DIGBY WELLS
ENVIRONMENTAL

SAHRIS Case ID: 8831

Environmental Impact Assessment and Environmental Management Plan for the Proposed Imvula Mining Project

Heritage Scoping Report

Project Number:

IXI3002

Prepared for:

Ixia Coal (Pty) Ltd

February 2015

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This document has been prepared by Digby Wells Environmental.

Report Type:	**Heritage Scoping Report**
Project Name:	**Environmental Impact Assessment and Environmental Management Plan for the Proposed Imvula Mining Project**
Project Code:	**IXI3002**

Name	Responsibility	Signature	Date
Justin du Piesanie Heritage Management Consultant ASAPA No. 270	Data collection Historical Layering Report Writing Scoping Survey Specialist Recommendations		February 2015
Johan Nel HRM Unit Manager ASAPA No. 095	Scoping Survey Review		February 2015

DECLARATION OF INDEPENDENCE

Digby Wells and Associates (Pty) Ltd

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2125		

I, Justin du Piesanie as duly authorised representative of Digby Wells and Associates (Pty) Ltd., hereby confirm my independence (as well as that of Digby Wells and Associates (Pty) Ltd.) and declare that neither I nor Digby Wells and Associates (Pty) Ltd. have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of Ixia Coal (Pty) Ltd, other than fair remuneration for work performed, specifically in connection with the Notification of Intent to Develop (NID) and Heritage Scoping Report (HSR) for the proposed Imvula Mining Project in the Gert Sibande District Municipality, Mpumalanga Province.

_____

Full name:	Justin du Piesanie
Title/ Position:	Heritage Management Consultant: Archaeologist
Qualification(s):	MSc in Archaeology
Experience (years):	5 years' experience
Registration:	Association of Southern African Professional Archaeologists (ASAPA)
	International Council on Monuments and Sites (ICOMOS) South Africa

Executive Summary

In 2013, Sasol conducted investigations to extend the existing Syferfontein Mine into the adjacent Block 4 reserves to the north-west. The proposed Block 4 reserves were intended to be mined through underground bord and pillar method accessed via the existing vent shaft and vertical incline shaft at the Syferfontein Mine. A Notification of Intent to Develop (NID) submitted to the South African Heritage Resources Authority (SAHRA) (Case ID: 4912) in February 2014 in which exemption from further heritage assessment was granted.

Ixia Coal (Pty) Ltd (hereafter Ixia Coal) intends to undertake open cast coal mining at the proposed Imvula Open Cast Coal Mine (Imvula Project). Ixia Coal is investigating the feasibility of a surface mine on certain reserves to the north of the current Syferfontein Mine reserve area, previously considered under Case ID: 4912 as part of the Sasol Syferfontein Block 4 Project. The newly proposed Imvula Project however will have surface infrastructure that could negatively impact on heritage resources. For Ixia Coal to proceed with the proposed Imvula Project, a Mining Right Application (MRA) in accordance with the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) was required. This includes an assessment of the impacts to heritage resources as required by the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

The Imvula Project Area is situated in close proximity to the towns of Kriel and Kinross in the Mpumalanga Province. This is a culturally sensitive landscape, supported through the findings of this scoping assessment.

Geologically, the lithologies of the *Madzaringwe Formation* comprise fluvial sandstone, shale, mudstone and coal that are interrupted by Karoo-aged intrusive dolerite dykes. The significance accorded to this formation is very high. The identification of the possible *Breytenia* plant fossil reiterates the palaeontological significance of this project area.

Farming Community settlements have been recorded throughout the landscape, the majority of which can be classified as Type V stone walling. However, no Farming Community stonewalled sites were identified within the project area during the scoping survey. The abundance of stonewalled settlements suggests the potential for Farming Community sites to occur within the project boundaries does exist.

Several LFC and/or historic settlements were identified within the boundaries of the project area. These sites all shared the following characteristics:

- A semi-circle of 5 – 6 hut foundations;
- Some stone walling or foundations;
- A large ashy midden with material culture;
- In close proximity to burial grounds and graves.

These settlements represent some of the earlier inhabitants of the area.

Based on the findings from the quantitative and qualitative data collection, a provisional assessment of the significance of the landscape indicated that that the Imvula Project is situated in a cultural landscape that has a high significance and requires further consideration during subsequent phases of the environmental authorisation process.

Based on these findings, Digby Wells recommends the following:

- A Palaeontological Impact Assessment including reconnaissance to identify and record palaeontological resources within the development footprint;
- An HIA must be completed focussing on the following:
  - An Archaeological Impact Assessment including reconnaissance to identify and record archaeological resources within the development footprint; and
  - An assessment of burial grounds and graves including reconnaissance to identify, record and document all burials that may exists in the development footprint.

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1 Project Background

1.1 Introduction

Ixia Coal (Pty) Ltd (hereafter Ixia Coal), a black-women controlled mining company with Sasol Mining Holdings and WIPCoal Investments as the primary shareholders, intends to undertake open cast coal mining near Secunda in the Mpumalanga Province at the proposed Imvula Open Cast Coal Mine (Imvula Project). Ixia Coal is investigating the feasibility of a surface mine on certain reserves to the north of the current Syferfontein Mine reserve area.

In 2013, Sasol conducted investigations to extend the existing Syferfontein Mine into the adjacent Block 4 reserves to the north-west. The proposed Block 4 reserves were intended to be mined through underground bord and pillar method accessed via the existing vent shaft and vertical incline shaft at the Syferfontein Mine. It was envisaged that the project would not generate any surface infrastructure over the Block 4 reserve project area, and therefore have no impact to the surface heritage that may be present. A Notification of Intent to Develop (NID) submitted to the South African Heritage Resources Authority (SAHRA) (Case ID: 4912) in February 2014 in which exemption from further heritage assessment was granted.

The newly proposed Imvula Project however will have surface infrastructure that could negatively impact on heritage resources. For Ixia Coal to proceed with the proposed Imvula Project, a Mining Right Application (MRA) in accordance with the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) was required. This includes an assessment of the impacts to heritage resources as required by the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

Digby Wells Environmental (hereafter Digby Wells) was requested by Ixia Coal to conduct an Environmental Impact Assessment (EIA) and Environmental Management Programme (EMPr) in support of the MRA for submission to the Department of Mineral Resources (DMR) through utilising and updating baseline information collected during the Sasol Syferfontein Block 4 Project.

1.2 Terms of Reference

To complete the EIA and EMPr in support of the MRA, a heritage specialist study in accordance with the following legislation was required:

- MPRDA;
- National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- National Environmental Management: Waste Act, 2008 (Act No 59 of 2008) (NEM:WA); and
- NHRA.

1.3 Scope of Work

As prescribed under section 38(8) of the NHRA, the relevant heritage resources authority (HRA) must provide Statutory Comment to the consenting authority, in this case the DMR, where the evaluation of impacts on heritage resources is required in terms of the NEMA or MPRDA.

As per the agreement between Ixia Coal and Digby Wells encapsulated within the proposal, an NID and Heritage Scoping Report (HSR) was compiled and submitted to the HRA. The Scope of Work (SoW) for completion of the HSR included:

- Review of relevant previous heritage studies;
- Conducting historical layering of the proposed pipeline route;
- Screening survey of the proposed pipeline route;
- Reporting; and
- Providing recommendations for further heritage assessments.

1.4 Project Details

Ixia Coal is investigating an open cast strip mine approximately 12 km from Kriel in the Mpumalanga Province (See Table 1-1 for project location details). A 10 to 15 year operation is envisaged, producing between 600 kilo tonne (kt) and 1 Mega tonne (Mt) per annum. The proposed Imvula Project will be covering an area of approximately 762 hectares. The current land use in the area is mainly agricultural and mining.

Table 1-1: Location of the Imvula Project

Province	Mpumalanga
Magisterial District / Local Authority	Bethal Magisterial District
District Municipality	Nkangala District Municipality (NDM)
Local municipality	Emalahleni Local Municipality (ELM)
Nearest Town	Kriel (12 km), Kinross (12 km)
Property Name and Number	Rietfontein 100 IS Portion 2 and 12 Rietfontein 101 IS Portion 3 and 4
1: 50 000 Map Sheet	2629AC Evander
GPS Co-ordinates (relative centre point of study area)	-26.350418
	29.184615

Plans depicting the study area can be found in Appendix A.

1.5 Project Activities

The potential Listed Activities as relevant to HRM that may be triggered as a result of the proposed Ixia Coal Imvula Project are summarised in Table-1-2. Detailed descriptions of the listed activities are provided in the Scoping Report.

Table-1-2: Potential Listed Activities for the Imvula Project

Listing Notice	Activity Number	Activity Description
GNR 983: Listing Notice 1	9	The development of infrastructure, widening of roads and excavation and/or clearance of topsoil and vegetation. *These listed activities may have a direct and indirect impact on potential heritage resources within the Imvula Project Area*
	10	
	11	
	12	
	13	
	14	
	19	
	24	
	25	
	27	
	56	
GNR 984: Listing Notice 2	4	The development of infrastructure, excavation and/or clearance of topsoil and vegetation, and the primary processing of a mineral resource. *These listed activities may have a direct, indirect and cumulative impacts on potential heritage resources within the Imvula Project Area*
	9	
	15	
	17	
	21	
	25	
	27	

Listing Notice	Activity Number	Activity Description
GNR 985: Listing Notice 3	2	The development of infrastructure, widening of roads and excavation and/or clearance of topsoil and vegetation. *These listed activities may have a direct and indirect impact on potential heritage resources within the Imvula Project Area*
	4	
	10	
	12	
	14	
	18	

1.6 Relevant Contact Details

Contact details for the Imvula Project and Digby Wells' project managers, and relevant landowners are provided in Table 1-3 to Table 1-5 below.

Table 1-3: Imvula project manager contact details

Contact person	Bertie Botha
Tel no	017 614 3369
Fax no	011 522 5192
E-mail address	bertie.botha@sasol.com

Table 1-4: Digby Wells project manager contact details

Contact person	Stephanie Aken
Tel no	011 789 9495
Fax no	011 789 9498
E-mail address	stephanie.aken@digbywells.com
Postal address	Private Bag X10046, Randburg, 2125

Table 1-5: Landowner contact details

Contact person	Nelius Greyling
Tel no	082 447 2171
Postal address	neliusg@gmail.com

1.7 Expertise of the Specialist

Justin du Piesanie completed the scoping site visit and compiled the HSR. He obtained his Master of Science (MSc) degree in Archaeology from the University of the Witwatersrand in 2008, specialising in the Southern African Iron Age. He currently holds the position of Heritage Management Consultant: Archaeologist at Digby Wells. He has over 6 years combined experience in Heritage Resources Management (HRM) in South Africa, gaining further generalist experience since his appointment at Digby Wells in Burkina Faso, the Democratic Republic of Congo, Liberia and Mali.

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

Johan Nel assisted with the scoping site visit and reviewed the HSR. He has more than 15 years of combined experience in the field of HRM including archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. He has gained experience both within urban settings and remote rural landscapes. Since 2010 he has been actively involved in environmental management that has allowed me to investigate and implement the integration of heritage resources management into environmental impact assessments (EIA). Many of the projects since have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. This exposure has allowed Johan to develop and implement a HRM approach that is founded on international best practice, leading international conservation bodies such as the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and ICOMOS and aligned to the South African legislation. Johan has worked in most South African Provinces, as well as Swaziland, the Democratic Republic of the Congo, Liberia and Sierra Leone.

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

The curricula vitae of the specialists are attached as Appendix A.

1.8 Restrictions and Limitations

The following restrictions and limitations were experienced as part of this study:

- Identification of resources and the relative age through the review of aerial imagery is dependent on the quality of the image;
- Identification of potential palaeontological resources was completed by archaeologists and will require verification of by a qualified palaeontologist;
- This report does not constitute an impact assessment.

2 Policy and Legal Framework

2.1 Introduction

The NHRA is the overarching legislation that protects heritage resources and regulates their management. The HRM process completed for the Imvula Project was done in accordance with section 38(8), where impacts on heritage are assessed in terms of other legislation – the MPRDA in this instance.

2.2 NHRA

The HRM approach developed and implemented by Digby Wells is founded on section 38(1) and 38(2) of the NHRA. These sections of the Act require that Heritage Resources Authorities (HRA's), in this case SAHRA and Mpumalanga Provincial Heritage Resources Authority (MPRHA), be notified as early as possible of any developments that may exceed certain minimum thresholds. The heritage specialist is required to provide SAHRA and MPHRA with sufficient information regarding the proposed development in order to determine whether a comprehensive Heritage Impact Assessment (HIA) is required. SAHRA and MPRHA should respond within 14 days whether or not a HIA is required, and if required should state which specialist studies should be included.

2.3 MPRDA

The MPRDA stipulates under section 5(4) that, "no person may…mine…on any area without (a) an approved environmental management programme or approved environmental management plan, as the case may be".

Furthermore, the Mineral and Petroleum Resources Development Amendment Bill, 2013 (Bill 13 of 2013) (MPRDAB) states under section 17 as an amendment to section 22 of the MPRDA that, "Any person who wishes to apply for a mining right must simultaneously apply for an environmental authorisation…". This process is regulated under the NEMA discussed below.

2.4 NEMA

The NEMA stipulates under section 2(4)(a) that sustainable development requires the consideration of all relevant factors including (iii) the disturbance of landscapes and sites that constitute the nation's cultural heritage must be avoided, or where it cannot be altogether avoided, is minimised and remedied.

Under section 23(2)(b) it is required to "identify, predict and evaluate the actual and potential impact on the … cultural heritage… the risks and consequences and alternatives and options for mitigation of activities, with a view to minimizing negative impacts, maximising benefits and promoting compliance with the principles of environmental management set out in section 2". Section 24(1)(c) and 24(7)(b) state "the potential impact on… cultural heritage of the 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 authorising, permitting or otherwise allowing the implementation of an activity."

2.5 NEM:WA

The NEM:WA section 48 (b) states that when a licensing authority is considering a waste management license, the authority must take into account the pollution likely to be caused by the waste activity will effect cultural heritage within the project area.

(c) states that the authority must ensure that the best environmental options and alternatives that can be taken to prevent pollution and not cause harm to cultural heritage as a result of the waste management activity have been considered

3 Methodology

3.1 Definitions

Sources of risk to heritage resources can, essentially, be divided into three broad categories, as follows:

- **Direct or primary effects** on heritage resources occur at the same time and in the same space as the activity, e.g. loss of historical fabric through demolition work.
- **Indirect, induced or secondary effects** on heritage resources occur later in time or at a different place from the causal activity, or as a result of a complex pathway, e.g. restriction of access to a heritage resource resulting in the gradual erosion of its significance, which is dependent on ritual patterns of access.
- **Cumulative effects** on heritage resources result from in-combination effects on heritage resources acting with a host of processes that are insignificant when seen in isolation, but which collectively have a significant effect. Cumulative effects can be:
  - **Additive**: the simple sum of all the effects, e.g. the total number of new buildings within a historical rural landscape
  - **Synergistic**: effects interact to produce a total effect greater than the sum of the individual effects, e.g. the visual effect of the increase of new buildings within a historical rural landscape.
  - **Time crowding**: frequent, repetitive impacts on a particular resource at the same time, e.g. the high rate of increase of new buildings within a historical rural landscape.
  - **Neutralizing**: where the effects may counteract each other to reduce the overall effect, e.g. the effect of changes in patterns of cultivation could reduce the overall visual impact of additional new buildings within a historical rural landscape.

- **Space crowding**: high spatial density of impacts on a heritage resource, e.g. density of new buildings resulting in suburbanisation of a historical rural landscape.

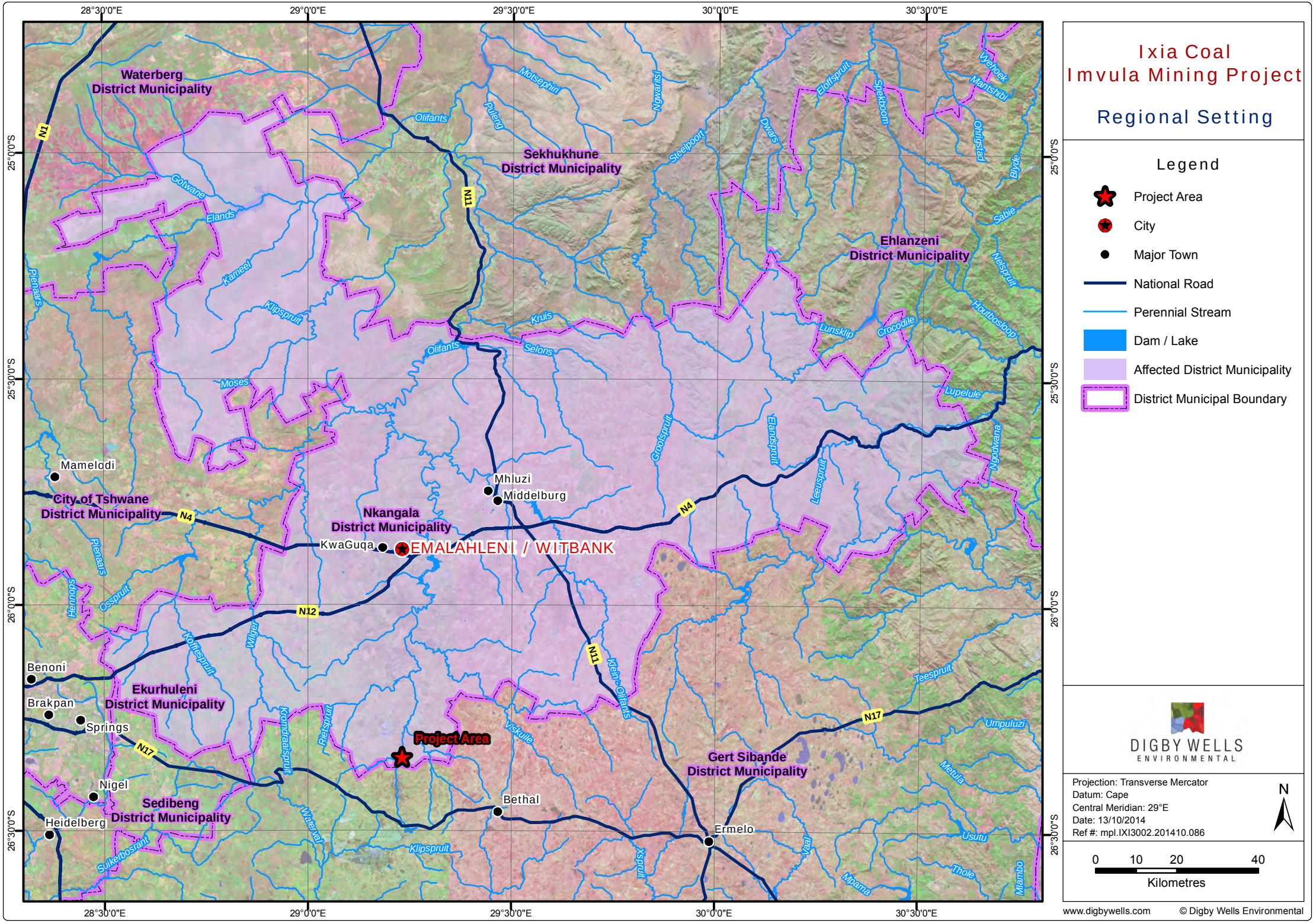
(adapted from Winter & Bauman 2005: 36)

Given that no individual identified heritage resource can exist in isolation to the wider natural, social, cultural and heritage landscape, three concentric study areas were defined for the purposes of this study. Defining these 'zones of influence' had a two-fold purpose:

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

The three zones of influence are as follows:

- **Primary Zone of Influence** (also referred to as the *site-specific* study area): This area was defined as the bounded project area i.e. the farm portions, within which the development will physically intrude through the construction of project infrastructure and project-related activities. The affected farm portions are listed in Table 1-1 and the site-specific study area depicted in Figure 3-3.
- **The Secondary Zone of Influence** (also referred to as *local* study area): This area was defined as the immediate surrounding properties / farms, as well as the affected local municipality. The local study area was specifically examined to provide a backdrop to the socio-economic conditions within which the proposed development will occur. The local study area furthermore provided the local development and planning context that may contribute to cumulative impacts. The local study area is depicted in Figure 3-2.
- **The Tertiary Zone of Influence** (also referred to as the *regional* study area): This area was defined as the district municipality. Where necessary, the regional study area was extended outside the boundaries of the district municipality to include much wider regional expressions of specific types of heritage resources and historical events. The regional study area, depicted in Figure 3-1, also provided the regional development and planning context that may contribute to cumulative impacts.



Ixia Coal
Imvula Mining Project

Regional Setting

Legend

- Project Area
- City
- Major Town
- National Road
- Perennial Stream
- Dam / Lake
- Affected District Municipality
- District Municipal Boundary

DIGBY WELLS ENVIRONMENTAL

Projection: Transverse Mercator
Datum: Cape
Central Meridian: 29°E
Date: 13/10/2014
Ref #: mpl.IXI3002.201410.086

N

0 10 20 40
Kilometres

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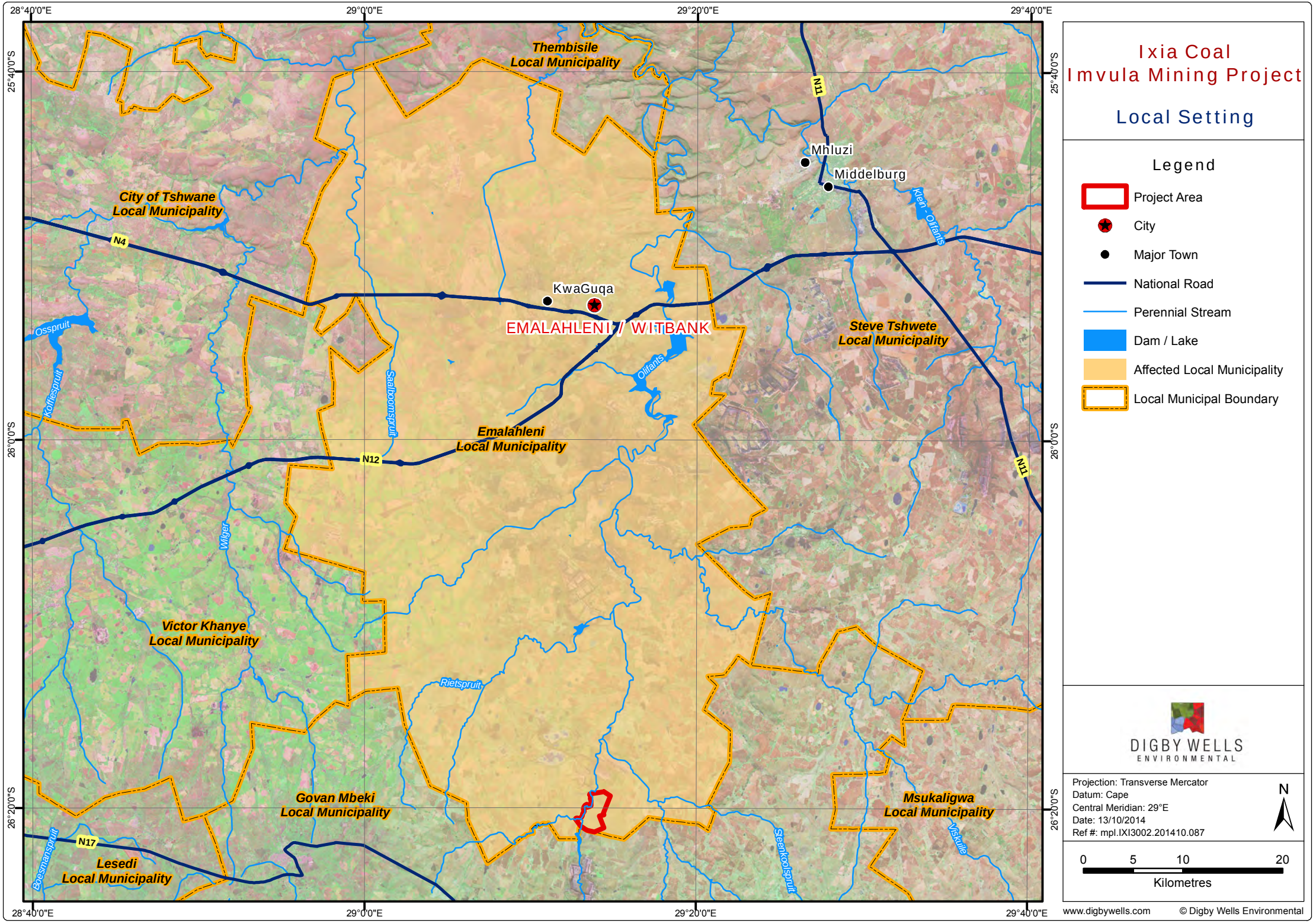


Ixia Coal
Imvula Mining Project

Local Setting

Legend

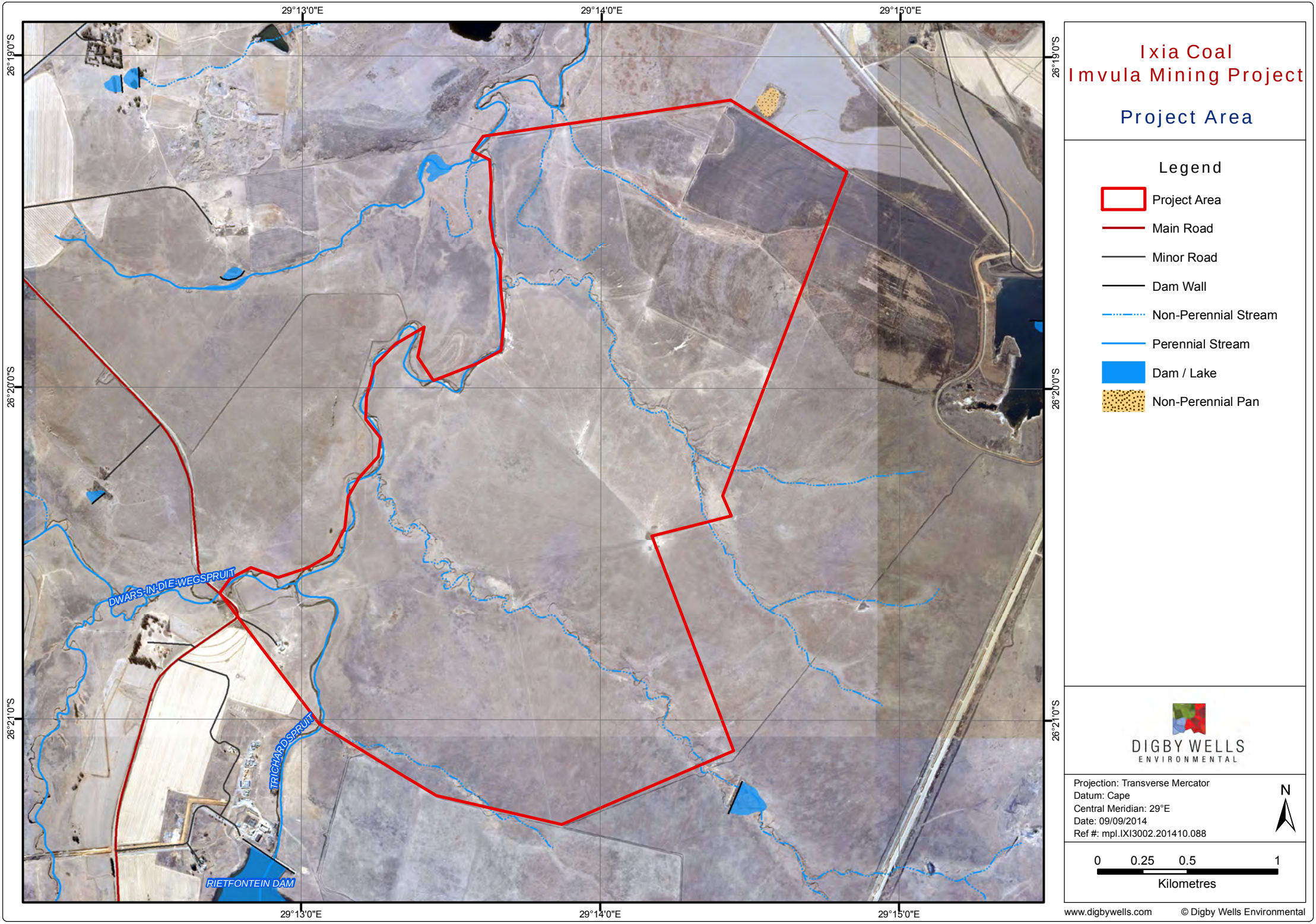
- Project Area
- City
- Major Town
- National Road
- Perennial Stream
- Dam / Lake
- Affected Local Municipality
- Local Municipal Boundary

DIGBY WELLS ENVIRONMENTAL

Projection: Transverse Mercator
Datum: Cape
Central Meridian: 29°E
Date: 13/10/2014
Ref #: mpl.IXI3002.201410.087

N

0 5 10 20
Kilometres



Ixia Coal
Imvula Mining Project

Project Area

Legend

- Project Area
- Main Road
- Minor Road
- Dam Wall
- Non-Perennial Stream
- Perennial Stream
- Dam / Lake
- Non-Perennial Pan

DIGBY WELLS ENVIRONMENTAL

Projection: Transverse Mercator
Datum: Cape
Central Meridian: 29°E
Date: 09/09/2014
Ref #: mpl.IXI3002.201410.088

N

0 0.25 0.5 1
Kilometres

3.2 Data Collection

3.2.1 Qualitative Data Collection

Data collection was aimed at information gathering relating to known heritage resources within and surrounding the proposed pipeline route. Information was obtained through intensive research using a variety of primary and secondary sources such as peer reviewed journals, textbooks and records, maps, photographs and plans.

Published literature was collated and analysed to determine relevance to this HSR. Previously completed heritage studies that were conducted in the surrounding areas were reviewed to expand on the background information discussed. The findings provide evidence-based inferences to be made with regard to the potential for, and description of heritage resources that are likely to occur in the project region. Sources used to inform the findings are fully referenced under Section 9 of this report and are briefly listed below.

Table 3-1: Relevant reviewed published sources and heritage studies

Palaeontology	■ Bamford, 2012 ■ Bamford, 2014 ■ Rubidge, 2013a ■ Rubridge, 2013
Stone Age	■ Deacon & Deacon, 1999 ■ Esterhuysen & Smith, 2007 ■ Lombard, et al., 2012 ■ Van Schalkwyk & Pelser, 2000
Farming Community	■ Esterhuysen & Smith, 2007 ■ Huffman, 1980 ■ Huffman, 2007 ■ Maggs, 1974 ■ Maggs, 1976 ■ Makhura, 2007
Historical and Colonial period	■ Delius & Cope, 2007 ■ Makhura, 2007 ■ Pakenham, 1979 ■ Pistorius, 2008a ■ Pistorius, 2008b

	■ Price, 1992 ■ Von der Hyde, 2013 ■ Willsworth, 2006
Planning documents	■ Statistics SA, 2013 ■ eMalahleni Local Municipality, 2014 ■ Nkangala District Municipality, 2013
General & Guidelines	■ Acocks, 1975 ■ Winter & Baumann, 2005

Relevant Heritage Studies		
Author	**Report type**	**Area / property / project**
van Schalkwyk, 2003a	AIA	Kriel Mine Extension
van Schalkwyk, 2003b	AIA	Secunda-Mozambique Gas Pipeline

In addition, a database survey was conducted by consulting the following repositories:

- South African Heritage Resources Information System (SAHRIS); and
- University of the Witwatersrand Archaeology Site Database.

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

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

Cartographic sources referred to in this report are listed in Table 3-2.

Table 3-2: Cartographic sources relevant to the project

Cartographic Sources and Aerial Imagery		
Map series	**Name / number**	**Date**
Major Jackson	Bethal Sheet 5	1905

Cartographic Sources and Aerial Imagery						
Aerial photographs						
Job no.	**Flight plan**	**Photo no.**	**Map ref.**	**Area**	**Date**	**Reference**
340	009	16465	2528, 2628	Pretoria, East Rand	1954	340/1954
548	008	00967	2528, 2530, 2628, 2630, 2728, 2730	Pretoria, Barberton, East Rand, Mbabane, Frankfort, Vryheid	1968	548/1968
750	005	00175	2628, 2728, 2730, 2630, 2528, 2530	East Rand, Frankfort, Vryheid, Mbabane, Pretoria, Barberton	1975	750/1975
881	009	0119	2526, 2528, 2530, 2626, 2628, 2630	Rustenburg, Pretoria, Barberton, Wes Rand, East Rand, Mbabane	1984	881/1984

3.2.2 Quantitative Data Collection

A scoping survey of the proposed Imvula Project area was conducted by Justin du Piesanie and Johan Nel (refer to Appendix A for detailed CV). The survey was completed over three days from 11 to 13 February, and focused mainly on undisturbed areas outcrops and watercourses within the project area.

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

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

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

3.3 Site Naming

Sites identified during field surveys are prefixed by the SAHRIS case number assigned to the study followed by the map sheet number, relevant period / feature code and site number, i.e. **8831/2629AC/BGG-001.**

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

Sites identified in previous relevant studies have been named according to the relevant section within the NHRA, period code / feature code and site number, i.e. **S.34/Ste/001.** Information pertaining to the original report has been recorded in the site table in Appendix B.

Table 3-3: Period codes used in this HSR

Period / Feature	Period / Feature Code
Burial Grounds and Graves	BGG
Feature	Ft
Farming Community	FC
Palaeontological	Pa
Ste	Structure
Wf	Werf

4 Cultural Heritage Baseline Description

4.1 Introduction

The baseline cultural heritage presented is divided into regional, local and site specific study area as defined under Section 3.1. The various periods considered within this section are discussed below to provide context for any identified heritage within and around the project area. This cultural historical context is necessary to adequately define the significance and assess the levels of impact caused by the proposed realignment of the distribution lines.

The following time periods are discussed as part of the cultural heritage baseline:

Table 4-1: Periods considered in the cultural heritage baseline profile (adapted from Winter & Bauman 2005: 36)

1 Palaeontological and geological
Precambrian to late Pleistocene (1.2 billion to late 20 000 years ago)
2 Indigenous
Early Stone Age (3 million to 300 00ya) (ESA)
Middle Stone Age (c 300 000 to 30 000 ya) (MSA)
Later Stone Age (c 30 000 to 2000 ya) (LSA)
Late Farming Community (c. 1000 to 1840) (LFC)
3 Colonial
British colony (1814 -1910)
4 Historical
Union of South Africa (1911-1961)
Apartheid Republic of South Africa (1961-1994)
Democratic Republic of South Africa (1994-Present)

4.2 Regional Study Area

4.2.1 Stone Age

Evidence for the three phases of the Stone Age (i.e. Early (ESA), Middle (MSA) and Late (LSA)) have previously been recorded in the Mpumalanga Province (See Table 4-2). The ESA is defined by the occurrence of large hand axes and cleavers, which can be found in layers dating between ± 2 Million years BP and 250 000 years BP (Esterhuysen & Smith, 2007). However, the majority of identified Stone Age sites have been limited to lithic scatters dating to the MSA (±250 000 to 20 000 year ago (kya)) and LSA. The MSA can be defined by the occurrence of blades and points produced from good quality raw material. (Deacon & Deacon, 1999). It is during this period that modern humans evolved and the emergence of behavioural patterns comparable to contemporary humans can be identified in the archaeological record (Mitchell, 2002).

Figure 4-1: Examples of ESA and MSA stone tools found in Southern Africa (Kuman, et al., 2005)

The LSA is dated to approximately 20 kya and can be characterized by the presence of microlithic technology and strong signs of ritual practises and complex societies, as well as rock art. Microlithics are produced from very fine-grained material such as quartz or chert, and often used as composite tools where they are hafted onto sticks for arrows. (Deacon & Deacon, 1999).

The identified occurrences may be associated with the Bushmen who were active in the region. Mr G.P. van Zyl recounts stories of his grandfather shooting Bushmen who were raiding livestock on his farm and the occurrence of rock art in the region (Van Schalkwyk & Pelser, 2000).

Table 4-2: The South African and Lesotho Stone Age sequence (Lombard, et al., 2012)

Period	Technocomplex	Also known as (including regional variants)
Later Stone Age <40 ka	ceramic final LSA <2 ka	Ceramic post-classic Wilton, Late Holocene with pottery (Doornfontein, Swartkop)
	final LSA 0.1-4 ka	Post-classic Wilton, Holocene microlithic (Smithfield, Kabeljous, Wilton)
	Wilton 4-8 ka	Holocene microlithic
	Oakhurst 7-1 ka	Terminal Pleistocene / early Holocene non-microlithic (Albany, Lockshoek, Kuruman)
	Robberg 12-18 ka	Late Pleistocene microlithic
	early LSA 18-40 ka	(informal designation) Late Pleistocene microlithic

Period	Technocomplex	Also known as (including regional variants)
Middle Stone Age >20 ka - <300 ka	final MSA 20-40 ka	(informal designation) MSA IV at Klasies River, MSA 4 generally
	Sibudu 45-58 ka	late MSA / post-Howieson's Poort or MSA III at Klasies and MSA 3 generally (all informal designations)
	Howieson's Poort 58-66 ka	
	Still Bay 70-77 ka	
	pre-Still Bay 72-96 ka	(informal designation)
	Mossel Bay 77-105 ka	MSA II at Klasies River, MSA 2b generally (Pietersburg, Orangian)
	Klasies River 105-130 ka	MSA I at Klasies River, MSA 2a generally (Pietersburg)
	early MSA 130-300 ka	(informal designation)
Early Stone Age >200 ka	ESA-MSA transition >200-600 ka	(informal designation) (Fauresmith, Sangoan)
	Acheulean 300-1.5 Ma	
	Oldowan 1.5-2 Ma	

4.2.2 Farming Community Period

The LSA is followed by the Farming Community Period (Makhura, 2007), which is associated with the spread of Bantu-speakers into southern Africa who for the first time settled in communities, cultivated crops and herded livestock. In South Africa, this period too is divided into the Early (EFC), and Late Farming Community (LFC) (Huffman, 2007). Climatic conditions during the EFC were not conducive to intensive occupation, who preferred the savannah area below 1000 m (Maggs, 1974). Permanent settlement of the region by farming communities began during the LFC from approximately the 16th century onwards (Esterhuysen & Smith, 2007; Makhura, 2007). Generally, these groups preferred to settle along rivers to utilise alluvial soils suited for agricultural purposes and near natural outcrops to provide material for the construction of settlements. Archaeologically, the primary identifiers of Farming Community Sites include material culture remains and stonewalled settlements during the LFC.

Huffman (1980) demonstrates that by considering three dimensions of ceramics, i.e. (1) profile; (2) design layout; and (3) motif categories, one could reliably recognise groups. The larger groups are termed 'traditions' and sub-groups termed 'facies'. These facies can be employed as temporal markers that provide tentative dates for sites where diagnostic

ceramics are found. Guided by this process of ceramic analysis, the most common ceramic facies' identified in the region are summarised in Table 4-3.

Table 4-3: Common ceramic facies found in Mpumalanga

Facies	Period	Key Characteristics
Uitkomst	1650 CE – 1820 CE	Stamped arcades, appliqué and blocks of parallel incisions, stamping and chord impressions
Rooiberg	1650 CE – 1750 CE	Stamped rim band, mixture of stamped and incised bands, arcades and triangles in the neck
Icon	1300 CE – 1500 CE	Multiple incised bands separated by colour and lip decorations on bowls
Madikwe	1500 CE – 1700 CE	Multiple bands of cord impressions, incisions, stabs and punctates separated by colour
Letaba	1600 CE – 1840 CE	Hatched bands on shoulder, below black and red triangles
Klingbeil	1000 CE – 1200 CE	Triangles in neck bordered with slashes, punctates on shoulder

Stonewalled settlements occur over much of southern Africa and are the most visible sign of agro-pastoralist settlement. Classification is based on construction techniques, type of coursing, height, shape and internal division (Huffman, 2007, p. 31). Stonewalling that is known to occur in the region is divided into two clusters summarised in Table 4-4 below:

Table 4-4: Stone walling clusters

Central Cattle Pattern			
Moor Park Cluster		**Ntsuanatsatsi Cluster**	
Moor Park	14th-16th Century	Type N	15th-17th Century
Melora	16th Century - ?	Badfontein	16th Century
Kwamaza	18th Century – Historic	Doornspruit	19th Century
		Klipriviersberg	19th Century
		Type V	19th Century
		Molokwane	19th Century
		Type Z	19th Century
		Type B	19th Century
		Tukela	19th Century

KwaMaza, found in Mpumalanga, follows a layout with beehive huts located at the back and the cattle kraals and central court built to look the same with two lobes, for cattle and calves, and a side chamber for a small court (Huffman, 2007). Type N stone walling dates to between the 15th and 17th centuries (Maggs, 1976). During this period it spread across the Vaal and in the Free State it led to the development of Type V. Consisting of the standard core of cattle enclosures surrounded by beehive huts, it usually lacks the presence of an outer wall. Additionally, it is believed that corbelled huts evolved from this type (Huffman, 2007). Western Sotho-Tswana built Molokwane walling. Aerial views depict the style resembling a 'sunflower' (Huffman, 2007: 38) with multiple arcs in the households surrounding the core. Type Z walling, associated with Southwestern Sotho-Tswana is similar to that of Molokwane but differs in its configuration which is a loose circle of individual bilobial households (Huffman, 2007). The Koni, an Nguni group in Mpumalanga, have circular settlements that consist of cattle lanes and terrace walls. Usually the cattle lane leads into a central enclosure, an exit on the opposite side allowed access to kraals attached to the central wall. This organisation may represent a left / right division. Later, Ledwaba Ndbele built similar walling around Polokwane. Huffman (2007: 41) refers to this type as Badfontein.

4.2.3 The Colonial and Historical Period

During the 18th and 19th century, the relatively peaceful occupation of the region was disrupted by the events Difeqane (Sotho) / Mfecane (Zulu). Thought to be predominantly associated with the expansion of the Zulu Kingdom, the period is better characterised as the rise of power blocks with a wide range of political centralisation and waves of violent population displacements (Makhura, 2007). For example, the Pedi under King Thulare (1780 CE – 1822 CE) embarked on a process of centralisation in which subordinate communities retained their local independence under some tributary obligations allowing the Pedi to emerge as the strongest power in the north-east. In the wake of the defeat of the Pedi in 1822 by Mzilikazi, and the dispersion of the Sotho in the region, the Highveld of Mpumalanga was left to intrusive groups such as the Swazi.

The political unrest prevalent in the region at the time facilitated colonial penetration with the establishment of the first Boer settlement at Ohrigstad in 1845 (Delius & Cope, 2007). During this period, large groups were dispersed or pushed out of the interior, leaving what was perceived as an unoccupied landscape. Boers quickly moved in, claiming land for themselves and exploited the natural resources. Historically, farmers in the vicinity exploited the coal deposits since the 1860s, but purely for domestic use. It was not until the discovery of diamonds in Kimberly in 1867 and gold on the Witwatersrand in 1886 that the exploitation of the coal deposits was for commercial purposes. It was due to this demand that the town Bethal was proclaimed in 1880 (Pistorius, 2008a). It was shortly after this that war erupted between the British Forces and Boers, resulting in the second Anglo-Boer War starting in 1899.

4.2.4 Development Context

The project area is located within the Nkangala District Municipality (NDM). The development context is encapsulated within the NDM Integrated Development Plan (NDM-IDP) (Nkangala District Municipality, 2013). The NDM-IDP was reviewed to supplement the assessment of potential sources of risk and positive impacts on heritage resources that may occur within the NDM.

The NDM-IDP presented a plan to guide socio-economic development within the district municipality. The NDM-IDP identifies tourism growth promotion and the preservation and development of heritage sites as a "Programme of Action" within the Provincial Growth and Development Strategy (Nkangala District Municipality, 2013). Here, the primary corridors of the N4 and N12 routes present significant opportunities for economic spin-off and tourism potential.

4.3 Local Study Area

A review of relevant previously completed heritage studies informed the cultural baseline description for the local study area. The majority of identified heritage resources are associated with the colonial and historical period, with only 15% of identified sites affiliated with Farming Communities (See Figure 4-2). As a result of these finding, the discussion for the local study area was focussed on these time periods.

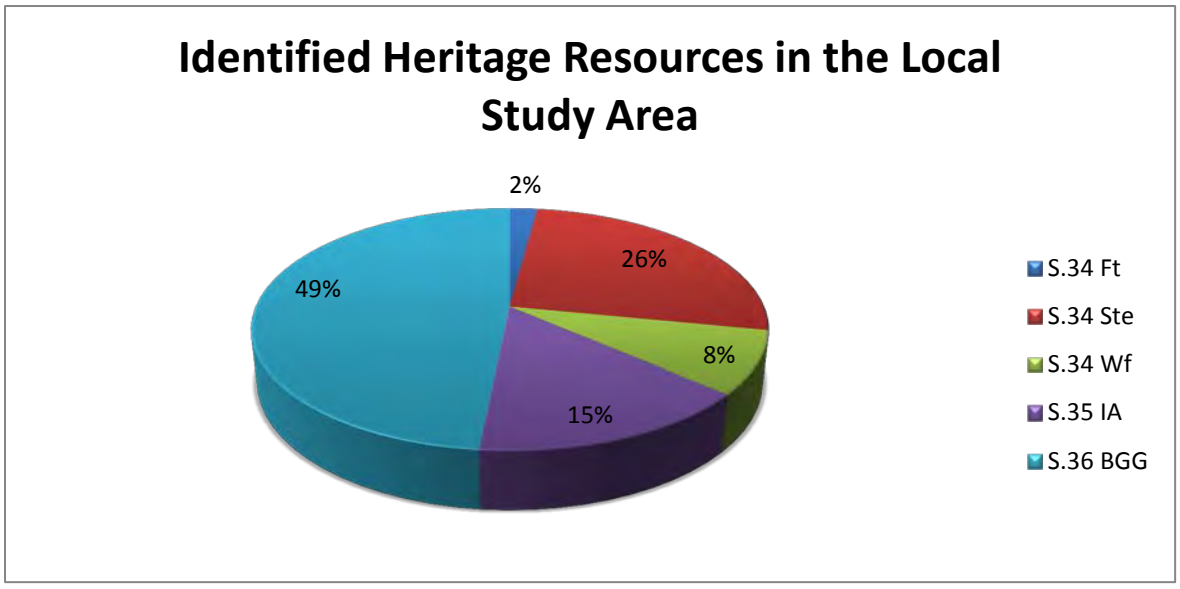


Figure 4-2: Identified heritage resources in the local study area

4.3.1 Geology and Palaeontology

Topographically, the project area is defined by low rolling hills with an elevation of between 1500 m and 1750 m above sea-level (Acocks, 1975). Geologically, two stratigraphic units are present in the project area:

- The Karoo (Jurassic) Dolerite Suite; and

- The *Madzaringwe Formation* of the Karoo Supergroup.

The significance accorded to the Karoo Dolerite Suite is zero (http://www.sahra.org.za/fossil-layers/karoo-jurassic-dolerite-suite), confirmed by among others Rubidge (2013a & b). The rock types include intrusive dolerites, associated diatremes that are plutonic igneous rocks that do not contain fossils (Rubidge, 2013a; Rubidge, 2013b). The geological age of this suite is c. 183 Ma associated with the Early Jurassic mass extinction event.

The lithologies of the *Madzaringwe Formation* comprise fluvial sandstone, shale, mudstone and coal that are interrupted by Karoo-aged intrusive dolerite dykes. The significance accorded to this formation is very high (http://www.sahra.org.za/fossil-layers/madzaringwe-formation). The shale found between the coal and the sandstone outcrops located on the surface do preserve plant fossils, and good quality fossil plants can commonly be found (Bamford, 2014). Fossils that could occur include *Glossopteris* leaves, roots and inflorescences, lycopod and sphenophyte stems, ferns, cordaitaleans and early gymnosperms (Bamford, 2012). Other potential fossils include the rare *Breytenia* plant fossil. As of 2013, there was only one specimen of the fossil *Breytenia* available for research. Work completed by Digby Wells in nearby Breyten some 75 km to the east in 2013 identified at least four other examples of this fossil type.

Coal is formed by the compression and heat alteration of plant matter. Through this formation process, the coal is altered to the point that any potential plant fossil remains are unrecognisable (Bamford, 2014).

4.3.2 The Farming Community Period

All sites identified in the local study area through the relevant heritage studies have been attributed with characteristic features of the LFC, specifically stone walling (van Schalkwyk, 2003a; 2003b). From the aerial imagery, it would appear as if these sites are affiliated with Type V (See Figure 4-3 to Figure 4-8) or Badfontein Walling , as defined by Huffman (2007, p. 41).

However, LFC settlements potentially associated with Nguni homesteads were recorded during the scoping survey (See Section 4.5 below). The Nguni are believed to follow the Central Cattle Pattern, a model derived from the worldview of the Nguni and used to understand settlement organisation (Huffman, 2001). Tangible indicators for these sites include a semi-circle of beehive hut foundations around a central cattle area, situated between a middle zone for ease of access to grazing land (Huffman, 2007).

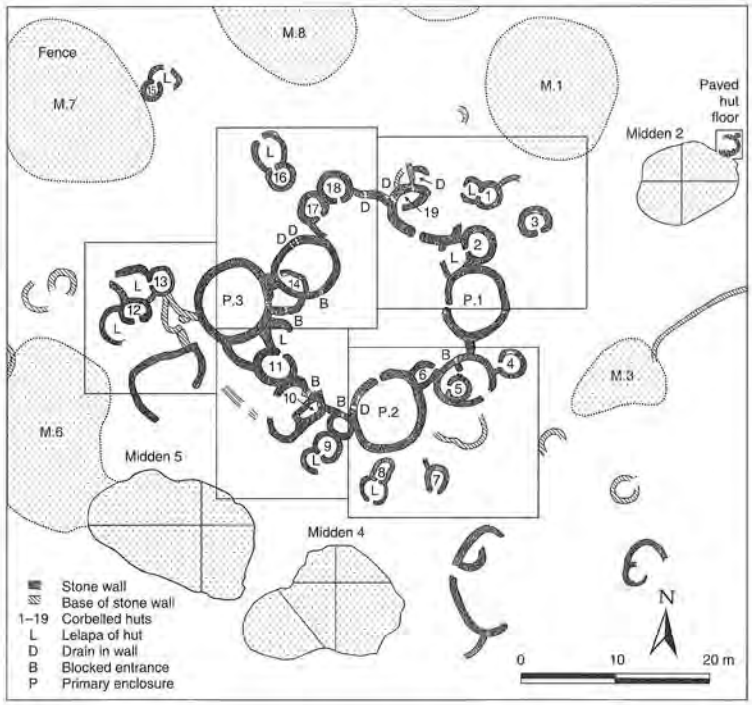


Figure 4-3: Type V Settlement (Huffman, 2007)

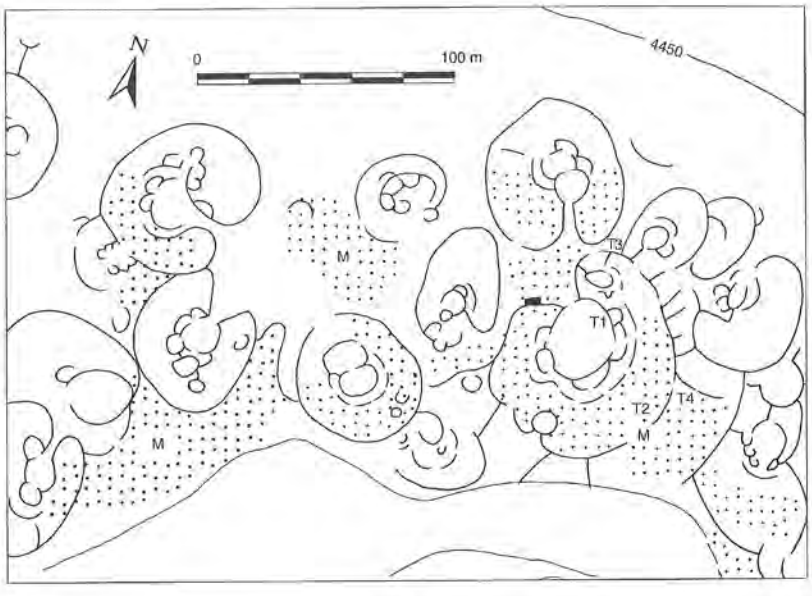


Figure 4-4: Badfontein Settlement (Huffman, 2007)

Figure 4-5: Example of LFC walling – Type V

Figure 4-6: Example of LFC walling – Type V

Figure 4-7: Example of LFC walling – Type V

Figure 4-8: Example of LFC walling – Type V

4.3.3 The Colonial and Historical Period

During the 2nd Anglo-Boer War, events within the local study area culminated with the Battle of Bakenlaagte on the 30th of October 1901 some 5 km from the project area. Lieutenant Colonel George Benson's No. 3 Flying Column set out from Syferfontein to march north-west to the Bakenlaagte farmstead where they intended to set up camp. Camp was reach and established by the advance guard, but by midday the rear-guard was still some distance away hampered by unfavourable weather conditions (von der Heyde, 2013).

In retaliation to Benson's successful night raids on the Boer forces on the Highveld, General Louis Botha rushed back from an unsuccessful invasion of Natal to join Groblar and his planned attack on Benson and his troops (von der Heyde, 2013). Botha ordered all available Boer soldiers to attack Benson's Column and eradicate the threat of night raids on the Boers (Pakenham, 1979; Willsworth, 2006). Due to the misty and wet conditions, Benson's column was divided, providing Botha with a great advantage when he arrived with his 800 reinforcements. Outnumbered four to one, the rear-guard was annihilated after a 20 minute gun battle. The result of this attack allowed the main Column time to deploy and set up a defensive perimeter under Lt Colonel Wools-Sampson. This deployment prevented the attacking Boer forces from riding on and capturing the main Column as originally planned. The Boers left the field with whatever spoils they could carry and the British transported the 134 wounded to the entrenched camp during the night (Willsworth, 2006).

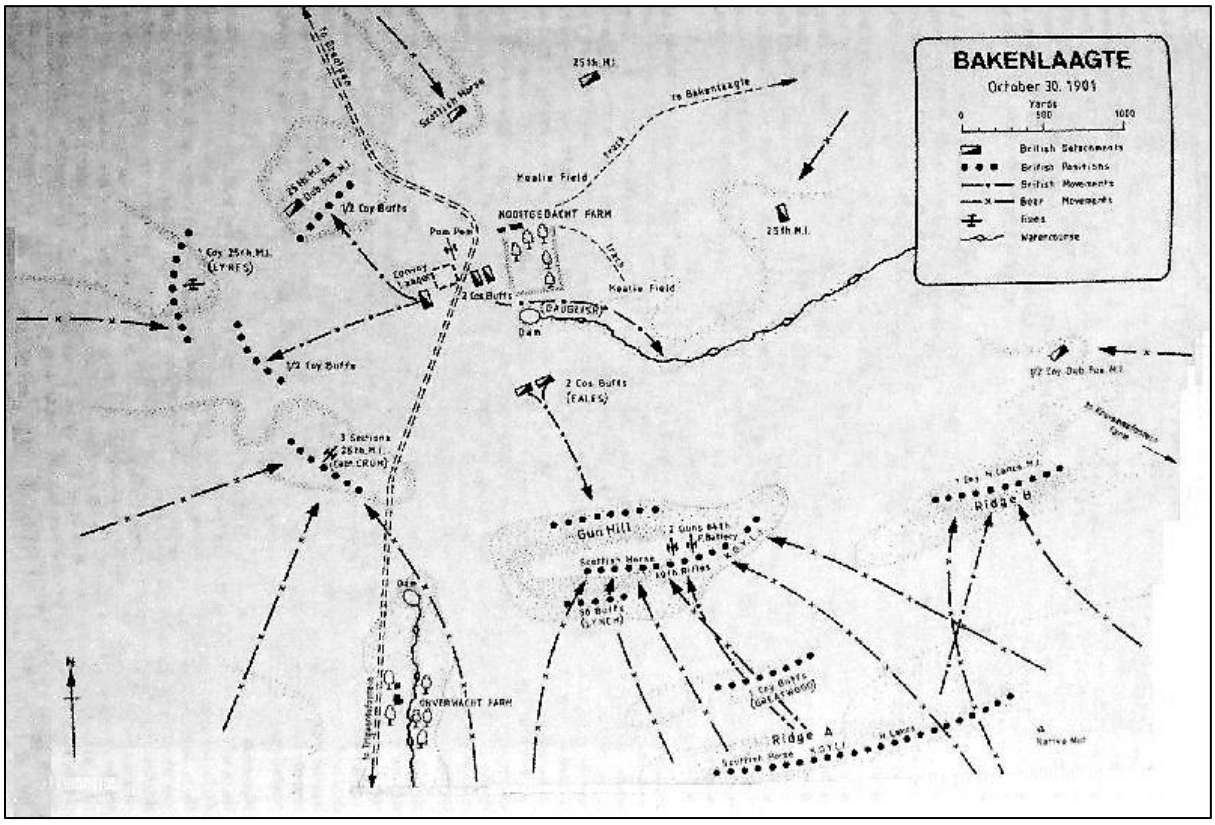


Figure 4-9: Plan of the Battle of Bakenlaagte (Price, 1992)

After the war, the area focussed on the coal mining industry as a source of cheap energy for gold mining activities on the Witwatersrand. The town of Trichardt, named after the son of famed Voortrekker Louis Trichardt was proclaimed in 1906. This was followed by the proclamation of the town Kinross in 1915. This town acted as the railhead for the line between the mines in Springs and the coal fields in Breyten. The railway was constructed by Scottish engineers who named the town after Kinross in Scotland. It was not until the 1950s that mines in the area surrounding Kinross came into operation, exploiting the coal fields (Pistorius, 2008b).

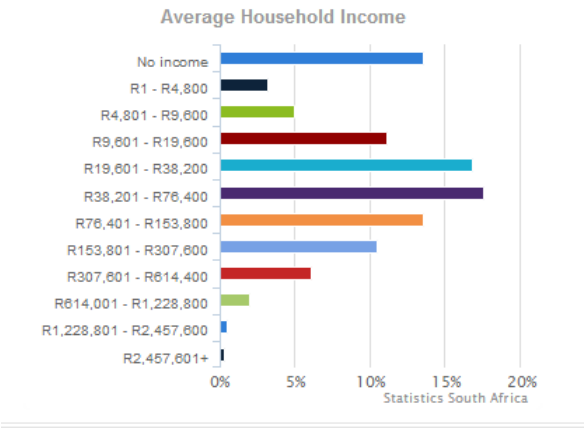
4.3.4 Development Context

The project area is situated within the eMalahleni Local Municipality (ELM). According to the 2011 census data (Statistics SA, 2011) the ELM has a total population of 395 466 people, of which 81.3% are black, 15.7% are white and the remaining 3% being made up of other ethnic groups. Of this total population, on 190 662 people are considered economically active, and of these 27.3% are unemployed (Statistics SA, 2011).

These statistics indicate that the ELM is economically vulnerable, and efforts to promote socio-economic development are key.

Table 4-5: Summary of the employment status and household income of the eMalahleni Local Municipality population (Statistics SA, 2011)

Employment Status	Number
Employed	138 548
Unemployed	52 114
Discouraged Work Seeker	9 612
Not Economically Active	81 494



Income	Percentage
No income	13,5%
R1 - R4,800	3,2%
R4,801 - R9,600	5%
R9,601 - R19,600	11,1%
R19,601 - R38,200	16,8%
R38,201 - R76,4000	17,5%
R76,401 - R153,800	13,5%
R153,801 - R307,600	10,5%
R307,601 - R614,400	6,1%
R614,001 - R1,228,800	2%
R1,228,801 - R2,457,600	0,5%
R2,457,601+	0,3%

Industries leading employment growth include trade, mining and manufacturing. Comparison of 2001 and 2011 statistics, indicates increased employment in the mining, construction, community services and finance sectors; trade decreased by 3% (Statistics SA, 2011).

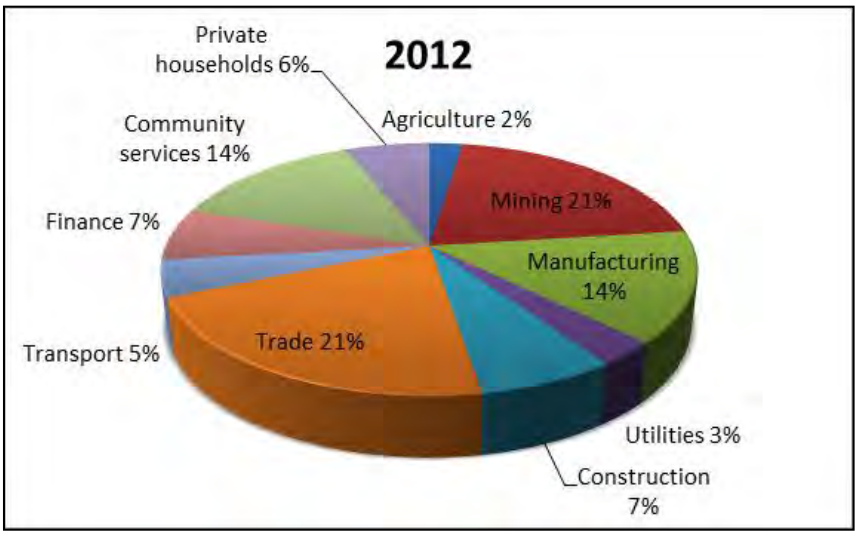


Figure 4-10: Employment sectors within the ELM (eMalahleni Local Municipality, 2014)

These dominant contributing sectors are reflected in the ELM IDP as the following key areas for economic development:

- Supporting industry to the mining sector;
- Diversification of the manufacturing sector;
- Establishing an Agriculture Development and Farmer Support Plan to stimulate the agricultural sector; and
- Facilitating the business tourism industry.

Acknowledgment of the significance of and potential for heritage to contribute to economic development is required. This has been done in part in the ELM IDP spatial and development plan (2014, p. 87), acknowledging the potential heritage significance in the local study area.

4.4 Site Specific Study Area

On the 1905 Major Jackson Map, there is a cluster of structures at the river confluence to the south-west of the project area (See Figure 4-11).

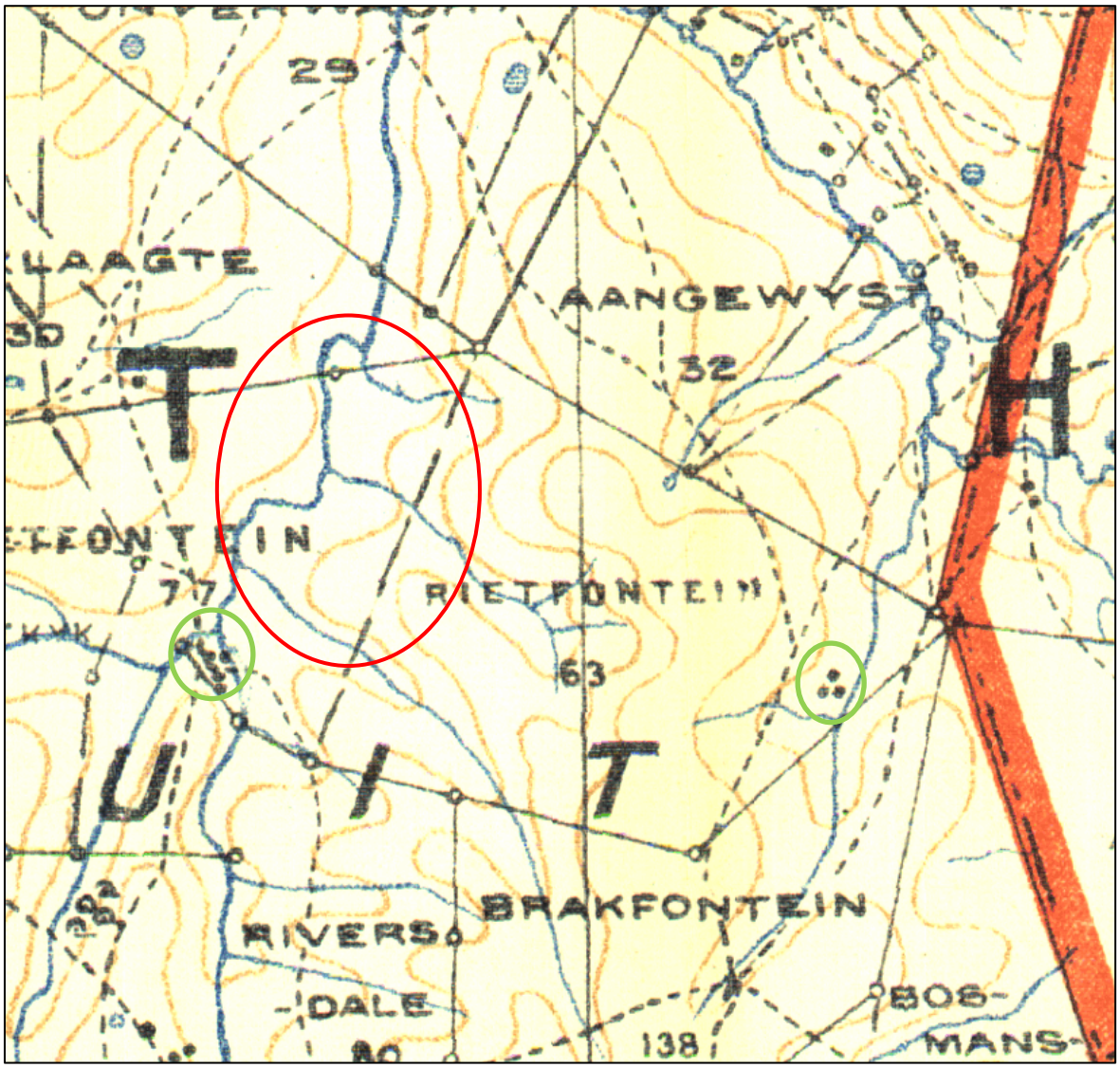


Figure 4-11: 1905 Major Jackson Bethal (Sheet 5) map with the current Imvula Project area indicated in red, and potential structures in green.

Historical aerial imagery for the Imvula Project area indicates very gradual changes to the project area since 1954. In 1954, the project area is dominated by grazing areas with a section of agricultural fields to the north. Approximately six structures were identified within the project area in 1954 and are concentrated around the agricultural fields (See Figure 4-12). By 1968, only five structures are visible, two of which were present in 1954 (See Figure 4-13). In 1975, only one structure (present in 1968) is visible (See Figure 4-14) and one new structure is present in 1984 (See Figure 4-15). In general, the cultural landscape within the project boundaries has not changed significantly. The project area has primarily been altered through agricultural activities over time. However, mining activities concentrated on the properties directly adjacent to the project boundaries have altered the sense-of-place.

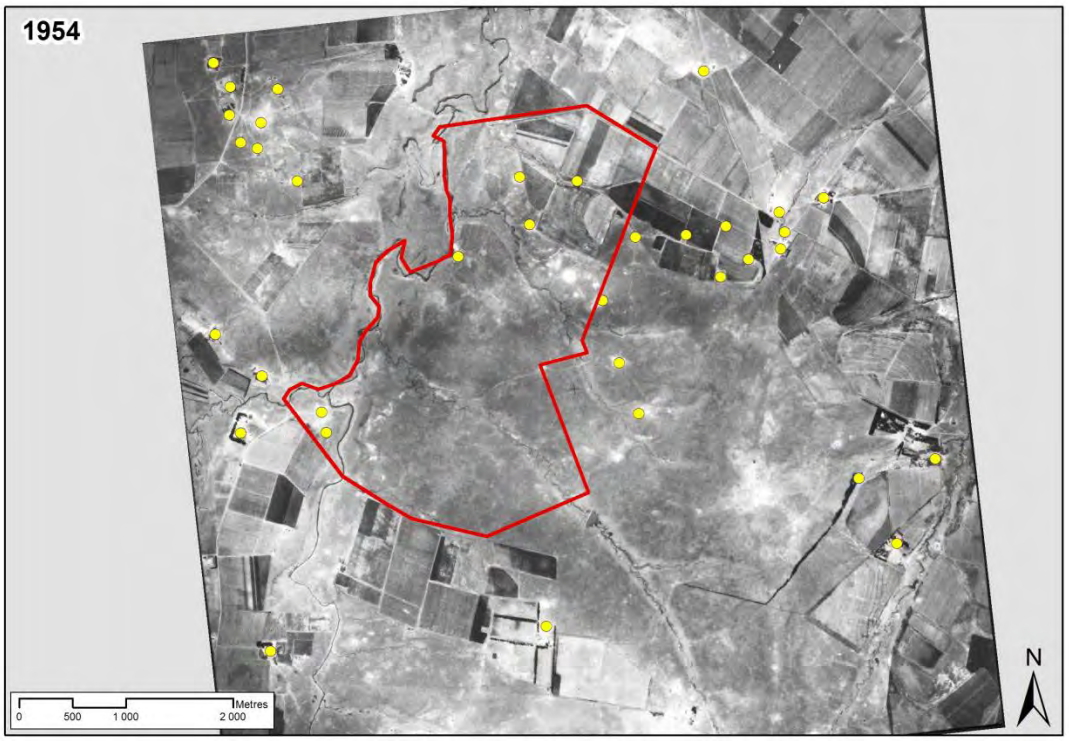


Figure 4-12[1]: 1954 aerial imagery of the Imvula Project area.

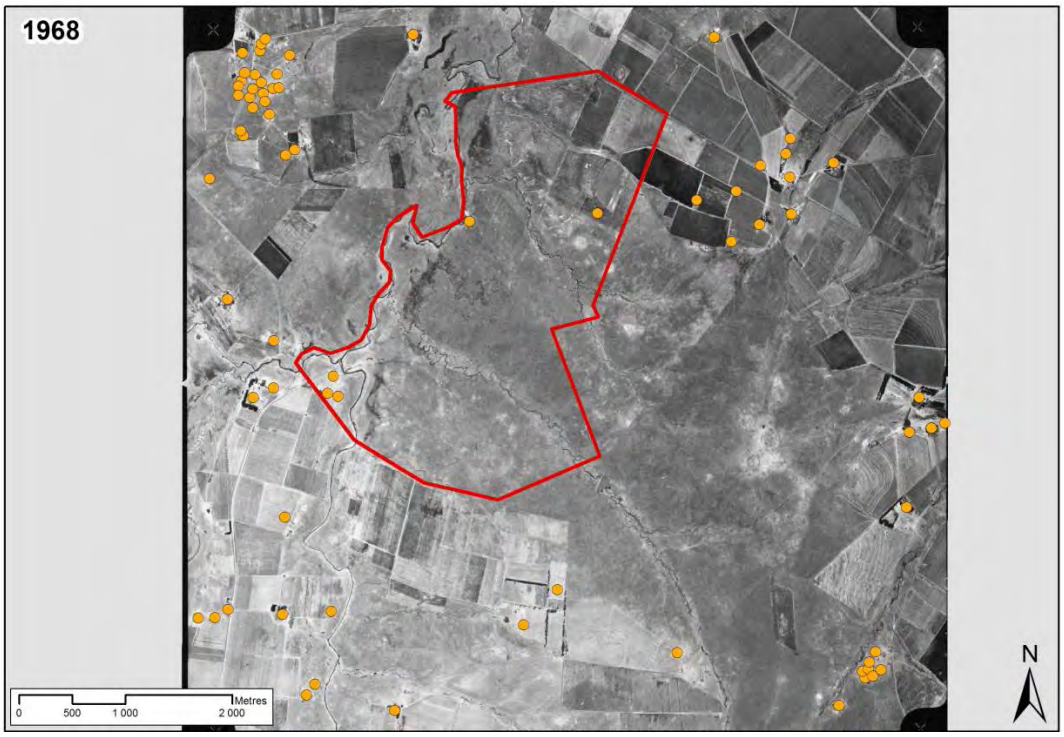


Figure 4-13: 1968 aerial imagery of the Imvula Project area

[1] Dots on aerial imagery in figures indicate the location of potential structures.

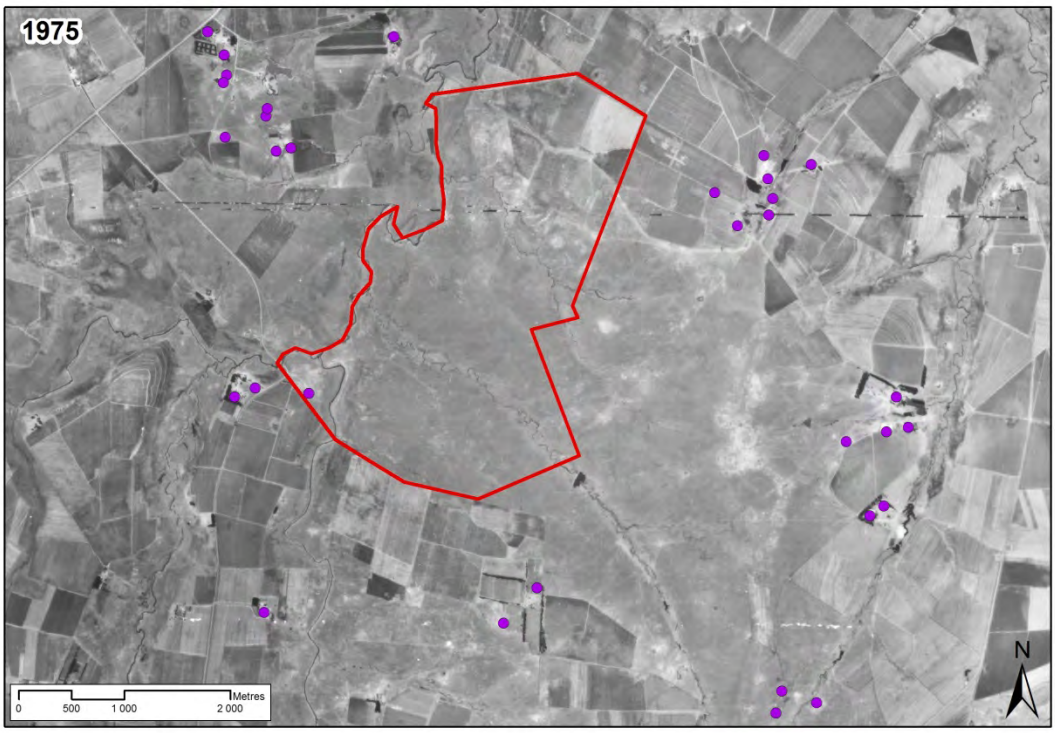


Figure 4-14: 1975 aerial imagery of the Imvula Project area

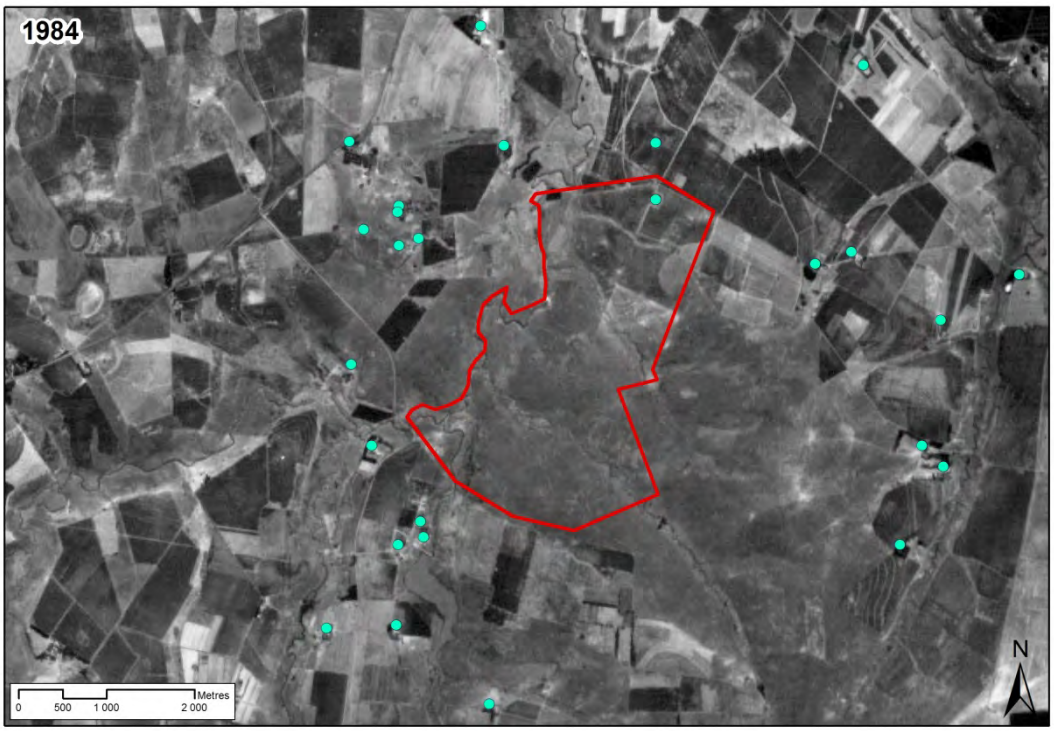


Figure 4-15: 1984 aerial imagery of the Imvula Project area

Figure 4-16: Recent aerial imagery of the Imvula Project area

4.5 Heritage Scoping Survey

The heritage scoping survey was completed from 11 – 13 February 2015. The scoping survey revealed that tangible heritage resources do occur within the boundaries of the project area. Several burial grounds and graves were identified, which seem to be associated with potential LFC and / or historic settlements. Recent aerial imagery clearly indicates relatively traditional settlement patterns of the identified sites. An example is provided in Figure 4-17.

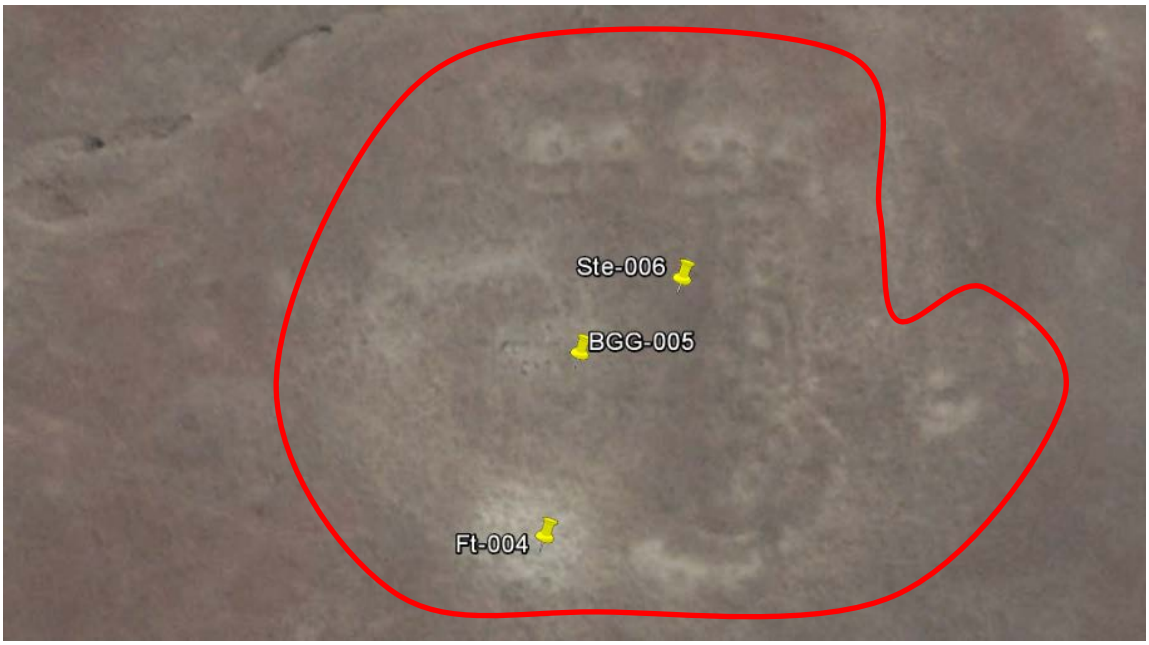


Figure 4-17: Extent of possible historic settlement. Hut foundations to the north of extent.

At least three of these settlements were recorded during the survey, with potential viable deposit. Middens associated with these settlements yielded material culture that could provide information that can contribute to the understanding of early inhabitants of this landscape.

Figure 4-18: Material culture from Ft-001

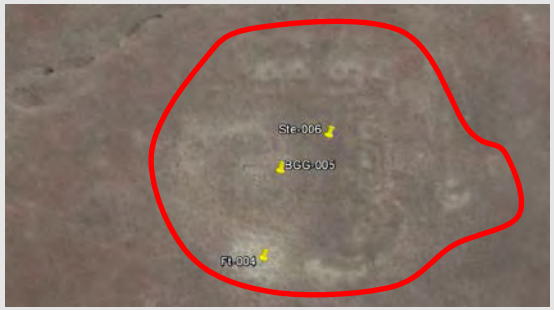
In addition to the tangible heritage resources identified, a female informant who wished to remain anonymous for cultural reasons indicated that initiation schools take place within the area. Although the exact location was not identified during the scoping survey, this information suggests that the potential of intangible heritage resources being located within the project boundaries is high.

The results of this survey are presented in Table 4-6 below.

Table 4-6: Identified heritage resources during the scoping survey

Name	Co-Ordinates	Description	Photographs
Site 1		Comprises of Ft-001, BGG-002 and Ft-003 discussed below	 Figure 4-19: Possible extent of Site 1
Ft-001	26°20'9.27"S 29°14'30.07"E	The site consists of foundations of a historic homestead. Stone foundations are configured in a square shape. This feature is adjacent to a large midden (Ft-003) and graves (BGG-002)	 Figure 4-20: Stone foundations indicated in red.

Name	Co-Ordinates	Description	Photographs
BGG-002	26°20'9.42"S 29°14'29.24"E	Graves adjacent to Ft-001. Only two of the possible ten graves had tombstones. These were weathered and no information was visible on them.	 **Figure 4-21: Grave with tombstone indicated in red**
Ft-003	26°20'9.27"S 29°14'28.75"E	Large midden associated with historic homestead Ft-001. Midden was very ashy and contained material cultural such as beads, porcelain and animal bones.	 **Figure 4-22: Image of large midden adjacent to Ft-001 and BGG-002**

Name	Co-Ordinates	Description	Photographs
Site 2		Comprises of Ft-004, BGG-005 and Ste-006 discussed below	 Figure 4-23: Possible extent of Site 2
Ft-004	26°20'2.69"S 29°14'19.13"E	Large midden adjacent to BGG-005 and several larger mounds that appear to have been hut foundations. Material culture from this site includes bones and glass.	 Figure 4-24: Large midden with animal disturbances
BGG-005	26°20'1.60"S 29°14'19.36"E	Cemetery containing at least 14 graves. Some have formal surface dressing, including granite and stone dressings. The earliest date observed is 1936. Family names include Shabanju, Masongo and Kabini. David Kalanga stated that the graves are still visited.	 Figure 4-25: Burial ground BGG-005

Name	Co-Ordinates	Description	Photographs
Ste-006	26°20'1.16"S 29°14'20.04"E	The site consists of stone foundations. This site is most likely associated with Ft-004 and BGG-005	 **Figure 4-26: Stone foundation of homestead**
Ste-007	26°19'55.03"S 29°14'18.73"E	Collapsed stone walling and foundations of homestead. Appears to be in a square shape and is most likely more recent. These are adjacent to large mounds thought to be foundations. Could be associated with a larger settlement.	 **Figure 4-27: Stone foundation and collapsed walls of homestead**
BGG-008	26°19'14.95"S 29°14'0.15"E	Cemetery consisting of approximately 8 graves. The family name on most markers is Jiyane. No dates were visible on the markers.	 **Figure 4-28: Row of graves within BGG-008 indicated in red**

Name	Co-Ordinates	Description	Photographs
SA-009	26°19'54.34"S 29°13'40.33"E	Sandstone outcrop adjacent to the water course. Possible MSA lithic to occur in the erosion wash. No definitive lithic identified.	 **Figure 4-29: Sandstone outcrop**  **Figure 4-30: Section profile of sandstone outcrop**
Pa-010	26°19'52.52"S 29°13'40.50"E	Possible plant fossil.	 **Figure 4-31: Possible plant fossil**

Name	Co-Ordinates	Description	Photographs
Ft-011	26°20'41.58"S 29°14'45.34"E	Some stone walling and foundations. Site has several mounds that could possibly be hut foundations.	 **Figure 4-32: Collapsed stone walling and foundations**
Ft-012	26°20'55.27"S 29°14'26.89"E	Stone walling associated with approximately 4 mounds that could be hut foundations	 **Figure 4-33: Remnants of stone walling indicated in red**

5 Provisional Statement of Significance

Heritage resources are intrinsic to the history and beliefs of communities. They characterise community identity and cultures, are finite, non-renewable and irreplaceable. Considering the innate value of heritage resources, the foundation of HRM is the acknowledgment that heritage resources have lasting worth as evidence of the origins of life, humanity and society. Notwithstanding the inherent value ascribed to heritage, significance of resources needs to be determined to allow implementation of appropriate management. This is achieved through assessing heritage resources value relative to certain prescribed criteria encapsulated in policies and legal frameworks as discussed under Section 2.

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

Table 5-1: Summary of dimensions and attributes

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

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

Based on our understanding of the heritage resources located within the project boundaries, a provisional statement of significance for the landscape is presented in Table 5-2. With the exception of palaeontological resources and burial grounds and graves, all other potential heritage resources were assessed on all attributed and dimensions. The result of the assessment indicates that the Imvula Project is situated in a cultural landscape that has a high significance.

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

Table 5-2: Provisional Statement of Significance

Resource ID	Aesthetic	Historic	Scientific	Social	INTEGRITY	VALUE
Madzaringwe Formation	-	-	5	-	4	20
Archaeological sites with good integrity	4	4	5	4	4	17
Archaeological sites with poor integrity	1	1	1	1	1	1
Historical sites affiliated with living groups - good integrity	3	4	4	5	4	16
Historical sites affiliated with living groups - poor integrity	1	1	1	1	1	1
Historical sites not affiliated with living groups - good integrity	3	4	4	3	4	14
Historical sites not affiliated with living groups - poor integrity	1	1	1	1	1	1
Burial grounds and graves	-	-	-	5	4	20

6 Possible Heritage Risks

Potential heritage risks to the proposed Imvula Project are placed into two broad categories:

1. Risk of significant heritage resources to project developments; and
2. Impacts on heritage resources that may have social repercussions.

6.1 Heritage Resources with High Significance

The proposed Imvula Project may be detrimental to the continued survival of significant resources, specifically those formally protected by the NHRA. The primary risk associated

with these resources is that a negative Record of Decision and / or restrictions on development activities may be imposed.

6.2 Impacts on Heritage Resources

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

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

7 Possible Heritage Impacts

The sources of risk to heritage resources are primarily associated with the project related activities and can be divided into the three categories as defined under Section 3.1. These include the following:

- Direct or primary effects;
- Indirect, induced or secondary effects; and
- Cumulative effects.

7.1 Construction Phase

The highest likelihood of changes to heritage resources is associated with activities that will be undertaken during the construction phase of the Imvula Project. Activities identified as sources of risk during the construction phase include:

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

Here, the potential negative impact of damage or destruction is the greatest.

7.2 Operational Phase

During the operational phase of the project, the sources of risk to heritage resources are limited. The primary sources of risk are associated with the potential removal of fossil

heritage associated with the *Madzaringwe Formation*, and alteration to the sense-of-place of the project area.

7.3 Decommissioning Phase

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

7.4 Cumulative Impacts

The cumulative impacts of the Imvula project result from the in-combination effects on heritage resources. The cumulative impacts identified for the Imvula Project include:

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

8 Conclusion and Recommendations

The Imvula Project Area is situated in close proximity to the towns of Kriel and Kinross in the Mpumalanga Province. This is a culturally sensitive landscape, supported through the findings of this scoping assessment.

Geologically, the lithologies of the *Madzaringwe Formation* comprise fluvial sandstone, shale, mudstone and coal that are interrupted by Karoo-aged intrusive dolerite dykes. The significance accorded to this formation is very high. The identification of the possible *Breytenia* plant fossil reiterates the palaeontological significance of this project area.

No LFC stonewalled sites were identified within the project area during the scoping survey. An abundance of stonewalled settlements have been recorded in the surrounding properties of the project area, and as such the potential for Farming Community sites to occur within the project boundaries does exist. The majority of these sites are classified as Type V stone walling.

Several LFC and/or historic settlements were identified within the boundaries of the project area. These sites all shared the following characteristics:

- A semi-circle of 5 – 6 hut foundations;
- Some stone walling or foundations;
- A large ashy midden with material culture;
- In close proximity to burial grounds and graves.

These settlements represent some of the earlier inhabitants of the area and require further consideration during subsequent phases of the environmental authorisation process.

Based on these findings, Digby Wells recommends the following:

- A Palaeontological Impact Assessment including reconnaissance to identify and record palaeontological resources within the development footprint;
- An HIA must be completed focussing on the following:
  - An Archaeological Impact Assessment including reconnaissance to identify and record archaeological resources within the development footprint; and
  - An assessment of burial grounds and graves including reconnaissance to identify, record and document all burials that may exists in the development footprint.

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Appendix A: Specialist CV

Mr. Justin du Piesanie

Heritage Management Consultant: Archaeologist

Social Sciences Department

Digby Wells Environmental

1 Education

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

2 Language Skills

Language	Written	Spoken
English	Excellent	Excellent
Afrikaans	Proficient	Good

3 Employment

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

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

4 Professional Affiliations

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

5 Publications

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

6 Experience

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

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

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

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

7 Project Experience

Please see the following table for relevant project experience:

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

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

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

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

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

JOHAN NEL

Mr Johan Nel

Unit manager: Heritage Resources Management

Social Sciences

Digby Wells Environmental

1 EDUCATION

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

2 LANGUAGE SKILLS

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

3 EMPLOYMENT

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

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

4 EXPERIENCE

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

5 PROFESSIONAL REGISTRATION

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

6 PUBLICATIONS AND CONFERENCE PAPERS

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

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

7 PROJECT EXPERIENCE

7.1 Archaeological Surveys and Impact Assessments

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

7.2 Archaeological Mitigation

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

7.3 Heritage Impact Assessments

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

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

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

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

7.4 Burial Grounds and Graves Consultation and Relocation

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

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

7.5 Research Reports and Reviews

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

Appendix B: Plans and Site Table

Plan 1

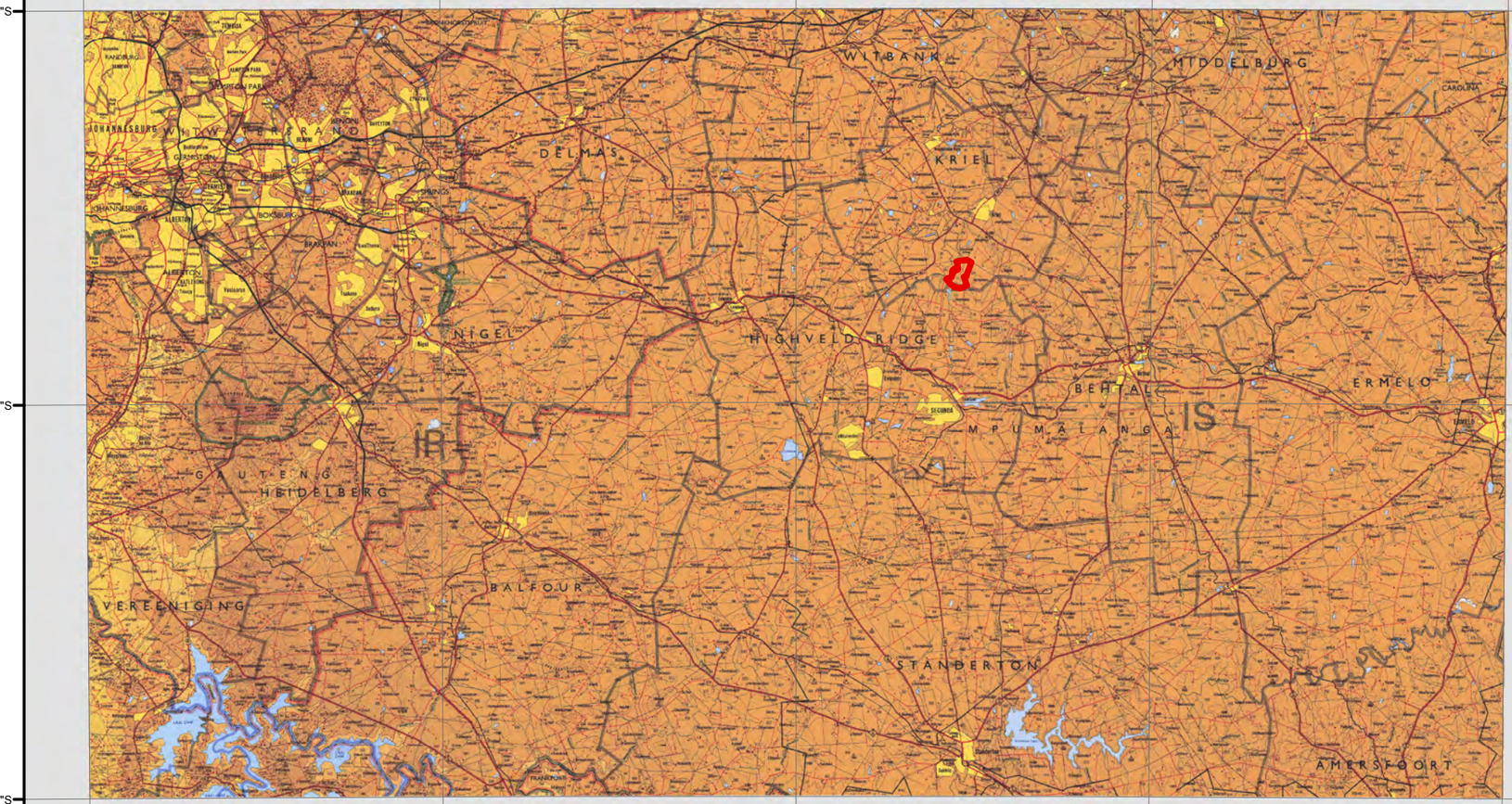
Ixia Coal
Imvula Mining Project
Regional Setting
1:250 000

28°0'0"E 28°30'0"E 29°0'0"E 29°30'0"E 30°0'0"E

26°0'0"S

26°30'0"S

27°0'0"S



Legend

Project Area

2628 East Rand

DIGBY WELLS ENVIRONMENTAL

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

Projection: Transverse Mercator	Ref #: mpl.IXI3002.201409.036
Datum: Cape	Revision Number: 1
Central Meridian: 29°E	Date: 09/09/2014

N

0 10 20 40

Kilometres

1:800 000

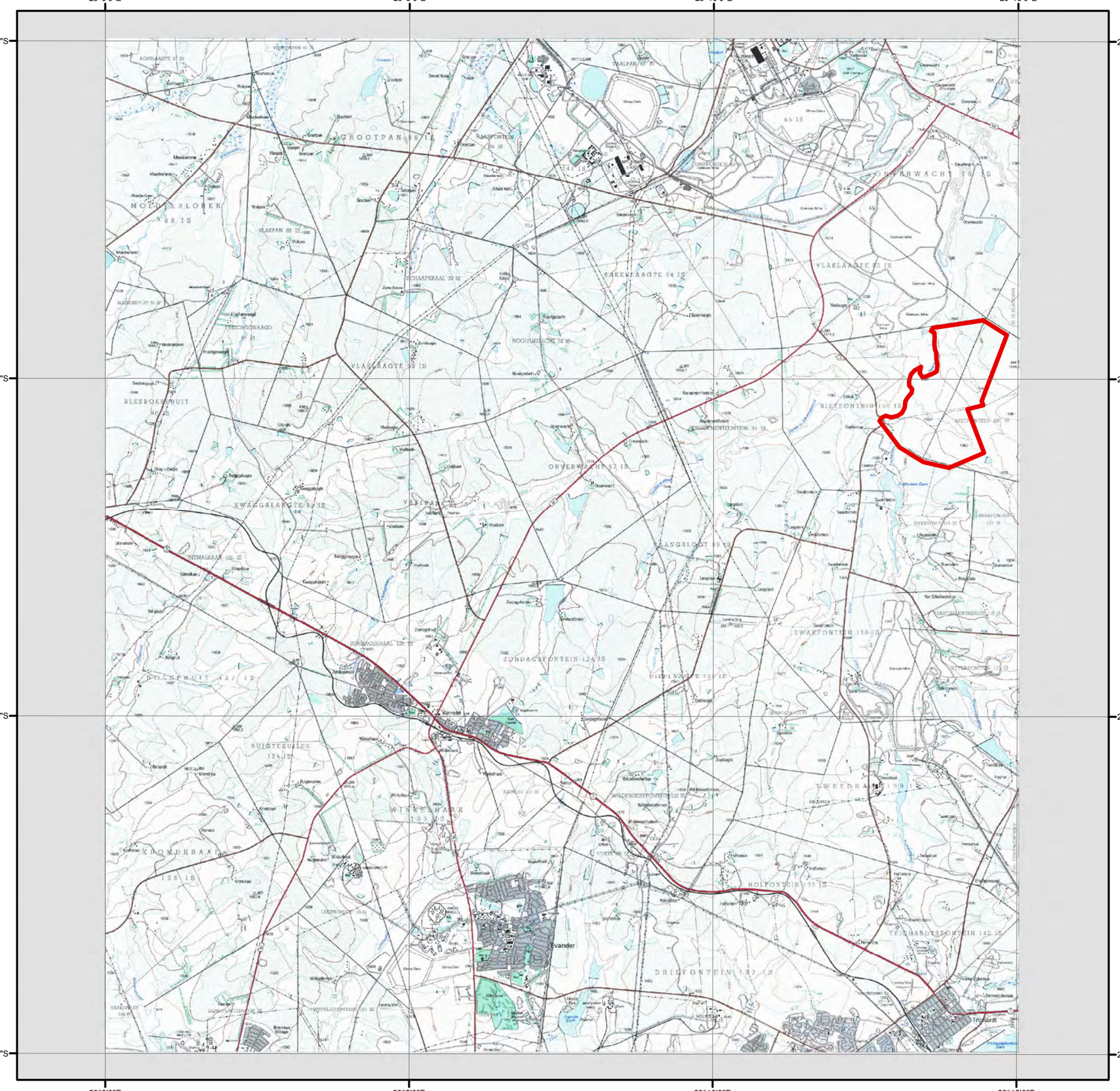
www.digbywells.com

Plan 2

Ixia Coal
Imvula Mining Project
Regional Setting
1:50 000

29°0'0"E 29°5'0"E 29°10'0"E 29°15'0"E

26°15'0"S 26°20'0"S 26°25'0"S 26°30'0"S



Legend

Project Area

2629AC Evander

DIGBY WELLS ENVIRONMENTAL

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

Projection: Transverse Mercator	Ref #: mpl.IXI3002.201409.037
Datum: Cape	Revision Number: 1
Central Meridian: 29°E	Date: 09/09/2014

N

0 1 2 4

Kilometres

1:110 000

www.digbywells.com

Plan 3

Ixia Coal
Imvula Mining Project
Regional Setting
1:10 000

Legend

Project Area

2629AC

DIGBY WELLS ENVIRONMENTAL

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

Projection: Transverse Mercator	Ref #: mpl.IXI3002.201409.038
Datum: Cape	Revision Number: 1
Central Meridian: 29°E	Date: 09/09/2014

N

0 1 2 4

Kilometres

1:110 000

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Plan 4

Ixia Coal
Imvula Mining Project
Regional Geology

28°50'0"E 29°0'0"E 29°10'0"E 29°20'0"E 29°30'0"E

26°0'0"S 26°10'0"S 26°20'0"S 26°30'0"S 26°40'0"S

Phola Minnaar Coalville Witbankdam Douglas Dam Kendal Ogies Vandyksdrif Gloria Rietspruit Kriel Leandra Kinross Evander Trichardt Secunda Bethal Roodebank Charl Cilliers Maizefield

N12 R545 R555 R575 R542 R547 R544 R35 R29 N17 R50 R580 R546 R38

Wilger Phoenix Colliery Mine Dam Van Dyksdrif Dam Rietspruitdam Kleinfontein Dam Olifants Kromdraai Dam Kromdraaispruit Rietspruit Trichardspruit Rietfontein Dam Vaskuile Steenkoolspruit Bethaldam Sulkerbosrant Vaalharts Klipspruit Bossiespruit Dam Boesmanspruit Leeuspruit Blesbokspruit Kwaggalaagte Trichardsfonteindam

Legend

- Project Area
- Major Town
- Secondary Town
- Other Town
- Settlement
- Main Road
- Arterial / National Route
- Perennial Stream
- Dam / Lake

Regional Geology

- Dwarsfontein Cplx
- Dwyka Grp, Karoo Spgrp
- Karoo Dolerite Sui
- Lebowa Granite Sui, Bushveld Cplx
- Loskop Fm, Transvaal Spgrp
- Madzaringwe Fm, Karoo Spgrp
- Pretoria Grp, Transvaal Spgrp
- Rashoop Granophyre Sui, Bushveld Cplx
- Rooiberg Grp, Transvaal Spgrp
- Silverton Fm, Pretoria Grp
- Vaalian Erathem

DIGBY WELLS ENVIRONMENTAL

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

Projection: Transverse Mercator	Ref #: mpl.IXI3002.201409.039
Datum: Cape	Revision Number: 1
Central Meridian: 29°E	Date: 09/09/2014

N

0 2 4 8 12

Kilometres

1:300 000

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Plan 6

Ixia Coal
Imvula Mining Project
Heritage Screening
Survey Results

Legend

- Project Area
- Identified Heritage Resources
- Main Road
- Minor Road
- Dam Wall
- Non-Perennial Stream
- Perennial Stream
- Dam / Lake
- Non-Perennial Pan

DIGBY WELLS ENVIRONMENTAL

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

Projection: Transverse Mercator	Ref #: mpl.IXI3002.201410.078
Datum: Cape	Revision Number: 1
Central Meridian: 29°E	Date: 10/10/2014

N

0 0.25 0.5 1

Kilometres

1:20 000

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Site Type	Code	No	Site ID	Description	South	East	Reference
S.34	Ste	001	CaseID:4912-001	An old house.	26°22'15.91"	29°06'03.67"	Heritage Screening Assessment
S.34	Wf	002	CaseID:4912-002	*A werf* comprising an old house, stable, work shed.	26°25'44.12"	29°08'12.02"	Heritage Screening Assessment
S.34	Wf	003	CaseID:4912-003	A *werf* comprising an old house, stable, work shed with new additions and modifications.	26°23'00.23"	29°10'02.20"	Heritage Screening Assessment
S.34	Wf	004	CaseID:4912-004	A *werf* comprising an old house, stable, work shed with new additions and modifications.	26°26'28.49"	29°09'08.95"	Heritage Screening Assessment
S.34	Ste	005	Van Schalkwyk-2007/3	Circular structures of stone. Possibly the foundations of houses dating to the middle part of this century.	26°26'46.00"	29°16'23.02"	Van Schalkwyk, 2007
S.34	Ste	006	Van Schalkwyk-2007/5	Circular stone structures of stone. Possibly the foundations of houses dating to the middle part of this century. These can probably be related to the graves in Van Schalkwyk-2007/4.	26°26'34.01"	29°16'32.99"	Van Schalkwyk, 2007
S.34	Wf	007	Van Schalkwyk-2007/8	An old homestead, with a number of other structures, possibly labourer houses, in the vicinity. Not much information would be gained from this structure.	26°27'09.00"	29°15'40.00"	Van Schalkwyk, 2007
S.34	Ste	008	Van Schalkwyk-2007/13	Remains of houses occupied by farm labourers.	26°28'10.99"	29°20'10.00"	Van Schalkwyk, 2007
S.34	Ste	009	Van Schalkwyk-2007/15	Remains of houses occupied by farm labourers.	26°28'05.02"	29°18'24.01"	Van Schalkwyk, 2007
S.34	Wf	010	Van Schalkwyk-2007/18	An old farmstead with outbuildings. Currently occupied by farm labourers. It seems to be older than 50 years and is therefore protected by the National Monuments Act.	26°27'25.99"	29°16'43.00"	Van Schalkwyk, 2007
S.34	Ste	011	Van Schalkwyk-2007/22	Ruins of old structure, possibly homestead.	26°26'48.98"	29°12'56.99"	Van Schalkwyk, 2007
S.34	Ste	012	Van Schalkwyk-2007/24	Remains of old farmstead. There is a possibility of graves in the area.	26°27'09.00"	29°13'18.98"	Van Schalkwyk, 2007
S.34	Ste	013	Van Schalkwyk-2007/30	An old farmhouse. Stylistically it dates to the 1920s, but can even be older.	26°27'18.07"	29°21'26.10"	Van Schalkwyk, 2007
S.34	Ste	014	Van Schalkwyk-2007/31	Old barns, sheds and stables, built in same style and bricks.	26°30'02.56"	29°17'54.20"	Van Schalkwyk, 2007
S.34	Ste	015	1996-SAHRA-0018/1	A Police Station Complex with 13 buildings dating back to 1902.	26°16'05.00"	29°14'14.40"	Van Schalkwyk et al. 1996
S.34	Wf	016	1996-SAHRA-0040/1	A European farm complex with a late 19th century house (the occupant dates house to 1896).	26°13'36.00"	29°17'56.00"	Huffman & Calabrese, 1996
S.34	Ste	017	1997-SAHRA-0051/2629AA3	Ruins of old homestead, demolished down to foundation level. Refuse midden containing recent artifacts occur.	26°11'43.90"	29°10'34.70"	Van Schalkwyk , 1997
S.34	Ste	018	1997-SAHRA-0051/2629AA5	Ruin of an old farm labourer homestead, demolished down to foundation level. Refuse midden containing recent artifacts occur.	26°11'54.20"	29°10'40.20"	Van Schalkwyk , 1997
S.34	Ste	019	1997-SAHRA-0051/2629AA6	An old farmstead outbuilding, built from blocks and ferricrete.	26°12'16.50"	29°09'24.40"	Van Schalkwyk , 1997
S.34	Ste	020	1997-SAHRA-0051/2629AA9	Remains of an old structure built of sandstone.	26°12'40.40"	29°07'55.00"	Van Schalkwyk , 1997
S.34	Ste	021	1997-SAHRA-0051/2629AA10	Concrete bases on which machinery was mounted.	26°13'08.20"	29°08'37.50"	Van Schalkwyk , 1997
S.34	Ste	022	1997-SAHRA-0051/2629AA11	Slabs of concrete as foundations - relates to mining activities	26°13'26.30"	29°08'36.50"	Van Schalkwyk , 1997
S.34	Ste	023	1997-SAHRA-0051/2629AA12	Two farm labourer homesteads	26°13'32.50"	29°08'25.80"	Van Schalkwyk , 1997
S.34	Wf	024	1997-SAHRA-0051/2629AA17	A number of old homesteads, possibly originating as farm labourer houses.	26°12'04.40"	29°10'15.30"	Van Schalkwyk , 1997
S.34	Ste	025	1998-SAHRA-0029/2629AC4	Ruins of old structure, possibly homestead	26°26'49.40"	29°12'57.20"	Van Schalkwyk , 1997
S.34	Ft	026	1998-SAHRA-0029/2629AC7	Number of privit trees planted in a rectangular format	26°22'39.90"	29°11'33.30"	Van Schalkwyk , 1997
S.34	Ft	027	1998-SAHRA-0029/2629AC8	Old rubbish dump	26°22'30.80"	29°11'30.70"	Van Schalkwyk , 1997
S.34	Ste	028	1998-SAHRA-0029/2629AC14	Rudimentary stone walling amongst outcrop.	26°23'27.00"	29°10'58.40"	Van Schalkwyk , 1997
S.34	Ste	029	1998-SAHRA-0029/2629AC18	Remains of old farmstead, possibility of graves in the area	26°27'09.20"	29°13'18.80"	Van Schalkwyk , 1997
S.34	Ste	030	1998-SAHRA-0029/2629AD3	Old farmstead	26°24'26.80"	29°15'49.70"	Van Schalkwyk , 1997
S.34	Ste	031	1998-SAHRA-0029/2629AD5	Ruins of old structure, possibly homestead	26°23'44.80"	29°15'23.10"	Van Schalkwyk , 1997
S.34	Ste	032	1998-SAHRA-0029/2629AD10	Circular structures of stone dating to middle part of the 20th century	26°26'45.50"	29°16'22.90"	Van Schalkwyk , 1997
S.34	Ste	033	1998-SAHRA-0029/2629AD12	Circular structures of stone dating to middle part of the 20th century	26°26'34.40"	29°16'32.70"	Van Schalkwyk , 1997
S.34	Wf	034	1998-SAHRA-0029/2629AD15	Old homestead, with a number of other structures, possibly labourer houses, in the vicinity. Not much information would be gained from this structure.	26°27'09.20"	29°15'39.70"	Van Schalkwyk , 1997
S.34	Wf	035	1998-SAHRA-0029/2629AD26	Old farmstead with outbuildings. It seems to be older than 50 years and is therefore protected by the National Monuments Act	26°23'36.80"	29°18'15.90"	Van Schalkwyk , 1997
S.34	Ste	036	1998-SAHRA-0029/2629AD38	Remains of houses occupied by farm labourers	26°28'11.20"	29°20'10.40"	Van Schalkwyk , 1997
S.34	Ste	037	1998-SAHRA-0029/2629AD40	Remains of houses occupied by farm labourers	26°28'05.20"	29°18'24.10"	Van Schalkwyk , 1997
S.34	Wf	038	1998-SAHRA-0029/2629AD43	Old farmstead with outbuildings. Currently occupied by farm labourers. It seems to be older than 50 years and is therefore protected by the National Monuments Act	26°27'26.00"	29°16'42.50"	Van Schalkwyk , 1997
S.34	Ste	039	2003-SAHRA-0075/2629AD105	A number of ash middens, probably remains of old cattle kraals. Short sections of stone walling occur among the middens	26°27'11.20"	29°22'31.30"	Van Schalkwyk, 2003
S.34	Ste	040	2008-SAHRA-0054/HH01	Historical House	26°12'33.24"	29°21'33.72"	Pistorius, 2008a
S.34	Ste	041	2008-SAHRA-0054/HH02	Historical House	26°12'32.40"	29°21'34.20"	Pistorius, 2008a
S.34	Ste	042	2008-SAHRA-0054/E	Enclosures (ferricrete)	26°12'30.16"	29°21'38.28"	Pistorius, 2008a
S.34	Ft	043	2008-SAHRA-0054/T	Trough (cement)	26°12'30.42"	29°21'38.34"	Pistorius, 2008a
S.34	Wf	044	Van Schalkwyk-2000/2629AD44	Old farmstead built in 1904	26°20'49.10"	29°16'18.60"	Van Schalkwyk, 2000

S.34	Ste	045	Van Schalkwyk-2000/2629AD46	An old farm labourer homestead	26°20'39.00"	29°16'26.6"	Van Schalkwyk, 2000
S.34	Ste	046	Van Schalkwyk-2000/2629AD53	Old farm labourer homestead	26°20'04.10"	29°15'01.60"	Van Schalkwyk, 2000
S.34	Wf	047	Van Schalkwyk-2000/2629AD56	An old farmstead	26°23'06.90"	29°17'30.70"	Van Schalkwyk, 2000
S.34	Ste	048	Van Schalkwyk-2000/2629AD63	Old farm labourer homestead	26°22'37.00"	29°15'23.20"	Van Schalkwyk, 2000
S.34	Ste	049	Van Schalkwyk-2000/2629AD64	Old farm labourer homestead	26°22'28.60"	29°15'31.90"	Van Schalkwyk, 2000
S.34	Wf	050	Van Schalkwyk-2000/2629AD65	Old farmstead	26°21'13.90"	29°18'21.10"	Van Schalkwyk, 2000
S.34	Wf	051	Van Schalkwyk-2000/2629AD66	Old farsmtead	26°21'54.60"	29°18'28.70"	Van Schalkwyk, 2000
S.34	Ste	052	Van Schalkwyk-2000/2629AD69	Old shaft where farmers mined coal	26°21'39.30"	29°18'14.50"	Van Schalkwyk, 2000
S.34	Ste	053	Van Schalkwyk-2000/2629AD70	Old shaft where farmers mined coal	26°21'43.10"	29°18'16.10"	Van Schalkwyk, 2000
S.34	Ste	054	Van Schalkwyk-2000/2629AD73	Old shaft where farmers mined coal	26°23'20.40"	29°19'58.40"	Van Schalkwyk, 2000
S.34	Ste	055	Van Schalkwyk-2000/2629AD83	Old farm labourer homestead	26°18'25.10"	29°16'13.80"	Van Schalkwyk, 2000
S.34	Ste	056	Van Schalkwyk-2000/2629AD84	Old shaft where farmers mined coal	26°18'15.50"	29°16.26.30"'	Van Schalkwyk, 2000
S.34	Wf	057	Van Schalkwyk-2000/2629AD85	Old farmstead	26°19'37.80"	29°15'45.40"	Van Schalkwyk, 2000
S.34	Ste	058	Van Schalkwyk-2000/2629AD89	Old farm labourer homestead	26°18'49.70"	29°17'41.90"	Van Schalkwyk, 2000
S.34	Ste	059	Van Schalkwyk-2000/2629AD92	Old farm labourer homestead	26°19'25.80"	29°17'25.60"	Van Schalkwyk, 2000
S.34	Ste	060	Van Schalkwyk-2000/2629AD95	Old mine shafts	26°19'35.70"	29°17'20.00"	Van Schalkwyk, 2000
S.34	Ste	061	Van Schalkwyk-2000/2629AC24	Old farm labourer homestead	26°20'27.30"	29°14'36.70"	Van Schalkwyk, 2000
S.34	Ste	062	Van Schalkwyk-2000/2629AC25	Old farm labourer homestead	26°20'42.10"	29°12'55.20"	Van Schalkwyk, 2000
S.34	Ste	063	Van Schalkwyk-2000/2629AC26	Old farmstead	26°22'13.90"	29°14'58.10"	Van Schalkwyk, 2000
S.34	Ste	064	Van Schalkwyk-2000/2629AC27	Old farmstead	26°22'32.00"	29°14'32.60"	Van Schalkwyk, 2000
S.34	Ste	065	Van Schalkwyk-2000/2629AD59	Historic stone walling	26°21'46.10"	29°15'28.10"	Van Schalkwyk, 2000
S.34	Ste	066	Van Schalkwyk-2000/2629AD61	Historic circular structure of stone	26°22'53.10"	29°15'40.80"	Van Schalkwyk, 2000
S.34	Ste	067	Van Schalkwyk-2000/2629AD62	Historic circular structure of stone	26°22'49.80"	29°15'35.40"	Van Schalkwyk, 2000
S.34	Ft	068	2008-SAHRA-0054/Cement Bricks	Dairy (Cement bricks?)	26°11'48.06"	29°20'31.32"	Pistorius, 2008a
S.34	Ste	069	1996-SAHRA-0040/2	A labourers homestead with two, possibly three graves.	26°14'02.00"	29°18'13.00"	Huffman & Calabrese, 1996
S.34	Wf	070	1998-SAHRA-0029/2629AD17	An old farmstead with 5 graves	26°26'21.90"	29°15'25.00"	Van Schalkwyk , 1997
S.35	IA	071	2003-SAHRA-0075/2629AD104	Stone walled site dating to the Late Iron Age	26°27'23.60"	29°21'55.40"	Van Schalkwyk, 2003
S.35	IA	072	Van Schalkwyk-2007/6	Circular structures of stone, typical of Late Iron Age structures. The Late Iron Age walling probably dates to the last 200 years and can possibly be related to the Sotho/Tswana speaking people.	26°26'44.02"	29°16'14.99"	Van Schalkwyk, 2007
S.35	IA	073	Van Schalkwyk-2007/7	Circular structures of stone, typical of Late Iron Age structures. The Late Iron Age walling probably dates to the last 200 years and can possibly be related to the Sotho/Tswana speaking people.	26°26'57.98"	29°15'41.00"	Van Schalkwyk, 2007
S.35	IA	074	Van Schalkwyk-2007/9	Circular structure of stone, typical of Late Iron Age structures. The Late Iron Age walling probably dates to the last 200 years and can possibly be related to the Sotho/Tswana speaking people.	26°26'43.01"	29°15'47.02"	Van Schalkwyk, 2007
S.35	IA	075	Van Schalkwyk-2007/12	A concentration of rocks that include a lower grindstone.	26°27'09.00"	29°19'28.99"	Van Schalkwyk, 2007
S.35	IA	076	Van Schalkwyk-2007/16	Stone walling	26°27'28.01"	29°15'00.00"	Van Schalkwyk, 2007
S.35	IA	077	Van Schalkwyk-2007/19	A site with extensive stone walling.	26°27'23.62"	29°21'55.40"	Van Schalkwyk, 2007
S.35	IA	078	Van Schalkwyk-2007/20	Five concentrations of soil with high ash content. Small sections of stone walling to one side. Grindstone in vicinity.	26°27'11.20"	29°22'31.33"	Van Schalkwyk, 2007
S.35	IA	079	Van Schalkwyk-2007/26	Circular structures of stone, typical of Late Iron Age structures. The Late Iron Age walling probably dates to the last 200 years and can possibly be related to the Sotho/Tswana speaking people.	26°27'08.60"	29°13'52.90"	Van Schalkwyk, 2007
S.35	IA	080	Van Schalkwyk-2007/27	Circular structures of stone, typical of Late Iron Age structures. The Late Iron Age walling probably dates to the last 200 years and can possibly be related to the Sotho/Tswana speaking people.	26°26'52.66"	29°16'06.74"	Van Schalkwyk, 2007
S.35	IA	081	1998-SAHRA-0029/2629AD13	Circular structures of stone typical of the LIA	26°26'44.20"	29°16'14.80"	Van Schalkwyk , 1997
S.35	IA	082	1998-SAHRA-0029/2629AD14	Circular structures of stone typical of the LIA	26°26'57.80"	29°15'40.50"	Van Schalkwyk , 1997
S.35	IA	083	1998-SAHRA-0029/2629AD16	Circular structures of stone typical of the LIA	26°26'42.70"	29°15'47.10"	Van Schalkwyk , 1997
S.35	IA	084	1998-SAHRA-0029/2629AD19	Circular structures of stone typical of the LIA	26°25'49.90"	29°15'46.70"	Van Schalkwyk , 1997
S.35	IA	085	1998-SAHRA-0029/2629AD37	Concentration of rocks that include a lower grindstone	26°27'09.30"	29°19'29.30"	Van Schalkwyk , 1997
S.35	IA	086	1998-SAHRA-0029/2629AD41	Circular structures of stone affiliated with the LIA	26°27'28.40"	29°15'59.90"	Van Schalkwyk , 1997
S.35	IA	087	Van Schalkwyk-2000/2629AD47	Late Iron Age stone walling with middens	26°20'29.40"	29°15'28.80"	Van Schalkwyk, 2000
S.35	IA	088	Van Schalkwyk-2000/2629AD48	Late Iron Age stone walling	26°20'35.70"	29°15'28.90"	Van Schalkwyk, 2000
S.35	IA	089	Van Schalkwyk-2000/2629AD49	Late Iron Age stone site	26°20'39.00"	29°15'20.40"	Van Schalkwyk, 2000
S.35	IA	090	Van Schalkwyk-2000/2629AD50	Late Iron Age stone walling with middens	26°20'43.70"	29°15'25.60"	Van Schalkwyk, 2000
S.35	IA	091	Van Schalkwyk-2000/2629AD51	Late Iron Age stone walling	26°21'37.40"	29°15'21.80"	Van Schalkwyk, 2000
S.35	IA	092	Van Schalkwyk-2000/2629AD52	Late Iron Age stone walling	26°21'38.00"	29°15'28.20"	Van Schalkwyk, 2000

S.35	IA	093	Van Schalkwyk-2000/2629AD74	Two small shelters showing evidence of being blocked off with stones	26°23'17.90"	29°19'57.30"	Van Schalkwyk, 2000
S.35	IA	094	Van Schalkwyk-2000/2629AD76	Late Iron Age site	26°22'47.70"	29°19'32.70"	Van Schalkwyk, 2000
S.35	IA	095	Van Schalkwyk-2000/2629AD77	Late Iron Age site	26°22'52.10"	29°19'31.20"	Van Schalkwyk, 2000
S.35	IA	096	Van Schalkwyk-2000/2629AD78	Late Iron Age site	26°22'49.40"	29°19'29.90"	Van Schalkwyk, 2000
S.35	IA	097	Van Schalkwyk-2000/2629AC20	Late Iron Age stone walling	26°20'47.20"	29°14'49.00"	Van Schalkwyk, 2000
S.35	IA	098	Van Schalkwyk-2000/2629AC21	Late Iron Age stone walling	26°20'56.00"	29°14'40.20"	Van Schalkwyk, 2000
S.35	IA	099	Van Schalkwyk-2007/1	One grave with headstone and inscription dating to 1928. This feature is located amongst the circular stone structures possibly dating to the Late Iron Age. The Late Iron Age walling probably dates to the last 200 years and can possibly be related to the Sotho/Tswana.	26°26'52.08"	29°16'08.00"	Van Schalkwyk, 2007
S.36	BGG	100	1998-SAHRA-0029/2629AD8	One grave with headstone dating to 1928. Stone walled stucture affiliated with the LIA	26°26'51.60"	29°16'07.60"	Van Schalkwyk , 1997
S.36	BGG	101	CaseID:4912-001	One informal grave and one formal grave.	26°22'10.74"	29°05'59.32"	Heritage Screening Assessment
S.36	BGG	102	CaseID:4912-002	A formal burial ground next to an initiation site.	26°23'23.17"	29°06'08.67"	Heritage Screening Assessment
S.36	BGG	103	CaseID:4912-003	A formal burial ground.	26°24'28.69"	29°05'37.43"	Heritage Screening Assessment
S.36	BGG	104	CaseID:4912-004	Two formal graves.	26°25'32.57"	29°08'46.44"	Heritage Screening Assessment
S.36	BGG	105	Van Schalkwyk-2007/2	Four graves marked with cairns. Just east of that, there are a number of circular stone structures that might be the foundations of old houses. These probably date to the early art of the century and can be related to the graves.	26°26'51.00"	29°16'13.01"	Van Schalkwyk, 2007
S.36	BGG	106	Van Schalkwyk-2007/4	An informal cemetery containing about 50 graves, of which five have headstones.	26°26'28.00"	29°16'13.01"	Van Schalkwyk, 2007
S.36	BGG	107	Van Schalkwyk-2007/10	An informal cemetery (although part of an old fence is still in place) containing about four graves marked with cairns.	26°28'17.00"	29°14'43.01"	Van Schalkwyk, 2007
S.36	BGG	108	Van Schalkwyk-2007/11	An informal cemetery with about five graves. One of these have a headstone dating to 1980.	26°27'53.02"	29°18'56.02"	Van Schalkwyk, 2007
S.36	BGG	109	Van Schalkwyk-2007/14	One grave with a headstone and a low wall of stone built around it.	26°28'05.02"	29°18'29.99"	Van Schalkwyk, 2007
S.36	BGG	110	Van Schalkwyk-2007/17	An informal cemetery with about five graves, one of which has a headstone.	26°27'23.00"	29°16'35.00"	Van Schalkwyk, 2007
S.36	BGG	111	Van Schalkwyk-2007/21	An informal cemetery containing about ten graves, of which three have headstones. Inscriptions are basically illegible.	26°26'48.98"	29°12'51.01"	Van Schalkwyk, 2007
S.36	BGG	112	Van Schalkwyk-2007/23	Possible graves marked by cairns.	26°26'42.00"	29°13'17.00"	Van Schalkwyk, 2007
S.36	BGG	113	Van Schalkwyk-2007/25	An informal cemetery with about 80 graves. Most are marked with cairns and eight have headstones.	26°26'43.01"	29°14'04.99"	Van Schalkwyk, 2007
S.36	BGG	114	Van Schalkwyk-2007/28	Approximately 20 graves of farm labourers, most without names.	26°28'49.08"	29°22'15.85"	Van Schalkwyk, 2007
S.36	BGG	115	Van Schalkwyk-2007/29	An informal cemetery with about 30 graves. Most are marked with cairns and a few have headstones.	26°28'54.77"	29°22'09.91"	Van Schalkwyk, 2007
S.36	BGG	116	1997-SAHRA-0051/2629AA1	Informal cemetery consisting of approximately 15 graves, five of which have headstones	26°11'54.20"	29°10'26.90"	Van Schalkwyk , 1997
S.36	BGG	117	1997-SAHRA-0051/2629AA2	Approximately 25 graves, four of which have headstones	26°11'43.50"	29°10'32.30"	Van Schalkwyk , 1997
S.36	BGG	118	1997-SAHRA-0051/2629AA4	A single grave with headstone. Anna Schalekamp, died February 1901.	26°11'42.40"	29°10'43.70"	Van Schalkwyk , 1997
S.36	BGG	119	1997-SAHRA-0051/2629AA7	Location of six possible graves.	26°12'16.50"	29°09'24.40"	Van Schalkwyk , 1997
S.36	BGG	120	1997-SAHRA-0051/2629AA8	Headstone of grave, three possible stone covered graves.	26°12'13.90"	29°09'24.90"	Van Schalkwyk , 1997
S.36	BGG	121	1997-SAHRA-0051/2629AA13	Informal cemetery consisting of approximately 30 graves, 15 of which have headstones	26°14'05.60"	29°08'17.50"	Van Schalkwyk , 1997
S.36	BGG	122	1997-SAHRA-0051/2629AA14	Single grave with headstone.	26°12'44.90"	29°07'34.40"	Van Schalkwyk , 1997
S.36	BGG	123	1997-SAHRA-0051/2629AA15	Cemetery containing more than 25 graves, 13 of which have headstones	26°11'39.20"	29°09'14.20"	Van Schalkwyk , 1997
S.36	BGG	124	1997-SAHRA-0051/2629AA16	Cemetery containing more than 20 graves, with approximately 5 with headstones. The last dated headstone dated to 1950.	26°12'35.10"	29°09'20.80"	Van Schalkwyk , 1997
S.36	BGG	125	1997-SAHRA-0051/2629AA18	Cemetery containing approximately 12 graves, of which 4 have headstones.	26°12'04.40"	29°10'31.90"	Van Schalkwyk , 1997
S.36	BGG	126	1997-SAHRA-0051/2629AA19	Informal cemetery consisting of more than 50 graves, of which roughly 10 have headstones	26°10'36.00"	29°10'19.50"	Van Schalkwyk , 1997
S.36	BGG	127	1998-SAHRA-0029/2629AC3	Informal cemetery containing approximately 10 graves, three of which have headstones.	26°26'49.20"	29°12'51.20"	Van Schalkwyk , 1998
S.36	BGG	128	1998-SAHRA-0029/2629AC5	Informal cemetery, containing approximately 50 graves.	26°25'23.20"	29°10'53.90"	Van Schalkwyk , 1997
S.36	BGG	129	1998-SAHRA-0029/2629AC6	Informal cemetery, containing approximately 20 graves.	26°22'38.90"	29°11'31.20"	Van Schalkwyk , 1997
S.36	BGG	130	1998-SAHRA-0029/2629AC9	Informal cemetery containing approximately 60 graves, some with headstones.	26°22'23.90"	29°13'13.50"	Van Schalkwyk , 1997
S.36	BGG	131	1998-SAHRA-0029/2629AC10	Informal cemetery containing approximately 10 graves.	26°22'18.50"	29°12'19.60"	Van Schalkwyk , 1997
S.36	BGG	132	1998-SAHRA-0029/2629AC11	Informal cemetery containing approximately 5 graves, one with a headstone	26°24'35.40"	29°14'50.80"	Van Schalkwyk , 1997
S.36	BGG	133	1998-SAHRA-0029/2629AC12	Formal cemetery, three, possibly more - le Roux family	26°23'50.40"	29°11'52.30"	Van Schalkwyk , 1997
S.36	BGG	134	1998-SAHRA-0029/2629AC13	Informal cemetery containing approximately 25 graves	26°23'10.70"	29°11'56.80"	Van Schalkwyk , 1997
S.36	BGG	135	1998-SAHRA-0029/2629AC15	Informal cemetery containing approximately 25 graves	26°23'26.40"	29°11'43.80"	Van Schalkwyk , 1997
S.36	BGG	136	1998-SAHRA-0029/2629AC16	Formal cemetery, six graves - Smit and Zietsman family	26°22'56.80"	29°11'57.10"	Van Schalkwyk , 1997
S.36	BGG	137	1998-SAHRA-0029/2629AC17	Possible graves, marked by cairns	26°26'41.70"	29°13'16.80"	Van Schalkwyk , 1997
S.36	BGG	138	1998-SAHRA-0029/2629AC19	Informal cemetery with approximately 80 graves, 8 of which have headstones	26°26'43.00"	29°14'04.90"	Van Schalkwyk , 1997

S.36	BGG	139	1998-SAHRA-0029/2629AD4	Informal cemetery consisting of 7 graves - Cilliers family	26°23'47.50"	29°15'27.10"	Van Schalkwyk , 1997
S.36	BGG	140	1998-SAHRA-0029/2629AD6	Formal cemetery with 10 graves - Erasmus family	26°24'40.90"	29°19'18.00"	Van Schalkwyk , 1997
S.36	BGG	141	1998-SAHRA-0029/2629AD7	Formal cemetery containing approximately 100 graves, some with headstones. Majority have been relocated during Sasol Mining developments.	26°24'49.30"	29°15'12.50"	Van Schalkwyk , 1997
S.36	BGG	142	1998-SAHRA-0029/2629AD9	Four graves marked with cairns.	26°26'51.20"	29°16'12.50"	Van Schalkwyk , 1997
S.36	BGG	143	1998-SAHRA-0029/2629AD11	Informal cemetery containing approximately 50 graves, five of which have headstones.	26°26'28.00"	29°16'30.60"	Van Schalkwyk , 1997
S.36	BGG	144	1998-SAHRA-0029/2629AD18	Two graves	26°26'19.60"	29°15'20.60"	Van Schalkwyk , 1997
S.36	BGG	145	1998-SAHRA-0029/2629AD20	Informal cemetery with approximately 50 graves, 5 of which have headstones and 15 are marked by concrete	26°25'13.70"	29°17'00.90"	Van Schalkwyk , 1997
S.36	BGG	146	1998-SAHRA-0029/2629AD21	Single grave	26°25'30.30"	29°17'25.30"	Van Schalkwyk , 1997
S.36	BGG	147	1998-SAHRA-0029/2629AD22	Two graves marked with cairns	26°25'37.40"	29°16'49.80"	Van Schalkwyk , 1997
S.36	BGG	148	1998-SAHRA-0029/2629AD23	Informal cemetery containing approximately 20 graves	26°25'14.50"	29°17'26.00"	Van Schalkwyk , 1997
S.36	BGG	149	1998-SAHRA-0029/2629AD24	Informal cemetery containing approximately 50 graves. One has a headstone	26°24'03.10"	29°18'12.40"	Van Schalkwyk , 1997
S.36	BGG	150	1998-SAHRA-0029/2629AD25	Informal cemetery containing approximately 5 graves.	26°23'43.60"	29°18'22.40"	Van Schalkwyk , 1997
S.36	BGG	151	1998-SAHRA-0029/2629AD27	Informal cemetery containing approximately 100 graves	26°24'19.10"	29°18'15.50"	Van Schalkwyk , 1997
S.36	BGG	152	1998-SAHRA-0029/2629AD28	Single grave	26°23'33.20"	29°17'43.90"	Van Schalkwyk , 1997
S.36	BGG	153	1998-SAHRA-0029/2629AD29	Informal cemetery containing approximately 10 graves, two of which have headstones	26°23'53.20"	29°17'08.80"	Van Schalkwyk , 1997
S.36	BGG	154	1998-SAHRA-0029/2629AD30	Two cairns possibly indicators of graves	26°23'52.50"	29°17'01.40"	Van Schalkwyk , 1997
S.36	BGG	155	1998-SAHRA-0029/2629AD31	Informal cemetery containing approximately 15 graves, five of which have headstones	26°24'14.80"	29°16'36.80"	Van Schalkwyk , 1997
S.36	BGG	156	1998-SAHRA-0029/2629AD32	Informal cemetery containing approximately 40 graves, three of which have headstones	26°23'49.40"	29°16'29.30"	Van Schalkwyk , 1997
S.36	BGG	157	1998-SAHRA-0029/2629AD33	Informal cemetery containing approximately 80 graves	26°24'33.60"	29°18'50.30"	Van Schalkwyk , 1997
S.36	BGG	158	1998-SAHRA-0029/2629AD34	Informal cemetery containing approximately 20 graves	26°24'45.60"	29°18'14.90"	Van Schalkwyk , 1997
S.36	BGG	159	1998-SAHRA-0029/2629AD35	Informal cemetery containing approximately 4 graves	26°28'17.20"	29°14'43.10"	Van Schalkwyk , 1997
S.36	BGG	160	1998-SAHRA-0029/2629AD36	Informal cemetery containing approximately 5 graves, one with a headstone dating to 1980	26°27'56.10"	29°18'56.00"	Van Schalkwyk , 1997
S.36	BGG	161	1998-SAHRA-0029/2629AD39	One grave with headstone, with a low wall of stone built around it	26°28'04.80"	29°18'30.40"	Van Schalkwyk , 1997
S.36	BGG	162	1998-SAHRA-0029/2629AD42	Informal cemetery with approximately 5 graves, one of which has a headstone.	26°27'23.40"	29°16'34.70"	Van Schalkwyk , 1997
S.36	BGG	163	2003-SAHRA-0075/2629AD103	Cemetery containing 5 graves of the Van Zyl family, some dating back to 1918	26°26'10.10"	29°25'39.40"	Van Schalkwyk, 2003
S.36	BGG	164	2003-SAHRA-0075/2629CA16	Single grave marked with stone	26°31'18.60"	29°14'13.50"	Van Schalkwyk, 2003
S.36	BGG	165	2008-SAHRA-0054/GY01	5 Graves	26°12'36.18"	29°21'32.94"	Pistorius, 2008a
S.36	BGG	166	2008-SAHRA-0054/GY02	At least 6 graves	26°11'28.20"	29°21'25.20"	Pistorius, 2008a
S.36	BGG	167	Pistorius-2008/GY04	Three informal graves next to the road near H. Smith's residence	26°31'42.06"	28°57'27.00"	Pistorius, 2008b
S.36	BGG	168	Van Vollenhoven & Pelser-2010/Site 1	This is a graveyard consisting of between 20 and 30 graves	26°32'23.30"	29°12'48.60"	Van Vollenhoven & Pelser, 2010
S.36	BGG	169	Van Schalkwyk-2000/2629AD45	A formal cemetery containing approximately 10 graves	26°20'44.90"	29°16'24.10"	Van Schalkwyk, 2000
S.36	BGG	170	Van Schalkwyk-2000/2629AD54	Informal cemetery containing four graves	26°23'13.60"	29°17'33.20"	Van Schalkwyk, 2000
S.36	BGG	171	Van Schalkwyk-2000/2629AD55	Informal cemetery containing 10 graves	26°22'58.00"	29°17'30.80"	Van Schalkwyk, 2000
S.36	BGG	172	Van Schalkwyk-2000/2629AD57	Informal cemetery contain six graves	26°23'31.40"	29°17'41.70"	Van Schalkwyk, 2000
S.36	BGG	173	Van Schalkwyk-2000/2629AD58	Informal cemetery contain approximately 50 graves	26°22'27.50"	29°16'39.70"	Van Schalkwyk, 2000
S.36	BGG	174	Van Schalkwyk-2000/2629AD60	Informal cemetery conatina approximately 15 graves	26°21'53.50"	29°15'52.30"	Van Schalkwyk, 2000
S.36	BGG	175	Van Schalkwyk-2000/2629AD67	Formal cemetery containing 12 graves	26°21'54.70"	29°18'32.40"	Van Schalkwyk, 2000
S.36	BGG	176	Van Schalkwyk-2000/2629AD68	Informal cemetery containing approximately 50 graves	26°21'21.50"	29°18'11.60"	Van Schalkwyk, 2000
S.36	BGG	177	Van Schalkwyk-2000/2629AD71	Formal cemetery with four graves	26°22'42.40"	29°19'15.60"	Van Schalkwyk, 2000
S.36	BGG	178	Van Schalkwyk-2000/2629AD72	Informal cemetery containing approximately 40 graves	26°22'55.60"	29°20'00.50"	Van Schalkwyk, 2000
S.36	BGG	179	Van Schalkwyk-2000/2629AD75	Informal cemetery containing approximately 20 graves	26°22'34.90"	29°19'43.60"	Van Schalkwyk, 2000
S.36	BGG	180	Van Schalkwyk-2000/2629AD79	Cemetery containing approximately 30 graves	26°23'04.40"	29°20'34.10"	Van Schalkwyk, 2000
S.36	BGG	181	Van Schalkwyk-2000/2629AD80	Cemetery containing approximately 30 graves	26°18'33.40"	29°17'06.60"	Van Schalkwyk, 2000
S.36	BGG	182	Van Schalkwyk-2000/2629AD81	Cemetery containing approximately 50 graves	26°18'49.10"	29°17'06.20"	Van Schalkwyk, 2000
S.36	BGG	183	Van Schalkwyk-2000/2629AD82	Cemetery containing four graves	26°18'55.80"	29°15'18.60"	Van Schalkwyk, 2000
S.36	BGG	184	Van Schalkwyk-2000/2629AD86	Cemetery containing four graves	26°19'41.90"	29°15'37.00"	Van Schalkwyk, 2000
S.36	BGG	185	Van Schalkwyk-2000/2629AD87	Cemetery containing five graves	26°19'35.20"	29°15'28.10"	Van Schalkwyk, 2000
S.36	BGG	186	Van Schalkwyk-2000/2629AD88	Cemetery containing four graves	26°19'48.70"	29°17'01.50"	Van Schalkwyk, 2000
S.36	BGG	187	Van Schalkwyk-2000/2629AD90	Cemetery containing approximately 20 graves	26°19'19.50"	29°17'34.70"	Van Schalkwyk, 2000
S.36	BGG	188	Van Schalkwyk-2000/2629AD91	Cemetery containing approximately 30 graves	26°19'20"70	29°17'32.90"	Van Schalkwyk, 2000
S.36	BGG	189	Van Schalkwyk-2000/2629AD93	Cemetery containing approximately 30 graves	26°19'51.90"	29°17'31.80"	Van Schalkwyk, 2000

S.36	BGG	190	Van Schalkwyk-2000/2629AD94	Cemetery containing four graves	26°20'03.40"	29°17'32.50"	Van Schalkwyk, 2000
S.36	BGG	191	Van Schalkwyk-2000/2629AC22	Formal cemetery contain three graves	26°20'51.20"	29°12'31.30"	Van Schalkwyk, 2000
S.36	BGG	192	Van Schalkwyk-2000/2629AC23	Informal cemetery containing approximately 10 graves	26°20'49.70"	29°12'53.20"	Van Schalkwyk, 2000