources Agency Information System (SAHRIS) Palaeo Map, the project area falls within a potentially sensitive fossiliferous zone and a Palaeontological Desktop Assessment is recommended for the project, subject to review and recommendations by the relevant heritage authorities. Should fossil remains such as fossil fish, reptiles or petrified wood be exposed during construction, these objects should carefully safeguarded and the relevant heritage resources authority (SAHRA) should be notified immediately so that the appropriate action can be taken by a professional palaeontologist..
- The remains of stone wall foundations and structures of unknown provenience and a possible Historical Period occupation site (**Site EXIGO-GTT-FT01, Site EXIGO-GTT-FT02, Site EXIGO-GTT-FT03, Site EXIGO-GTT-HP01**) are of low significance due to the general absence of site context and the poor preservation of the features. The sites occur within the proposed Thorncliffe TSF development area and it is recommended that the general area be monitored in order to avoid the destruction of previously undetected heritage remains. In addition, application should be made for a destruction

permit from the relevant heritage authorities should the possible Historical Period site be impacted on.

- Two small Iron Age settlement areas at **Site EXIGO-GTT-IA01** and **Site EXIGO-GTT-IA02** are significant in terms of their regional representation in the Iron Age farmer period landscape of the Sekhukhune area. The sites are located outside of the proposed Thorncliffe TSF development area and it is primarily recommended that impact on the heritage resources be avoided by the implementation of a heritage conservation buffer of at least 100m around the heritage receptors. Should either of the sites be impacted on at any stage it is recommended that the historical fabric of the sites be conserved by means of a Phase 2 Specialist study (mapping, site sampling and possible conservation management and protection) and the necessary excavation and destruction permits should be obtained from the relevant Heritage Resources Authorities.
- Four burial sites or assumed burial sites occurring within, or in close proximity of the proposed Thorncliffe TSF development area (**Site EXIGO-GTT-BP01, Site EXIGO-GTT-BP02, Site EXIGO-GTT-BP02, Site EXIGO-GTT-BP04**) are of high significance and these sites will in all probability be impacted on by the proposed project. For these burial sites, the implementation of a conservation buffer of at least 100m is primarily recommended and the sites should be monitored on a frequent basis during construction by a heritage consultant or informed ECO in order to detect and manage negative impact on the sites. In addition, the sites should be fenced prior to the commencement of construction and strict access control should be applied. A site management plan detailing strict site management conservation measures for these heritage receptors should be compiled prior to the commencement of construction. The developer should carefully liaise with the heritage specialist and SAHRA with regards to the management and monitoring of any human grave or cemetery. **However, should impact on any human burial prove inevitable, full grave relocations are recommended for these burial grounds. This measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation, permitting, statutory permissions and subject to any local and regional provisions and laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials.**
- It is essential that cognisance be taken of the larger heritage landscape of the area in order to avoid the destruction of previously undetected heritage sites. As an example, the **Gamawela Cave Site**, situated approximately 6km south-west of the Thorncliffe Mine on the farm St George 2 JT proves to be an invaluable living heritage site for local communities. Even though the site occurs away from mining areas, indirect effects on the site emanating from mining such as vibration impacts should be carefully managed in order to ensure the preservation of the site and similar areas of heritage importance in the region.
- It should be stated that it is likely that further undetected archaeological remains might occur elsewhere in the Study Area along water sources and drainage lines, fountains and pans would often have attracted human activity in the past. Also, since Stone Age material seems to originate from below present soil surfaces in eroded areas, the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits. Burials and historically significant structures dating to the Colonial Period. As such, the general monitoring of the development progress by an ECO or by the heritage specialist is recommended for all stages of the project. Should any subsurface palaeontological, archaeological or historical material, or burials be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately

Heritage resources ranging in significance from low to high occur inside the proposed Glencore Eastern Mines Expansion Development footprints. However, it is the opinion of the author of this Archaeological Impact Assessment Report that the proposed Glencore Eastern Mines Expansion Development on portions of the farms Thorncliffe 374 KT, Helena 6 JT and De Grooteboom 373 KT may proceed from a culture resources management perspective, provided that mitigation measures are implemented and no previously undetected heritage remains are found at any point in construction and operational phases.

Glencore Eastern Mines Expansion Development heritage sites locations

Site Code	Short Description	Coordinate S E	Mitigation Action
EXIGO-GTT-IA01	Iron Age Occupation Site	**S24.97284° E30.11559°**	Avoidance, conservation buffer, site monitoring. Phase 2 documentation (middens) & destruction permitting (foundations) if impacted on. General site monitoring by informed ECO.
EXIGO-GTT-IA02	Iron Age Occupation Site	**S24.97042° E30.11906°**	
EXIGO-GTT-HP01	Historical Period Occupation Site	**S24.973634°° E30.124959°**	Destruction permitting if impacted on. General site monitoring by informed ECO.
EXIGO-GTT-FT01	Stone Wall Foundation Structure	**S24.97225° E30.12181°**	Destruction permitting if / when applicable. General site monitoring by informed ECO.
EXIGO-GTT-FT02	Stone Wall Foundation Structure	**S24.97269° E30.12076°**	
EXIGO-GTT-FT03	Unknown Stone Structure	**S24.96793° E30.11866°**	
EXIGO-GTT-BP01	Burial Site	**S24.97169° E30.12185°**	Avoidance & redesign footprint to avoid the heritage resource / strict 100m conservation buffer, fence all burial places and apply access control, frequent site monitoring, site management plan implementation. Grave Relocation Alternative: Relocation of burials and documentation of site, full social consultation with affected parties, possible conservation management and protection measures. Subject to authorisations and relevant permitting from heritage authorities and affected parties.
EXIGO-GTT-BP02	Burial Site	**S24.97354° E30.12203°**	
EXIGO-GTT-BP03	Burial Site	**S24.97416° E30.12441°**	
EXIGO-GTT-BP04	Burial Site	**S24.974087° E30.125441°**	
Gamawela Cave Site	Cave Site	**S25.01160° E30.07370° (Relative)**	NA – manage indirect impacts.

Should human remains be discovered at any stage, these should be reported to the Heritage Specialist and relevant authorities (SAHRA) and development activities should be suspended until the site has been inspected by the Specialist. The Specialist will advise on further management actions and possible relocation of human remains in accordance with the Human Tissue Act (Act 65 of 1983 as amended), the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the National Heritage Resources Act (Act no. 25 of 1999) and any local and regional provisions, laws and by-laws pertaining to human remains. It should be noted that recommendations and possible mitigation measures are valid for the duration of the development process, and mitigation measures might have to be implemented on additional features of heritage importance not detected during this Phase 1 assessment (e.g. uncovered during the construction process).

NOTATIONS AND TERMS/TERMINOLOGY

Absolute dating: Absolute dating provides specific dates or range of dates expressed in years.

Archaeological record: The archaeological record minimally includes all the material remains documented by archaeologists. More comprehensive definitions also include the record of culture history and everything written about the past by archaeologists.

Artefact: Entities whose characteristics result or partially result from human activity. The shape and other characteristics of the artefact are not altered by removal of the surroundings in which they are discovered. In the Southern African context examples of artefacts include potsherds, iron objects, stone tools, beads and hut remains.

Assemblage: A group of artefacts recurring together at a particular time and place, and representing the sum of human activities.

Context: An artefact's context usually consists of its immediate *matrix*, its *provenience* and its *association* with other artefacts. When found in *primary context*, the original artefact or structure was undisturbed by natural or human factors until excavation and if in *secondary context,* disturbance or displacement by later ecological action or human activities occurred.

Cultural Heritage Resource: The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

Cultural landscape: A cultural landscape refers to a distinctive geographic area with cultural significance.

Cultural Resource Management (CRM): A system of measures for safeguarding the archaeological heritage of a given area, generally applied within the framework of legislation designed to safeguard the past.

Feature: Non-portable artefacts, in other words artefacts that cannot be removed from their surroundings without destroying or altering their original form. Hearths, roads, and storage pits are examples of archaeological features

Impact: A description of the effect of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.

Lithic: Stone tools or waste from stone tool manufacturing found on archaeological sites.

Matrix: The material in which an artefact is situated (sediments such as sand, ashy soil, mud, water, etcetera). The matrix may be of natural origin or human-made.

Midden: Refuse that accumulates in a concentrated heap.

Microlith: A small stone tool, typically knapped of flint or chert, usually about three centimetres long or less.

Monolith: A geological feature such as a large rock, consisting of a single massive stone or rock, or a single piece of rock placed as, or within, a monument or site.

Phase 1 CRM Assessment: An Impact Assessment which identifies archaeological and heritage sites, assesses their significance and comments on the impact of a given development on the sites. Recommendations for site mitigation or conservation are also made during this phase.

Phase 2 CRM Study: In-depth studies which could include major archaeological excavations, detailed site surveys and mapping / plans of sites, including historical / architectural structures and features. Alternatively, the sampling of sites by collecting material, small test pit excavations or auger sampling is required. Mitigation / Rescue involves planning the protection of significant sites or sampling through excavation or collection (in terms of a permit) at sites that may be lost as a result of a given development.

Phase 3 CRM Measure: A Heritage Site Management Plan (for heritage conservation), is required in rare cases where the site is so important that development will not be allowed and sometimes developers are encouraged to enhance the value of the sites retained on their properties with appropriate interpretive material or displays.

Provenience: Provenience is the three-dimensional (horizontal and vertical) position in which artefacts are found. Fundamental to ascertaining the provenience of an artefact is *association,* the co-occurrence of an artefact with other archaeological remains; and *superposition,* the principle whereby artefacts in lower levels of a matrix were deposited before the artefacts found in the layers above them, and are therefore older.

Random Sampling: A probabilistic sampling strategy whereby randomly selected sample blocks in an area are surveyed. These are fixed by drawing coordinates of the sample blocks from a table of random numbers.

Scoping Assessment: The process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an impact assessment. The main purpose is to focus the impact assessment on a manageable number of important questions on which decision making is expected to focus and to ensure that only key issues and reasonable alternatives are examined. The outcome of the scoping process is a Scoping Report that includes issues raised during the scoping process, appropriate responses and, where required, terms of reference for specialist involvement.

Site (Archaeological): A distinct spatial clustering of artefacts, features, structures, and organic and environmental remains, as the residue of human activity. These include surface sites, caves and rock shelters, larger open-air sites, sealed sites (deposits) and river deposits. Common functions of archaeological sites include living or habitation sites, kill sites, ceremonial sites, burial sites, trading, quarry, and art sites,

Stratigraphy: This principle examines and describes the observable layers of sediments and the arrangement of strata in deposits

Systematic Sampling: A probabilistic sampling strategy whereby a grid of sample blocks is set up over the survey area and each of these blocks is equally spaced and searched.

Trigger: A particular characteristic of either the receiving environment or the proposed project which indicates that there is likely to be an *issue* and/or potentially significant *impact* associated with that proposed development that may require specialist input. Legal requirements of existing and future legislation may also trigger the need for specialist involvement.

LIST OF ABBREVIATIONS

Abbreviation	Description
ASAPA	Association for South African Professional Archaeologists
AIA	Archaeological Impact Assessment
BP	Before Present
BCE	Before Common Era
CRM	Culture Resources Management
EIA	Early Iron Age (also Early Farmer Period)
EIA	Environmental Impact Assessment
EFP	Early Farmer Period (also Early Iron Age)
ESA	Earlier Stone Age
GIS	Geographic Information Systems
HIA	Heritage Impact Assessment
IAPS	Integrated Algal Ponding System
ICOMOS	International Council on Monuments and Sites
K2/Map	K2/Mapungubwe Period
LFP	Later Farmer Period (also Later Iron Age)
LIA	Later Iron Age (also Later Farmer Period)
LSA	Later Stone Age
MIA	Middle Iron Age (also Early later Farmer Period)
MRA	Mining Right Area
MSA	Middle Stone Age
NHRA	National Heritage Resources Act No.25 of 1999, Section 35
PFS	Pre-Feasibility Study
PHRA	Provincial Heritage Resources Authorities
SAFA	Society for Africanist Archaeologists
SAHRA	South African Heritage Resources Association
TSF	Tailings Storage Facility
YCE	Years before Common Era (Present)

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1 BACKGROUND

1.1 Scope and Motivation

Exigo Sustainability was commissioned by Glencore Eastern Mines for an Archaeological Impact Assessment (AIA) study on portions of the farms Thorncliffe 374 KT, Helena 6 JT, De Grooteboom 373 KT and St George 2 JT, subject to an Environmental Basic Assessment (BA) process for the proposed Glencore Eastern Mines Expansion Development in the Steelpoort area of the Greater Fetakgomo Tubatse Local Municipality, Greater Sekhukhune District Municipality, Limpopo Province. The rationale of this AIA is to determine the presence of heritage resources such as archaeological and historical sites and features, graves and places of religious and cultural significance in previously unstudied areas; to consider the impact of the proposed project on such heritage resources, and to submit appropriate recommendations with regard to the cultural resources management measures that may be required at affected sites / features.

1.2 Project Direction

Exigo Sustainability's expertise ensures that all projects be conducted to the highest international ethical and professional standards. As archaeological specialist for Exigo Sustainability, Mr Nelius Kruger acted as field director for the project; responsible for the assimilation of all information, the compilation of the final consolidated AIA report and recommendations in terms of heritage resources on the demarcated project areas. Mr Kruger is an accredited archaeologist and Culture Resources Management (CRM) practitioner with the Association of South African Professional Archaeologists (ASAPA), a member of the Society for Africanist Archaeologists (SAFA) and the Pan African Archaeological Association (PAA) as well as a Master's Degree candidate in archaeology at the University of Pretoria.

1.3 Project Brief

The Glencore Eastern Mines Expansion project involves the expansion of underground mining unto the farms Richmond and St George. No surface disturbances on these properties are foreseen planned but a number of secondary developments are planned in order to provide necessary infrastructure for the underground mining expansion.

These include:

- Thorncliffe Mine: a new Tailings Storage Facility (TSF) with 3 adjacent sites demarcated for this purpose **(footprints totalling approximately 65ha)**.
- Helena Mine: a new Waste Rock Dump (WRD) on footprint of existing TSF site **(footprint totalling approximately 25ha)** with associated stormwater management infrastructure.
- A vent shaft at Magareng **(footprint approximately 20m x 20m)**.
- A vent shaft at Thorncliffe **(footprint approximately 20m x 20m)**.

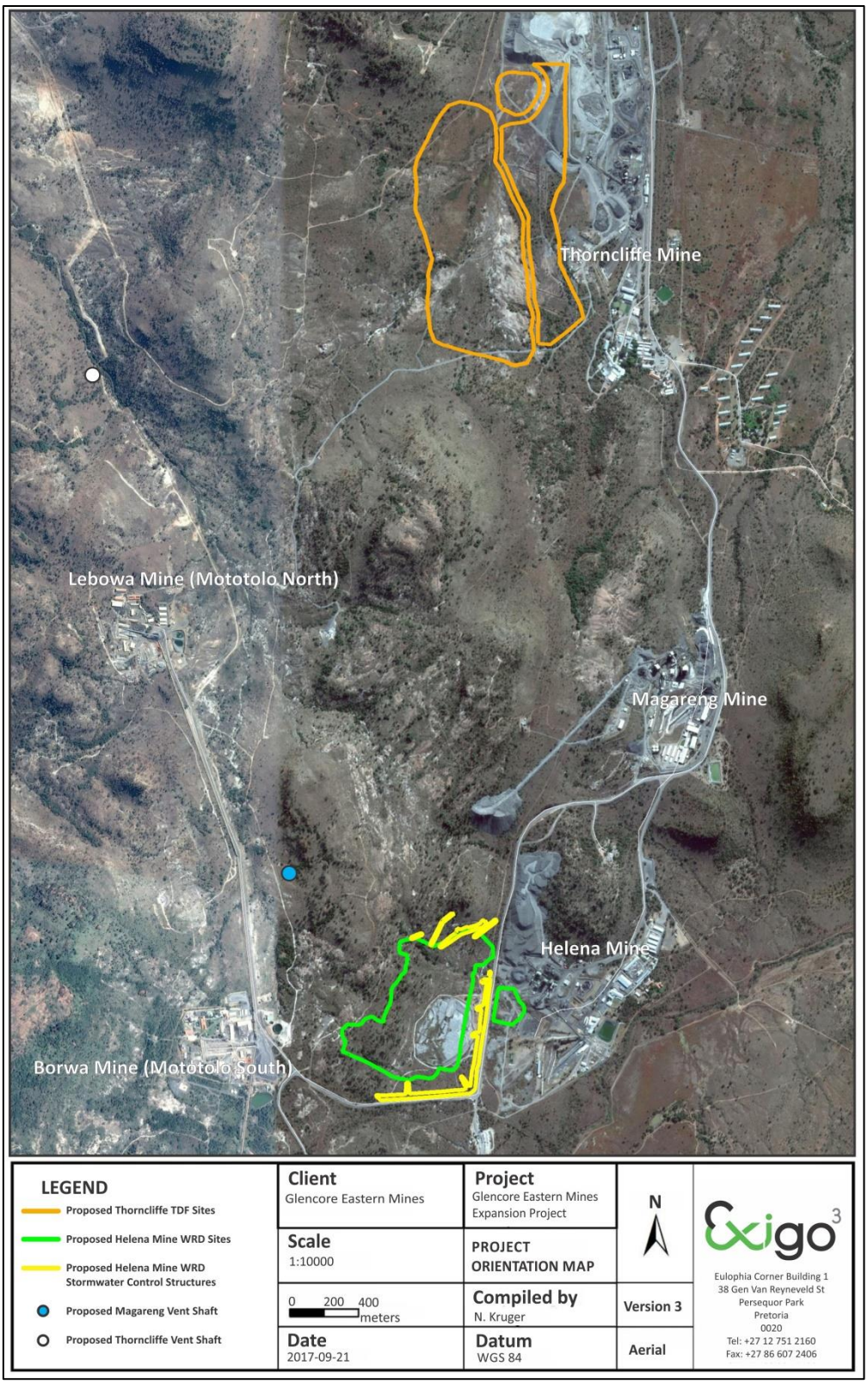

Figure 1-1: Aerial representation of the Glencore Eastern Mines Expansion Development infrastructure components.

1.4 Terms of Reference

Heritage specialist input into the Environmental Impact Assessment (EIA) process is essential to ensure that, through the management of change, developments still conserve our heritage resources. Heritage specialist input in EIA processes can play a positive role in the development process by enriching an understanding of the past and its contribution to the present. It is also a legal requirement for certain development categories which may have an impact on heritage resources (Refer to Section 2.5.2).

Thus, EIAs should always include an assessment of heritage resources. The heritage component of the EIA is provided for in the **National Environmental Management Act, (Act 107 of 1998)** and endorsed by section 38 of the **National Heritage Resources Act (NHRA - Act 25 of 1999)**. In addition, the NHRA protects all structures and features older than 60 years, archaeological sites and material and graves as well as burial sites. The objective of this legislation is to ensure that developers implement measures to limit the potentially negative effects that the development could have on heritage resources. Based hereon, this project functioned according to the following **terms of reference for** heritage specialist input**:**

- *Provide a detailed description of all archaeological artefacts, structures (including graves) and settlements which may be affected, if any.*
- *Assess the nature and degree of significance of such resources within the area.*
- *Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;*
- *Assess and rate any possible impact on the archaeological and historical remains within the area emanating from the proposed development activities.*
- *Propose possible heritage management measures provided that such action is necessitated by the development.*
- *Liaise and consult with the South African Heritage Resources Agency (SAHRA)*

1.5 CRM: Legislation, Conservation and Heritage Management

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

1.5.1 Legislation regarding archaeology and heritage sites

The South African Heritage Resources Agency (SAHRA) and its provincial offices aim to conserve and control the management, research, alteration and destruction of cultural resources of South Africa. It is therefore vitally important to adhere to heritage resource legislation at all times.

a. National Heritage Resources Act No 25 of 1999, section 35

According to the National Heritage Resources Act No 25 of 1999 (section 35) the following features are protected as cultural heritage resources:

a. Archaeological artifacts, structures and sites older than 100 years

b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography

c. Objects of decorative and visual arts

d. Military objects, structures and sites older than 75 years

e. Historical objects, structures and sites older than 60 years

f. Proclaimed heritage sites

g. Grave yards and graves older than 60 years

h. Meteorites and fossils

i. Objects, structures and sites of scientific or technological value.

In addition, the national estate includes the following:

a. Places, buildings, structures and equipment of cultural significance

b. Places to which oral traditions are attached or which are associated with living heritage

c. Historical settlements and townscapes

d. Landscapes and features of cultural significance

e. Geological sites of scientific or cultural importance

f. Archaeological and paleontological importance

g. Graves and burial grounds

h. Sites of significance relating to the history of slavery

i. Movable objects (e.g. archaeological, paleontological, meteorites, geological specimens, military, ethnographic, books etc.)

With regards to activities and work on archaeological and heritage sites this Act states that:

"No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority." (34. [1] 1999:58)

and

"No person may, without a permit issued by the responsible heritage resources authority-

(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;

(b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

(c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or

(d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites. (35. [4] 1999:58)."

and

"No person may, without a permit issued by SAHRA or a provincial heritage resources agency-

(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority;

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals (36. [3] 1999:60)."

b. Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925

Graves and burial grounds are commonly divided into the following subsets:

a. ancestral graves
b. royal graves and graves of traditional leaders
c. graves of victims of conflict
d. graves designated by the Minister
e. historical graves and cemeteries
f. human remains

Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act and the Human Tissues Act of 1983. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and Ordinance on Excavations (Ordinance no. 12 of 1980) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial MEC as well as the relevant local authorities.

c. National Heritage Resources Act No 25 of 1999, section 35

This act (Act 107 of 1998) states that a survey and evaluation of cultural resources must be done in areas where development projects, that will change the face of the environment, will be undertaken. The impact of the development on these resources should be determined and proposals for the mitigation thereof are made. Environmental management should also take the cultural and social needs of people into account. Any disturbance of landscapes and sites that constitute the nation's cultural heritage should be avoided as far as possible and where this is not possible the disturbance should be minimized and remedied.

1.5.2 Background to HIA and AIA Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. Heritage sites are frequently threatened by development projects and both the environmental and heritage legislation require impact assessments (HIAs & AIAs) that identify all heritage resources in areas to be developed. Particularly, these

assessments are required to make recommendations for protection or mitigation of the impact of the sites. HIAs and AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources including archaeological and palaeontological sites that might occur in areas of developed and (b) make recommendations for protection or mitigation of the impact on the sites.

A detailed guideline of statutory terms and requirements is supplied in Addendum 1.

2 REGIONAL CONTEXT

2.1 Area Location

The Glencore Eastern Mines Expansion project area is located on portions of the farms Thorncliffe 374 KT, Helena 6 JT, De Grooteboom 373 KT and St George 2 JT in the Steelpoort area of the Greater Fetakgomo Tubatse Local Municipality, Limpopo Province. It is located approximately 30km south of Steelpoort and 110km south-east of Polokwane, east of the R555 regional road connecting Burgersfort and Stoffberg. The area falls under the Sekhukhune District Municipality in the Limpopo Province (see Figure 2-1). Key location points of the respective development areas are as follows:

- Thorncliffe Mine TSF: **S24.97262° E30.12282°**
- Helena Mine WRD: **S25.00041° E30.11966°**
- Magareng Vent Shaft: **S24.99455° E30.11350°**
- Thorncliffe Vent Shaft: **S24.975173° E30.105129°**

The study area appears on 1:50 000 Map Sheet 2430CC.

2.2 Area Description: Receiving Environment

The regional topographical setting of the Steelpoort area can be largely classified as low mountainous terrain throughout most parts of the central, eastern and western sections of the study area often forming deep valleys and a gorge to the west where the Olifants River cuts through the mountainous area. This eastern area is dominated by rugged hills with well-defined ridges and joint pattern controlled valleys and troughs. The landscape straddles the westerly flowing Olifants River which appears to have exploited the natural joint pattern and created a deeply incised valley. Vegetation in the areas is generally classified as Bushveld and grassland cover.

2.3 Site Description

The Glencore Eastern Mines Expansion project area is situated along rugged hills south of the town of Steelpoort. The terrain consists predominantly of mountainous areas with flatter parcels of developable land on the plateaus, terraces and areas adjacent to the rivers. The proposed project development footprints are situated in areas that have been altered extensively as a result of earlier mining, prospecting and the establishment of mine roads and other infrastructure. Original vegetation remains intact on high slopes of mountains in the area as well as along water courses and pioneer plant species are prevalent in transformed zones. A number of perennial and non-perennial streams and drainage lines originating in the surrounding hills, bisect the region. Generally, human impact has resulted to the degradation of the environment as a result of over-exploitation and overgrazing. This manifests in large-scale surface soil loss both as donga and sheet erosion which is prevalent throughout the region.

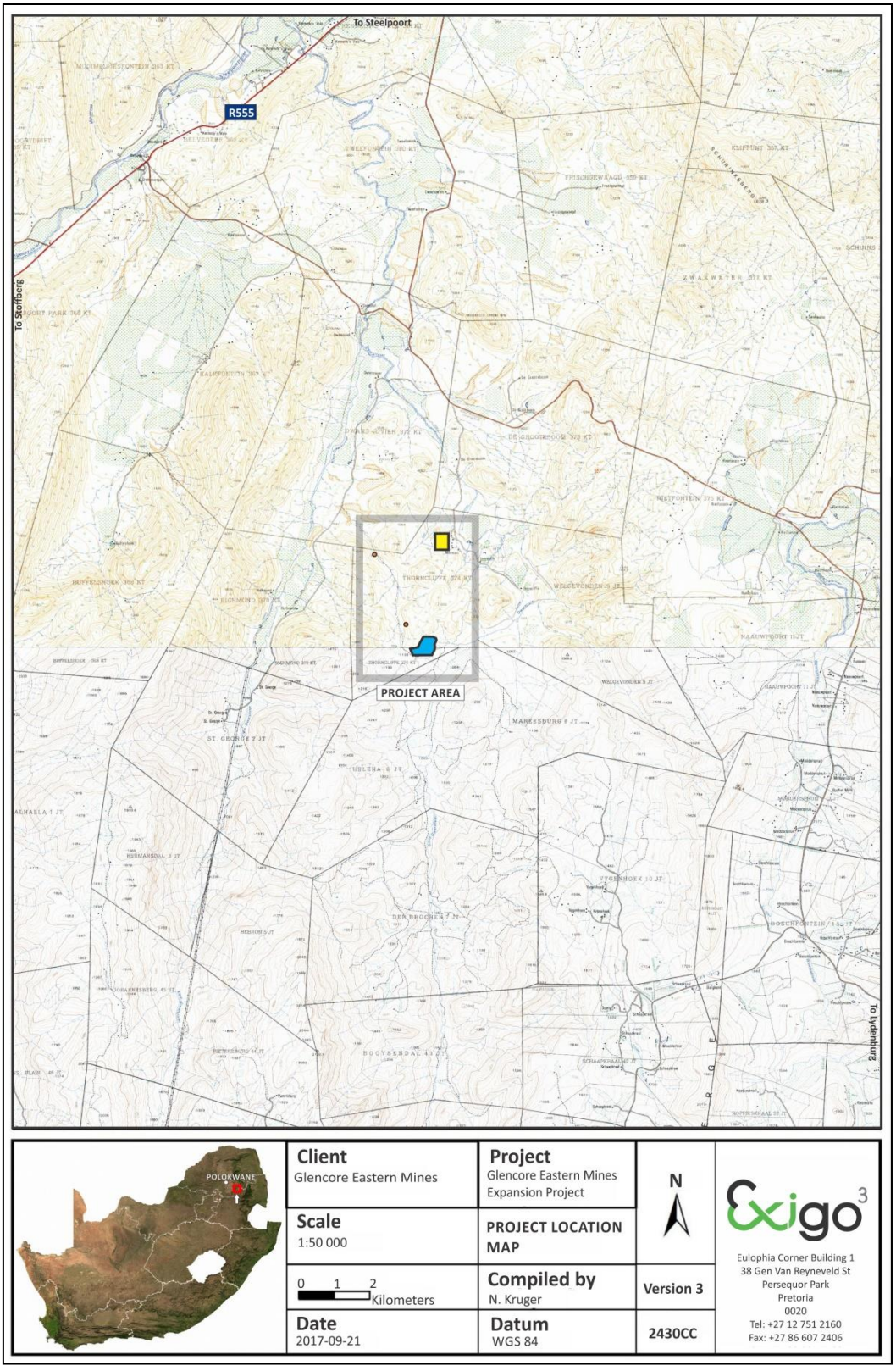

Figure 2-1: 1:50 00 Map representation of the location of the proposed Glencore Eastern Mines Expansion Development (sheet 2430CC).

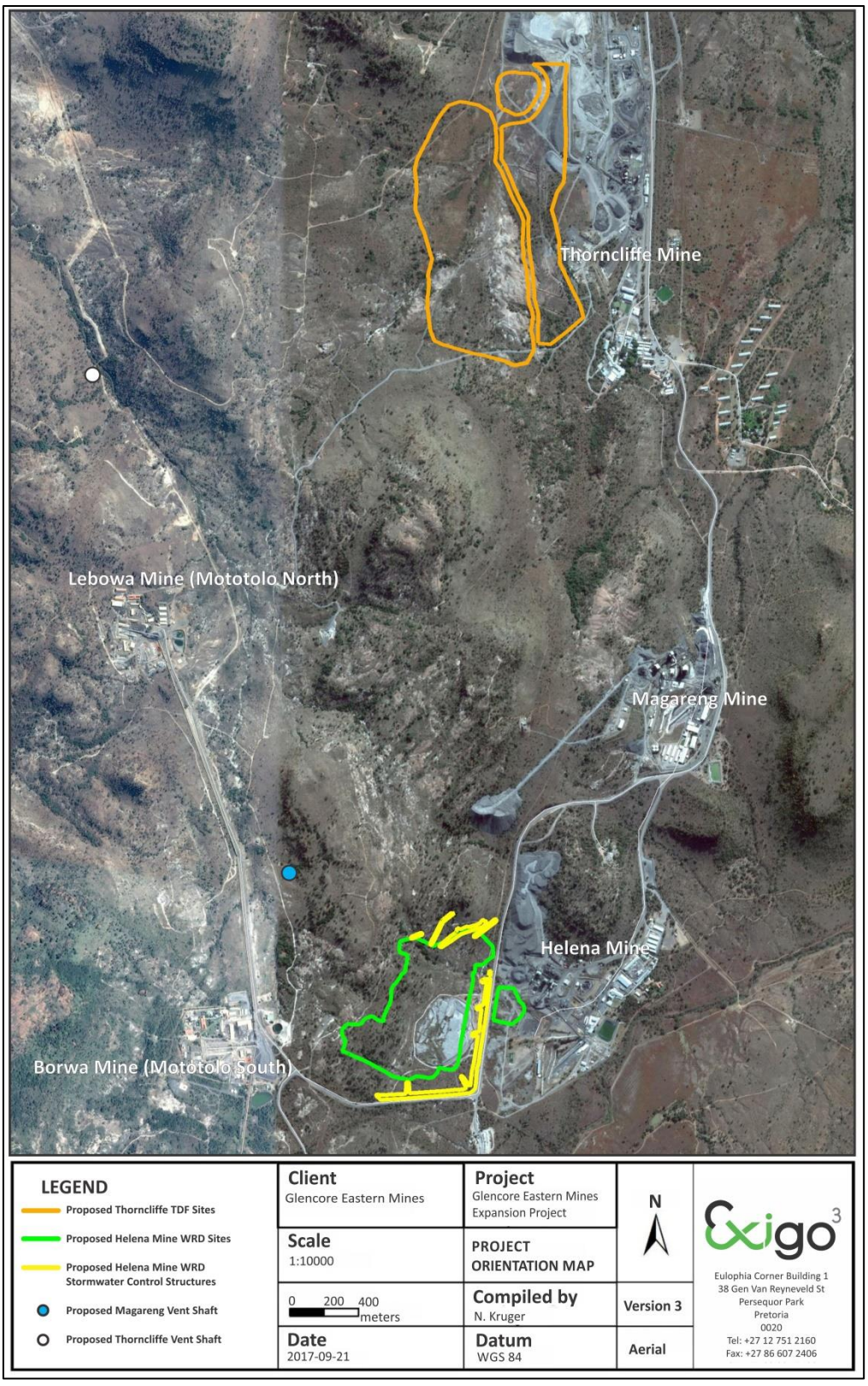

Figure 2-2: Aerial representation of the regional setting for the proposed Glencore Eastern Mines Expansion Development and proposed development components.

3 METHOD OF ENQUIRY

3.1 Sources of Information

Data from detailed desktop, aerial and field studies were employed in order to sample surface areas systematically and to ensure a high probability of heritage sites recording.

3.1.1 Desktop Study

A desktop study was prepared in order to contextualize the proposed project within a larger historical milieu. The study focused on relevant previous studies, archaeological and archival sources, aerial photographs, historical maps and local histories, all pertaining to the Steelpoort area and the larger landscape of this section of the Limpopo Province. The desktop study examined a number of archaeological and historical impact assessments conducted in the Steelpoort Valley and surrounds.

3.1.2 Aerial Representations and Survey

Aerial photography is often employed to locate and study archaeological sites, particularly where larger scale area surveys are performed. This method was applied to assist the foot site surveys where depressions, variation in vegetation, soil marks and landmarks were examined. Specific attention was given to shadow sites (shadows of walls or earthworks which are visible early or late in the day), crop mark sites (crop mark sites are visible because disturbances beneath crops cause variations in their height, vigour and type) and soil marks (e.g. differently coloured or textured soil (soil marks) might indicate ploughed-out burial mounds). Attention was also given to moisture differences, as prolonged dampening of soil as a result of precipitation frequently occurs over walls or embankments. By superimposing high frequency aerial photographs with images generated with Google Earth, potential sensitive areas were subsequently identified, geo-referenced and transferred to a handheld GPS device. These areas served as referenced points from where further vehicular and pedestrian surveys were carried out.

The aerial survey identified surface areas in the proposed Glencore Eastern Mines Expansion Development footprints which might have been subjected to historical and more recent disturbances, largely the result of mining.

3.1.3 Mapping of sites

Merging data generated during the desktop study and the aerial survey, sites and areas of heritage importance were plotted on 1:50 000 topographic maps of the larger Sekhukhune area using ArcGIS 9.3. These maps were then superimposed on high definition aerial representations in order to graphically demonstrate the geographical locations and distribution of sensitive areas. Information on areas with dense clusters of heritage sites were expanded in the text employing academic and research based literature.

3.1.4 Field Survey

Archaeological survey implies the systematic procedure of the identification of archaeological sites. Archaeological surveys of the respective footprint areas proposed for the Thorncliffe TSF, the Helena WRD and the Thorncliffe vent shaft locations were conducted in November 2016, May 2017 and September 2017. The process encompassed a systematic field survey in accordance with standard archaeological practice by which heritage resources are observed and documented. In order to sample surface areas systematically and to ensure a high probability of site recording, the each of the footprint areas were systematically surveyed on foot by means of a transect survey. GPS reference points identified during the

aerial survey was also visited and random spot checks were made (see detail in previous section). Using a Garmin E-trex Legend GPS objects and structures of archaeological / heritage value were recorded and photographed with a Digital camera. Real time aerial mapping and positioning by means of a hand-held tablet-based Google Earth application was also employed on site to investigate possible disturbed areas during the survey.

3.1.5 Public and Community Liaison

Consultation with Gamawela community members took place on the 9th of May 2017 to provided valuable insights into the oral histories of the larger region and heritage sites in the landscape surrounding the project areas.

3.2 Limitations

3.2.1 Access

The Glencore Eastern Mines is accessed from a regional road connecting to the R555 to Steelpoort. A network of mine roads provided access to the respective footprint areas. Strict access control is applied to the premises but no restrictions were encountered during the site visit since access was granted by the management and the author was accompanied by a staff member from the mine.

3.2.2 Visibility

The surrounding vegetation in the study area is mostly comprised of mixed grasslands and scattered trees as well as pioneer species in disturbed and transformed areas. As the HIA site inspections were conducted in late spring and early autumn with prevailing drier climatic conditions (November 2016, May 2017, September 2017), vegetation was sparser which increased surface visibility and site observation (see Figures 3-1 to 3-18). In single cases during the survey sub-surface inspection was possible. Where applied, this revealed no archaeological deposits.

Figure 3-1: General surroundings at the site of the proposed Magareng vent shaft at the time of the survey (November 2016).

Figure 3-2: View of the Borwa (Mototolo South) Mine from the proposed Magareng vent shaft location.

Figure 3-3: View of the Thorncliffe vent shaft location (September 2017).

Figure 3-4: General surroundings at the proposed Helena WRD site (November 2016).

Figure 3-5: View of tree and grass cover at the proposed Helena WRD site.

Figure 3-6: View of the current dumps at the site of the proposed Helena WRD.

Figure 3-7: Disturbed surface areas at the site of the proposed Helena WRD. The Helena Mine is visible in the background.

Figure 3-8: Disturbed surface areas and downflow at the site of the proposed Helena WRD.

Figure 3-9: Pristine vegetation along mountain slopes at the site of the proposed Helena WRD (September 2017).

Figure 3-10: More pristine vegetation on the summit of a small hill at the site of the proposed Helena WRD (September 2017).

Figure 3-11: General surroundings at the site of the proposed Thorncliffe TSF Site Area at the time of the survey (November 2016).

Figure 3-12: View of disturbed areas at the site of the proposed Thorncliffe TSF Site Area.

Figure 3-13: Cleared surfaces at the site of the proposed Thorncliffe TSF Site Area.

Figure 3-14: View of deep erosion gullies and surface excavations at the site of the proposed Thorncliffe TSF Site Area.

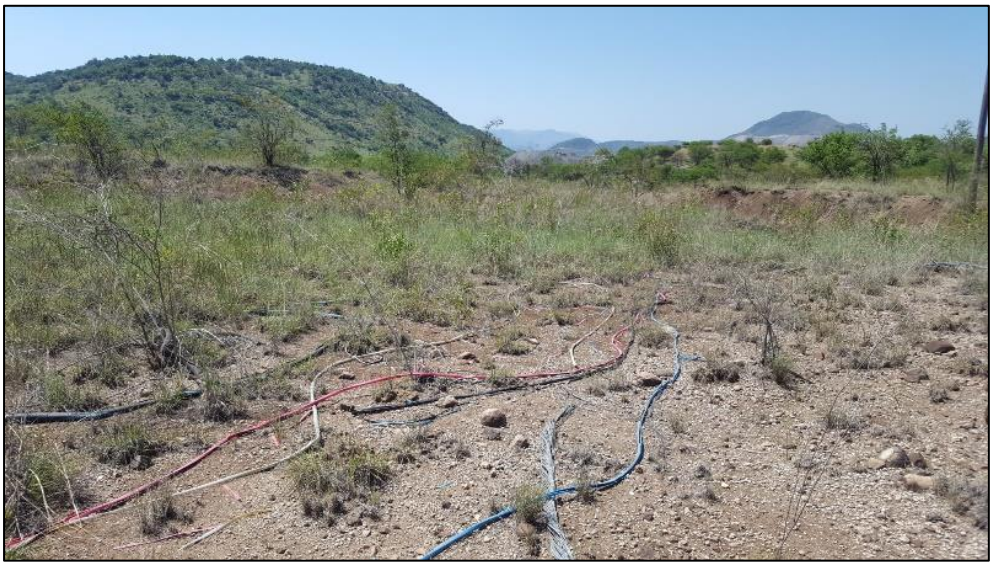

Figure 3-15: View of general surroundings along the eastern border of the proposed Thorncliffe TSF Site Area.

Figure 3-16: View of general surroundings along the south-western periphery of the proposed Thorncliffe TSF Site 2.

Figure 3-17: View of general surroundings along in the proposed Thorncliffe TSF Site 2.

Figure 3-18: Denser vegetation along a drainage line in the proposed Thorncliffe TSF Site 2.

Figure 3-19: High grasses along the western and northern section of the Thorncliffe TSF Site 2.

Figure 3-20: A rock outcrop in the proposed Thorncliffe TSF Site Area.

Figure 3-21: Water runoff pipelines along the eastern periphery of the proposed Thorncliffe TSF Site.

3.2.3 Limitations and Constraints

The foot site survey for the respective Glencore Eastern Mines Expansion footprints primarily focused around areas of potential heritage sensitivity as well as areas of high human settlement catchment probability (for example near drainage lines, in association with vegetation changes or around soil disturbances . The following constraints were encountered:

- **Visibility:** Visibility proved to be a constraint in areas with denser surface cover which was not destroyed by a recent veld fire, as well as portions where vegetation is more pristine.

Thus, even though it might be assumed that survey findings are representative of the heritage landscape of the project area for the Glencore Eastern Mines Expansion Development, it should be stated that the possibility exists that individual sites could be missed due to the localised nature of some heritage remains as well as the possible presence of sub-surface archaeology. Therefore, maintaining due cognisance of the integrity and accuracy of the archaeological survey, it should be stated that the heritage resources

identified during the study do not necessarily represent all the heritage resources present in the project area. The subterranean nature of some archaeological sites, dense vegetation cover and visibility constraints sometimes distort heritage representations and any additional heritage resources located during consequent development phases must be reported to the Heritage Resources Authority or an archaeological specialist.

3.3 Impact Assessment

For consistency among specialists, impact assessment ratings by Exigo Specialists are generally done using the Plomp[1] impact assessment matrix scale supplied by Exigo. According to this matrix scale, each heritage receptor in the study area is given an impact assessment. A cumulative assessment for the proposed project is also included.

4 ARCHAEO-HISTORICAL CONTEXT

4.1 The archaeology of Southern Africa

Archaeology in Southern Africa is typically divided into two main fields of study, the **Stone Age** and the **Iron Age** or **Farmer Period**. The following table provides a concise outline of the chronological sequence of periods, events, cultural groups and material expressions in Southern African pre-history and history.

Table 1 Chronological Periods across Southern Africa

Period	Epoch	Associated cultural groups	Typical Material Expressions
Early Stone Age 2.5m – 250 000 YCE	Pleistocene	Early Hominins: *Australopithecines* *Homo habilis* *Homo erectus*	Typically large stone tools such as hand axes, choppers and cleavers.
Middle Stone Age 250 000 – 25 000 YCE	Pleistocene	First *Homo sapiens* species	Typically smaller stone tools such as scrapers, blades and points.
Late Stone Age 20 000 BC – present	Pleistocene / Holocene	*Homo sapiens sapiens* including San people	Typically small to minute stone tools such as arrow heads, points and bladelets.
Early Iron Age / Early Farmer Period 300 – 900 AD	Holocene	First Bantu-speaking groups	Typically distinct ceramics, bead ware, iron objects, grinding stones.
Middle Iron Age (Mapungubwe / K2) / early Later Farmer Period 900 – 1350 AD	Holocene	Bantu-speaking groups, ancestors of present-day groups	Typically distinct ceramics, bead ware and iron / gold / copper objects, trade goods and grinding stones.
Late Iron Age / Later Farmer Period 1400 AD -1850 AD	Holocene	Various Bantu-speaking groups including Venda, Thonga, Sotho-Tswana and Zulu	Distinct ceramics, grinding stones, iron objects, trade objects, remains of iron smelting activities including iron smelting furnace, iron slag and residue as well as iron ore.
Historical / Colonial Period ±1850 AD – present	Holocene	Various Bantu-speaking groups as well as European farmers, settlers and explorers	Remains of historical structures e.g. homesteads, missionary schools etc. as well as, glass, porcelain, metal and ceramics.

[1] Plomp, H.,2004

4.1.1 The Stone Ages

- **The Earlier Stone Age (ESA)**

The Earlier Stone Age, from between 1.5 million and 250 000 years ago, refers to the earliest that *Homo sapiens sapiens'* predecessors began making stone tools. The earliest stone tool industry was referred to as the Olduwan Industry, originating from stone artefacts recorded at Olduvai Gorge, Tanzania. The Acheulian Industry, the predominant Southern African Early Stone Age Industry, which replaced the Olduwan Industry approximately 1.5 million years ago, is attested to in diverse environments and over wide geographical areas. The hallmark of the Acheulian Industry is its large cutting tools (LCTs or bifaces), primarily handaxes and cleavers. Bifaces emerged in East Africa more than 1.5 million years ago but have been reported from a wide range of areas, from South Africa to northern Europe and from India to the Iberian coast. Earlier Stone Age deposits typically occur on the flood-plains of perennial rivers. These ESA open sites sometimes contain stone tool scatters and manufacturing debris ranging from pebble tool choppers to core tools such as handaxes and cleavers. These groups seldom actively hunted, and relied heavily on the opportunistic scavenging of meat from carnivore kill sites. The most well-known Early Stone Age site in Southern Africa is Amanzi Springs, situated about 10km north-east of Uitenhage, near Port Elizabeth (Deacon 1970). In a series of spring deposits a large number of stone tools were found in situ to a depth of 3-4m. Wood and seed material preserved remarkably very well within the spring deposits, and possibly date to between 800 000 to 250 000 years old.

- **The Middle Stone Age (MSA)**

The Middle Stone Age (MSA) spans a period from 250 000-30 000 years ago and focuses on the emergence of modern humans through the change in technology, behaviour, physical appearance, art and symbolism. Various stone artefact industries occur during this time period, although less is known about the time prior to 120 000 years ago, extensive systemic archaeological research is being conducted on sites across Southern Africa dating within the last 120 000 years (Thompson & Marean 2008). The large handaxes and cleavers were replaced by smaller stone artefacts called the MSA flake and blade industries. Surface scatters of these flake and blade industries occur widespread across Southern Africa although rarely with any associated botanical and faunal remains. It is also common for these stone artefacts to be found between the surface and approximately 50-80cm below ground. Fossil bone may in rare cases be associated with MSA occurrences (Gess 1969). These stone artefacts, like the Earlier Stone Age handaxes are usually observed in secondary context with no other associated archaeological material. The MSA is distinguished from the ESA by the smaller-sized and distinctly different stone artefacts and *chaine operatoire* (method) used in manufacture, the introduction of other types of artefacts and evidence of symbolic behaviour. The prepared core technique was used for the manufacture of the stone artefacts which display a characteristic facetted striking platform and includes mainly unifacial and bifacial flake blades and points. The Howiesons Poort Industry (80 000-55 000 years ago) is distinguished from the other MSA stone artefacts: the size of tools are generally smaller, the range of raw materials include finer-grained rocks such as silcrete, chalcedony, chartz and hornfels, and include segments, backed blades and trapezoids in the stone toolkit which were sometimes hafted (set or glued) onto handles. In addition to stone artefacts, bone was worked into points, possibly hafted, and used as tools for hunting (Deacon & Deacon 1999). Other types of artefacts that have been encountered in archaeological excavations include tick shell beads, the rim pieces of ostrich eggshell (OES) water flasks, ochre-stained pieces of ostrich eggshell and engraved and scratched ochre pieces, as well as the collection of materials for purely aesthetic reasons. The majority of MSA sites occur on flood plains and sometimes in caves and rock shelters. Sites usually consist of large concentrations of knapped stone flakes such as scrapers, points and blades and associated manufacturing debris. Tools may have been hafted but organic materials, such as those used in hafting, seldom remain preserved in the archaeological record. Limited drive-hunting activities are associated with the MSA.

- **The Later Stone Age (LSA)**

The Later Stone Age (LSA) spans the period from about 20 000 years ago until the colonial era, although some communities continue making stone tools today. The period between 30 000 and 20 000 years ago is referred to as the transition from the MSA to LSA; although there is a lack of crucial sites and evidence that represent this change. By the time of the Later Stone Age the genus Homo, in southern Africa, had developed into *Homo sapiens sapiens*, and in Europe, had already replaced *Homo neanderthalensis*. The LSA is marked by a series of technological innovations, new tools and artefacts, the development of economic, political and social systems, and core symbolic beliefs and rituals. The stone toolkits changed over time according to time-specific needs and raw material availability, from smaller microlithic Robberg, Wilton Industries and in between, the larger Albany/Oakhurst and the Kabeljous Industries. Bored stones used as part of digging sticks, grooved stones for sharpening and grinding and stone tools fixed to handles with mastic also become more common. Fishing equipment such as hooks, gorges and sinkers also appear within archaeological excavations. Polished bone tools such as eyed needles, awls, linkshafts and arrowheads also become a more common occurrence. Most importantly bows and arrows revolutionized the hunting economy. It was only within the last 2000 years that earthenware pottery was introduced. Before then tortoiseshell bowls were used for cooking and ostrich eggshell (OES) flasks were used for storing water. Decorative items like ostrich eggshell and marine/fresh water shell beads and pendants were made. Hunting and gathering made up the economic way of life of these communities; therefore, they are normally referred to as hunter-gatherers. Hunter-gatherers hunted both small and large game and gathered edible plant foods from the veld. For those that lived at or close to the coast, marine shellfish and seals and other edible marine resources were available for the gathering. The political system was mainly egalitarian, and socially hunter-gatherers lived in bands of up to twenty people during the scarce resource availability dispersal seasons and aggregated according to kinship relations during the abundant resource availability seasons. Symbolic beliefs and rituals are evidenced by the deliberate burial of the dead and in the rock art paintings and engravings scattered across the Southern African landscape. Sites dating to the LSA are better preserved in rock shelters, although open sites with scatters of mainly stone tools can occur. Well-protected deposits in shelters allow for stable conditions that result in the preservation of organic materials such as wood, bone, hearths, ostrich eggshell beads and even bedding material. By using San (Bushman) ethnographic data a better understanding of this period is possible. South African rock art is also associated with the LSA.

4.1.2 The Iron Age Farmer Period

- **Early Iron Age (Early Farming Communities)**

The Early Iron Age (also Early Farmer Period) marks the movement of Bantu speaking farming communities into South Africa at around 200 A.D. These groups were agro-pastoralists that settled in the vicinity of water in order to provide subsistence for their cattle and crops. Artefact evidence from Early Farmer Period sites is mostly found in the form of ceramic assemblages and the origins and archaeological identities of this period are largely based upon ceramic typologies and sequences, where diagnostic pottery assemblages can be used to infer group identities and to trace movements across the landscape. Early Farmer Period ceramic traditions are classified by some scholars into different “streams” or trends in pot types and decoration that over time emerged in Southern Africa. These “streams” are identified as the Kwale Branch (east), the Nkope Branch (central) and the Kalundu Branch (west). More specifically, in the northern regions of South Africa at least three settlement phases have been distinguished for prehistoric Bantu-speaking agro-pastoralists. The first phase of the Early Iron Age, known as Happy Rest (named after the site where the ceramics were first identified), is representative of the Western Stream of migrations, and dates to AD 400-AD 600. The second phase of Diamant is dated to AD 600-AD 900 and was first recognized at the eponymous site of Diamant in the western Waterberg. The third phase, characterised by herringbone-decorated pottery of the Eiland tradition, is regarded as the final expression of the Early Iron Age (EIA) and occurs over large parts of the North West Province, Northern Province, Gauteng and

Mpumalanga. This phase has been dated to about AD 900-AD 1200. Early Farmer Period ceramics typically display features such as large and prominent inverted rims, large neck areas and fine elaborate decorations. The Early Iron Age continued up to the end of the first millennium AD.

- **Middle Iron Age / K2 Mapungubwe Period (early Later Farming Communities)**

The onset of the middle Iron Age dates back to ±900 AD, a period more commonly known as the Mapungubwe / K2 phase. These names refer to the well-known archaeological sites that are today the pinnacle of South Africa's Iron Age heritage. The inhabitants of K2 and Mapungubwe, situated on the banks of the Limpopo, were agriculturalists and pastoralists and were engaged in extensive trade activities with local and foreign traders. Although the identity of this Bantu-speaking group remains a point of contestation, the Mapungubwe people were the first state-organized society Southern Africa has known. A considerable amount of golden objects, ivory, beads (glass and gold), trade goods and clay figurines as well as large amounts of potsherds were found at these sites and also appear in sites dating back to this phase of the Iron Age. Ceramics of this tradition take the form of beakers with upright sides and decorations around the base (K2) and shallow-shouldered bowls with decorations as well as globular pots with long necks. (Mapungubwe). The site of Mapungubwe was deserted at around 1250 AD and this also marks the relative conclusion of this phase of the Iron Age.

- **Later Iron Age (Later Farming Communities)**

The late Iron Age of Southern Africa marks the grouping of Bantu speaking groups into different cultural units. It also signals one of the most influential events of the second millennium AD in Southern Africa, the difaqane. The difaqane (also known as "the scattering") brought about a dramatic and sudden ending to centuries of stable society in Southern Africa. Reasons for this change was essentially the first penetration of the Southern African interior by Portuguese traders, military conquests by various Bantu speaking groups primarily the ambitious Zulu King Shaka and the beginning of industrial developments in South Africa. Different cultural groups were scattered over large areas of the interior. These groups conveyed with them their customs that in the archaeological record manifest in ceramics, beads and other artefacts. This means that distinct pottery typologies can be found in the different late Iron Age groups of South Africa.

- **Bantu Speaking Groups in the South African interior**

It should be noted that terms such as "Nguni", "Sotho", "Venda" and others refer to broad and comprehensive language groups that demonstrated similarities in their origins and language. It does not imply that these Nguni / Sotho groups were homogeneous and static; they rather moved through the landscape and influenced each other in continuous processes marked by cultural fluidity.

Ethnographers generally divide major Bantu-speaking groups of Southern Africa into two broad linguistic groups, the Nguni and the Sotho with smaller subdivisions under these two main groups. Nguni groups were found in the eastern parts of the interior of South Africa and can be divided into the northern Nguni and the southern Nguni. The various Zulu and Swazi groups were generally associated with the northern Nguni whereas the southern Nguni comprised the Xhosa, Mpondo, Thembu and Mpondomise groups. The same geographically based divisions exist among Sotho groups where, under the western Sotho (or Tswana), groups such as the Rolong, Hurutshe, Kwena, Fokeng and Kgatla are found. The northern Sotho included the Pedi and amalgamation of smaller groups united to become the southern Sotho group or the Basutho. Other smaller language groups such as the Venda, Lemba and Tshonga Shangana transpired outside these major entities but as time progressed they were, however to lesser or greater extend influenced and absorbed by neighbouring groups.

4.1.3 Pastoralism and the last 2000 years

Until 2000 years ago hunter-gatherer communities traded, exchanged goods, encountered and interacted with other hunter-gatherer communities. From about 2000 years ago the social dynamics of the Southern

African landscape started changing with the immigration of two 'other' groups of people, different in physique, political, economic and social systems, beliefs and rituals. One of these groups, the Khoekhoe pastoralists or herders entered Southern Africa with domestic animals, namely fat-tailed sheep and goats, travelling through the south towards the coast. They also introduced thin-walled pottery common in the interior and along the coastal regions of Southern Africa. Their economic systems were directed by the accumulation of wealth in domestic stock numbers and their political make-up was more hierarchical than that of the hunter-gatherers.

4.1.4 Historical and Colonial Times and Recent History

The Historical period in Southern Africa encompass the course of Europe's discovery of South Africa and the spreading of European settlements along the East Coast and subsequently into the interior. In addition, the formation stages of this period are marked by the large scale movements of various Bantu-speaking groups in the interior of South Africa, which profoundly influenced the course of European settlement. Finally, the final retreat of the San and Khoekhoen groups into their present-day living areas also occurred in the Historical period in Southern Africa.

4.2 The Steelpoort Landscape: Specific Themes.

The history of the Steelpoort is reflected in a rich archaeological landscape, mostly dominated by Stone Age and Iron Age Farmer occurrences. Numerous sites, documenting Earlier, Middle and Later Stone Age habitation occur across the province, mostly in open air locales or in sediments alongside rivers or pans. In addition, a wealth of Iron Age sites is to be found in the larger landscape. These sites occur on hilltops, slopes, rock outcrops and occasionally in river beds. Moving into recent times, the archaeological record reflects the development of a rich colonial frontier, characterised by, amongst others, a complex industrial archaeological landscape such as mining developments, which herald the modern era in South African history.

4.2.1 The Stone Ages

Human habitation of the Steelpoort area dates back as far as the earlier Stone Age. One of the more important sites, known as Bushman Rock Shelter, is located at Echo Caves north of Ohrigstad. Early humans lived here for thousands of years from the Early Stone Age, through what is known as the Middle Stone Age and well into the Late Stone Age. The majority of Stone Age finds are classified as isolated surface occurrences, and mostly date to the Middle Stone Age. The location of Stone Age scatters in the area corresponds with a general Stone Age site distribution pattern where Stone Age archaeological sites in the landscape occur near water sources close to local sources of rare raw materials in lithic manufacture. From the deposition pattern and stratigraphy as observed in erosion gullies in this area, it is clear that the lithic scatters occur mainly as multiple horizons within a calcrete formation. In addition, an ephemeral surface overlay of Later Stone Age (LSA) artefacts produced on a variety of raw materials occurs in places. These materials are mostly of igneous origin, and predominantly fine-grained Cryptocrystalline Silicas (CCS) including quartzes, chalcedony, agates and mudstones, but also fine-grained dolerite and banded ironstone. Distinct production technologies were used to manufacture a range of specific tool types, resulting in characteristic features and attributes. Typical MSA tool types comprise blades, convergent flakes and backed formal tools. The latter tool types are mostly unifacial and bifacial points, knives, a variety of scrapers and also perforating tools (Thackeray 1992: Wadley 2005; Soriano et al 2007). The evidence for stages of lithic reduction, as observed in the dongas at Lesego points to some primary deposition and site integrity. However, only an in-depth technological study will identify a chain(s) of knapping operations, which can inform on such aspects, and also whether there are differences in

knapping operations that may indicate chronological periods, e.g. early or final MSA depositions (Wadley 2001:216).

4.2.2 The Iron Age / Farmer Period

Iron Age people moved into southern Africa by c. AD 200, entering the area either by moving down the coastal plains, or by using a more central route. It seems more likely that the first option was what brought people into the Steelpoort area. From the coast they followed the various rivers inland. Being cultivators, they preferred rich alluvial soils. One of the earliest dated Iron Age sites is located near Tzaneen (Silver Leaves). Iron Age occupation of the larger Steelpoort area seems to have taken place on a significant scale and of note is the Doornkop phase of the Early Iron Age. A thousand years ago this large and sophisticated community existed for hundreds of years in the Steelpoort area. Known to archaeologists as the "Doornkop phase" (named after the type site) of the Earlier Iron Age, these people are well-known for the extraordinary clay masks they produced, some of which was found on a site near Lydenburg. These settlements seem to have been followed at a slightly later date by settlements linked to the "Eiland Phase" of the EIA (c. AD 1000) which lasted well into the second millennium AD. Early Iron Age sites are generally our only source of evidence for the occupation of the area by early farming communities. As such these sites are important and they are viewed to have medium to high significance.

The last period of pre-colonial occupation consisted of Pedi-, Swazi- and Ndebele-speaking people that settled on terraced sites at the foot on the mountains. A single decorated potsherd from Site IA5 displays motives similar to that of the Maloko ceramic tradition, which can be broadly associated with some of these groups. The last 500 years in the area were characterised by population movements, conflict, contact and change which largely resulted in the current population and demographic distribution in the area today. The resonance of these sites in contemporary history generally deems them of medium significance.

4.2.3 Later History and Colonial Period

The Historical / Colonial Period in the Steelpoort area commenced roughly in the early 19th century with the arrival of the first white settlers. After negotiations between the Voortrekkers and the Pedi, the Steelpoort River was set as border between the groups. However, tension soon followed which rapidly resulted to armed conflict, notably the so-called Sekhukhune Wars (1876, 1879) if which remnants are still to be found in the larger geographical region. Later, during the so-called Mapoch Wars (1863, 1883) resulting land-ownership conflicts were contested. In later years, farms were proclaimed, most of which were used only for winter grazing. This was followed by a period when farmsteads and road infrastructure developed. In recent years, the substantial mineral wealth of the area was realised, primarily resulting from seminal work by geologist Hans Merensky.

The farm De Grootboom and other farms in the area were proclaimed in 1890.

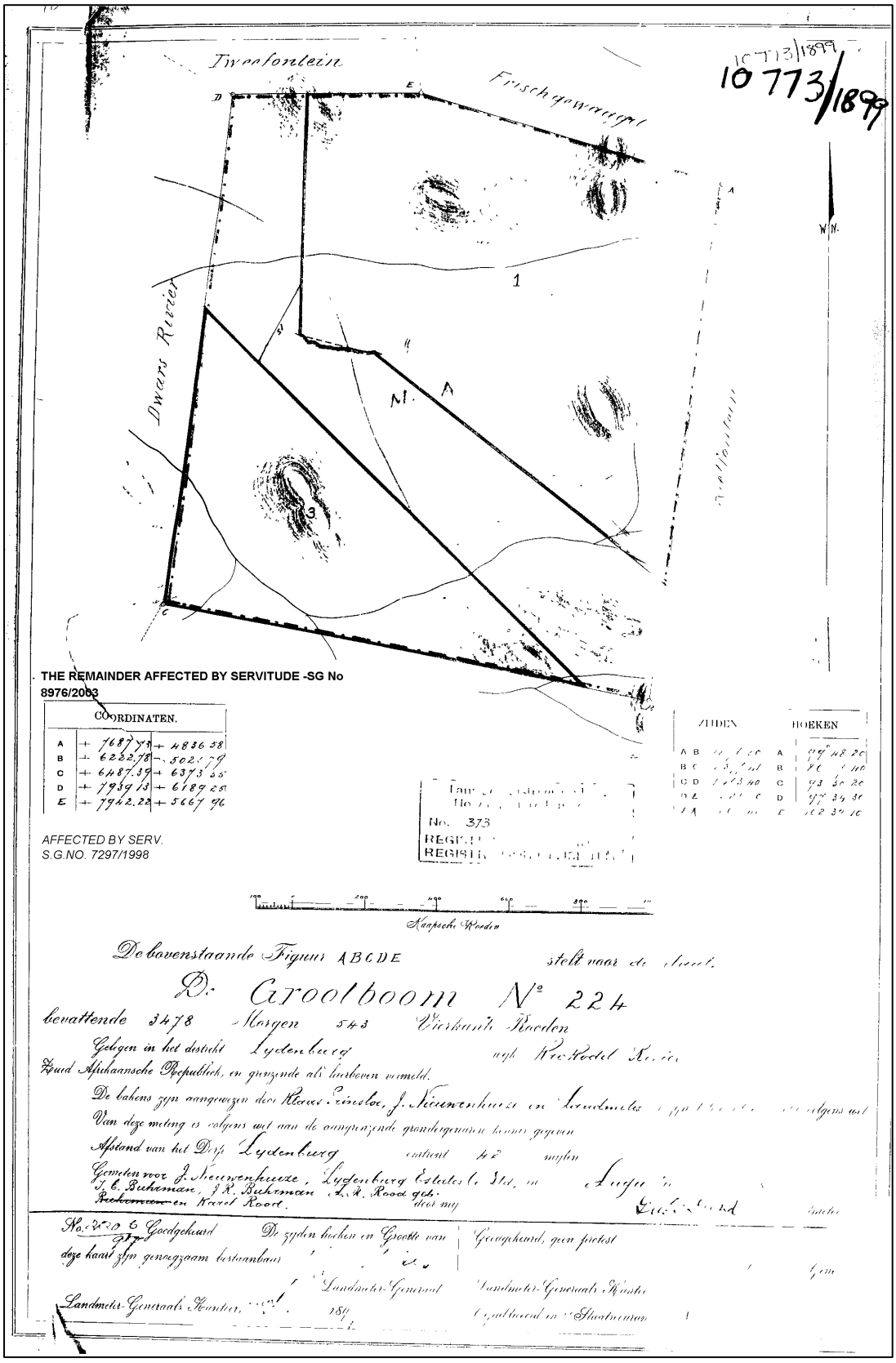

Figure 4-1: The original title deed for the farm De Grootboom c. 1890.

4.2.4 A History and Heritage of the Gamawela Community[2]

Gamawela is situated in the Klein Dwars River valley, known traditionally as Molototsi. The Dwars River ("Moletsi"), is itself a tributary of the Steelpoort ("Tubatse") River, which is a major tributary of the Olifants ("Lepelle") River. The Gamawela community is typical of many of the communities removed from farms in the Lydenburg District of the former Transvaal Province in the period between the 1950s and 1970s. The members of the community are scattered among various settlements and tribal authorities, including Maseven (Magolego), Ngwaabe (Rantho), GaMasha (Masha Nkotwane), Strydkraal (Masha), Mare-Ngwarits

The Gamawela community is one of many groups that moved into the area known as the Lydenburg district in previous centuries, migrating between different places depending on external factors such as climate, conflicts and even wars. According to the oral history of the community, the Bakone Ba Mankge group moved into area known as Gamawela in the early 1800s, and established itself under its Chief ("kgoshi") Marobele, the father of Mapale who succeeded Marobele as a chief. The community was comprised of a number of clans (dikgoro), including Mashilangoako, Lelengoa, Leshaba, Maredi and Magane. The Gamawela area was divided up among these clans, and the affairs of the community were administered accordingly. The land was allocated by the tribal council (moshate) under the leadership of the Bakone ba Mankge, and these practices continued until the final dispossession of the community. The white farmers gave some recognition to this situation in earlier days, and would consult with the kgoshi on certain decisions on land use, including the allocation of fields to new households moving on to the farm from outside. The moshate practiced a system of traditional law under which matters were first dealt with at clan level, and then referred to the moshate, which would refer unresolved matters further to the Kingdom of Sekhukhune for adjudication. The community was known for its powers as rainmakers, and was consulted on such matters by the Kingdom of Sekhukhune.

The Gamawela community lived on the land by grazing their cattle, goats and sheep in the valleys and mountains of the area. They also ploughed their fields twice in the year, producing, maize, sorghum (mabele), wheat, potatoes, sweet potatoes and varieties of indigenous beans. The community also kept pigs and chickens on the farm. The social lives of the members of the community was typical of communities in the area, celebrating marriages, coming of age (initiation), births, rain and harvest. Events were also held to mourn deaths. A number of rituals were conducted, including grave cleaning and intercessions for good luck and for keeping the ancestors alive within the community. Initiation was carried out on the farm and the remains of the initiation sites (mphato) can be seen on the farm. The Mankge community was respected for their knowledge of various ailments and traditional medicines. People came to the community seeking remedies obtained in the mountains and valleys of the area which provide a diverse habitat for a number of medicinal plants and wild fruits. The Gamawela community was self-sufficient in many ways and there was active trading amongst communities in the area, for tools, craft materials and medicinal herbs. The valley has a rare type of river reed for making grain baskets and the community weaved for themselves and to trade with other communities in the area. As was typical of the communities living in the area before occupation of the land by white settlers, the community built furrows along the valleys to irrigate their crops. The last white farmer (van den Berg) was still using the old furrow system to channel water from the various streams to the storage dams for irrigation. During the period while the community members were labour tenants on the property, the farmers used their labour to plant and harvest crops including, tobacco, sweet potatoes, maize, wheat and soya beans. After the development of the Witwatersrand gold mines, members of the community began to migrate to urban centres to earn wages, some of which were sent as remittances to the families at Ga Mawela.

[2] This section was, for the largest part adapted from a document "The History of the Gamawela Community" published online. The author of the document could not be verified and, even though general information therein correlates with known regional histories pertaining to this part of Sekhukhune, its contents should not be read uncritically.

According to local folklore, a number of sites of sacred importance to the community exist on the farm St George. These sites are said to include a sacred cave, mountain pools and rivers. In addition, there are remains on the farm of the kraals used by the community to keep livestock, as well as the places used for grinding grains.

Figure 4-2: View of the Gamawela Caves on the farm St Georges.

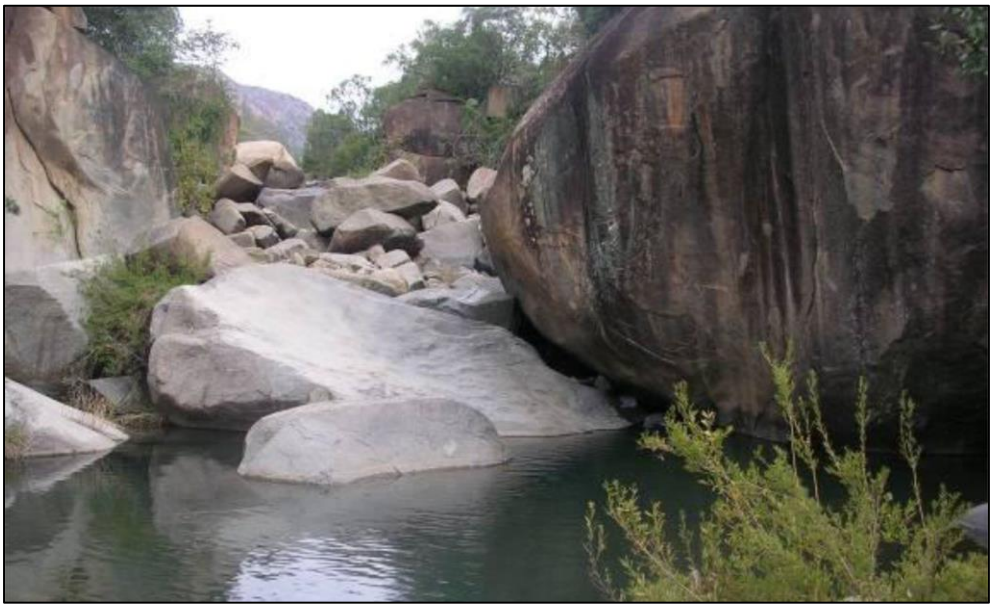

Figure 4-3: Rock pools in the landscape are said to hold cultural meaning to local communities.

5 RESULTS: ARCHAEOLOGICAL SURVEY

The history and archaeology of the larger Sekhukhune region around Steelpoort is primarily well known for the occurrence of Stone Age and Iron Age farmer occurrences where archaeological sites, dating from the Early Iron Age (800AD) to the Pedi occupation are prevalent in the area. This is most probably due to the safety the valley offered from outside attacks, but also as a result of the deep and rich sedimentary soils of the lowlying area. It is also of historical importance due to the activities of the Berlin Missionary Society who entered the area in the time of Chief Sekwati. Similar, a number of sites of heritage potential were noted, specifically in the footprint for the proposed Thorncliffe TSF. The absence of heritage sites in other areas might be attributed to the fact that the surroundings at the Glencore Eastern Mines have been transformed throughout by mining, prospecting and related infrastructure developments. Heritage resources identified during this study were uniquely coded **EXIGO-GTT-IAxx** (Exigo Glencore Thorncliffe Iron Age Site xx), **EXIGO-GTT-HPxx** (Exigo Glencore Thorncliffe Historical Period Site xx), **EXIGO-GTT-BPxx** (Exigo Glencore Thorncliffe Tailings Burial Site xx) and **EXIGO-GTT-FTxx** (Exigo Glencore Thorncliffe Tailings Feature xx).

5.1 The Stone Age

Stone Age material generally occurs along drainage lines and exposed surfaces in the landscape. However, no stone tools or associated material culture or evidence of any factory or workshop site were found in the project areas.

5.2 The Iron Age Farmer Period

A frontier zone between the north and the south, the Steelpoort landscape is rich in precolonial Iron Age Farmer Period remnants. The site inspection produced two areas with probable Iron Age farmer signatures.

- **Site EXIGO-GTT-IA01**
  S24.97301° E30.11529°

A small Iron Age occupation site consisting out of the foundations of crude stone wall structures occurs on a ridge south-west of the Thorncliffe TSF Site. The structures, which extends for about 5m are poorly preserved but material culture associated with Iron Age farmer occupation such as undecorated potshards and lower grindstones were noted at the site. The site might be significance in terms of its regional representation in the Iron Age farmer period landscape of the area and it is rated as of medium significance. The site occurs approximately 400m west of the proposed Thorncliffe TSF site and no direct impact on the site is expected.

Figure 5-1: Undecorated potsherds on the surface at Site EXIGO-GTT-IA01.

Figure 5-2: A crude stone wall structure at Site EXIGO-GTT-IA01.

Figure 5-3: A lower grindstone from Site EXIGO-GTT-IA01.

- **Site EXIGO-GTT-IA02**
  S24.97042° E30.11906°

Another Iron Age occupation site occurs on a small ridge between two large rock faces along the western boundary of the Thorncliffe TSF Site. At the site, a number of grinding hollows occur on the surrounding rock faces. In addition, stone wall structures, and specifically a circular enclosure occur at the site. The structures are poorly preserved and associated Iron Age farmer Period material culture is largely absent from the site. However, the site might be of significance in terms of its regional representation in the Iron Age farmer period landscape of the area and it is rated as of medium significance. The site occurs in close proximity of the proposed Thorncliffe TSF site and unmitigated impact on the site is expected to be peripheral.

Figure 5-4: View of grinding hollows in a large rock face at Site EXIGO-GTT-IA02.

Figure 5-5: A circular stonewall structure at Site EXIGO-GTT-IA02.

Figure 5-6: View of general surroundings at Site EXIGO-GTT-IA02.

5.3 Colonial Period and recent times

European and local farming communities settled in the Steelpoort during the Colonial Period in the last century. A possible Colonial Period occurrence was observed in the project area.

- **Site EXIGO-GTT-HP01**
  S24.973634°° E30.124959°

A possible Historical Period occupation site was documented along the south-easer border of the proposed TSF site. Here, a number rough stone wall features constructed out of stones of varying sizes were noted under a number of Euphorbia trees. The presence of clusters of *Euphorbia candelabrum* trees is usually a good indicator of archaeological sites since these trees grows well in acidic and disturbed soils. In addition, a broken lower grindstone as well as enamel artefacts was noted in association with the stone structures. A temporal context for the site is not known but its proximity to the two recent Historical Period cemeteries (Site EXIGO-GTT-BP03 and Site EXIGO-GTT-BP04) and the presence of household remains might imply a Colonial Period occupation of the site. The general preservation of the site is poor and no material culture deposits in ash heaps were noted. The site, which is of low heritage significance due to its poor preservation and the general absence of further diagnostic material culture site context, occurs within the proposed Thorncliffe TSF site and unmitigated impact on the site is expected to be direct.

Figure 5-7: A stone structure under a Euphorbia Tree at Site EXIGO-GTT-HP01.

Figure 5-8: A broken lower grindstone noted at Site EXIGO-GTT-HP01.

Figure 5-9: Irregular stone structures at Site EXIGO-GTT-HP01.

5.4 Other Features / Sites

- **Site EXIGO-GTT-FT01**
  S24.97225° E30.12181°

A stone wall foundation structure extends for approximately 10m from east to west near deep erosion gullies along a western section of the TSF site. The feature was constructed out of locally sourced round stones of varying sizes. No material culture or surface artefact occurrences were noted in association with the structure. As such, a temporal context, function or provenience for the site is not known but, considering the absence of settlement or household remains the wall probably formed part of a livestock enclosure in previous centuries. The general preservation of the feature and its structural integrity is poor due to site disturbances as well as deterioration due to natural processes. The site, which is of low heritage significance due to its poor preservation and the general absence of site context, occurs within the proposed Thorncliffe TSF site and unmitigated impact on the site is expected to be direct.

Figure 5-10: The remains of a stone wall foundation structure in the Thorncliffe TSF project area at Site EXIGO-GTT-FT01.

- **Site EXIGO-GTT-FT02**
  S24.97269° E30.12076°
- **Site EXIGO-GTT-FT03**
  S24.96793° E30.11866°

Another stone wall structure, as well as a stone heap occurs in a central and western section of the TSF sites. The stone wall extends for approximately 15m from north to south and it was constructed out of locally sourced round stones of varying sizes. The stone heap measures approximately 1m x 1m. No material culture or surface artefact occurrences were noted in association with either of the structures. As such, a temporal context, function or provenience for the sites is not known but, considering the absence of settlement or household remains the wall probably formed part of livestock enclosures. The general preservation of the features is poor due to site disturbances as well as deterioration due to natural processes. The sites, which are of low heritage significance due to its poor preservation and the general absence of site context, occur within the proposed Thorncliffe TSF site and unmitigated impact on the sites is expected to be direct.

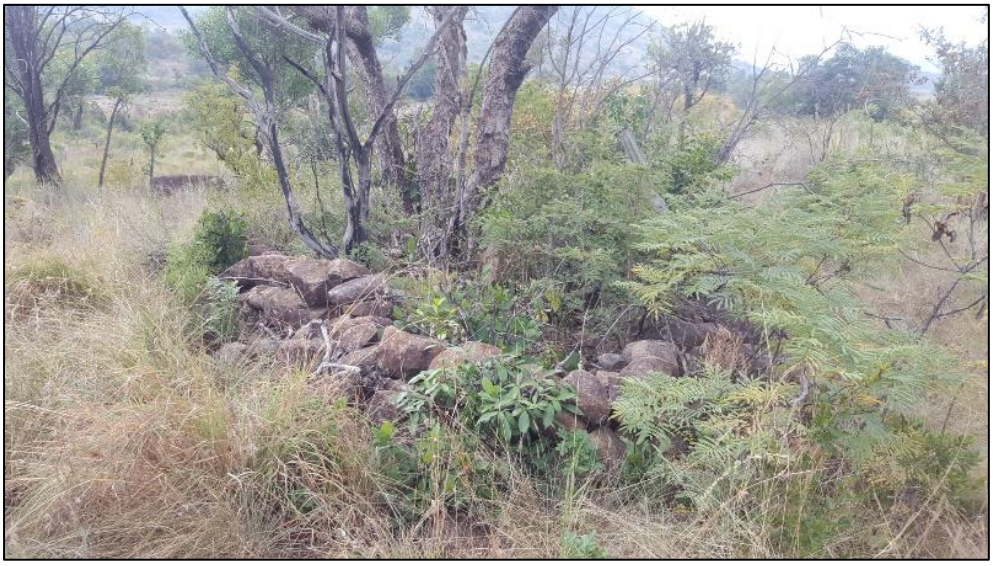

Figure 5-11: The remains of a stone wall structure at Site EXIGO-GTT-FT02.

Figure 5-12: A small stone heap / cairn at Site EXIGO-GTT-FT03.

5.5 Graves

At least 3 burial sites were located in the study area at the Thorncliffe TSF site. The burial places hold various numbers of graves, a number of which are older than 60 years or unmarked. In the rural areas of the Limpopo Province graves and cemeteries often occur within settlements or around homesteads but they are also randomly scattered around archaeological and historical settlements. The probability of additional and informal human burials encountered during development should thus not be excluded. In addition, human remains and burials are commonly found close to archaeological sites; they may be found in "lost" graveyards, or occur sporadically anywhere as a result of prehistoric activity, victims of conflict or crime. It is often difficult to detect the presence of archaeological human remains on the landscape as these burials, in most cases, are not marked at the surface.

- **Site EXIGO-GTT-BP01**
  S24.97169° E30.12185°

An informal cemetery containing at least 5 graves occurs along a slightly elevated embankment along the western section of the Thorncliffe TSF site. The graves, which are placed in an east-west orientation, are

marked by elongated and rectangular stone structures with one of the graves bearing an inscribed concrete headstone. The following text is visible in faded paint on this headstone:

Kadi 1970

Segopotso

Samagorena

Kekolwa ba Motebele

Other grave structures are filled in with soil and marked with monotliths as headstones. Material culture such as tin beakers, snuff boxes, glass containers and enamel metal objects were noted on the surface in association with some of the graves. The site is not maintained but a rusted metal shovel, probably used to clean the cemetery, was left hanging in a tree at the site and this might indicate that site maintenance of the site did occur at some point. In addition a dilapidated wire fence with large posts partially enclosure the cemetery. As such, the condition and preservation of the site is generally poor. The burial site, which is of high heritage significance, occurs within the proposed Thorncliffe TSF site and unmitigated impact on the site is expected to be direct.

Figure 5-13: View of a small graveyard in the Thorncliffe TSF project area at Site EXIGO-GTT-BP01.

Figure 5-14: A marked grave at Site EXIGO-GTT-BP01.

Figure 5-15: A rusted shovel fixed to a tree at Site EXIGO-GTT-BP01. The shovel was probably used to clear the graveyard in past years.

- **Site EXIGO-GTT-BP02**
  S24.97354° E30.12203°

An elongated stone cairn, closely resembling a human burial occurs along a slightly elevated embankment along the south western section of the Thorncliffe TSF site. The structure, which is not placed in a definite orientation, is marked by a stone rectangle which is filled in with soil. No material was noted on the surface in association with the feature. The condition and preservation of the site is generally poor and it is clearly not maintained on any way. The assumed burial site, which is of high heritage significance, occurs within the proposed Thorncliffe TSF site and unmitigated impact on the site is expected to be direct.

Figure 5-16: View of a square stone structure resembling a human burial at Site EXIGO-GTT-BP02.

- **Site EXIGO-GTT-BP03**
  S24.97416° E30.12441°

Another small informal cemetery containing at least 6 graves occurs in a densely vegetated area south-eastern periphery of the Thorncliffe TSF Site 2. The graves, which are placed in an east-west orientation, are marked either by elongated or rectangular stone structures, or rectangular brick casings. A number of burials bear inscribed concrete headstones. The following text is partially visible in faded paint on these

headstones:

Abram Mamonyane

Born on 1911

Died 6-11-1991 (?)

Buried 16-11-1991 (?)

Amos Choma (?)

1945-10-5

8-5-1956 (?)

Other grave structures are filled in with soil and marked with prefabricated plastic and metal crosses as headstones. Material culture such as clay pots, snuff boxes, glass containers and enamel metal objects were noted on the surface in association with some of the graves. The site is not maintained but a relatively intact wire fence with entrance gate encloses the cemetery. The condition and preservation of the site is generally fair. The burial site, which is of high heritage significance, occurs within the proposed Thorncliffe TSF site and unmitigated impact on the site is expected to be direct.

Figure 5-17: The entrance gate to a small graveyard at Site EXIGO-GTT-BP03.

Figure 5-18: View of a small graveyard in the Thorncliffe TSF project area at Site EXIGO-GTT-BP03.

Figure 5-19: A marked concrete headstone on a burial at Site EXIGO-GTT-BP03.

- **Site EXIGO-GTT-BP04**
  S24.974087° E30.125441°

A poorly preserved burial site containing at least 1 grave were noted close to Site EXIGO-GTT-BP03 outside of the south-eastern periphery of the Thorncliffe TSF Site. At the site, a concrete headstone of a grave occurs in displaced context where it was found upside down. The headstone bears a hand written inscription with the following text partially visible:

Magolesha

bA 1967,12,8 (?)

Material culture such as snuff boxes, glass containers and enamel metal objects were noted on the surface in association with the grave. The site is not maintained but the wooden posts of a fence remain at the site. The condition and preservation of the site is poor. The burial site, which is of high heritage significance, occurs approximately 30m from the proposed Thorncliffe TSF site border and unmitigated impact on the site is expected to peripheral.

Figure 5-20: A displaced concrete headstone at Site EXIGO-GTT-BP04.

Figure 5-21: Enamel artefacts noted on the surface at the burial at Site EXIGO-GTT-BP04.

5.6 Living Heritage

- **Gamawela Cave Site (refer to Figure 2-2)**
  S25.01160° E30.07370° (relative location in order to avoid unauthorized access)

As noted previously, the Gamawela community expresses a direct and pronounced cultural and social connection with the landscape around the Thorncliffe mine, specifically on the farm St Georges and it is to be expected that a number of sites of heritage and cultural meaning remain in the area. As a consequence, portions of this farm were returned to the community after a successful land repatriation process. A site of particular significance to the Gamawela community is the Gamawela Cave Site, situated in a deep valley on the farm St George 2 JT. According to local knowledge, this cave was used as shelter in times of warfare and later acted as ceremonial centre for local communities. To this day, members of the Gamawela community visit the site for ritual purposes.

Figure 5-22: View of the Gamawela Cave site and the surrounding landscape.

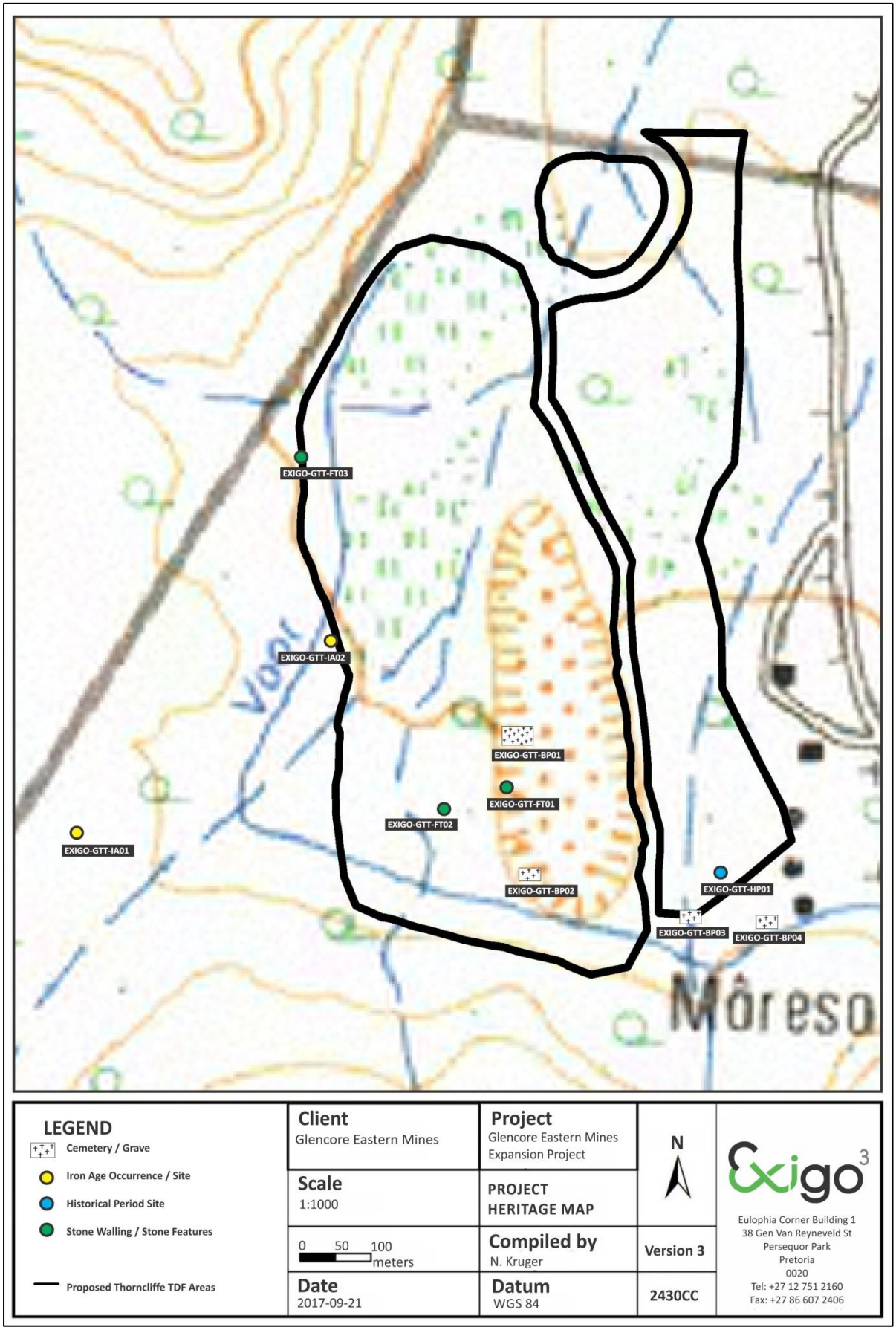

Figure 5-24: Topographic map indicating the locations of all heritage occurrences discussed in the text.

6 RESULTS: STATEMENT OF SIGNIFICANCE AND IMPACT RATING

6.1 Potential Impacts and Significance Ratings[3]

The following section provides a background to the identification and assessment of possible impacts and alternatives, as well as a range of risk situations and scenarios commonly associated with heritage resources management. A guideline for the rating of impacts and recommendation of management actions for areas of heritage potential within the study area is supplied in Section 10.2 of the Addendum.

6.1.1 General assessment of impacts on resources

Generally, the value and significance of archaeological and other heritage sites might be impacted on by any activity that would result immediately or in the future in the destruction, damage, excavation, alteration, removal or collection from its original position, any archaeological material or object (as indicated in the National Heritage Resources Act (No 25 of 1999)). Thus, the destructive impacts that are possible in terms of heritage resources would tend to be direct, once-off events occurring during the initial construction period. However, in the long run, the proximity of operations in any given area could result in secondary indirect impacts. The EIA process therefore specifies impact assessment criteria which can be utilised from the perspective of a heritage specialist study which elucidates the overall extent of impacts.

6.1.2 Direct impact rating

Direct or primary effects on heritage resources occur at the same time and in the same space as the activity, e.g. loss of historical fabric through demolition work. **Indirect effects or secondary effects** on heritage resources occur later in time or at a different place from the causal activity, or as a result of a complex pathway, e.g. restriction of access to a heritage resource resulting in the gradual erosion of its significance, which is dependent on ritual patterns of access (refer to Section 10.3 in the Addendum for an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected).

Heritage receptors were found in the project area and potential impact to heritage resources is foreseen.

The following table summarizes impacts to heritage features located within and around the footprints of the proposed Glencore Eastern Mines Expansion Development: **(Site EXIGO-GTT-FT01, Site EXIGO-GTT-FT02**, **Site EXIGO-GTT-FT03)**.

Key to Scoring of Impacts:

Probability: This describes the likelihood of the impact actually occurring.	
Improbable	The possibility of the impact occurring is very low, due to the circumstances, design or experience.
Probable	There is a probability that the impact will occur to the extent that provision must be made therefore.
Highly Probable	It is most likely that the impact will occur at some stage of the development.
Definite	The impact will take place regardless of any prevention plans, and there can only be relied on mitigatory actions or contingency plans to contain the effect.

[3] Based on: W inter, S. & Baumann, N. 2005. *Guideline for involving heritage specialists in EIA processes: Edition 1.*

Duration: The lifetime of the impact	
Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a time span shorter than any of the phases.
Medium term	The impact will last up to the end of the phases, where after it will be negated.
Long term	The impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.
Permanent	Impact that will be non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient.
Scale: The physical and spatial size of the impact	
Local	The impacted area extends only as far as the activity, e.g. footprint
Site	The impact could affect the whole, or a measurable portion of the above mentioned properties.
Regional	The impact could affect the area including the neighbouring residential areas.
Magnitude/ Severity: Does the impact destroy the environment, or alter its function.	
Low	The impact alters the affected environment in such a way that natural processes are not affected.
Medium	The affected environment is altered, but functions and processes continue in a modified way.
High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
Significance: This is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.	
Negligible	The impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.
Low	The impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.
Moderate	The impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.
High	The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in mitigation.
Mitigation Effect:Degree to which the impact can be managed following mitigation	
Can be reversed	Can be avoided, managed or mitigated in such a way that natural processes are not affected and returned to natural state
Can be avoided, managed or mitigated	Can be avoided, managed or mitigated to the degree that functions and processes continue in a modified way)
May cause irreplaceable loss of resources	Irreversible impact (may cause irreplaceable loss of resources). Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

Nr	Activity	Impact	Without or With Mitigation	Nature (Negative or Positive Impact)	Probability		Duration		Scale		Magnitude/ Severity		Significance		Mitigtion Measures	Mitigation Effect
					Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Score	Magnitude		
Planning Phase																
1	Planning	**Site EXIGO-GTT-IA01 (medium significance) Site EXIGO-GTT-IA01 (medium significance)**	**WOM**	**Negative**	Improbable	1	Short term	4	Local	1	Low	2	7	Negligible	Site Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Short term	1	Local	1	Low	2	4	Negligible	Site Monitoring	Can be avoided, managed or mitigated
2	Planning	**Site EXIGO-GTT-HP01 (low significance)**	**WOM**	**Negative**	Improbable	1	Short term	1	Local	1	Medium	6	8	Negligible	Site Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Short term	1	Local	1	Low	2	4	Negligible	Site Monitoring	Can be avoided, managed or mitigated
3	Planning	**Site EXIGO-GTT-FT01 (low significance) Site EXIGO-GTT-FT02 (low significance) Site EXIGO-GTT-FT03 (low significance) Site EXIGO-GTT-FT04 (low significance)**	**WOM**	**Negative**	Improbable	1	Short term	1	Local	1	Low	2	4	Negligible	Site Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Short term	1	Local	1	High	8	10	Negligible	Site Monitoring	Can be avoided, managed or mitigated
4	Planning	**Site EXIGO-GTT-BP01 (high significance) Site EXIGO-GTT-BP02 (highsignificance) Site EXIGO-GTT-BP03 (highsignificance) Site EXIGO-GTT-BP04 (highsignificance)**	**WOM**	**Negative**	Improbable	1	Short term	1	Local	1	Low	2	4	Negligible	Site Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Short term	1	Local	1	High	8	10	Negligible	Site Monitoring	Can be avoided, managed or mitigated
Construction Phase																
5	Construction / Clearing	**Site EXIGO-GTT-IA01 (medium significance) Site EXIGO-GTT-IA01 (medium significance)**	**WOM**	**Negative**	Definite	2	Permanent	3	Site	1	Medium	6	20	Negligible	Avoidance, Phase 2 Study and Sampling	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Short term	1	Site	2	Low	2	5	Negligible	Avoidance, Phase 2 Study and Sampling	Can be avoided, managed or mitigated
6	Construction / Clearing	**Site EXIGO-GTT-HP01 (low significance)**	**WOM**	**Negative**	Highly Probable	5	Permanent	5	Local	1	Low	2	40	Low	Site Monitoring, Destruction Permitting	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Short term	1	Site	2	Low	2	5	Negligible	Site Monitoring, Destruction Permitting	Can be avoided, managed or mitigated
7	Construction / Clearing	**Site EXIGO-GTT-FT01 (low significance) Site EXIGO-GTT-FT02 (low significance) Site EXIGO-GTT-FT03 (low significance)**	**WOM**	**Negative**	Definite	5	Short term	5	Local	1	Low	2	40	Low	Site Monitoring, Destruction Permitting	Can be avoided, managed or mitigated

		Site EXIGO-GTT-FT04 (low significance)	**WM**	**Positive**	Improbable	1	Short term	1	Local	1	Low	2	4	Negligible	Site Monitoring, Destruction Permitting	Can be avoided, managed or mitigated
8	Planning	**Site EXIGO-GTT-BP01 (high significance) Site EXIGO-GTT-BP02 (high significance) Site EXIGO-GTT-BP03 (high significance) Site EXIGO-GTT-BP04 (high significance)**	**WOM**	**Negative**	Definite	5	Permanent	5	Site	2	High	8	75	High	Avoidance, Grave Relocation, Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Short term	1	Local	1	High	8	10	Negligible	Avoidance, Grave Relocation, Monitoring	Can be avoided, managed or mitigated
Operation Phase																
9	Mining / Processing	**Site EXIGO-GTT-IA01 (medium significance) Site EXIGO-GTT-IA01 (medium significance)**	**WOM**	**Negative**	Improbable	1	Medium term	3	Site	2	Medium	6	11	Negligible	Site Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Medium term	3	Site	2	Low	2	7	Negligible	Site Monitoring	Can be avoided, managed or mitigated
10	Mining / Processing	**Site EXIGO-GTT-HP01 (low significance)**	**WOM**	**Negative**	Highly Probable	4	Medium term	3	Local	1	Low	2	24	Low	Site Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Medium term	3	Site	2	Low	2	7	Negligible	Site Monitoring	Can be avoided, managed or mitigated
11	Mining / Processing	**Site EXIGO-GTT-FT01 (low significance) Site EXIGO-GTT-FT02 (low significance) Site EXIGO-GTT-FT03 (low significance) Site EXIGO-GTT-FT04 (low significance)**	**WOM**	**Negative**	Highly Probable	4	Medium term	3	Local	1	Low	2	24	Low	Site Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Medium term	3	Site	2	Low	2	7	Negligible	Site Monitoring	Can be avoided, managed or mitigated
12	Planning	**Site EXIGO-GTT-BP01 (high significance) Site EXIGO-GTT-BP02 (high significance) Site EXIGO-GTT-BP03 (high significance) Site EXIGO-GTT-BP04 (high significance)**	**WOM**	**Negative**	Highly Probable	4	Long term	4	Site	2	High	8	56	Moderate	Site Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Short term	1	Local	1	High	8	10	Negligible	Site Monitoring	Can be avoided, managed or mitigated
Closure and Decommissioning Phase																
13	Decommissioning	**Site EXIGO-GTT-IA01 (medium significance) Site EXIGO-GTT-IA01 (medium significance)**	**WOM**	**Negative**	Improbable	1	Short term	1	Site	2	Medium	6	9	Negligible	Site Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Short term	1	Site	2	Low	2	5	Negligible	Site Monitoring	Can be avoided, managed or mitigated
14	Decommissioning	**Site EXIGO-GTT-HP01 (low significance)**	**WOM**	**Negative**	Definite	5	Short term	1	Site	2	Low	2	25	Low	Site Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Short term	1	Site	2	Low	2	5	Negligible	Site Monitoring	Can be avoided, managed or mitigated
15	Decommissioning	**Site EXIGO-GTT-FT01 (low significance) Site EXIGO-GTT-FT02 (low significance) Site EXIGO-GTT-FT03 (low significance) Site EXIGO-GTT-FT04 (low significance)**	**WOM**	**Negative**	Definite	5	Short term	1	Site	2	Low	2	25	Low	Site Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Short term	1	Site	2	Low	2	5	Negligible	Site Monitoring	Can be avoided, managed or mitigated

16	Planning	**Site EXIGO-GTT-BP01 (high significance) Site EXIGO-GTT-BP02 (high significance) Site EXIGO-GTT-BP03 (high significance) Site EXIGO-GTT-BP04 (high significance)**	**WOM**	**Negative**	Probable	2	Long term	4	Site	2	High	8	28	Low	Site Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Short term	1	Local	1	High	8	10	Negligible	Site Monitoring	Can be avoided, managed or mitigated
Post-Closure Phase																
17	Post-Closure	**Site EXIGO-GTT-IA01 (medium significance) Site EXIGO-GTT-IA01 (medium significance)**	**WOM**	**Negative**	Improbable	1	Permanent	5	Site	2	Medium	6	13	Negligible	Site Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Permanent	5	Site	2	Low	2	9	Negligible	Site Monitoring	Can be avoided, managed or mitigated
18	Post-Closure	**Site EXIGO-GTT-HP01 (low significance)**	**WOM**	**Negative**	Improbable	1	Permanent	5	Site	2	Low	2	9	Negligible	Site Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Permanent	5	Site	2	Low	2	9	Negligible	Site Monitoring	Can be avoided, managed or mitigated
19	Post-Closure	**Site EXIGO-GTT-FT01 (low significance) Site EXIGO-GTT-FT02 (low significance) Site EXIGO-GTT-FT03 (low significance) Site EXIGO-GTT-FT04 (low significance)**	**WOM**	**Negative**	Improbable	1	Permanent	5	Site	2	Low	2	9	Negligible	Site Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Permanent	5	Site	2	Low	2	9	Negligible	Site Monitoring	Can be avoided, managed or mitigated
20	Planning	**Site EXIGO-GTT-BP01 (high significance) Site EXIGO-GTT-BP02 (high significance) Site EXIGO-GTT-BP03 (high significance) Site EXIGO-GTT-BP04 (high significance)**	**WOM**	**Negative**	Improbable	1	Permanent	5	Local	1	High	8	14	Negligible	Site Monitoring	Can be avoided, managed or mitigated
			WM	**Positive**	Improbable	1	Permanent	5	Local	1	High	8	14	Negligible	Site Monitoring	Can be avoided, managed or mitigated

Aspect	Description	Weight
Probability	Improbable	1
	Probable	2
	Highly Probable	4
	Definite	5
Duration	Short term	1
	Medium term	3
	Long term	4
	Permanent	5
Scale	Local	1
	Site	2
	Regional	3
Magnitude	Low	2
	Medium	6
	High	8

Negligible	</=20
Low	</=40
Moderate	</=60
High	>60

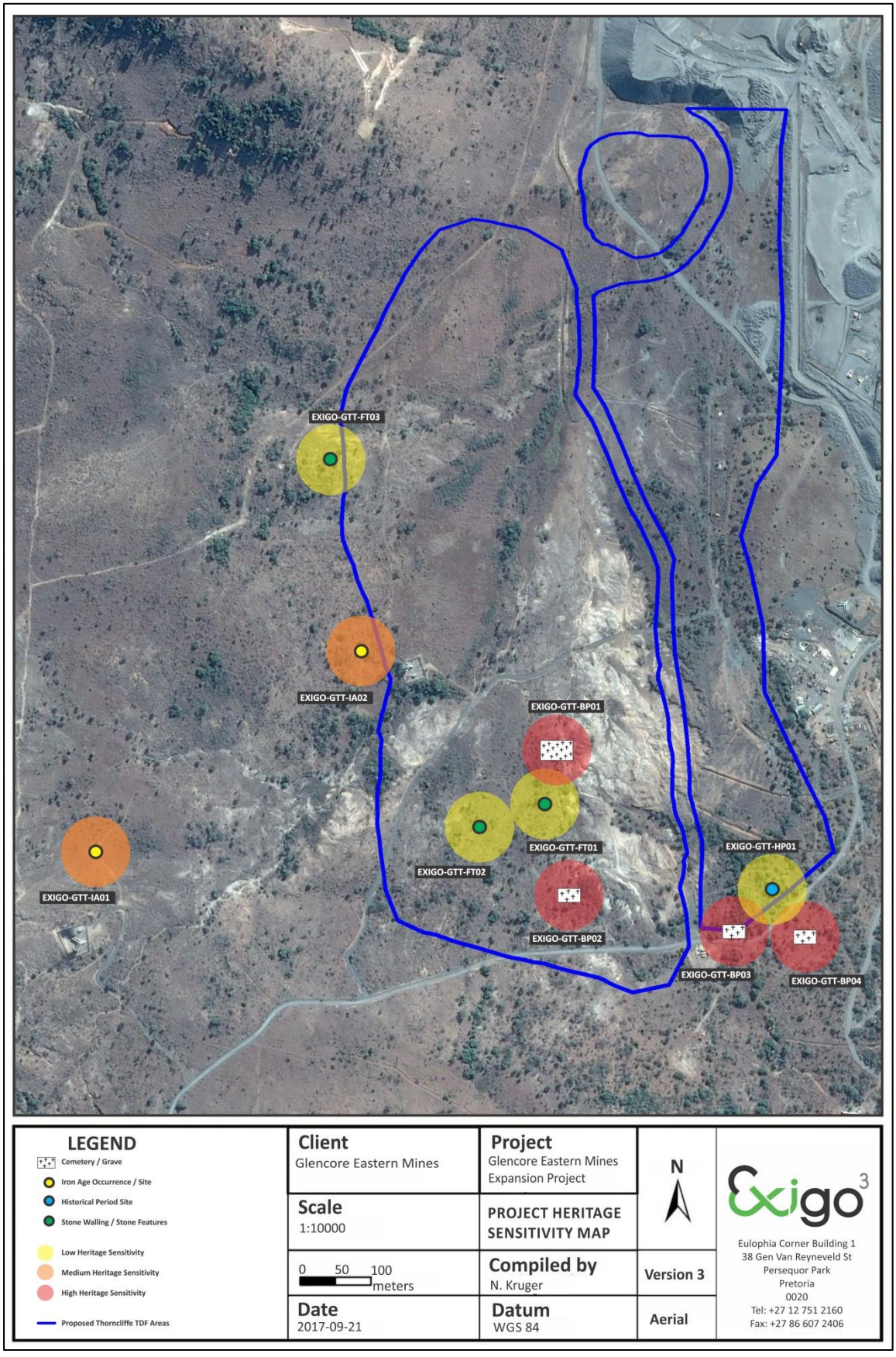

Figure 6-1: Aerial map indicating heritage sites, sensitivity ratings and associated conservation buffers for heritage receptors as discussed in the text.

6.2 Evaluation Impacts

Previous studies conducted in the Steelpoort region suggest a rich and diverse archaeological landscape but the surroundings of the Glencore Eastern Mines have been transformed by mining, prospecting and related developments. Cognisance should nonetheless be taken of archaeological material that might be present in surface and sub-surface deposits along drainage lines and in pristine areas.

Heritage resources ranging in significance from low to high occur inside and in the vicinity of the proposed Glencore Eastern Mines Expansion Development footprints. However, it is the opinion of the author of this Archaeological Impact Assessment Report that the proposed Glencore Eastern Mines Expansion Development on portions of the farms Thorncliffe 374 KT, Helena 6 JT and De Grooteboom 373 KT may proceed from a culture resources management perspective, provided that mitigation measures are implemented and no previously undetected heritage remains are found at any point in construction and operational phases.

6.2.1 Archaeology

The Glencore Eastern Mines is situated in a rich archaeological landscape with Stone Age and Iron Age remnants occurring throughout. The study identified Iron Age archaeological sites which will be directly impacted by the proposed project but these impacts can be mitigated. As such, the impact on the resources is potentially MODERATE but this impact rating can be limited to a NEGLIBLE impact by the implementation of mitigation measures (avoidance, Phase 2 Assessment, site monitoring) for the sites, if / when required**.**

6.2.2 Built Environment

A single stone wall feature of unknown context, as well as a possible Historical Period occupation site occur within the footprint detracted for the Thorncliffe TSF but the significance of these sites is medium-low due to the general loss of site context and the poor preservation of the structures. For the rest of the project area, the study has not identified any buildings or structures which will be impacted by the proposed project. This is confirmed by an examination of aerial photographs of the area. No impact on built environment sites is therefore anticipated.

6.2.3 Cultural Landscape

Even though the larger Steelpoort area comprises a rich cultural landscape, the landscape surrounding the proposed project areas have been transformed by mining, human settlement and agriculture. Further away from the project area, the landscape is typical of Sekhukhune, with large areas of undulating hills, large mountains to the south and north and flatter plains in-between. This landscape stretches over many kilometres and the proposed project is unlikely to result in a significant impact on the landscape.

6.2.4 Graves / Human Burials Sites

At least 4 burial sites or probable burial sites were located in the study area within the footprint detracted for the Thorncliffe TSF. These receptors are of high significance for their social and cultural value. The impact on the resources is potentially HIGH but this impact rating can be limited to a NEGLIBLE impact by the implementation of mitigation measures (avoidance, site management, site monitoring / grave relocation) for the sites, if / when required**.**

In the rural areas of the Limpopo Province graves and cemeteries often occur within settlements or around homesteads but they are also randomly scattered around archaeological and historical settlements. The

probability of additional and informal human burials encountered during development should thus not be excluded. In addition, human remains and burials are commonly found close to archaeological sites; they may be found in "lost" graveyards, or occur sporadically anywhere as a result of prehistoric activity, victims of conflict or crime. It is often difficult to detect the presence of archaeological human remains on the landscape as these burials, in most cases, are not marked at the surface. Human remains are usually observed when they are exposed through erosion. In some instances packed stones or rocks may indicate the presence of informal pre-colonial burials. If any human bones are found during the course of construction work then they should be reported to an archaeologist and work in the immediate vicinity should cease until the appropriate actions have been carried out by the archaeologist. Where human remains are part of a burial they would need to be exhumed under a permit from either SAHRA (for pre-colonial burials as well as burials later than about AD 1500). Should any unmarked human burials/remains be found during the course of construction, work in the immediate vicinity should cease and the find must immediately be reported to the archaeologist, or the South African Heritage Resources Agency (SAHRA). Under no circumstances may burials be disturbed or removed until such time as necessary statutory procedures required for grave relocation have been met.

6.3 Management actions

Recommendations for relevant heritage resources management actions are vital to the conservation of heritage resources. A general guideline for recommended management actions is included in Section 10.4 of the Addendum. The following management measures would be required during implementation of the proposed Glencore Eastern Mines Expansion Development.

OBJECTIVE: prevent unnecessary disturbance and/or destruction of previously undetected heritage receptors.

*No specific action in terms of mitigation is required for the medium-low significance stone wall foundation structures and the possible Historical Period site (**Site EXIGO-GTT-FT01, Site EXIGO-GTT-FT02, Site EXIGO-GTT-FT03, Site EXIGO-GTT-HP01)** occurring within the proposed Glencore Eastern Mines Expansion Development. However, the following general procedure is required for the site:*

PROJECT COMPONENT/S	All phases of construction and operation.		
POTENTIAL IMPACT	Damage/destruction of sites.		
ACTIVITY RISK/SOURCE	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
MITIGATION: TARGET/OBJECTIVE	To locate previously undetected heritage remains / graves as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL		**RESPONSIBILITY**	**TIMEFRAME**
Fixed Mitigation Procedure (**required**)			
Site Monitoring: Regular examination of trenches and excavations. Destruction permitting if and when required.		ECO	Monitor as frequently as practically possible.
PERFORMANCE INDICATOR	Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.		
MONITORING	Successful location of sites by person/s monitoring.		

*For Iron Age Sites of medium significance (**Site EXIGO-GTT-IA01, Site EXIGO-GTT-IA02**) in the general vicinity of the proposed Glencore Eastern Mines Expansion Development the following are required in terms of heritage management and mitigation:*

PROJECT COMPONENT/S	All phases of construction and operation.		
POTENTIAL IMPACT	Damage/disturbance to sites and subsurface features and deposits.		
ACTIVITY RISK/SOURCE	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
MITIGATION: TARGET/OBJECTIVE	To the historical fabric and conserve existing, and locate undetected heritage remains as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL		**RESPONSIBILITY**	**TIMEFRAME**
Preferred Mitigation Procedure			
Avoidance: Implement a heritage conservation buffer of at least 100m around the heritage receptor, where possible redesign infrastructure to avoid the heritage resource and the proposed conservation buffer. Fence all burial places and apply access control.		DEVELOPER QUALIFIED HERITAGE SPECIALIST	Prior to the commencement of construction and earth-moving.
Alterative Mitigation Procedure (**if preferred mitigation procedure is not feasible**)			
Phase 2 Study and Sampling: Full Phase 2 Specialist Assessment of sites including mapping, site sampling and possible conservation management and protection measures should the sites be impacted on. Subject to authorisations and relevant permitting from heritage authorities and affected parties.		QUALIFIED HERITAGE SPECIALIST	Prior to the commencement of construction and earth-moving.
Fixed Mitigation Procedure (**required**)			
Site Monitoring: Regular examination of trenches and excavations.		ECO	Monitor as frequently as practically possible.
PERFORMANCE INDICATOR	Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.		
MONITORING	Successful location of sites by person/s monitoring.		

*For the highly significant burial sites (**Site EXIGO-GTT-BP01, Site EXIGO-GTT-BP02, Site EXIGO-GTT-BP03, Site EXIGO-GTT-BP04**) occurring within or in close proximity of the proposed Glencore Eastern Mines Expansion Development the following are required in terms of heritage management and mitigation:*

PROJECT COMPONENT/S	All phases of construction and operation.		
POTENTIAL IMPACT	Damage/disturbance to subsurface burials and surface burial features.		
ACTIVITY RISK/SOURCE	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
MITIGATION: TARGET/OBJECTIVE	To locate human burials as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL		**RESPONSIBILITY**	**TIMEFRAME**
Preferred Mitigation Procedure			
Avoidance: Implement a strict heritage conservation buffer of at least 100m around the graves / cemeteries, if		DEVELOPER QUALIFIED HERITAGE	Prior to the commencement of

necessary redesign the footprint area to avoid the heritage resource and the proposed conservation buffer. Fence all burial places and apply access control. If this procedure is followed strict and continuous monitoring of the heritage sites during construction will be required. Implement a site management plan detailing strict site management conservation measures.	SPECIALIST	construction and earth-moving, monitoring during construction.
Alterative Mitigation Procedure (**if preferred mitigation procedure is not feasible**)		
Grave Relocation: Relocation of burials and documentation of site, full social consultation with affected parties, possible conservation management and protection measures. Subject to authorisations and relevant permitting from heritage authorities and affected parties.	QUALIFIED HERITAGE SPECIALIST	Prior to the commencement of construction and earth-moving.
Fixed Mitigation Procedure (**required**)		
Site Monitoring: Regular examination of trenches and excavations in this area in order to avoid the destruction of previously undetected burials or heritage remains. If burials were to be retained a strict site management and monitoring protocol will be required (planning, construction phases).	ECO	Monitor as frequently as practically possible.
PERFORMANCE INDICATOR	Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.	
MONITORING	Successful location of sites by person/s monitoring.	

7 RECOMMENDATIONS

Previous studies conducted in the Steelpoort region suggest a rich and diverse archaeological landscape but the surroundings of some of the areas in the proposed Glencore Eastern Mines Expansion Project have been transformed by mining, prospecting and other developments. Cognisance should nonetheless be taken of archaeological material that might be present in surface and sub-surface deposits along drainage lines and in pristine areas. Heritage resources occur within the proposed project areas and the following recommendations are made based on general observations:

- According to the South African Heritage Resources Agency Information System (SAHRIS) Palaeo Map, the project area falls within a potentially sensitive fossiliferous zone and a Palaeontological Desktop Assessment is recommended for the project, subject to review and recommendations by the relevant heritage authorities. Should fossil remains such as fossil fish, reptiles or petrified wood be exposed during construction, these objects should carefully safeguarded and the relevant heritage resources authority (SAHRA) should be notified immediately so that the appropriate action can be taken by a professional palaeontologist..
- The remains of stone wall foundations and structures of unknown provenience and a possible Historical Period occupation site (**Site EXIGO-GTT-FT01, Site EXIGO-GTT-FT02, Site EXIGO-GTT-FT03, Site EXIGO-GTT-HP01**) are of low significance due to the general absence of site context and the poor preservation of the features. The sites occur within the proposed Thorncliffe TSF development area and it is recommended that the general area be monitored in order to avoid the destruction of previously undetected heritage remains. In addition, application should be made for a destruction permit from the relevant heritage authorities should the possible Historical Period site be impacted on.
- Two small Iron Age settlement areas at **Site EXIGO-GTT-IA01** and **Site EXIGO-GTT-IA02** are significant in terms of their regional representation in the Iron Age farmer period landscape of the Sekhukhune area. The sites are located outside of the proposed Thorncliffe TSF development area and it is primarily recommended that impact on the heritage resources be avoided by the implementation of a heritage conservation buffer of at least 100m around the heritage receptors. Should either of the sites be impacted on at any stage it is recommended that the historical fabric of the sites be conserved by means of a Phase 2 Specialist study (mapping, site sampling and possible conservation management and protection) and the necessary excavation and destruction permits should be obtained from the relevant Heritage Resources Authorities.
- Four burial sites or assumed burial sites occurring within, or in close proximity of the proposed Thorncliffe TSF development area (**Site EXIGO-GTT-BP01, Site EXIGO-GTT-BP02, Site EXIGO-GTT-BP02, Site EXIGO-GTT-BP04**) are of high significance and these sites will in all probability be impacted on by the proposed project. For these burial sites, the implementation of a conservation buffer of at least 100m is primarily recommended and the sites should be monitored on a frequent basis during construction by a heritage consultant or informed ECO in order to detect and manage negative impact on the sites. In addition, the sites should be fenced prior to the commencement of construction and strict access control should be applied. A site management plan detailing strict site management conservation measures for these heritage receptors should be compiled prior to the commencement of construction. The developer should carefully liaise with the heritage specialist and SAHRA with regards to the management and monitoring of any human grave or cemetery. **However, should impact on any human burial prove inevitable, full grave relocations are recommended for these burial grounds. This measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation, permitting, statutory permissions and subject to any local and regional provisions and laws and by-laws**

pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials (see Addendum 2).

- It is essential that cognisance be taken of the larger heritage landscape of the area in order to avoid the destruction of previously undetected heritage sites. As an example, the **Gamawela Cave Site**, situated approximately 6km south-west of the Thorncliffe Mine on the farm St Georges proves to be an invaluable living heritage site for local communities. Even though the site occurs away from mining areas, indirect effects on the site emanating from mining such as vibration impacts should be carefully managed in order to ensure the preservation of the site and similar areas of heritage importance in the region.
- It should be stated that it is likely that further undetected archaeological remains might occur elsewhere in the Study Area along water sources and drainage lines, fountains and pans would often have attracted human activity in the past. Also, since Stone Age material seems to originate from below present soil surfaces in eroded areas, the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits. Burials and historically significant structures dating to the Colonial Period. As such, the general monitoring of the development progress by an ECO or by the heritage specialist is recommended for all stages of the project. Should any subsurface palaeontological, archaeological or historical material, or burials be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately

In addition to these site-specific recommendations, careful cognizance should be taken of the following:

- As Palaeontological remains occur where bedrock has been exposed, all geological features should be regarded as sensitive.
- Water sources such as drainage lines, fountains and pans would often have attracted human activity in the past. As Stone Age material the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits.

8 GENERAL COMMENTS AND CONDITIONS

This AIA report serves to confirm the extent and significance of the heritage landscape of the proposed Glencore Eastern Mines Expansion Development area. The larger heritage horizon encompasses rich and diverse archaeological landscapes and cognisance should be taken of heritage resources and archaeological material that might be present in surface and sub-surface deposits. If, during construction, any possible archaeological material culture discoveries are made, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find. Such material culture might include:

- Formal Earlier Stone Age stone tools.
- Formal MSA stone tools.
- Formal LSA stone tools.
- Potsherds
- Iron objects.
- Beads made from ostrich eggshell and glass.
- Ash middens and cattle dung deposits and accumulations.
- Faunal remains.
- Human remains/graves.
- Stone walling or any sub-surface structures.
- Historical glass, tin or ceramics.
- Fossils.

If such sites were to be encountered or impacted by any proposed developments, recommendations contained in this report, as well as endorsement of mitigation measures as set out by AMAFA, SAHRA, the National Resources Act and the CRM section of ASAPA will be required.

It must be emphasised that the conclusions and recommendations expressed in this archaeological heritage sensitivity investigation are based on the visibility of archaeological sites/features and may not therefore, represent the area's complete archaeological legacy. Many sites/features may be covered by soil and vegetation and might only be located during sub-surface investigations. If subsurface archaeological deposits, artefacts or skeletal material were to be recovered in the area during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately **(*cf*. NHRA (Act No. 25 of 1999)**, Section 36 (6)). It must also be clear that Archaeological Specialist Reports will be assessed by the relevant heritage resources authority (SAHRA).

9 BIBLIOGRAPHY

Acocks,J.P.H. 1988. Veld types of South Africa (3rd edition). Memoirs of the Botanical Survey of South Africa 57: 1-146

Bergh, J.S.1999. Geskiedenisatlas van Suid-Afrika: die vier noordelike provinsies. Pretoria: J.L. van Schaik

Bornman, H. 1994. Pioneers of the Lowveld. Nelspruit: SA Country Life.

Deacon, J. 1996.Archaeology for Planners, Developers and Local Authorities. National Monuments Council. Publication no. P021E.

Deacon, J.1997. Report: Workshop on Standards for the Assessment of Significance and Research Priorities for Contract Archaeology. In: Newsletter No 49, Sept 1998. Association for Southern African Archaeologists.

Delius P, & Hay, M. 2009. Mpumalanga, an illustrated history. Highveld Press

Denbow, J.R. 1979. Cenchrus ciliaris: an ecological indicator of Iron Age middens using aerial photography in eastern Botswana. South African Journal of Science 75:405—408

De V. Pienaar, U. 1990. Neem uit die Verlede. Pretoria: National Parks Board.

Eloff J.F. 1982. Verslag oor Argeologiese Navorsing in die Krugerwildtuin, June / July.

Evers,T.M.1988. The recognition of Groups in the Iron Age of Southern Africa. PhD thesis. Johannesburg: University of the Witwatersrand.

Eriksson, PG, Hattingh, PJ & Altermann, W. 1994. An overview of the geology of the Transvaal Sequence and Bushveld Complex, South Africa. *Mineralium Deposita* 30(2):98-11.

Huffman, T.N. 2002. Regionality in the Iron Age: the case of the Sotho-Tswana. Southern African Humanities. Vol 14. Pietermaritzburg.

Huffman, T.N. 2007. Handbook to the Iron Age. Pietermaritzburg: University of Kwazulu-Natal Press

Mason, R.J. 1986. Origins of black people of Johannesburg and the southern western central Transvaal AD 350--1880. Johannesburg: Witwatersrand University Press.

Roodt, F. 2006. Heritage Impact Assessment for the mining development on the farm Maandagshoek 254 KT, Tubatse Municipal Area, Sekhukhune district. R&R Culture Resources Consultants.

Swanepoel, N. et al (Eds.) 2008. Five hundred years rediscovered. Johannesburg: Wits University Press

Vinnicombe, P 1972. Myth, motive, and selection in Southern African rock art. Africa: Journal of the International African Institute 42: 192-204

Swanepoel, N. et al (Eds.) 2008. Five hundred years rediscovered. Johannesburg: Wits University Press

Thackeray, AI. 1992. The Middle Stone Age south of the Limpopo River. *Journal of World Prehistory* 6(4):385-440

Van Warmelo, N.J. 1935. A Preliminary Survey of the Bantu Tribes of South Africa. Pretoria: Government Printer.

Van der Ryst, MM. 2006. *Seeking shelter: hunter-gatherer-fishers of Olieboomspoort, Limpopo, South Africa.* Unpublished PhD: University of the Witwatersrand.

Van der Ryst, MM & Kruger, N. 2008. A Phase 2 Heritage Specialist Study of Stone Age localities on the farm Maandagshoek 254 KT, Tubatse Municipal Area, Sekhukhune district. Pretoria: UNISA

Voight, E. 1981. Guide to the Archaeological sites in the Northern and Eastern Transvaal. Transvaal Museum.

Winter, S. & Baumann, N. 2005. Guideline for involving heritage specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 E. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

Human Tissue Act and Ordinance 7 of 1925, Government Gazette, Cape Town

National Resource Act No.25 of 1999, Government Gazette, Cape Town

www.csg.dla.gov.za *accessed 2016-09-30*

http://www.sahistory.org.za/sites/default/files/History%20of%20the%20Gamawela%20Community.pdf *accessed 2017-04-20*

10 ADDENDUM 1: HERITAGE LEGISLATION BACKGROUND

10.1 CRM: Legislation, Conservation and Heritage Management

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

10.1.1 Legislation regarding archaeology and heritage sites

The South African Heritage Resources Agency (SAHRA) and their provincial offices aim to conserve and control the management, research, alteration and destruction of cultural resources of South Africa. It is therefore vitally important to adhere to heritage resource legislation at all times.

d. National Heritage Resources Act No 25 of 1999, section 35

According to the National Heritage Resources Act of 1999 a historical site is any identifiable building or part thereof, marker, milestone, gravestone, landmark or tell older than 60 years. This clause is commonly known as the "60-years clause". Buildings are amongst the most enduring features of human occupation, and this definition therefore includes all buildings older than 60 years, modern architecture as well as ruins, fortifications and Iron Age settlements. "Tell" refers to the evidence of human existence which is no longer above ground level, such as building foundations and buried remains of settlements (including artefacts).

The Act identifies heritage objects as:

- objects recovered from the soil or waters of South Africa including archaeological and palaeontological objects, meteorites and rare geological specimens
- visual art objects
- military objects
- numismatic objects
- objects of cultural and historical significance
- objects to which oral traditions are attached and which are associated with living heritage
- objects of scientific or technological interest
- any other prescribed category

With regards to activities and work on archaeological and heritage sites this Act states that:

"No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority." (34. [1] 1999:58)

and

"No person may, without a permit issued by the responsible heritage resources authority-

(d) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;

(e) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

(f) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or

(g) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites. (35. [4] 1999:58)."

and

"No person may, without a permit issued by SAHRA or a provincial heritage resources agency-

(h) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

(i) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority;

(j) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals (36. [3] 1999:60)."

e. Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925

Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act and the Human Tissues Act of 1983. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and the Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial MEC as well as the relevant Local Authorities.

10.1.2 Background to HIA and AIA Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. Heritage sites are frequently threatened by development projects and both the environmental and heritage legislation require impact assessments (HIAs & AIAs) that identify all heritage resources in areas to be developed. Particularly, these assessments are required to make recommendations for protection or mitigation of the impact of the sites. HIAs and AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources including archaeological and palaeontological sites that might occur in areas of developed and (b) make recommendations for protection or mitigation of the impact on the sites.

The National Heritage Resources Act (Act No. 25 of 1999, section 38) provides guidelines for Cultural Resources Management and prospective developments:

***"38.** (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a*

development categorised as:

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) the construction of a bridge or similar structure exceeding 50m in length;

(c) any development or other activity which will change the character of a site:

(i) exceeding 5 000 m^2 in extent; or

(ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10 000 m^2 in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage

resources authority,

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development."

And:

"The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

(k) The identification and mapping of all heritage resources in the area affected;

(l) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;

(m) an assessment of the impact of the development on such heritage resources;

(n) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;

(o) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;

(p) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and

(q) plans for mitigation of any adverse effects during and after the completion of the proposed development (38. [3] 1999:64)."

Consequently, section 35 of the Act requires Heritage Impact Assessments (HIAs) or Archaeological Impact Assessments (AIAs) to be done for such developments in order for all heritage resources, that is, all places or objects of aesthetics, architectural, historic, scientific, social, spiritual, linguistic or technological value or significance to be protected. Thus any assessment should make provision for the

protection of all these heritage components, including archaeology, shipwrecks, battlefields, graves, and structures older than 60 years, living heritage, historical settlements, landscapes, geological sites, palaeontological sites and objects.Heritage resources management and conservation

10.2 Assessing the Significance of Heritage Resources

Archaeological sites, as previously defined in the National Heritage Resources Act (Act 25 of 1999) are places in the landscape where people have lived in the past – generally more than 60 years ago – and have left traces of their presence behind. In South Africa, archaeological sites include hominid fossil sites, places where people of the Earlier, Middle and Later Stone Age lived in open sites, river gravels, rock shelters and caves, Iron Age sites, graves, and a variety of historical sites and structures in rural areas, towns and cities. Palaeontological sites are those with fossil remains of plants and animals where people were not involved in the accumulation of the deposits. The basic principle of cultural heritage conservation is that archaeological and other heritage sites are valuable, scarce and *non-renewable.* Many such sites are unfortunately lost on a daily basis through development for housing, roads and infrastructure and once archaeological sites are damaged, they cannot be re-created as site integrity and authenticity is permanently lost. Archaeological sites have the potential to contribute to our understanding of the history of the region and of our country and continent. By preserving links with our past, we may not be able to revive lost cultural traditions, but it enables us to appreciate the role they have played in the history of our country.

- Categories of significance

Rating the significance of archaeological sites, and consequently grading the potential impact on the resources is linked to the significance of the site itself. The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences. The guidelines as provided by the NHRA (Act No. 25 of 1999) in Section 3, with special reference to subsection 3 are used when determining the cultural significance or other special value of archaeological or historical sites. In addition, ICOMOS (the Australian Committee of the International Council on Monuments and Sites) highlights four cultural attributes, which are valuable to any given culture:

- *Aesthetic value:*

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria include consideration of the form, scale, colour, texture and material of the fabric, the general atmosphere associated with the place and its uses and also the aesthetic values commonly assessed in the analysis of landscapes and townscape.

- *Historic value:*

Historic value encompasses the history of aesthetics, science and society and therefore to a large extent underlies all of the attributes discussed here. Usually a place has historical value because of some kind of influence by an event, person, phase or activity.

- *Scientific value:*

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality and on the degree to which the place may contribute further substantial information.

- *Social value:*

Social value includes the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a certain group.

It is important for heritage specialist input in the EIA process to take into account the heritage management structure set up by the NHR Act. It makes provision for a 3-tier system of management including the South Africa Heritage Resources Agency (SAHRA) at a national level, Provincial Heritage Resources Authorities (PHRAs) at a provincial and the local authority. The Act makes provision for two types or forms of protection of heritage resources; i.e. formally protected and generally protected sites:

Formally protected sites:

- Grade 1 or national heritage sites, which are managed by SAHRA
- Grade 2 or provincial heritage sites, which are managed by the provincial HRA (MP-PHRA).
- Grade 3 or local heritage sites.

Generally protected sites:

- Human burials older than 60 years.
- Archaeological and palaeontological sites.
- Shipwrecks and associated remains older than 60 years.
- Structures older than 60 years.

With reference to the evaluation of sites, the certainty of prediction is definite, unless stated otherwise and if the significance of the site is rated high, the significance of the impact will also result in a high rating. The same rule applies if the significance rating of the site is low. The significance of archaeological sites is generally
ranked into the following categories.

Significance	Rating Action
No significance: sites that do not require mitigation.	None
Low significance: sites, which may require mitigation.	2a. Recording and documentation (Phase 1) of site; no further action required 2b. Controlled sampling (shovel test pits, augering), mapping and documentation (Phase 2 investigation); permit required for sampling and destruction
Medium significance: sites, which require mitigation.	3. Excavation of representative sample, C14 dating, mapping and documentation (Phase 2 investigation); permit required for sampling and destruction [including 2a & 2b]
High significance: sites, where disturbance should be avoided.	4a. Nomination for listing on Heritage Register (National, Provincial or Local) (Phase 2 & 3 investigation); site management plan; permit required if utilised for education or tourism
High significance: Graves and burial places	4b. Locate demonstrable descendants through social consulting; obtain permits from applicable legislation, ordinances and regional by-laws; exhumation and reinterment [including 2a, 2b & 3]

Furthermore, the significance of archaeological sites was based on six main criteria:

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter),
- Social value,
- Uniqueness, and
- Potential to answer current and future research questions.

A fundamental aspect in assessing the significance and protection status of a heritage resource is often whether or not the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and mitigated in order to gain data / information, which would otherwise be lost.

11 ADDENDUM 2: GRAVE RELOCATION AND SITE MANAGEMENT: STATUTORY MANDATE

11.1 Archaeology, graves and the law

Note that four categories of graves can be identified. These are:
- Graves younger than 60 years;

- Graves older than 60 years, but younger than 100 years;

- Graves older than 100 years; and

- Graves of victims of conflict or of individuals of royal descent

In terms of Section 36(3) of the National Heritage Resources Act, no person may, without a permit issued by the relevant heritage resources authority:
(a) destroy, damage, alter, exhume or remove from its original position of otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
(b) destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
(c) bring onto or use at a burial ground or grave referred to in paragraph
(a) Or (b) any excavation, or any equipment which assists in the detection or recovery
of metals.

Human remains that are less than 60 years old are subject to provisions of the Human Tissues Act (Act 65 of 1983) and to local regulations. Exhumation of graves must conform to the standards set out in the Ordinance on Excavations (Ordinance no. 12 of 1980) (replacing the old Transvaal Ordinance no. 7 of 1925). Permission must also be gained from the descendants (where known), the National Department of Health, Provincial Department of Health, Premier of the Province and local police. Furthermore, permission must also be gained from the various landowners (i.e. where the graves are located and where they are to be relocated) before exhumation can take place.
A registered undertaker can only handle human remains or an institution declared under the Human Tissues Act (Act 65 of 1983 as amended).

Unidentified/unknown graves are also handled as older than 60 until proven otherwise.
Summary of applicable legislation and legal requirements:

- Human Tissue Act (Act 65 of 1983 as amended).
- Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925)
- Ordinance on Excavations (Ordinance no. 12 of 1980)
- Local and regional provisions, laws and by-laws
- National Heritage Resources Act (Act no. 25 of 1999)
- Permit from SAHRA for removal of human remains

11.2 Graves: necessary procedures

When graves are located in an area demarcated for development, the following mitigation options might be considered:

- **Conservation:** The establishment of a 50 meter buffer zone around the burial place which is fenced off and, maintained and conserved. *This option is generally recommended as the relocation of burial places is an extremely complicated, time consuming and sensitive process.*

- **Mitigation and relocation:** In the event where impact on the burial place will occur, mitigation measures may entail full grave relocation. Such a relocation process must be undertaken by suitably qualified individuals with a proven track record. The relocation must also be undertaken in full cognisance of all relevant legislation, including the specific requirements of the National Heritage Resource Act (Act no. 25 of 1999). Furthermore, a concerted effort must also be made to identify all buried individuals and to contact their relatives and descendants. Other legislative measures which may be of relevance include the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the Human Tissues Act (Act no. 65 of 1983, as amended), the Ordinance on Excavations (Ordinance no. 12 of 1980) as well as any local and regional provisions, laws and by-laws that may be in place.

Methodology for grave relocations:

- **Documentation:** Physical documentation of graves and determining context of graves prior to exhumation: Photographic, GPS, Site Map, Historical Background.
- **Public Notices:** In order to locate and notify descendant families, notices (in compliance with the National Heritage Resources Act) must be placed on the site/s, indicating the intent of relocation. These notices, translated into at least 3 languages, have to remain in place for a minimum of 60 days. Additionally, newspaper adverts and notices on local radio stations announcements are required.
- **Social consultation:** If any descendant families were located during initial consultation/public participation phases, a full social consultation action will lodged.
- **Permit application:** Application for a permit from SAHRA can only be obtained after all necessary consent documents from descendant families, landowners and relevant authorities have been secured.
- **Exhumation & relocation**
  The exhumation, investigation and reburial of the burial place may commence after SAHRA has issued relevant permits and permissions

12 ADDENDUM 3: CONVENTIONS USED TO ASSESS THE SIGNIFICANCE OF HERITAGE

12.1 Site Significance Matrix

According to the NHRA, Section 2(vi) the **significance** of heritage sites and artefacts is determined by it aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these. The following matrix is used for assessing the significance of each identified site/feature.

2. SITE EVALUATION			
2.1 Heritage Value (NHRA, section 2 [3])	High	Medium	Low
It has importance to the community or pattern of South Africa's history or pre-colonial history.			
It possesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage.			
It has potential to yield information that will contribute to an understanding of South Africa's natural and cultural heritage.			
It is of importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects.			
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.			
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.			
It has marked or special association with a particular community or cultural group for social, cultural or spiritual reasons (sense of place).			
It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.			
It has significance through contributing towards the promotion of a local sociocultural identity and can be developed as a tourist destination.			
It has significance relating to the history of slavery in South Africa.			
It has importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation.			
2.2 Field Register Rating			
National/Grade 1 [should be registered, retained]			
Provincial/Grade 2 [should be registered, retained]			
Local/Grade 3A [should be registered, mitigation not advised]			
Local/Grade 3B [High significance; mitigation, partly retained]			
Generally Protected A [High/Medium significance, mitigation]			
Generally protected B [Medium significance, to be recorded]			
Generally Protected C [Low significance, no further action]			
2.3 Sphere of Significance	High	Medium	Low
International			
National			
Provincial			
Local			
Specific community			

12.2 Impact Assessment Criteria

The following table provides a guideline for the rating of impacts and recommendation of management actions for sites of heritage potential.

Significance of the heritage resource

This is a statement of the nature and degree of significance of the heritage resource being affected by the activity. From a heritage management perspective it is useful to distinguish between whether the significance is embedded in the physical fabric or in associations with events or persons or in the experience of a place; i.e. its visual and non-visual qualities. This statement is a primary informant to the nature and degree of significance of an impact and thus needs to be thoroughly considered. Consideration needs to be given to the significance of a heritage resource at different scales (i.e. sitespecific, local, regional, national or international) and the relationship between the heritage resource, its setting and its associations.

Nature of the impact

This is an assessment of the nature of the impact of the activity on a heritage resource, with some indication of its positive and/or negative effect/s. It is strongly informed by the statement of resource significance. In other words, the nature of the impact may be historical, aesthetic, social, scientific, linguistic or architectural, intrinsic, associational or contextual (visual or non-visual). In many cases, the nature of the impact will include more than one value.

Extent

Here it should be indicated whether the impact will be experienced:

- On a site scale, i.e. extend only as far as the activity;
- Within the immediate context of a heritage resource;
- On a local scale, e.g. town or suburb
- On a metropolitan or regional scale; or
- On a national/international scale.

Duration

Here it should be indicated whether the lifespan of the impact will be:

- Short term, (needs to be defined in context)
- Medium term, (needs to be defined in context)
- Long term where the impact will persist indefinitely, possibly beyond the operational life of the activity, either because of natural processes or by human intervention; or
- Permanent where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.

Of relevance to the duration of an impact are the following considerations:

- Reversibility of the impact; and
- Renewability of the heritage resource.

Intensity

Here it should be established whether the impact should be indicated as:

- Low, where the impact affects the resource in such a way that its heritage value is not affected;
- Medium, where the affected resource is altered but its heritage value continues to exist albeit in a modified way; and
- High, where heritage value is altered to the extent that it will temporarily or permanently be damaged or destroyed.

Probability

This should describe the likelihood of the impact actually occurring indicated as:

- Improbable, where the possibility of the impact to materialize is very low either because of design or historic experience;
- Probable, where there is a distinct possibility that the impact will occur;
- Highly probable, where it is most likely that the impact will occur; or
- Definite, where the impact will definitely occur regardless of any mitigation measures

Confidence

This should relate to the level of confidence that the specialist has in establishing the nature and degree of impacts. It relates to the level and reliability of information, the nature and degree of consultation with I&AP's and the dynamic of the broader socio-political context.

- High, where the information is comprehensive and accurate, where there has been a high degree of consultation and the socio-political context is relatively stable.

- Medium, where the information is sufficient but is based mainly on secondary sources, where there has been a limited targeted consultation and socio-political context is fluid.
- Low, where the information is poor, a high degree of contestation is evident and there is a state of socio-political flux.

Impact Significance

The significance of impacts can be determined through a synthesis of the aspects produced in terms of the nature and degree of heritage significance and the nature, duration, intensity, extent, probability and confidence of impacts and can be described as:

- Low; where it would have a negligible effect on heritage and on the decision
- Medium, where it would have a moderate effect on heritage and should influence the decision.
- High, where it would have, or there would be a high risk of, a big effect on heritage. Impacts of high significance should have a major influence on the decision;
- Very high, where it would have, or there would be high risk of, an irreversible and possibly irreplaceable negative impact on heritage. Impacts of very high significance should be a central factor in decision-making.

12.3 Direct Impact Assessment Criteria

The following table provides an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected

	TYPE OF DEVELOPMENT			
HERITAGE CONTEXT	**CATEGORY A**	**CATEGORY B**	**CATEGORY C**	**CATEGORY D**
CONTEXT 1 High heritage Value	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected	Very high heritage impact expected
CONTEXT 2 Medium to high heritage value	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected
CONTEXT 3 Medium to low heritage value	Little or no heritage impact expected	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected
CONTEXT 4 Low to no heritage value	Little or no heritage impact expected	Little or no heritage impact expected	Minimal heritage value expected	Moderate heritage impact expected

NOTE: A DEFAULT "LITTLE OR NO HERITAGE IMPACT EXPECTED" VALUE APPLIES WHERE A HERITAGE RESOURCE OCCURS OUTSIDE THE IMPACT ZONE OF THE DEVELOPMENT.

HERITAGE CONTEXTS	CATEGORIES OF DEVELOPMENT
Context 1: Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 1, 2 or 3A heritage resources **Context 2:** Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources. **Context 3:** Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources **Context 4:** Of little or no intrinsic, associational or contextual heritage value due to disturbed, degraded conditions or extent of irreversible damage.	**Category A: Minimal intensity development** - No rezoning involved; within existing use rights. - No subdivision involved. - Upgrading of existing infrastructure within existing envelopes - Minor internal changes to existing structures - New building footprints limited to less than 1000m2. **Category B: Low-key intensity development** - Spot rezoning with no change to overall zoning of a site. - Linear development less than 100m - Building footprints between 1000m2-2000m2 - Minor changes to external envelop of existing structures (less than 25%) - Minor changes in relation to bulk and height of immediately adjacent structures (less than 25%). **Category C: Moderate intensity development** - Rezoning of a site between 5000m2-10 000m2.

	- Linear development between 100m and 300m. - Building footprints between 2000m2 and 5000m2 - Substantial changes to external envelop of existing structures (more than 50%) - Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 50%) **Category D: High intensity development** - Rezoning of a site in excess of 10 000m2 - Linear development in excess of 300m. - Any development changing the character of a site exceeding 5000m2 or involving the subdivision of a site into three or more erven. - Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 100%)

12.4 Management and Mitigation Actions

The following table provides a guideline of relevant heritage resources management actions is vital to the conservation of heritage resources.

No further action / Monitoring

Where no heritage resources have been documented, heritage resources occur well outside the impact zone of any development or the primary context of the surroundings at a development footprint has been largely destroyed or altered, no further immediate action is required. Site monitoring during development, by an ECO or the heritage specialist are often added to this recommendation in order to ensure that no undetected heritage\ remains are destroyed.

Avoidance

This is appropriate where any type of development occurs within a formally protected or significant or sensitive heritage context and is likely to have a high negative impact. Mitigation is not acceptable or not possible. This measure often includes the change / alteration of development planning and therefore impact zones in order not to impact on resources.

Mitigation

This is appropriate where development occurs in a context of heritage significance and where the impact is such that it can be mitigated to a degree of medium to low significance, e.g. the high to medium impact of a development on an archaeological site could be mitigated through sampling/excavation of the remains. Not all negative impacts can be mitigated.

Compensation

Compensation is generally not an appropriate heritage management action. The main function of management actions should be to conserve the resource for the benefit of future generations. Once lost it cannot be renewed. The circumstances around the potential public or heritage benefits would need to be exceptional to warrant this type of action, especially in the case of where the impact was high.

Rehabilitation

Rehabilitation is considered in heritage management terms as a intervention typically involving the adding of a new heritage layer to enable a new sustainable use. It is not appropriate when the process necessitates the removal of previous historical layers, i.e. restoration of a building or place to the previous state/period. It is an appropriate heritage management action in the following cases:

- The heritage resource is degraded or in the process of degradation and would benefit from rehabilitation.
- Where rehabilitation implies appropriate conservation interventions, i.e. adaptive reuse, repair and maintenance, consolidation and minimal loss of historical fabric.
- Where the rehabilitation process will not result in a negative impact on the intrinsic value of the resource.

Enhancement

Enhancement is appropriate where the overall heritage significance and its public appreciation value are improved. It does not imply creation of a condition that might never have occurred during the evolution of a place, e.g. the tendency to sanitize the past. This management action might result from the removal of previous layers where these layers are culturally of low significance and detract from the significance of the resource. It would be appropriate in a range of heritage contexts and applicable to a range of resources. In the case of formally protected or significant resources, appropriate enhancement action should be encouraged. Care should, however, be taken to ensure that the process does not have a negative impact on the character and context of the resource. It would thus have to be carefully monitored