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Heritage Resources Management Process for the Exxaro Matla Mine

Heritage Impact Assessment

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Prepared for:

Exxaro Coal Mpumalanga (Pty) Ltd

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Digby Wells and Associates (South Africa) (Pty) Ltd
Co. Reg. No. 2010/008577/07. Turnberry Office Park, 48 Grosvenor Road, Bryanston, 2191. Private Bag
X10046, Randburg, 2125, South Africa
Tel: +27 11 789 9495, Fax: +27 11 069 6801, info@digbywells.com, www.digbywells.com

Directors: GE Trusler (C.E.O), GB Beringer, LF Koeslag, J Leaver (Chairman)*, NA Mehlomakulu*,
MJ Morifi*, DJ Otto, RA Williams*
*Non-Executive



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Name	Responsibility	Signature	Date
Shannon Hardwick Assistant HRM Consultant ASAPA Member: 451	Site Visit HIA Compilation		17 January 2018
Justin du Piesanie Manager: HRM ASAPA Member 270	Site Visit Technical Review		17 January 2018

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DECLARATION OF INDEPENDENCE

Digby Wells and Associates (South Africa) (Pty) Ltd

Contact Person: Justin du Piesanie

Digby Wells House
48 Grosvenor Road
Turnberry Office Park, Bryanston
2191

Tel: 011 789 9495
Fax: 011 789 9498
E-mail: justin.dupiesanie@digbywells.com

I, Justin du Piesanie as duly authorised representative of Digby Wells and Associates (South Africa) (Pty) Ltd., hereby confirm my independence (as well as that of Digby Wells and Associates (South Africa) (Pty) Ltd.) and declare that neither I nor Digby Wells and Associates (South Africa) (Pty) Ltd. have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of Exxaro Coal Mpumalanga (Pty) Ltd, other than fair remuneration for work performed, specifically in connection with the Heritage Resources Management (HRM) Process for the Exxaro Matla Mine, located near Kriel, Mpumalanga Province.



Full Name:	Justin du Piesanie
Title/ Position:	Manager: HRM
Qualification(s):	MSc
Experience (Years):	11 years
Registration(s):	Association of Southern African Professional Archaeologists (ASAPA) International Council on Monuments and Sites (ICOMOS) South Africa International Association for Impact Assessment South Africa (IAIAAsa)

DECLARATION OF INDEPENDENCE

Digby Wells and Associates (South Africa) (Pty) Ltd

Contact Person: Shannon Hardwick

Digby Wells House
48 Grosvenor Road
Turnberry Office Park, Bryanston
2191

Tel: 011 789 9495
Fax: 011 789 9498
E-mail: shannon.hardwick@digbywells.com

I, Shannon Hardwick as duly authorised representative of Digby Wells and Associates (South Africa) (Pty) Ltd., hereby confirm my independence (as well as that of Digby Wells and Associates (South Africa) (Pty) Ltd.) and declare that neither I nor Digby Wells and Associates (South Africa) (Pty) Ltd. have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of Exxaro Coal Mpumalanga (Pty) Ltd, other than fair remuneration for work performed, specifically in connection with the Heritage Resources Management (HRM) Process for the Exxaro Matla Mine, located near Kriel, Mpumalanga Province.



Full Name:	Shannon Hardwick
Title/ Position:	HRM: Assistant Consultant
Qualification(s):	MSc
Experience (Years):	1 year
Registration(s):	Association of Southern African Professional Archaeologists (ASAPA)

ABBREVIATIONS AND GLOSSARY OF TERMS

Abbreviation	Meaning
ASAPA	Association of Southern African Professional Archaeologists
BA	Bachelor of Arts
BCE	Before Common Era (also: Before Christ or BC)
BID	Background Information Document
BSc	Bachelor of Science
c.	circa, meaning approximately
CE	Common Era (also: <i>Anno Domini</i> or AD)
CFP	Chance Find Protocol
CRR	Comments and Response Report
CS	Cultural Significance
Digby Wells	Digby Wells Environmental
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EFC	Early Farming Community (also known as Early Iron Age)
EIA	Environmental Impact Assessment. Please note that EIA can also refer to the 'Early Iron Age'; however, in this document, this time period is referred to as 'Early Farming Community'.
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
ESA	Early Stone Age
GIS	Geographical Information System
GN R	Government Notice Regulation
GPS	Global Positioning System
HIA	Heritage Impact Assessment
Hons	Honours degree
HRAs	Heritage Resources Authorities
HRM	Heritage Resources Management
HSMP	Heritage Site Management Plan
ICOMOS	International Council on Monuments and Sites

Abbreviation	Meaning
Kya	Thousand years ago
LED	Local Economic Development
LFC	Late Farming Community also known as Late Iron Age
LSA	Late Stone Age
MIA	Middle Iron Age
MPRHA	Mpumalanga Provincial Heritage Resources Authority
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MSA	Middle Stone Age
MSc	Master of Science
Mya	Million years ago
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
RoD	Record of Decision
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SCF	Statutory Comment Feedback
SEP	Stakeholder Engagement Process
SoW	Scope of Work
ToR	Terms of Reference
Wits	University of the Witwatersrand
Werf	A farmstead or multiple outbuildings associated with a farmhouse or agricultural activities. Plural: <i>werwe</i> (Afrikaans).

Term	Definition
Alter	Any action affecting the structure, appearance or physical properties of a place or object, whether by way of structural or other works, by painting, plastering or other decoration or any other means.
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.
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 include high-fired wares such as porcelain, stoneware, etc.
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 on 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 continuum. 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 ethnic identity, especially during the LFC period.
Ceramic classification	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. Huffman (1970) postulated that the migration of farming communities could be recognised via a technique of 'ceramic seriation'. Ceramic seriation is based on the premise that certain styles of ceramics, including vessel shape and decorative motifs, follow each other chronologically, and can be attributed to certain archaeological 'cultures'

Term	Definition
	<p>(Huffman, 1970; 1980).</p> <p>Huffman (1970) and Phillipson (1977) demonstrated that Bantu-speaking groups may have migrated southwards in three 'streams' from a possible central homeland, over different periods (See Figure 6 4). These streams are generally associated with diverse Eastern Bantu-speaking societies and various farming community periods. Although these hypotheses have since undergone meaningful reviews and received significant opposition, a general consensus remains that ceramic seriation can be used to reconstruct population movements.</p>
Compulsory repair order	<p>A heritage resources authority may serve on the owner of a heritage site an order to repair or maintain such site, to the satisfaction of the heritage resources authority, within a reasonable period of time as specified in the order where the heritage resources authority considers that such site:</p> <ul style="list-style-type: none"> Has been allowed to fall into disrepair for the purpose of effecting or enabling its destruction or demolition, enabling the development of the designated land, or enabling the development of any land adjoining the designated land. Is neglected to such an extent that it will lose its potential for conservation.
Conservation	<p>In relation to heritage resources includes the protection, maintenance, preservation and sustainable use of places or objects so as to safeguard their cultural significance.</p>
Cultural significance (CS)	<p>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:</p> <ul style="list-style-type: none"> 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.

Term	Definition
Development	<p>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:</p> <ul style="list-style-type: none"> 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.
Early Farming Community/ies	The first Farming Communities (also known as Early Iron Age) that appear in the southern archaeological record during the early first millennium CE. The EFC period is generally dated from c. 200 CE to 1000 CE.
Early Stone Age	The South African ESA dates from ~3 Mya to c. 250 Kya. This period is associated with later <i>Australopithecus</i> and early <i>Homo</i> species. The lithic industries that characterise the ESA include Oldowan and Early Acheulian, typically as simple core tools, choppers handaxes and cleavers.
Excavation	The scientific excavation, recording and retrieval of archaeological deposit and objects through the use of accepted archaeological procedures and methods, and excavate has a corresponding meaning.
Farming Community/ies	Term signifying the appearance in the southern African archaeological of Bantu-speaking agricultural based societies from the early first millennium CE. The term replaces the <i>Iron Age</i> 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 artificial boundary between archaeology and history.
Field Rating	<p>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:</p> <ul style="list-style-type: none"> 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

Term	Definition
	<p>region.</p> <ul style="list-style-type: none"> Grade III: Other heritage resources worthy of conservation. General Protected: i.e. generally protected in terms of Sections 33 to 37 of the NHRA.
General protection	<p>General protections are afforded to:</p> <ul style="list-style-type: none"> Objects protected in terms of laws of foreign states. Structures older than 60 years. Archaeological and palaeontological sites and material and meteorites. Burial grounds and graves. Public monuments and memorials.
Grave	<p>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.</p>
Heritage Impact Assessment (HIA)	<p>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.</p>
Heritage resource	<p>Any place or object of cultural significance.</p>
Heritage resources management	<p>Process required when development is intended categorised as:</p> <ul style="list-style-type: none"> 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	<p>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</p>

Term	Definition
	resources authority.
Late Farming Community/ies	Farming Communities who either developed / evolved from EFC groups, or who migrated into southern African from the late first millennium / early second millennium CE. The LFC period evidences distinct changes in socio-political organisation, settlement patterns, trade and economic 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.
Late Stone Age	The South African LSA dates from ~30 Kya. This period is associated with modern <i>Homo sapiens sapiens</i> 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 cryptocrystalline, quartz and chert. The LSA is also associated with archaeological rock art including both paintings and engravings.
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.
Management	In relation to heritage resources, includes the conservation, presentation and improvement of a place protected in terms of the NHRA.
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 <i>Homo sapiens species</i> . 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.
National estate	<p>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:</p> <ul style="list-style-type: none"> ▪ 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

Term	Definition
	<p>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 (Act No. 61 of 2003).</p> <ul style="list-style-type: none"> ▪ 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.
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) Also: Heritage Site	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

Term	Definition
Management Plan (HSMP)	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.
Presentation	In relation to a heritage resource, site or place includes: the exhibition or display of; the provision of access and guidance to; the provision, publication or display of information in relation to; and performances or oral presentations related to, heritage resources protected in terms of the NHRA.
Provisional protection	A protected area or heritage resource provisionally protected by SAHRA or a provincial heritage resources authority by a notice in the Gazette or Provincial Gazette.
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 includes sampling as this is a permitted activity, usually undertaken during so-called Phase 2 AIAs (ASAPA).
Site	Any area of land, including land covered by water, and including any

Term	Definition
	structures or objects thereon.
Stop work order	An order served on a person by the Minister on advice of SAHRA or MEC to immediately cease all work in and around a heritage site for a period not exceeding 10 years. The order attaches to land is binding on the current owner and any future owner.
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.

EXECUTIVE SUMMARY

Digby Wells Environmental (hereinafter Digby Wells) are providing specialist services to Exxaro Coal Mpumalanga (Pty) Ltd (hereinafter Exxaro) to comply with the national legislative process for the consolidation of their Matla Coal Mine Mining Rights Area (MRA) Environmental Management Plan (EMP) and application for the use of total extraction mining methods ("the Project"). The consolidation is being completed in compliance with the requirements of:

- The Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA);
- The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- The NEMA Regulations, 2017 (Government Notice Regulations [GN R 982], as amended by GN R 326 of 7 April 2017); and
- The National Water Act (Act No. 36 of 1998) (NWA).

The aim of the Heritage Resources Management (HRM) process was to comply with the regulatory requirements encapsulated in Section 38(3) of the National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA). This HRM process will retroactively consider past and current mining activities, as well as the proposed future mining activities. The following activities were completed:

- A Gap Analysis of van Vollenhoven (2012; 2014) (Case ID 102);
- Description of the predominant cultural landscape supported through secondary and primary data collection;
- Identification (as far as possible) of the heritage resources within the Project Area which may be impacted by Project activities and the assessment of the Cultural Significance (CS) of such;
- Identification of potential impacts to heritage resources based on Project activities;
- Recommending feasible management or mitigation measures to avoid and/or minimise negative impacts and enhance potential benefits; and
- Considerations of the socio-economic benefits of the Project.

Through an understanding of various heritage resources distribution within the site-specific study area, the statement of CS as presented in the table below demonstrates an average low significance rating for the defined cultural landscape.

Resource ID	Description	INTEGRITY	CS Value	Cultural Significance
Vryheid Formation	Geological strata with palaeontological sensitivity	4	20	Very High
BGG	Burial grounds and graves	4	20	Very High
STE-003	Single Historic Built Environment site	3	8	Low
BKLGT	Battlefield associated with the Battle of Bakenlaagte	2	7	Low
LFC	Stonewalling	2	4	Negligible
Historic Built Environment	Structures and <i>werwe</i>	2	4	Negligible

The proposed mining methodologies will occur at sub-surface levels and no mining activities will occur on the surface. High-extraction mining increases the risk of subsidence during the operation and decommission phases. This risk is intrinsically linked to the depth at which the coal will be extracted.

The following heritage resources are at risk of being negatively impact by Project activities, as they occur directly above the proposed future mining areas or within a 15 m buffer thereof:

- Burial Grounds and Graves: BGG-003, BGG-004, BGG-005, BGG-008, BGG-009, BGG-010, BGG-011, BGG-013 and BGG-017; and
- Historic Built Environment: STE-002, STE-003, STE-004, STE-005, STE-006 and STE-007; and WF 002, WF-003, WF-004 and WF-006.

A summary of the impact assessment is presented in the table below. The next table (Table 7-7 in the main document) summarises the potential risk to protected heritage resources.

Summary of the Impact Assessment

Code	Impact	Pre-mitigation:						Post-mitigation:					
		Duration	Extent	Intensity	Consequence	Probability	Significance	Duration	Extent	Intensity	Consequence	Probability	Significance
BGG-BUF	Direct impact to burial grounds and graves (15m buffer)	Permanent	International	Extremely high - negative	Extremely detrimental	Highly probable	Major - negative	Beyond project life	Municipal Area	High - negative	Highly detrimental	Highly unlikely	Negligible - negative
STE-003	Direct impact to STE-003	Permanent	Province/Region	Very low - negative	Moderately detrimental	Certain	Moderate - negative	Beyond project life	Local	Very low - negative	Moderately detrimental	Certain	Minor - negative
BKLGT	Indirect impact to Battlefield (Battle of Bakenlaagte)	Beyond project life	Limited	Very low - negative	Slightly detrimental	Certain	Minor - negative	Beyond project life	Limited	Very low - positive	Slightly beneficial	Unlikely	Negligible - positive

Summary of the potential risk to heritage resources

Phase	Activity	Risk	Potential Impact
Operational	Underground Mining, i.e. bord and pillar and stooping	Undermining methodologies may result in subsidence, which would affect heritage resources within a 15 m buffer of the development footprint.	Damage or destruction of NHRA Section 34 resources, i.e. structures and built environment resources older than 60 years.
		Considering the distribution of identified heritage resources within the site-specific study area, those at the greatest risk of subsidence include:	Destruction of or disturbance to NHRA Section 35 resources, i.e. archaeological and/or palaeontological resources.
		<ul style="list-style-type: none"> - BGG-003, BGG-004, BGG-005, BGG-008, BGG-009, BGG-010, BGG-011, BGG-013 and BGG-017; - STE-002, STE-003, STE-005, STE-006; and - WF 002, WF-003, WF-004 and WF-006. 	Damage or destruction of, and loss of access to, NRHA Section 36 resources, i.e. burial grounds and graves.
Decommissioning	Closure	Underground mining voids may result in subsidence, which could potentially affect the resources mentioned above.	Destruction or alteration of NHRA Section 34 resources, i.e. structures and built environment resources older than 60 years.
			Destruction of or disturbance to NHRA Section 35 resources, i.e. archaeological and/or palaeontological resources.
			Damage or destruction of, and loss of access to, NRHA Section 36 resources, i.e. burial grounds and graves.

Based on Digby Wells' understanding of the Project (Refer to Section 1.2) while considering the defined cultural landscape and known heritage resources (Refer to Section 6), Digby Wells recommends the following:

- Project-related mitigation must aim to amend the development footprint to avoid identified potential negative impacts to the heritage resources. It is acknowledged that this may not be feasible;
- Identified heritage resources must be subject to detailed land survey recording to determine precise location in relation to proposed undermining areas. Where it is

determined that negative impact manifestation is certain, mitigation measures in accordance with the requirements of the NHRA and NHRA Regulation, 2000 (GN R 548) will be required. These may include:

- A NHRA Section 34 Permit Application Process as regulated by Chapter III of the NHRA Regulations to MPRHA; and
- Burial Grounds and Graves Consultation (BGGC) and Grave Relocation Process (GRP) in accordance with Section 36 of the NHRA and Chapter IX and XI of the NHRA Regulations;
- Identified heritage resources within a 15 m buffer of proposed undermining areas must be incorporated into the current Heritage Site Management Plan (HSMP) (Du Piesanie, 2017a)¹ developed for the Matla Coal Mine, and monitored; and
- Rehabilitation of subsidence in the area associated with the South African War Battle of Bakenlaagte, should it occur, must aim to minimise the visual impact to retain the 'sense-of-place'. This may be achieved through landscape contouring to restore the impacted area to a natural topography profile; and
- A Request for Exemption (RfE) from further palaeontological assessment is requested, based on the motivations and conditions presented in Section 10.

Where these recommendations are adopted, Digby Wells does not object to the implementation of the Project.

¹ Case ID: 10967, accessible from: <http://www.sahra.org.za/sahris/cases/exx4610-matla-mine-grave-management-plan>

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1 Introduction

Exxaro Coal Mpumalanga (Pty) Ltd (hereinafter Exxaro) is presently undertaking a consolidation process of the Environmental Management Plan (EMP) for the Matla Coal Mine Mining Right Area (MRA). The consolidation is being completed in compliance with the requirements of:

- The Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA);
- The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- The NEMA Regulations, 2017 (Government Notice Regulations [GN R 982], as amended by GN R 326 of 7 April 2017); and
- The National Water Act (Act No. 36 of 1998) (NWA).

To this effect, Exxaro appointed Digby Wells Environmental (hereinafter Digby Wells) to complete a Heritage Resources Management (HRM) process. The HRM process was undertaken in support of the aforementioned regulatory process, as well as to retrospectively consider past, current and future mining activities to promote compliance with Section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

This report constitutes the Heritage Impact Assessment (HIA) to inform the South African National Heritage Resources Agency (SAHRA) and the Mpumalanga Provincial Heritage Resources Authority (MPHRA) of the proposed Project.

1.1 Project background

The Matla Coal Mine has been in operation since the 1970s, prior to any stringent mining or environmental national legislation. In 1994, a mining right was issued for the operational activities at Matla Coal Mine in respect of the Minerals Act, 1991 (Act No. 50 of 1991) and Environment Conservation Act, 1989 (Act No. 73 of 1989). To address the prescribed requirements encapsulated in the applicable legislation, Exxaro compiled the first EMP that considered underground bord and pillar and long- and short wall mining activities. This was submitted for approval in 1997.

At this time, the National Monuments Act, 1969 (No. 28 of 1969) was the primary legislation that considered heritage resources in South Africa. This Act, under Section 12(3)(a), made an exception for mining, engineering and agricultural activities where material could be removed without a permit through normal activities, provided that they were not recovered from a midden or cave deposit and provided the removal or find was reported to a recognised institution. It did not specifically require an assessment of heritage resources, therefore none was undertaken at the time.

In 2006, Exxaro completed an MPRDA Section 102 Application Process in support of increasing the total extraction mining area at Matla Mine 2 and 3, and including bord and

pillar mining activities at the No. 5 seam horizon at E'Tingweni Mine. A third EMP was compiled and submitted in 2009. The new application made provision for:

- A new mine shaft at Matla Mine 1;
- Establishment of an overland conveyor coal-delivery system; and
- Amendments to align the existing EMP with the requirements encapsulated in the MPRDA.

Exxaro completed a fourth EMP in 2012 in support of authorisation for the construction of a Water Treatment Plant (WTP). This was approved by the competent authorities in 2013.

While these various applications were made subsequent to the promulgation of the NHRA in 1999, no evidence of an HIA as required by Section 38 of the NHRA could be identified. To this effect, the first assessment completed in support of the Matla Coal Mine to comply with the NHRA requirements was Van Vollenhoven (2012²), updated in 2014. These reports were, however, compiled in support of the current consolidation process presently undertaken and subject to a gap analysis presented in Section 5 below.

1.2 Project description

The Matla Coal Mine is located in the Mpumalanga Province, approximately 20 km west of Kriel. The MRA covers roughly 22 000 hectare (ha) across the Gert Sibande and Nkanga District Municipalities (GSDM and NDM respectively). The location and extent of the Matla MRA are depicted in Plan 1 included in Appendix B. Table 1-1 summarises the details of the Project location.

Table 1-1: Project location details

Name of property/ies	Matla Coal Mine
Street address or location (e.g.: Off R44)	North of the R580, east of the R547 and south-east of the R545.
Erf or farm number/s	This information is presented in the Notification of Intent to Develop and a draft Scoping Report, both submitted to SAHRA via SAHRIS ³ . A land tenure plan is included in Appendix B.
Coordinates of approximate centre of project area	26.2585866° S
	29.1161468° E

² Case ID 102, available from SAHRIS at: <http://www.sahra.org.za/sahris/cases/exxaro-matla-project>

³ Case ID: 11829. Both reports are available from SAHRIS at: <http://www.sahra.org.za/sahris/cases/exxaro-matla-empr-amendment-and-consolidation>

Town or District	Ga Nala (Kriel)
Responsible Municipalities	<ul style="list-style-type: none"> ■ GSDM <ul style="list-style-type: none"> ▪ Goven Mbeki Local Municipality (GMLM) ■ NDM <ul style="list-style-type: none"> ▪ Emalahleni Local Municipality (ELM) ▪ Victor Khanye Local Municipality (VKLM)
Extent of property	3 127 ha (Considered in the EMP Update)
Maximum extent of proposed development	232.17 ha
Current use	Mining and agriculture
Predominant land use/s of surrounding properties	Mining and agriculture

Exxaro are currently consolidating the above-mentioned EMPs into one EMP for the Matla Coal Mine MRA. In addition, Exxaro propose to apply for total extraction (i.e. stope) of previously underground mining areas where bord and pillar mining methods were utilised. Stopping, as the final phase of underground mining techniques, entails the removal of support pillars to exploit the remainder of the coal resource, allowing the 'roof' to collapse. This collapse results in surface subsidence.

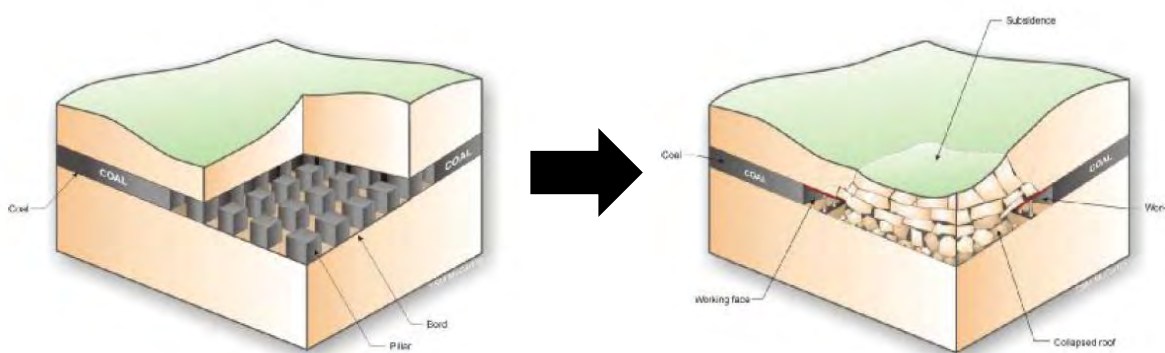


Figure 1-1: Graphical representation of bord and pillar to stopping mining methodologies (GCS (Pty) Ltd, 2017)

The proposed development will trigger the following activities listed in the 2017 NEMA Regulations:

Table 1-2: Identified listed activities

NEMA Activity No.	NHRA Trigger	Description	Expected duration/phase
Activity 19 of GN R 983 (As amended by GN R 324)	38(1)(c)(i)	Rehabilitation of goafing areas, where areas are stripped of vegetation and topsoil, shaped and then topsoiled and re-vegetated.	Operational
Activity 6 of GN R 984 (As amended by GN R 326)	38(8)	Application for an IWULA for activities triggered in terms of Section 21 of the NWA	Operational
Activity 15 of GN R 984 (As amended by GN R 326)	38(1)(c)(i)	Rehabilitation of goafing areas, where areas are stripped of vegetation and topsoil, shaped and then topsoiled and re-vegetated.	Operational
Activity 17 of GN R 984 (As amended by GN R 326)	38(1)(c)(i)	Stooping (Mining of pillars)	Operational

The inclusion of stooping into the current mining activities will extend operations by six years. This Life of Mine (LoM) extension will result in additional coal resources for Eskom's Matla Power Station, thereby contributing to the national power grid and maintaining job security. The positive impacts on the local and regional economy and local municipalities would also continue for the extended LoM.

There are several potential alternatives for the stooping, which are outlined in Table 1-3 below. There are no alternatives in terms of project siting, as the operational mining areas are already established.

Table 1-3: Project alternatives

Alternative	Description
Stope and Fill	<p>This method would require open stopes to be backfilled with material, which can include: a mixture of cement and rock, a mixture of sand and cement or a mixture of cement and tailings. This would allow for total extraction of resources, as the refilled stopes provide support for adjacent stopes.</p> <p>This method is economically unviable because of the cost of material required for backfilling and so it is not preferred.</p>
Development of open cast pits	<p>Open cast mining would have several advantages, including:</p> <ul style="list-style-type: none"> ■ Lower cost of recovery as trucks can enter the mine to retrieve and transport material; ■ Ore would not be lost, as no pillars would be required to hold up a roof;

Alternative	Description
	<ul style="list-style-type: none"> ■ Materials would be easier to handle and treat to recover their marketable product; and ■ A safer workplace environment with a lower risk of collapse. <p>However, this option is also economically non-viable because the stooping areas are too vast. This option would also have a larger impact on the biophysical and cultural environment as the existing landscape and geology would be destroyed.</p>
No-go alternative	If the project were to not obtain approval, the potential environmental impacts associated with stooping would not occur. However, the potential benefits associated with the extended LoM would also not occur.

1.3 Terms of Reference

The Terms of Reference (ToR) for the specialist heritage study was to conduct an HRM Process in support of the authorisation application applicable to this Project. Digby Wells completed the HRM Process in accordance with Section 38(8) of the NHRA.

1.4 Scope of Work

The Scope of Work (SoW) for the specialist HRM process included the compilation of an HIA to comply with the requirements encapsulated in Section 38(3) of the NHRA. The following activities were completed as part of the SoW:

- A Gap Analysis of van Vollenhoven (2012; 2014) (Case ID 102);
- Description of the predominant cultural landscape supported through secondary and primary data collection;
- Undertaking historical layering to identify potential structures older than 60 years that are protected under Section 34 of the NHRA, or any other tangible heritage resources;
- Assessment of the Cultural Significance (CS) of identified heritage resources;
- Identification of potential impacts to heritage resources based on Project Activities;
- An evaluation of the potential impacts to heritage resources relative to the sustainable socio-economic benefits that may be derived from the Project;
- Recommending feasible management or mitigation measures to avoid and/or minimise negative impacts and enhance potential benefits; and
- Submission of the HIA report to the SAHRA and MPHRA for Statutory Comment as required under Section 38(8) of the NHRA.

1.5 Expertise of the specialist

The expertise of the HRM specialist is presented in Table 1-4.

Table 1-4: Expertise of the specialists

Team Member	Bio Sketch
<p>Shannon Hardwick</p> <p>ASAPA Member: 451</p> <p>Years' Experience: 1</p>	<p>Shannon joined the Digby Wells team in May 2017 as a Heritage Management Intern, and has subsequently been appointed as an Assistant Heritage Resources Management Consultant. Shannon is an archaeologist who obtained a Master of Science (MSc) degree from the University of the Witwatersrand in 2013, specialising in historical archaeobotany in the Limpopo Province. She is a published co-author of one paper in <i>Journal of Ethnobiology</i>. Since joining Digby Wells, Shannon has gained generalist experience through the compilation of Notification of Intent to Develop (NID) applications and cultural baselines. Her other experience includes compiling a Community Health, Safety and Security Management Plan (CHSSMP) and researching Artisanal and Small-Scale Mining for input into a Livelihood Restoration Framework (LRF). Shannon's experience in the field includes pre-disturbance surveys in South Africa and fieldwork in Malawi.</p>
<p>Justin du Piesanie</p> <p>ASAPA Member 270 AMAFA Registered ICOMOS Member 14274 IAIASa Member</p> <p>Years' Experience: 11</p>	<p>Justin is the HRM Manager at Digby Wells. Justin joined the company in August 2011 as an archaeologist and was subsequently made manager in the Social and Heritage Services Department. 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. Justin also attended courses in architectural and urban conservation through the University of Cape Town's Faculty of Engineering and the Built Environment Continuing Professional Development Programme in 2013. Justin is a professional member of the Association of Southern African Professional Archaeologists (ASAPA), and accredited by the association's Cultural Resources Management (CRM) section. He is also a member of the International Council on Monuments and Sites (ICOMOS), an advisory body to the UNESCO World Heritage Convention. He has over 11 years combined experience in HRM in South Africa, including heritage assessments, archaeological mitigation, grave relocation, and NHRA Section 34 application processes. Justin has gained further generalist experience since his appointment at Digby Wells in Botswana, Burkina Faso, Cameroon, the Democratic Republic of Congo, Liberia, Mali, Tanzania, and Senegal on projects that have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. Furthermore, Justin has acted as a technical expert reviewer of HRM projects undertaken in Cameroon and Senegal. Justin's current focus at Digby Wells is to develop the HRM process as an integrated discipline following international HRM principles and standards. This approach aims to provide clients with comprehensive, project-specific solutions that promote ethical heritage management and assist in achieving strategic objectives.</p>

1.6 Structure of the Report

The remainder of the report, with references to the relevant information required in terms of Section 38(3) of the NHRA, is structured as per the below table.

Table 1-5: Structure of the report

Section	Description	NHRA information requirements
2	Outlines the legislative framework relevant to the specialist heritage study.	-
3	Identifies the specific constraints and limitations of the HIA.	-
4	Describes the methodology employed in the compilation of this HIA.	-
5	Details the results of the gap analysis completed on the van Vollenhoven (2012; 2014) reports.	-
6	Provides the baseline cultural landscape.	38(3)(a)
7	Motivates for the defined CS of the identified heritage resources and landscape.	38(3)(b)
	Considers the potential impacts to heritage resources by project related activities.	38(3)(c)
	Outlines possible risks to heritage resources and heritage related risks to the project.	
8	Considers the development context to assess the socio-economic benefits of the project in relation to the presented impacts and risks.	38(3)(d)
9	Presented the results of consultation.	38(3)(e)
10	Details the specific recommendations based on the contents of the HIA.	38(3)(g)
11	Collates the most salient points of the HIA and concludes with the specific outcomes and recommendations of the study.	38(3)(f) 38(3)(g)
12	Lists the source material used in the development of the report.	-

2 Legislative and policy framework

The HRM process is governed by the national legislative framework. This section provides a brief summary of the relevant legislation pertaining to the conservation and responsible management of heritage resources.

Table 2-1: Applicable legislation considered in the HRM process

Applicable legislation used to compile the report	Reference where applied
<p><u>Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)</u></p> <p>Section 24 of the Constitution states that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that –</p> <ol style="list-style-type: none"> Prevent pollution and ecological degradation; Promote conservation; and Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development 	<p>The HRM process is being undertaken to identify heritage resources and determine heritage impacts associated with the Project.</p> <p>As part of the HRM process, applicable mitigation measures, monitoring plans and/or remediation will be recommended to ensure that any potential impacts are managed to acceptable levels to support the rights as enshrined in the Constitution.</p>
<p><u>Mineral and Petroleum Resource Development Act, 2002 (Act No. 28 of 2002)</u></p> <p>The MPRDA sets out the requirements relating to the development of the nation's mineral and petroleum resources. It also aims to ensure the promotion of economic and social development through exploration and mining-related activities.</p> <p>The MPRDA requires that mining companies assess the socio-economic impacts of their activities from start to closure and beyond. Companies must develop and implement a comprehensive Social and Labour Plan (SLP) to promote socio-economic development in their host communities and to prevent or lessen negative social impacts.</p> <p>Section 102 of this Act applies in respect of proposed amendments to the existing mining rights. A Section 102 Amendment does not explicitly require a heritage study and therefore does not trigger a NHRA section 38(8) application.</p>	<p>This HIA, which relates specifically to the Matla Coal Mine EMP consolidation and update, has been compiled in accordance with the MPRDA read in conjunction with the EIA Regulations, 2017.</p>

Applicable legislation used to compile the report	Reference where applied
<p>However, a Section 102 Amendment does require an EA application to be completed which entails a BAR or EIA to be conducted.</p> <p>The EIA or BAR must therefore be conducted in accordance with Section 39 of the MPRDA that give effect to the general objectives of integrated environmental management encapsulated in Chapter 5 of the NEMA. The EIA must furthermore speak to impacts that the mining will have on the environment in accordance with section 24(7) of the NEMA.</p>	
<p><u>National Environmental Management Act, 1998 (Act No. 107 of 1998)</u></p> <p>The NEMA, as amended, was set in place in accordance with section 24 of the Constitution of the Republic of South Africa. Certain environmental principles under NEMA have to be adhered to, to inform decision making on issues affecting the environment. Section 24 (1)(a), (b) and (c) of NEMA state that:</p> <p><i>The potential impact on the environment, socio-economic conditions and cultural heritage of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.</i></p> <p>The Environmental Impact Assessment (EIA) Regulations, Government Notice Regulation (GN) R.982 were published on 04 December 2014 and promulgated on 08 December 2014. Together with the EIA Regulations, the Minister also published GN R.983 (Listing Notice No. 1), GN R.984 (Listing Notice No. 2) and GN R.985 (Listing Notice No. 3) in terms of Sections 24(2) and 24D of the NEMA, as amended.</p>	<p>The application process is being undertaken in accordance with the principles of Section 2 of NEMA as well as with the EIA 2017 Regulations, promulgated in terms of NEMA.</p> <p>Based on the regulatory process, it has been identified that a full EIA process is required for the Project. An application for the amendment of the EMP will be submitted to the DMR who is the relevant Competent Authority in respect of this application for authorisation.</p>
<p><u>GN R. 982: Environmental Impact Assessment Regulations, 2014 (as amended by GN R 326 of 7 April 2017)</u></p> <p>These three listing notices set out a list of</p>	<p>Listed activities detailed within GN R 983 and 984, as amended by GN R 324 and GN R 326 respectively, will be triggered. To comply with the regulations, an EIA process must be</p>

Applicable legislation used to compile the report	Reference where applied
<p>identified activities which may not commence without an Environmental Authorisation from the relevant Competent Authority through one of the following processes:</p> <ul style="list-style-type: none"> ▪ Regulation GN R. 983 - Listing Notice 1: This listing notice provides a list of various activities which require environmental authorisation and which must follow a basic assessment process. ▪ Regulation GN R. 984 – Listing Notice 2: This listing notice provides a list of various activities which require environmental authorisation and which must follow an environmental impact assessment process. ▪ Regulation GN R. 985 – Listing Notice 3: This notice provides a list of various environmental activities which have been identified by provincial governmental bodies which if undertaken within the stipulated provincial boundaries will require environmental authorisation. The basic assessment process will need to be followed. 	<p>completed in support of Environmental Authorisation. This HIA was completed to inform the EIA process to comply with Section 24 of the NEMA.</p>
<p><u>National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)</u></p> <p>The NHRA is the overarching legislation that protects and regulates the management of heritage resources in South Africa, with specific reference to the following Sections:</p> <ul style="list-style-type: none"> ▪ 5. General principles for HRM ▪ 6. Principles for management of heritage resources ▪ 7. Heritage assessment criteria and grading ▪ 38. Heritage resources management <p>The Act requires that Heritage Resources Authorities (HRAs), in this case SAHRA and MPRHA, be notified as early as possible of any developments that may exceed certain minimum thresholds in terms of Section 38(1), or when assessments of impacts on heritage resources are</p>	<p>This HIA will be submitted to the SAHRA and MPHRA. The HIA was compiled to comply with Section 5, 38(3), (4) and (8) of the NHRA.</p>

Applicable legislation used to compile the report	Reference where applied
required by other legislation in terms of Section 38(8) of the Act.	

Table 2-2: Applicable policies considered in the HRM process

Applicable policies used to compile the report	Reference where applied
<p><u>SAHRA Archaeology, Palaeontology and Meteorites (APM) Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports (2007)</u></p> <p>The guidelines provide the minimum standards that must be adhered to for the compilation of a HIA Report.</p> <p>Chapter II Section 7 outlines the minimum requirements for inclusion in the heritage assessment as follows:</p> <ul style="list-style-type: none"> ▪ Background information on the Project; ▪ Background information on the cultural baseline; ▪ Description of the properties or affected environs; ▪ Description of identified sites or resources; ▪ Recommended field rating of the identified sites to comply with Section 38 of the NHRA; ▪ A statement of Cultural Significance in terms of Section 3(3) of the NHRA; and ▪ Recommendations for mitigation or management of identified heritage resources. 	<p>The HIA was compiled to adhere to the minimum standards as defined by Chapter II of the SAHRA APM Guidelines (2007)</p>

3 Constraints and limitations

The following limitations and constraints were experienced in the compilation of this report:

- Whilst every attempt to obtain the latest available information was made, the reviewed literature does not represent an exhaustive list of information sources for the various study areas;

- Whilst every effort was made to survey the extent of the Matla MRA, this report does not present an exhaustive list of identified heritage resources;
- Health and safety constraints associated with inclement weather conditions limited access to certain areas within the site-specific study area;
- Access to certain properties was not granted at the time of the field survey;
- Verification of identified heritage resources as reported by Van Vollenhoven (2012; 2014), was limited to sites where access was granted;
- Results from the previously completed heritage studies were not subject to an assessment of CS; and
- Palaeontological and archaeological resources commonly occur at subsurface levels. These types of resources may not be adequately recorded or documented by assessors without intrusive and destructive methodologies. Therefore, the reviewed literature, previously completed assessments, and the results of the field survey are in themselves limited to surface observations.

4 Methodology

4.1 Defining the study area

Heritage resources do not exist in isolation to the greater natural and social environment, including the socio-cultural, social-economic and socio-political contexts. The NHRA requires the grading of heritage resources in terms of national, provincial and local concern, based on their importance and therefore on the official (i.e. State) management effort required. These categories require different types and levels of baseline information to adequately predict potential heritage impacts. Three 'concentric' study areas were defined for the purpose of this study, which include:

- The *site-specific* study area: the farm portions extent associated with the proposed project, including a 500m buffer area. The site-specific area may extend linearly; in such instances, the defined site-specific area includes the linear development (for example, a road) and a 200m buffer either side of the development footprint;
- 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. The local study area is defined as the area bounded by the local municipality (in this case, the ELM, GMLM and VKLM) with particular reference to the immediate surrounding properties or farms. The local study area was specifically examined to offer 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; and
- The *regional* study area: the area bounded by the district municipality demarcation. In this case, the Project is situated across both the GSDM and NDM. Where necessary,

the regional study 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.

4.2 Gap analysis

The heritage gap analysis considered criteria contained in Section 38 of the NHRA in terms of the minimum HIA report requirements listed in subsection 38(3) and the HRM process as per subsection 38(4) (Refer to Table 4-1). The aim of the gap analysis is to determine compliance and adequacy of information to enable the relevant HRAs to make appropriate decisions. Determining adequacy, however, is too subjective to rate and was rather included in the analysis as recommendations for additional information.

The gap analysis employed a compliance matrix to identify gaps and rate the level of compliance and adequacy. The sum of a simple "yes/no" rating was used with each criterion divided by nine to provide the compliance rating. Non-compliance was considered as a total less than one, partial compliance as a total rating from one to eight, and full compliance as a rating of nine.

Table 4-1: NHRA Section 38 criteria

NHRA Section	Description of criteria
38(3)(a)	Identification and mapping of heritage resources
38(3)(b)	Evaluation of significance
38(3)(c)	Heritage impact on resources
38(3)(d)	Heritage impact relative to sustainable social and economic benefits
38(3)(e)	Results of consultation
38(3)(f)	Consideration of alternatives
38(3)(g)	Mitigation plans
38(4)	Report submission to responsible HRA
38(4)	Statutory Comment issued by responsible HRA

Table 4-2: Compliance rating system

		Compliance rating																		
Criteria		-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9
	1	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9
	2	-5	-4	-4	-3	-3	-2	-2	-1	-1	0	1	1	2	2	3	3	4	4	5
	3	-3	-3	-2	-2	-2	-1	-1	-1	0	0	0	1	1	1	2	2	2	3	3
	4	-2	-2	-2	-2	-1	-1	-1	-1	0	0	0	1	1	1	1	2	2	2	2
	5	-2	-2	-1	-1	-1	-1	-1	0	0	0	0	0	1	1	1	1	1	2	2
	6	-2	-1	-1	-1	-1	-1	-1	0	0	0	0	0	1	1	1	1	1	1	2
	7	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	1	1	1	1	1	1
	8	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	1	1	1	1	1	1
	9	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	0	0	1	1	1	1	1

4.3 Statement of cultural significance

Digby Wells has designed a significance rating process to provide a numerical rating of the CS⁴ of identified heritage resources. This process considers heritage resources assessment criteria as set out in subsection 3(3) of the NHRA to determine the intrinsic, comparative and contextual significance of identified heritage resources. The importance rating of a resource is based on information obtained through a review of available credible sources as well as its representativity or uniqueness (i.e. known examples of similar resources to exist).

The matrix rated the importance (or the potential) of an identified resource relative to its contribution to certain values – aesthetic, historical, scientific and social. Resource significance was directly related to the impact on it that could result from project-related activities, as it provided minimum accepted levels of change to the resource.

The value of an identified heritage resource is determined prior to the completion of any assessments of impacts. A heritage resource's value is a direct indication of its sensitivity to change (i.e. impacts)

4.4 Data collection

Secondary data was collected through desktop studies of the site-specific study area, as defined above, and surrounds, prior to the primary data collection, which took place through surveys of the site-specific study area. Both processes are detailed below.

⁴ Cultural significance is defined in the NHRA as the intrinsic “aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance” of a heritage resource. These attributes are combined and reduced to four themes used in the Digby Wells significance matrix: aesthetic, historical, scientific and social.

4.4.1 Primary data collection

Primary data was collected by Shannon Hardwick through a pre-disturbance survey of the Matla Coal Mine MRA (site-specific study area) from 13 to 18 November 2017. Additional surveys were carried out on 29 November and 6 to 7 December 2017. The surveys were non-intrusive (i.e. no sampling was undertaken) with the objectives to:

- Visually record the current state of the cultural landscape;
- Ground-truth certain heritage resources and sites identified through the literature; and
- Record a representative sample of visible tangible heritage resources present within the site-specific and local study areas.

Identified heritage resources were recorded as waypoints using handheld GPS and documented through written and photographic records. The survey was recorded as track logs. Plans of the survey tracks and waypoints recorded through the survey are included in Appendix B (Plan 3 and 4).

4.4.2 Secondary data collection

Data collection assists in the development of a cultural heritage baseline profile of the study area under consideration. Qualitative data was collected to inform this HIA and primarily obtained through secondary information sources, i.e. desktop literature review and historical layering.

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; and
- Identify any potential fatal flaws, sensitive areas, current social complexities / issues and known or possible tangible heritage.

Repositories that were surveyed included the SAHRIS database as well as online / electronic journals and platforms, and certain internet sources. This HIA only includes a summary and discussion of the most relevant findings. Relevant sources were cited and included in the literature review's reference list.

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.

All sources that were consulted for this HIA are listed in Table 4-3 below.

Table 4-3: Qualitative data sources

Reviewed Qualitative Data					
Databases					
SAHRIS		Statistics South Africa, 2011			
SAHRIS Cases					
Case ID	102	Case ID	166	Map ID	654
Case ID	1772	Case ID	174	Map ID	659
Case ID	1724	Case ID	466	Map ID	662
Case ID	138	Case ID	1487	Map ID	672
Case ID	1803	Case ID	2261	Map ID	648
Case ID	4249	Case ID	4309	Map ID	687
Case ID	5914	Case ID	6251	Map ID	710
Case ID	6357	Case ID	6391	Map ID	711
Case ID	6492	Case ID	8410	Map ID	1025
Case ID	3020	Case ID	5472	Map ID	1121
Case ID	6392	Case ID	756	Map ID	1153
Case ID	3135	Case ID	3907	Map ID	1164
Case ID	4919	Case ID	6810	Map ID	1165
Case ID	10337	Case ID	7529	Map ID	1179
Case ID	10237	Map ID	707	Map ID	1668
Case ID	7332	Map ID	1123	Map ID	1718
Case ID	9087	Map ID	719	Map ID	2179
Case ID	9959	Map ID	1147	Map ID	2418
Case ID	9216	Map ID	672	Map ID	2859
Case ID	10490	Map ID	653	Map ID	2907

Reviewed Qualitative Data		
Case ID 8831		
Cited Text		
Ackermann, 1969	Anonymous, 1980	Bamford, 2012; 2014; 2016
Behrens & Swanepoel, 2008	Brodie, 2008	Clark, 1982
Deacon & Deacon, 1999	Delius & Cope, 2007	Delius, et al., 2014
Du Piesanie, 2017a; 2017b	Duvenage, 1994	Eastwood, et al., 2002
Esterhuysen & Smith, 2007	GCS (Pty) Ltd, 2017	Gert Sibande District Municipality, 2017
Groenewald & Groenewald, 2014	Holden & Mathabatha, 2007	Huffman, 2004; 2007
Johnson, et al., 1996; 2006	Landau, 2010	Maggs, 1974; 1976
Makhura, 2007	McCarthy & Rubidge, 2005	Mitchell, 2002
Mpumalanga Tourism and Parks Authority, No Date	Mucina & Rutherford, 2010	National Planning Commission, 2012
Nkangala District Municipality, 2017	Pakenham, 1979	Pistorious, 2008a; 2008b
Potgieter, 1955	Price, 1992	Rubidge, 2008; 2013a; 2013b
Smith & Ouzman, 2004	Smith & Zubieta, 2007	Swanepoel, et al., 2008
Voortrekkers, 2014	Wessels, 2010	Willsworth, 2006
von der Heyde, 2013		

A more detailed list of works cited is included in Section 12.

4.5 Site naming convention

Heritage resources identified by Digby Wells during the pre-disturbance survey were prefixed by the SAHRIS case identification generated for this Project. Information on the

relevant period / feature code and site number followed (e.g. 11829/BGG-001). This number may be shortened on plans or figures to the period / feature code and site number (e.g. BGG-001).

Heritage resources identified through the secondary data collection were prefixed by the relevant SAHRIS case or map identification (*where applicable*), and the original site name used by the author (e.g. 1233/Site1).

5 Gap analysis summary

Digby Wells completed a gap analysis of the original heritage assessment (van Vollenhoven, 2012), as well as the updated 2014 report for the Exxaro Matla Coal Mine Stopping EIA. The reports were reviewed utilising the methodologies presented in Section 4.2 above. This section provides a summary of the results of this analysis.

The initial heritage assessment (van Vollenhoven, 2012) complied with six of the nine criteria assessed, and was evaluated as partially compliant. The updated report (Van Vollenhoven, 2014) only complied with four of the nine criteria. Notwithstanding addressing the aforementioned gaps, Digby Wells recommended including additional information (Refer to Table 5-1 and Table 5-2).

The current HRM process aims to, in as far as possible, address the identified gaps to promote compliance with the requirements of Section 38 of the NHRA.

Table 5-1: Gap analysis summary of van Vollenhoven (2012)

NHRA HRM Criteria				
HIA report requirements	Addressed in HIA	HIA reference	Adequacy	Information required
38(3)(a) - Identification and mapping of heritage resources	Yes	Section 9	Adequate	None
38(3)(b) - Evaluation of significance	Yes	Section 9	Inadequate	Methodology to determine significance of identified heritage resources not provided to demonstrate compliance with Section 3(3) of the NHRA
38(3)(c) - Heritage impacts on resources	No	None	Inadequate	Identification and assessment of impacts are not considered in the report. This must be addressed to comply with the

NHRA HRM Criteria				
HIA report requirements	Addressed in HIA	HIA reference	Adequacy	Information required
				requirements encapsulated in the NHRA.
38(3)(d) - Heritage impact relative to sustainable social and economic benefits	No	None	Inadequate	Sustainable social and economic impacts are not considered in the report. This must be addressed to comply with the requirements encapsulated in the NHRA.
38(3)(e) - Results of consultation	No	Section 10	Inadequate	The report identifies individuals consulted. The results are not included in the report. This must be addressed to comply with the requirements encapsulated in the NHRA
38(3)(f) - Consideration of alternatives	Yes	Section 9	Inadequate	The report considers alternative mitigations for identified heritage resource types. The report does not consider project alternatives. This must be addressed to comply with the requirements encapsulated in the NHRA
38(3)(g) - Mitigation plans	Yes	Section 12	Inadequate	Recommendations considering project activities and cultural significance of identified heritage resources to comply with the requirements encapsulated within the NHRA

NHRA HRM Criteria				
HIA report requirements	Addressed in HIA	HIA reference	Adequacy	Information required
NHRA HIA requirement compliance (out of 7)	4	Partial compliance		
HRM Process Requirements	Action	Report / Case Reference	Date	Responsible HRA
38(4) - Report submission to responsible HRA	Yes	Case ID: 102	12/06/2012	SAHRA and MPRHA
38(4) - Statutory Comment issued by responsible HIA	Yes	Case ID: 102	25/06/2012	SAHRA and MPRHA
HRM process compliance (out of 2)	2	Full compliance		
Overall compliance (out of 9)	6	Partial compliance		

Table 5-2: Gap analysis summary of van Vollenhoven (2014)

NHRA HRM Criteria				
HIA report requirements	Addressed in HIA	HIA reference	Adequacy	Information required
38(3)(a) - Identification and mapping of heritage resources	Yes	Section 8	Adequate	None
38(3)(b) - Evaluation of significance	Yes	Section 8	Inadequate	Methodology to determine significance of identified heritage resources not provided to demonstrate compliance with Section 3(3) of the NHRA

NHRA HRM Criteria				
HIA report requirements	Addressed in HIA	HIA reference	Adequacy	Information required
38(3)(c) - Heritage impacts on resources	No	None	Inadequate	Identification and assessment of impacts are not considered in the report. This must be addressed to comply with the requirements encapsulated in the NHRA.
38(3)(d) - Heritage impact relative to sustainable social and economic benefits	No	None	Inadequate	Sustainable social and economic impacts are not considered in the report. This must be addressed to comply with the requirements encapsulated in the NHRA.
38(3)(e) - Results of consultation	No	Section 9	Inadequate	The report identifies individuals consulted. The results are not included in the report. This must be addressed to comply with the requirements encapsulated in the NHRA
38(3)(f) - Consideration of alternatives	Yes	Section 9	Inadequate	The report considers alternative mitigations for identified heritage resource types. The report does not consider project alternatives. This must be addressed to comply with the requirements encapsulated in the NHRA
38(3)(g) - Mitigation plans	Yes	Section 10	Inadequate	Recommendations considering project activities and cultural significance of identified heritage resources to comply with the requirements encapsulated within the NHRA
NHRA HIA requirement compliance (out of 7)	4	Partial compliance		

NHRA HRM Criteria				
HIA report requirements	Addressed in HIA	HIA reference	Adequacy	Information required
HRM Process Requirements	Action	Report / Case Reference	Date	Responsible HRA
38(4) - Report submission to responsible HRA	No	None		SAHRA and MPRHA
38(4) - Statutory Comment issued by responsible HIA	No	None		SAHRA and MPRHA
HRM process compliance (out of 2)	0	Non-compliance		
Overall compliance (out of 9)	4	Partial compliance		

6 Cultural heritage baseline description

The cultural heritage baseline description considered the predominant landscape based on the identified heritage resources within the regional and local study area. Table 6-1 presents the broad timeframes for the major periods of the past in Mpumalanga.

Table 6-1: Archaeological periods in Mpumalanga (adapted from Esterhuysen & Smith, 2007)

The Stone Age	Early Stone Age (ESA)	2 million years ago (mya) to 250 thousand years ago (kya)
	Middle Stone Age (MSA)	250 kya to 20 kya
	Later Stone Age (LSA)	20 kya to 500 CE (Common Era ⁵)
There appears to be a gap in the record in Mpumalanga between approximately 7000 and 2000 BCE.		

⁵ Common Era (CE) refers to the same period as *Anno Domini* ("In the year of our Lord", referred to as AD): i.e. the time after the accepted year of the birth of Jesus Christ and which forms the basis of the Julian and Gregorian calendars. Years before this time are referred to as 'Before Christ' (BC) or, here, BCE (Before Common Era).

Farming Communities	Early Farming communities (EFC)	500 to 1400 CE
	Late Farming Communities (LFC)	1100 to 1800 CE
Historical Period	-	1500 CE to 1994 (Behrens & Swanepoel, 2008)

The predominant tangible heritage resources recorded in the area under consideration demonstrate affiliations with the historical period, dominated by the historical built environment and burial grounds and graves. This notwithstanding, expressions of palaeontological, MSA, LSA and LFC resources have been recorded in the greater study area.

In total, 964 heritage resources were identified within the regional, local and site-specific study areas, the breakdown of which is illustrated below in Figure 6-1.

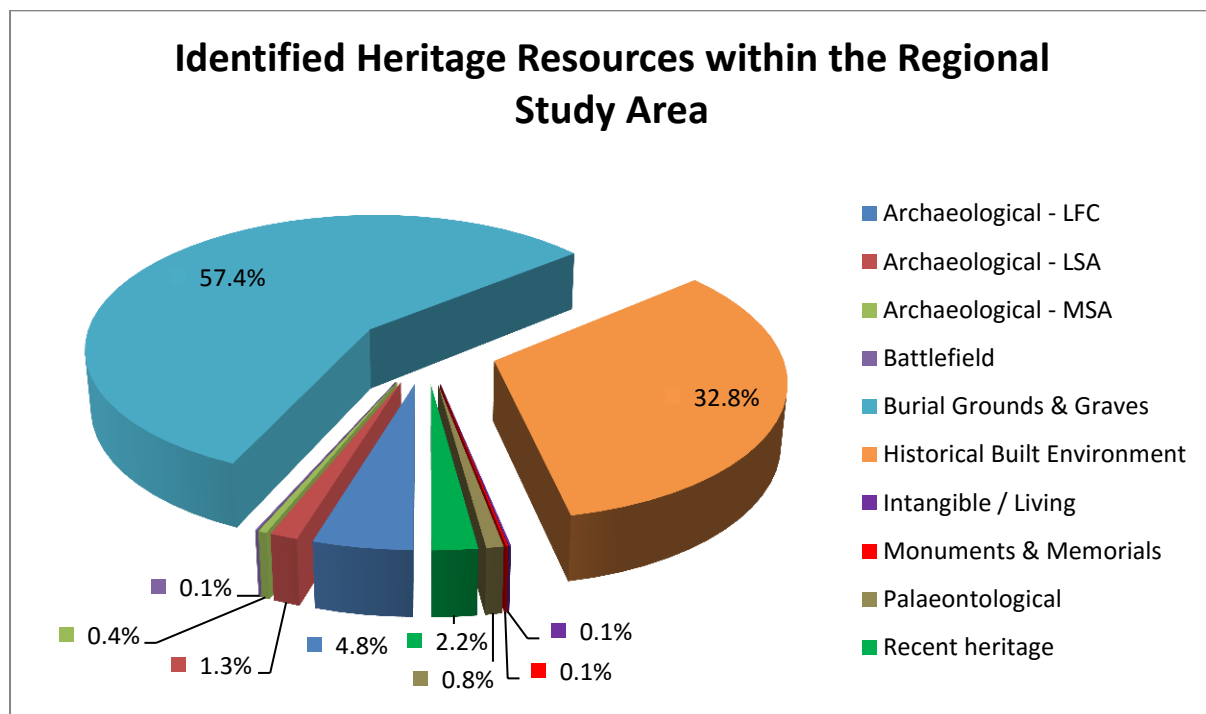


Figure 6-1: Heritage resources identified within the greater study area

This section defines the cultural landscape through providing a brief description that offers the reader contextual information, as well as assists the identification of potential risks and impacts to the heritage resources (discussed in Section 7).

6.1 Regional and local study area

6.1.1 Geology and palaeontological context

Mpumalanga's geological history takes place over 3 600 million years (Johnson *et al* 2006; Groenewald & Groenewald, 2014). The province is underlain by valuable geological formations, both in terms of mineral and fossil wealth. Briefly, these comprise:

- The Karoo Supergroup;
- The Bushveld Complex; and
- Transvaal Supergroup.

The regional and local study areas form part of the Highveld Coalfield, which extends approximately 7 000 km². The regional and local study areas are predominantly underlain by the Main Karoo Basin, which comprises lithostratigraphic units associated with the Karoo Supergroup. The Main Karoo Basin dates to the Late Carboniferous to Middle Jurassic Periods (roughly 320 to 145 mya) (Johnson, et al., 2006). The relevant geological sequence is illustrated in Table 6-2.

The Main Karoo Basin constitutes a retro-arc foreland basin. As described by Johnson *et al* (2006), this is because of:

- The thick flysch-molasse succession which wedges out northwards over the adjacent craton;
- It Main Karoo Basin's position behind an inferred magmatic arc; and
- The associated fold thrust belt produced by northward subduction of oceanic lithosphere located south of the arc.

These processes allowed for sedimentation of the basin, forming what is collectively known as the Karoo Supergroup (Johnson, et al., 2006). These sediments cover approximately 700 000 km², including the site-specific study area. The Karoo Supergroup is well known for the terrestrial vertebrate fossils, distinctive plant assemblages, thick glacial deposits and extensive dolerite dykes and sills among the sediments (Johnson, et al., 1996; 2006). Figure 6-2 illustrates the extent of the Karoo basins as well as the envisaged plate tectonic setting of the basin in the Late Triassic.

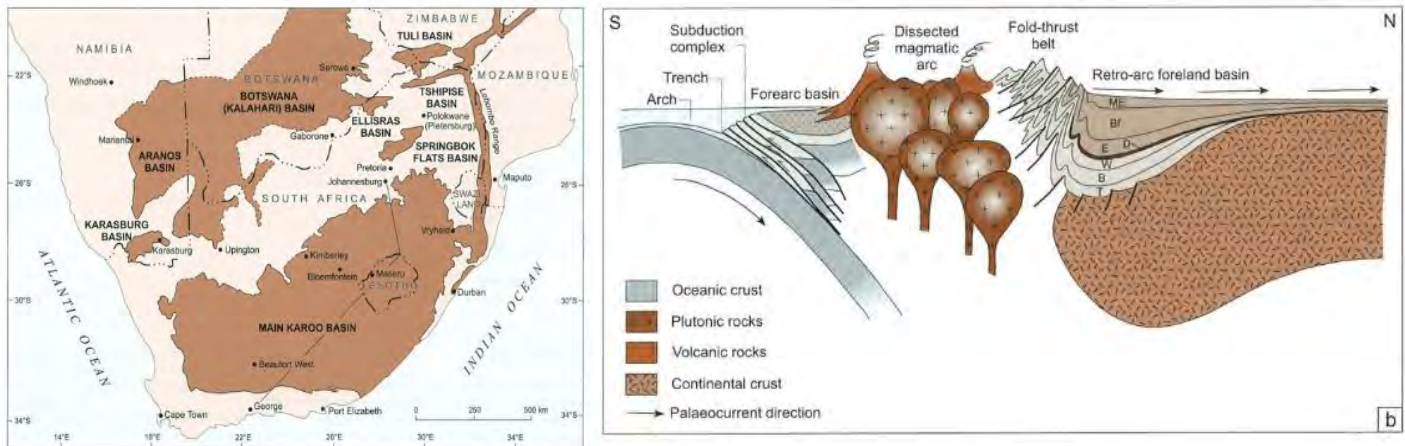


Figure 6-2: Location and envisaged plate tectonic setting of the Main Karoo Basin during the Late Triassic. E = Ecca Group (adapted from Johanson, *et al.*, 2006)

Within the Karoo Supergroup are the sediments of the Ecca Group (dating to the Permian Period), the most paleontologically sensitive of the geological layers, which overlie the *Dwyka Formation* (labelled 'D' in Figure 6-2). These Ecca Group sediments are well-known for the wealth of plant fossils, characterised by assemblage of *Glossopteris* (plant species which are defined through fossil leaves) and contain significant coal reserves (Groenewald & Groenewald, 2014).

The Bushveld Complex and Transvaal Supergroup are represented within the local study area as outcrops of the Rooiberg Group and Lebowa Granite Suite respectively (as shown in Plan 2 in Appendix B). Fossils associated with the Transvaal Supergroup include thick deposits of stromatolites and stromatolitic dolomite (Groenewald & Groenewald, 2014). Stromatolites are the ancient predecessors of modern algal mats. These fossils have been recorded in other formations within the Transvaal Supergroup; however, no such fossils have as yet been recorded in the Rooiberg Group, despite its low palaeontological sensitivity (Groenewald & Groenewald, 2014; SAHRA, 2013c). Fossils are unlikely within the group, because of its fluvial depositional setting and the subsequent metamorphic processes which have taken place within the layers.

Table 6-2: Geological sequence and palaeontological sensitivity for the local study area

Eon	Era	Period	Epoch	Mya	Lithographic Units				Significance	Fossils
					Supergroup	Group	Sub-group	Formation		
Phanerozoic	Mesozoic	Jurassic		145				Karoo dolerites	Negligible	None
	Palaeozoic	Permian	200	Karoo Supergroup	Ecca Group		Volsrust	High	The Volsrust Formation comprises of trace fossils, rare temnospondyl amphibian remains, invertebrates (bivalves, insects), minor coals with plant remains, petrified wood, organic microfossils (acritarchs), and low-diversity marine to non-marine trace fossil assemblages.	
			Vryheid				Very-high	Abundant plant fossils of Glossopteris and other plants. Trace fossils. The reptile Mesosaurus has been found in the southern part of the Karoo Basin. Rich fossil plant assemblages of the Permian Glossopteris Flora (lycopods, rare ferns and horsetails, abundant glossopterids, cordaitaleans, conifers, ginkgoaleans), rare fossil wood, diverse palynomorphs. Abundant, low diversity trace fossils, rare insects, possible conchostracans, non-marine bivalves, fish scales.		
			300							
Proterozoic	Vaalian		2050	Bushveld Complex			Lebowa Granite Suite	Negligible	None	
2100										
Archaean			2500	Transvaal Supergroup	Rooiberg Group			Low	Fossils within the minor sedimentary units included in the group are unlikely because of the fluvial depositional setting, which has subsequently been metamorphosed. If found, fossils may potentially include stromatolites.	

6.1.2 Stone Age

The Stone Age in southern Africa comprises three broad phases. These phases are determined according to the lithic tools and material culture produced by the various hominid species through time. These phases are:

- The ESA;
- The MSA; and
- The LSA.

The review of available data highlighted very few expressions of MSA (4 records or 0.4% of the total identified heritage resources) and LSA (13 records or 1.3%) as shown in Figure 6-3. No expressions of ESA material were noted in the available resources and so this period is not considered in the assessment any further. The MSA is represented in the regional study area as an isolated artefact and low-density surface scatters (Digby Wells 2013a, 2016; Fourie 2000).

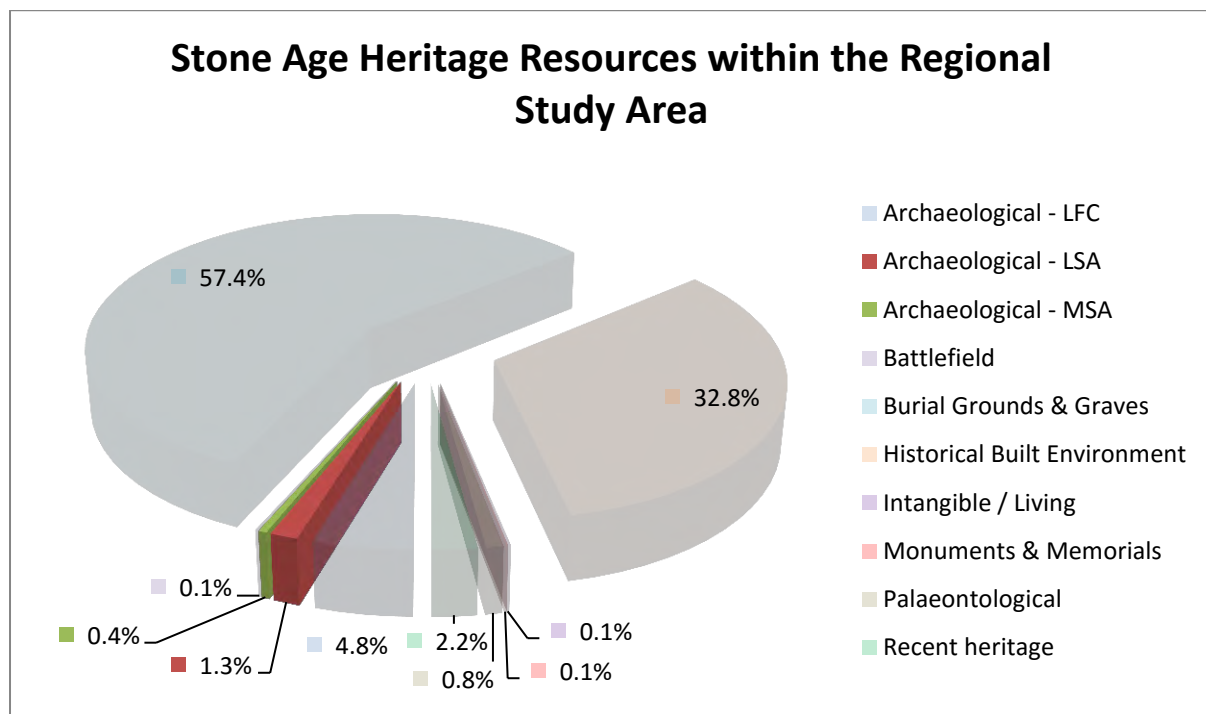


Figure 6-3: Stone Age Heritage Resources identified within GSDM and NDM

The MSA dates from approximately 300 kya to 20 kya. Early MSA lithic industries are characterised by high proportions of minimally modified blades, created using the Levallois technique (Clark, 1982; Deacon & Deacon, 1999). The use of good quality raw material as well as bone tools, ochre, beads and pendants also define this period.

The LSA dates between 40 kya to the historical period. LSA lithics are specialised where specific tools have been created for specific tasks (Mitchell, 2002). Bone points are included

in LSA assemblages, which also commonly include diagnostic tools such as scrapers and segments.

In southern Africa, the LSA is closely associated with hunter-gatherers. The San (including hunter-gatherer, Basarwa and Bathwa groups) are generally accepted as the first inhabitants of southern Africa and Mpumalanga (Makhura, 2007). Regional hunter-gatherer occupation is well documented, although open sites are usually poorly preserved and difficult to identify because of the nomadic nature of these peoples. The San have been described by Potgeiter (1955) as occupying rock shelters throughout the landscape and creating reed platforms in the Chrissiesmeer Lake District (which is approximately 110 km east of the site-specific study area).

Within the regional study area, expressions of the LSA include⁶:

- Isolated artefacts and low density scatters of lithic accumulations (Digby Wells 2013a, 2013b);
- Rock shelters with deposit and artefacts (Fourie 2000); and
- Rock Art (Van Schalkwyk 2003; Digby Wells 2013a, 2016).

The LSA, as alluded to above, is further defined by evidence of ritual practices and complex societies (Deacon & Deacon, 1999). Three rock art painting traditions occur within Mpumalanga and are widely dispersed, although they are most notably recorded in the northern and eastern regions. Each of the traditions is associated with particular cultural groups, such as:

- Fine-line paintings: the first and oldest rock painting tradition, associated with autochthonous LSA hunter-gatherer groups. These paintings are usually made with red, white or black pigment, through the use of fine brushes, quills or sticks. Bichrome or polychrome paintings do occur, but these are rare. Subjects depicted in the paintings include: realistic and proportionally correct animals, such as antelope, human figures and symbolic beings (Eastwood, et al., 2002);
- Finger paintings: associated with the later arrival of pastoralists; the tradition extends in linear bands following the proposed migration routes pastoralists may have followed from southern Angola and western Zambia to the southern Cape (Smith & Zubieta, 2007). The tradition was initially identified by Ben Smith and Sven Ouzman. (Smith & Ouzman, 2004) It is characterised by predominantly finger-painted geometric images, which are composed of circles, finger lines, finger dots and handprints, mostly painted in red pigment but also in red and white and occasionally only in white (Eastwood, et al., 2002; Smith & Zubieta, 2007); and

⁶ The SAHRIS Case and Map IDs for these reports are listed in Table 4-3.

- Finger paintings: associated with a much later, possibly historical, farming communities. This tradition has not been identified within the study area and as such is not considered further in this report.

6.1.3 Farming Community

The San were later followed by the various peoples of the Farming Community, including ancestors of modern Sotho-Tswana and Nguni peoples (Makhura, 2007). The farming community period correlates to the movements of Bantu-speaking agro-pastoralists moving into southern Africa. Heritage resources associated only with the Late Farming Community (LCF) (1100 to 1800 CE) were recorded in the regional study area – no early farming community material was identified. The LFC resources accounted for 46 (or 4.8%) of the identified heritage resources in the regional study area, as shown in Figure 6-4.

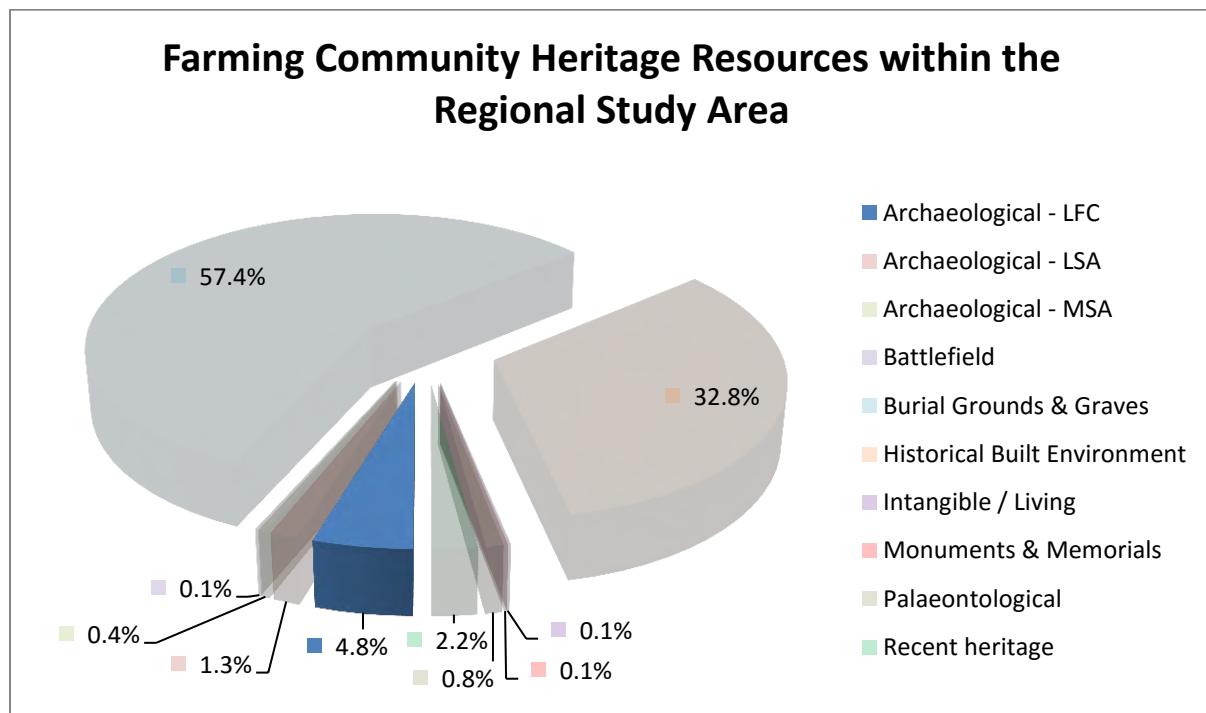


Figure 6-4: Farming Community Heritage Resources identified within GSDM and NDM

Stonewalling is the most visible indicator of LFC settlements. Stonewalls attest to the complex processes of development and decline over several years (Delius, et al., 2014). It has been argued, by Maggs (1974) and Delius *et al.* (2014) for example, that earlier regional occupation predominantly occurred at lower altitudes in the valleys, close to rivers. After the sites were abandoned, they were covered by accumulated soil. These sites may also remain unidentified, as the surface indicators are not visible because of this soil accumulation.

Several stonewalled settlement types are found within the regional study area, including:

- Bokoni, also referred to as Badfontein (16th Century);
- KwaMaza (1700 – 1840 CE); and
- Type V (19th Century).

Huffman (2007, p. 41) refers to the first type as Badfontein, although the accepted convention is Bokoni (Delius, et al., 2014). Bokoni settlements are considered to be rooted in the movement of Nguni speakers into the region, developed through processes of innovation, adaptation and interactions. These sites cluster along rivers and are distributed primarily along the escarpment between Carolina and Ohrigstad (approximately 100 km east and 230 km southwest of the site-specific study area respectively) (Huffman, 2004; Delius, et al., 2014). The settlements are composed of large areas of terrace walls and cattle trackways, which usually lead into a central enclosure. An exit on the opposite side of the entrance allowed for access to kraals attached to the central wall (Maggs, 1976; Huffman, 2004). The organisation of these features may represent a left / right division.

KwaMaza settlements have been described as a variant of Moor Park walling located within midlands of KwaZulu-Natal and Nguni origins (Huffman, 2007, p. 31). These settlements are arranged with beehive huts at the back. The cattle kraals and central court are built to look the same, with two lobes for cattle and calves, and a side chamber for a small court. These sites commonly occur outside of the study area, near the Stoffberg region, and are not considered further in this report.

Type V settlements are the most common and most widely distributed within the local study area, around Bethel and Ermelo in the south-east region of Mpumalanga. The settlements comprise of a number of primary enclosures that are grouped around a ring (Maggs, 1976). The enclosures can be either contiguous or linked by secondary walling to form a secondary enclosure; there may also be free-standing structures around the periphery of the settlement, but there is no surrounding wall.

LFC sites can be identified through secondary tangible surface indicators, such as ceramics and evidence for domesticated animals, i.e. dung deposits or faunal remains. These resources provide motivation for settlement and possible trade networks (Delius, et al., 2014) and are distributed across the region. Huffman (2007) provides a reference for the possible distribution of ceramic facies within the regional study area. This is summarised in Table 6-3.

Table 6-3: Ceramic facies commonly found in Mpumalanga (Huffman 2007)

Facies	Key Characteristics	Period
Uitkomst	Stamped arcades, appliqué and blocks of parallel incisions, stamping and chord impressions	1650 CE – 1820 CE
Rooiberg	Stamped rim band, mixture of stamped and incised bands, arcades and triangles in the neck	1650 CE – 1750 CE

Facies	Key Characteristics	Period
Icon	Multiple incised bands separated by colour and lip decorations on bowls	1300 CE – 1500 CE
Madikwe	Multiple bands of cord impressions, incisions, stabs and punctates separated by colour	1500 CE – 1700 CE
Letaba	Hatched bands on shoulder, below black and red triangles	1600 CE – 1840 CE
Klingbeil	Triangles in neck bordered with slashes, punctates on shoulder	1000 CE – 1200 CE

Within the regional study area, identified LFC heritage resources include:

- Sites of low and medium complexity (Van Schalkwyk 2003; Digby Wells 2013a);
- Structural sites, including stone walling or structural remains (ruins of homesteads or circular stone structures) (Fourie 2000; Van Schalkwyk 2000, 2003; Van Schalkwyk & Moifatswane 2003; Pelser & van Vollenhoven, 2008; Digby Wells 2013a, 2013b; Higgitt 2014; Karodia 2014);
- Isolated ceramic potsherds and low density surface scatters (De Jong 2006; Digby Wells 2013a, 2013b; Karodia 2014; Pelser 2015); and
- Ash deposits or middens, which are most likely the remains of cattle kraals or refuse dumps containing artefacts relating to this period (Van Schalkwyk 2003).

6.1.4 The Historical Period

The historical period⁷ is commonly regarded as the period characterised by contact between Europeans and Bantu-speaking African groups and the written records associated with this interaction. However, the division between the LFC and historical period is artificial, as there is a large amount of overlap between the two.

Throughout the transitions between the LFC and the historical period (and through the historical period itself), migration, population growth, climatic variation and trade to the east significantly impacted the Pedi, Koni and other groups on the Mpumalanga Highveld. The rise of power blocs, including violent displacement and political centralisation, characterised this time (Makhura, 2007). Within this region, the Pedi developed a system of centralisation where subordinate communities could retain their independence in exchange for tribute in various forms. The Pedi grew to become the strongest power in the north-east, amongst the escalating conflict and intensifying violence (Delius, et al., 2014).

⁷ In southern Africa, especially in Mpumalanga, the last 500 years represents a formative period that is marked by enormous internal economic invention and political experimentation that shaped the cultural contours and categories of modern identities outside of European contact. This period is currently not well documented, but is being explored through the 500 year initiative (Swanepoel, et al., 2008).

In the Nguni region, similar processes played out, contributing to the rise of several large, aggressive states, including: the Ndwandwe, the Mthethwa, the Swazi and the Zulu Kingdom. Skirmishes between these groups resulted in several battles, the pillaging of settlements and the movement of various groups into the interior; both the Pedi and the Koni suffered the severe consequences. While the Ndwandwe, the Swazi and the Ndebele (led by Mzilikazi) were seen as the dominant forces on the landscape, smaller groups of invaders and raiders contributed to these events (Delius, et al., 2014).

An example of the overlap between the LFC and the historical period is the Mfecane or, north of the Orange River, the Difaqane. These terms refer to a period of violence and unrest between approximately 1817 to 1826 AD (Landau, 2010). Many aspects of the Mfecane/Difaqane have been debated and challenged. The traditional understanding of the period is that Mzilikazi and his Ndebele group were pushed out of their territory by the Zulu group led by Shaka. This displacement had a knock-on effect, as multiple groups were subsequently displaced to the north and the west. A drought during this time exacerbated the instability and increased the pressure on food supplies, which were already running low. European settlers, traders, missionaries and travellers moving into the interior further added to instability and resulting power struggles. The Mfecane/Difaqane was characterised by unprecedented (at least within the records of the Europeans travelling within southern Africa) social and political mobilisation and violence across the Highveld as individuals sought personal and food security.

As a result of social and political upheaval, the Mpumalanga Highveld was vulnerable to intrusive groups including the Swazi and the *Voortrekkers*. Groups of Afrikaaners initiated a move from the Cape to the interior to establish an independent state in approximately 1835, in reaction to increased British liberalism and the abolishment of slavery and pass laws. The migration of these *Voortrekkers* is commonly referred to as the Great Trek (or *Groot Trek*) and it started with the first group, the Robert Schoon Party, in 1836. The first permanent settlement that was established as a result of this movement was Ohrigstad in 1845 – the *Voortrekkers* at this time were intruding into an already volatile interior and exacerbated the strife in this area, frequently skirmishing with remnant Pedi, Ndazundza Ndebele and Kopa groups (Delius & Cope, 2007; Voortrekkers, 2014).

In 1852, *Voortrekker* and British representatives signed the Sand River Convention into effect; the convention acknowledged Trekboer independence and officially established the *Zuid-Afrikaansche Republiek* (ZAR). ZAR independence allowed for land to be distributed to its citizens, though the demarcation of farms and the issuing of title deeds. The Trekboers continued their violent encounters with the smaller groups in this region, armed with their perceived right to land under the ZAR. These conflicts resulted in a Trekboer-Swazi alliance: the Swazi besieged and destroyed the Kopa and orchestrated assaults against the Ndazundza Ndebele. The Ndazundza Ndebele remained undefeated, but came to a compromise with the Trekboers where land would be leased by the Trekboers through a system of tribute (Delius & Cope, 2007; Voortrekkers, 2014).

Soon after settling in the area, the Trekboers (now farmers) discovered and exploited the Highveld Coalfields. The coal was initially used by the Boers as a domestic resource; however the discovery of gold in the Witwatersrand in 1886 created an enormous demand for coal (Brodie, 2008; Pistorious, 2008a; 2008b). This increase in the demand for coal drove the commercial exploitation of the coal, until the industry was put on hold by the outbreak of war.

The South African War of 1899-1902 (previously referred to as the Second Anglo-Boer War) officially started on October 9th, 1899. The war was the result of building tensions and conflicting political agendas between the Trekboers and the British. There are two notable battles associated with the South African War within the regional study area: the Battles of Lake Chrissie (February 6th, 1901) and Bakenlaagte⁸ (October 30th, 1901).

Under Louis Botha, the Trekboer forces launched a surprise attack on the British forces stationed around Lake Chrissie. The objective of this attack was to halt British advancement into the Transvaal. The British, led by Gen. H.L. Smith-Doriens, were taken by surprise as 'Boer-friendly' San scouts (called *agterryers*) had kept British movements under surveillance. During the battle; the Boers lost 80 men from their commando. The British lost 75 men and over 300 horses and the movement of British forces into the ZAR was significantly delayed for most of 1901.

Other important events associated with the South African War in the broader area include:

- Trigaardsfontein (10 December 1901),
- Klippan (18 February 1902); and
- Boschmanskop (1 April 1904) (Van Vollenhoven 2012).

Historical heritage resources associated with the early settlement of these groups in the region make up the large majority of the identified heritage resources in the area under consideration, as shown in Figure 6-5.

⁸ The Battle of Bakenlaagte is discussed in greater detail in Section 6.2.3, as it has some bearing on the past within the site-specific project area.

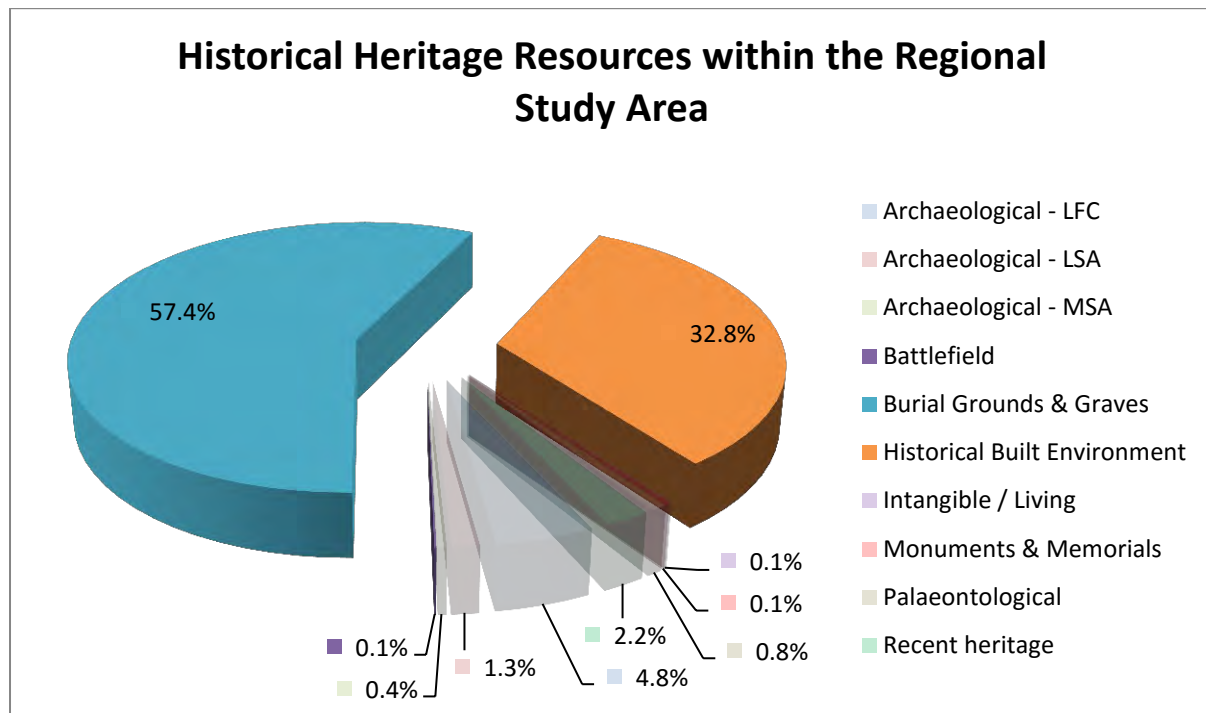


Figure 6-5: Historical Heritage Resources identified within GSDM and NDM

Historical heritage resources within the regional study area are represented as:

- A battlefield (discussed in detail in Section 6.2.3);
- Burial grounds and graves, ranging from single burials to graveyards containing over one hundred individuals; (Van Schalkwyk 1997a, 1997b, 2002a, 2002b, 2002c, 2003a, 2003b, 2003c, 2003d; Huffman 1999; Fourie 2000, 2008, 2010, 2012a, 2012b; Van Schalkwyk & Moifatswane 2003; Pistorius 2004a, 2004b, 2007, 2008, 2011, 2012, 2013, 2014, 2015, 2016; De Jong 2006, 2007; Van der Walt 2007; Pelser & van Vollenhoven, 2008; Miller 2010; Birkholtz, 2011, 2013; Magoma 2011; Van Vollenhoven & Pelser, 2011; Van Vollenhoven 2012, 2014, 2015a, 2015b, 2017a, 2017b; Digby Wells 2013a, 2013b, 2016a, 2016b; Higgitt 2013, 2014a, 2014b; Pelser 2013a, 2013b; Seliane, 2013; Karodia, 2014; Van der Walt 2015; and
- Historical built environment resources, such as structural remains (stonewall structures, homesteads, farmhouses and functional structures) and structural complexes; middens and ash deposits (Huffman & Calabrese, 1996; Van Schalkwyk *et al* 1996; Van Schalkwyk 1997a, 1997b, 2002a, 2002c, 2003d, 2013; Huffman 1999; De Jong 2006, 2007; Pistorius 2007, 2008, 2011, 2012, 2013, 2016; Van der Walt 2007; Pelser & van Vollenhoven 2008; Miller 2010; Fourie 2010, 2012a, 2012b; Coetzee 2011; Van Vollenhoven & Pelser, 2011; Birkholtz, 2013; Digby Wells 2013a, 2013b, 2016a, 2016b; Higgitt 2013, 2014a; Pelser 2013a, 2013b; Seliane, 2013;

Karodia, 2014; Van Wyk, 2014; Kruger 2015; Coetzee & Behrens 2015; Van Vollenhoven 2015a, 2015b, 2017).

6.1.5 Recent History

From the 20th century, South Africa has been characterised by ethnic prejudices which were formalised into a system of racial segregation under Apartheid between 1948 and 1990. The so-called “Potato Boycott” is a notable event associated with this period, within the regional study area.

The African National Congress (ANC) approved the Potato Boycott, encouraging labourers and the public to boycott the purchase and consumption of potatoes from the farmers in the Bethal district. The protest was in reaction to investigations into exploitive, “slave-like” practices on farms within this area during the 1940s and 1950s. The investigations were led by Gert Sibande (a member and later the president of the ANC) and revealed instances of coercion and beatings of the labourers, the latter of which was sometimes fatal. The Apartheid Government launched their own investigations as a response to these allegations, although they were ultimately dismissed by H.F. Verwoerd. The Potato Boycott provided inspiration for a broader resistance movement against the Apartheid government (Holden & Mathabatha, 2007). A monument to Gert Sibande was erected in Bethal town to commemorate his contribution to the Potato Boycott and to the ANC.

6.2 Site-specific and development footprint study area

6.2.1 Current natural environment

The site-specific study area falls into the Mesic Highveld Grassland Bioregion of the Grassland Biome (Mucina & Rutherford, 2010). Within the Grassland Biome, this bioregion is the largest, and includes the largest number of species. Within the Mesic Highveld Grassland Bioregion, the site-specific study area is located within the Eastern Highveld Grassland (Unit Gm 12). This unit is characterised by short, dense grassland dominated by Highveld grasses (various species within the *Aristida*, *Digitaria*, *Eragrostis*, *Themeda* and *Tristachya* genera). Small rocky outcrops with species of sour grass and some woody species (including *Acacia caffra*, *Celtis africana*, *Diospyros lycoides* subspecies *lycoides*, *Parinari cepenses* and *Sersia magalismontanum* as well as several *Protea* species) break up the Highveld grass cover on the landscape. This grassland unit is considered endangered.

The natural vegetation of the site-specific study area has been disturbed in varying degrees by human activities. The land use is predominantly agriculture (primarily maize and cattle) and mining activities associated with the Matla and Kriel Power Stations near to the site-specific study area.

6.2.2 Site-specific geological and palaeontological context

As introduced in Section 6.1.1 above, the regional study area is primarily underlain by lithologies associated with the Eccca Group within the Karoo Supergroup. Formations within the Eccca Group include:

- The *Pietermaritzburg Formation*, which rarely forms good outcrops and fossils are rare and difficult to find. This formation is of moderate palaeontological sensitivity;
- The *Vryheid Formation*, which is the main coal-producing formation in South Africa. This formation has produced a number of fossils, including extensive *Glossopteris* assemblages. Other fossils reported from this formation include: trace fossils, rare insects, possible conchostracans (bivalve crustaceans and shrimp clams, which are presently still extant), non-marine bivalves and fish scales; and
- The *Volksrust Formation*: monotonous sequence of grey shale. Fossils are significant but rare and include: temnospondyl amphibian remains, invertebrates and minor coal with plant remains, petrified wood and trace fossils assemblages (Groenewald & Groenewald, 2014).

The site-specific study area is associated with Karoo dolerites and the *Vryheid Formation* (Rubidge, 2008; Rubidge, 2013a; Rubidge, 2013b). The Karoo dolerites are intrusive diatremes⁹ classified as plutonic igneous rocks. These features include no fossiliferous material and their palaeo-sensitivity is negligible (Rubidge, 2013a; 2013b; SAHRA, 2013a; 2017). The Karoo dolerite suite is therefore considered no further in this report.

The *Vryheid Formation* has a very-high palaeo-sensitivity (SAHRA, 2013b; 2017) and is the primary potential fossil-bearing layer underlying the site-specific study area. The formation corresponds to the basal unit of the Eccca Group, which was deposited roughly 180 mya in a deltic¹⁰ environment. Shales, sandstones, mudstones and coal feature all constitute this formation (Bamford, 2016).

Coal is formed through the compression and heat alteration of plant matter. During the formation of coal, alteration happens to such an extent that potential plant fossil remains are no longer recognisable. The shales between the coal horizons, however, have the potential to preserve very good examples of plant fossils (Bamford, 2014; 2016). To a lesser extent, the sandstone surface outcrops may also preserve fossil plants. Common fossil plants that could be expected within the *Vryheid Formation* include *Glossopteris* leaves, roots and inflorescences; and *Calamites* stems. These potential plant fossils are illustrated in Figure 6-6. Coal deposits can potentially also include fossils of mammal-like reptiles and mammals. These are however, rarely, if ever, preserved with plant fossils (Bamford, 2012; 2016).

⁹ These formations are created when rising magma comes into contact with groundwater, which potentially results in gaseous explosions and a volcanic 'pipe' (diatreme).

¹⁰ This occurs when lithologies are deposited onto an alluvial plain through river action.

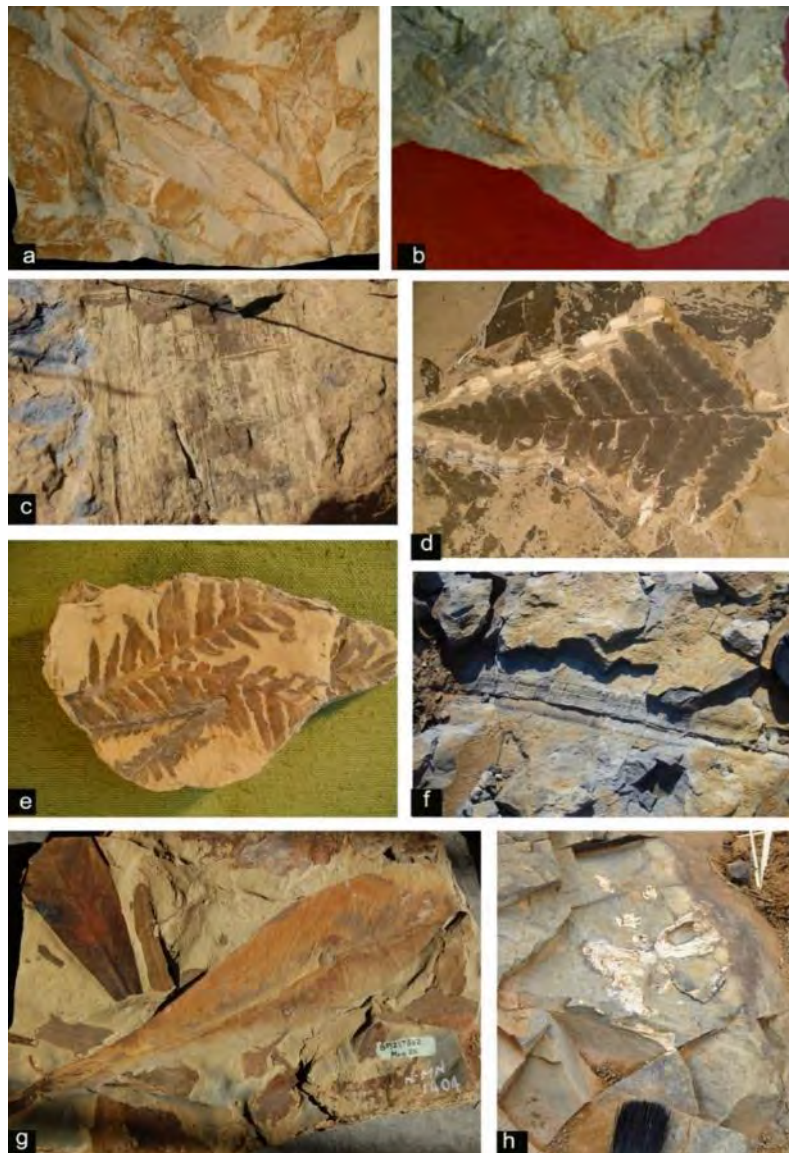


Figure 6-6: Composite of possible Karoo-aged fossil plants that may be identified within the site-specific study area (Bamford, 2016)

6.2.3 Site specific cultural heritage baseline

A Heritage Site Management Plan (HSMP) was developed for a single grave identified within the boundaries of Mine 2. The grave belongs to Helena Booyens (1852-1934). The grave is located on the farm Rietvlei 62 IS Portion 3 (within the ELM area). The HSMP aims to mitigate or avoid negative impacts on the *in situ* grave that may be caused by various mining activities undertaken within Mine 2, most notably potential subsidence caused by the total extraction mining method used at the site.

A survey undertaken by Van Vollenhoven (2012; 2014)¹¹ included areas of development for the Matla Coal Mine project area, across an area of approximately 22 000 ha. The survey identified 31 sites within the Matla MRA, as illustrated in Figure 6-7. These include:

- A Battlefield (1 record);
- Burial Grounds and Graves (26 records); and
- Historical Built Environment sites (4 records).

Burial grounds were most commonly recorded heritage resource within the site specific study area, accounting for 83.9% of all sites. In terms of sites representing the historical built environment, structural complexes (i.e. *werwe*) are the most common. No Stone Age accumulations have been recorded in the Matla MRA to date.

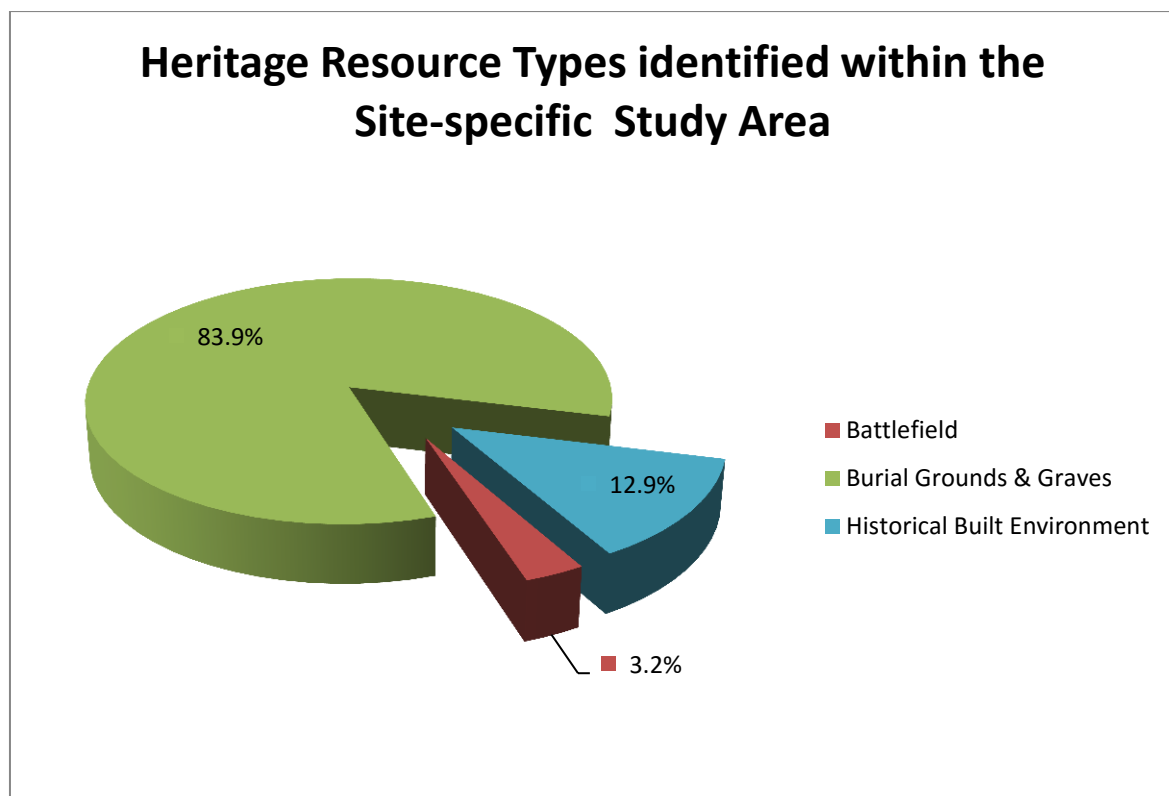


Figure 6-7: Heritage resource types previously identified within the Matla MRA

The battlefield identified by Van Vollenhoven relates to the Battle of Bakenlaagte. The Battle of Bakenlaagte was the climax to a series of events and occurred within 20 km of the site-specific study area.

Lieutenant Colonel George Benson's No. 3 Flying Column moved from the farm Syferfontein, marching north-west to the Bakenlaagte farmstead, where they intended to camp. The advance guard reached the farmstead and set up the camp, but by midday, the

¹¹ SAHRIS Case ID 102

rear-guard had been hampered by unfavourable weather and were still some distance away from the farm. General Botha of the Boer commando and his 800 reinforcements planned to attack Benson's Column and this division of the force provided the Boers with an advantage. Outnumbered four to one, the Boers decimated the rear-guard in a gun battle that lasted just 20 minutes; but the attack did allow the main column to deploy and set up a defensive perimeter. This perimeter prevented the Boers from capturing the main column as they had envisaged and the Boers left with what spoils they could. The British transported their 134 wounded to the entrenched camp during the night (Pakenham, 1979; Willsworth, 2006; Wessels, 2010; von der Heyde, 2013). British losses included at least 66 dead, 120 were taken prisoner and the loss of two British guns. Boer casualties included at least 52 who were killed or wounded (Wessels, 2010). Figure 6-8 presents a plan of the battle.

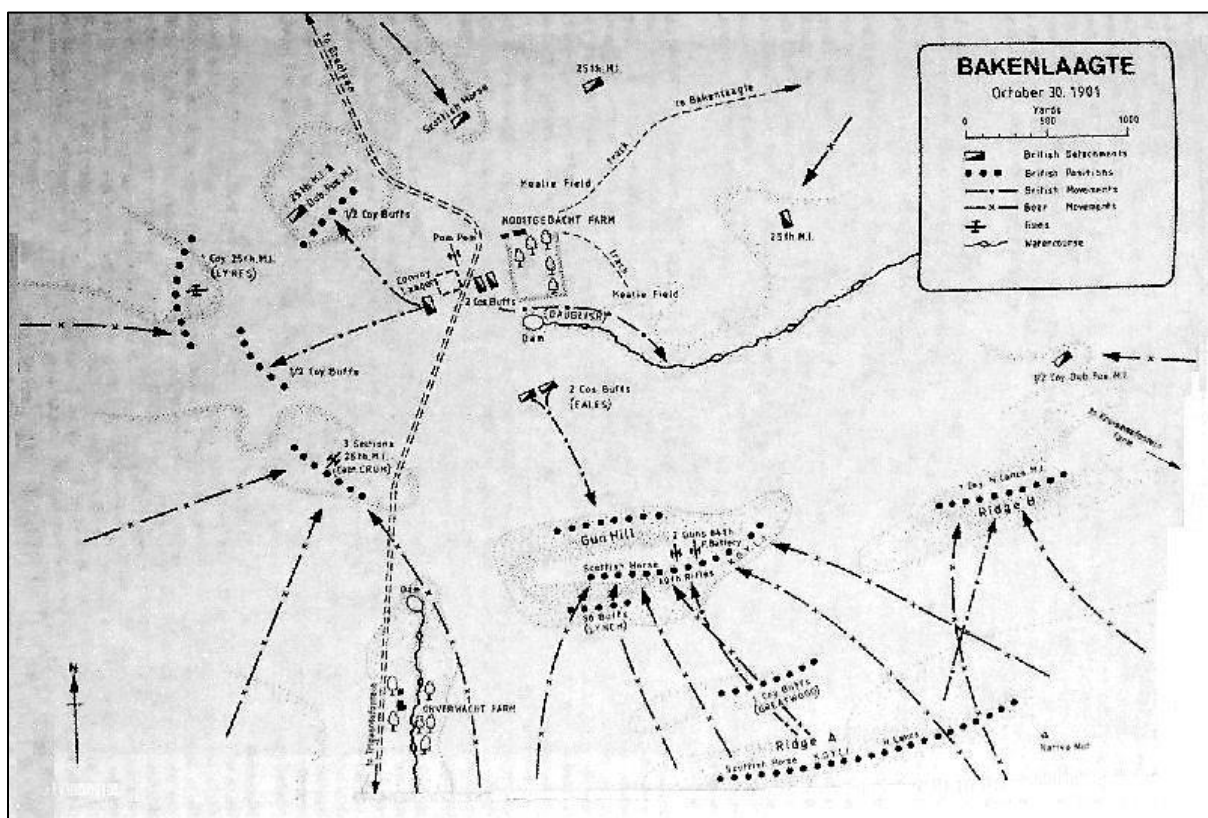


Figure 6-8: Plan of the Battle of Bakenlaagte (Price, 1992)

6.2.4 Results of the field survey

Table 6-4 lists the heritage resources that were identified during the pre-disturbance survey undertaken during November and December 2017. A full list of all the relevant heritage resources identified within the site-specific study area through these and previous surveys is included in Appendix C. Figure 6-9 provides some examples of the types of heritage identified in the survey.

Table 6-4: Heritage Resources identified through the pre-disturbance surveys

Site Name	Latitude	Longitude	Description
11829/BGG-001	-26.2093260	29.1011310	3 potential unmarked graves (piles of soil and brick, covered in vegetation) near occupied houses and a rubbish heap.
11829/BGG-002	-26.2100440	29.0501820	Burial ground with 24 visible graves demarcated by a wire fence with a gate. Graves have cement headstones with and without cement fittings and granite headstones and fittings. Surnames identified include: Mahlangu, Radebe, and Mtshweni and what may be Skozana and legible dates ranged from 1952-2001. Large exotic plants growing in graveyard. Some headstones have fallen over
11829/BGG-003	-26.2110090	29.0502720	Burial ground within sight of BGG-002; also demarcated by a fence and with large exotic plants (overgrown). Three graves are visible, but it is likely that there are more (overgrown and lots of space in the fenced off area). No writing was legible on the headstones (cement). Not as well maintained as BGG-002
11829/BGG-004	-26.2103670	29.0544550	Single grave, which is the focus of the Digby Wells HSMP compiled for Exxaro Matla (Du Piesanie, 2017a).
11829/BGG-005	-26.2288440	29.0502230	Single grave with a cement headstone which has been weathered slightly and is difficult to read, but may read: GAMEISISBAN and 1994. The grave is within a maize field and a small buffer has been left uncultivated around it.
11829/BGG-006	-26.2575190	29.0399710	Burial ground with two graves, one of which is a double-grave with a granite headstone and fittings belonging to the Marthinus family. Both interred passed away on the same day in 1952. The single grave has a marble headstone, with the surname Meyer and dates to 1927. The graves used to be enclosed by a wire fence, which has since fallen away. [102/Site 7: reported only the Meyer surname].
11829/BGG-007	-26.2536389	29.0420556	Burial ground surrounded by a wire fence including 16 visible graves and potentially four more (which may



Site Name	Latitude	Longitude	Description
			be marked by metal plates/boards within enclosed area). Cement headstones with or without fittings and granite headstones. The graveyard is fairly overgrown, although some graves have been cleared. Identified surnames include: Mathebe, Shoba, Kabini, Tshoba, Mahlangu and Ntuli. Dates range from 1962-1981, although many are illegible. One grave may potentially be a double grave. [102/Site 6: grave includes at least 28 graves and oldest date is 1965]
11829/BGG-008	-26.3185820	29.1201800	Burial ground with 9 visible graves, two of which are double graves. Both double graves belong to the Van den Berg family (1943 and possibly 1953) (1913 and 1932). The graveyard is surrounded by a wire fence and (open) gate. Another double grave belongs to the Van der Heever family (2002) and is the only grave not belonging to the Van den Berg family. Dates range from 1913 to 2002. All headstones are marble or granite and some are very ornate. [102/Site 21: oldest date is 1943, not 1913].
11829/BGG-009	-26.3379470	29.1692540	Graveyard including 9 graves with marble and cement headstones and fittings. 1 headstone was damaged by a fallen tree and may potentially be a double grave. Surnames identified include: Geldenhuys, Van Wyk, Van den Berg and Oosterhuis and dates range from 1915 and 1952. The graveyard was demarcated by a wire fence with a gate, which has since fallen away.
11829/BGG-010	-26.3192890	29.1216430	Single burial with a cement headstone and brick dressing and two more burials surrounded by brick and soil. The writing on the cement headstone is barely legible and appears to date to either 1912 or 1942. The graves are not demarcated or fenced off and are between a fence-line and a farm-road. One of the unmarked graves has been disturbed by erosion (or the soil has been replaced over the grave). Visible from BGG-011.
11829/BGG-011	-26.3192620	29.1219400	Appears to be a grave of heaped soil and brick/stone with no headstone in a void within a maize field. Visible from BGG-010.
11829/BGG-	-26.2788470	28.9795010	Graveyard with six visible graves and two more



Site Name	Latitude	Longitude	Description
012			potential headstones and one potential unmarked grave. Graves have granite headstones and fittings, cement headstones and fittings or just cement headstones. One grave was surrounded by a metal fence with a locked gate. Visible inscriptions included the surnames Kumalo and Mthombe and dates: 1958 and 1972. [102/Site 12: graveyard of at least 12 graves].
11829/BGG-013	-26.3589180	29.1239570	Two graves on the side of a (overgrown) farm road, not demarcated or surrounded by a fence. Both gravestones (and fittings) are made of cement. One headstone was not inscribed, but included an epitaph written using metal wire. The headstone was damaged and so the epitaph was only partially legible but looks to date to 1964. Small coloured marbles / rounded glass were added to the headstone and corners of the cement fittings. The other headstone was not legible. The area was very overgrown and could potentially include more graves.
11829/BGG-014	-26.2089940	29.0996840	Graveyard with 7 visible graves and another 3 possible graves (although there could potentially be more as the area is very overgrown). Not surrounded by a fence. The graves include: cement headstones, with or without cement or brick fittings and granite headstones and fittings. Inscriptions include: Ncema (or Ngema), Mashiane, and Defries and dates range from 1979-1987, although not all dates were legible. 3 graves were protected by wire fencing, which has since fallen away.
11829/BGG-015	-26.2753690	29.0962890	Single (double) grave belonging to the Robertson family ('vader' and 'moeder' – father and mother in German or Afrikaans). Dates to 1958 and 1973. Headstone and fittings are marble and the grave is protected by a strong fence.
11829/BGG-016	-26.3101890	29.1099680	Burial ground with two sections - one fenced and one section unfenced. The graveyard includes a total of approximately 155 identified graves (51 in the unfenced section and 104 in the fenced section) as well as 16 additional potential graves (7 unfenced and 9 fenced). These potential graves include areas which



Site Name	Latitude	Longitude	Description
			have been fenced off (double or single graves) with no headstone or visible signs of burial. A tree has fallen over in the unfenced section which could be obscuring more potential graves. Graves are marked by cement headstones with or without cement or brick fittings, granite headstones and fittings, a stone/brick headstone only or with a metal cross and heaps of stone and soil. Many headstones have fallen over. Includes child graves. Surnames identified outside the fenced-off area include: Sebande (and Sibande), Tholo, Dube, Masuku, Kuken and Mbonani. Dates range from 1963 to 1989, although many are not legible. Within the fencing, graves were marked by granite headstones with granite or cement fixings, cement headstones with or without cement fixings, cement headstones with cement slabs, stone/brick headstones or heaps of stone or brick and soil. Surnames identified here include: Mahlangu, Motau, Mthombeni, Sithole, Masimula, Dlamini and Mthimunya. Dates range from 1920 to 2004. The Mthimunya (1969) grave was at a 90 degree angle to the other graves.
11829/BGG-017	-26.2340550	29.1031980	Graveyard of 9 visible graves, potentially with one more grave (although the site is overgrown and there may be more graves). The site is at the intersection of some fences but is not bounded by fences. Graves are marked by cement headstones with cement slabs or cement or brick fittings, or a stone headstone (marker). Only one surname (Dinamsweni) was legible; no dates were legible. Some headstones have fallen over.
11829/BGG-018	-26.2939800	29.1510740	Graveyard of 13 graves and one potential additional grave. The graves are marked by cement headstones and fittings, granite headstones and fittings and a metal marker with brick fittings. There is potentially one burial marked with a heap of soil and brick/stone. Two surnames were identified: Sibiya (or Sibija) and Tsale. Dates range from 1924 to 1979. Includes child burials. The graveyard was demarcated with a fence, which has since fallen away.
11829/BGG-	-26.2969650	29.1469700	Three graves bounded by a fence which is starting to



Site Name	Latitude	Longitude	Description
019			rust away, in the middle of a field. The vegetation is very overgrown. The only name and date legible was that of Du Toit (1891). [102/Site 18: noted Oosthuysen and 1933]. All three headstones are cement, with cement fittings.
11829/LFC-001	-26.2721610	28.9658610	Pile of stone that suggests it is collapsed stone walling near a maize field.
11829/STE-001	-26.2594680	29.0400160	Very close to WF-001 (and therefore a historical layering point). Two small structures (one may be a pump house, the other is not known) remain inside an elaborate gate with the remains of an intercom system. Some building rubble. Age unknown
11829/STE-002	-26.3385570	29.1680250	Small building with the roof missing. The structure includes two rooms (with no communication between), two doors leading outside and one window with metal bars (no glass). There is some collapse of the outer walls. 4 concrete pillars (with some wire remaining) surround the structure.
11829/STE-003	-26.3384220	29.1673210	Large stone structure with no roof and some collapse. Structure includes four 'rooms' (including a 'courtyard') with several doorways/entrances and one room has three windows (no other rooms have windows). Two of the rooms have long concrete slabs with several metal rings embedded in the concrete and three metal rings were embedded in the wall of the courtyard at different heights. A brick ramp-type inclined structure is nearby, between this structure and STE-002. A small structure in a state of disrepair was constructed of the same, or similar, material and so may be associated as well. Near a historical layering waypoint.
11829/STE-004	-26.3383960	29.1668440	Two buildings in a state of disrepair. Both structures are missing their roofs and have some wall collapse. Some corrugated iron lean-tos / informal structures have been attached to the outer walls of the larger building, which is used for storing refuse. The larger structure has an electrical box and so may be recent. Near a historical layering waypoint (same as STE-003).



Site Name	Latitude	Longitude	Description
11829/STE-005	-26.2773200	28.9821190	Foundations of a long and narrow rectangular structure very near to WF-005 (may be associated). The structure is made of stone and cement, with some metal pieces and metal rings embedded in the cement. Four short walls remain in a small square and there are five visible post holes around the one wall of this small square.
11829/STE-006	-26.3191790	29.1580380	Bakenlaagte farmhouse (belonging to and occupied by Mr. JH Jacobs and his family). Mr. Jacobs confirmed the farmhouse was approximately 100 years old, having been built shortly after the South African War.
11829/STE-007	-26.3134030	29.1075050	Remains of a one-roomed structure with the roof missing and two walls collapsed.
11829/WF-001	-26.2589990	29.0399710	Remains of a farmhouse and associated outbuildings (milking shed/barn, troughs, another building and two possible reservoirs). The house is in good condition with some windows with glass still in them and others which have been broken. The doors all appear to have been plastered up. Surrounded by wire fence and (locked) gate. Age unknown, but close to historical layering point and so may be older than 60 years.
11829/WF-002	-26.2633650	29.0394640	Farmhouse and associated outbuildings. The farmhouse is in the process of being demolished and looks to be raided for bricks. An abandoned caravan parked behind the building suggests the structure was recently abandoned. Water tanks, outbuildings and a gate remain, marked with caution tape.
11829/WF-003	-26.3194760	29.1192060	Remains of a farmhouse with a pump house and water pump nearby. The farmhouse is still standing and is in fairly good condition, and still has its roof. There is some building rubble in the "yard". Some windows of the farmhouse are covered with corrugated iron.
11829/WF-004	-26.2764570	28.9815780	Abandoned farmhouse/barn with outbuildings, including another structure, remains of what appears to be 4 brick pillars and 4 silos. The ages of the



Site Name	Latitude	Longitude	Description
			buildings are unknown, but '1949' is written into the cement of one of the silos. There are rubbish heaps over the site and the silos are also being used as refuse storage. The additional structure is a four-roomed structure with a chimney and "Room 1" written above the lintel. Both structures still have their roofs and show no collapse. Two small brick squares occur between the structure and the silos.
11829/WF-005	-26.2433620	29.0023610	Farmhouse near to historical layering waypoint that is currently occupied. The farmhouse was therefore observed from a distance but appears to be in a good condition (roof and walls intact, some windows covered with corrugated metal). Another structure lies in ruins near the farmhouse and there appears to be a pump house as well.
11829/WF-006	-26.3176240	29.1598700	Outbuildings (including a wagon house and what may have been a pig sty) associated with the Bakenlaagte farmhouse, although Mr. Jacobs did not know the age of the buildings (younger than the farmhouse). The outbuildings are historical (the wagon house matches historical layering). The wagon house and the piggery are in good condition; there are some small structures that are also in good condition but are being used for refuse storage (intended function unknown). There is also a water pump and silo.



Figure 6-9: Examples of identified heritage resources

7 Impact Assessment

7.1 Cultural significance of the identified landscape

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, HRM acknowledges that these have lasting worth as evidence of the origins of life, humanity and society. Notwithstanding the inherent value ascribed to heritage, it is incumbent of the assessor to determine resources significance 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.

This section presents a statement of cultural significance as relevant to the newly identified heritage resources and greater cultural landscape of the site-specific study area. The statement of significance considers the identified heritage resources and landscape

importance or contribution to four broad value categories: aesthetic, historical, scientific and social values, to summarise the CS and other values described in Section 3(3) of the NHRA.

Three categories of heritage resources were recorded during the field survey of the Matla Coal Mine site-specific study area. These comprised:

- Archaeological – LFC (1 record);
- Burial grounds and graves (19 records); and
- Historical built environment (13 records).

The assessment of the CS and Field Ratings demonstrated that the identified have a CS designation ranging from negligible to very-high. A summary of this is presented in Table 7-1. Sites of the same type that share the same CS have been grouped together in terms of the impact assessment presented in Section 7.2.

Table 7-1: CS and Field Ratings of newly identified heritage resources within the Matla Coal Mine site-specific study area

Resource ID	Type	Description	Aesthetic	Historic	Scientific	Social	INTEGRITY	VALUE	Designation	Recommended Field Rating	Field Rating Description	Recommended Mitigation
VRYH	Geological	<i>Vryheid Formation</i>	- This geological formation was not assessed against aesthetic criteria as defined in Section 3(3) of the NHRA.	- This geological formation was not assessed against historic criteria as defined in Section 3(3) of the NHRA.	5 The fossils within this palaeontologically sensitive formation potentially provide significant scientific information and are considered rare heritage resources.	-- This geological formation was not assessed against social criteria as defined in Section 3(3) of the NHRA.	4 The integrity of the formation is considered to be excellent with both tangible and intangible fabric preserved.	20	Very High	Grade I	Heritage resources with qualities so exceptional that they are of special national significance.	A fossil finds procedure must be developed and included in the consolidated EMP (See Section 10)
BGG-001	Burial / grave	Burial Grounds & Graves	- Burial grounds and graves were not assessed against aesthetic criteria as defined in Section 3(3) of the NHRA.	- Burial grounds and graves were not assessed against historic criteria as defined in Section 3(3) of the NHRA.	- Burial grounds and graves were not assessed against scientific criteria as defined in Section 3(3) of the NHRA.	5 Burial grounds and graves have specific connections to communities or groups for spiritual reasons. The significance is universally accepted.	4 The integrity of burial grounds is considered to be excellent with both tangible and intangible fabric preserved.	20	Very High	Grade I ¹²	Heritage resources with qualities so exceptional that they are of special national significance.	Project design must change to avoid the resource completely where possible. A Burial Grounds and Graves Consultation (BGCC) and Grave Relocation Process (GRP) may be necessary. Resources within the 15m buffer zone must be incorporated into the HSMP.
BGG-002												
BGG-003												
BGG-004												
BGG-005												
BGG-006												
BGG-007												
BGG-008												
BGG-009												
BGG-010												
BGG-011												
BGG-012												
BGG-013												
BGG-014												

¹² Field ratings considered the assigned CS and the level of official management required or the local competency of heritage authorities. Currently the MPHRA is only competent to manage and issue permits on NHRA Section 34 heritage resources, and no local (i.e. local government) competency exists within the province. All decisions relating burial grounds and graves therefore fall under the ambit of SAHRA.

Resource ID	Type	Description	Aesthetic	Historic	Scientific	Social	INTEGRITY	VALUE	Designation	Recommended Field Rating	Field Rating Description	Recommended Mitigation
BGG-015												
BGG-016												
BGG-017												
BGG-018												
BGG-019												
STE-003	Site	Historic Built Environment	2 This historic structure, in comparison to other examples in the study area, exhibits superior aesthetics and technical skill for the particular period it was constructed.	4 The site, based on aesthetic criteria, is assumed to date to the early settlement of the region and may be affiliated with events associated with the Battle of Bakenlaagte.	2 This structure has some information potential, but this will require investigation. Some encroachment on setting has been noted.	3 This resource has the potential to be important to communities across South Africa.	3 The structure is fairly well preserved with some meaning evident. There is some (limited) encroachment.	8	Low	General Protection IV B	Resources under general protection in terms of NHRA sections 34 to 37 with Low significance.	Project design must change to avoid the resource. If this is not possible, the resource must be fully recorded, including detailed site mapping and surface sampling if necessary, before destruction.
BKLG	Battlefield	Battle of Bakenlaagte	- The battleground was not assessed against aesthetic criteria as defined in Section 3(3) of the NHRA.	4 The battlefield, as a part of the South African War, must be considered at national level. This is the only battlefield in the local area.	2 There is some information potential and evident meaning; however the site has been encroached upon.	4 This Battle contributes to the history of South Africa and should be considered at the national level having specific associations to communities for cultural reasons.	2 The site has been encroached upon, however, there is still meaning and information potential.	7	Low	General Protection IV B	Resources under general protection in terms of NHRA sections 34 to 37 with Low significance.	Project design must change to avoid the resource. Where this is not possible, rehabilitation of the subsidence area associated with the Battle of Bakenlaagte must aim to minimise the visual impact to retain the 'sense-of-place'
LFC-001	Feature	Late Farming Community	1 The feature demonstrated aesthetic principles that are common and well represented throughout South Africa.	2 The feature is generally well-represented but in the context of the site-specific study area displays superior qualities.	1 The feature demonstrates limited information potential and is better represented elsewhere.	3 The feature may be associated with specific groups that may attribute meaning to the tangible remains for social or cultural reasons.	2 The fabric of the feature is partially intact with encroachment on the setting.	4	Negligible	General Protection IV C	Resources under general protection in terms of NHRA sections 34 to 37 with Negligible significance.	Sufficiently recorded, no mitigation required.
STE-001	Site	Historic Built Environment	1 These structures	2 Some of the	1 These sites	3 Some of the	2 These structures	4	Negligible	General Protection	Resources under general	Sufficiently recorded, no mitigation required

Resource ID	Type	Description	Aesthetic	Historic	Scientific	Social	INTEGRITY	VALUE	Designation	Recommend ed Field Rating	Field Rating Description	Recommended Mitigation
STE-002												
STE-004												
STE-005												
STE-006												
STE-007												
WF-001												
WF-002												
WF-003												
WF-004												
WF-005												
WF-006												

7.2 Heritage Impact Assessment

The assessment of potential impacts to heritage resources considers the aforementioned activities associated with the Project, specifically all undermining processes. The proposed mining methodologies will occur at sub-surface levels and no mining activities will occur on the surface. High-extraction mining increases the risk of subsidence during the operation and decommissioning phases. This risk is intrinsically linked to the depth at which the coal will be extracted.

The following heritage resources were identified directly above and within a 15 m buffer of the proposed mining areas:

- Burial Grounds and Graves: BGG-003, BGG-004, BGG-005, BGG-008, BGG-009, BGG-010, BGG-011, BGG-013 and BGG-017; and
- Historic Built Environment: STE-002, STE-003, STE-004, STE-005, STE-006 and STE-007; and WF-002, WF-003, WF-004 and WF-006.

These resources are at risk of negative impacts from Project activities. These impacts are discussed in this section.

The following heritage resources were identified outside the 15m buffer of the proposed mining areas:

- Burial Grounds and Graves: BGG-001, BGG-002, BGG-006, BGG-007, BGG-012, BGG-014, BGG-015, BGG-016, BGG-018 and BGG-019;
- Historic Built Environment: STE-001 and WF-001 and WF-005; and
- LFC: LFC-001.

It is envisaged that undermining activities as proposed by Exxaro will cause no impact on these heritage resources and therefore these resources will not be considered further in this assessment.

The SAHRA Minimum Standards recommend that heritage resources with negligible CS require no mitigation and their inclusion into an HIA report is considered to be sufficient in terms of recording these resources. Their inclusion into Table 6-4 (and the site list in Appendix C) is considered sufficient to meet these requirements. To this effect, the LFC stonewalling and historic built environment resources, with the exception of STE-003, are considered no further in this assessment. Similarly, BGG-004 will not be considered further as the heritage resource was subject to an HSMP.

7.2.1 Burial Grounds and Graves within the buffer

Burial Grounds and Graves identified within the 15m buffer of proposed mining areas may be negatively impacted by subsidence in the operation and decommissioning phases of the Project. Burial grounds with multiple graves, namely BGG-003 and BGG-009, could be damaged by subsidence cracks and sudden changes to the topography.

Table 7-2 presents a summary of the potential direct impact to these heritage resources.

Table 7-2: Summary of the potential direct impact to Burial Grounds and Graves

IMPACT DESCRIPTION: Direct impact to burial grounds and graves (15m buffer)				
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Permanent (7)	Unmitigated change will result in permanent damage to the heritage resource.	Consequence: Extremely detrimental (-21)	Significance: Major - negative (-126)
Extent	International (7)	Damage to these resources could potentially have an international effect in terms of Exxaro's reputation (which could have a knock-on effect in terms of investment). The NoK could potentially reside in neighbouring countries		
Intensity x type of impact	Extremely high - negative (-7)	Damage would constitute a major change to resource of Very High CS		
Probability	Highly probable (6)	Without the implementation of mitigation or management measures, it is highly probable that these resources will be damaged by subsidence		
MITIGATION:				
<p>The project related mitigation must aim to amend the project design to avoid the potential negative impact to the heritage resources. Where this is not feasible based on the current mining operations and location of the mineral resources, heritage related mitigations must be employed.</p> <p>Heritage related mitigations include:</p> <p>Identified heritage resources must be subject to detailed land survey recording to determine precise location in relation to proposed undermining areas. Where it is determined that negative impact</p>				

IMPACT DESCRIPTION: Direct impact to burial grounds and graves (15m buffer)

Dimension	Rating	Motivation
<p>manifestation is certain, mitigation measures in accordance with the requirements of the NHRA and NHRA Regulation, 2000 (GN R 548) will be required. These may include a Burial Grounds and Graves Consultation (BGGC) and Grave Relocation Process (GRP) in accordance with Section 36 of the NHRA and Chapter IX and XI of the NHRA Regulations;</p> <p>Where it is determined that the negative impact may not manifest, the heritage resources must be incorporated into the developed HSMP and be subject to the same requirements encapsulated therein.</p> <p>The determination of the precise location of these resources must be done prior to undermining activities to allow for sufficient time to undertake the necessary management and mitigation measures within the regulated timeframes.</p>		

POST-MITIGATION

Duration	Beyond project life (6)	If the mitigation measures are put into place, specifically relocation of the graves, the effects will continue after the Project is complete.	Consequence: Highly detrimental (-15)	Significance: Negligible - negative (-15)
Extent	Municipal Area (4)	If graves are relocated, they will be relocated to municipal graveyards.		
Intensity x type of impact	High - negative (-5)	Relocation would constitute a minor change to a resource of Very High CS.		
Probability	Highly unlikely (1)	If relocated, there will be no further impact on the heritage resources from any Project-related activities.		

7.2.2 Historical Built Environment: STE-003

STE-003 is a historical resource of low CS. This site has been assigned a CS greater than that of the remaining structures and *werwe* for its potential link to the Battle of Bakenlaagte, the location of which has been recorded in the site-specific study area.

As the battle and associated events took place over a large area, and no feature of the battle itself remains, it is not possible to delineate the exact extent of the site. What is known is the battle and associated events covered many of the present farms in the site-specific study area.

STE-003, a structure older than 60 years and possibly dating to the period of the South African War, may have links to the Battle of Bakenlaagte. The veracity of this assumption, however, will require further investigation. The structure is on the farm Kruisementfontein 95 IS, which is adjacent to the farm Bakenlaagte 84 IS. Points where events associated with the battle were said to have taken place were noted on the farms Onverwacht 97 IS (roughly 3.5 km away from STE-003) and Schaapkraal 93 IS (roughly 6.3 km away) through consultation with the owners of these farms (refer to Section 9).

Outside the site-specific study area, structures on the farm Yzervarkfontein 140 IS (roughly 26 km from STE-003) were affected by events leading up to the battle, as well as the battle itself (Du Piesanie, 2017b). The original farmhouse belonging to Mr. D.J. Erasmus was burnt down during the war and his son, Lourens Erasmus, was killed in action during the Battle of Bakenlaagte. Nearby, the residence of Mr G. Hamman was set up as a field hospital for the treatment of British soldiers wounded in the skirmish leading up to the battle itself. Many farm buildings were destroyed as the colonel set buildings alight while retreating, before regrouping and moving on to Bakenlaagte.

It is therefore very likely that the occupants of STE-003 at the time of the Battle of Bakenlaagte would have been involved or impacted by the battle, even if the physical structure itself was not.

STE-003 has been identified at the surface above the future mining areas and as such, it is at risk of being damaged by subsidence. Table 7-3 summarises the potential direct impact on STE-003.

Table 7-3: Summary of potential direct impact to STE-003

IMPACT DESCRIPTION: Direct impact to STE-003				
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Permanent (7)	Any unmitigated change to STE-003 would be permanent.	Consequence: Moderately detrimental (-13)	Significance: Moderate - negative (-91)
Extent	Province/ Region (5)	This heritage resource will be changed, which may have an impact on the larger cultural landscape in the region		

IMPACT DESCRIPTION: Direct impact to STE-003

Dimension	Rating	Motivation		
		based on the potential affiliation with the Battle of Bakenlaagte.		
Intensity x type of impact	Very low - negative (-1)	Based on the defined criteria, any change to a heritage resource with low CS is considered to have a very low intensity.		
Probability	Certain (7)	STE-003 is directly above the proposed future mining area. If subsidence occurs, the site will be damaged.		

MITIGATION:

The project related mitigation must aim to amend the project design to avoid the potential negative impact to the heritage resources. Where this is not feasible based on the current mining operations and location of the mineral resources, heritage related mitigations must be employed.

Heritage related mitigations include:

Identified heritage resources must be subject to detailed land survey recording to determine precise location in relation to proposed undermining areas. Where it is determined that negative impact manifestation is certain, mitigation measures in accordance with the requirements of the NHRA and NHRA Regulation, 2000 (GN R 548) will be required. These may include a NHRA Section 34 Permit Application to MPRHA in accordance with Chapter III of the NHRA Regulations;

Where it is determined that the negative impact may not manifest, the heritage resource must be incorporated into the developed HSMP and be subject to the same requirements encapsulated therein.

The determination of the precise location of these resources must be done prior to undermining activities to allow for sufficient time to undertake the necessary management and mitigation measures within the regulated timeframes.

POST-MITIGATION

Duration	Beyond project life (6)	The structures will be preserved through record in completing a Section 34 permit application. While the physical structure will be gone,	Consequence: Moderately detrimental (-10)	Significance: Minor - negative (-70)
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IMPACT DESCRIPTION: Direct impact to STE-003				
Dimension	Rating	Motivation		
		records of the site will be available after the project life.		
Extent	Local (3)	The mitigation will only affect this heritage resource, although the information will add to the local cultural landscape		
Intensity x type of impact	Very low - negative (-1)	Based on the defined criteria, any change to a heritage resource with low CS is considered to have a very low intensity.		
Probability	Certain (7)	The resource will still be destroyed through Project activities; however, the information will be preserved in record.		

7.2.3 Battlefield associated with Battle of Bakenlaagte

The Battlefield associated with the Battle of Bakenlaagte is a heritage resource of low CS as no tangible remains of the event were identified in that location. The site, furthermore, cannot be accurately delineated, but covers a significant portion of the site-specific study area (and may extend beyond). This site is at risk of an indirect impact, i.e. degradation to the sense of place, as a potential result of subsidence. Subsidence will change the topography from its natural state to an undulating landscape of alternating areas of subsidence and where pillars remain. This change in topography will have a significant visual impact and will detract from the sense of place.

Table 7-4 summarises the potential indirect impact on this site.

Table 7-4: Summary of potential indirect impact to the Battle of Bakenlaagte site

IMPACT DESCRIPTION: Indirect impact to Battlefield (Battle of Bakenlaagte)				
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Beyond project life (6)	The impact will potentially be mitigated over time, as natural vegetation re-establishes itself.	Consequence: Slightly detrimental (-9)	Significance: Minor - negative (-63)
Extent	Limited (2)	The battlefield as such cannot be delineated and the subsidence will have a local impact.		
Intensity x type of impact	Very low - negative (-1)	Based on the defined criteria, any change to a heritage resource with low CS is considered to have a very low intensity.		
Probability	Certain (7)	The battlefield is directly above the PMA. If the landscape is destroyed or significantly altered, the sense of place will be degraded.		
MITIGATION:				
Rehabilitation of subsidence in the area associated with the South African War Battle of Bakenlaagte, should it occur, must aim to minimise the visual impact to retain the 'sense-of-place'. This may be achieved through landscape contouring to restore the impacted area to a natural topography profile.				
POST-MITIGATION				
Duration	Beyond project life (6)	The rehabilitated topography will remain beyond the project life	Consequence: Slightly beneficial (9)	Significance: Negligible - positive (27)
Extent	Limited (2)	It will be limited to areas of subsidence in the landscape associated with the battlefield.		

IMPACT DESCRIPTION: Indirect impact to Battlefield (Battle of Bakenlaagte)				
Dimension	Rating	Motivation		
Intensity x type of impact	Very low - positive (1)	Based on the defined criteria, any change to a heritage resource with low CS is considered to have a very low intensity.		
Probability	Unlikely (3)	Through implementation of the proposed mitigation measures, it is unlikely that the degradation of the sense of place will be as intense.		

7.3 Cumulative impacts on the cultural landscape

Cumulative impacts occur from in-combination effects of various impacts on heritage resources acting within a host of processes that result in an incremental effect. The importance of identifying and assessing cumulative impacts is that the whole is often greater than the sum of its parts. This implies that the total effect of multiple stressors or change processes acting simultaneously on a system may be greater than the sum of their effects when acting in isolation.

This Project in conjunction with other mining operations and planned developments in line with the strategic development plans for Mpumalanga requires consideration to identify the possible in-combination effects of various impacts to known heritage resources.

The following possible cumulative impacts of the Project have been identified:

Table 7-5: Summary of potential cumulative impacts

Type	Cumulative Impact	Direction of Change	Extent of Impact
Additive	The continued effects operational activities, i.e. underground mining activities, on the integrity of the various known heritage resources within the site-specific study area.	Negative	Site-specific
Additive Synergistic	Increased significance of remaining <i>in situ</i> archaeological sites and accumulations and historic built structures regardless of integrity within the greater local study area.	Negative	Local

7.4 Risks and unplanned events

This section considers the potential risks *to* protected heritage resources, as well as the potential heritage risks that could arise *for* Exxaro in terms of implementation of the Project. These two aspects are discussed separately.

The application to undertake high-extraction mining in addition to the current bord and pillar methodology increases the risk of subsidence, which is directly correlated to the depth of coal. Where Exxaro knowingly do not take proactive management measures and the identified risks as per Table 7-7 manifest, possible risks for Exxaro may include:

- Litigation in respect of Section 51 of the NHRA;
- Social repercussions; and
- Reputational risk.

A summary of the primary risks that may arise for Exxaro is presented in the following table:

Table 7-6: Identified heritage risks that may arise for Exxaro

Description	Primary Risk
Heritage resources with a high CS rating are inherently sensitive to any development in so far that the continued survival of the resource could be threatened. In addition to this, certain heritage resources are formally protected thereby restricting various development activities. Within the site-specific study area, these include one LFC site (protected by Section 35 of the NHRA), historical built environment resources (protected by Section 34 of the NHRA), and burial grounds and graves (protected by Section 36 of the NHRA).	Negative Record of Decision (RoD) and/or development restrictions issued by SAHRA and/or MPRHA in terms of Section 38(8).
Impacting on heritage resources formally and generally protected by the NHRA without following due process. Due process may include social consultations and/or permit application processes to SAHRA and/or MPRHA.	Fines Penalties Seizure of Equipment Compulsory Repair / Cease Work Orders Imprisonment

The identified risks to known heritage resources from subsidence may include damage and / or destruction. A summary of the potential risk to protected heritage resources is presented in Table 7-7.

Table 7-7: Potential risk to identified protected heritage resources

Phase	Activity	Risk	Potential Impact
Operational	Underground Mining: i.e. bord and pillar and stooping	Undermining methodologies may result in subsidence, which would affect heritage resources within a 15 m buffer of the development footprint. Considering the distribution of the identified heritage resources, those at the greatest risk of subsidence are presented in Table 7-8 against the current LoM plan.	Damage or destruction of NHRA Section 34 resources, i.e. structures and built environment resources older than 60 years.
			Destruction of or disturbance to NHRA Section 35 resources, i.e. archaeological and/or palaeontological resources.
			Damage or destruction of, and loss of access to, NRHA Section 36 resources, i.e. burial grounds and graves.
Decommissioning	Closure	Underground mining voids may result in subsidence, which could potentially affect the resources mentioned above.	Destruction or alteration of NHRA Section 34 resources, i.e. structures and built environment resources older than 60 years.
			Destruction of or disturbance to NHRA Section 35 resources, i.e. archaeological and/or palaeontological resources.
			Damage or destruction of, and loss of access to, NRHA Section 36 resources, i.e. burial grounds and graves.

Table 7-8 outlines the heritage resources that are at risk of possible subsidence in relation to the future mining period that presents the risk of subsidence. The heritage resources are illustrated in spatial relation to the future mining areas in Figure 7-1 below.

Table 7-8: Identified heritage resources at risk of possible subsidence

Future Mining Period	Heritage Category	Site ID	Description
April 2013 to March 2018	Burial Grounds & Graves	102/Site 5	Site described by Van Vollenhoven (2012): graveyard of at least 9 graves, the oldest of which dates to 1940.
		102/Site 17	Site described by Van Vollenhoven (2012; 2014)
		BGG-003	Graveyard of three visible graves with no legible dates, demarcated by a wire fence with a gate.
		BGG-005	Single grave with a weathered headstone which may be that of Gameisisban and which may date to 1994.
		BGG-008	Burial ground including 9 graves, two of which are double graves. Dates range from 1913 to 2002.
		BGG-010	Three burials, one of which has a headstone which is barely legible and may date to either 1912 or 1942. One grave has been disturbed by erosion.
		BGG-011	Appears to be a single grave marked by a heap of bricks and soil with no headstone.
	Historical Built Environment	WF-003	Remains of a farmhouse with a pump house and a water pump nearby.
		STE-007	Remains of a one-roomed structure with the roof missing and two walls collapsed.
April 2018 to March 2023	Burial Grounds & Graves	102/Site 25	Site described by Van Vollenhoven (2012): graveyard of at least 8 graves which date between 1981 and 1987.
		BGG-005	This resource is at risk of subsidence from the 2013-2018 future mining phase. This phase poses further risk to the resource: if

Future Mining Period	Heritage Category	Site ID	Description
			the resource was not impacted on in the previous phase, it may be now; if the resource has been previously impacted on, it may be further impacted in this phase.
	Historical Built Environment	STE-006	Bakenlaagte farmhouse, built shortly after the South African War and which is currently occupied by Mr. JH Jacobs and his family.
		WF-006	Outbuildings (wagon house and a possible pig sty) associated with the Bakenlaagte farmhouse. Age unknown but more than 60 years.
April 2023 to March 2028	Burial Grounds and Graves	102/Site 3	Site described by Van Vollenhoven (2012): graveyard of at least 30 graves. The earliest visible date on the headstones is 1942.
		102/Site 8	Site described by Van Vollenhoven (2012): graveyard of at least 40 graves. Legible dates range from 1972 and 1996.
		BGG-017	Graveyard of at least 9 visible graves. No dates were visible on the headstones.
	Historical Built Environment	WF/002	Remains of a farmhouse and associated outbuildings. The farmhouse is currently being demolished. Age of structure not known.
April 2028 to March 2033	Burial Grounds & Graves	102/Site 23	Site described by Van Vollenhoven (2012; 2014): graveyard of at least 41 graves which range in year from 1979 to 1997.
		BGG-009	Graveyard including 9 graves, which range in date from 1915 to 1952. The graveyard was demarcated by a fence, which has since fallen away.
		BGG-013	Very overgrown graveyard of at least two graves (but may include more). The one headstone was barely legible but appears to



Future Mining Period	Heritage Category	Site ID	Description
			date to 1964.
	Historical Built Environment	STE-002	Remains of a small building with two rooms. There is some exterior wall collapse and the roof is missing.
		STE-003	Large stone structure with no roof, four sections ('rooms') and some interior wall collapse. Appears to date to the South African War.
		STE-004	Two structures in disrepair. Both roofs are missing and there is some wall collapse in both buildings. The larger building is used for refuse storage.
		WF-002	This resource is at risk of subsidence from the 2023-2028 future mining phase. This phase poses further risk to the resource: if the resource was not impacted on in the previous phase, it may be now; if the resource has been previously impacted on, it may be further impacted in this phase.
April 2033 to March 2038	Burial Grounds & Graves	102/Site 22	Site described by Van Vollenhoven (2012; 2014): graveyard of at least 7 graves. The year was legible on only one headstone, which dates to 1938.
		102/Site 31	Site described by Van Vollenhoven (2014): graveyard of at least 17 graves, with no legible dates.
	Historical Built Environment	WF-004	Abandoned farmhouse/barn with outbuildings, including another structure with four rooms, collapsed brick pillars and what appear to be four silos, one of which has "1949" written into the cement.
		STE-005	Remains of a long, narrow, rectangular structure near WF-005 (may be associated).

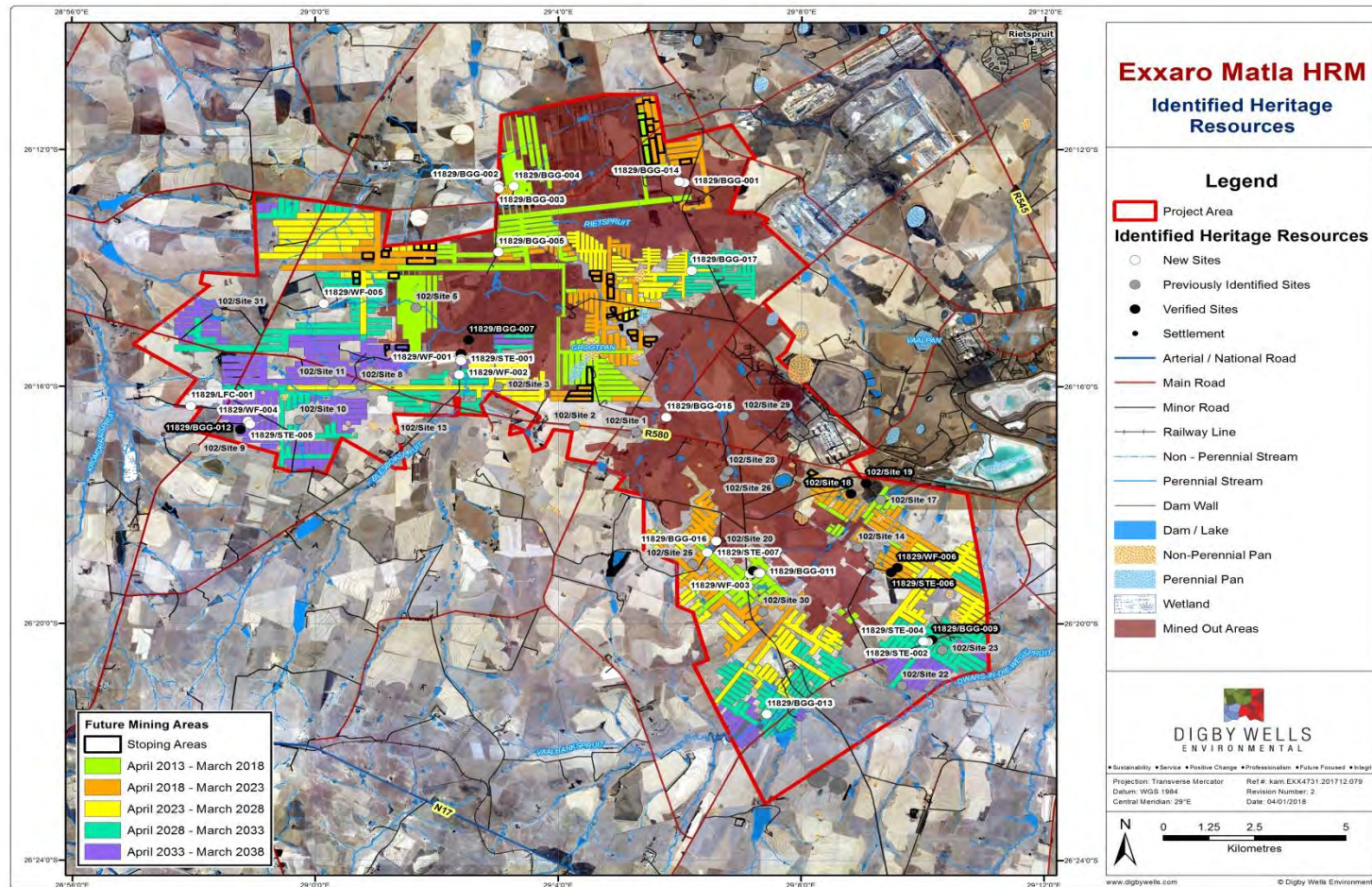


Figure 7-1: Identified heritage resources in relation to the future mining areas

8 Identified heritage impacts versus socio-economic benefit

The site-specific project area includes parts of both the GSDM and NDM in Mpumalanga. This section presents a summary of the information included in the Integrated Development Plans (IDPs)¹³ for both these district municipalities. Within these two district municipalities, the site-specific study area covers parts of the ELM, GMLM and VKLM. The latter local municipality, however, constitutes only a small portion of the local study area and no heritage resources were identified within this portion. Information relevant to the ELM and GMLM is presented here. Data from Statistics South Africa is also included here. These references are detailed in Section 12.

In GSDM in 2012, trade, community services and mining were the largest employment sectors (Gert Sibande District Municipality, 2017). In this same year, mining contributed 14.1% to the Gross Value Added by Region (GVA-R) for the municipality and employed 14.5% of the workforce. Mining is a significant contributor to the GVA-R of NDM, contributing 40.8% in 2015 (Nkangala District Municipality, 2017).

Within both GSDM and NDM, high rates of unemployment are a challenge (Statistics South Africa, 2011; Gert Sibande District Municipality, 2017; Nkangala District Municipality, 2017). GMLM has the largest population within GSDM (with 340 091 people living in the local municipality in 2016). This high population is due primarily to people moving into the local municipality in search of employment. The employment statistics within both district municipalities are summarised in Table 8-1 and Figure 8-1 below.

Table 8-1: Summary of employment statistics for GMLM and ELM (adapted from Statistics South Africa, 2011).

Population (2011)	GMLM (GSDM)		ELM (NDM)	
Total Population	294 538	-	395 466	-
Working Age (15-64)	204 409	69.4%	281 572	71.2%
Employed	99 138	48.5%	138 548	49.2%
Reported Unemployment Rate	-	26.2%	-	27.3%

¹³ (Gert Sibande District Municipality, 2017; Nkangala District Municipality, 2017).

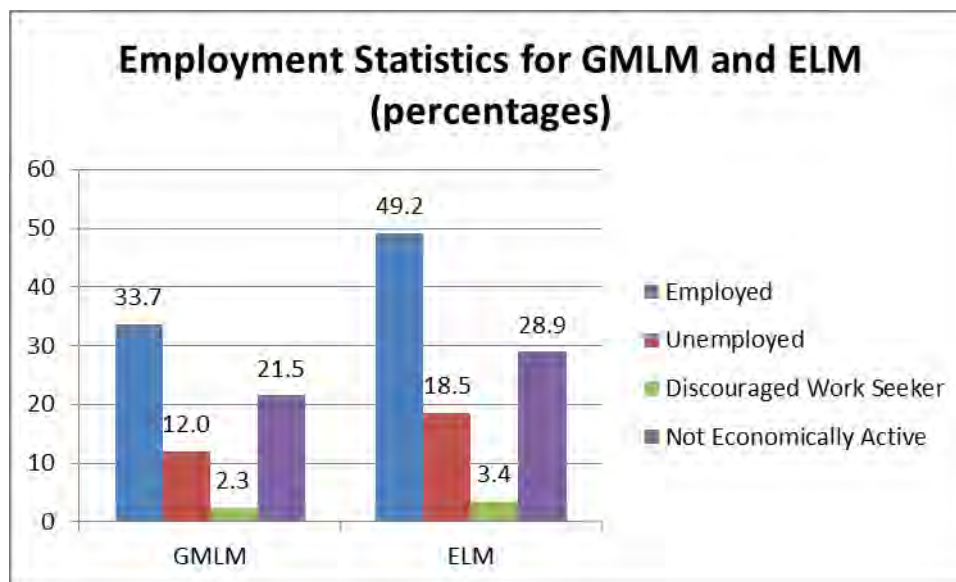


Figure 8-1: Employment statistics for GMLM and ELM as percentages (adapted from Statistics South Africa, 2011)

Unemployment is especially problematic within the working or economically active youth (i.e. members of the population aged between 15 and 34 years). Economic development and job creation are therefore major themes in the IDPs of both district municipalities. To this end, the aims and objectives of these IDPs include skills development and skills transfer in a number of outreach exercises to empower the youth and provide opportunities for employment. The strategy of the IDP for the GSDM includes partnerships with various stakeholders to respond to gaps in skills required by the growing regional economy. Within their Local Economic Development (LED) Unit, strategies to rectify unemployment by diversifying the economy through the promotion of agriculture, Small, Medium and Micro-Enterprises (SMMEs), co-operatives, Informal Traders and tourism.

NDM and GSDM both have strategies for increasing tourism to increase job opportunities. GSDM proposes to broadly visibly promote the tourism sector. The IDP developed by the NDM includes a more robust tourism strategy within the LED Unit. The strategy includes the development of NDM as a cultural, historic and political cluster, focusing on the Ndebele culture and associated heritage sites. The LED strategy also includes the creation of 'tourism belts' and 'culture-historic' routes in each of the municipal areas. The medium-term goal of the tourism strategy includes the implementation of basic conservation steps, including interpretive plaques, road signage and repairing fences. In this plan, local communities and schools may act as custodians to sites with these conservation measures in place.

The Matla Coal Mine provides coal for the Matla Power Station and so supports the national power grid. Electricity security falls within the National Development Plan as a milestone to "Produce sufficient energy to support industry at competitive prices, ensuring access for poor households, while reducing carbon emissions per unit of power by about one-third" by 2030 (National Planning Commission, 2012). Extending the LoM for Matla will therefore contribute to the national power grid and electricity security for an additional six years.

The extended LoM of the Matla Coal Mine will contribute to the economic development of the local study area and provide job security for an additional six years in a region with high unemployment. The Matla Coal Mine can further contribute to LED initiatives, such as skills transfer strategies and could potentially add to the cultural tourism plans out forward by the NDM. This could potentially be achieved, in consultation with local government, through supporting the medium-term goals of the NDM by assisting with the repair and maintenance of fences around burial grounds and graves within the site-specific study area and installation of commemorative plaques in the area associated with the Battle of Bakenlaagte.

Based on the review of the applicable planning documents and the motivation above, the potential socio-economic benefits that may result from the Project and the intended extension of the LoM for the Matla Coal Mine outweigh the identified impacts and risks to known heritage resources within the site-specific study area. This statement is supported by the following:

- Select identified heritage resources can be maintained *in situ*;
- Identified impacts and risks can be managed through the proposed recommendations;
- The Matla Coal Mine will contribute to the economic development of the GSDM and NDM;
- The Matla Coal Mine can contribute to local LED initiatives; and
- The extraction of coal and subsequent supply to the Matla Power Station will contribute to the national electricity grid and support power security.

9 Consultation

The consultation process affords Interested and Affected Parties (I&APs) opportunities to engage in the EIA process. The objectives of the Stakeholder Engagement Process (SEP) include the following:

- To ensure that I&APs are informed about the project;
- To provide I&APs with an opportunity to engage and provide comment on the project;
- To draw on local knowledge by identifying environmental and social concerns associated with the project;
- To involve I&APs in identifying methods in which concerns can be addressed;
- To verify that stakeholder comments have been accurately recorded; and
- To comply with the legal requirements.

No formal consultation was undertaken as part of this assessment. Informal consultation was undertaken during the field survey with:

- Mr J.H. Jacobs (owner of several portions of the farm Bakenlaagte 84 IS); and

- Mr. B. Roux (owner of multiple portions of the farms Nooitgedacht 94 IS and Portion 2 of the farm Schaapskraal 93 IS).

Both gentlemen were aware of heritage resources on their farms. Mr Jacobs described the Bakenlaagte farmhouse, currently occupied by himself and his family, as being built just after the South African War with the associated outbuilding being built subsequent. He was unsure of the exact age of each of the buildings. Mr Jacobs also described three burial grounds on his property, one of which appeared to correspond with 102/Site 14.

Mr B Roux described the Battle of Bakenlaagte and indicated a location on his farm (Portion 2 of the farm Schaapkraal 93 IS) at which events of the Battle were meant to have occurred. Mr Roux also described the Battle as being one of the few instances of Boers attacking the British with horses, as opposed to relying on their characteristic guerrilla tactics. Colonel Benson was meant to have been killed in action on this farm, but Mr. Roux was unsure of the exact location.

10 Recommendations

Much of the site-specific study area is underlain by the *Vryheid Formation*, a palaeontologically sensitive layer with a high CS. Plant fossiliferous material commonly occurs below the surface, in shale lenses between coal seams. During a palaeontological study for a similar project Bamford (2016) concluded that until excavation of the coal seams themselves took place, field assessments would not produce any additional information. Digby Wells acknowledges the significance of the *Vryheid Formation* but requests exemption from further palaeontological assessment based on this motivation and on condition that a Fossil Chance Find procedure is included in the consolidated EMP.

Table 10-1 summarises the recommended procedure, adapted from the procedure as developed by Bamford (2016).

Table 10-1: Recommended fossil finds procedure

Phase	Procedure
Operational	<p>The mine is already operational, and has been for some time. The following procedure must therefore be implemented where coals and shales are impacted upon:</p> <ul style="list-style-type: none"> ■ A monitoring schedule must be agreed upon by Matla Coal Mine a palaeontologist and the agreement letter submitted to SAHRA; ■ Should any fossil material be disturbed, the material must be set aside for inspection by the palaeontologist. This inspection must be carried out within a reasonable timeframe so as to minimise any delay to the Project; ■ If it is not feasible for the palaeontologist to visit the mine timeously then digital photographs of good quality and resolution must be sent to the

Phase	Procedure
	<p>palaeontologist to assess and make recommendations.</p> <ul style="list-style-type: none"> ■ The geologist must review visual references and descriptions of palaeontological material presented in Sections 6.1.1 and 6.2.2. <p>It is the responsibility of the palaeontologist to make the following recommendations from site visits or the supplied photographs:</p> <ul style="list-style-type: none"> ■ Material is of no value so development can proceed, or ■ Fossil material is of some interest. A representative sample should be carefully collected and put aside for further study and incorporated into a recognised repository (e.g. Ditsong Museum, Council for Geosciences, Pretoria; Evolutionary Studies Institute, University of the Witwatersrand, Johannesburg). A permit must be obtained from SAHRA for the removal of the fossils. Project activities may then proceed, or ■ Fossils are scientifically important and the palaeontologist must obtain a SAHRA permit to excavate the fossils and put them into a recognised repository. Project activities may then proceed.
Decommissioning	<p>A palaeontologist should search through the dumps and exposed shales and seams, rescue any fossil material of scientific interest, store it in a recognised repository so it is available for future research before the land is rehabilitated.</p>

Underground mining methodologies pose a risk of subsidence that may damage or destroy heritage resources. Heritage resources within a 15 m buffer of these areas are at greatest risk of negative impacts. To mitigate against the identified impacts, Digby Wells has made the following recommendations:

- Project-related mitigation must aim to amend the development footprint to avoid identified potential negative impacts to the heritage resources. It is acknowledged that this may not be feasible;
- Identified heritage resources must be subject to detailed land survey recording to determine precise location in relation to proposed undermining areas. Where it is determined that negative impact manifestation is certain, mitigation measures in accordance with the requirements of the NHRA and NHRA Regulation, 2000 (GN R 548) will be required. These may include:
 - A NHRA Section 34 Permit Application Process as regulated by Chapter III of the NHRA Regulations to MPRHA; and
 - BGGC and GGRP in accordance with Section 36 of the NHRA and Chapter IX and XI of the NHRA Regulations;

- Identified heritage resources within a 15 m buffer of proposed undermining areas must be incorporated into the current HSMP developed for the Matla Coal Mine, and monitored;
- A project specific Chance Find Protocol (CFP) must be developed and included in the EMP as a condition of authorisation; and
- Rehabilitation of subsidence in the area associated with the South African War Battle of Bakenlaagte, should it occur, must aim to minimise the visual impact to retain the 'sense-of-place'. This may be achieved through landscape contouring to restore the impacted area to a natural topography profile.

11 Conclusion

The aim of the HRM process was to comply with regulatory requirements contained within Section 38 of the NHRA through the following:

- Defining the cultural landscape within which the Project is situated;
- Identify, as far as is feasible, heritage resources that may be impacted upon by the project as well as define the CS;
- Assess the possible impacts to the identified heritage resources;
- Consider the socio-economic benefits of the Project; and
- Provide feasible mitigation and management measures to avoid, remove or reduce perceived impacts and risks.

These objectives were met as presented in Sections 6 through 10 above. Based on the understanding of the Project while considering the results of this assessment, Digby Wells does not object to the Project where the provided recommendations are adopted.

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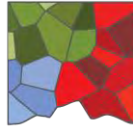
Heritage Impact Assessment

Heritage Resources Management Process for the Exxaro Matla Mine

EXX4731



Appendix A: Specialist CV



DIGBY WELLS

ENVIRONMENTAL

Miss Shannon Hardwick
Assistant Heritage Resources Management Consultant
Social and Heritage Services Department
Digby Wells Environmental

1 Education

Date	Degree(s) or Diploma(s) obtained	Institution
2013	MSc (Archaeology)	University of the Witwatersrand
2010	BSc (Honours) (Archaeology)	University of the Witwatersrand
2009	BSc	University of the Witwatersrand
2006	Matric	Rand Park High School

2 Language Skills

Language	Written	Spoken
English	Excellent	Excellent
Afrikaans	Fair	Basic

3 Employment

Period	Company	Title/position
2017 to present	Digby Wells Environmental	Intern: Heritage Resources Management
2016-2017	Tarsus Academy	Facilitator
2011-2016	University of the Witwatersrand	Teaching Assistant
2011	University of the Witwatersrand	Collections Assistant

4 Experience

I joined the Digby Wells in April 2016 as an archaeologist. I joined Digby Wells as a Heritage Resources Management intern in the Social and Heritage Services Department and have subsequently been appointed as an Assistant Consultant. I received my Master of Science (MSc) degree in Archaeology from the University of the Witwatersrand in 2010, specialising in archaeobotany and historical archaeology in the Limpopo Province. I have fieldwork experience in historical archaeology as well as in Stone Age archaeology in South Africa. My fieldwork experience at Digby Wells includes pre-disturbance surveys in South Africa and fieldwork in Malawi. I have gained generalist experience through the compilation of Notification of Intent to Develop (including Request for Exemption) applications, cultural baselines and Heritage Impact Assessments. I have compiled a Community Health, Safety and Security Plan and I have been involved in researching Artisanal and Small-Scale Mining (ASM) in Senegal for input into a Livelihood Restoration Framework (LRF).

5 Project Experience

My project experience is listed in the table below:

Project Title	Project Location	Date:	Description of the Project	Name of Client
Zuurfontein NID	Ekurhuleni, Johannesburg, South Africa	July 2017	Notification of Intent to Develop	Shuma Africa Projects
Liwonde Additional Studies	Liwonde, Southern Region, Malawi	July 2017	Resettlement Action Plan.	Mota-Engil

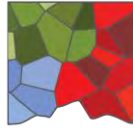
Project Title	Project Location	Date:	Description of the Project	Name of Client
National Heritage Resources Act, 1999 (Act No. 25 of 1999) Section 35 Archaeological Investigations, Lanxess Chrome Mine, North-West Province	Rustenburg, North West Province, South Africa	July 2017	Phase 2 Mitigation Assessment	Lanxess Chrome Mines (Pty) Ltd
Environmental and Social Input for the Pre-Feasibility Study	Bougouni, southern Mali	July 2017	Pre-Feasibility Study	Birimium Gold
Environmental Fatal Flaw Analysis for the Mabula Filling Station	Waterberg, Limpopo Province, South Africa	November 2017	Fatal Flaw Analysis	Mr van den Bergh
Basic Assessment and Environmental Management Plan for the Proposed pipeline from the Mbali Colliery to the Tweefontein Water Reclamation Plant, Mpumalanga Province	Mpumalanga Province, South Africa	Ongoing	Heritage Basic Assessment Report	HCI Coal (Pty) Ltd (Mbali Colliery)

6 Professional Registrations

Position	Professional Body	Registration Number
Member	Association for Southern African Professional Archaeologists (ASAPA)	451

7 Publications

Esterhuysen, A.B. & Hardwick, S.K. 2017. Plant remains recovered from the 1854 siege of the Kekana Ndebele, Historic Cave, Makapan Valley, South Africa. *Journal of Ethnobiology* 37(1): 97-119.



DIGBY WELLS

ENVIRONMENTAL

Mr. Justin du Piesanie

Manager: Heritage Resources Management

Social and Heritage Services Department

Digby Wells Environmental

1 Education

Date	Degree(s) or Diploma(s) obtained	Institution
2015	Continued Professional Development, Intermediate Project Management Course	PM.Ideas: A division of the Mindset Group
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
2016 to present	Digby Wells Environmental	Unit Manager: Heritage Resources Management
2011-2016	Digby Wells Environmental	Heritage Management Consultant: Archaeologist
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 Experience

I joined the company in August 2011 as an archaeologist and was subsequently made unit manager in the Social and Heritage Services Department in 2016. I obtained my Master of Science (MSc) degree in Archaeology from the University of the Witwatersrand in 2008, specialising in the Southern African Iron Age. I further attended courses in architectural and urban conservation through the University of Cape Town's Faculty of Engineering and the Built Environment Continuing Professional Development Programme in 2013. I am a professional member of the Association of Southern African Professional Archaeologists (ASAPA), and accredited by the association's Cultural Resources Management (CRM) section. I am also a member of the International Council on Monuments and Sites (ICOMOS), an advisory body to the UNESCO World Heritage Convention. I have over 10 years combined experience in HRM in South Africa, including heritage assessments, archaeological mitigation, grave relocation, and NHRA Section 34 application processes. I gained further generalist experience since my appointment at Digby Wells in Botswana, Burkina Faso, the Democratic Republic of Congo, Liberia and Mali on projects that have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. Furthermore, I have acted as a technical expert reviewer of HRM projects undertaken in Cameroon and Senegal. My current focus at Digby Wells is to develop the HRM process as an integrated discipline following international HRM principles and standards. This approach aims to provide clients with comprehensive, project-specific solutions that promote ethical heritage management and assist in achieving strategic objectives.

5 Project Experience

Please see the following table for relevant project experience:

Project Title	Project Location	Date:		Description of the Project	Name of Client
Klipriviersberg Archaeological Survey	Meyersdal, Gauteng, South Africa	2005	2006	Archaeological surveys	ARM
Sun City Archaeological Site Mapping	Sun City, Pilanesberg, North West Province, South Africa	2006	2006	Phase 2 Mapping	Sun International
Witbank Dam Archaeological Impact Assessment	Witbank, Mpumalanga, South Africa	2007	2007	Archaeological survey	ARM
Archaeological Assessment of Modderfontein AH Holdings	Johannesburg, Gauteng, South Africa	2008	2008	Heritage Basic Assessment	ARM
Heritage Assessment of Rhino Mines	Thabazimbi, Limpopo Province, South Africa	2008	2008	Heritage Impact Assessment	Rhino Mines
Cronimet Project	Thabazimbi, Limpopo Province, South Africa	2008	2008	Archaeological surveys	Cronimet
Eskom Thohoyandou SEA Project	Limpopo Province, South Africa	2008	2008	Heritage Statement	Eskom
Wenzelrust Excavations	Shoshanguve, Gauteng, South Africa	2009	2009	Phase 2 Excavations	Heritage Contracts Unit
University of the Witwatersrand Parys LIA Shelter Project	Parys, Free State, South Africa	2009	2009	Phase 2 Mapping	University of the Witwatersrand
Transnet NMPP Line	Kwa-Zulu Natal, South Africa	2010	2010	Heritage survey	Umlando Consultants
Archaeological Impact Assessment – Witpoortjie Project	Johannesburg, Gauteng, South Africa	2010	2010	Archaeological Impact Assessment	ARM
Der Brochen Archaeological Excavations	Steelpoort, Mpumalanga, South Africa	2010	2010	Phase 2 Excavations	Heritage Contracts Unit
De Brochen and Booyendal Archaeology Project	Steelpoort, Mpumalanga, South Africa	2010	2010	Phase 2 Mapping	Heritage Contracts Unit
Eskom Thohoyandou Electricity Master Network	Limpopo Province, South Africa	2010	2010	Heritage Statement	Strategic Environmental Focus
Bathako Mine Expansion	North-West Province, South Africa	2010	2010	Phase 2 Mapping	Heritage Contracts Unit
Kibali Gold Project Grave Relocation Plan	Oriental Province, Democratic Republic of Congo	2011	2013	Grave Relocation	Randgold Resources Limited

Project Title	Project Location	Date:		Description of the Project	Name of Client
Kibali Gold Hydro-Power Project	Oriental Province, Democratic Republic of Congo	2012	2014	Heritage Impact Assessment	Randgold Resources Limited
Everest North Mining Project	Steelpoort, Mpumalanga, South Africa	2012	2012	Heritage Impact Assessment	Aquarius Resources
Environmental Authorisation for the Gold One Geluksdal TSF and Pipeline	Gauteng, South Africa	2012	2012	Heritage Impact Assessment	Gold One International
Platreef Burial Grounds and Graves Survey	Mokopane, Limpopo Province, South Africa	2012	2012	Burial Grounds and Graves Survey	Platreef Resources
Resgen Boikarabelo Coal Mine	Limpopo Province, South Africa	2012	2012	Phase 2 Excavations	Resources Generation
Bokoni Platinum Road Watching Brief	Burgersfort, Limpopo Province, South Africa	2012	2012	Watching Brief	Bokoni Platinum Mine
SEGA Gold Mining Project	Burkina Faso	2012	2013	Socio Economic and Asset Survey	Cluff Gold PLC
Everest North Mining Project	Steelpoort, Mpumalanga, South Africa	2012	2015	Heritage Impact Assessment	Aquarius Resources
SEGA Gold Mining Project	Burkina Faso	2013	2013	Technical Reviewer	Cluff Gold PLC
Consbrey and Harwar Collieries Project	Breyton, Mpumalanga, South Africa	2013	2013	Heritage Impact Assessment	Msobo
New Liberty Gold Project	Liberia	2013	2014	Grave Relocation	Aureus Mining
Falea Uranium Mine Environmental Assessment	Falea, Mali	2013	2013	Heritage Scoping	Rockgate Capital
Putu Iron Ore Mine Project	Petroken, Liberia	2013	2014	Heritage Impact Assessment	Atkins Limited
Sasol Twistdraai Project	Secunda, Mpumalanga, South Africa	2013	2014	Notification of Intent to Develop	ERM Southern Africa
Daleside Acetylene Gas Production Facility	Gauteng, South Africa	2013	2013	Heritage Impact Assessment	ERM Southern Africa
Exxaro Belfast GRP	Belfast, Mpumalanga, South Africa	2013	-	Grave Relocation	Exxaro Coal Mpumalanga (Pty) Ltd
Nzoro 2 Hydro Power Project	Oriental Province, Democratic Republic of Congo	2014	2014	Social consultation	Randgold Resources Limited
Eastern Basin AMD Project	Springs, Gauteng, South Africa	2014	2014	Heritage Impact Assessment	AECOM
Soweto Cluster Reclamation Project	Soweto, Gauteng, South Africa	2014	2014	Heritage Impact Assessment	Ergo (Pty) Ltd

Project Title	Project Location	Date:		Description of the Project	Name of Client
Klipspruit South Project	Ogies, Mpumalanga, South Africa	2014	2014	Heritage Impact Assessment	BHP Billiton
Klipspruit Extension: Weltevreden Project	Ogies, Mpumalanga, South Africa	2014	2014	Heritage Impact Assessment	BHP Billiton
Ergo Rondebult Pipeline Basic Assessment	Johannesburg, South Africa	2014	2014	Heritage Basic Assessment	Ergo (Pty) Ltd
Kibali ESIA Update Project	Oriental Province, Democratic Republic of Congo	2014	2014	Heritage Impact Assessment	Randgold Resources Limited
GoldOne EMP Consolidation	Westonaria, Gauteng, South Africa	2014	2014	Gap analysis	Gold One International
Yzermitte PIA	Wakkerstroom, Mpumalanga, South Africa	2014	2014	Palaeontological Assessment	EcoPartners
Sasol Mooikraal Basic Assessment	Sasolburg, Free State, South Africa	2014	2014	Heritage Basic Assessment	Sasol Mining
Oakleaf ESIA Project	Bronkhorstspuit, Gauteng, South Africa	2014	2015	Heritage Impact Assessment	Oakleaf Investment Holdings
Rea Vaya Phase II C Project	Johannesburg, Gauteng, South Africa	2014	2014	Heritage Impact Assessment	ILISO Consulting
Imvula Project	Kriel, Mpumalanga, South Africa	2014	2015	Heritage Impact Assessment	Ixia Coal
Sibanye WRTRP	Gauteng, South Africa	2014	2016	Heritage Impact Assessment	Sibanye
VMIC Vanadium EIA Project	Mokopane, Limpopo, South Africa	2014	2015	Heritage Impact Assessment	VM Investment Company
NLGM Constructed Wetlands Project	Liberia	2015	2015	Heritage Impact Assessment	Aureus Mining
ERPM Section 34 Destruction Permits Applications	Johannesburg, Gauteng, South Africa	2015	2015	Section 34 Destruction Permit Applications	Ergo (Pty) Ltd
JMEP II EIA	Botswana	2015	2015	Heritage Impact Assessment	Jindal
Gino's Building Section 34 Destruction Permit Application	Johannesburg, Gauteng, South Africa	2015	2016	Heritage Impact Assessment and Section 34 Destruction Permit Application	Bigen Africa Services (Pty) Ltd
EDC Block Refurbishment Project	Johannesburg, Gauteng, South Africa	2015	2016	Heritage Impact Assessment and Section 34 Permit Application	Bigen Africa Services (Pty) Ltd
Namane IPP and Transmission Line EIA	Steenbokpan, Limpopo Province, South Africa	2015	2016	Heritage Impact Assessment	Namane Resources (Pty) Ltd
Temo Coal Road Diversion and Rail Loop EIA	Steenbokpan, Limpopo Province, South Africa	2015	2016	Heritage Impact Assessment	Namane Resources (Pty) Ltd
Groningen and Inhambane PRA	Limpopo Province, South Africa	2016	2016	Heritage Basic Assessment	Rustenburg Platinum Mines Limited

Project Title	Project Location	Date:		Description of the Project	Name of Client
NTEM Iron Ore Mine and Pipeline Project	Cameroon	2014	2016	Technical Review	IMIC plc
Palmietkuilen MRA	Springs, Gauteng, South Africa	2016	2016	Heritage Impact Assessment	Canyon Resources (Pty) Ltd
Copper Sunset Sand Mining S.102	Free State, South Africa	2016	2016	Heritage Basic Assessment	Copper Sunset Sand (Pty) Ltd
Grootvlei MRA	Springs, Gauteng, South Africa	2016	2016	Notification of Intent to Develop	Ergo (Pty) Ltd
Lambda EMP	Mpumalanga, South Africa	2016	2016	Palaeontological Impact Assessment	Eskom Holdings SOC Limited
Kilbarchan Basic Assessment and EMP	Newcastle, KwaZulu-Natal, South Africa	2016	2016	Heritage Basic Assessment	Eskom Holdings SOC Limited
Grootegeeluk Amendment	Lephalale, Limpopo Province, South Africa	2016	2016	Notification of Intent to Develop	Exxaro
Garsfontein Township Development	Pretoria, Gauteng, South Africa	2016	2016	Notification of Intent to Develop	Leungo Construction Enterprises
Massawa EIA	Senegal	2016	2017	Technical Reviewer Heritage Impact Assessment	Randgold Resources Limited
Louis Botha Phase 2	Johannesburg, Gauteng, South Africa	2016	2016	Phase 2 Excavations	Royal Haskoning DHV
Beatrix EIA and EMP	Welkom, Free State, South Africa	2016	2017	Heritage Impact Assessment	Sibanye Gold Ltd
Sun City Heritage Mapping	Pilanesberg, North-West Province, South Africa	2016	2016	Phase 2 Mapping	Sun International
Sun City Chair Lift	Pilanesberg, North-West Province, South Africa	2016	2017	Notification of Intent to Develop and Heritage Basic Assessment	Sun International
Hendrina Underground Coal Mine EIA	Hendrina, Mpumalanga, South Africa	2016	2017	Heritage Impact Assessment	Umcebo Mining (Pty) Ltd
Elandsfontein EMP Update	Clewer, Mpumalanga, South Africa	2016	2017	Heritage Impact Assessment	Anker Coal
Eskom Northern KZN Strengthening	KwaZulu-Natal, South Africa	2016	-	Heritage Impact Assessment	ILISO Consulting
Thabametsi GRP	Lephalale, Limpopo Province, South Africa	2017	-	Grave Relocation	Exxaro Resources Ltd
Grootegeeluk Watching Brief	Lephalale, Limpopo Province, South Africa	2017	2017	Watching Brief	Exxaro Resources Ltd
Matla HSMP	Kriel, Mpumalanga Province, South Africa	2017	2017	Heritage Site Management Plan	Exxaro Coal Mpumalanga (Pty) Ltd
Ledjadja Coal Borrow Pits	Lephalale, Limpopo Province, South Africa	2017	2017	Heritage Basic Assessment	Ledjadja Coal (Pty) Ltd
Exxaro Belfast Implementation Project PIA	Belfast, Mpumalanga, South Africa	2017	2017	Palaeontological Impact Assessment	Exxaro Coal Mpumalanga (Pty) Ltd

Project Title	Project Location	Date:		Description of the Project	Name of Client
Lanxess Chrome Mine Archaeological Mitigation	Rustenburg, North West Province, South Africa	2017	2017	Phase 2 Excavations	Lanxess Chrome Mine (Pty) Ltd
Goulamina EIA Project	Goulamina, Sikasso Region, Mali	2017	2017	Heritage Impact Assessment	Birimian Limited
Zuurfontein Residential Establishment Project	Ekurhuleni, Gauteng, South Africa	2017	2017	Notification of Intent to Develop	Shuma Africa Projects
Kibali Grave Relocation Training and Implementation	Oriental Province, Democratic Republic of Congo	2017	-	Grave Relocation	Randgold Resources Limited
Exxaro Matla HRM	Kriel, Mpumalanga	2017	-	Heritage Impact Assessment	Exxaro Coal Mpumalanga (Pty) Ltd

6 Professional Registrations

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
Member	International Association of Impact Assessors (IAIA) South Africa	5494

7 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

du Piesanie, J.J., 2017. Book Review: African Cultural Heritage Conservation and Management. *South African Archaeological Bulletin* 72(205)

Appendix B: Plans

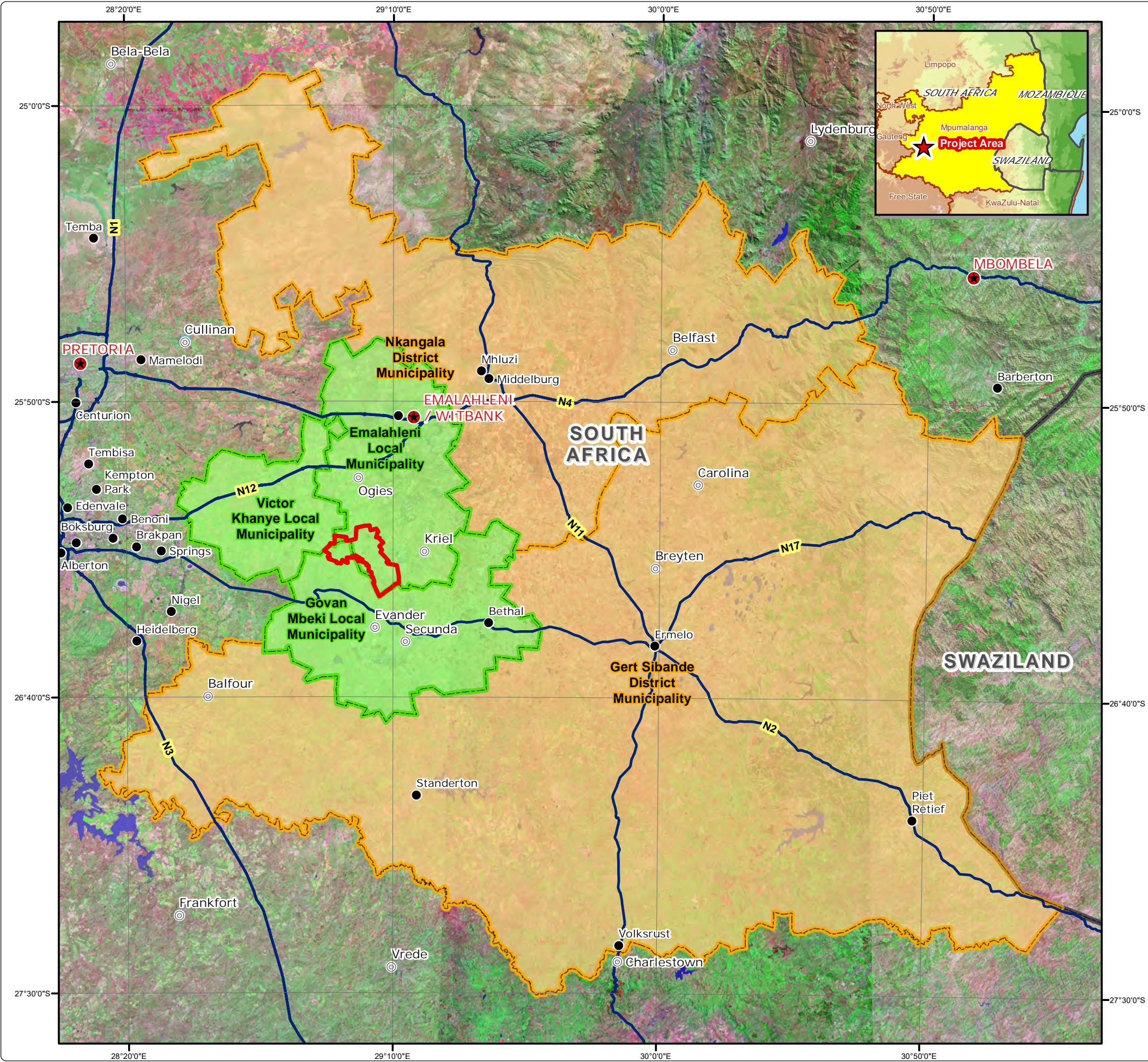
1. Study area
2. Geology
3. Survey tracks and proposed future mining areas
4. Identified heritage resources
5. Land tenure

Exxaro Matla HRM

Study Areas

Legend

-  Project Area
-  Regional Study Area
-  Local Study Area
-  City
-  Major Town
-  Secondary Town
-  National Road
-  International Boundary



• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity














Projection: Transverse Mercator Ref #: kam.EXX4731.201712.076
Datum: WGS 1984 Revision Number: 1
Central Meridian: 29°E Date: 14/12/2017





Exxaro Matla HRM

Geology

Legend

-  Project Area
-  Settlement
-  Arterial / National Road
-  Main Road
-  Minor Road
-  Railway Line
-  Non - Perennial Stream
-  Perennial Stream
-  Dam Wall
-  Dam / Lake
-  Non-Perennial Pan
-  Perennial Pan
-  Wetland

Geology

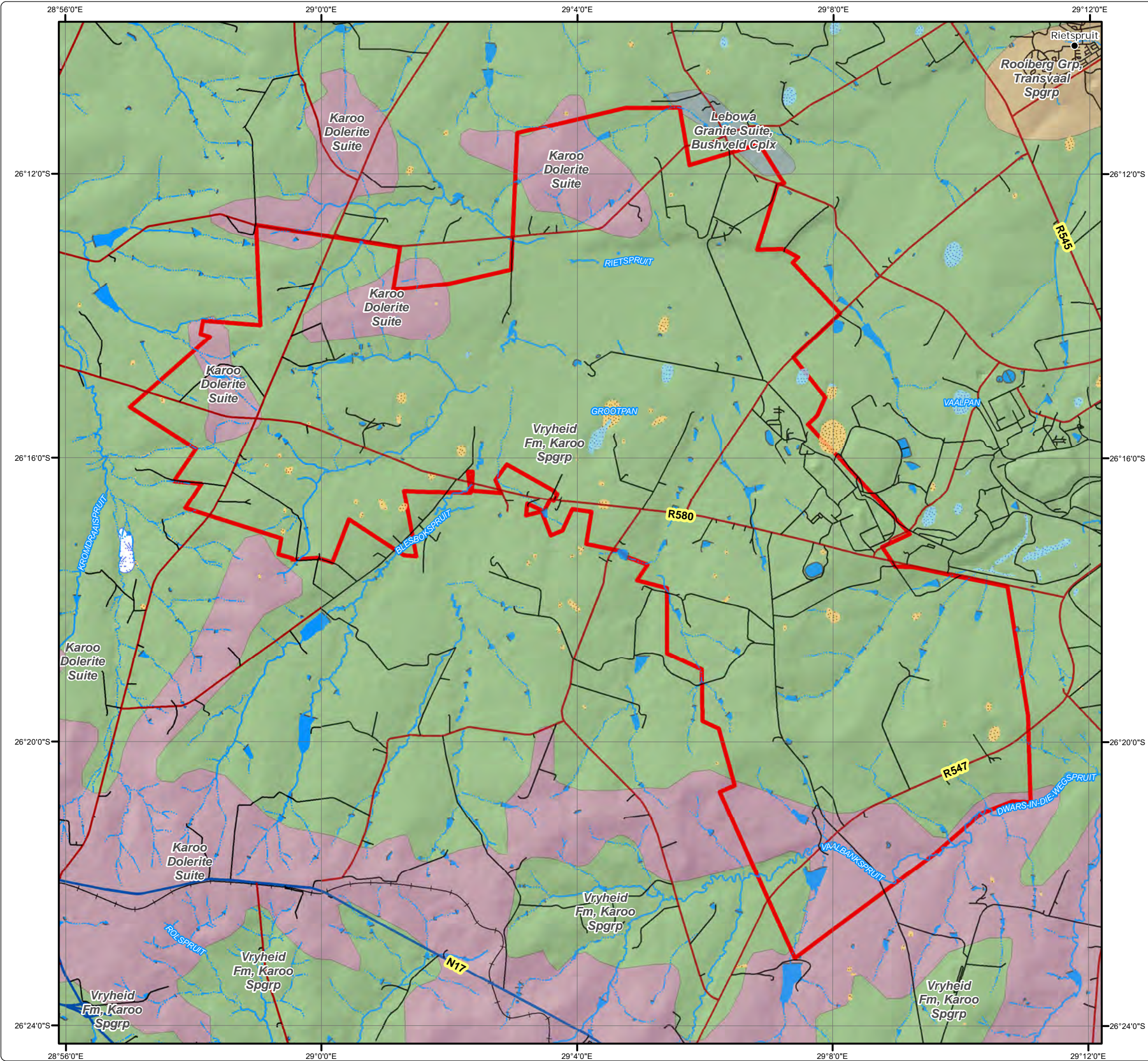
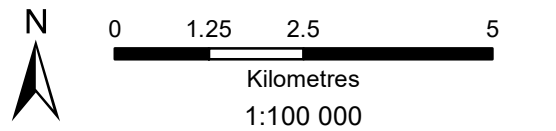
-  Karoo Dolerite Suite
-  Rooiberg Group, Transvaal Supergroup
-  Lebowa Granite Suite, Bushveld Complex
-  Vryheid Formation, Karoo Supergroup



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Projection: Transverse Mercator	Ref #: kam.EXX4731.201712.077
Datum: WGS 1984	Revision Number: 1
Central Meridian: 29°E	Date: 14/12/2017



Exxaro Matla HRM

Survey Track Log

Legend

- Project Area
- Survey Track Log
- Settlement
- Arterial / National Road
- Main Road
- Minor Road
- Railway Line
- Non - Perennial Stream
- Perennial Stream
- Dam Wall
- Dam / Lake
- Non-Perennial Pan
- Perennial Pan
- Wetland
- Mined Out Areas

Future Mining Areas

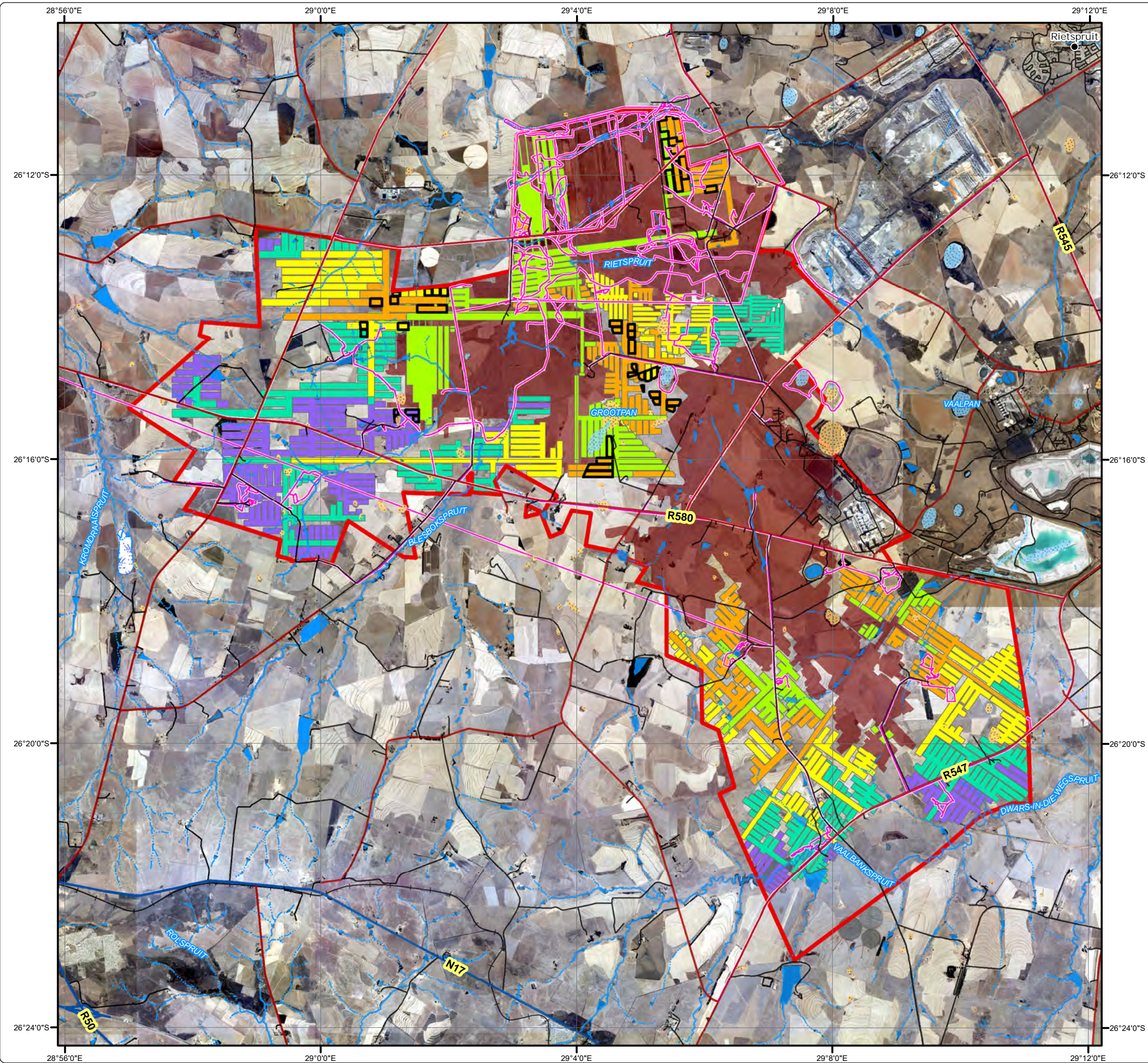
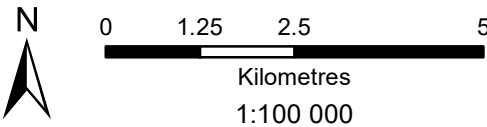
- Stopping Areas
- April 2013 - March 2018
- April 2018 - March 2023
- April 2023 - March 2028
- April 2028 - March 2033
- April 2033 - March 2038



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Datum: WGS 1984 Revision Number: 1
Central Meridian: 29°E Date: 14/12/2017



Exxaro Matla HRM

Identified Heritage Resources

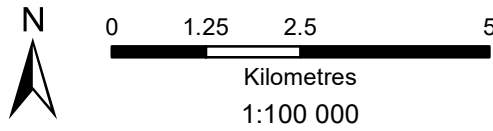
Legend

- Project Area
- Identified Heritage Resources**
- New Sites
- Previously Identified Sites
- Verified Sites
- Settlement
- Arterial / National Road
- Main Road
- Minor Road
- Railway Line
- Non - Perennial Stream
- Perennial Stream
- Dam Wall
- Dam / Lake
- Non-Perennial Pan
- Perennial Pan
- Wetland



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Projection: Transverse Mercator Ref #: kam.EXX4731.201712.079
Datum: WGS 1984 Revision Number: 1
Central Meridian: 29°E Date: 14/12/2017



Exxaro Matla HRM

Land Tenure

Legend

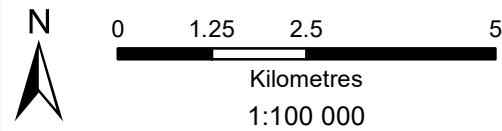
- Project Area
- Settlement
- Arterial / National Road
- Main Road
- Minor Road
- Railway Line
- Non - Perennial Stream
- Perennial Stream
- Dam Wall
- Dam / Lake
- Non-Perennial Pan
- Perennial Pan
- Wetland
- Farm Boundary
- Farm Portion



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Projection: Transverse Mercator Ref #: kam.EXX4731.201712.080
Datum: WGS 1984 Revision Number: 1
Central Meridian: 29°E Date: 14/12/2017



Appendix C: Site List

Table C-1: Site list including all heritage resources identified within the Project Area

Site Name	GPS Co-ordinates		Description	Reference
11829/BGG-001	-26.2093260	29.1011310	3 potential unmarked graves (piles of soil and brick, covered in vegetation) near occupied houses and a rubbish heap.	
11829/BGG-002	-26.2100440	29.0501820	Burial ground with 24 visible graves demarcated by a wire fence with a gate. Graves have cement headstones with and without cement fittings and granite headstones and fittings. Surnames identified include: Mahlangu, Radebe, and Mtshweni and what may be Skozana and legible dates ranged from 1952-2001. Large exotic plants growing in graveyard. Some headstones have fallen over	
11829/BGG-003	-26.2110090	29.0502720	Burial ground within sight of BGG-002; also demarcated by a fence and with large exotic plants (overgrown). Three graves are visible, but it is likely that there are more (overgrown and lots of space in the fenced off area). No writing was legible on the headstones (cement). Not as well maintained as BGG-002	
11829/BGG-004	-26.2103670	29.0544550	Single grave, which is the focus of the Digby Wells HSMP compiled for Exxaro Matla (Du Piesanie, 2017a).	
11829/BGG-005	-26.2288440	29.0502230	Single grave with a cement headstone which has been weathered slightly and is difficult to read, but may read: GAMEISISBAN and 1994. The grave is within a maize field and a small buffer has been left uncultivated around it.	
11829/BGG-006	-26.2575190	29.0399710	Burial ground with two graves, one of which is a double-grave with a granite headstone and fittings belonging to the Marthinus family. Both interred passed away on the same day in 1952. The single grave has a marble headstone, with the surname Meyer and dates to 1927. The graves used to be enclosed by a wire fence, which has since fallen away. [102/Site 7: reported only the Meyer surname].	102/Site 7

Site Name	GPS Co-ordinates		Description	Reference
11829/BGG-007	-26.2536389	29.0420556	Burial ground surrounded by a wire fence including 16 visible graves and potentially four more (which may be marked by metal plates/boards within enclosed area). Cement headstones with or without fittings and granite headstones. The graveyard is fairly overgrown, although some graves have been cleared. Identified surnames include: Mathebe, Shoba, Kabini, Tshoba, Mahlangu and Ntuli. Dates range from 1962-1981, although many are illegible. One grave may potentially be a double grave. [102/Site 6: grave includes at least 28 graves and oldest date is 1965]	102/Site 6
11829/BGG-008	-26.3185820	29.1201800	Burial ground with 9 visible graves, two of which are double graves. Both double graves belong to the Van den Berg family (1943 and possibly 1953) (1913 and 1932). The graveyard is surrounded by a wire fence and (open) gate. Another double grave belongs to the Van der Heever family (2002) and is the only grave not belonging to the Van den Berg family. Dates range from 1913 to 2002. All headstones are marble or granite and some are very ornate. [102/Site 21: oldest date is 1943, not 1913].	102/Site 21
11829/BGG-009	-26.3379470	29.1692540	Graveyard including 9 graves with marble and cement headstones and fittings. 1 headstone was damaged by a fallen tree and may potentially be a double grave. Surnames identified include: Geldenhuys, Van Wyk, Van den Berg and Oosterhuis and dates range from 1915 and 1952. The graveyard was demarcated by a wire fence with a gate, which has since fallen away.	102/Site 24
11829/BGG-010	-26.3192890	29.1216430	Single burial with a cement headstone and brick dressing and two more burials surrounded by brick and soil. The writing on the cement headstone is barely legible and appears to date to either 1912 or 1942. The graves are not demarcated or fenced off and are between a fence-line and a farm-road. One of the unmarked graves has been disturbed by erosion (or the soil has been replaced over the grave). Visible from BGG-011.	
11829/BGG-011	-26.3192620	29.1219400	Appears to be a grave of heaped soil and brick/stone with no headstone in a void within a maize field. Visible from BGG-010.	



Site Name	GPS Co-ordinates		Description	Reference
11829/BGG-012	-26.2788470	28.9795010	Graveyard with six visible graves and two more potential headstones and one potential unmarked grave. Graves have granite headstones and fittings, cement headstones and fittings or just cement headstones. One grave was surrounded by a metal fence with a locked gate. Visible inscriptions included the surnames Kumalo and Mthombe and dates: 1958 and 1972. [102/Site 12: graveyard of at least 12 graves].	102/Site 12
11829/BGG-013	-26.3589180	29.1239570	Two graves on the side of a (overgrown) farm road, not demarcated or surrounded by a fence. Both gravestones (and fittings) are made of cement. One headstone was not inscribed, but included an epitaph written using metal wire. The headstone was damaged and so the epitaph was only partially legible but looks to date to 1964. Small coloured marbles / rounded glass were added to the headstone and corners of the cement fittings. The other headstone was not legible. The area was very overgrown and could potentially include more graves.	
11829/BGG-014	-26.2089940	29.0996840	Graveyard with 7 visible graves and another 3 possible graves (although there could potentially be more as the area is very overgrown). Not surrounded by a fence. The graves include: cement headstones, with or without cement or brick fittings and granite headstones and fittings. Inscriptions include: Ncema (or Ngema), Mashiane, and Defries and dates range from 1979-1987, although not all dates were legible. 3 graves were protected by wire fencing, which has since fallen away.	
11829/BGG-015	-26.2753690	29.0962890	Single (double) grave belonging to the Robertson family ('vader' and 'moeder' – father and mother in German or Afrikaans). Dates to 1958 and 1973. Headstone and fittings are marble and the grave is protected by a strong fence.	



Site Name	GPS Co-ordinates		Description	Reference
11829/BGG-016	-26.3101890	29.1099680	Burial ground with two sections - one fenced and one section unfenced. The graveyard includes a total of approximately 155 identified graves (51 in the unfenced section and 104 in the fenced section) as well as 16 additional potential graves (7 unfenced and 9 fenced). These potential graves include areas which have been fenced off (double or single graves) with no headstone or visible signs of burial. A tree has fallen over in the unfenced section which could be obscuring more potential graves. Graves are marked by cement headstones with or without cement or brick fittings, granite headstones and fittings, a stone/brick headstone only or with a metal cross and heaps of stone and soil. Many headstones have fallen over. Includes child graves. Surnames identified outside the fenced-off area include: Sebande (and Sibande), Tholo, Dube, Masuku, Kuken and Mbonani. Dates range from 1963 to 1989, although many are not legible. Within the fencing, graves were marked by granite headstones with granite or cement fixings, cement headstones with or without cement fixings, cement headstones with cement slabs, stone/brick headstones or heaps of stone or brick and soil. Surnames identified here include: Mahlangu, Motau, Mthombeni, Sithole, Masimula, Dlamini and Mthimunye. Dates range from 1920 to 2004. The Mthimunye (1969) grave was at a 90 degree angle to the other graves.	
11829/BGG-017	-26.2340550	29.1031980	Graveyard of 9 visible graves, potentially with one more grave (although the site is overgrown and there may be more graves). The site is at the intersection of some fences but is not bounded by fences. Graves are marked by cement headstones with cement slabs or cement or brick fittings, or a stone headstone (marker). Only one surname (Dinamsweni) was legible; no dates were legible. Some headstones have fallen over.	

Site Name	GPS Co-ordinates		Description	Reference
11829/BGG-018	-26.2939800	29.1510740	Graveyard of 13 graves and one potential additional grave. The graves are marked by cement headstones and fittings, granite headstones and fittings and a metal marker with brick fittings. There is potentially one burial marked with a heap of soil and brick/stone. Two surnames were identified: Sibiya (or Sibija) and Tsale. Dates range from 1924 to 1979. Includes child burials. The graveyard was demarcated with a fence, which has since fallen away.	102/Site 19
11829/BGG-019	-26.2969650	29.1469700	Three graves bounded by a fence which is starting to rust away, in the middle of a field. The vegetation is very overgrown. The only name and date legible was that of Du Toit (1891). [102/Site 18: noted Oosthuysen and 1933]. All three headstones are cement, with cement fittings.	102/Site 18
11829/LFC-001	-26.2721610	28.9658610	Pile of stone that suggests it is collapsed stone walling near a maize field.	
11829/STE-001	-26.2594680	29.0400160	Very close to WF-001 (and therefore a historical layering point). Two small structures (one may be a pump house, the other is not known) remain inside an elaborate gate with the remains of an intercom system. Some building rubble. Age unknown	
11829/STE-002	-26.3385570	29.1680250	Small building with the roof missing. The structure includes two rooms (with no communication between), two doors leading outside and one window with metal bars (no glass). There is some collapse of the outer walls. 4 concrete pillars (with some wire remaining) surround the structure.	
11829/STE-003	-26.3384220	29.1673210	Large stone structure with no roof and some collapse. Structure includes four 'rooms' (including a 'courtyard') with several doorways/entrances and one room has three windows (no other rooms have windows). Two of the rooms have long concrete slabs with several metal rings embedded in the concrete and three metal rings were embedded in the wall of the courtyard at different heights. A brick ramp-type inclined structure is nearby, between this structure and STE-002. A small structure in a state of disrepair was constructed of the same, or similar, material and so may be associated as well. Near a historical layering waypoint.	

Site Name	GPS Co-ordinates		Description	Reference
11829/STE-004	-26.3383960	29.1668440	Two buildings in a state of disrepair. Both structures are missing their roofs and have some wall collapse. Some corrugated iron lean-tos / informal structures have been attached to the outer walls of the larger building, which is used for storing refuse. The larger structure has an electrical box and so may be recent. Near a historical layering waypoint (same as STE-003).	
11829/STE-005	-26.2773200	28.9821190	Foundations of a long and narrow rectangular structure very near to WF-005 (may be associated). The structure is made of stone and cement, with some metal pieces and metal rings embedded in the cement. Four short walls remain in a small square and there are five visible post holes around the one wall of this small square.	
11829/STE-006	-26.3191790	29.1580380	Bakenlaagte farmhouse (belonging to and occupied by Mr. JH Jacobs and his family). Mr. Jacobs confirmed the farmhouse was approximately 100 years old, having been built shortly after the South African War.	102/Site 15
11829/STE-007	-26.3134030	29.1075050	Remains of a one-roomed structure with the roof missing and two walls collapsed.	
11829/WF-001	-26.2589990	29.0399710	Remains of a farmhouse and associated outbuildings (milking shed/barn, troughs, another building and two possible reservoirs). The house is in good condition with some windows with glass still in them and others which have been broken. The doors all appear to have been plastered up. Surrounded by wire fence and (locked) gate. Age unknown, but close to historical layering point and so may be older than 60 years.	
11829/WF-002	-26.2633650	29.0394640	GPS Site Approximate. Farmhouse and associated outbuildings. The farmhouse is in the process of being demolished and looks to be raided for bricks. An abandoned caravan parked behind the building suggests the structure was recently abandoned. Water tanks, outbuildings and a gate remain, marked with caution tape.	



Site Name	GPS Co-ordinates		Description	Reference
11829/WF-003	-26.3194760	29.1192060	Remains of a farmhouse with a pump house and water pump nearby. The farmhouse is still standing and is in fairly good condition, and still has its roof. There is some building rubble in the "yard". Some windows of the farmhouse are covered with corrugated iron.	
11829/WF-004	-26.2764570	28.9815780	Abandoned farmhouse/barn with outbuildings, including another structure, remains of what appears to be 4 brick pillars and 4 silos. The ages of the buildings are unknown, but '1949' is written into the cement of one of the silos. There are rubbish heaps over the site and the silos are also being used as refuse storage. The additional structure is a four-roomed structure with a chimney and "Room 1" written above the lintel. Both structures still have their roofs and show no collapse. Two small brick squares occur between the structure and the silos.	
11829/WF-005	-26.2433620	29.0023610	Farmhouse near to historical layering waypoint that is currently occupied. The farmhouse was therefore observed from a distance but appears to be in a good condition (roof and walls intact, some windows covered with corrugated metal). Another structure lies in ruins near the farmhouse and there appears to be a pump house as well.	
11829/WF-006	-26.3176240	29.1598700	Outbuildings (including a wagon house and what may have been a pig sty) associated with the Bakenlaagte farmhouse, although Mr. Jacobs did not know the age of the buildings (younger than the farmhouse). The outbuildings are historical (the wagon house matches historical layering). The wagon house and the piggery are in good condition; there are some small structures that are also in good condition but are being used for refuse storage (intended function unknown). There is also a water pump and silo.	102/Site 16

Site Name	GPS Co-ordinates		Description	Reference
102/Site 1	-26.2794833	29.0879667	Ruin of an old farm building, and may be part of an old farm yard. Possibly (but not confirmed) older than 60 years.	Van Vollenhoven (2012; 2014) (Case ID 102)
102/Site 2	-26.2779167	29.0710833	Ruins of an old farm yard, including old farm dams and buildings. Possibly (but not confirmed) older than 60 years.	
102/Site 3	-26.2667333	29.0502000	Grave yard consisting of at least 30 graves with various dressings and headstones. The graveyard requires maintenance and has been damaged. The earliest dated headstone dates back to 1942, but most of the graves are not marked.	
102/Site 4	-26.2035167	28.5911500	Graveyard containing at least 9 graves. Identified dates range between 1919 and 1955. Identified surnames include Mabena, Hlowu and Mloka. Dressings include: cement dressings and headstone, granite slabs, heaps of soil, brick borders and metal barriers.	
102/Site 5	-26.2445167	29.0276000	Graveyard consisting of at least 9 identified graves (although there may be more that were not identified during the site visit because of dense grass cover). A few graves are in need of some repair and there are various dressings represented in the graveyard: slate and granite headstone and cement or stone dressings. The oldest dated headstone dates back to 1940 and identified surnames include Postma and Strydom.	
102/Site 8	-26.2665000	29.0125500	Identified headstones date between 1972 and 1996 (although some graves are unmarked) and identified surnames include: Mokoena, Mkwena and Mahlangu. This graveyard may still be in use. Various types of dressings are represented here and include: stone headstones (with and without dressings), cement and brick borders with cement headstones, granite borders and headstones and heaps of soil.	
102/Site 9	-26.2840667	28.9667833	Burial ground including at least 18 graves. All graves have either cement or granite borders and headstones. Jansen was the only surname identified. All graves "appear to be older than 60 years" (but this may not be confirmed).	

Site Name	GPS Co-ordinates		Description	Reference
102/Site 10	-26.2762000	28.9956667	Graveyard of at least 9 graves, all with cement borders; some have cement headstones and some are without headstones. Mahlangu was the only identified surname and identified dates range from 1922 and 1985.	
102/Site 11	-26.2656667	29.0050333	Graveyard which includes at least 27 graves. Grave dressings include: stone dressing and headstone, cement dressing (or borders and headstone), granite dressings or borders and headstones and heaps of soil. Dates range from 1951 to 1990 and Nkosi was the only surname identified.	
102/Site 13	-26.2814667	29.0233500	Graveyard consisting of at least 3 graves. Two of the graves have cement borders with granite headstones; the third has only a cement slab on top of it. The former two graves were dated to 1937 and 1944 and included the surnames Skeen and Pretorius. The third grave had no information.	
102/Site 14	-26.3119500	29.1488500	Burial ground of at least 15 graves with various dressings. Only one headstone has legible information and dates to 1991. Mputi is the surname included on this headstone.	
102/Site 17	-26.2985833	29.1550833	Graveyard including at least two graves, both of which are covered with cement slabs. No dates, or other information, are provided by these graves.	
102/Site 20	-26.3101833	29.1101167	Very large graveyard of at least 188 graves. Various types of graves are included here: some have cement borders and headstones, brick borders, granite borders and headstones and stone packed and some have metal fences around them. Dates range from 1906 to 1981 and surnames identified include: Mutau, Sebanda, Mahlangu, Tholo, Masuku and Kabini. Most of the graves are, however, unmarked.	
102/Site 22	-26.3508333	29.1609833	Graveyard of at least 7 graves. Some graves have cement borders and headstones; others are stone-packed, with or without headstones. No biographical information was legible on any of the headstones and only one date (1938) was identified.	

Site Name	GPS Co-ordinates		Description	Reference
102/Site 23	-26.3408167	29.1720500	Graveyard consisting of 41 graves (although the site was covered in dense vegetation). Graves have various dressings, including stone-packed, cement or granite borders and headstones, and some have only a stone headstone. Dates range from 1923 and 1997. Identified surnames include: Mgcina, Tholakele, Nkabinde and Mahlangu.	
102/Site 25	-26.3166333	29.1036000	Burial ground including at least 8 graves with either cement borders and headstones or brick borders. One surname was identified (Mtsweni) and dates range between 1981 and 1987. Some graves do not have legible information.	
102/Site 26	-26.2921500	29.1122833	Burial ground including at least 9 graves. Graves have either stone dressings or cement headstones and borders. Masango is the only identified surname and the only identified date is 1990.	
102/Site 27	-26.2907667	29.1129833	Graveyard including at least four graves, all of which have granite borders and headstones. Dates range between 1934 and 1948 and four surnames were identified: Opperman, Slabber, Potgieter and Van de Spuy.	
102/Site 28	-26.2904500	29.1133333	Burial ground consisting of at least 15 graves (also covered in dense vegetation). Graves had either cement borders and headstones or stone headstones (without any dressing). The only surname identified was Madela and dates ranged from 1944 and 1959.	
102/Site 29	-26.2750167	29.1174667	At least 46 graves with different dressings, including: cement borders and headstones, brick borders and stone headstones without dressing. Dates range from 1908 and 1975 and identified surnames include Phokojoe and Malaza.	
102/Site 30	-26.3300000	29.1227500	Main area where the Battle of Bakenlaagte was fought (although the entire Matla Mining Right area may have hosted activities associated with the battle). No structure or physical features remain from the Battle.	

Heritage Impact Assessment

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Site Name	GPS Co-ordinates		Description	Reference
102/Site 31	-26.2458333	28.9732167	Graveyard including at least 17 graves. No dates or surnames were legible on any headstones. Grave dressings included cement borders and headstones and packed stone with or without headstones.	