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ENVIRONMENTAL

Environmental Authorisation for the Pamish Magnetite Mine Project

Heritage Scoping Report

Project Number:

VMC3049

Prepared for:

Pamish Investment No. 39 (Pty) Ltd

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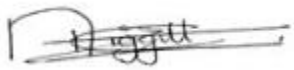
Name	Responsibility	Signature	Date
Natasha Higgitt Assistant Heritage Consultant ASAPA Member 335	Heritage Screening Survey & Report		12 January 2015
Justin du Piesanie Heritage Management Consultant: Archaeologist ASAPA Member 270	Heritage Scoping Report Compilation		02 February 2015
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I, Justin du Piesanie as duly authorised representative of Digby Wells and Associates (Pty) Ltd., hereby confirm my independence (as well as that of Digby Wells and Associates (Pty) Ltd.) and declare that neither I nor Digby Wells and Associates (Pty) Ltd. have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of VM Investment Company or Pamish Investment No. 39 (Pty) Ltd, other than fair remuneration for work performed, specifically in connection with the Heritage Resources Management (HRM) Process for the proposed Magnetite Project, Limpopo Province.

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ACRONYMS AND ABBREVIATIONS

ASAPA	Association of Southern African Professional Archaeologists
BA	Bachelor of Arts
BGG	Burial Ground and Graves
BGGC	Burial Ground and Graves Consultation
BID	Background Information Document
Bsc	Bachelor of Science
c.	circa, meaning approximately
CMP	Conservation Management Plan
CRR	Comments and Response Report
EAP	Environmental Assessment Practitioner
EFC	Early Farming Community (also known as Early Iron Age)
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
ESA	Early Stone Age
GIS	Geographical Information System
GPS	Global Positioning System
GRP	Grave Relocation Plan
HIA	Heritage Impact Assessment
Hons	Honours degree
HRM	Heritage Resources Management
IAIA	International Association for Impact Assessment
ICOMOS	International Council on Monuments and Sites
LFC	Late Farming Community also known as Late Iron Age

LIHRA	Limpopo Heritage Resources Authority
LoM	Life of Mine
LSA	Late Stone Age
MIA	Middle Iron Age
MPRDA	Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MSA	Middle Stone Age
Msc	Master of Science
Mt	Monument
NEM:WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID	Notification of Intent to Develop
NWA	National Water Act, 1998 (Act No. 36 of 1998)
RoM	Run of Mine
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SAMA	South African Museum Association
SEP	Stakeholder Engagement Process
Ste	Structure
STP	Shovel Test Pit
UP	University of Pretoria
Wf	Werf
Wits	University of the Witwatersrand

GLOSSARY

Archaeological	Material remains resulting from human activity that are in a state of disuse and older than 100 years, including artefacts, human and hominid remains and artificial features and structures. Rock art created through human agency older than 100 years, including any area within 10 m of such representation. Wrecks older than 60 years - either vessels or aircraft - or any part thereof that was wrecked in South Africa on land, internal or territorial waters, and any cargo, debris or artefacts found or associated therewith. Features, structures and artefacts associated with military history that are older than 75 years and the sites on which they are found, e.g. battlefields.
Archaeologist	A trained professional who uses scientific methods to excavate, record and study archaeological sites and deposits.
Artefact	Any object manufactured or modified by human beings.
Burial Grounds and Graves Consultation (BGGC)	The regulated consultation process required in terms of Section 36 of the NHRA and Regulations to the Act when burial grounds and graves are identified within a project area.
Conservation	In relation to heritage resources includes the protection, maintenance, preservation and sustainable use of places or objects so as to safeguard their cultural significance.
Cultural significance (CS)	The aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. A heritage may have cultural significance or other special value because of its: Importance in the community, or pattern of South Africa's history. Possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage. Importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects. Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group. Importance in demonstrating a high degree of creative or technical achievement at a particular period. Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons. Strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa. Significance relating to the history of slavery in South Africa.

Development	Any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of a heritage authority in any way result in a change to the nature, appearance or physical nature of a place, or influence its stability and future well-being, including: Construction, alteration, demolition, removal or change of use of a place or a structure at a place. Carrying out any works on or over or under a place. Subdivision or consolidation of land comprising, a place, including the structures or airspace of a place. Constructing or putting up for display signs or hoardings. Any change to the natural or existing condition or topography of land. Any removal or destruction of trees, or removal of vegetation or topsoil.
Field Rating	SAHRA requires heritage resources to be provisionally rated in accordance with Section 7 of the NHRA that provides a three tier grading system of resources that form part of the national estate. The rating system distinguishes between four categories: Grade I: Heritage resources with qualities so exceptional that they are of special national significance. Grade II: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region. Grade III: Other heritage resources worthy of conservation. General Protected: i.e. generally protected in terms of Sections 33 to 37 of the NHRA.
Grave	A a place of interment and includes the contents, headstone or other marker of such a place, and any other structure on or associated with such place.
Heritage Impact Assessment (HIA)	An assessment of the cultural significance of, and possible impacts on, diverse heritage resources that may be affected by a proposed development. A HIA may include several specialist elements such as archaeological, built environment and palaeontological studies. The HIA must supply the heritage authority with sufficient information about the sites to assess, with confidence, whether or not it has any objection to a development, indicate the conditions upon which such development might proceed and assess which sites require permits for destruction, which sites require mitigation and what measures should be put in place to protect sites that should be conserved. The content of HIA reports are clearly outlined in Section 38(3) of the NHRA and SAHRA Minimum Standards.
Heritage resource	Any place or object of cultural significance.
Heritage resources management	Process required when development is intended categorised as: Any linear development exceeding 300m in length.

	Construction of a bridge or similar structure exceeding 50 m in length. Any activity which will change the character of a site exceeding 0.5 hectares in extent or involving three or more existing erven or subdivisions thereof or that have been consolidated within the past five years or costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority. Re-zoning of a site exceeding one hectare in extent. Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.
Heritage site	Any place declared to be a national heritage site by SAHRA or a place declared to be a provincial heritage site by a provincial heritage resources authority.
Living / intangible heritage	The intangible aspects of inherited culture that could include cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems, the holistic approach to nature, society and social relationships.
National estate	The national estate as defined in Section 3 of the NHRA, i.e. heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations. The national estate may include: Places, buildings, structures and equipment of cultural significance. Places to which oral traditions are attached or which are associated with living heritage. Historical settlements and townscapes. Landscapes and natural features of cultural significance. Geological sites of scientific or cultural importance. Archaeological and palaeontological sites. Graves and burial grounds, including ancestral graves, royal graves and graves of traditional leaders, graves of victims of conflict, graves of individuals designated by the Minister by notice in the Gazette, historical graves and cemeteries, and other human remains which are not covered in terms of the National Health Act, 2003. Sites of significance relating to the history of slavery in South Africa. Movable objects, including objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens; objects to which oral traditions are attached or which are associated with living heritage; ethnographic art and objects; military objects; objects of decorative or fine art; objects of scientific or technological interest. Books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

Object	Any movable property of cultural significance which may be protected in terms of any provisions of this Act, including: any archaeological artefact; palaeontological and rare geological specimens; meteorites; and other objects referred to in Section 3 of the NHRA.
Palaeontological	Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trance.
Palaeontologist	A trained professional who uses scientific methods to excavate, collect, record and study palaeontological sites and fossils.
Pedestrian survey	A method of examining a site in which surveyors, spaced at regular intervals, systematically walk over the area being investigated.
Phase 1 Archaeological Impact Assessment (AIA)	Phase 1 AIAs generally involve the identification and assessment of sites during a field survey of a portion of land that is going to be affected by a potentially destructive or landscape-altering activity.
Phase 2 Archaeological Impact Assessment (AIA)	Phase 2 AIAs are primarily based on salvage or mitigation excavations preceding development that will destroy or impact on a site. This may involve collecting of artefacts from the surface and / or excavation of representative samples of the artefactual material to allow characterisation of the site and the collection of suitable materials for dating the sites. Phase 2 AIAs aim to obtain a general idea of the age, significance and meaning of the site that is to be lost and to store a sample that can be consulted at a later date for research purposes. Phase 2 excavations can only be done under a permit issued by SAHRA, or other appropriate heritage agency, to the appointed archaeologist.
Phase 3 Management Plan / Conservation Management Plan (CMP)	On occasion, a site may require a Phase 3 programme involving the modification of the site or the incorporation of the site into the development itself as a site museum, a special conservation area or a display. Alternatively it is often possible to relocate or plan the development in such a way as to conserve the archaeological site or any other special heritage significance the place may have. For example, in a wilderness area or open space when sites are of public interest the development of interpretative material is recommended and adds value to the development. Permission for the development to proceed can be given only once the heritage resources authority is satisfied that measures are in place to ensure that the archaeological sites will not be damaged by the impact of the development or that they have been adequately recorded and sampled. Careful planning can minimise the impact of archaeological surveys on development projects by selecting options that cause the least amount of inconvenience and delay. The process as explained above allows the rescue and preservation of

	information relating to our past heritage for future generations. It balances the requirements of developers and the conservation and protection of our cultural heritage as required of SAHRA and the provincial heritage resources authorities (ASAPA).
Place	A place includes: a site, area or region; a building or other structure which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure; a group of buildings or other structures which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures; an open space, including a public square, street or park; and in relation to the management of a place, includes the immediate surroundings of a place.
Pre-disturbance survey (syn. reconnaissance)	A survey to record a site as it exists, with all the topographical and other information that can be collected, without excavation or other disturbance of the site.
Reconnaissance	A broad range of techniques involved in the location of archaeological sites, e.g. surface survey and the recording of surface artefacts and features, the sampling of natural and mineral resources, and sometimes testing of an area to assess the number and extent of archaeological resources. However, in terms of South African practice, reconnaissance during a so-called Phase 1 AIA never inlcudes sampling as this is a permitted activity, usually undertaken during so-called Phase 2 AIAs (ASAPA).
Run of Mine (RoM)	Coal delivered from the mine that reports to the coal preparation plant, i.e. the raw material consisting of coal, rocks, middlings, minerals and contamination.
Site	Any area of land, including land covered by water, and including any structures or objects thereon.
Structure	Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.
Tangible heritage	Physical heritage resources such as archaeological sites, historical buildings, burial grounds and graves, fossils, etc. Tangible heritage may be associated with intangible elements, e.g. the living cultural traditions, rituals and performances associated with burial grounds and graves and deceased persons.
Werf (pl. werfs)	The Afrikaans word for ‘farmyard’, and a more correct one in the local context as it includes the buildings on it, more than just the space itself. It is the roughly level, uncultivated but close-cropped open space on which

	the buildings of a farm complex are arranged.
Early Stone Age	The South African ESA dates from ~3 Mya to c. 250 Kya. This period is associated with later Australopithecus and early Homo species. The lithic industries that characterise the ESA include Oldowan and Early Acheulian, typically as simple core tools, choppers handaxes and cleavers.
Middle Stone Age	The South African MSA dates from ~300 Kya to c. 30 Kya. This period is associated with the changing behavioural patterns and the emergence of modern cognitive abilities in early Homo sapiens species. The lithic industries that characterise the MSA are typically more complex tools with diagnostic identifiers, including convergent flake scars, multi-faceted platforms, retouch and backing. Assemblages are characterised as refined lithic technologies such as prepared core techniques, retouched blades and points manufactured from good quality raw material
Late Stone Age	The South African LSA dates from ~30 Kya. This period is associated with modern Homo sapiens sapiens and the complex hunter-gatherer societies, ancestral to the Bushmen / San and Khoi. The LSA lithic assemblage contains microlithic technology and composite tools such as arrows commonly produced from fine-grained cryptocrystalines, quarts and chert. The LSA is also associated with archaeological rock art including both paintings and engravings.
Farming Community/ies	Term signifying the appearance in the southern African archaeological of Bantu-speaking agricultural based societies from the early first millenium CE. The term replaces the *Iron Age* as a more accurate description for groups who practiced agriculture and animal husbandry, extensive manufacture and use of ceramics, and metalworking. The Farming Community period is divided into an Early and Late phase. The use of Later Farming Communities especially removes the artifical boundary between archaeology and history.
Early Farming Community/ies	The first Farming Communities (also known as Early Iron Age) that appear in the souther archaeological record during the early first millenium CE. The EFC period is generally dated from c. 200 CE to 1000 CE.
Late Farming Community/ies	Farming Communities who either developed / evolved from EFC groups, or who migrated into southern African from the late first millenium / early second millenium CE. The LFC period evidences distinct changes in socio-political organisation, settlement patterns, trade and econmic activities, including extensive trade routes. The LFC period is generally dated from c. 1000 CE well into the modern historical period of the nineteenth century.

Ceramic facies / facies	Subgroups of a primary ceramic tradition or sequence. Typically used in ceramic analyses. Various facies are attributed to different temporal periods based of radiometric dates obtained from archaeological contexts. Facies are often used to infer cultural identity of archaeological groups. However, in context of this study identified ceramic facies merely provide a relative temporal context for archaeological sites in the landscape.
Ceramic tradition	The sequence of ceramic styles that develop out of each other and form a continuim. A tradition is the primary group to which subsequent ceramic facies belong. A ceramic tradition can be broadly associated with various linguistic and cultural groups, but do not represent any given ethinc identity, especially during the LFC period.
Ceramic (syn. pottery)	In an archaeological context any vessel or other object produced from natural clay that has been fired. Indigenous ceramics associated with Farming Communities are low-fired wares, typically found as potsherds. Imported and more historic ceramics generally inlcude high-fired wares such as porcelain, stoneware, etc.

EXECUTIVE SUMMARY

Introduction

Pamish Investments No. 39 (Pty) Ltd (Pamish) are proposing to develop a new opencast Magnetite mine approximately 35 kilometres (km) northwest of Mokopane town, within Limpopo Province (i.e. the Magnetite Project). The applicant is bound by national legislation to submit a Mining Right Application (MRA) to the Department of Mineral Resources (DMR), and simultaneously apply for Environmental Authorisation (EA) from the Department of Environmental Affairs (DEA). Digby Wells Environmental (Digby Wells) was appointed to undertake the environmental and social baseline studies required for the MRA and EA, according to national legislative requirements and international best practices standards and principles.

This document presents the specialist Heritage Scoping Report (HSR) to inform the greater project Scoping Report.

The heritage scoping study was designed to comply with the relevant national legislative requirements as contained in the National Heritage Resources Act, 1999 (NHRA), Minerals and Petroleum Resources Development Act, 2002 (MPRDA) and National Environmental Management Act, 1998 (NEMA).

Project Description

The proposed Magnetite Project is a greenfields operation situated approximately 33 km north-west of Mokopane, within a rural setting. The prospecting right area comprises several farms, namely Vogelstruisfontein 765 LR, Vriesland 781 LR, Vleigekraal 783 LR, Schoonoord 786 LR and portions Re/1, Re/2, 3, 4, 5 and 6 of the farm Bellevue 808 LR. Probable project- affected villages include Ditlotswana, Malokong, Mosate and Sepharane.

Cultural Heritage Baseline

Considering the regional geology and palaeontological sensitivity, the site specific study area has largely no significance. However, a small area with high palaeontological sensitivity is located in the south-western part of the study area. This area has expressions of the Malmani Subgroup of the Chuniespoort Group of the Transvaal Supergroup, dated to between ~2600 Ma and ~2000 Ma. The presence of Malmani dolomites in the site specific study area should therefore be highlighted as a sensitive area. These dolomites are associated with the more extensive Makapan Valley karst landscape, but falls outside the protected area.

The geology of the area influences the distribution and availability of raw material for the production of Stone Age lithics. All three Stone Age periods have been recorded in the regional study area and throughout the Limpopo Province: Early Stone Age (ESA, ca. 3 Ma to 300 Ka), Middle Stone Age (MSA, ca. 300 Ka to 30 Ka) and Later Stone Age (LSA, ca. 30 Ka to 2000 years ago). At least one assessment study reported an LSA deposit in the local study area (about 16 km south of the site specific study area) that included diverse rock art

from various periods. The predominant type was, however, white finger paintings associated with Late Farming Communities, known as “Late White”.

Ceramic sherds and stone walled settlements were identified during the scoping survey of the project area, as well as in several archaeology and heritage studies previously completed in the region. The ceramics provide evidence of Late Farming Communities settlement from at least the 17th century CE continuing to the 19th century CE. This is consistent with the regional study area. In addition, stonewalled sites were also identified in the scoping survey and in reports. The combination of the various ceramic facies and types of stonewalled sites provide evidence of long-term occupation by Kekana and Langa Northern Ndebele as well as other groups.

There is sufficient evidence that prove continuity from Farming Community settlement into the historic period, and the division must be understood as largely artificial.

The site-specific study area is located within the historic Bakenberg Location, also known as the Hendrik Masibi Location, one of the original three chiefdoms settled in locations created by the ZAR government. The area is at present under the Bakenberg Tribal Authority’s jurisdiction. The scoping survey, historical aerial images and previously completed assessment studies have provided evidence for several archaeological and historic stonewalled sites within the study area. This includes Hendrik Masibi’s historic early 20th century capital that was identified during the scoping survey.

Scoping Survey Results

During the scoping survey, the following resources were identified:

Resource Type	Number
Stone Age Scatter	3
Farming Communities / Historic	7
Burial Grounds and Graves	3

Identified Potential Risks and Impacts

Some heritage resources may be so significant or sensitive that any development will be detrimental to their continued survival. In addition, certain heritage resources are formally protected that restricts various development activities. The primary risk associated with highly significant heritage resources to the Magnetite Project is that the presence of any such resources may result in negative Records of Decision and / or restrictions imposed on development activities.

Potential impacts on heritage resources are associated with the operational phases of the Magnetite Project. The highest likelihood of changes to heritage resources is associated with

activities that will be undertaken during the construction phase. Here, the potential negative impacts, such as damage or destruction, are the greatest. During the operation phase of the proposed project, sources of risk to heritage resources are limited. The primary risk during the operational phase will be associated with the degradation of the sense-of-place of the project area. Although the study area has over the years been altered through urbanisation, agricultural and mining activities, thereby possibly minimising the intensity of this risk to heritage resources, urbanisation and mining can form part of people's heritage.

Recommendations

Based on our understanding of the cultural landscape and the identified heritage resources within the project area, Digby Wells recommends the following:

- Exemption from further palaeontological assessments for the proposed infrastructure footprint as the palaeo-sensitivity is insignificant. Although the dolomites are located within the prospecting right area, they are located at least 8 km from the infrastructure footprint;
- An HIA be undertaken that includes the following heritage components:
  - An Archaeological Impact Assessment including reconnaissance to identify and record archaeological resources within the impact footprint;
  - An assessment of burial grounds and graves including reconnaissance to identify, record and document all burials that may exist in the impact footprint;
  - Integration of additional specialist studies to determine any possible living heritage in the project area. Studies that may be considered for integration include Social Impact Assessment, Biophysical Assessment and Visual Assessment.

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1 Introduction

Pamish Investments No. 39 (Pty) Ltd (Pamish) are proposing to develop a new opencast Magnetite mine approximately 35 kilometres (km) northwest of Mokopane town, within Limpopo Province (i.e. the Magnetite Project). The applicant is bound by national legislation to submit a Mining Right Application (MRA) to the Department of Mineral Resources (DMR), and simultaneously apply for Environmental Authorisation (EA) from the Department of Environmental Affairs (DEA).

The application process is phased, where the first phase requires the compilation of a Scoping Report that contains baseline information of the proposed project area. The second phase requires that an Environmental Impact Assessment (EIA) be undertaken where possible impacts on the baseline environment are assessed, ranked and recommended management and mitigation measures are proposed. The EIA comprises diverse specialist assessments that are collated into an Environmental Impact Report (EIR). The EIA / EIR inform and guide the compilation of an Environmental Management Plan (EMP).

Digby Wells Environmental (Digby Wells) was appointed to undertake the environmental and social baseline studies required for the MRA and EA, according to national legislative requirements and international best practices standards and principles. This document presents the specialist Heritage Scoping Report (HSR) to inform the greater project Scoping Report.

1.1 Terms of Reference for the Study

The Terms of Reference (ToR) for the heritage scoping assessment are to:

- Describe the baseline cultural landscape within which the Magnetite Project is located; and
- Identify the potential heritage impacts that may arise as a result of the proposed operation, and that will be investigated in greater detail during the EIA phase of the project.

1.2 Policy and legal framework

This section briefly discusses national and international legislation relevant to heritage resources management. The section begins with a summary of South African legislation, policy and plans, followed by an overview of relevant international law, standards and guidelines.

1.2.1 National Legislation and Policies

1.2.1.1 The South African Constitution

The South African Constitution supersedes all other legislation, entitling every South African citizen to certain rights (with responsibilities), and imposes obligations and restrictions on

individuals or entities. In terms of heritage, the Constitution entitles every person or community to the right to enjoy their culture, practise their religion and use their language.

1.2.1.2 National Environmental Management Act, 1998 (NEMA)

This Act provides that sustainable development requires the integration of social, economic and environmental factors in the planning, implementation and evaluation of decisions so as to ensure that development serves present and future generations. The Act further sets out the process for public participation in terms of the NEMA Regulations GNR 733 of 8 December 2014.

1.2.1.3 National Heritage Resources Act, 1999 (NHRA)

The NHRA is the overarching legislation that protects and regulates the management of heritage resources in South Africa. This Act considers various heritage resources as forming part of the national estate as contemplated in Section 3. In addition, certain other categories are afforded automatic formal or general protection, outlined below:

- Formal protection:
  - Section 27 - national (Grade I) and provincial (Grade II) heritage sites;
  - Section 28 - protected areas; and
  - Section 32 - heritage areas.
- General protection:
  - Section 34 – historical built environment;
  - Section 35 – archaeology, palaeontology and meteorites;
  - Section 36 – burial grounds and graves; and
  - Section 37 - public monuments and memorials.

Section 5 of the NHRA outlines general principles for heritage resources management that the specialist heritage component of the Magnetite Project aims to adhere to.

Section 38 provides the HRM process and minimum requirements that need to be complied with:

- Subsection (8) requires a HIA study to be conducted if an impact assessment is required in terms of any other Act. In this instance impact assessments are required by several Acts, but notably the NEMA and MPRDA; and
- Subsection (3) outlines the minimum information that must be included in a HIA report.

This report was completed to comply in part with Section 38 of the Act. Digby Wells has developed a HRM approach in an attempt to fully integrate with both the MPRDA and NEMA

processes. This approach aims to comply with Sections 5 and 38(3) of the NHRA, and can be made available to interested parties on request.

1.2.1.4 Mineral and Petroleum Resources Development Act, 2002 (MPRDA)

Upon the acceptance of an application for a mining right, the applicant is required to prepare an Environmental Management Programme (EMP) in accordance with requirements of the MPRDA, to mitigate diverse impacts of the proposed development, including heritage impacts.

1.2.1.5 Extension of Security of Tenure Act (ESTA) (Act No. 62 of 1997)

This Act confers certain rights to non-landowning residents of a property, where such rights are linked to the period of time in which persons have been resident on the land. The Act applies to all rural areas in South Africa, regardless of whether the land is used for farming or mining purposes. The application of this Act to this study is specific to provisions regarding burial grounds and graves.

1.2.1.6 National Development Plan (NDP)

Development in South Africa is guided by the NDP, which presents a shared long-term strategic framework within which more detailed development planning can take place in order to advance the long-term goals adopted in the NDP (National Planning Commission, 2011). The Plan aims to ensure that all South Africans attain a decent standard of living through the elimination of poverty and the reduction of inequality.

1.2.1.7 Integrated Development Plans (IDPs)

Development policies comprise initiatives and plans intended to guide development on national, provincial, district and local levels. These documents also include spatial and economic development frameworks and plans. This section briefly outlines development policies relevant to this heritage scoping report. More information and additional documents are discussed in more detail in the socio-economic scoping report.

Two Integrated Development Plans (IDPs) were reviewed in this study: the Mogalakwena Local Municipality IDP (MLM-IDP, 2012); Waterberg District Municipality IDP (WDM-IDP, 2014). An IDP is a municipal-level planning document that aims to provide a developmental framework for regional and local government, in which municipalities must provide leadership, management, budgeting, and direction in the provision of services and infrastructure. They serve to guide developmental planning and community development. Municipal IDPs highlight local needs and priorities that could be considered by the project.

1.2.2 International standards and guidelines

1.2.2.1 International Finance Corporation Performance Standard 8: Cultural Heritage

This Performance Standard (PS) recognises the importance of cultural heritage for current and future generations. Consistent with the United Nations Education, Scientific and Cultural Organisation (UNESCO) World Heritage Convention (WHC). This PS aims to ensure that cultural heritage is protected in the course of project activities. In addition, the requirements of this PS on a project's use of cultural heritage are based in part on standards set by the UNESCO Convention on Biological Diversity. The objectives of PS 8 are:

- To protect cultural heritage from the adverse impacts of project activities and support its preservation.
- To promote the equitable sharing of benefits from the use of cultural heritage.

1.2.2.2 UNESCO World Heritage Convention

The UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972 is an international legal instrument that binds South Africa to tis content and supplementary texts. In addition, the WHC is referenced in the IFC PS 8: Cultural Heritage. These texts include among others charters and doctrinal texts published by the International Council on Monuments and Sites (ICOMOS).

The Socio-economic Scoping Report contains details of other legislation and policy that could be relevant to this study, but that is not discusses here for the sake of brevity.

1.3 Constraints and Limitations

The following constraints and limitations were experienced as part of the heritage scoping study:

- The NEMA Regulations that came into effect on 8 December 2014 significantly constrains timeframes within which studies can be completed;
- The heritage scoping report is primarily desktop based – field work was limited to a screening site visit undertaken over 1.5 days and focused on the proposed infrastructure footprint;
- The HSR is not intended to present an exhaustive list and description of heritage resources;
- The purpose of the screening site visit was to visually document the current conservation status of the cultural landscape, and to ground-truth certain tangible heritage resources identified in the literature review. The screening survey did not use systematic, controlled survey techniques, nor was it intended to be a comprehensive survey of the proposed project area. The survey was further hindered

by the presence of very dense *Dichrostachys cinerea* / sickle bush growth. Heavy rain immediately preceding and during the survey also restricted access to certain roads and areas. A more intensive reconnaissance will be completed during the Heritage Impact Assessment;

- Desktop findings are based on available research from credible sources. These sources are cited in text and listed in the reference list at the end of the literature review in Appendix C. While every attempt to obtain the latest available information was made, reviewed literature does not represent an exhaustive list of information sources for the study area;
- Time constraints did not allow the heritage specialists to engage any stakeholders in respect of heritage resources: should heritage-focusses stakeholder participation be required this will take place as part of the wider Stakeholder Engagement Process and Environmental Impact Assessment;
- Where historic aerial imagery was used, the quality was generally poor resulting in pixelated images that limited the interpretation of these images;
- Many tangible heritage resources, specifically archaeological resources, commonly occur below the visible surface, and may not be adequately recorded, documented and assessed without intrusive and destructive methods. Such investigations are outside the scope of this HSR and the consequent HIA, as well as beyond the requirements to conduct a HIA in terms of the NHRA.

1.4 Specialist Expertise

Natasha Higgitt undertook a screening site visit. She obtained her Bachelor of Arts (BA) Honours degree in Archaeology in 2010 from the University of Pretoria. She currently holds the position of Assistant Heritage Consultant: Archaeology Specialist at Digby Wells. She has more than 3 years' experience in archaeological survey and gained further generalist heritage experience since her appointment at Digby Wells in South Africa and Liberia.

Natasha is a professional member of the Association of Southern African Archaeologists (ASAPA) (*Member No. 335*).

Justin du Piesanie compiled the Heritage Scoping Report. He obtained his Master of Science (MSc) degree in Archaeology from the University of the Witwatersrand in 2008, specialising in the Southern African Iron Age. He currently holds the position of Heritage Management Consultant: Archaeologist at Digby Wells. He has over 5 years combined experience in Heritage Resources Management (HRM) in South Africa, including heritage assessments, archaeological mitigation and grave relocation. Justin has gained further generalist experience since his appointment at Digby Wells in Burkina Faso, the Democratic Republic of Congo, Liberia and Mali on projects that have required compliance with International Finance Corporation (IFC) requirements such as Performance Standard 8: Cultural Heritage.

Justin is a professional member of ASAPA (*Member No. 270*) and the International Council on Monuments and Sites (ICOMOS) South Africa (*Member No. 14274*).

Johan Nel reviewed the Heritage Scoping Report and compiled the geological background section. He has more than 13 years of combined experience in the field of HRM including archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. He has gained experience both within urban settings and remote rural landscapes. Since 2010 he has been actively involved in environmental management that has allowed me to investigate and implement the integration of heritage resources management into environmental impact assessments (EIA). Many of the projects since have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. This exposure has allowed Johan to develop and implement a HRM approach that is founded on international best practice, leading international conservation bodies such as the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and ICOMOS and aligned to the South African legislation. Johan has worked in most South African Provinces, as well as Swaziland, the Democratic Republic of the Congo, Liberia and Sierra Leone.

Johan is a professional member of ASAPA (*Member No. 095*) and ICOMOS South Africa (*Member No. 13839*).

1.5 Structure of Heritage Scoping Report

The rest of this heritage scoping report is structured as follows:

- Section 2 describes the methodology adopted for this study and includes descriptions on the study areas, data collection and compilation of the cultural heritage baseline profile;
- Section 3 provides a summary of the proposed project, project activities and initially identifies project-related risks and impacts;
- Section 4 discusses the cultural heritage baseline profile based on the literature review attached as Appendix B and the results of the scoping survey;
- Section 5 presents a provisional Statement of Cultural Significance for the project area;
- Section 6 outlines possible heritage risks to the project;
- Section 7 discusses possible heritage impacts that may likely occur by the proposed project activities; and
- Section 8 concludes the study with recommendations regarding aspects that will require specific attention during the HIA that will be undertaken during the impact assessment phase of the project.

2 Methodology

The heritage scoping study was designed to comply with the relevant national legislative requirements as contained in the NHRA, MPRDA and NEMA. The activities undertaken as part of the study are described below.

2.1 Defining of the Study Areas

Notwithstanding that this report constitutes a scoping study, it forms the foundation the evaluation of cultural significance and impact assessment will be based. Defined study areas must therefore be useful for the impact assessment phase. The IFC (2012) generally defines a "study area" for an impact assessment as the area most likely to experience impacts arising from or to exert an influence on, the project or activity being assessed.

In terms of heritage impact assessments this is complicated by the fact that different heritage impacts may manifest in different geographical areas and diverse communities. For instance, heritage impacts can simultaneously affect the physical resource and have social repercussions: for example negative impacts on heritage sites associated with a particular community's history can manifest as social issues within the community, even if that community is not resident at or near the site.

This is compounded when the intensity of physical impacts and social repercussions differ significantly. In addition, heritage impacts can influence the cultural significance of heritage resources without any actual physical impact on the resources taking place. Heritage impacts can therefore generally be placed into three broad categories (adapted from Winter & Bauman 2005: 36):

- **Direct or primary heritage impacts** affect the fabric or physical integrity of the heritage resource, for example destruction of an archaeological site or historical building. Direct or primary impacts may be the most immediate and noticeable. Such impacts are usually ranked as the most intense, but can often be erroneously assessed as high-ranking.
- **Indirect, induced or secondary heritage impacts** can occur later in time or at a different place from the causal activity, or as a result of a complex pathway. For example, restricted access to a heritage resource resulting in the gradual erosion of its cultural significance that may be dependent on ritual patterns of access. Although the physical fabric of the resource is not affected through any primary impact, its significance is affected that can ultimately result in the loss of the resource itself.
- **Cumulative heritage impacts** result from in-combination effects on heritage resources acting within a host of processes that are insignificant when seen in isolation, but which collectively have a significant effect. Cumulative effects can be:
  - **Additive**: the simple sum of all the effects, e.g. the total number of development activities that will occur within the study area.

- **Synergistic**: effects interact to produce a total effect greater than the sum of the individual effects, e.g. the effect of each different activity on the archaeological landscape in the study area.
- **Time crowding**: frequent, repetitive impacts on a particular resource at the same time, e.g. the effect of regular blasting activities on a nearby rock art site or protected historical building high.
- **Neutralizing**: where the effects may counteract each other to reduce the overall effect, e.g. the effect of changes in land use could reduce the overall impact on sites within the archaeological landscape of the study area.
- **Space crowding**: high spatial density of impacts on a heritage resource, e.g. density of new buildings resulting in suburbanisation of a historical rural landscape.

The relevance of the above distinction to defining the study area arises from the fact that heritage resources do not exist in isolation to the wider natural, social, cultural and heritage landscape: cultural significance is therefore also linked to rarity / uniqueness, physical integrity and importance to diverse communities. In addition, the NHRA requires that heritage resources are graded in terms of national, provincial and local concern based on their importance and consequent official (i.e. State) management effort required. The type and level of baseline information required to adequately predict heritage impacts varies between these categories. Three 'concentric' study areas were defined for the purposes of this study. These areas are defined below; each one encompasses its precursor and exceeds it in scale:

- First, it provided the context within which identified heritage resources need to be interpreted and understood to determine cultural significance; and
- Second, assessing the significance of impacts on heritage resources corresponding to the three impact categories listed above.

- The *site-specific study area* – this is the area where heritage impacts are most probable due to development. This area is defined as the extent of the farm portions of the proposed project area including a 500 m buffer area around project area. The site-specific study area may extend linearly. In such instances, the linear development, e.g. a road, is defined as the site-specific area including a 200 m buffer either side of the development footprint. (Figure 2-3).
- The *local study area* – the area most likely to be influenced by any changes to heritage resources in the project area, or where project development could cause heritage impacts. This area was defined as the immediate surrounding properties / farms, as well as the affected local municipality. The local study area was specifically examined to provide a backdrop to the socio-economic conditions within which the proposed development will occur. The local study area furthermore provided the local

development and planning context that may contribute to cumulative impacts (Figure 2-2).

- The *regional study area* - : this area was defined as the district municipality. Where necessary, the regional study area was extended outside the boundaries of the district municipality to include much wider regional expressions of specific types of heritage resources and historical events. The regional study area also provided the regional development and planning context that may contribute to cumulative impacts (Figure 2-1).

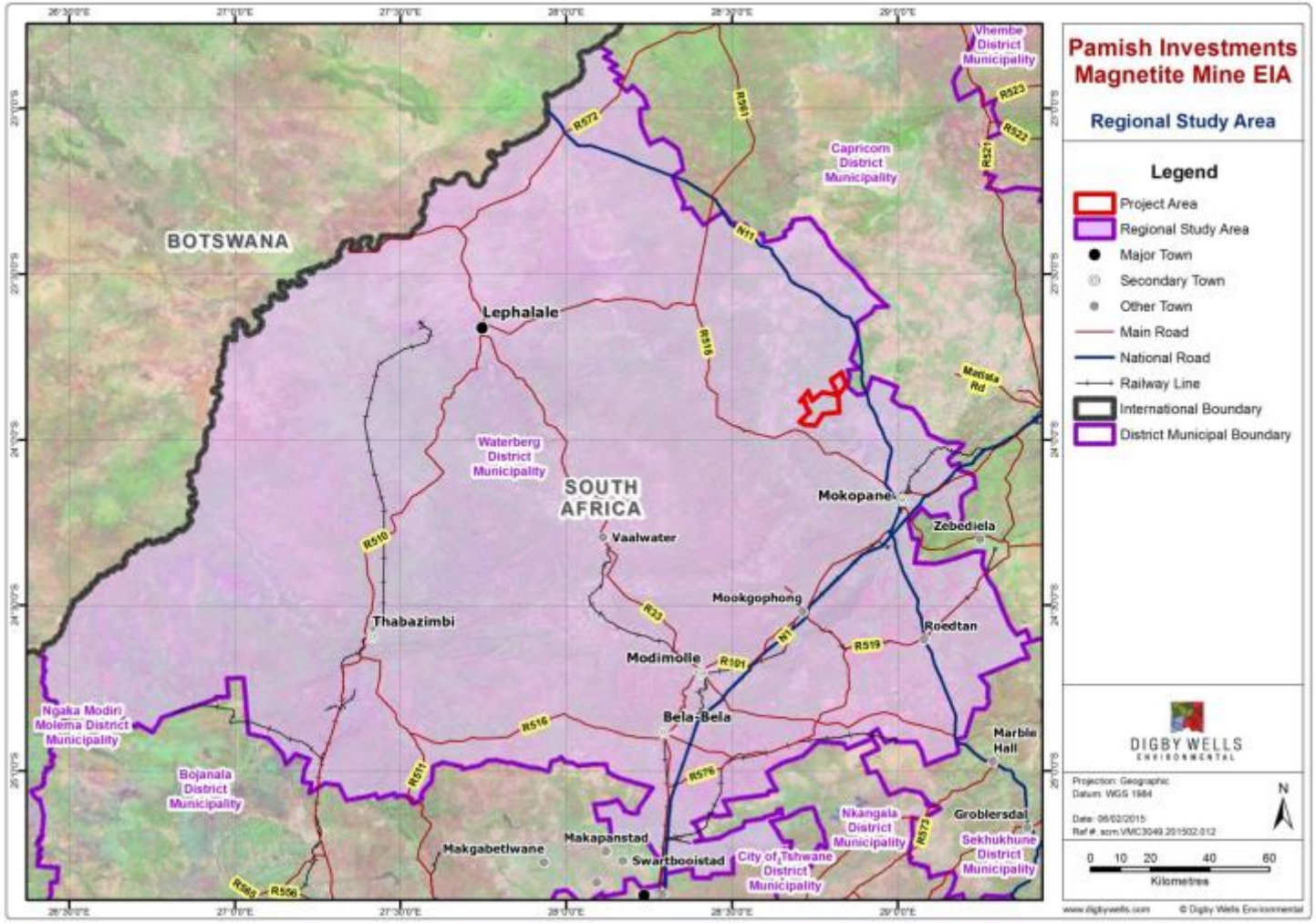

Figure 2-1: Regional study area

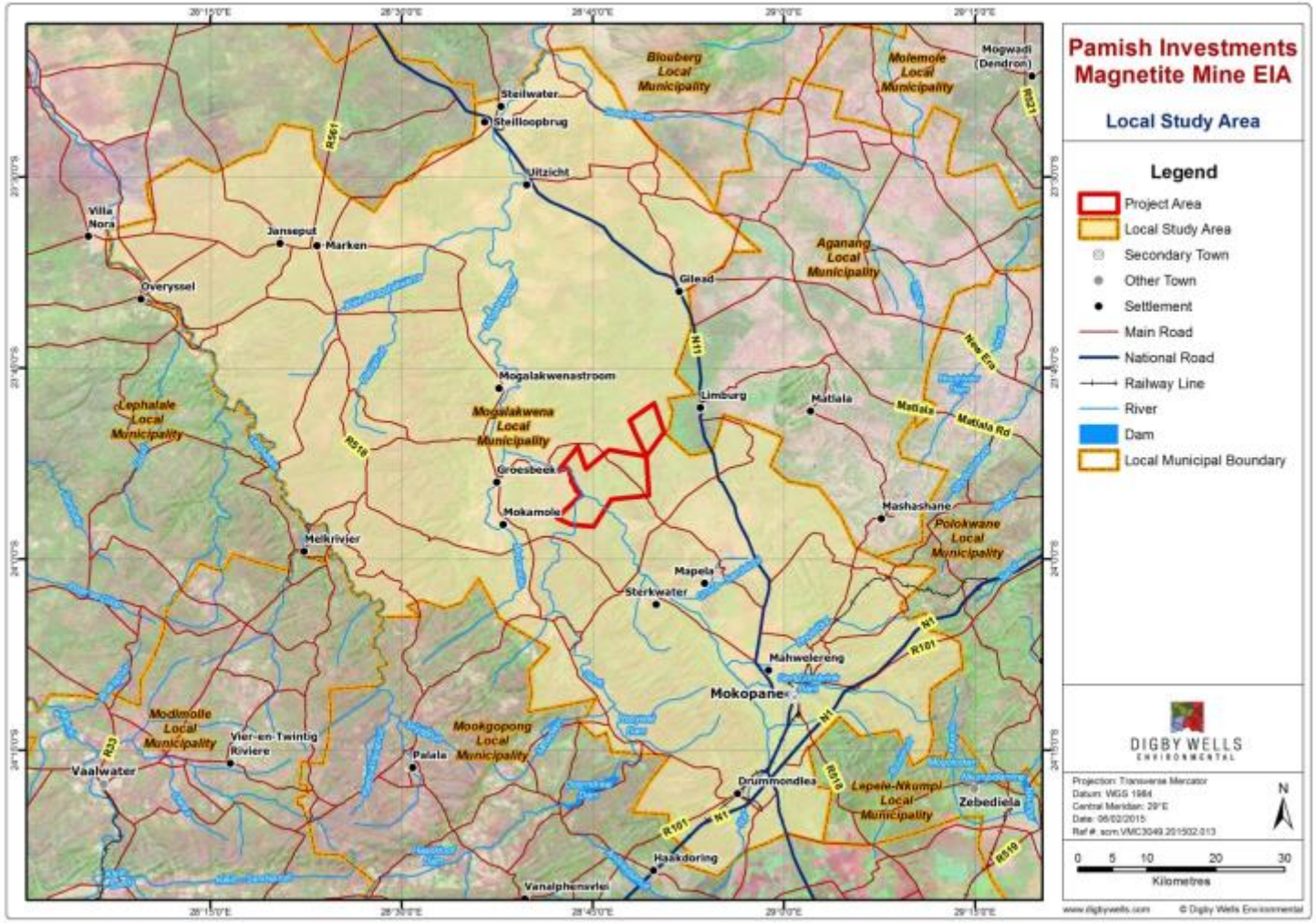

Figure 2-2: Local study area

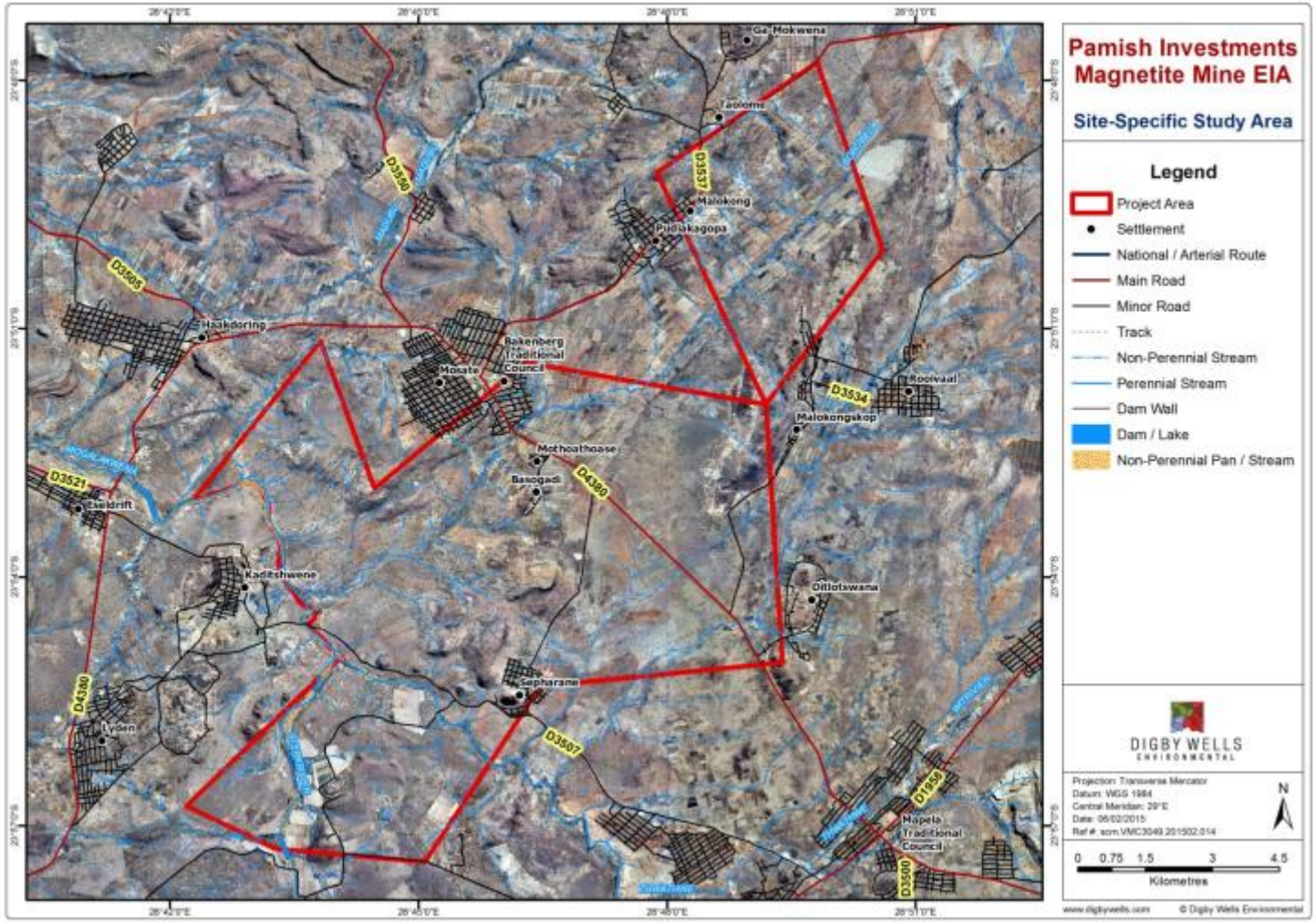

Figure 2-3: Site specific study area

2.2 Data Collection

The purpose of data collection is to gather relevant information to develop a cultural heritage baseline profile for the proposed Magnetite Project. Data collection was both qualitative and quantitative. Qualitative data was primarily obtained through secondary information sources, i.e. desktop literature review and historical layering. Quantitative data was obtained through field surveys where primary, raw data was collected – for example observed archaeological sites. Both methods are described in more detail below.

2.2.1 Qualitative data collection

A survey of diverse information repositories was made to identify appropriate relevant information sources. These sources were analysed for credibility and relevance. Credible, relevant sources were then critically reviewed. The objectives of the literature review were to:

- Gain an understanding of the cultural landscape within which the proposed project is located;
- Identify any potential fatal flaws, sensitive areas, current social complexities / issues and known or possible tangible heritage; and
- Inform the scoping site visit.

Repositories that were surveyed included the SAHRIS, online / electronic journals and platforms, and certain internet sources. This Heritage Scoping Report only includes a summary and discussion of the most relevant findings: please refer to Appendix B for the complete literature review. Relevant sources were cited and included in the literature review's reference list. However, Table 2-1 to Table 2-2 below summarise the relevant reviewed literature and other sources.

Historical layering is a process whereby diverse cartographic sources from various time periods are layered chronologically using Geographic Information System (GIS). The rationale behind historical layering is threefold, as it:

- Enables a virtual representation of changes in the land use of a particular area over time;
- Provides relative dates based on the presence/absence of visible features; and
- Identifies potential locations where heritage resources may exist within an area.

Cartographic sources referred to in this report are listed in Table 2-2.

Table 2-1: Summary of reviewed literature, reports and databases

Geology & Palaeontology		
Baker, 2006	Longridge, 2013	SAHRA, 2013b
Barker, et al., 2006	Longridge, 2014	SAHRA, 2013c
Cawthorn, et al., 2006	McCarthy, et al., 2011	SAHRA, 2013d
Colarossi, 2013	Martini, 2006	SAHRIS, 2014
Eriksson, et al., 2006	Robb, et al., 2000	Sinclair, et al., 2003
Esterhuysen, 2010	Robb, et al., 2006	
Knight, et al., 2014	SAHRA, 2013a	
Stone Age		
Deacon & Deacon, 1999	Goodwin & Van Riet Lowe, 1929	Mitchell, 2002
Esterhuysen, 2003(a)	Latham & Herries, 2004	
Esterhuysen & Smith, 2007	Lombard, et al., 2012	
Rock Art		
Henry, 2010	Prins & Hall, 1994	Smith & van Schalkwyk, 2002
Namono & Eastwood, 2005	Smith & Ouzman, 2004	
Iron Age		
Dalby, 1975	Huffman, 2004	Mitchell, 2002
Huffman, 1980	Huffman, 2007	
Colonial / Historical		
Bonner, 1983	Hofmeyr, 1988	Saccaggi, 2012
Delius, 1983	Hofmeyr, 1989	Skosana, 2012
Esterhuysen, 2003(a)	Hofmeyr, 1992	Skosana, 2013
Esterhuysen, 2003(b)	Huffman, 2004	Tobias, 1945
Esterhuysen, 2006	Jackson, 1969	Transvaal Native Affairs Department, 1905(a)
Esterhuysen, 2007	Jackson, 1982	Transvaal Native Affairs Department, 1905(b)
Esterhuysen, et al., 2009	Kopytoff, 1987	

Esterhuysen, 2012	Naidoo, 1987	
Planning documents		
Mogalakwena Local Municipality, 2012	Statistics SA, 2011	Waterberg District Municipality, 2014
Databases		
GSSA	SAHRIS	Wits Archaeological Site Database

Relevant assessment reports					
Author	**Report type**	**SAHRA Reference**	**Author**	**Report type**	**SAHRA Reference**
Coetzee, 2011	HIA	Case ID 1799	Pistorius, 2002	HIA	2002-SAHRA-0085
Hutten, 2013	HIA		Pistorius, 2008	HIA	Case ID: 1574
Kusel, 2005	HIA	2005-SAHRA-0053	Roodt, 2008(a)	HIA	2008-SAHRA-0246
Kusel, 2007	HIA	2007-SAHRA-0506	Roodt, 2008(b)	HIA	2008-SAHRA-0263
Munyai & Roodt, 2006	HIA	2006-SAHRA-0202	Roodt, 2008(c)	HIA	2008-SAHRA-0324
Murimbika, 2006	HIA	2006-SAHRA-0354	Roodt, 2008(d)	HIA	2008-SAHRA-0529

Table 2-2: Cartographic sources relevant to the project

Cartographic Sources					
Map series			**Name / number**		**Date**
Jeppe			02_Transvaal		1899
TVL Degree Sheets			06_Blaauwberg		1909
Imperial			097_Waterberg		1919
Aerial photographs					
Job no.	**Flight plan**	**Photo nos.**	**Area**	**Date**	**Reference**
321	8	21797	North of Potgietersrus	1953	321/1953
	9	21860; 21862			
	10	24850; 24852; 24854			
	11	11553; 11554			
527	10	229; 230	Steilloopbrug	1965	527/1965
	11	75; 76			
682	20	8706; 8707	Steilloopbrug	1972	682/1972
	21	9115; 9117; 9119			
	22	8567; 8569; 8571			
	23	8494; 8496			
842	4	2320	Pietersburg	1980	842/1980
868	22	8933; 8934	Swartwater	1983	868/1983
	23	8888; 8890			
946	4	1036	Pietersburg	1991	946/1991
1002	10	9489	Pietersburg	1997	1002/1997
	11	226; 228			

2.2.2 Quantitative Data Collection

A scoping survey of the proposed Magnetite Project area was conducted by Natasha Higgitt (refer to Appendix A for detailed CV). The survey was completed over one and a half days from 16 to 18 December 2014, and focused mainly on undisturbed areas and hills within the project area. Two local community members (Thabang Chaba and Frans Makgoka) provided assistance.

The survey was a non-intrusive (i.e. no sampling of any kind took place) pedestrian survey. The objectives of the scoping survey to:

- Visually record the current state of the cultural landscape;
- Ground-truth certain sites identified in the literature; and
- Record a representative sample of visible tangible heritage resources present in the project area.

Visible tangible heritage resources were recorded as waypoints using a handheld GPS and documented through written and photographic records. The survey itself was recorded as a track log.

2.3 Site Naming

Sites identified during the field survey are prefixed by the map sheet number; relevant period / feature code and site number, i.e. **2328DD/BGG-001** Applicable period codes used in this report are defined in Table 2-3 below.

This number may be shortened on any plans or maps to the period / feature code with the site number used in that report. For example: **BGG-001**,

Site identified in previous relevant studies are prefixed by the SAHRIS case or map number and the original site name used by the author, i.e**. 2702/MF001**.

Table 2-3: Period codes used in this HSR

Period / Feature	Code
Burial Grounds and Graves	BGG
Ft	Feature
Ste	Structure

2.4 Compilation of a Cultural Heritage Baseline Profile

A cultural heritage baseline profile was compiled based on the information collected through the literature review and scoping survey. This profile focussed on the following:

- Local geology and palaeontological sensitivity, including karst topography;
- The archaeological record considering Stone Age, Farming Communities and Colonial / Historical periods;
- Socio-cultural and socio-political history.

3 Project Description

This section summarises basic project information relevant to the Heritage Scoping Report. More detailed project information is contained in the integrated Scoping Report. The main elements discussed in this section include: a general overview of the proposed Magnetite Project including activities currently being undertaken; project timing; and possible alternatives.

3.1 Project Overview

The proposed Magnetite Project is a greenfields operation situated approximately 33 km north-west of Mokopane, within a rural setting. The prospecting right area comprises several farms, namely Vogelstruisfontein 765 LR, Vriesland 781 LR, Vleigekraal 783 LR, Schoonoord 786 LR and portions Re/1, Re/2, 3, 4, 5 and 6 of the farm Bellevue 808 LR. Probable project- affected villages include Ditlotswana, Malokong, Mosate and Sepharane.

The VM Investment Company (Pty) Ltd has to date undertaken the following activities within the limits of the EMP approved in accordance with the MPRDA.

3.2 Mining Method and Infrastructure Requirements

The proposed mining method will be an opencast operation. Primary infrastructure that will be required includes:

- Plant site;
- Open pit;
- Waste rock dump; and
- Tailings facility

Supporting infrastructure will probably include workshops, stores, laboratory, offices, contractor's yard, security facilities, diesel storage facilities, haul roads, and access roads.

3.2.1 Project Timing

At the time of compiling the Heritage Scoping Report, detailed timing of the project had not been finalised. This information will be included in the Heritage Impact Assessment.

3.2.2 Activities per Project Phase

The following activities are envisioned for each of the Project phases:

Table 3-1: Project activities per phase

Construction	Operation	Decommissioning and Closure
Site clearance and vegetation removal	Development of two open pits	Rehabilitation of project area
Topsoil removal and stockpiling	Development of Waste Rock Dumps	
Development and use of access	Mine operation	
Construction of infrastructure	Mineral processing	
	Operation of tailings dams, pollution control dam, water storage and associated pipelines	
	Storage of fuels, process concentrate and maintenance oils	
	Waste generation, storage and disposal	
	Product storage	
	Rail siding for transport of product	
	Employment of construction and operational mine workers	

3.3 Project Alternatives

Two types of Project alternatives are considered in this section:

- Alternatives *to* the Project (in terms of the "no-go" option and alternative uses of the Project area in the event that the Project is not implemented; and
- Alternatives *involving* the Project (in terms of alternative mining methods, infrastructure layout and transport routes to the Project site).

3.3.1 The "No-Go" Option and Land Use Alternatives

This section is summarised from the Socio-economic Scoping Report.

Consideration of land use alternatives is one of the cornerstones of community planning. Land use decisions must be evaluated in terms of sustainability, broadly defined as balancing environmental, economic and social equity concerns. The primary land use categories that encompass basic functions are residential, commercial, industrial, recreational, institutional and agricultural uses. Optimal land use is determined by a number of factors, including climate, resources, population growth, economic activity and topography. When considering a new development for an area, it is required that other land use alternatives are considered to ensure that the development is justified and viable.

Agriculture is the dominant land use (primarily livestock grazing, followed by subsistence maize farming) on the proposed Project site, with small areas also being utilised for residential purposes. The dominant land use surrounding the Project site is mixed used, comprising residential and agricultural.

If not used for mining (the no-go option), possible alternative land uses for the Project site include commercial agriculture, grazing, or low-cost housing. These land use alternatives are not necessarily precluded by the proposed Project: after mine closure and rehabilitation of mined areas, the land capability may return to a state which would allow the continuation of agricultural practices, albeit not to baseline levels of agricultural production, as well as low cost housing.

3.3.2 Mining Method and Infrastructure

The relatively shallow nature of the resource determines the preferred open cast mining method. The only possible alternative available in terms of mining method will be the no-go alternative. In terms of infrastructure and pit location several alternatives are considered. Based on the heritage sensitivity map, the tailings dam, plant areas and calcine dump are currently located on hills which are considered to have a high sensitivity. This proposed infrastructure will need to be re-positioned/re-located to avoid these hills. The waste rock dump option 1 is partially located within an agricultural field, however this is considered to be medium to high significance, based on the potential occurrence of graves.

4 Cultural Heritage Baseline Profile

A cultural heritage baseline profile is summarised here based on the literature review: no citations are included here. The reader should refer to the relevant sections in the literature review attached to this report as Appendix B.

The structure of this section is as follows:

- The first part summarises the regional and local study areas, as defined in Section 2.1. This part contains descriptions of the geology, archaeology and more recent history of the cultural landscape within which the Magnetite Project is located. The development context is also discussed.

- The second part focusses on the site-specific study area where possible issues of specific concern are highlighted.

Several important geological, archaeological and historical periods are discussed in the baseline. These are summarised in Table 4-1.

Table 4-1: Periods considered in the cultural heritage baseline profile (adapted from Winter & Bauman 2005)

1 Palaeontological and geological
Precambrian to late Pleistocene (1.2 billion to late 20 000 years ago)
2 Indigenous
Early Stone Age: approximately (ca.) 3 million years ago (Ma) to 300 000 years ago (Ka) (ESA)
Middle Stone Age: ca. 300 Ka to 30 Ka (MSA)
Later Stone Age: ca. 30 Ka to 2000 years ago (LSA)
Late Farming Communities (1500's to 1850's) (LIA)
3 Colonial
British colony (1814 -1910)
4 Historical
Union of South Africa (1911-1961)
Apartheid Republic of South Africa (1961-1994)
Democratic Republic of South Africa (1994-Present)

4.1 Regional and Local Study Area

4.1.1 Geology and Palaeontological Sensitivity

The project area is located on a part of the northern limb of the Bushveld Complex, where the ultramafic and mafic rocks of the Rustenburg Layered Suite overlays a floor of Archaean basement granites, gneiss and schist to the east. To the west, the Rustenburg Layered Suite is overlain by Bushveld granite sills, namely the Lebowa Granite Suite and younger post Bushveld Waterberg Group and Quaternary cover rocks. The study area is in general of zero to moderate palaeontological significance, primarily due to the igneous nature of the dominant underlying rocks.

However, the presence of Malmani Subgroup dolomite is an exception due to inherent stromatolitic nature and potential for karst topography to have developed. This subgroup has a high palaeontological sensitivity for two reasons. First, stromatolitic dolomites contain stromatolites and organic-walled microfossils: stromatolites represent the oldest fossil evidence of cyanobacteria. Second, the dolomites are conducive to karst topography and associated cave formation and breccia.

Karst topography refers to landscapes formed from the dissolution of soluble rocks, including dolomite and limestone. Dissolution of these soluble Malmani dolomites created voids –

karts caves – that filled with fine- to coarse-grained alluvium during periodic flooding. The alluvium may be represented by bodies of breccia, sandstone and siltstone. The detritus can include diverse animal bone fragments including hominid remains and tools, similar to those excavated from the Cave of Hearths and the Limeworks in the Makapan Valley Wold Heritage Site (WHS) which is the most significant example of a karst landscape in the region. The Makapan Valley WHS was listed as part of the Fossil Hominid Sites of South Africa WHS in 2005. The karst caves associated with the Makapan Valley WHS are continuously at risk due to a diverse range issues – some natural and others anthropogenic. Some of these risks include the inherent tendency to collapse (often exacerbated by blasting associated with mining), and subsidence due to water extraction from dolomite aquifers. Significantly, the International Union for Conservation of Nature (IUCN) considers caves and karsts as generally protected world heritage. The IUCN Wold Commission on Protected Area (WCPA) created two working groups which focus on the management of geological protected areas and heritage: the Geoheritage Specialist Group (GSG) and the Caves and Karst Specialist Group (CKSG). These two groups have published guidelines that need to be considered within the South African legal framework pertaining to both protected areas and world heritage.

The Makapan Valley WHS core area is situated approximately 45 km south-east from the site specific study area.

4.1.2 Stone Age

All three Stone Age periods have been recorded in the regional study area and throughout the Limpopo Province.

The most important Stone Age sites are associated mainly with cave deposits in the Makapan Valley WHS, where the Cave of Hearths is considered the most prolific site in the region. There archaeological investigations have since the early 20th century continuously produced artefacts from all three Stone Ages, as well as hominid fossils identified as *Homo ergaster*. Re-evaluation of excavated material has led researchers to postulate that large amounts of material were transported into the cave from elsewhere: either as raw material or completed tools. This provides evidence of much wider hominid activity in the area, including possible open air sites. However, Stone Age *in situ* open air sites are scarce and not easily recognised, significantly increasing their importance if identified.

The MSA is defined by new lithic production technology and emerging more complex cognitive behavioural patterns associated with the evolution of modern *Homo sapiens*. Open air surface MSA lithic scatters have been reported in several assessments previously undertaken. These sites were commonly located on hill tops and exposed in erosion gullies.

The LSA is characterised by a microlithic production technology, convincing evidence of ritual practises and complex societies, and rock art. Microlithics are produced from very fine-grained material such as quartz or chert, and often used as composite tools where they are hafted onto sticks for arrows. The most notable LSA site in the region is associated with the LSA occupation in the Makapan Valley WHS.

At least one assessment study reported an LSA deposit in the local study area (about 16 km south of the site specific study area) that included diverse rock art from various periods. The predominant type was, however, white finger paintings associated with the Late Farming Communities, known as “Late White”. Late White rock art is mainly found in the northern parts of South Africa, particularly the Limpopo Province. The paintings are generally stylised human and animal figures, and sometimes geometric forms, finger painted using thick white clay-derived pigment.

4.1.3 Farming Communities

Ceramic classification is universally used by archaeologists to establish relative cultural-historical temporal sequences within southern African Farming Communities. In this way, relative dates can be assigned to sites, as well as inferring tenuous cultural similarities or associations. The predominant ceramics reported in the regional study area include several facies dating from the 14th century to the 1800s.

In addition to ceramics, stonewalling is perhaps the most visible surface indicator of Farming Communities sites. Within the regional context stonewalled sites are primarily associated with the Moor Park cluster that is accepted as being of Nguni origin. During the 17th and 18th centuries, Nguni-speaking people moved north into Waterberg region. These Nguni-groups became known as so-called Northern Ndebele, of whom the Langa Ndebele are the present descendants. In addition the Langa Ndebele, there are also LIA sites that can be associated with earlier Sotho-Tswana occupation.

However, given the nature of these early chiefdoms, the Nguni immigrants married local women, joined or were joined by other Sotho or Nguni groups. The Ndebele and Pedi residing in the region today are the descendants or modern manifestations of these intricate relationships.

4.1.4 Historical Period and Socio-political History

The authors acknowledge that the recent historical landscape is complex: issues such as succession disputes are representative of an inherent complex and conflicted heritage that is the current subject of much research and public debate. The death of the previous Bakenberg chief in 2014 has resulted in an apparent succession dispute. There is also evident conflict between village leadership and the current Traditional Council, evidenced in comments raised during meetings held as part of the SEP. However, a comprehensive study of these issues is outside the scope of this study.

The historical period is usually dated from around 1840 when the first white people started settling permanently in the region. Within the region this period is complex and fraught with social and political issues. Much of the history of the original black people are inferred from oral histories collected by missionaries, traders and other immigrating whites during the early 18th century, as well as possibly Traditional Council archives. However, these accounts do not necessarily provide accurate and coherent descriptions of events. A thorough examination of the historical period is unfortunately not possible in context of this study, but

certain important issues and episodes must be highlighted, focussing mainly on the social and political history of the local study area, i.e. the areas immediately surrounding the Magnetite Project.

Mechanisms within the prevailing social system triggered repeated fission, migration and fusion of polities that led to the formation of new polities on the margins of, or in the spaces between more established societies. Balance between political and economic power shifted between chiefdoms producing a myriad of frontier-like interactions. Arguably, the most important product of these early 'frontier societies' in the region is associated with the various Northern Ndebele tribes, including the Kekana and Langa. Both oral history and archaeological evidence indicate that the Northern Ndebele descended from a Late Farming Communities Nguni-speaking Ndebele tribe who migrated westwards from the present northern KwaZulu-Natal between 1630 CE and 1670 CE. This movement is thought to be associated with two groups, namely the Musi (Southern Ndebele including the Ndzundza, Manala and Kekana) and Langa (of Hlubi origin).

Within the regional context, the current Kekana tribe traces their ancestry to a succession dispute between an early Langa Ndebele chief, Madidzi's two sons Lidwaba and Gegana, after his death. This caused the chiefdom to be split into a Lidwaba and a Gegana faction, after which the latter moved to Muledlana, near present day Zebediela. However, the Gegana also experienced a succession dispute after chief Tjhumana died the 18th century. His two sons, Mugombane I (Kxhaba) and Kxhumbha, fought over the chieftaincy: Mugombane I was defeated and moved into the Makapan Valley (named after Mugombane).

The Langa is believed to have entered the region under chief Podile and settled at Bosega, east of present day Polokwane towards the late 17th century. They moved from Bosega to Thaba Tsweu (Witkoppen Mountain). Thereafter, they established themselves in the area between the Matlotlo Mountains, the Sandsloot River in the south and Mogalakwena River to the west. There are several historically known Langa settlements spread across the numerous hills within the region: Segopa, Magope, Fothane, Matlhogo and Ditlotswane. The Langa also experienced a succession dispute after Seitarita died in 1795. The dispute between his sons Mapela, Mamoala and Masoge resulted in the splitting of the chiefdom. Although he was junior to his two brothers, Mapela became chief and relocated his seat to Fothane Hill from Moumon-wa-Matswaka on the farm Zuid Holland 773 LR to Fothane Hill.

The disputes briefly discussed above demonstrate shifting authorities due to splitting and assimilation of various polities. A significant contributor to these tensions was extensive competition over resources and trade. The latter part of the 18th century specifically saw an increased demand for ivory.

The established trade network and market was economically attractive to white immigrants, especially the Voortrekker Boers and other exiles from the Cape Colony. This incursion by a new group into the region resulted in tensions between the Boers and Ndebele chiefdoms over resources including land, and labour including allegations of enslavement. This was exacerbated by the constant threat of the Pedi to the east. The Kekana consequently established strong socio-economic alliances to ensure the survival of, and expand their

economic interests, within among others the Mmakau and Langa Ndebele. The tension between the Boers and the Kekana intensified during the 1850's when the former established the town Pietpotgietersrust (renamed Mokopane after Kekana chief Mugombane).

Mugombane I called upon Mapela to assist in a campaign to 'scare' the Boers back to Pretoria that resulted in a series of killings of Boers by the Kekana and Langa in September 1854. The Boers immediately retaliated and reinforcements were sent from Rustenburg and the Soutpansberg. Mugombane I and Mapela used the opportunity to retreat: the Kekana took refuge in Makapansgat in the Makapan Valley and the Langa took refuge in the hills to the north. However, the Boers discovered and besieged the Kekana at Makapansgat; Kekana resistance was broken within a month, resulting in large-scale deaths.

After Mapela's death, the Langa under chief Maleya moved from Fothane Hill to Ditlotswana, where they remained. There Maleya was ousted by his uncle Mankopane, considered as the rightful heir, and under him the Langa moved to Magagamatala Mountain on the farm Ruigtevlei 710 LR. Here, a retributive Boer expedition attacked and killed approximately 800 people on 14 April 1858. After this defeat the much reduced Langa moved to Thutlwane Hill on the farm Kromkloof 774 LR.

Mankopane was succeeded by his son Masibi around 1890, but the latter's death resulted in another succession dispute between his two sons, Hans and Backeberg (Hendrik). The two disputing factions were continually attacking each other. However, unlike earlier disputes, the *Zuid-Afrikaansche Republiek* (ZAR) government under President Paul Kruger played a role in demarcating land and establishing peace between the two groups. The ZAR acknowledged both brothers as chiefs, thereby dividing the Langa tribe and assigned separate 'locations' for the two newly constructed chiefdoms. Both chiefs Hendrik and Hans Masibi are recorded as being Boer allies during the Second Anglo Boer War / South African War of 1899 to 1902. However, Hans Masibi came into conflict with Hendrik due to the latter's pro-British stance.

In addition to Hans and Hendrik Masibi, the ZAR government also acknowledged Mugombane's successor Valtyn as Kekana chief. This led to the ZAR demarcating the three dominant chiefdoms, namely the Valtyn, Mapela and Bakenberg polities within the local study area. The ZAR established a 17 km long, 5 km boundary within which these constructed polities were confined. The boundary was based where communities resided at the time. The consequence was the confinement of around 30 000 people within these limited borders, resulting in the loss of much traditional grazing and arable land.

Under the ZAR, the post 1902 British Colonial administration and the 1910 Union administrations official boundaries were continuously adjusted to the detriment of the three chiefdoms. The Valtyn location was, for example, reduced from 14 541 ha in 1913 to 12 229 ha in 1936. From the early 20th century, the land was also fenced off and fenced in for various reasons that by the 1940s resulted in in far reaching impacts ranging from overcrowding, shortages of arable and grazing land, water and increased migrancy. This

degradation escalated to the point where the Valtyn location was likened to the Sahara desert.

Official government intervention and interference in traditional political structures started with the late 19th century Land Commission. The infamous 1913 Land Act, discovery of platinum in the area in 1936, and the 1960s Acts known as the Group Areas Acts further aggravated the already contentious land issues. More people were relocated into and restricted to an already marginal area. During the 20th century, manipulation of traditional authority was rampant, especially through the black homeland system where traditional chiefs vied for political power with government appointed leaders. This was complicated by the history of succession disputes.

From the outset, state recognition of chieftaincies offered a platform for 'recognised' chiefs and tribal council members to enter into economic deals and politically binding decisions without consulting the 'unrecognised' faction or villagers. Recent research conducted in the region postulate even within the current democratic administration, the Communal Land Rights Act, 2004 recognises the authority of traditional, government vetted chiefs in land administration affairs of their communities. This authority allows them to play a central role in the decision-making processes of economies – including mining-related – within their chiefdom.

However, the legitimacy of this authority has been brought into question in part through recent succession disputes, where both established and manufactured histories play a role. This evident in the current succession dispute within the Vaaltyn Kekana tribe.

4.1.5 Current Development Context

The proposed project is situated in the Mogalakwena Local Municipality (MLM) within the greater Waterberg District Municipality (WDM) of the Limpopo Province. The MLM was established in December 2000 through the amalgamation of The Greater Potgietersrus (Mokopane), Bakenberg and Koedoesrand\Rebone.

The MLM has a population of 307 682 with 96.1% black and 3% white (Statistics SA, 2011). The preceding discussion of the social history should provide some background to the fact that 70.9% of the total MLM population live within tribal/traditional land. The working age population (i.e. persons between 14 and 65 years of age) is 58.3%, of which 78 647 are economically active – working or unemployed but looking for work. Unemployment is 40.2%, nearly double that of any other municipality in the region. Unemployment of economically active youth (15 to 35 years old) is the highest in the district at 51.7%. This creates a high dependency ratio of 71.5%. These statistics provide evidence of an underdeveloped socio-economic landscape, firmly rooted in some of the historical issues discussed above. The WDM and MLM IDPs contain plans and initiatives to address some of the issues.

The main plans and strategies contained in these IDPs include *inter alia*:

- Support economic development and growth through mining and agricultural industries;

- Developing tourism as a viable and sustainable option: the Waterberg District is considered as 'choice' tourist destination with sites such as the Waterberg Biosphere Reserve, Makapan Valley WHS and Marakele National Park.

In terms of heritage resources management, local heritage sites such as the Makapan Valley WHS are significant potential contributors to local economic development in the region. The WDM-IDP specifically identifies the *Makapan Heritage Route Project* key in achieving the following strategic objectives that include the creation of a sustainable and enabling environment for local economic development, and facilitating access to land and rural tourism development.

4.2 Site Specific Study Area

4.2.1 Geology and Palaeontological Sensitivity[1]

Considering the regional geology and palaeontological sensitivity discussed above, the site specific study area has largely no significance. However, a small area with high palaeontological sensitivity is located in the south-western part of the study area. This area has expressions of the Malmani Subgroup of the Chuniespoort Group of the Transvaal Supergroup, dated to between ~2600 Ma and ~2000 Ma.

The presence of Malmani dolomites in the site specific study area should therefore be highlighted as a sensitive area. These dolomites are associated with the more extensive Makapan Valley karst landscape, but falls outside the protected area. However, karst geology in general is accepted as protected in terms of international accepted practice.

4.2.2 Stone Age

The Stone Age is intimately linked with the geological and hydrological features of the landscape. Geologically, raw material for stone tool production is readily available throughout the landscape. Identified lithics from the reconnaissance of the project area are defined as comprising of fine grained Felsic tuff with quarts and feldspar crystals (pers. comm. Megan Edwards, 16 January 2015). This raw material originates from the greenstone belt. These heritage resources are presented in Table 4-2 below.

Lithic scatters and isolated finds associated with the MSA have been reported throughout the landscape. Based on our understanding of the geo-hydrological process associated with the Mogalakwena River and its tributaries, the reported distribution of lithics are expected, as demonstrated in the discussion of the Makapan Valley WHS above. Natural processes of progradation, aggradation and sedimentation of the Mogalakwena River result in the transportation of sediments including lithic material. These lithics are often identified in

[1] This section was compiled by Johan Nel based on literature cited in text and palaeontological information obtained from the SAHRIS. The content was reviewed by Megan Edwards (*Digby Wells Geologist*).

isolation and outside of discernible context, therefore providing limited scientific information beyond form, function and technique of manufacture.

4.2.3 Farming Communities

Ceramic sherds and stone walled settlements were identified during the scoping survey of the project area, as well as in several archaeology and heritage studies previously completed in the region. The ceramics provide evidence of Farming Communities settlement from at least the 17th century CE continuing to the 19th century CE. This is consistent with the regional study area discussion above. In addition, stonewalled sites were also identified in the scoping survey and in reports. The combination of the various ceramic facies and types of stonewalled sites provide evidence of long-term occupation by Kekana and Langa Northern Ndebele as well as other groups.

4.2.4 Historic Period

There is sufficient evidence that prove continuity from Farming Communities settlement into the historic period, and the division must be understood as largely artificial.

The site-specific study area is located within the historic Bakenberg Location, also known as the Hendrik Masibi Location, one of the three original chiefdoms described above. The area is at present under the Bakenberg Tribal Authority's jurisdiction. The scoping survey, historical aerial images and previously completed assessment studies have provided evidence for several archaeological and historic stonewalled sites within the study area. This includes Hendrik Masibi's historic early 20th century capital that was indicated during the scoping survey.

Previously completed heritage studies have investigated sites associated with the history of the Langa in the study area. These sites include Malokong Hill situated on the eastern border of the project area where a large stone walled settlement was identified. The settlement type conforms to a typical Nguni settlement pattern associated with the Moor Park cluster. According to this study, the Mabusela clan occupied the area throughout living memory, first settling at the highest point of the hill for security expanding the settlement over five stages. This site was verified during the scoping survey and was noted in historical aerial imagery dating from 1953 through to 2012.

The Bakenberg Tribe has initiated a land claim on several properties within the site-specific and local study areas.

4.3 Scoping Survey Findings

The scoping survey found that the western portion of the Malokong Hill has been disturbed through granite mining activities. According to a Masters dissertation, the mining has resulted in negative heritage and social impacts experienced by the Rooivaal and Malokong community.

Table 4-2 provides a summarised list and description of tangible heritage resources that were identified during the scoping survey. These findings are not exhaustive, but provide a representative sample of tangible resources likely to be affected by the proposed Magnetite Project. Site location details are not provided, but kept on record by Digby Wells and SAHRIS.

Table 4-2: Identified Heritage Resources within the Magnetite Project area

Site number	Site type	Description	Images
Ft/001-003	Surface occurrence	Scattered surface occurrences of Middle Stone Age (MSA) stone tools can be found spread across the flat areas of the Magnetite Project area i.e. proposed opencast pit and waste rock dump areas. The tools include blades, points, scrapers and cores.	 **Figure 4-1: MSA lithics recorded in the Magnetite Project area**

Site number	Site type	Description	Images
Ste/004	Farming Communities settlement	A circular stone walled structure (± 15 m in diameter) was identified in close proximity to the closed granite quarry within the proposed TSF area. It is assumed that there may have once been more stone walls, but that have since been damaged and destroyed as a result of the quarrying. Decorated pottery possibly attributed to the *Uitkomst facies* were identified within the stone walls (See Figure 4-3).	 **Figure 4-2: Stone walled structure found at Ste/004**  **Figure 4-3: Decorated ceramic potsherds at Ste/004**

Site number	Site type	Description	Images
Ft/005	Surface occurrence	A single decorated ceramic potsherd (as shown in Figure 4-4) was found at the base of a small koppie (See Figure 4-5) within the proposed plant area. The decorations can be characterised as *Uitkomst*.	 **Figure 4-4: Decorated ceramic potsherd found at Ste/005**  **Figure 4-5: Small koppie where the potsherd was identified**

Site number	Site type	Description	Images
Ste/006	Farming Communities structure	A small shelter with a single undiagnostic potsherd was identified on the east side of the hill (See Figure 4-6). Stone walling is present behind the shelter (See Figure 4-7).	 **Figure 4-6: Small shelter with undiagnostic ceramic potsherd found at Ste/006**  **Figure 4-7: Walling behind the shelter**

Site number	Site type	Description	Images
Ft/007	Feature	A man-made rock pool was identified on the eastern side of the hill (See Figure 4-8). A number of natural springs and drainage lines can be found flowing down the slopes of the hill, and it is assumed that these rock pools were constructed to collect the water during the rainy season. These rock pools may still be in use today, for both drinking water and ritual purposes.	 **Figure 4-8: Rock pool at the base of the hill found at Ste/007**

Site number	Site type	Description	Images
Ste/008	Farming Communities settlement	A stone walled settlement stretching 800 m north from 008 to an existing contemporary settlement. The stone walls consist of circular structures, passageways, rectangular structures and terraces (See Figure 4-9). The settlement is scattered with surface occurrences of ceramic potsherds and decorated potsherds (See Figure 4-10).	 **Figure 4-9: Southern section of the stone walled settlement at Ste/008**  **Figure 4-10: Decorated potsherd found at Ste/008**

Site number	Site type	Description	Images
Ft/009	Surface occurrence	A decorated lug fragment was identified in a recently dug up area. The lug has an incised triangle on the handle with parallel lines within the triangle. Incised parallel lines are present where the handle meets the pot surface.	 **Figure 4-11: Decorated lug found at Ste/009**  **Figure 4-12: Side profile of the lug fragment**

Site number	Site type	Description	Images
BGG/010	Grave	The grave of Johannes Seleka Lamola (1840-1920) (See Figure 4-13) was identified within the stone walled settlement (Ste/008) referred to above. The grave is located on the eastern side of the hill, approximately 100 m from the gravel road.	 **Figure 4-13: Grave of Johannes Seleka Lamola at BGG/010**

Site number	Site type	Description	Images
Ste/011	Farming Communities structure	A stone walled enclosure set against large boulders on the western side of the hill (See Figure 4-14). The enclosure measured approximately 10 m in diameter. Approximately 20 m north of the stone enclosure, a rock pool is present (See Figure 4-15). This is similar to the rock pool on the eastern side of the hill (Refer to Figure 4-8), however this one is not as overgrown as the other.	 **Figure 4-14: Stone wall enclosure at Ste/011**  **Figure 4-15: Rock pool at Ste/011**

5 Provisional Statement of Significance

Heritage resources are intrinsic to the history and beliefs of communities. They characterise community identity and cultures, are finite, non-renewable and irreplaceable. Considering the innate value of heritage resources, the foundation of HRM is the acknowledgment that heritage resources have lasting worth as evidence of the origins of life, humanity and society. Notwithstanding the inherent value ascribed to heritage, significance of resources needs to be determined to allow implementation of appropriate management. This is achieved through assessing heritage resources value relative to certain prescribed criteria encapsulated in policies and legal frameworks as discussed under Section 1.2.

The importance of a heritage resource is determined on four dimensions – aesthetic, historic, scientific and social which in turn are measured against one or more descriptive attributes. This aims to guide whether a resource should be included in the national estate as defined in the NHRA and international conventions.

Table 5-1: Summary of dimensions and attributes

Dimension	Attributes considered		NHRA Ref.
Aesthetic & technical	1	Importance in aesthetic characteristics	S.3(3)(e)
	2	Degree of technical / creative skill at a particular period	S.3(3)(f)
Historical importance & associations	3	Importance to community or pattern in country's history	S.3(3)(a)
	4	Site of significance relating to history of slavery	S.3(3)(i)
	5	Association with life or work of a person, group or organisation of importance in the history of the country	S.3(3)(h)
Information potential	6	Possession of uncommon, rare or endangered natural or cultural heritage aspects	S.3(3)(b)
	7	Information potential	S.3(3)(c)
	8	Importance in demonstrating principle characteristics	S.3(3)(d)
Social	9	Association to community or cultural group for social, cultural or spiritual reasons	S.3(3)(g)

To provide a provisional Statement of Significance for the cultural landscape, the various types of potential heritage resources located within the Magnetite Project were assessed against the dimensions and attributes presented in Table 5-1.

The Digby Wells Heritage Impact Matrix Methodology can be made available to interested parties on request.

Table 5-2: Provisional Statement of Significance

Description	Aesthetic	Historic	Scientific	Social	INTEGRITY	VALUE
Archaeological and historical sites associated with living communities - good integrity	5	5	5	5	4	20
Archaeological and historical sites associated with living communities - poor integrity	0	5	2	3	1	3
Palaeontological sites and karst caves	-	-	5	-	4	20
Burial grounds and graves	-	5	-	5	4	20
Archaeological and historical sites not associated with living communities - good integrity	5	5	5	-	4	20
Archaeological and historical sites not associated with living communities - poor integrity	0	1	1	-	1	1

Table 5-2 provides a summary of the provisional Statement of Significance for the cultural landscape. Archaeological and historical sites were assessed on all dimensions and attributes. Palaeontological sites, karst caves and burial grounds and graves were assessed on select dimensions as applicable. The results of the provisional assessment indicate that the various potential types of heritage resources within the Magnetite Project Area and surrounds are of high significance. These findings reaffirm that the cultural landscape is of high value.

6 Possible Heritage Risks

Possible heritage risks to the proposed Magnetite Project can be broadly placed into two categories: risk of very significant heritage resources to project developments; and impacts on heritage resources that may have social repercussions that pose risks to the applicant.

6.1 Heritage Resources with Very High Cultural Significance

Some heritage resources may be so significant or sensitive that any development will be detrimental to their continued survival. In addition, certain heritage resources are formally protected that restricts various development activities.

The primary risk associated with highly significant heritage resources to the Magnetite Project is that the presence of any such resources may result in negative Records of Decision and / or restrictions imposed on development activities.

6.2 Impacts on Heritage Resources

Where heritage resources are impacted on by project activities and these resources may have special significance or importance for various communities, impacts on heritage could result in social repercussions. This could range from low-level issues to public confrontation and litigation. The applicant may experience reputational risk and withdrawal of any social licence to operate that may be in existence.

In addition, impacts on any heritage resource formally or generally protected in terms of the NHRA is an offence. Any impact that will change the nature or integrity of such resources must be permitted by SAHRA and / or LIHRA. Failure to apply for the necessary permits may results in fines, penalties, seizure of equipment, compulsory repair of cease work orders, or imprisonment.

7 Possible Heritage Impacts

7.1 Construction Phase

The highest likelihood of changes to heritage resources is associated with activities that will be undertaken during the construction phase of the proposed Magnetite project. Here, the potential negative impacts, such as damage or destruction, are the greatest.

Activities identified as sources of risk during construction include:

- Construction of facilities and infrastructure will cause damage to or destroy any physical heritage resources that may be present in the footprint areas;
- The construction and/or widening of roads will cause damage to or destroy any physical heritage resources that may be present in the impact footprint; and
- Physical alteration of land in connection with the expansion of facilities will change the character of the land and possibly destroy *in situ* heritage resources.

7.2 Operational Phase

During the operation phase of the proposed project, sources of risk to heritage resources are limited. The primary risk during the operational phase will be associated with the alteration of the sense-of-place of the project area. However, as identified in previous sections, the study

area is disturbed through urbanisation, agricultural and mining activities, thereby minimising the intensity of this risk to heritage resources.

7.3 Decommissioning Phase

No sources of risk to heritage resources are envisaged for the decommissioning phase of the project at this stage. However, if structures older than 60 or 100 years at the time of decommissioning exist, these may be impacted upon by decommissioning of the proposed Magnetite project.

7.4 Cumulative Impacts

Cumulative impacts on heritage resources have been identified in the discussion of the development context of the project under section 4.1.5. Additional cumulative impacts that may occur include:

- Enhancing of the industrial, mining sense-of-place ;
- Loss of identified heritage resources could decrease the significance of the landscape while increasing the significance of the remaining *in situ* heritage resources;
- Population increase through an influx of additional workers could potentially impact on tangible archaeological, built environment and burial grounds and graves heritage resources in the surrounding study area, which if managed correctly in line with the development context, could be positive; and
- Loss of access to burial grounds and graves and/or intangible heritage.

8 Conclusions and Recommendations

The project area is located in the Limpopo Province some 35 km north of Mokopane and 60 km west of Polokwane. This is a culturally sensitive landscape. An extensive review of available literature and relevant previously completed reports confirms this assessment.

Geologically, the project area is located on a part of the northern limb of the Bushveld Complex. Palaeontologically the primary impact footprint of the project area has an insignificant palaeo-sensitivity. The potential of Karst topography has been identified within the prospecting right area. Karst topography refers to landscapes formed from the dissolution of soluble rocks, including dolomite and limestone. Karst topography is characterised by underground drainage systems with sinkholes, dolines, and caves. This geological phenomenon creates karst caves that can filled with fine- to coarse-grained alluvium during periodic flooding. The alluvium may be represented by bodies of breccia, sandstone and siltstone which have an increased potential to contain archaeological material.

Stone Age material has been identified throughout the landscape and reported on in other relevant heritage studies. Based on our understanding of the geo-hydrological process associated with the Mogalakwena River and its tributaries, the reported distribution of lithics

are expected. Natural processes of progradation, aggradation and sedimentation of the Mogalakwena River result in the transportation of sediments including lithic material. These lithics are often identified in isolation and outside of discernible context, therefore providing limited scientific information beyond form, function and technique of manufacture. However, there is the potential for the existence of *in situ* Stone Age sites to be located within the project area footprint.

The study area is intimately associated with the history of the Ndebele, spanning from the Farming Communities through to the present. The project area specifically associated with the Langa Ndebele. The Langa are said to have arrived in the regional study area toward the end of the 17th century and reside between the Matlotlo Mountains, the Sandsloot River in the south and Mogalakwena River to the west. The Langa and Kekana chiefdoms were the primary players in the events that culminated in the 1854 Siege of Makapan, an event that has influenced socio-cultural landscape of the region.

Based on our understanding of the cultural landscape and the identified heritage resources within the project area, Digby Wells recommends the following:

- Exemption from further palaeontological assessments for the proposed infrastructure footprint as the palaeo-sensitivity is insignificant. However, findings of the geohydrological specialist study should be reviewed to determine whether there may be any ground water effects on the dolomite and karst topography;
- An HIA be undertaken that includes the following heritage components:
  - A Phase 1 Archaeological Impact Assessment including reconnaissance to identify and record archaeological and historical resources within the impact footprint;
  - An assessment of burial grounds and graves including reconnaissance to identify, record and document all burials that may exist in the impact footprint;
  - Integration of additional specialist studies to determine any possible living heritage in the project area. Studies that may be considered for integration include Social Impact Assessment, Biophysical Assessment and Visual Assessment.

Appendix A: Specialist CV

JOHAN NEL

Mr Johan Nel

Unit manager: Heritage Resources Management

Social Sciences

Digby Wells Environmental

1 EDUCATION

Date	Degree(s) or Diploma(s) obtained	Institution
2014	Integrated Heritage Resources Management Certificate, NQF Level 6	Rhodes University
2002	BA (Honours) (Archaeology)	University of Pretoria
2001	BA	University of Pretoria
1997	Matric with exemption	Brandwag Hoërskool

2 LANGUAGE SKILLS

Language	Speaking	Writing	Reading
English	Excellent	Excellent	Excellent
Afrikaans	Excellent	Excellent	Excellent

3 EMPLOYMENT

Period	Company	Title/position
09/2011 to present	Digby Wells Environmental	Manager: Heritage Resources Management unit
05/2010-2011	Digby Wells Environmental	Archaeologist
10/2005-05/2010	Archaic Heritage Project Management	Manager and co-owner
2003-2007		Freelance archaeologist
	Rock Art Mapping Project	Resident archaeologist

2002-2003	Department of Anatomy, University of Pretoria	Special assistant: Anthropology
2001-2002	Department of Anatomy, University of Pretoria	Technical assistant
1999-2001	National Cultural History Museum & Department of Anthropology and Archaeology, UP	Assistant: Mapungubwe Project,

4 EXPERIENCE

Johan Nel has 13 years of combined experience in the field of cultural heritage resources management (HRM) including archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. I have gained experience both within urban settings and remote rural landscapes. Since 2010 I have been actively involved in environmental management that has allowed me to investigate and implement the integration of heritage resources management into environmental impact assessments (EIA). Many of the projects since have required compliance with International Finance Corporation (IFC) requirements and other World Bank standards. This exposure has allowed me to develop and implement a HRM approach that is founded on international best practice and leading international conservation bodies such as UNESCO and ICOMOS. I have worked in most South African Provinces, as well as Swaziland, the Democratic Republic of the Congo, Liberia and Sierra Leone. I am fluent in English and Afrikaans, with excellent writing and research skills.

5 PROFESSIONAL REGISTRATION

Position	**Professional Body**	**Registration Number**
Council member	Association for Southern African Professional Archaeologists (ASAPA); ASAPA Cultural Resources Management (CRM) section	095
Member	International Association of Impact Assessors (IAIA)	N/A
Member	International Council on Monuments and Sites (ICOMOS)	
Member	Society for Africanist Archaeologists (SAfA)	N/A

6 PUBLICATIONS AND CONFERENCE PAPERS

Authors and Year	Title	Published in/presented at
Nel, J. (2001)	Cycles of Initiation in Traditional South African Cultures.	South African Encyclopaedia (MWEB).
Nel, J. 2001.	Social Consultation: Networking Human Remains and a Social Consultation Case Study	Research poster presentations at the. Bi-annual Conference (SA3) Association of Southern African Professional Archaeologists the National Museum, Cape Town
Nel, J. 2002.	Collections policy for the WG de Haas Anatomy museum and associated Collections.	Unpublished. Department of Anatomy, School of Medicine: University of Pretoria.
Nel, J. 2004.	Research and design of exhibition for Eloff Belting and Equipment CC	Institute of Quarrying 35th Conference and Exhibition on 24 – 27 March 2004
Nel, J. 2004.	Ritual and Symbolism in Archaeology, Does it exist?	Research paper presented at the Bi-annual Conference (SA3) Association of Southern African Professional Archaeologists: Kimberley
Nel, J & Tiley, S. 2004.	The Archaeology of Mapungubwe: a World Heritage Site in the Central Limpopo Valley, Republic of South Africa.	Archaeology World Report, (1) United Kingdom p.14-22.
Nel, J. 2007.	The Railway Code: Gautrain, NZASM and Heritage.	Public lecture for the South African Archaeological Society, Transvaal Branch: Roedean School, Parktown.
Nel, J. 2009.	Un-archaeologically speaking: the use, abuse and misuse of archaeology in popular culture.	The Digging Stick. April 2009. 26(1): 11-13: Johannesburg: The South African Archaeological Society.
Nel, J. 2011.	'Gods, Graves and Scholars' returning Mapungubwe human remains to their resting place.' In: Mapungubwe Remembered.	University of Pretoria commemorative publication: Johannesburg: Chris van Rensburg Publishers.

Nel, J. 2012	HIAs for EAPs.	. Paper presented at IAIA annual conference: Somerset West.
Nel, J. 2013.	The Matrix: A proposed method to evaluate significance of, and change to, heritage resources.	Paper presented at the 2013 ASAPA Biennial conference: Gaborone, Botswana.
Nel, J. 2013	HRM and EMS: Uncomfortable fit or separate process.	. Paper presented at the 2013 ASAPA Biennial conference: Gaborone, Botswana.

7 PROJECT EXPERIENCE

7.1 Archaeological Surveys and Impact Assessments

- 2003-2004. Freelance consulting archaeologist. Roodt & Roodt CC. RSA. Archaeological surveys. Specialist.
- 2004-2005. Resident archaeologist Rock Art Mapping Project. University of KwaZulu-Natal. Kwazulu-Natal, RSA. Rock art mapping & recording. Specialist.

7.2 Archaeological Mitigation

- 2007. Archaeological investigation of Old Johannesburg Fort. Johannesburg Development Agency. Gauteng, RSA. Archaeological mitigation. Project manager.
- 2008. Final consolidated report: Watching Brief on Soutpansberg Road Site for the new Head Offices of the Department of Foreign Affairs, Pretoria Gauteng. Imbumba-Aganang D & C Joint Venture. Gauteng, RSA. Watching Brief. Project manager.
- 2011. Sessenge archaeological site mitigation. Randgold Resources. Doko, DRC. Archaeological mitigation. Specialist.
- 2011. Mitigation of three sites, Koidu Kimberlite Project. Koidu Holdings SA. Koidu, Sierra Leone. Archaeological mitigation. Project manager.
- 2012. Boikarabelo Phase 2 Mitigation of Archaeological Sites. Ledjadja Coal (Pty) Ltd. Limpopo, RSA. Archaeological permitting and mitigation. Project manager.
- 2012. Additional Archaeology Mitigation of Sites. Ledjadja Coal (Pty) Ltd. Limpopo, RSA. Archaeological permitting and mitigation. Project manager.
- 2013. Archaeological Excavations of Old Well, Rhodes University, Grahamstown. Rhodes University. Eastern Cape, RSA. Archaeological mitigation. Specialist.
- 2014. Archaeological Site Destruction. Ledjadja Coal (Pty) Ltd. Limpopo, RSA. Archaeological permitting and mitigation. Project manager.

7.3 Heritage Impact Assessments

- 2005. Final consolidated Heritage Impact Assessment report: Proposed development of high-cost housing and filling station, Portion of the farm Mooiplaats 147 JT. Go-Enviroscience. Mpumalanga, RSA. Heritage Impact Assessment. Project manager.
- 2006. Final report: Heritage resources Scoping survey and preliminary assessment for the Transnet Freight Line EIA, Eastern Cape and Northern Cape. ERM Southern Africa (Pty) Ltd. Northern & Eastern Cape, RSA. Heritage Scoping Assessment. Project manager.
- 2007. Proposed road upgrade of existing, and construction of new roads in Burgersfort, Limpopo Province. AGES South Africa (Polokwane). Limpopo, RSA. Heritage Impact Assessment. Project manager.
- 2007. Recommendation of Exemption: Above-ground SASOL fuel storage tanks located at grain silos in localities in the Eastern Free State. Sasol Group Services (Pty) Ltd. Free State, RSA. Letter of Exemption. Project manager.
- 2008. Summary report: Old dump on premises of the new Head Offices, Department of Foreign Affairs, Pretoria, Gauteng. Imbumba-Aganang D & C Joint Venture. Gauteng, RSA. Archaeological Impact Assessment. Project manager.
- 2008. Van Reenen Eco-Agri Development Project. Go-Enviroscience. Kwazulu-Natal & Free State, RSA. Heritage Impact Assessment. Project manager.
- 2008. Heritage Impact Assessment for proposed water pipeline routes, Mogalakwena District, Limpopo Province. AGES South Africa (Polokwane). Limpopo, RSA. Heritage Impact Assessment. Project manager.
- 2008. Phase 1 Heritage and Archaeological Impact Assessment: Proposed establishment of an access road between Sapekoe Drive and Koedoe Street, Erf 3366 (Extension 22) and the Remainder of Erf 430 (Extension 4). AGES South Africa (Polokwane). Limpopo, RSA. Heritage Impact Assessment. Project manager.
- 2008. Heritage resources scoping survey and preliminary assessment: Proposed establishment of township on Portion 28 of the farm Kennedy's Vale 362 KT, Steelpoort, Limpopo Province. AGES South Africa (Polokwane). Limpopo, RSA. Heritage Scoping Assessment. Project manager.
- 2008. Randwater Vlakfontein-Mamelodi water pipeline survey. Archaeology Africa CC. Gauteng, RSA. Heritage Impact Assessment. Specialist.
- 2010. Heritage Impact Assessment for conversion of PR to MRA. Georock Environmental. Northwest, RSA. Heritage Impact Assessment. Project manager.
- 2010. Temo Coal Project. Namane Commodities (Pty) Ltd. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2011. Marapong Treatment Works. Ceenex (Pty) Ltd. Limpopo, RSA. Archaeological Impact Assessment. Project manager.

- 2011. Complete Environmental Authorisation. Rhodium Reefs Ltd. Limpopo, RSA. Archaeological Impact Assessment. Specialist.
- 2011. Big 5 PV Solar Plants. Orlight (Pty) Ltd. Western and Northern Cape, RSA. Heritage Impact Assessment. Specialist.
- 2011. Heritage Impact Assessment for Koidu Diamond Mine. Koidu Holdings SA. Koidu, Sierra Leone. Heritage Impact Assessment. Specialist.
- 2012. TSF and Pipeline. Gold One. Gauteng, RSA. Heritage Impact Assessment. Project manager.
- 2012. Kangra Coal Heritage Screening Assessment. ERM Southern Africa (Pty) Ltd. Mpumalanga, RSA. Heritage Screening Assessment. Project manager.
- 2012. Environmental and Social Studies. Platreef Resources (Pty) Ltd. Limpopo, RSA. Heritage specialist advice. Project manager.
- 2012. ESKOM Powerline EIA. Ledjadja Coal (Pty) Ltd. Limpopo, RSA. Notification of Intent to Develop. Project manager.
- 2012. Falea Project ESIA. Denison Mines Corp. (Rockgate Capital Corp). Falea, Mali. Heritage Impact Assessment. Specialist.
- 2012. EIA for Proposed Emergency Measures to Pump and Treat. AECOM SA (Pty) Ltd. Gauteng, RSA. Heritage Impact Assessment. Specialist.
- 2012. Tonguma Baseline Studies. Koidu Holdings SA. Tonguma, Sierra Leone. Heritage Impact Assessment. Specialist.
- 2012. Vedanta IPP. Black Mountain Mining (Pty) Ltd. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2012. Boikarabelo Railway Realignment. Ledjadja Coal (Pty) Ltd. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2012. Platreef ESIA. Platreef Resources (Pty) Ltd. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2012. Roodekop EIA. Universal Coal Development 4 (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Specialist.
- 2012. Kangala HIA. Universal Coal Development 1 (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment and permitting. Specialist.
- 2012. Roodepoort Strengthening. Eskom Holdings SOC Ltd. Gauteng, RSA. Notification of Intent to Develop. Specialist.
- 2012. Trichardtsfontein EIA / EMP. Xstrata Coal South Africa. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2012. Zandbaken EIA/EMPR. Xstrata Coal South Africa. Limpopo, RSA. Heritage Impact Assessment. Specialist.

- 2013. ATCOM Tweefontein NID. Jones & Wagener (Pty) Ltd. Mpumalanga, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2013. Roodepoort Heritage Impact Assessment. Fourth Element Consulting (Pty) Ltd. Gauteng, RSA. Heritage Impact Assessment. Project manager.
- 2013. JHB BRT Phase 2 Heritage Impact Assessment. Iliso Consulting (Pty) Ltd. Gauteng, RSA. Heritage Impact Assessment. Project manager.
- 2013. Kangra Coal HIA. ERM Southern Africa (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Project manager.
- 2013. Slypsteen Bulk Sample Application. Summer Season Trading (Pty) Limited. Northern Cape, RSA. Heritage Impact Assessment. Project manager.
- 2013. Kempton Park Heritage Statement and NID. ERM Southern Africa (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Project manager.
- 2013. Sasol Twistdraai CFD. ERM Southern Africa (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Project manager.
- 2013. HRS & NID - River Crossings Upgrade. Iliso Consulting (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Project manager.
- 2013. Waterberg Prospecting Right Applications. Platinum Group Metals (Pty) Ltd. Limpopo, RSA. Notification of Intent to Develop. Project manager.
- 2013. Landau Waste Licence Application. Anglo Operations (Pty) Limited. Mpumalanga, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2013. Prospecting Right Consultation Report. Rustenburg Platinum Mines Limited. Mpumalanga, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2013. Witrand Prospecting EMP. Rustenburg Platinum Mines Limited. Mpumalanga, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2013. EMP Amendment for CST. Copper Sunset Trading (Pty) Ltd. Mpumalanga, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2013. Maseve IFC ESHIA. Maseve Investment (Pty) Ltd. Mpumalanga, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2013. Dalyshope ESIA. Anglo Operations (Pty) Limited. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2013. Klipfontein Opencast Project. Bokoni Platinum Mines (Pty) Ltd. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2013. Consbrey and Harwar MPRDA EIA/EMP. Msobo Coal (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Specialist.
- 2013. Slypsteen 102 EMP Amendment. Summer Season Trading (Pty) Limited. Northern Cape, RSA. Heritage Impact Assessment. Specialist.

- 2013. Putu Iron Ore ESIA. Atkins Limited Incorporated. Putu, Liberia. Heritage Impact Assessment. Specialist.
- 2013. Ash backfilling at Sigma Colliery. Sasol Mining (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Specialist.
- 2013. Syferfontein Block 4 - Underground Coal Mining for Sasol. Sasol Mining (Pty) Ltd. Mpumalanga, RSA. Notification of Intent to Develop. Specialist.
- 2013. Prospecting Right Amendment to Include Bulk Sampling. Sikhuliso Resources (Pty) Ltd. Mpumalanga, RSA. Notification of Intent to Develop. Specialist.
- 2013. Nooitgedacht EIA, EMP Amendment & Gap Analysis. Xstrata Coal South Africa. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2014. Gold One EMP Consolidation Phase 0. Gold One. Gauteng, RSA. Heritage Impact Assessment. Reviewer / specialist.
- 2014. Kilbarchan Audit and EIA. Eskom Holdings SOC Ltd. Kwazulu-Natal, RSA. Heritage Impact Assessment. Reviewer / specialist.
- 2014. Klipspruit Extension Environmental Assessment. BHP Billiton Energy Coal South Africa Limited. Mpumalanga, RSA. Heritage Impact Assessment. Reviewer / specialist.
- 2014. Klipspruit South BECSA EIA. BHP Billiton Energy Coal South Africa Limited. Mpumalanga, RSA. Heritage Impact Assessment. Reviewer / specialist.
- 2014. EIA/EMP Soweto Cluster. DRD GOLD ERGO (Ergo Mining (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2014. London Road Heritage Statement. ERM Southern Africa (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2014. Grootegeluk MPRDA, NEMA and IWULA. Exxaro Coal (Pty) Ltd. Limpopo, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2014. Kibali ESIA & EMP Update. Randgold Resources. Doko, DRC. Heritage Impact Assessment. Specialist.
- 2014. Nokuhle Colliery NEMA Process. HCI Coal (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Specialist.
- 2014. HRM Process for Hendrina Wet Ashing. Lidwala Consulting Engineers (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Specialist.
- 2014. Weltevreden NEMA. Northern Coal (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Specialist.
- 2014. Sasol Sigma Mooikraal Pipeline BA. Sasol Mining (Pty) Ltd. Mpumalanga, RSA. Notification of Intent to Develop. Specialist.

7.4 Burial Grounds and Graves Consultation and Relocation

- 2005. Report on exhumation, relocation and re-internment of 49 graves on Portion 10 of the farm Tygervallei 334 JR, Kungwini Municipality, Gauteng D Georgiades East Farm (Pty) Ltd. Gauteng, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2005. Southstock Collieries Grave Relocation. Doves Funerals, Witbank. Mpumalanga, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2005. Social consultation for Smoky Hills Platinum Mine Grave Relocation. PGS (Pty) Ltd. Limpopo, RSA. Stakeholder consultation on burial grounds and graves. Social consultant.
- 2005. Social consultation for Elawini Lifestyle Estate Grave Relocation. PGS (Pty) Ltd. Mpumalanga, RSA. Stakeholder consultation on burial grounds and graves. Social consultant.
- 2006. Social consultation for Zonkezizwe Grave Relocation. PGS (Pty) Ltd. Gauteng, RSA. Stakeholder consultation on burial grounds and graves. Social consultant.
- 2006. Social consultation for Motaganeng Residential Development Grave Relocation. PGS (Pty) Ltd. Mpumalanga, RSA. Stakeholder consultation on burial grounds and graves. Social consultant.
- 2006. Social consultation for Zondagskraal Coal Mine Grave (Pty) Ltd. Mpumalanga, RSA. Stakeholder consultation on burial grounds and graves. Social consultant.
- 2007. Exploratory excavation of an unknown cemetery at Du Preezhoek, Fountains Valley, Portion 383 of the farm Elandspoort 357 JR, Pretoria, Gauteng. Bombela Civil Joint Venture. Gauteng, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2007. Final consolidated report: Phase 2 test excavations ascertaining the existence of alleged mass graves, Tlhabane West, Extension 2, Rustenburg, Northwest Province. Bigen Africa Consulting Engineers. Northwest, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2007. Repatriation of Mapungubwe Human Remains. Department of Environmental Affairs and Tourism. Limpopo, RSA. Repatriation. Project manager.
- 2008. Report on skeletal material found at Pier 30, R21 Jones Street off-ramp, Kempton Park. Bombela Civil Joint Venture. Gauteng, RSA. Heritage Scoping Assessment. Project manager.
- 2011. Kibali Grave Relocation. Randgold Resources. Doko, DRC. International grave relocation. Specialist.
- 2012. Platreef Platinum Mine Burial Grounds and Graves Census. Platreef Resources (Pty) Ltd. Limpopo, RSA. Stakeholder consultation on burial grounds and graves. Project manager.

- 2013. New Liberty Grave Relocation Process. Aureus Mining Inc. Kinjor, Liberia. International grave relocation. Project manager.
- 2013. Bokoni Burial Grounds and Grave Census and Grave Relocation Plan. Bokoni Platinum Mines (Pty) Ltd. Limpopo, RSA. Stakeholder consultation on burial grounds and graves. Project manager.
- 2014. Arnot Colliery Grave Relocation Project. Exxaro Coal (Pty) Ltd. Mpumalanga, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2014. Paardeplaats and Belfast RAPs. Exxaro Coal (Pty) Ltd. Mpumalanga, RSA. Burial grounds and graves consultation, permitting and relocation. Reviewer / specialist.
- 2014. Thabametsi EIA, EMP, IWULA, IWWMP and PPP. Exxaro Coal (Pty) Ltd. Limpopo, RSA. Stakeholder consultation on burial grounds and graves. Specialist.

7.5 Research Reports and Reviews

- 2007. Research report on cultural symbols. Ministry of Intelligence Services. RSA. Research report. Project manager.
- 2007. Research report on the remains of kings Mampuru I and Nyabela. National Department of Arts and Culture. RSA. Research report. Project manager.
- 2012. Baseline Scoping and Pre-feasibility Songwe Rare Earth Element Project. Mkango Resources Limited. Songwe, Malawi. Heritage Impact Assessment. Reviewer / specialist.
- 2013. Fatal Flaw Analysis and EIA Process for AMD Man in Eastern Basin. AECOM SA (Pty) Ltd. Gauteng, RSA. Heritage Impact Assessment. Reviewer / specialist.

Mr. Justin du Piesanie

Heritage Management Consultant: Archaeologist

Social Sciences Department

Digby Wells Environmental

1 Education

Date	Degree(s) or Diploma(s) obtained	Institution
2013	Continued Professional Development Programme, Architectural and Urban Conservation: Researching and Assessing Local Environments	University of Cape Town
2008	MSc	University of the Witwatersrand
2005	BA (Honours) (Archaeology)	University of the Witwatersrand
2004	BA	University of the Witwatersrand
2001	Matric	Norkem Park High School

2 Language Skills

Language	Written	Spoken
English	Excellent	Excellent
Afrikaans	Proficient	Good

3 Employment

Period	Company	Title/position
08/2011 to present	Digby Wells Environmental	Heritage Management Consultant: Archaeologist

Period	Company	Title/position
2009-2011	University of the Witwatersrand	Archaeology Collections Manager
2009-2011	Independent	Archaeologist
2006-2007	Maropeng & Sterkfontein Caves UNESCO World Heritage Site	Tour guide

4 Professional Affiliations

Position	Professional Body	Registration Number
Member	Association for Southern African Professional Archaeologists (ASAPA); ASAPA Cultural Resources Management (CRM) section	270
Member	International Council on Monuments and Sites (ICOMOS)	14274
Member	Society for Africanist Archaeologists (SAfA)	N/A

5 Publications

- Huffman, T.N. & du Piesanie, J.J. 2011. Khami and the Venda in the Mapungubwe Landscape. Journal of African Archaeology 9(2): 189-206

6 Experience

I have 5 years experiences in the field of heritage resources management (HRM) including archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. During my studies I was involved in academic research projects associated with the Stone Age, Iron Age, and Rock Art. These are summarised below:

- Wits Fieldschool - Excavation at Meyersdal, Klipriviersberg Johannesburg (Late Iron Age Settlement).
- Wits Fieldschool - Phase 1 Survey of Prentjiesberg in Ugie / Maclear area, Eastern Cape.
- Wits Fieldschool – Excavation at Kudu Kopje, Mapungubwe National Park Limpopo Province.

- Wits Fieldschool – Excavation of Weipe 508 (2229 AB 508) on farm Weipe, Limpopo Province.
- Survey at Meyerdal, Klipriviersberg Johannesburg.
- Mapping of Rock Art Engravings at Klipbak 1 & 2, Kalahari.
- Survey at Sonop Mines, Windsorton Northern Cape (Vaal Archaeological Research Unit).
- Excavation of Kudu Kopje, Mapungubwe National Park Limpopo Province.
- Excavation of KK (2229 AD 110), VK (2229 AD 109), VK2 (2229 AD 108) & Weipe 508 (2229 AB 508) (Origins of Mapungubwe Project)
- Phase 1 Survey of farms Venetia, Hamilton, Den Staat and Little Muck, Limpopo Province (Origins of Mapungubwe Project)
- Excavation of Canteen Kopje Stone Age site, Barkley West, Northern Cape
- Excavation of Khami Period site AB32 (2229 AB 32), Den Staat Farm, Limpopo Province

Since 2011 I have been actively involved in environmental management throughout Africa, focusing on heritage assessments incompliance with International Finance Corporation (IFC) Performance Standards and other World Bank Standards and Equator Principles. This exposure to environmental, and specifically heritage management has allowed me to work to international best practice standards in accordance with international conservation bodies such as UNESCO and ICOMOS. In addition, I have also been involved in the collection of quantitative data for a Relocation Action Plan (RAP) in Burkina Faso. The exposure to this aspect of environmental management has afforded me the opportunity to understand the significance of integration of various studies in the assessment of heritage resources and recommendations for feasible mitigation measures. I have work throughout South Africa, as well as Burkina Faso, the Democratic Republic of Congo, Liberia and Mali.

7 Project Experience

Please see the following table for relevant project experience:

Project Title	Project Location	Date:	Description of the Project	Role of Firm in the Project	Own Role in the Project	Time involved (man months)	Name of Client	Contract Outcomes	Reference
Klipriviersberg Archaeological Survey	Meyersdal, Gauteng, South Africa	2005 2006	Survey of residential development in Meyersdal. This included the recording of identified stone walled settlements through detailed mapping and photographs. Included was the Phase 2 Mitigation of two stone walled settlements	Archaeological Impact Assessments	Researcher, Archaeological Assistant	2 months		Completed survey, excavations and reporting	Archaeological Resource Management (ARM) Prof T.N. Huffman thomas.huffman@wits.ac.za
Sun City Archaeological Site Mapping	Sun City, Pilanesberg, North West Province, South Africa	2006 2006	Recording of an identified Late Iron Age stonewalled settlement through detailed mapping	Mapping	Archaeological Assistant, Mapper	1 month	Sun City	Completed mapping	Archaeological Resources Management (ARM) Prof T.N. Huffman thomas.huffman@wits.ac.za
Witbank Dam Archaeological Impact Assessment	Witbank, Mpumalanga, South Africa	2007 2007	Archaeological survey for proposed residential development at the Witbank dam	Archaeological Impact Assessment	Archaeological Assistant	1 week		Completed Archaeological Impact Assessment report	Archaeological Resources Management (ARM) Prof T.N. Huffman thomas.huffman@wits.ac.za
Archaeological Assessment of Modderfontein AH Holdings	Johannesburg, Gauteng, South Africa	2008 2008	Archaeological survey and basic assessment of Modderfontein Holdings	Archaeological Impact Assessment	Archaeologist	1 month		Completed the assessment of 13 properties	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com
Heritage Assessment of Rhino Mines	Thabazimbi, Limpopo Province, South Africa	2008 2008	Heritage Assessment for expansion of mining area at Rhino Mines	Heritage Impact Assessment	Archaeologist	2 weeks	Rhino Mines	Completed the assessment	Archaeological Resources Management (ARM) Prof T.N. Huffman thomas.huffman@wits.ac.za
Cronimet Project	Thabazimbi, Limpopo Province, South Africa	2008 2008	Archaeological survey of Moddergat 389 KQ, Schilpadnest 385 KQ, and Swartkop 369 KQ,	Archaeological Impact Assessment	Archaeologist	1 weeks	Cronimet	Completed field survey and reporting	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com

Eskom Thohoyandou SEA Project	Limpopo Province, South Africa	2008 2008	Heritage Statement defining the cultural landscape of the Limpopo Province to assist in establishing sensitive receptors for the Eskom Thohoyadou SEA Project	Heritage Statement	Archaeologist	2 months	Eskom	Completed Heritage Statement	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com
Wenzelrust Excavations	Shoshanguve, Gauteng, South Africa	2009 2009	Contracted by the Heritage Contracts Unit to help facilitate the Phase 2 excavations of a Late Iron Age / historical site identified in Shoshanguve	Excavation and Mapping	Archaeologist	1 week	Heritage Contracts Unit	Completed excavations	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com
University of the Witwatersrand Parys LIA Shelter Project	Parys, Free State, South Africa	2009 2009	Mapping of a Late Iron Age rock shelter being studied by the Archaeology Department of the University of the Witwatersrand	Mapping	Archaeologist	1 day	University of the Witwatersrand	Completed mapping of the shelter	University of the Witwatersrand Karim Sadr karim.sadr@wits.ac.za
Transnet NMPP Line	Kwa-Zulu Natal, South Africa	2010 2010	Heritage Survey of the Anglo-Boer War Vaalkrans Battlefield where the servitude of the NMP pipeline	Heritage Impact Assessment	Archaeologist	1 week	Umlando Consultants	Completed survey	Umlando Consultants Gavin Anderson umlando@gmail.com
Archaeological Impact Assessment – Witpoortjie Project	Johannesburg, Gauteng, South Africa	2010 2010	Heritage survey of Witpoortjie 254 IQ, Mindale Ext 7 and Nooitgedacht 534 IQ for residential development project	Archaeological Impact Assessment	Archaeologist	1 week	ARM	Completed survey for the AIA	Archaeological Resources Management (ARM) Prof T.N. Huffman thomas.huffman@wits.ac.za
Der Brochen Archaeological Excavations	Steelpoort, Mpumalanga, South Africa	2010 2010	Phase 2 archaeological excavations of Late Iron Age Site	Archaeological Excavation	Archaeologist	2 weeks	Heritage Contracts Unit	Completed excavations	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com
De Brochen and Booysendal Archaeology Project	Steelpoort, Mpumalanga, South Africa	2010 2010	Mapping of archaeological sites 23, 26, 27, 28a & b on the Anglo Platinum Mines De Brochen and Booysendal	Mapping	Archaeologist	1 week	Heritage Contracts Unit	Completed Mapping	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com

Eskom Thohoyandou Electricity Master Network	Limpopo Province, South Africa	2010	2010	Desktop study to identify heritage sensitivity of the Limpopo Province	Desktop Study	Archaeologist	1 Month	Strategic Environmental Focus	Completed Report	Strategic Environmental Focus (SEF) Vici Napier vici@sefsa.co.za
Batlhako Mine Expansion	North-West Province, South Africa	2010	2010	Mapping of historical sites located within the Batlhako Mine Expansion Area	Mapping	Archaeologist	1 week	Heritage Contracts Unit	Completed Mapping	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com
Kibali Gold Project Grave Relocation Plan	Orientale Province, Democratic Republic of Congo	2011	2013	Implementation of the Grave Relocation Project for the Randgold Kibali Gold Project	Grave Relocation	Archaeologist	2 years	Randgold Resources	Successful relocation of approximately 3000 graves	Kibali Gold Mine Cyrille Mutombo Cyrille.c.mutombo@kibaligold.com
Kibali Gold Hydro-Power Project	Orientale Province, Democratic Republic of Congo	2012	2014	Assessment of 7 proposed hydro-power stations along the Kibali River	Heritage Impact Assessment	Heritage Consultant	2 years	Randgold Resources	Completed Heritage Impact Assessment	Randgold Resources Charles Wells Charles.wells@randgoldreources.com
Everest North Mining Project	Steelpoort, Mpumalanga, South Africa	2012	2012	Heritage Impact Assessment on the farm Vygenhoek	Heritage Impact Assessment	Heritage Consultant	6 months	Aquarius Resources	Completed Heritage Impact Assessment	Aquarius Resources
Environmental Authorisation for the Gold One Geluksdal TSF and Pipeline	Gauteng, South Africa	2012	2012	Heritage impact Assessment for the proposed TSF and Pipeline of Geluksdal Mine	Heritage Impact Assessment	Heritage Consultant	4 months	Gold One International	Completed Heritage Impact Assessment	Gold One International
Platreef Burial Grounds and Graves Survey	Mokopane, Limpopo Province, South Africa	2012	2012	Survey for Burial Grounds and Graves	Burial Grounds and Graves Management Plan	Heritage Consultant	4 months	Platreef Resources	Project closed by client due to safety risks	Platreef Resources Gerick Mouton
Resgen Boikarabelo Coal Mine	Limpopo Province, South Africa	2012	2012	Archaeological Excavation of identified sites	Archaeological Excavation	Heritage Consultant	4 months	Resources Generation	Completed excavation and reporting, destruction permits approved	Resources Generation Louise Nicolai
Bokoni Platinum Road Watching Brief	Burgersfort, Limpopo Province, South Africa	2012	2012	Watching brief for construction of new road	Watching Brief	Heritage Consultant	1 week	Bokoni Platinum Mine	Completed watching brief, reviewed report	Bokoni Platinum Mines (Pty) Ltd

SEGA Gold Mining Project	Burkina Faso	2012 2013	Socio Economic and Asset Survey	RAP	Social Consultant	3 months	Cluff Gold PLC	Completed field survey and data collection	Cluff Gold PLC
SEGA Gold Mining Project	Burkina Faso	2013 2013	Specialist Review of Heritage Impact Assessment	Reviewer	Heritage Consultant	1 week	Cluff Gold PLC	Reviewed specialist report and made appropriate recommendations	Cluff Gold PLC
Consbrey and Harwar Collieries Project	Breyton, Mpumalanga, South Africa	2013 2013	Heritage Impact Assessment for the proposed Consbrey and Harwar Collieries	Heritage Impact Assessment	Heritage Consultant	2 months	Msobo	Completed Heritage Impact Assessments	Msobo
New Liberty Gold Project	Liberia	2013 2014	Implementation of the Grave Relocation Project for the New Liberty Gold Project	Grave Relocation	Heritage Consultant	On-going	Aureus Mining	Project is on-going	Aureus Mining
Falea Uranium Mine Environmental Assessment	Falea, Mali	2013 2013	Heritage Scoping for the proposed Falea Uranium Mine	Heritage Scoping	Heritage Consultant	2 months	Rockgate Capital	Completed scoping report and recommended further studies	Rockgate Capital
Putu Iron Ore Mine Project	Petroken, Liberia	2013 2014	Heritage impact Assessment for the proposed Putu Iron Ore Mine, road extension and railway line	Heritage Impact Assessment	Heritage Consultant	6 months	Atkins Limited	Completed Heritage Impact Assessment and provided recommendations for further studies	Atkins Limited Irene Bopp Irene.Bopp@atkinsglobal.com
Sasol Twistdraai Project	Secunda, Mpumalanga, South Africa	2013 2014	Notification of intent to Develop and Heritage Statement for the Sasol Twistdraai Expansion	NID	Heritage Consultant	2 months	ERM Southern Africa	Completed NID and Heritage Statement	ERM Southern Africa Alan Cochran Alan.Cochran@erm.com
Daleside Acetylene Gas Production Facility	Gauteng, South Africa	2013 2013	Project Management of the heritage study	NID	Project Manager	3 months	ERM Southern Africa	Project completed	ERM Southern Africa Kasantha Moodley Kasantha.Moodley@erm.com
Exxaro Belfast, Paardeplaats and Eerstelingsfontein GRP	Belfast, Mpumalanga, South Africa	2013 2014	Grave Relocation Plan for the Belfast, Paardeplaats and Eerstelingsfontein Projects	GRP	Project Manager, Heritage Consultant	On-going	Exxaro	Project is on-going	Exxaro Johan van der Bijl Johan.vanderbijl@exxaro.com

Nzoro 2 Hydro Power Project	Orientale Province, Democratic Republic of Congo	2014 2014	Social consultation for the Relocation Action Plan component of the Nzoro 2 Hydro Power Station	RAP	Social Consultant	On-going	Randgold Resources	Completed introductory meetings – project on-going	Kibali Gold Mine Cyrille Mutombo Cyrille.c.mutombo@kibaligold.com
Eastern Basin AMD Project	Springs, Gauteng, South Africa	2014 2014	Heritage Impact Assessment for the proposed new sludge storage facility and pipeline	Heritage Impact Assessment	Heritage Consultant	On-going	AECOM	Project is on-going	AECOM
Soweto Cluster Reclamation Project	Soweto, Gauteng, South Africa	2014 2014	Heritage Impact Assessment for reclamation activities associated with the Soweto Cluster Dumps	Heritage Impact Assessment	Heritage Consultant	On-going	ERGO	Project is on-going	ERGO Greg Ovens Greg.ovens@drdgold.com
Klipspruit South Project	Ogies, Mpumalanga, South Africa	2014 2014	NID and Heritage Statement for the Section 102 Amendment of the Klipspruit Mine EMP	NID	Heritage Consultant	On-going	BHP Billiton	Project is on-going	BHP Billiton
Klipspruit Extension: Weltevreden Project	Ogies, Mpumalanga, South Africa	2014 2014	NID and Heritage Statement for the expansion of the Klipspruit Mine	NID	Heritage Consultant	On-going	BHP Billiton	Project is on-going	BHP Billiton
Ergo Rondebult Pipeline Basic Assessment	Johannesburg, South Africa	2014 2014	NID and Heritage Statement for the construction of the Rondebult Pipeline	NID	Heritage Consultant	1 Week	ERGO	Completed screening assessment and NID	ERGO
Kibali ESIA Update Project	Orientale Province, Democratic Republic of Congo	2014 2014	Update of the Kibali ESIA for the inclusion of new open-cast pit areas	Heritage Impact Assessment	Heritage Consultant	On-going	Randgold Resources	Project is on-going	Randgold Resources Charles Wells Charles.wells@randgoldresources.com
GoldOne EMP Consolidation	Westonaria, Gauteng, South Africa	2014 2014	Gap analysis for the EMP consolidation of operations west of Johannesburg	Gap Analysis	Heritage Consultant	On-going	Gold One International	Project is on-going	Gold One International

NATASHA HIGGITT

Ms Natasha Higgitt

Assistant Heritage Consultant

Social Department

Digby Wells Environmental

1 EDUCATION

- University of Pretoria
- BA Degree (2008)
- Archaeology Honours (2010)
- Title of Dissertation- Pass the Salt: An Archaeological analysis of lithics and ceramics from Salt Pan Ledge, Soutpansberg, for evidence of salt working and interaction.

2 LANGUAGE SKILLS

- English - Excellent (read, write and speak)
- Afrikaans - Fair (read, write and speak)
- Italian – Poor (Speaking only)

3 EMPLOYMENT

- July 2011 to Present: Assistant Heritage Consultant at Digby Wells Environmental
- April 2011 to June 2011: Lab assistant at the Albany Museum Archaeology Department, Grahamstown, Eastern Cape
- April 2010 to March 2011: Intern at the Archaeology Department, Albany Museum, Grahamstown, Eastern Cape under the Department of Sports, Recreation, Arts and Culture, Eastern Cape Government, South Africa (DSRAC)

4 FIELD EXPERIENCE

- Human remains rescue excavation at St Francis Bay, Eastern Cape
- Human remains rescue excavation at Wolwefontein, Eastern Cape
- Recorded two rock art sites at Blaauwbosch Private Game Reserve, Eastern Cape

- Attended a 2 week excavation/study tour in the Friuli Region in Italy, organised by the *Società Friulana di Archeologia*, sponsored by *Ente Friuli nel Mondo*, and excavated a 12th century medieval castle
- Attended a 2 week excavation in Limpopo, Waterpoort Archaeological Project organised by Xander Antonites (Yale PhD Candidate)
- A total of 5 University of Pretoria Archaeology field schools in Limpopo and Gauteng spanning over 4 years

5 PROJECT EXPERIENCE

- Notification of Intent to Develop for the Doornkloof Flood Remedial Measures Project, Centurion, Gauteng Province for Iliso Consulting (Pty) Ltd (Digby Wells Environmental)
- Notification of Intent to Develop for the Oakleaf Open Cast Coal Mine, Bronkhorstspruit, Gauteng Province for Oakleaf Resources (Digby Wells Environmental)
- Notification of Intent to Develop for the Rietfontein 101IS Prospecting Project for Rustenburg Platinum (Digby Wells Environmental)
- Heritage Impact Assessment for the Weltevreden Open Cast Coal Mine, Belfast, Mpumalanga for Northern Coal (Pty) Ltd (Digby Wells Environmental)
- Notification of Intent to Develop for the Grootegeluk Expansion Project, Lephalale, Limpopo Province for Exxaro Resources (Pty) Ltd (Digby Wells Environmental)
- Notification of Intent to Develop and Heritage Statement for the London Road Petrol Station, Alexandria, Gauteng for ERM Southern Africa (Pty) Ltd (Digby Wells Environmental)
- Heritage Impact Assessment for the Roodepoort Strengthening Project, Roodepoort, Gauteng for Fourth Element (Digby Wells Environmental)
- Heritage Statement for the Stoffel Park Bridge Upgrade, Mamelodi, Gauteng for Iliso Consulting (Pty) Ltd (Digby Wells Environmental)
- Heritage Statement for the Witrand Prospecting EMP, Bethal, Mpumalanga for Rustenburg Platinum (Digby Wells Environmental)
- Heritage Statement for the Onverwacht Prospecting EMP, Kinross, Mpumalanga for Rustenburg Platinum (Digby Wells Environmental)
- Heritage Statement for a Proposed Acetylene Gas Production Facility, located near Witkopdorp, Daleside, south of Johannesburg, Gauteng Province for Erm Southern Africa (Pty) Ltd (Digby Wells Environmental)
- Heritage Impact Assessment for the Platreef Platinum Project, Mokopane, Limpopo for Platreef Resources (Digby Wells Environmental)
- Heritage Statement for ATCOM and Tweefontein Dragline Relocation Project, near Witbank, Mpumalanga Province for Jones and Wagner Consulting Civil Engineers (Digby Wells Environmental)

- Heritage Statement Report for the Wilgespruit Bridge Upgrade, Pretoria, Gauteng Province for Iliso Consulting (Pty) Ltd (Digby Wells Environmental)
- Heritage Statement Report for the Kosmosdal sewer pipe bridge upgrade, Pretoria, Gauteng Province for Iliso Consulting (Pty) Ltd (Digby Wells Environmental)
- Phase 1 Heritage Impact Assessment for the Thabametsi Coal Mine, Lephalale, Limpopo for Exxaro Coal (Digby Wells Environmental)
- Heritage Statement for the Zandbaken Coal Mine Project, Zandbaken 585 IR, Sandbaken 363 IR and Bosmans Spruit 364 IS, Standerton, Mpumalanga for Xtrata Coal South Africa (Digby Wells Environmental)
- Phase 1 Heritage Impact Assessment for the Brakfontein Thermal Coal Mine, Mpumalanga for Universal Coal (Digby Wells Environmental)
- Development of a RAP for Aureus Mining for the New Liberty Gold Mine Project, Liberia (Digby Wells Environmental)
- Phase 1 Archaeological Impact Assessment for the MBET Pipeline, Steenbokpan, Limpopo (Digby Wells Environmental)
- Notice of Intent to Develop and Cultural Resources Pre-Assessment for Orlight SA (PTY) Ltd Solar PV Project. 2012. (Digby Wells Environmental)
- Agricultural Survey for Platreef ESIA, Mokopane, Limpopo. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for the Proposed Sylvania Everest North Mining Development in Mpumalanga, near Lydenburg. 2011. (Digby Wells Environmental)
- Phase 2 Mitigation of Archaeological sites at Boikarabelo Coal Mine, Steenbokpan, Limpopo. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for Proposed Platinum Mine Prospecting in Mpumalanga, near Bethal for Anglo Platinum. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for proposed Platinum Mine at Mokopane, Limpopo for Ivanhoe Platinum. 2011. (Digby Wells Environmental)
- Phase 1 AIA Mixed-use housing Development, Kwanobuhle, Extension 11, Uitenhage, Eastern Cape. 2011.
- Phase 1 AIA Centane to Qholora and Kei River mouth road upgrade survey, Mnquma Municipality, Eastern Cape. 2011. (SRK Consulting)
- Phase 1 AIA Clidet Data Cable survey, Western Cape, Northern Cape, Free State and Eastern Cape. 2011. (SRK Consulting)
- Phase 1 AIA Karoo Renewable Energy Facility, Victoria West, Northern Cape. 2011. (Savannah Environmental)
- Phase 1 AIA Windfarm survey in Hamburg, Eastern Cape. 2010. (Savannah Environmental)

- Phase 1 AIA Windfarm survey in Molteno, Eastern Cape. 2010. (Savannah Environmental)
- Phase 1 AIA Housing Development at Motherwell, P.E. 2010. (SRK Consulting)
- Phase 1 AIA Sand quarry survey in Paterson, Eastern Cape. 2010. (SRK Consulting)
- Phase 1 AIA Quarry Survey at Victoria West. 2010. (Acer [Africa] Environmental Management Consultants)
- Phase 1 AIA Quarry Survey at Port Elizabeth. 2010. (E.P Brickfields)

6 PROFESSIONAL AFFILIATIONS

- Association of Southern African Professional Archaeologists (ASAPA): Professional member
- Association of Southern African Professional Archaeologists (ASAPA): CRM Practitioner (Field Supervisor: Stone Age, Iron Age and Rock Art)
- South African Museums Association (SAMA): Member

Appendix B: Heritage Literature Review

DIGBY WELLS
ENVIRONMENTAL

Pamish Magnetite Mine Project

Heritage Scoping Literature Review

Project Number:

VMC3049

Prepared for:

Pamish Investments No. 39 (Pty) Ltd

February 2015

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1 Introduction

This document constitutes a literature review that informed the Heritage Scoping Report in general and the cultural heritage baseline profile in that report specifically. The purpose of the literature review is to collate appropriate information to describe the cultural landscape and heritage on regional, local and site-specific scales, as defined in the Heritage Scoping Report. This description is useful to determine cultural significance of heritage resources and identify and assess possible heritage impacts.

The structure of the literature review report is as follows:

- Chapter 2 provides definitions of terms and time periods relevant to the Project;
- Chapter 3 describes data collection methods, information source analysis and motivation for inclusion or exclusion of information sources;
- Chapter 4 discusses the regional and local study areas in chronological order, i.e. geology and palaeontology through to historical and more recent periods;
- Chapter 5 discusses the site-specific study area in chronological order;
- Chapter 6 discusses the development context on regional, local and site scales, based on the Socio-Economic Scoping Report; and
- Chapter 7 concludes the literature review with a summary of the most salient and significant heritage aspects identified in the reviewed literature.

2 Definitions

The cultural heritage baseline describes the regional, local and site specific areas defined in, and considered the following relevant time periods:

Table 2-1: Periods considered in the cultural heritage baseline profile (adapted from Winter & Bauman 2005)

Periods	Definitions
1 Palaeontological and geological	Precambrian to late Pleistocene (1.2 billion to late 20 000 years ago)
2 Indigenous	Early Stone Age (3 million to 300 00ya) (ESA)
	Middle Stone Age (c 300 000 to 30 000 ya) (MSA)
	Later Stone Age (c 30 000 to 2000 ya) (LSA)
	Late Farming Communities (1500's to 1850's) (LIA)
3 Colonial	British colony (1814 -1910)
4 Historical	Union of South Africa (1911-1961)
	Apartheid Republic of South Africa (1961-1994)
	Democratic Republic of South Africa (1994-Present)

3 Data Collection and Analysis Methods

The reviewed literature included information sources such as peer reviewed academic articles, textbooks, books, existing heritage study reports, database surveys, development plans and aerial imagery. These sources were identified using key word searches and collected through Internet sources including online journal platforms, library and other databases, websites, the South African Heritage Information System (SAHRIS). In addition, relevant specialist Scoping studies and Project technical reports were considered.

Identified information sources were analysed using an Information Source Matrix (ISM) developed specifically to determine their relevance or appropriateness to the Project. Information sources are categorised into different types, listed in Table 3-1.

Table 3-1: Information source categories used in ISM

Act	Magazine
Archive document	Newspaper
Bill	Other
Book / chapter	Planning document
Brochure	Policy
Cartographic / map	Popular science book / journal / magazine
Collection	Report
Desktop database	Standards
Dissertation / thesis	Television
Encyclopaedia	Textbook
Framework document	Web page
Guidelines	White paper
Journal / Serial	

The ISM rates the credibility or confidence of each source category and the relevance of that source to provide an information value rating. Credibility / confidence and relevance ratings

are ranked from 1 to 10 to give a relevance rating out of 100. The ISM obliges the reviewer to critically interrogate identified sources and aims to provide an objective list of sources to be included in the literature review. In addition, the information value provides an objective time to cost value ratio, i.e. time required to review a source relative to the cost or effort required and the source's contribution to the overall Project.

The credibility / confidence and relevance ratings are provided in Table 3-2 and

Table 3-3. The information value ratings and designations are provided in Table 3-4 and Table 3-5.

Table 3-2: Credibility / confidence descriptions and ratings

Description	Rating
No confidence; unverified; unreferenced; hearsay	1
Unpublished; commissioned work	2
Published; popular	3
Primary source; unverified; unreferenced	4
Unpublished; academic	5
Respected, well-known source	6
Published; commissioned work	7
Primary source; verified; referenced	8
Published; academic	9
Highly credible; original research; referenced; peer reviewed; national / international standard	10

Table 3-3: Relevance descriptions and ratings

Description	Rating
Source relevant, but unavailable	1
No demonstrable relevance to study	2
Little demonstrable relevance to study, e.g. single mention of place name without further context	3
Very generic information	4
Relevant to broader regional context	5
Relevant to broader local context	6
Relevant to specific issues in regional context	7
Relevant to specific issues in local context	8
Relevant to site-specific context	9
Relevant to specific identified heritage	10

Table 3-4: Information rating matrix

Credibility / confidence		Relevance									
		1	2	3	4	5	6	7	8	9	10
	1	1	2	3	4	5	6	7	8	9	10
	2	2	4	6	8	10	12	14	16	18	20
	3	3	6	9	12	15	18	21	24	27	30
	4	4	8	12	16	20	24	28	32	36	40
	5	5	10	15	20	25	30	35	40	45	50
	6	6	12	18	24	30	36	42	48	54	60
	7	7	14	21	28	35	42	49	56	63	70
	8	8	16	24	32	40	48	56	64	72	80
	9	9	18	27	36	45	54	63	72	81	90
	10	10	20	30	40	50	60	70	80	90	100

Table 3-5: Information rating descriptions and ratings

Rating	Description
70-100	Integral to study; in-depth review required; ensure source is cited
50-69	Useful to study; review and ensure citation
40-49	Limited use; only use as extended motivation; cite if used
30-39	Very limited use; only use as extended motivation; cite if used
20-21	Ignore unless source is cross referenced by an integral or useful source
11-19	Ignore unless source is cross referenced by an integral or useful source
1-10	Ignore source

4 Regional and Local Study Area

4.1 Geology and Palaeontological Sensitivity[1]

The basement rock in the regional study area comprises magmatic, Archaean Granite and Gneisses, which are Neoarchaean in age dating from *c.* 2 800 Ma to 2 500 Ma. These Neoarchaean granitoids are associated with the linear Pietersburg and Giyani Greenstone belts (Robb, Brandl, Anhaeusser, & Puojol, 2006, p. 75). The most voluminous member of the Neoarchaean granite group is Turfloop Granite. The inherent magmatic igneous origin of the Neoarchaean granitoids precluded fossil taphonomy (SAHRA, 2013b).

The SAHRIS PalaeoSensitivity Map (see Figure 4-1 below) indicates a small area in the south-western part of the project area where palaeontological potential is considered high. This area has expressions of the Malmani Subgroup of the Chuniespoort Group of the Transvaal Supergroup, dated to between ~2600 Ma and ~2000 Ma. The Malmani Subgroup is divided into five formations that are based on chert content, stromatolite morphology, intercalated shales and erosion surfaces (Eriksson, Altermann, & Hartzer, 2006, p. 244). This subgroup has a high palaeontological sensitivity for two reasons. First, stromatolitic dolomites contain stromatolites and organic-walled microfossils: stromatolites represent the oldest fossil evidence of cyanobacteria (SAHRA, 2013d). Second, the dolomites are conducive to cave formation and breccia (SAHRA, 2013d). This aspect is discussed in more detail in Section 4.2 below.

The Bushveld Complex comprises of felsic and mafic igneous rocks, containing the largest platinum-group elements ore reserves globally within the mafic units of the complex ((Cawthorn, Eales, Walraven, Uken, & Watkeys, 2006, p. 261). The lithostratigraphy of the Bushveld Complex underlying the project area is summarised in Figure 4-2. It is dominated by the Lower, Critical, Main and Upper Zones of the Rustenburg Layered Suite that date from c. 2 050 Ma to around 2 000 Ma of the Eoproterozioc Era. The predominant rocks that comprise the Rustenburg Layered Suite include gabbro and gabbronorite – both igneous in origin and hence usually devoid of fossils (Cawthorn, Eales, Walraven, Uken, & Watkeys, 2006, pp. 263-264; SAHRA, 2013c).

The Rustenburg Layered Suite is overlain by the Lebowa Granite Suite (c. 1 790 Ma to 1 604 Ma) comprising Nebo Granite representing the final stratigraphic unit of the Bushveld Complex in the project area (Cawthorn, Eales, Walraven, Uken, & Watkeys, 2006, p. 273; Robb, Freeman, & Armstrong, 2000, pp. 269, 276). The granite is magmatic, i.e. igneous in origin, and therefore also of no palaeontological significance. (SAHRA, 2013c).

[1] This section was compiled by Johan Nel based on literature cited in text and palaeontological information obtained from the SAHRIS. The content was reviewed by Megan Edwards (BSc Honours Geology, UJ & BSc Honours Geohydrology, UFS) and Lucas Smith (Manager Geohydrology, BSc, UFS).

The Waterberg Group overlying the Lebowa Granite Suite in the western parts of the project area are considered to be between 1700 Ma and 2000 Ma old, and of Kheisian period of the Palaeoproterizoic era. During the Kheisian period, sufficient quantity of free atmospheric oxygen was first available to produce ferruginous mineral oxides (Barker, Brandl, Callaghan, Erikson, & van der Neut, 2006, p. 301). The oxidisation process allowed the formation of 'red beds', occurring in a cratonic setting in the Waterberg Group. The typical rocks associated with this group are arenite and rudite – sedimentary rocks deposited by large braided rivers (Barker, Brandl, Callaghan, Erikson, & van der Neut, 2006, p. 314). Rudite includes sedimentary rocks composed of conglomerate rounded or angular granules, pebbles, cobbles and boulders. Fossils typically found in the Mogalakwena Formation of the Waterberg Group include the earliest recorded terrestrial cyanobacterial mats from playa lake deposits (SAHRA, 2013a).

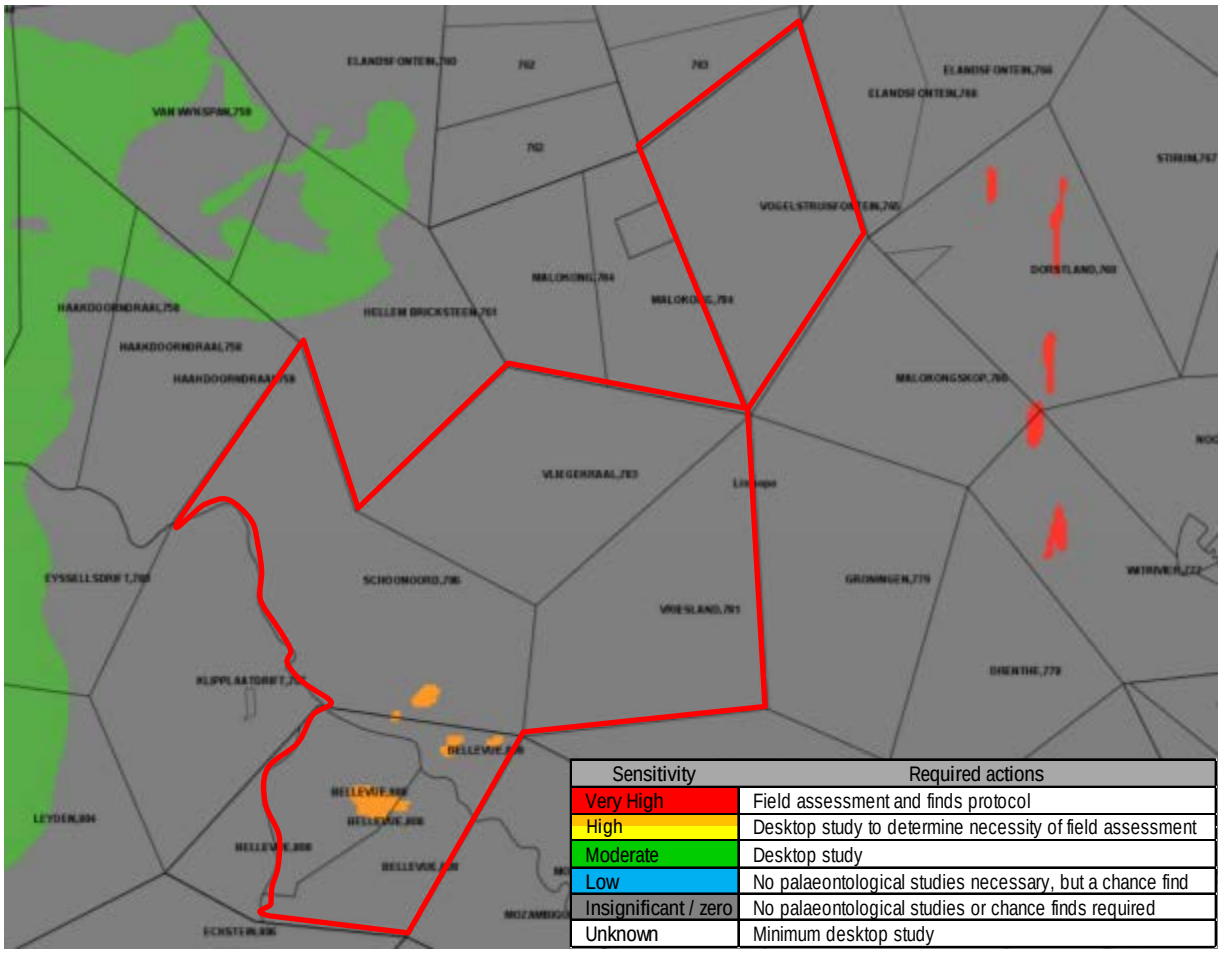

Figure 4-1: Palaeontological sensitivity of the Magnetite Project (adapted from SAHRIS PalaeoSensitivity Map[2])

[2] Available from http://www.sahra.org.za/map/palaeo [Accessed 7/1/2015].

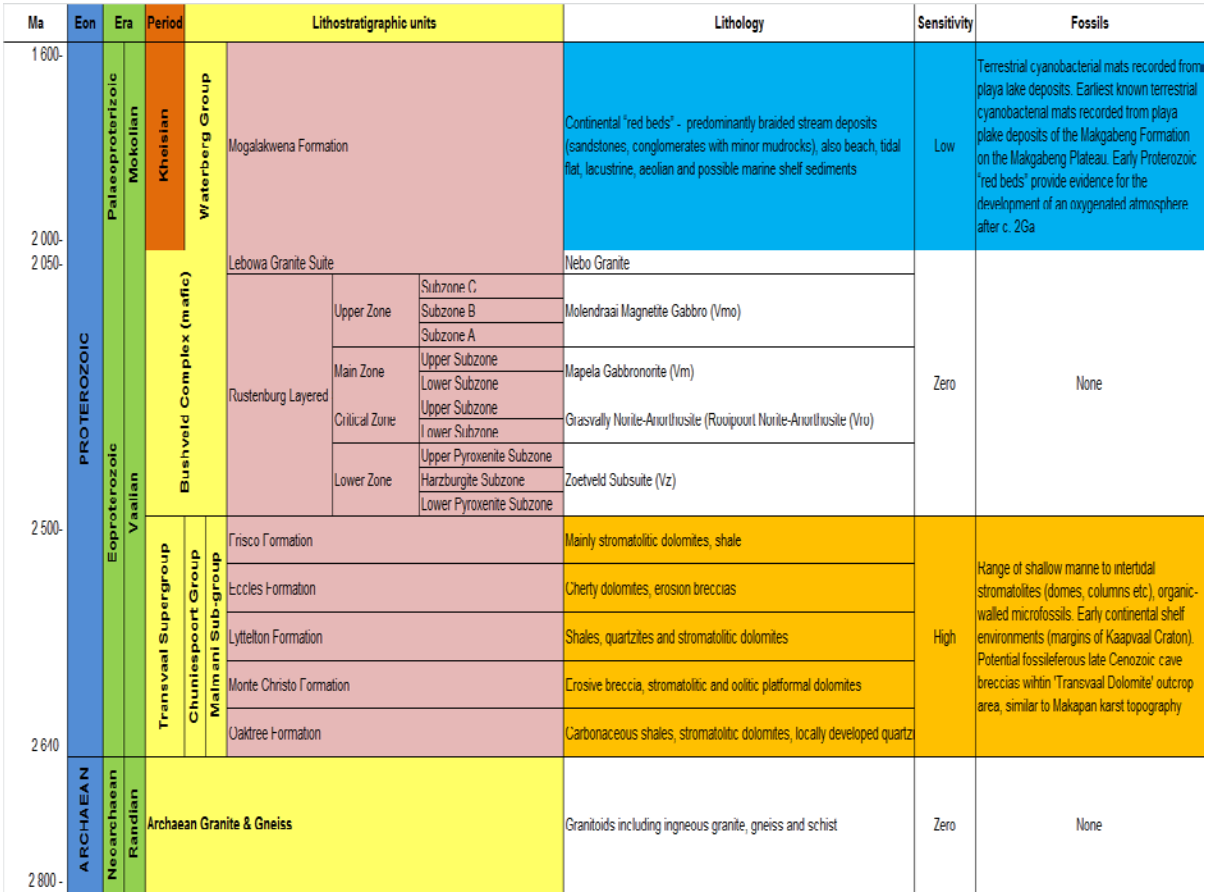

Figure 4-2: Lithostratigraphic units and fossil sensitivity (adapted from Longridge 2014, Johnson et al 2006 and SAHRIS[3])

4.2 Karst Topography and Cave Formation

Karst topography refers to landscapes formed from the dissolution of soluble rocks, including dolomite and limestone. A karst topography is characterised by underground drainage systems with sinkholes, dolines, and caves. The Transvaal Supergroup forms one of three main karst areas in South Africa, as karst landscapes developed on hardened insoluble chert-rich, iron and manganese dolomite of the Malmani Subgroup (Martini, 2006, pp. 661-662). Dissolution of these soluble Malmani dolomites created voids – karts caves – that filled with fine- to coarse-grained alluvium during periodic flooding. The alluvium may be represented by bodies of breccia, sandstone and siltstone. The detritus can include diverse animal bone fragments including hominid remains and tools (Martini, 2006, pp. 662-663; Knight, Grab, & Esterhuysen, 2014, p. 8; Sinclair, McCraith, & Nelson, 2003).

[3] Available from http://www.sahra.org.za/fossil-heritage-layer-browser [Accessed 7/1/2015]

The most significant example of a karst landscape in the region is the Makapan Valley World Heritage Site (WHS). The Makapan Valley WHS – named after Kekakana chief Mokopane – was listed as part of the Fossil Hominid Sites of South Africa WHS in 2005. It is situated approximately 45 km from the project area. At least eight karstic caves have been found and researched: Research House, Makapansgat Limeworks, Zwartkrans, Cave of Hearths, Historic, Rainbow, Buffalo and Cold Air Caves. These sites provide an exceptionally deep and relative continuous record of hominid and human evolution and occupation spanning four million years. In addition, cave speleothems have provided detailed information about climate and environmental change in the region. (Esterhuysen A. B., 2010; Knight, Grab, & Esterhuysen, 2014).

The karst caves associated with the Makapan Valley WHS is continuously at risk due to a diverse range issues – some natural and others anthropogenic. Some of these risks include the inherent tendency to collapse (often exacerbated by blasting associated with mining), and subsidence due to water extraction from dolomite aquifers (Knight, Grab, & Esterhuysen, 2014, p. 8).

Significantly, the International Union for Conservation of Nature (IUCN) considers caves and karsts as generally protected world heritage. The IUCN Wold Commission on Protected Area (WCPA) created two working groups which focus on the management of geological protected areas and heritage: the Geoheritage Specialist Group (GSG) and the Caves and Karst Specialist Group (CKSG). These two groups have published guidelines that need to be considered within the South African legal framework pertaining to both protected areas and world heritage.

The presence of Malmani dolomites in the project area should therefore be highlighted as a sensitive area, probably associated with the more extensive Makapan Valley karst landscape and therefore under possible protection.

4.3 Stone Age

Southern Africa has been inhabited by stone tool producing hominids for at least two million years. The characteristics of this period have been influenced through time to some extent by demography, socio-economic factors and environmental variations affected by geology, geomorphology, climate, fauna and flora (Lombard, et al., 2012). Classification schemes for the Stone Age have been concerned with both form and function, and more recently the techniques of manufacture. Based on these criteria, the model of Earlier, Middle and Later Stone Ages developed by Goodwin and Van Riet Lowe (1929) has maintained its relevance to Stone Age archaeological research. The three Ages and associated technocomplexes are listed in Table 4-1. Evidence for all three Stone Ages exists within the regional study area.

Table 4-1: The South African and Lesotho Stone Age sequence (Lombard, et al., 2012)

Period	Technocomplex	Also known as (including regional variants)
Later Stone Age <40 ka	ceramic final LSA <2 ka	Ceramic post-classic Wilton, Late Holocene with pottery (Doornfontein, Swartkop)
	final LSA 0.1-4 ka	Post-classic Wilton, Holocene microlithic (Smithfield, Kabeljous, Wilton)
	Wilton 4-8 ka	Holocene microlithic
	Oakhurst 7-1 ka	Terminal Pleistocene / early Holocene non-microlithic (Albany, Lockshoek, Kuruman)
	Robberg 12-18 ka	Late Pleistocene microlithic
	early LSA 18-40 ka	(informal designation) Late Pleistocene microlithic
Middle Stone Age >20 ka - <300 ka	final MSA 20-40 ka	(informal designation) MSA IV at Klasies River, MSA 4 generally
	Sibudu 45-58 ka	late MSA / post-Howieson's Poort or MSA III at Klasies and MSA 3 generally (all informal designations)
	Howieson's Poort 58-66 ka	
	Still Bay 70-77 ka	
	pre-Still Bay 72-96 ka	(informal designation)
	Mossel Bay 77-105 ka	MSA II at Klasies River, MSA 2b generally (Pietersburg, Orangian)
	Klasies River 105-130 ka	MSA I at Klasies River, MSA 2a generally (Pietersburg)
	early MSA 130-300 ka	(informal designation)
Early Stone Age >200 ka	ESA-MSA transition >200-600 ka	(informal designation) (Fauresmith, Sangoan)
	Acheulean 300-1.5 Ma	
	Oldowan 1.5-2 Ma	

4.3.1 Early Stone Age

The most significant are perhaps sites in the Makapan Valley to the south-east of present day Mokopane. Here, the Cave of Hearths is considered the most prolific Stone Age site in the region and is one of the most deeply stratified archaeological sites in the South Africa (Esterhuysen A. , 2003a). The Makapan Valley WHS includes a 2 220 ha core area and a 48 065 ha surrounding buffer zone of 48 065 ha, as gazetted in Government Notice 1197 of 2007, depicted in Figure 4-4.

The site was name by Clarens Van Riet Lowe in 1937 after fossil bearing breccia and blackened patches and “ash” in ESA layers was revealed in a miner’s horizontal cutting. Typical ESA lithics that were found included large bifacial hand axes, depicted in Figure 4-3 and cleavers dating to between ca. 2 Ma and 250 Ka (Esterhuysen & Smith, 2007). Excavations removed around 1 800 tons of cave fill, revealing a 7 m thick section containing cultural layers (Latham & Herries, 2004). These layers also yielded remains of *Homo heidelbergensis* and later Acheulean, MSA and LSA lithics, and Farming Communities material (Esterhuysen A. , 2003a).

In 1997, original excavated material was re-evaluated by archaeologists. The results indicated that large amounts of material within the Cave of Hearths were purposefully brought in, either as raw material or completed tools. This finding provides evidence that much wider hominid activity must exist within the region. Esterhuysen (2003a, p. 3) states that this information is key to the potential identification of Stone Age open sites are few and far between, as well as not easily recognised.

As previously mentioned in Section 4.2 above, the Makapan Valley was included into the *UNESCO Fossil Hominid Sites of South Africa WHS* in 2005. The serial listing is based on its Outstanding Universal Value captured in the following criteria (emphases added):

- Criterion (iii): The nominated serial site bears ***exceptional testimony to some of the most important Australopithecine specimens*** dating back more than 3.5 million years. This therefore throws light on to the origins and then the evolution of humankind, through the hominisation process.
- Criterion (vi): The serially nominated sites are situated in ***unique natural settings that have created a suitable environment for the capture and preservation of human and animal remains*** that have allowed scientists a window into the past. Thus, this site constitutes a ***vast reserve of scientific data of universal scope*** and considerable potential, linked to the history of the most ancient periods of humankind.
- Integrity (2005): The Fossil Hominid Sites of Sterkfontein, Swartkrans, Kromdraai and environs together with Makapan Valley and Taung Skull Fossil Site comprise five separate components situated in different provinces and each has a buffer zone. Collectively these components contain the ***necessary evidence of sites where abundant scientific information on the evolution of modern humans*** over the past 3.5 million years was uncovered. Furthermore, the nominated serial site covers

an area big enough to constitute a vast reserve of scientific information, with enormous potential.

Authenticity (2005): As regards authenticity, the sites contain within their deposits all of the key interrelated and interdependent elements in their natural palaeontological relationships. Thus, the breccia representing the cave fillings contains the fossilised remains of hominids, their lithicultural remains (from about 2.0 million years onwards), fossils of other animals, plants and pollen, as well as geochemical and sedimentological evidence of the conditions under which each member of the deposits was laid down. They represent a succession of palaeo−ecosystems. The caves, breccias and strata from which quantities of fossils or tools have been extracted, together with the landscape are generally intact, but are vulnerable to development pressures, villagers' use of the environment and tourism.

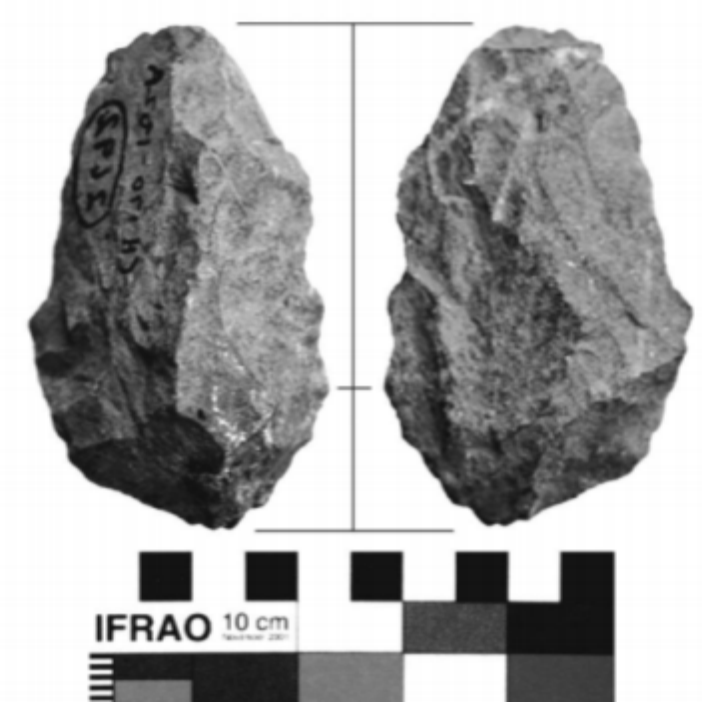

Figure 4-3: Biface in Cave of Hearths Bed IV (Underhill, 2012)

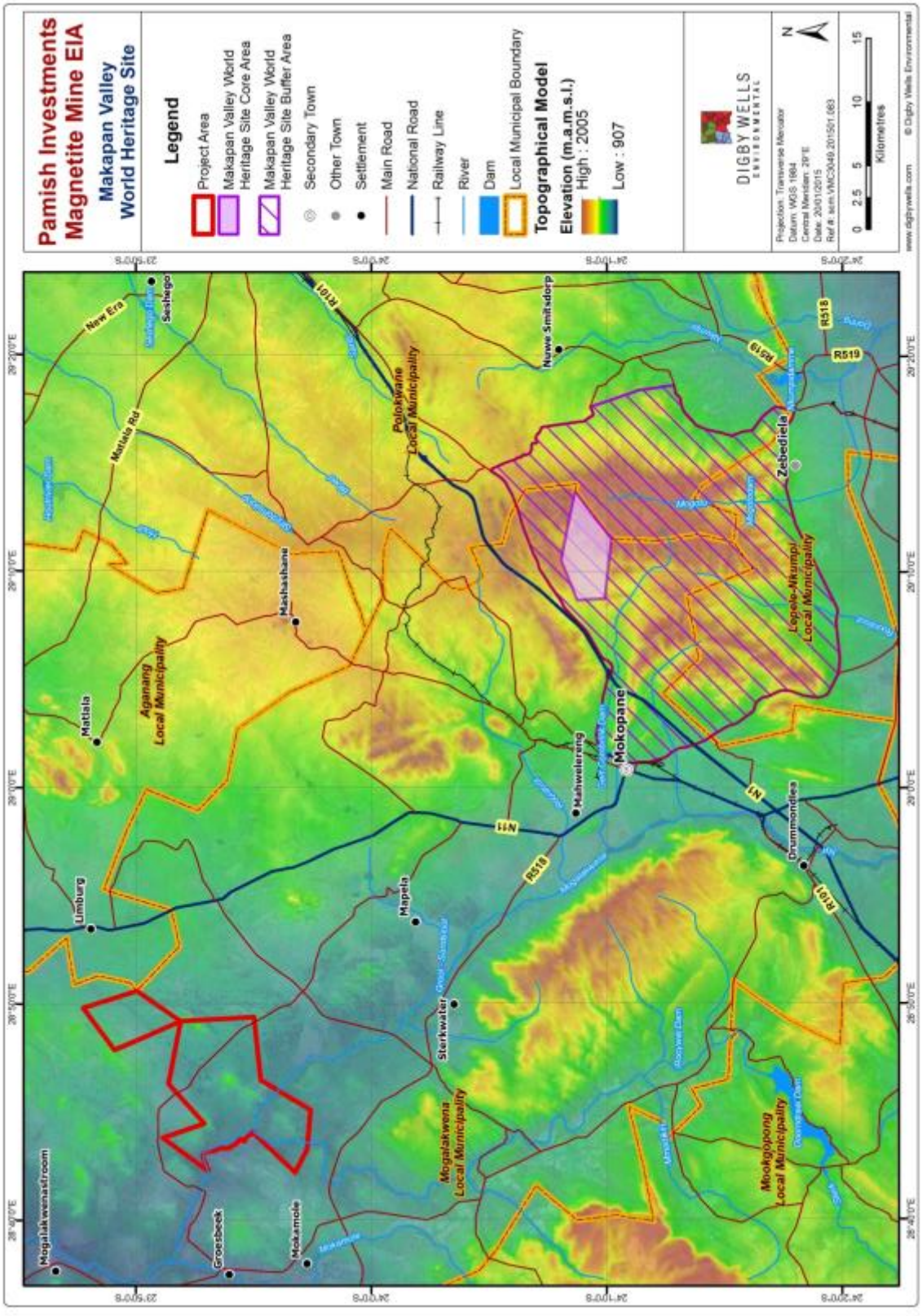

Figure 4-4: Makapan Valley WHS in relation to project area.

4.3.2 Middle Stone Age

The MSA is characterised by the rapid development of more refined lithics such as blades and points produced from good quality raw material. (Deacon & Deacon, 1999). This refinement in lithic technology is furthermore associated with the evolution of modern human - *Homo sapiens sapiens* – and emerging behavioural patterns comparable to contemporary humans (Mitchell, 2002).

Development-driven archaeological studies report on MSA scatters throughout the regional study area landscape (Kusel, 2005; Roodt, 2008a; Roodt, 2008b; Pistorius, 2008). These recorded sites are commonly found on hill tops and slopes or exposed in erosion gullies. Figure 4-5 depicts MSA lithics recorded on Molokong Hill in the site specific study area (Kusel, Cultural Heritage Resources Impact Assessment on Malokong Hill, 2005).

Figure 4-5: MSA material identified on Molokong Hill (Kusel, 2005)

4.3.3 Later Stone Age

The LSA is characterised by a microlithic manufacturing technology and irrefutable evidence for modern cognitive behaviour including complex society and ritual practises and artistic expression. Microlithics are generally produced from very fine-grained material such as quartz, chert and crypto crystalline silicate (CCS). These small tools are often used as composite tools, hafted onto organic bases such as bone and wood to produce implements such as arrows or sickles (Deacon & Deacon, 1999). The LSA is also associated with autochthonous hunter-gatherer societies that include the San / Bushmen and Khoi herders.

The most notable site in the region is associated with the LSA occupation at Makapansgat, one of the archaeological sites in the Makapan Valley WHS. At least one archaeological assessment study reports on LSA deposit at a site around 16 km south of the site specific study area (Kusel, 2007). This site also includes a diverse range of rock art, including LSA

and from various periods, but most prolific being the white finger paintings associated with the Late Farming Communities (LIA). This is discussed in more detail in Section 4.5

4.4 Farming Communities

The Farming Community period is discussed largely in terms of ceramic distribution in the region. To this end the works of Huffman (1980; 2007) are used as the primary text to identify ceramics that in turn provide relative temporal markers for occupation in the region. Although ceramics are used as broad cultural and/or linguistic markers as well, it is acknowledged that ceramics do not necessarily equate to narrowly defined ethnic groups.

Approximately 1 800 years ago, various Bantu-speaking groups started entering southern Africa from a Bantu-language origin centre in the present Cameroon-Nigeria area (Dalby, 1975). Two migratory streams are widely accepted by archaeologists, anthropologists and linguists (Huffman, 1980; 2007). These streams include Western Bantu languages that spread from the origin southwards along the African west coast and interior. Eastern Bantu languages are thought to have spread eastwards along the perimeter of the rainforests, then southwards to the Great Lakes region, depicted in Figure 4-6. From there, Eastern Bantu-speakers migrated into southern Africa (Mitchell, 2002).

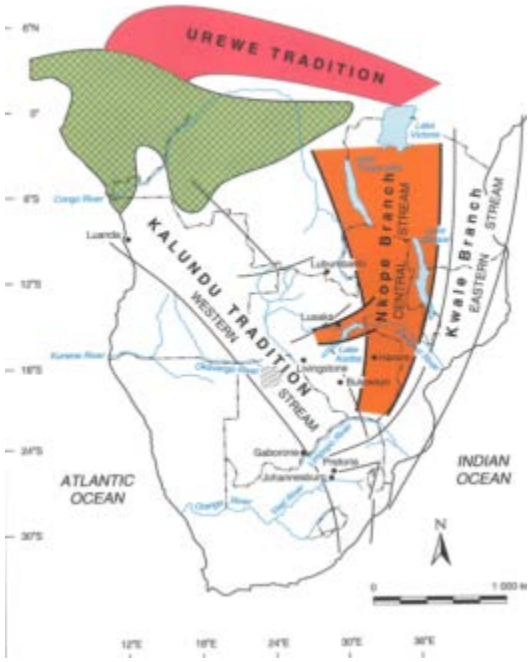

Figure 4-6: Eastern Bantu migrations to southern Africa (Huffman, 2007)

This migration into southern Africa marked a new era that is commonly referred to as Farming Communities. The southern African Farming Community period is divided into two phases to distinguish between widespread events:

- Early Farming Communities (EFC) (200 CE – 1000 CE); and

- Late Farming Communities (LFC) (1300 CE – 1840 CE).

These groups were significantly different from the autochthonous hunter-gatherer communities whom they gradually replaced. The most notable, visible changes include more sedentary occupation and an agro-pastoral economy (Huffman, 2007). The perceived homogeneity of material culture associated with agricultural activities, its rapid introduction and the absence of local precursors have led archaeologists to conclude that it must reflect the physical movement of a substantial number of people into southern Africa (Mitchell, 2002). Farming Community material culture also significantly differs to that of the LSA: much more extensive ceramic production, metal working including smelting and forging, and glass trade beads.

Ceramic analysis is a universally accepted method to establish a relative cultural history sequence: it is based on the assumption that ceramic manufacture, style and decoration had to be transferred from person to person through mutually intelligible language or languages. Therefore, ceramic analyses are used to indicate similarities and differences in style and decoration, and group similar traits. Huffman (1980) demonstrates that by considering three dimensions of ceramics, i.e. (1) profile; (2) design layout; and (3) motif categories, one could reliably recognise groups. The larger groups are termed 'traditions' and sub-groups termed 'facies'. These facies develop over time. Typical examples generally exist within specific timeframes, and as a result facies can be employed as temporal markers to provide tentative dates for sites, if diagnostic ceramics are found (*This concept is expanded on in following sections*). Guided by this process of ceramic analysis, the most common ceramic facies' identified in the region are summarised in Table 4-2.

Table 4-2: Ceramic assemblages found within and surrounding the study area (Huffman, 2007)

Facies	Branch	Period	Key Characteristics
Bambata	Kalundu	150 CE - 650 CE	Fine decoration, multiple bands and cross-hatching on long rim, alternating blocks of stamped and incised lines in neck
Happy Rest	Kalundu	500 CE - 750 CE	Thickened rim, multiple bands of mixed decoration techniques, ladder stamping
Diamant	Kalundu	750 CE - 1000 CE	Tapered rims with broadly incised herringbone
Doornkop	Kalundu	750 CE - 1000 CE	Multiple herringbone bands in neck
Klingbeil	Kalundu	1000 CE – 1200 CE	Triangles in neck bordered with slashes, punctates on shoulder
Eiland	Kalundu	1000 CE - 1300 CE	Fine herringbone with ladder stamping

Icon	Moloko	1300 CE – 1500 CE	Multiple incised bands separated by colour and lip decorations on bowls
Madikwe	Moloko	1500 CE – 1700 CE	Multiple bands of cord impressions, incisions, stabs and punctates separated by colour
Letaba	Kalundu	1600 CE - 1840 CE	Hatched bands on shoulder, below black and red triangles
Uitkomst	Blackburn	1650 CE – 1820 CE	Stamped arcades, appliqué and blocks of parallel incisions, stamping and chord impressions

The second and most visible indicator for Farming Community settlement is stonewalling. In the regional context, stonewalling is associated with the Moor Park cluster of Nguni origin. During the 17th and 18th centuries CE, Nguni-speaking people migrated from northern KwaZulu-Natal north-westwards into the into Waterberg region. These Nguni-speakers constructed defensive hilltop stonewalled settlements similar to Moor Park stonewalled sites. This regional expression was named after the type-site of Melora. Figure 4-7 illustrates a plan of a Melora-type site at Buffelsfontein that incorporates beehive huts at the back of small terrace platforms with defensive walling that encompasses the settlement (Huffman, 2007).

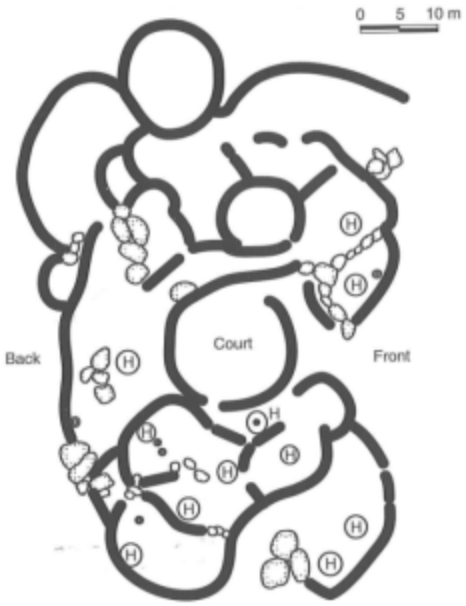

Figure 4-7: Plan of Melora-type stonewalled site at Buffelsfontein (Huffman 2007)

Within the regional study area, numerous Farming Community sites have been reported in archaeological assessment studies. These sites include sites with mainly ceramic scatters evident, metalworking sites and stonewalled sites.

Ceramic scatters affiliated with the Moloko Branch have been reported in at least three archaeological assessments (Kusel, 2005; Kusel, 2007; Roodt, 2008a). The Moloko Branch is associated with LIA migrations from the Great Lakes region north of Lake Malawi into southern Africa (See Figure 4-8). The earliest recorded facies of Moloko is *Icon* dating to 1300 CE – 1500 CE and geographically limited to the Limpopo and Mpumalanga Provinces. From this, we can see in the ceramic record that *Madikwe facies* of the North-West and Limpopo Provinces is derived from *Icon*. In addition, ceramics associated with the *Madikwe facies* have also been reported (Roodt, 2008a).

One assessment reported an archaeological site with evidence of metalworking (Pistorius, 2008). Slag, or remnant bloom from the smelting and forging process, was noted, however, no other features associated with iron smelting were identified.

Figure 4-8: LIA migrations of the Moloko Branch (Huffman, 2007).

4.5 Late Farming Community Rock Art

White finger paintings are commonly referred to as “Late White” and are predominantly found in the northern parts of South Africa, particularly the Limpopo Province (Prins & Hall, 1994; Smith & van Schalkwyk, 2002; Namono & Eastwood, 2005; Henry, 2010). Late White rock art comprises images characteristically finger painted using thick white clay-based

pigment. Subject matter includes stylised human and animal figures and in some instances, geometric forms (Smith & Ouzman, 2004; Namono & Eastwood, 2005; Henry, 2010).

Figure 4-9: Late White rock art identified by Kusel 2007.

4.6 Historical Period

The historical period overlaps with the LFC, and the divide between the two periods is in many ways artificial. This section focuses on the LFC Nguni-speaking groups that entered the region during the 17th century CE.

These Nguni-speaking migrant groups became what today is termed the Ndebele, divided into two the Southern and Northern Ndebele. Most of the Ndebele are believed to have left Kwa-Zulu Natal between 1630 – 1670 CE (Skhosana, 2010; Jackson, 1982; Esterhuysen A. B., 2007). This is postulated from “datable phenomena”, such as initiation cycles (Huffman, 2004). The migration routes from Kwazulu-Natal depicted in Figure 4-10 are thought to be associated with two groups, namely the Musi (ancestral Southern Ndebele Ndzundza, Manala and Kekana) and the Hlubi (ancestral Northern Ndebele Langa).

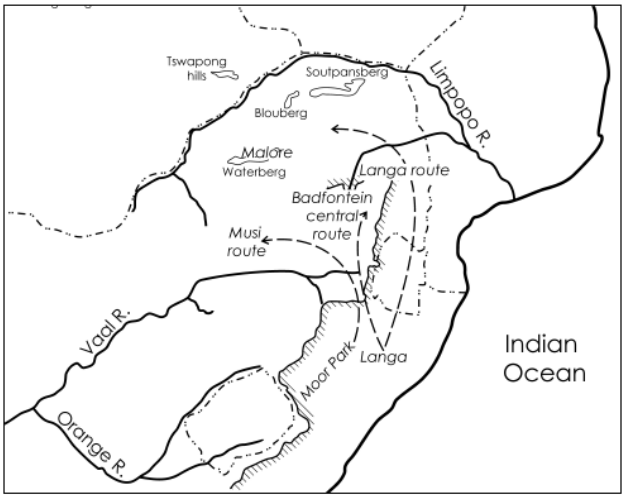

Figure 4-10: Proposed migration routes as per Huffman 2004.

Much of the history of these Ndebele groups is accessible through oral history (Huffman, 2004). However, 17th and 18th century oral histories that have been collected do not necessarily provide coherent descriptions of events that led to the current populace and political environment (Delius, 1983). Missionary documents from the 19th century provide only a slightly more lucid record of the movements and fission of various chiefdoms (Esterhuysen A. , 2003a).

The regional cultural landscape is likened to a frontier as described by Kopytoff (1987). Mechanisms within social systems trigger repeated fission, migration and fusion of polities leading to the formation of new polities on the margins of, or in the spaces between more established societies (Esterhuysen A. B., 2007; Esterhuysen A. B., 2006). The balance between political and economic power shifts between chiefdoms producing a myriad of frontier like interactions.

Primary interpretations on the origins of the South African Ndebele based on available oral histories recorded in the 19th century have been summarised (Skosana D. E., 2012, pp. 20-23). This clearly illustrates divergent perspectives about the history of these two groups and blatant inconsistencies in the oral records. Having noted this, it must be taken into consideration that the presentation and interpretation of this information is also subject to these same inconsistencies. Figure 4-11 outlines the complex succession history as a reference point for further discussion of the Northern Ndebele.

Oral histories suggest that the Kekana trace their ancestry to the split of the chieftaincy after the death of Madidzi. A succession dispute between the two sons resulted in the chiefdom being divided into the Lidwaba and Gegana. The Gegana relocated their chiefdom to Muledlana near present day Zebediela (Esterhuysen A. , 2003a). After a few generations, the lineage was disrupted again when Tjhumana passed away some time in the 18th century. Again, sons Mugombane I (Kxhaba) and Kxhumbha rivalled for the chieftaincy resulting in a

split. Mugombane I was defeated by his brother and moved to the area just outside present day Mokopane in what has become known as the Makapan Valley.

The Langa first entered the regional study area toward the end of the 17th century, settling between the Matlotlo Mountains, the Sandsloot River in the south and Mogalakwena River to the west (Esterhuysen A. , 2003a; Pistorius, 2002). They were led by Podile and settled at Bosega to the east of present day Polokwane. From there they moved to Thaba Tsweu (Witkoppen Mountain). The numerous hills within the region are known to contain several historic Langa settlements, including Segopa, Magope, Fothane, Matlhogo and Ditlotswane.

After the death of Seitarita in 1795, the sons Mapela, Mamoala and Masoge entered into a succession dispute that resulted in the splitting of the chiefdom. Mapela took over as chief, even though his brothers were of higher ranking, and moved the chiefdom from Moumon-wa-Matswaka on the farm Zuid Holland 773 LR to Fothane Hill.

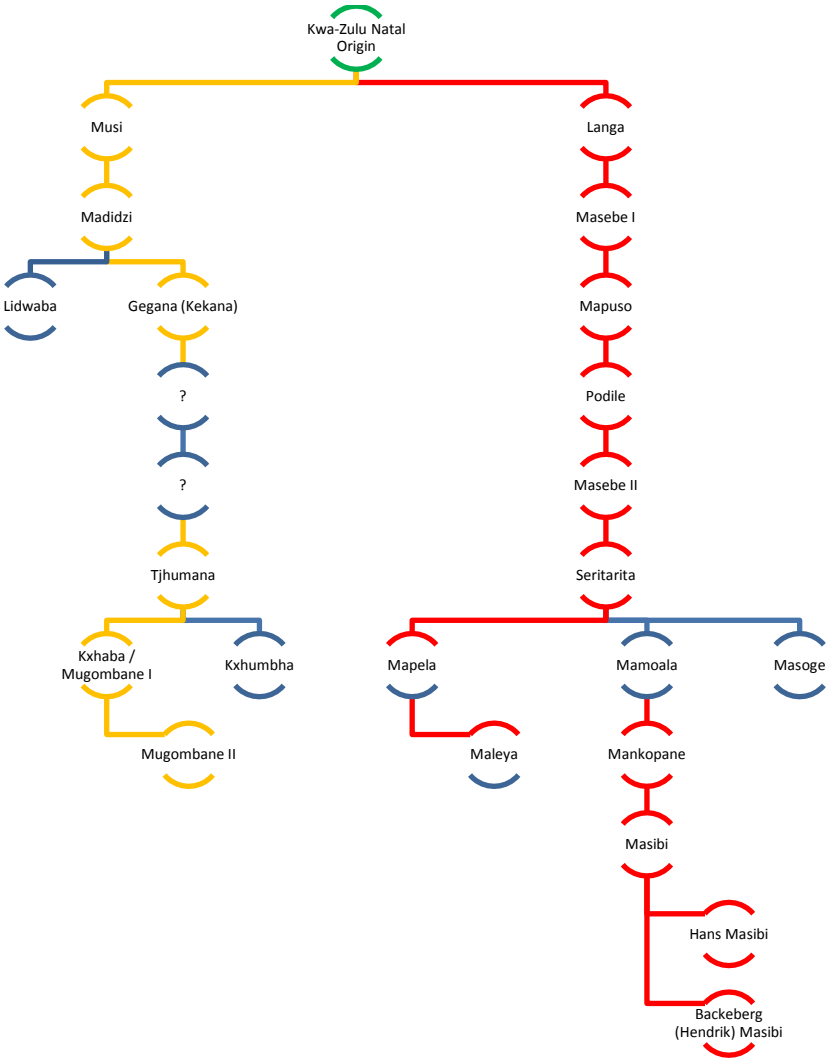

Figure 4-11: Brief South African Ndebele genealogy

The majority of literature focuses on the events surrounding the Makapan Valley in 1854. To understand how these events culminated, one must consider the socio-political landscape of the time. As previously mention, the northern region of South Africa at this time was characterised by shifting authority through the splitting and assimilation of various polities. These activities were driven by extensive competition over resources and trade, specifically the growth in demand for ivory during the latter part of the 18th century (Esterhuysen A. B., 2007).

This established trade network and market was economically attractive to the Boers and other exiles from the Cape. The prospect of establishing profitable trade relations with the Portuguese held for the Boers the promise of wealth and independence from British rule (Esterhuysen A. B., 2007). In 1837, around the time of the Great Trek from the Cape, the Boers arrived at Louis Trichardt marking the first contact between the Boers and Ndebele (Naidoo, 1987). The influx of this new group into the region, as well as the constant threat of the Pedi to the east required strong socio-economic alliances to be established to ensure the survival of the Kekana, and expand economic interests (Esterhuysen A. B., 2006). Following Esterhuysen (2012), these alliances were with the Mmakau and Langa Ndebele.

Tensions began to develop between the Boers and Ndebele chiefdoms over land, labour and allegations of Boer slaving. This tension was exacerbated in the 1850's when the Boers established the town Pietpotgietersrust (*renamed Potgietersrust and today Mokopane*) (Tobias, 1945; Bonner, 1983; Hofmeyr, 1988; Hofmeyr, 1989; Esterhuysen, Sanders, & Smith, 2009; Esterhuysen A. B., 2010). Mubongane I called upon his Langa allies, Mapela to undertake a campaign against the Boers in the hopes of 'scaring' them back to Pretoria (Hofmeyr, 1989).

In September 1854, a series of killings of Boers by the Kekana and Langa were undertaken. At a crossing of the Nyl River (*today Mogalakwena River*) along the then Soutpansberg – Pretoria highway, a group of 12 Boers were ambushed by Mugombane I warriors who slayed the entire party. At the same time, M.A. Venter and his son entered the Kekana stronghold at Pruissen for trade purposes and were killed (Naidoo, 1987). Further north on the same day, the Langa chief, Mapela lured one of the Boer leaders, Hermanus Potgieter and his party to his capital on Fothane Hill. All the men were killed (Naidoo, 1987; Hofmeyr, 1989). These actions prompted immediate Boer action (Esterhuysen A. B., 2007).

Boer reinforcements were sent from Rustenburg and the Southpansberg. During the time it took for these groups to arrive, Mugombane I and his followers had retreated into the Makapan Valley taking refuge in what has been subsequently been named Historic Cave, and the Langa retreated into the hills to the north. Boers discovered the Kekana hide-away and over the period of a month implemented various strategies to dislodge the group. The Ndebele resistance dwindled over this time and eventually the Boers were victorious (Esterhuysen A. B., 2007).

After the death of Mapela, the Langa Ndebele moved from Fothane Hill to Ditlotswana under the new chief Maleya, the uncle of Mankopane. This site was occupied until Mankopane,

who was considered the rightful heir to the chieftaincy, ousted him. With this, the Langa are said to have moved to Magagamatala, a high flat topped mountain on the farm Ruigtevlei 710 LR. It was at this location on 14 April 1858 that a retributive Boer expedition attacked and killed approximately 800 of Mankopane's subjects. After this defeat, the reduced Langa moved their capital to Thutlwane Hill on the farm Kromkloof 774 LR (Jackson, 1969; Jackson, 1982; Pistorius, 2002).

Mankopane was succeeded by his son Masibi who ruled until his death around 1890 through apparent suicide. After the death of Masibi, his two sons, Hans and Backeberg (Hendrik) entered into a succession dispute. Both laid claim to the chieftainship (Native Affairs Department, 1905). To settle the dispute, the government at the time stepped in and proclaimed that they recognised both as chief, dividing the tribe and location (Massie, 1905).

Chief Hans Masibi is reported as a brutal and depraved chief feared by his tribe, while his brother Chief Hendrik is thought to have less strength of mind and personality. Chief Valtyn of the Kekana is reported as having been a quiet man with not much influence. Both Valtyn and Hans Masibi are recorded as assisting the Boers through various campaigns and the Anglo-Boer War of 1899-1902, although infighting amongst the polities resulted in Hans Masibi waging war against Valtyn owing to his pro-British proclivities (Massie, 1905).

Around the time of the death of Masibi and the succession dispute between his sons, the government demarcated the three dominant polities, namely the Valtyn, Mapela and Bakenberg chiefdoms, into a 17 km long and 5 km wide narrow solid block that housed some 30 000 people. The Location Commission looked at where communities resided and declared these areas locations, the result being that much grazing and arable land was lost (Hofmeyr, 1989; 1992).

For the overcrowded chiefdoms, every inch of land was crucial; however, the Europeans were constantly shifting official boundaries in their favour. This is evident when the surveyed surface area of Valtyn location reduced from 14 541 ha in 1913 to 12 229 ha in 1936. By the 1940s, fencing had far reaching impacts on overcrowding, shortage of land and water, overgrazing and an increase in migrancy. The degradation of the landscape as a result of overcrowding and grazing escalated to the point that the Valtyn location was compared to the Sahara desert (Hofmeyr, 1992).

The project area is located within the historic Bakenberg Location (*also known as the Hendrik Masibi Location*) (Figure 5-5 - Figure 5-7).

5 Site Specific Study Area

5.1 Geology, Palaeontology and Geohydrology

The presence of lithostratigraphic units in the site specific study area is based on 2013 and 2014 annual prospecting reports (Longridge, 2013; Longridge, 2014). The project area is located on a part of the northern limb of the Bushveld Complex (Baker, 2006; Cawthorn, Eales, Walraven, Uken, & Watkeys, 2006; Longridge, 2014). According to Longridge (2014) the ultramafic and mafic rocks of the Rustenburg Layered Suite of this part of the Bushveld Complex overlays a floor of Archaean basement granites, gneiss and schist to the east. To the west, the Rustenburg Layered Suite is overlain by Bushveld granite sills, namely the Lebowa Granite Suite and younger post Bushveld Waterberg Group and Quaternary cover rocks. The rock age increases from west to east, summarised below:

- From the west, Bushveld granitic and granophyric rocks comprises the high ground of the western parts of the farms Vliegekraal and Vogelstruisfontein. These rocks are intruded by a late Waterberg-age diabase sill.
- East of this the Upper Zone of the Rustenburg Layered Suite is expressed as Molendraai Magnetite Gabbro, dominating the thick soil covered central portion of the project area.
- The upper subzone of the Mapela Gabbronorite, forming part of the Main Zone of the Rustenburg Suite, defines the eastern portion of the project area.
- The Lower subzone of the Main Zone and underlying units, including the platinum-rich Platreef, do not outcrop in the project area. This reef dips below the sub-outcropping Main (upper subzone) and Upper Zone at approximately 1 000 m.

These units, including geological age and palaeontological sensitivity are summarised in Figure 4-1. Based on the SAHRIS Palaeontological Sensitivity Map and Fossil Heritage Layers, the project area is mainly of zero palaeontological significance due to the primarily igneous nature of the underlying rocks (SAHRA, 2013b). However, there are two exceptions: the Malmani Subgroup and Waterberg Group.

The magmatic, Archaean Granite and Gneisses, which are Neoarchaean in age dating from *c.* 2 800 Ma to 2 500 Ma, form the basement rock underlying the project area lithologies. Neoarchaean granitoids are associated with the linear Pietersburg and Giyani Greenstone belts (Robb, Brandl, Anhaeusser, & Puojol, 2006, p. 75). The most voluminous member of Neoarchaean granite group in the project area is the Turfloop Granite. The inherent magmatic igneous origin of the Neoarchaean granitoids precluded fossil taphonomy (SAHRA, 2013b). As indicated in Section 4.1 above, as small palaeontologically sensitive area is present in the site specific study area, associated with Malmani dolomites and karst topography.

The major watercourses running through the project area include the Mogalakwena River and its tributary, the Borobela River. A recent Masters study examined the validity of the

depositional model of the Mogalakwena River floodplain (Colarossi D. , 2013). This model holds that the Mogalakwena River was once a bedrock river that has changed into an alluvial river due to the flow transport capacity being outpaced by the sediment supply from the tributaries. An increase in sediment supply is thought to be brought about by pronounced climate change such as aridification, where decreased vegetation cover and period of heavy rainfall would result in large amounts of sediment laden runoff and the creation of fan formation and progradation at the trunk-tributary confluences. The result of this being floodplain wetlands and shallow lakes (vleis) creation and the migration of the Mogalakwena River westwards toward the Waterberg.

This process of floodplain deposition and aggradation is directly correlated with climatic events such as the Little Ice Age and Medieval Warm Epoch, as well has bearing on the vegetation found within the project area. This study is relevant both in terms of the palaeontological potential of the possible karst systems in the Malmani dolomite, as well as for Holocene Stone Age and possibly earlier deposits.

5.2 Stone Age

The Stone Age is intimately linked with the geological and hydrological features of the landscape as discussed under Sections 4.1, 4.2, 4.3, and 5.1 respectively. Raw material suitable for stone tool production is readily available in the study area, including fine grained Felsic tuff with quarts and feldspar crystals and cryptocrystalline silicates (CCS).

Lithic scatters and isolated finds associated with the MSA are reported in several archaeological assessments completed in and around the study area (Kusel, 2005; Pistorius, 2008; Roodt, 2008a; Roodt, 2008b). The reported distribution of is expected based on an understanding of the geo-hydrological process associated with the Mogalakwena River and its tributaries (cf. Colarossi, 2013). Natural processes of progradation, aggradation and sedimentation of the Mogalakwena River result in the transportation of sediments including lithic material. These lithics are often identified in isolation and outside of discernible context, therefore providing limited scientific information beyond form, function and technique of manufacture.

5.3 Late Farming Community and Historical Period

Late Farming Communities and historical period sites are reported in assessment studies, ranging from mere ceramic scatters to metalworking and stonewalled sties.

One study is specifically significant to the site specific study area (Kusel, 2005). This study reports in findings of an archaeological survey Malokong Hill, situated on the eastern border of the study area. A large stonewalled settlement was identified, with the largest concentration of walling reported to occur along the south-western potion of the Hill. The walling and spatial layout conforms to the typical Nguni settlement pattern associated with the Moor Park cluster and the regional Melora Hill expression (Huffman, 2007).

The study also reports that a local headman, Induna Mabusela, claimed that the settlement is associated with the Mabusela clan who has occupied the area throughout living memory (Kusel, 2005). According to the Induna, the hill was first settled at the highest point for security, and in time expanded over five stages. The expansion was in reaction to population increase when residents started to settle along the base of the hill. Historical aerial imagery confirms the existence of this settlement and several other possible potential stonewalled settlements (see Figure 5-3 and Figure 5-4).

Figure 5-1: Closed granite quarry on the slopes of Malokong Hill

Historically, the project area overlay the Bakenberg (Hendrik) Masibi Location discussed in Section 4.6, the boundaries of which are depicted in Figure 5-5 to Figure 5-7. There is a registered land claim by the Bakenberg Tribe of several properties[4] including the farms Bellevue 808 LR, Schoonoord 786 LR and Vogelstruisfontein 765 LR within the study area (Mogalakwena Local Municipality, 2012). The claim is clearly based on the historic Bakenberg settlement (see Figure 5-5).

The Communal Land Rights Act, 2004 (Act No. 11 of 2004) recognises the authority of chiefs in land administration affairs of their communities. This authority allows them to play a central role in the decision-making processes of the mining economies within their

[4] Properties under the Bakenberg Tribe land claim include: Klein Galakwin 712 LR, Ruigtevley 710 LR, Galelia 675 LR, Rietfontein 665 LR, Kafferboom 664 LR, Lagerplaats 451 LR, Vianen 450 LR, Inhambane 802 LR, Mozambique 807 LR, Jackhalskuil 754 LR, Zwartkop 742 LR, Elandsfontein 760, LR, EersteGeluk 741 LR, Cleremont 738 LR, Vlakfontein 739, LR, Haaspan 739 LR, Haaspan 724 LR, Buffelshoek 722 LR, Madamefontein 721 LR, Hermasdal 789 LR, Schuurmanshoogte 792 LR, Esselsdrift 788 LR, Bastaardspad 790 LR, Galakwyn Stroom 745 LR, Wydhoek 746 LR, Haakdoorndraai 758 LR, Skrikfontein 715 LR**, Schoonoord 786 LR**, Rietfontein 665 LR, Vlakfontein 763 LR, **Bellevue 808 LR**, Kiss Me Quick 794 LR, Malokongskop 780 LR, Groningen 779 LR, **Vogelstruisfontein 765 LR**, Goedehoop 762 LR, Hellem Bricks 761 LR, Krom Kloof 744 LR, Paulus 743 LR, Sterkloop 720 LR, Raadslid 718 LR, Haakdoorndraai 711 LR, Klipplaatdrift 787 LR, Wydhoek 746 LR, Vlakfontein 763 LR, Molokong 784 LR.

chieftaincy (Skosana D. E., 2012). However, the legitimacy of this authority is often brought into question as succession disputes feature strongly in the history of the northern Ndebele (Esterhuysen A. B., 2006), historically based on both established and manufactured genealogies.

These disputes are compounded even further through interference by the Land Commission of the 19th century and present day state recognition of current chieftaincies. State recognition offers a platform for 'recognised' chiefs and tribal council members to enter into economic deals and politically binding decisions without consulting the 'unrecognised' faction or villagers (Skosana D. E., 2012). This is most evident in regards to the Vaaltyn Tribe dispute and almost certainly with the Masibi Tribes.

While the authors acknowledge that succession disputes are present amongst the Ndebele groups within the regional study area, this falls outside the ambit of this heritage study for the Magnetite Project.

Figure 5-2: Remnant stone walling from indicated Bakenberg settlement

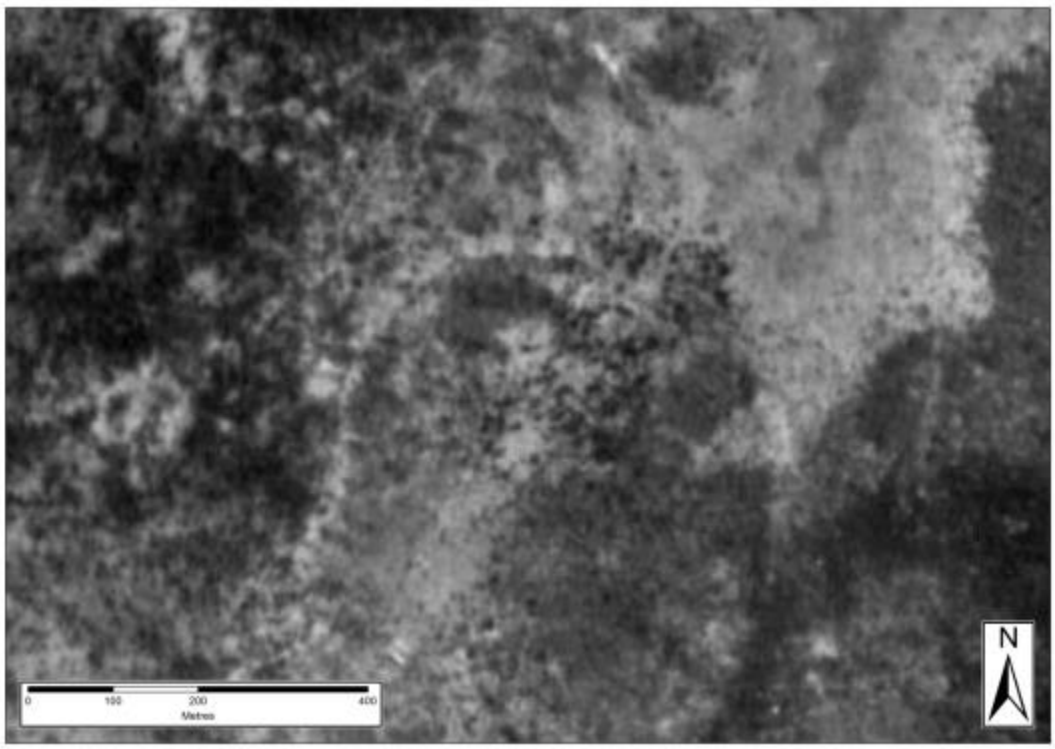

Figure 5-3: Aerial imagery of stone walling on Malokong Hill dated 1953

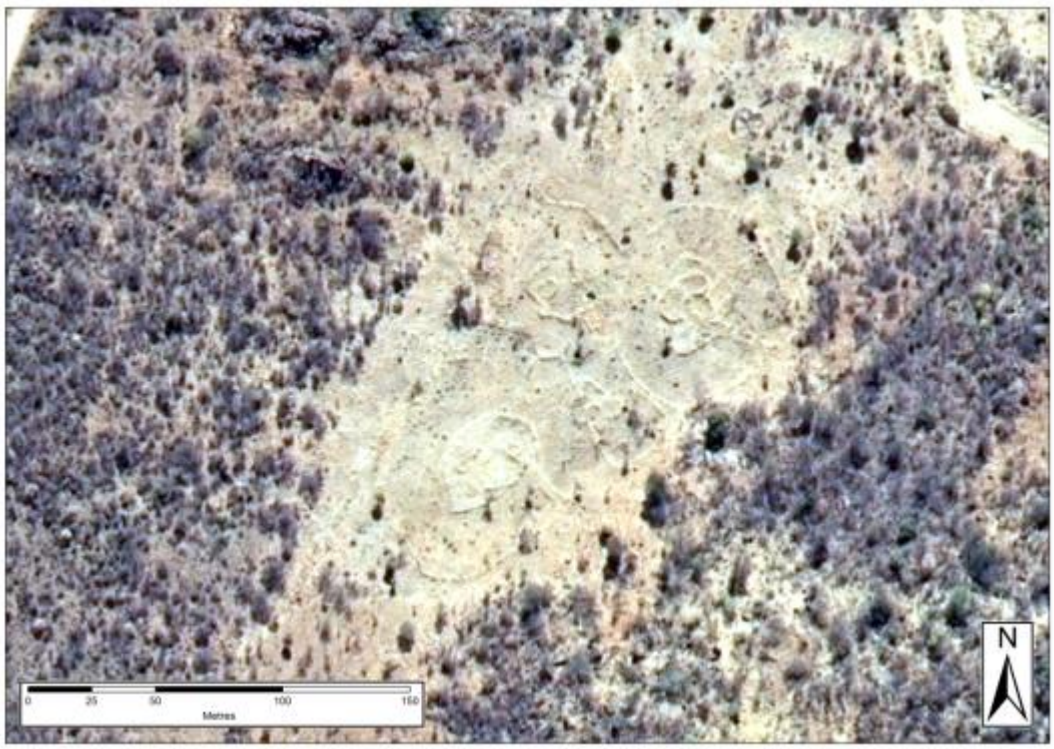

Figure 5-4: Aerial imagery of stone walling on Malokong Hill dated 2012

Figure 5-5: Extract from the 1899 Jeppe Map of the Transvaal

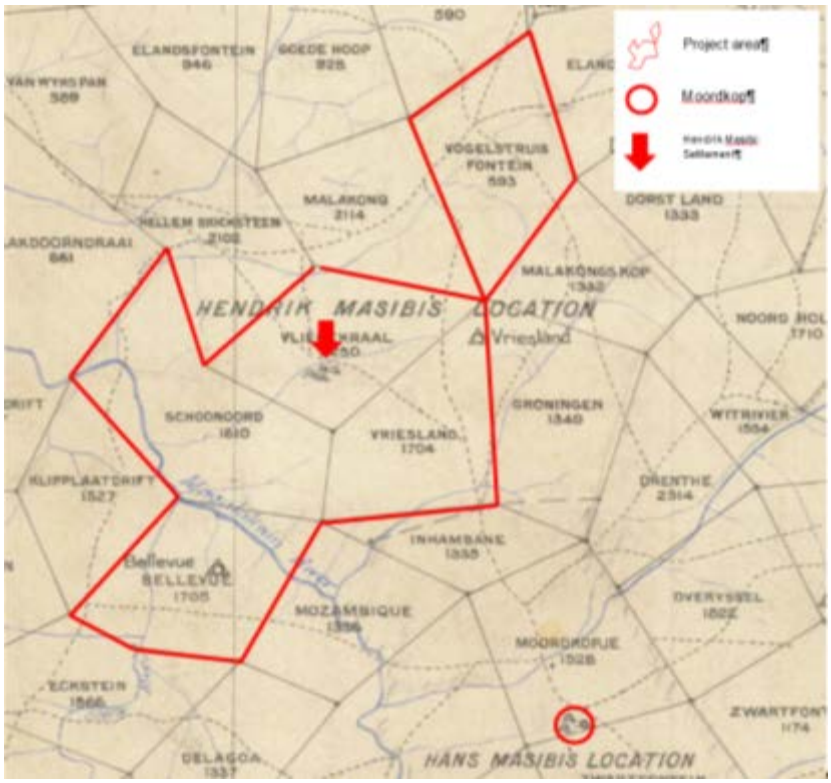

Figure 5-6: Extract from the 1902-1909 Transvaal Degree Sheets

Figure 5-7: Extraction from the 1900-1919 Imperial Series

6 Current State of the Cultural Landscape

The project area falls primarily within the Makhado Sweet Bushveld and the Central Sandy Bushveld in the south (Figure 6-3) (Mucina & Rutherford, 2006). The Makhado Sweet Bushveld vegetation occurs on slight to moderate undulating plains generally sloping down to the north with some hills in the south-west: typical vegetation is a short and shrubby bushveld with a poorly developed grass layer. The Central Sandy Bushveld vegetation occurs in low undulating areas between mountains and sandy plains and catena: typical vegetation includes tall, deciduous woodlands comprised of *Terminalia sericea* and *Burkea africana* woodland on deep sandy soils and low broad-leaf *Combretum* woodland on shallow rocky or gravelly soils. However, the study project area is reality dominated by dense pockets of *Dichrostachys cinerea* (sickle bush), evidence of severe degradation partly due to the historical impacts of overcrowding discussed in Section 4.6 above.

The study area has experienced recent environmental and social impacts due to ongoing granite quarrying. This is clearly evident in the western portion of Malokong Hill. The social and possible heritage impacts resulting from these activities on Rooivaal and Malokong communities have been described in a Masters dissertation as follows:

“Some of the youth employed by the mine have reported being ordered to exhume community graves and destroy bones. Community members have not been able to access the sites where this is reported to have occurred, as the mine has cordoned off these areas. They are unable even to visit the graves to communicate with their ancestors, as well as check if the rumours of their graves destruction are true. If these stories are fanciful, they are none the less disturbing; communities in this area honestly feel as if their very cultural roots are being systematically attacked by the advance of mining” (Saccaggi B. D., 2012, pp. 67-68).

In addition to the above, social and heritage impacts associated with ancestral graves have been experienced by several other communities in and around the project area due to the development of mines. These include Blinkwater, Ga-Molekana, Ga-Pila, Mokgoabading and Mabusela (Saccaggi B. D., 2012).

Figure 6-1: Dense vegetation within proposed opencast pit 1

Figure 6-2: Dense sickle bush within the proposed opencast pit 2 and waste rock dump option 2

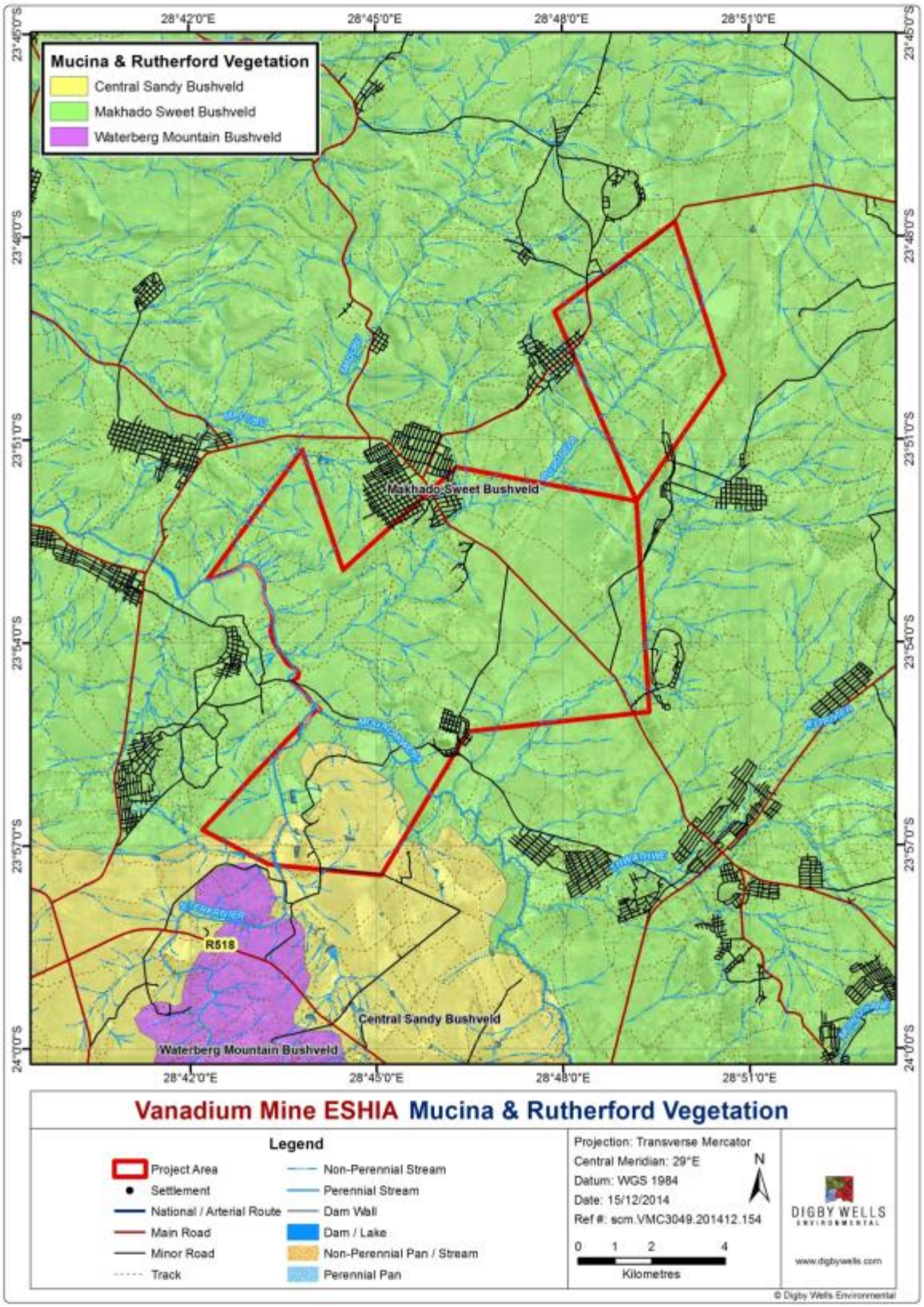

Figure 6-3: Vegetation types in the site specific study area

7 Development Context

The proposed project is situated in the Mogalakwena Local Municipality (MLM) within the greater Waterberg District Municipality (WDM) of the Limpopo Province. The development context of this region provides a broad understanding of the current socio-economic environment. Information presented below was collated from the following sources:

- The Waterberg District Municipality Integrated Development Plan (WDM-IDP) (Waterberg District Municipality, 2014);
- The Mogalakwena Local Municipality Integrated Development Plan (MLM-IDP) (Mogalakwena Local Municipality, 2012); and
- Statistics South Africa.

The MLM was established in December 2000 through the amalgamation of The Greater Potgietersrus (Mokopane), Bakenberg and Koedoesrand\Rebone. Demographically, the MLM has a population of 307 682 with 96.1% black and 3% white (Statistics SA, 2011) (Figure 7-1).

Of this population, 70.9% live within tribal/traditional land. Also 58.3% of the population are of working age (15-64 years), with 78 647 economically active (working or unemployed looking for work). The MLM has an unemployment rate of 40.2%, almost double of any other municipality in the region, and an unemployment rate of 51.7% of economically active youth (15-35 years), the highest in the district. The result is a high dependency ratio of 71.5% (Figure 7-2).

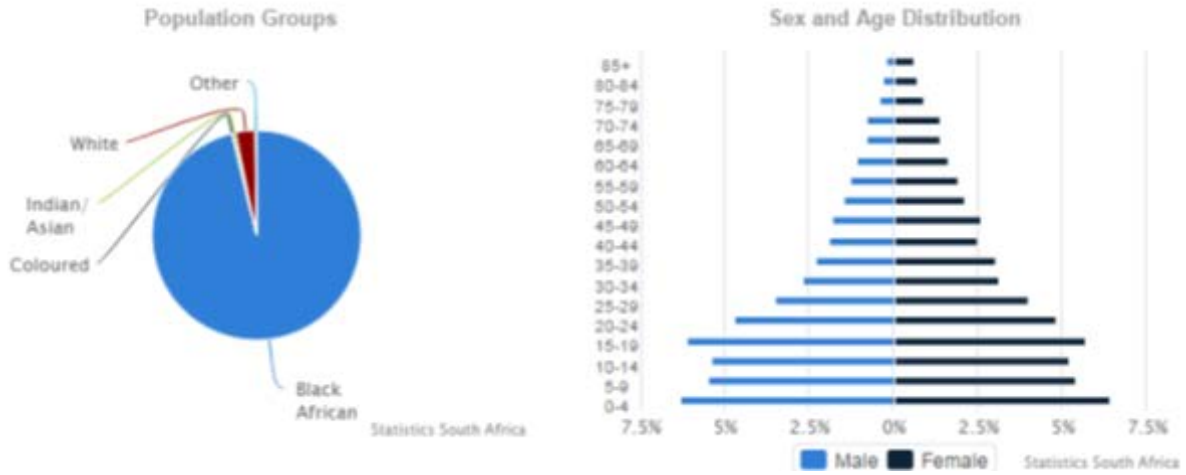

Figure 7-1: Demographic information for the MLM (Statistics SA, 2011)

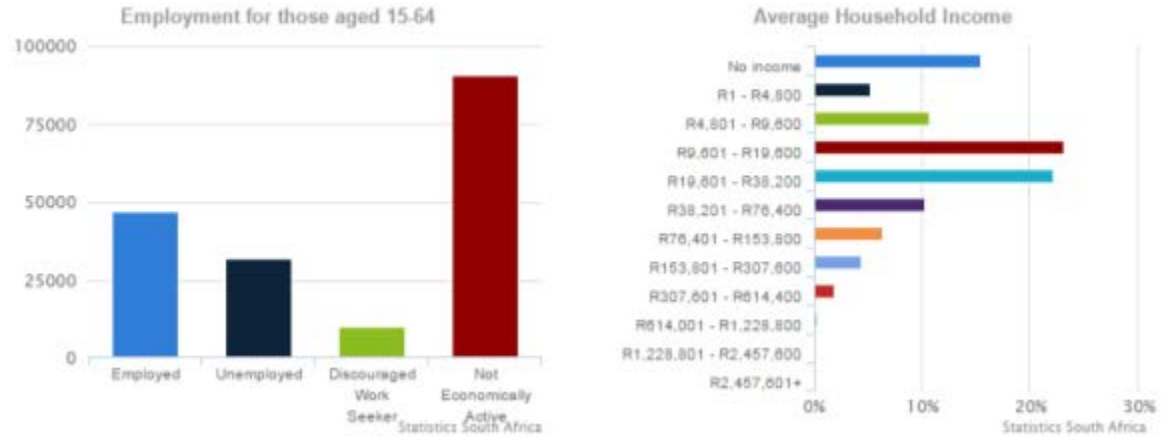

Figure 7-2: Distribution of economically active population (Statistics SA, 2011).

To address the shortcomings of the socio-economic landscape, strategic planning at both district and local municipalities is required. The WDM-IDP is the principle strategy to support economic development and growth within the WDM. Economic opportunities are abound in the mining and agricultural industries according to the WDM-IDP, but require increased skills development to exploit these resources optimally. Within this document the WDM is identified as a 'choice' tourist destination with sites such as the Waterberg Biosphere Reserve, Makapans Valley World Heritage Site and Marekele National Park (Waterberg District Municipality, 2014). However, as indicated in the WDM Scarce Skills Development Strategy, tourism is the most undeveloped economic sector (Figure 7-3).

Sector	Scarce Skill	Baseline	Required	Variance
Mining	Artisan [mining, electricity]	89	120	31
	Mining Technician	19	90	80
	Machine Operators	54	140	86
	Excavator	100	210	110
	Engineering Manager	2	10	80
Tourism	Tourism Marketing	20	200	180
	Tour Guides	690	1200	510
	Tourism Information Presenters	50	300	250
	Travelling & gallery	20	120	100
Agriculture	Agricultural Engineers	2	12	10
	Veterinary Doctors	8	45	37
	Meat Processors and inspectors	18	240	222
	Horticulturists	1	180	179

Figure 7-3: Scarce skills variance for the Mogalakwena Local Municipality

The local heritage sites are significant potential contributors to local economic development in the region. A large proportion of the tourism businesses in the region are driven by the traditional market, although gradually there is a growing interest in the tourism industry from previously disadvantaged individuals (PDI's). To facilitate the potential growth of this sector and implement a *Tourism and Development Implementation Plan*, the Local Tourism Association was established as a link between the WDM, local municipalities and Limpopo Tourism and Parks. The effectiveness of this body is threatened by a lack of resources (Waterberg District Municipality, 2014), compounded by the absence of available skill sets

within the local population. When one considers the levels of education of the population, where only 8.8% completed secondary education and 1% higher education (Statistics SA, 2011), the variance in scarce skills as shown in Figure 7-3, is unlikely to be rectified within the local population at this point in time.

Within KPA 3: Planning and Economic Development of the WDM-IDP, the *Makapan Heritage Route Project* has been identified as key in achieving the following strategic objectives:

- Create a sustainable and enabling environment for local economic development;
- Facilitate access to land and rural tourism development.

Additional initiatives such as these are required to alleviate some of the pressures faced by the economically disenfranchised. The MLM-IDP recognises tourism as an economic contributor, and indicates the municipality's willingness to assist in projects such as the Mabyaneng facility, Thutlane Sacred Site and Arend Dieperink Museum. Having noted this, tourism skills and infrastructure development is not the primary strategic focus of the MLM-IDP as basic infrastructure requirements and immediate community needs take precedence (Mogalakwena Local Municipality, 2012).

8 Conclusion

The project area is located in the Limpopo Province some 35 km north of Mokopane and 60 km west of Polokwane. Geologically, the project area is located on a part of the northern limb of the Bushveld Complex. Palaeontologically the primary impact footprint of the project area has an insignificant palaeo-sensitivity. The potential of Karst topography has been identified within the prospecting right area. Karst topography refers to landscapes formed from the dissolution of soluble rocks, including dolomite and limestone. Karst topography is characterised by underground drainage systems with sinkholes, dolines, and caves. This geological phenomenon creates karst caves that can filled with fine-to-coarse grained alluvium during periodic flooding. The alluvium may be represented by bodies of breccia, sandstone and siltstone which have an increased potential to contain archaeological material.

The Stone Age is linked with the geological and hydrological features of the landscape. Lithic material has been identified throughout the landscape and reported on in other relevant heritage studies. Based on our understanding of the geo-hydrological process associated with the Mogalakwena River and its tributaries, the reported distribution of lithics are expected. Natural processes of progradation, aggradation and sedimentation of the Mogalakwena River result in the transportation of sediments including lithic material. These lithics are often identified in isolation and outside of discernible context, therefore providing limited scientific information beyond form, function and technique of manufacture. However, there is the potential for the existence of *in situ* Stone Age sites to be located within the project area footprint.

The study area is intimately associated with the history of the Ndebele, spanning from the Farming Communities through to the present. The project area specifically associated with the Langa Ndebele. The Langa are said to have arrived in the regional study area toward the end of the 17th century and reside between the Matlotlo Mountains, the Sandsloot River in the south and Mogalakwena River to the west. The Langa and Kekana chiefdoms were the primary players in the events that culminated in the 1854 Siege of Makapan, an event that has influenced socio-cultural landscape of the region through to the present.

As is evident in this extensive review of available literature and relevant previously completed reports, the project area is situated within a culturally sensitive landscape.

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