



# DIGBY WELLS

## ENVIRONMENTAL

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## Environmental Authorisation for the Proposed Invula Coal Mine

## Heritage Impact Assessment Report

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**Project Number:**

IXI3002

**Prepared for:**

Ixia Coal (Pty) Ltd

February 2016

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## DECLARATION OF INDEPENDENCE

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## EXECUTIVE SUMMARY

### Introduction

Ixia Coal (Pty) Ltd (hereafter Ixia Coal), intends to undertake open pit coal mining near Secunda in the Mpumalanga Province at the proposed Imvula Open Pit 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. 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).

### Results of Data Collection

Pre-disturbance surveys were completed between 11 – 13 February 2015, 10 July 2015 and 12 October 2015. The surveys identified nine instances of heritage resources located within or in close proximity to the development footprint of the Imvula Project:

- One isolated Stone Age find spot with negligible significance;
- Two isolated burial ground with very high significance;
- Two historical settlement sites comprising burial grounds, potential hut foundations and middens with medium significance; and
- Four sites comprising of stone foundations or mounds that could potentially represent hut foundations with negligible significance.

### Impact Assessment

The potential direct and indirect impacts on heritage resources identified within the development footprint of the Imvula Project, as well as those within the greater surrounding landscape were considered as part of this assessment.

The findings of the assessment are summarised in the following tables:

Cultural Significance	Count of Type
<b>Very High</b>	<b>2</b>
Burial / grave	2
BGG-008	1
BGG-014	1
<b>Medium</b>	<b>2</b>
Site	2
Site 1	1

<b>Cultural Significance</b>	<b>Count of Type</b>
Site 2	1
<b>Negligible</b>	<b>5</b>
Occurrence	1
SA-009	1
Site	3
Ft-011	1
Ft-012	1
Ft-013	1
Structure	1
Ste-007	1
<b>Grand Total</b>	<b>9</b>

Code	Impact	Pre-Mitigation						Post-Mitigation					
		Duration	Extent	Intensity	Consequence	Probability	Significance	Duration	Extent	Intensity	Consequence	Probability	Significance
V.High-CS	Direct impact to burial grounds and graves	Permanent	National	Extremely high - negative	Extremely detrimental	Certain	Major - negative	Beyond project life	Limited	High - negative	Moderately detrimental	Highly probable	Moderate - negative
Med-CS	Direct impact to Site 1 and 2	Permanent	Local	Moderately high - negative	Highly detrimental	Certain	Moderate - negative	Beyond project life	Limited	Moderately high - positive	Moderately beneficial	Highly probable	Minor - positive
V.High-CS	Indirect impact to burial grounds and graves	Project Life	National	High - negative	Highly detrimental	Likely	Moderate - negative	Project Life	Municipal Area	Very high - positive	Highly beneficial	Likely	Moderate - positive

## Recommendations

Based on the recommended minimum standards outlined by the South African Heritage Resources Agency (SAHRA), heritage resources with a cultural significance (CS) of negligible have been sufficiently recorded and no further mitigation on these resources is required.

Burial grounds and graves have been identified within or in close proximity to the project boundary of the Imvula Project. These resources will be both directly and indirectly impacted upon based on the current development footprint design. It is recommended that the design of the development footprint be amended as far as is feasible to exclude the burial grounds and graves and preserve the site *in situ* and maintain the present status quo. Furthermore, it is recommended that a Burial Grounds and Graves Consultation (BGGC) process be undertaken in accordance with section 36 of the NHRA and Chapter XI of the Regulations to the Act to:

- Identify as far as possible bona fide Next-of-Kin (NoK); and
- Consult and reach agreement with the NoK and Ixia Coal to the management of the burial grounds through a Conservation Management Plan (CMP), including access to the burial grounds.

For burial ground BGG-014 specifically, further recommendations include the establishment of a 25 m buffer around the extent of the burial ground, and the implementation of a Watching Brief during the construction phase of the pipeline.

Where *in situ* conservation of the burial grounds is not feasible, a Grave Relocation Process (GRP) supported through the BGGC process must be completed.

Notwithstanding the recommendations for burial grounds and graves above, the two identified historic settlement sites are at risk of being directly impacted upon during construction activities, specifically Activity 3, 9 and 11 based on the current development footprint of the Imvula Project. These activities have the potential to damage and / or destroy the sites. It is recommended that the project design be amended as far as is feasible to remove the potential negative impacts to these sites. Where this is not possible, archaeological mitigation with the relevant SAHRA Section 35 permit is recommended.

Finally, Chance Find Procedures must be drafted and implemented as a condition of authorisation that clearly defines and described the necessary procedure to be followed in the event of accidental exposure of previously unidentified heritage resources.

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Appendix A: Specialists CV

## LIST OF ACRONYMS

Acronym	Definition
<b>AIA</b>	Archaeological Impact Assessment
<b>ASAPA</b>	Association of Southern African Professional Archaeologists
<b>BA</b>	Bachelor of Arts
<b>BGG</b>	Burial Ground and Graves
<b>BGGC</b>	Burial Ground and Graves Consultation
<b>c.</b>	circa, meaning approximately
<b>CE</b>	Common Era
<b>CFPs</b>	Chance Find Procedures
<b>cHIA</b>	Community Health Impact Assessment
<b>CMP</b>	Conservation Management Plan
<b>CRR</b>	Comments and Response Report
<b>DEA</b>	Department of Environmental Affairs
<b>Digby Wells</b>	Digby Wells Environmental
<b>DMR</b>	Department of Mineral Resources
<b>EA</b>	Environmental Authorisation
<b>EAP</b>	Environmental Assessment Practitioner

<b>EMP</b>	Environmental Management Programme
<b>ESA</b>	Early Stone Age
<b>ESIA</b>	Environmental and Social Impact Assessment
<b>ESI</b>	Evolutionary Studies Institute
<b>GIS</b>	Geographical Information System
<b>GRP</b>	Grave Relocation Plan
<b>HIA</b>	Heritage Impact Assessment
<b>HRM</b>	Heritage Resources Management
<b>HSR</b>	Heritage Scoping Report
<b>ICOMOS</b>	International Council on Monuments and Sites
<b>IFC</b>	International Finance Corporation
<b>IKS</b>	Indigenous Knowledge Systems
<b>km</b>	Kilometres
<b>Kya</b>	Thousand years ago
<b>LIHRA</b>	Limpopo Heritage Resources Authority
<b>LoM</b>	Life of Mine
<b>LRE</b>	Letter of Request for Exemption
<b>LSA</b>	Late Stone Age
<b>MA</b>	Master of Arts
<b>MPRDA</b>	Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
<b>MSA</b>	Middle Stone Age
<b>MSc</b>	Master of Science
<b>NEMA</b>	National Environmental Management Act, 1998 (Act No. 107 of 1998)
<b>NHRA</b>	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
<b>NID</b>	Notification of Intent to Develop
<b>NoK</b>	Next-of-Kin
<b>PPV</b>	Peak Particle Velocity
<b>RoD</b>	Record of Decision
<b>RoM</b>	Run of Mine
<b>SAfA</b>	Society of Africanist Archaeologists
<b>SAHRA</b>	South African Heritage Resources Agency
<b>SAHRIS</b>	South African Heritage Resources Information System

<b>SCF</b>	Statutory Comment Feedback
<b>SEP</b>	Stakeholder Engagement Process
<b>SIA</b>	Social Impact Assessment
<b>SoW</b>	Scope of Work
<b>STP</b>	Shovel Test Pit
<b>ToR</b>	Terms of Reference
<b>UP</b>	University of Pretoria
<b>Wits</b>	University of the Witwatersrand
<b>ZAR</b>	Zuid Afrikaanse Republiek

## GLOSSARY OF TERMS

<b>Term</b>	<b>Definition</b>
<b>Archaeological</b>	Material remains resulting from human activity that are in a state of disuse and older than 100 years, including artefacts, human and hominid remains and artificial features and structures. Rock art created through human agency older than 100 years, including any area within 10 m of such representation. Wrecks older than 60 years - either vessels or aircraft - or any part thereof that was wrecked in South Africa on land, internal or territorial waters, and any cargo, debris or artefacts found or associated therewith. Features, structures and artefacts associated with military history that are older than 75 years and the sites on which they are found, e.g. battlefields.
<b>Archaeologist</b>	A trained professional who uses scientific methods to excavate, record and study archaeological sites and deposits.
<b>Artefact</b>	Any object manufactured or modified by human beings.
<b>Burial Grounds and Graves Consultation (BGGC)</b>	The regulated consultation process required in terms of Section 36 of the NHRA and Regulation GNR 548 to the Act when burial grounds and graves are identified within a project area.
<b>Ceramic (syn. pottery)</b>	In an archaeological context any vessel or other object produced from natural clay that has been fired. Indigenous ceramics associated with Farming Communities are low-fired wares, typically found as potsherds. Imported and more historic ceramics generally include high-fired wares such as porcelain, stoneware, etc.
<b>Ceramic facies / facies</b>	Subgroups of a primary ceramic tradition or sequence. Typically used in ceramic analyses. Various facies are attributed to different temporal periods based of radiometric dates obtained from archaeological contexts. Facies are often used

Term	Definition
	to infer cultural identity of archaeological groups. However, in context of this study identified ceramic facies merely provide a relative temporal context for archaeological sites in the landscape.
<b>Ceramic tradition</b>	The sequence of ceramic styles that develop out of each other and form a continuum. A tradition is the primary group to which subsequent ceramic facies belong. A ceramic tradition can be broadly associated with various linguistic and cultural groups, but do not represent any given ethnic identity, especially during the LFC period.
<b>Conservation</b>	In relation to heritage resources includes the protection, maintenance, preservation and sustainable use of places or objects so as to safeguard their cultural significance.
<b>Cultural significance (CS)</b>	<p>The aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. A heritage may have cultural significance or other special value because of its:</p> <ul style="list-style-type: none"> <li>Importance in the community, or pattern of South Africa's history.</li> <li>Possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage</li> <li>Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage.</li> <li>Importance in demonstrating the principal characteristics of a particular class of South Africa are natural or cultural places or objects.</li> <li>Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.</li> <li>Importance in demonstrating a high degree of creative or technical achievement at a particular period.</li> <li>Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.</li> <li>Strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.</li> <li>Significance relating to the history of slavery in South Africa.</li> </ul>
<b>Development</b>	<p>Any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of a heritage authority in any way result in a change to the nature, appearance or physical nature of a place, or influence its stability and future well-being, including:</p> <ul style="list-style-type: none"> <li>Construction, alteration, demolition, removal or change of use of a place or a structure at a place.</li> <li>Carrying out any works on or over or under a place.</li> <li>Subdivision or consolidation of land comprising, a place, including the structures or airspace of a place.</li> <li>Constructing or putting up for display signs or hoardings.</li> <li>Any change to the natural or existing condition or topography of land.</li> <li>Any removal or destruction of trees, or removal of vegetation or topsoil.</li> </ul>
<b>Early Farming</b>	The first Farming Communities (also known as Early Iron Age) that appear in



<b>Term</b>	<b>Definition</b>
<b>Community/ies</b>	the southern archaeological record during the early first millennium CE. The EFC period is generally dated from c. 200 CE to 1000 CE.
<b>Early Stone Age</b>	The South African ESA dates from ~3 Mya to c. 250 Kya. This period is associated with later <i>Australopithecus</i> and early <i>Homo</i> species. The lithic industries that characterise the ESA include Oldowan and Early Acheulian, typically as simple core tools, choppers hand axes and cleavers.
<b>Excavation</b>	The scientific excavation, recording and retrieval of archaeological deposit and objects through the use of accepted archaeological procedures and methods, and excavate has a corresponding meaning.
<b>Farming Community/ies</b>	Term signifying the appearance in the southern African archaeological of Bantu-speaking agricultural based societies from the early first millennium CE. The term replaces the <i>Iron Age</i> as a more accurate description for groups who practiced agriculture and animal husbandry, extensive manufacture and use of ceramics, and metalworking. The Farming Community period is divided into an Early and Late phase. The use of "Later Farming Communities" especially removes the artificial boundary between archaeology and history.
<b>Field Rating</b>	SAHRA requires heritage resources to be provisionally rated in accordance with Section 7 of the NHRA that provides a three tier grading system of resources that form part of the national estate. The rating system distinguishes between four categories: Grade I: Heritage resources with qualities so exceptional that they are of special national significance. Grade II: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region. Grade III: Other heritage resources worthy of conservation. General Protected: i.e. generally protected in terms of Sections 33 to 37 of the NHRA.
<b>Formal protection</b>	Places with qualities so exceptional that they are of special national significance as national heritage sites or that have special qualities as provincial heritage sites.
<b>General protection</b>	General protections are afforded to: Objects protected in terms of laws of foreign states. Structures older than 60 years. Archaeological and palaeontological sites and material and meteorites. Burial grounds and graves. Public monuments and memorials.
<b>Grave</b>	A place of interment and includes the contents, headstone or other marker of such a place, and any other structure on or associated with such place.



Term	Definition
<b>Heritage Impact Assessment (HIA)</b>	An assessment of the cultural significance of, and possible impacts on, diverse heritage resources that may be affected by a proposed development. A HIA may include several specialist elements such as archaeological, built environment and palaeontological studies. The HIA must supply the heritage authority with sufficient information about the sites to assess, with confidence, whether or not it has any objection to a development, indicate the conditions upon which such development might proceed and assess which sites require permits for destruction, which sites require mitigation and what measures should be put in place to protect sites that should be conserved. The content of HIA reports are clearly outlined in Section 38(3) of the NHRA and SAHRA Minimum Standards.
<b>Heritage resource</b>	Any place or object of cultural significance.
<b>Heritage resources management</b>	<p>Process required when development is intended categorised as:</p> <ul style="list-style-type: none"> <li>Any linear development exceeding 300m in length.</li> <li>Construction of a bridge or similar structure exceeding 50 m in length.</li> <li>Any activity which will change the character of a site exceeding 0.5 hectares in extent or involving three or more existing erven or subdivisions thereof or that have been consolidated within the past five years or costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority.</li> <li>Re-zoning of a site exceeding one hectare in extent.</li> <li>Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.</li> </ul>
<b>Heritage site</b>	Any place declared to be a national heritage site by SAHRA or a place declared to be a provincial heritage site by a provincial heritage resources authority.
<b>Late Farming Community/ies</b>	Farming Communities who either developed / evolved from EFC groups, or who migrated into southern African from the late first millennium / early second millennium CE. The LFC period evidences distinct changes in socio-political organisation, settlement patterns, trade and economic activities, including extensive trade routes. The LFC period is generally dated from c. 1000 CE well into the modern historical period of the nineteenth century.
<b>Late Stone Age</b>	The South African LSA dates from ~30 Kya. This period is associated with modern <i>Homo sapiens sapiens</i> and the complex hunter-gatherer societies, ancestral to the Bushmen / San and Khoi. The LSA lithic assemblage contains microlithic technology and composite tools such as arrows commonly produced from fine-grained cryptocrystallines, quartz and chert. The LSA is also associated with archaeological rock art including both paintings and engravings.
<b>Living / intangible heritage</b>	The intangible aspects of inherited culture that could include cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems, the holistic approach to nature, society and social relationships.





Term	Definition
<b>Management</b>	In relation to heritage resources, includes the conservation, presentation and improvement of a place protected in terms of the NHRA.
<b>Middle Stone Age</b>	The South African MSA dates from ~300 Kya to c. 30 Kya. This period is associated with the changing behavioural patterns and the emergence of modern cognitive abilities in early <i>Homo sapiens species</i> . The lithic industries that characterise the MSA are typically more complex tools with diagnostic identifiers, including convergent flake scars, multi-faceted platforms, retouch and backing. Assemblages are characterised as refined lithic technologies such as prepared core techniques, retouched blades and points manufactured from good quality raw material.
<b>National estate</b>	<p>The national estate as defined in Section 3 of the NHRA, i.e. heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations. The national estate may include:</p> <ul style="list-style-type: none"> <li>Places, buildings, structures and equipment of cultural significance.</li> <li>Places to which oral traditions are attached or which are associated with living heritage.</li> <li>Historical settlements and townscapes.</li> <li>Landscapes and natural features of cultural significance.</li> <li>Geological sites of scientific or cultural importance.</li> <li>Archaeological and palaeontological sites.</li> <li>Graves and burial grounds, including ancestral graves, royal graves and graves of traditional leaders, graves of victims of conflict, graves of individuals designated by the Minister by notice in the Gazette, historical graves and cemeteries, and other human remains which are not covered in terms of the National Health Act, 2003.</li> <li>Sites of significance relating to the history of slavery in South Africa.</li> <li>Movable objects, including objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens; objects to which oral traditions are attached or which are associated with living heritage; ethnographic art and objects; military objects; objects of decorative or fine art; objects of scientific or technological interest.</li> <li>Books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).</li> </ul>
<b>Palaeontological</b>	Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.
<b>Palaeontologist</b>	A trained professional who uses scientific methods to excavate, collect, record and study palaeontological sites and fossils.
<b>Pedestrian survey</b>	A method of examining a site in which surveyors, spaced at regular intervals, systematically walk over the area being investigated.



Term	Definition
<b>Phase 1 Archaeological Impact Assessment (AIA)</b>	Phase 1 AIAs generally involve the identification and assessment of sites during a field survey of a portion of land that is going to be affected by a potentially destructive or landscape-altering activity.
<b>Phase 2 Archaeological Impact Assessment (AIA)</b>	Phase 2 AIAs are primarily based on salvage or mitigation excavations preceding development that will destroy or impact on a site. This may involve collecting of artefacts from the surface and / or excavation of representative samples of the artefactual material to allow characterisation of the site and the collection of suitable materials for dating the sites. Phase 2 AIAs aim to obtain a general idea of the age, significance and meaning of the site that is to be lost and to store a sample that can be consulted at a later date for research purposes. Phase 2 excavations can only be done under a permit issued by SAHRA, or other appropriate heritage agency, to the appointed archaeologist.
<b>Phase 3 Management Plan / Conservation Management Plan (CMP)</b>	On occasion, a site may require a Phase 3 programme involving the modification of the site or the incorporation of the site into the development itself as a site museum, a special conservation area or a display. Alternatively it is often possible to relocate or plan the development in such a way as to conserve the archaeological site or any other special heritage significance the place may have. For example, in a wilderness area or open space when sites are of public interest the development of interpretative material is recommended and adds value to the development. Permission for the development to proceed can be given only once the heritage resources authority is satisfied that measures are in place to ensure that the archaeological sites will not be damaged by the impact of the development or that they have been adequately recorded and sampled. Careful planning can minimise the impact of archaeological surveys on development projects by selecting options that cause the least amount of inconvenience and delay. The process as explained above allows the rescue and preservation of information relating to our past heritage for future generations. It balances the requirements of developers and the conservation and protection of our cultural heritage as required of SAHRA and the provincial heritage resources authorities (ASAPA).
<b>Pre-disturbance survey (syn. reconnaissance)</b>	A survey to record a site as it exists, with all the topographical and other information that can be collected, without excavation or other disturbance of the site.
<b>Reconnaissance</b>	A broad range of techniques involved in the location of archaeological sites, e.g. surface survey and the recording of surface artefacts and features, the sampling of natural and mineral resources, and sometimes testing of an area to assess the number and extent of archaeological resources. However, in terms of South African practice, reconnaissance during a so-called Phase 1 AIA never includes sampling as this is a permitted activity, usually undertaken during so-called Phase 2 AIAs (ASAPA).

Term	Definition
<b>Site</b>	Any area of land, including land covered by water, and including any structures or objects thereon.
<b>Structure</b>	Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.
<b>Tangible heritage</b>	Physical heritage resources such as archaeological sites, historical buildings, burial grounds and graves, fossils, etc. Tangible heritage may be associated with intangible elements, e.g. the living cultural traditions, rituals and performances associated with burial grounds and graves and deceased persons.

## 1 Introduction

### 1.1 Project Background<sup>1</sup>

Ixia Coal (Pty) Ltd (hereafter Ixia Coal), intends to undertake open cast coal mining near Secunda in the Mpumalanga Province at the proposed Imvula Open Pit 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. 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 complete 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. A Notification of Intent to Develop (NID) and Heritage Scoping Report (HSR) were completed as part of the heritage specialist study and submitted to the South African Heritage Resources Agency (SAHRA) and Mpumalanga Provincial Heritage Resources Authority (MPHRA) via the South African Heritage Resources Information System (SAHRIS) (Case ID: 8831) on 4 December 2015. Submission of the NID and HSR is required under section 38(8) of the NHRA.

This document constitutes the Heritage Impact Assessment (HIA) to inform the greater Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) Report for the proposed Imvula Project. This report must be read and understood in conjunction with the HSR.

### 1.2 Terms of Reference<sup>2</sup>

The Terms of Reference for the HIA are based on the recommendations provided in the NID and HSR. These required that an HIA be completed and submitted to the relevant Heritage Resources Authorities (HRAs) prior to the development, and must include:

- 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 exist in the development footprint.

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<sup>1</sup> Detailed project descriptions, including consideration of alternatives, definitions, legal frameworks and baseline cultural landscape descriptions were reported on in the HSR and not repeated in this report for the sake of brevity.

<sup>2</sup> A palaeontological assessment has been excluded from the Terms of Reference for this HIA Report. A separate palaeontological assessment will be required.

### 1.3 Scope of Work

The key deliverables as part of this assessment included an HIA and Statutory Comment Feedback (SCF) Report. The Scope of Work required to complete these deliverables, based on the ToR outlined in Section 1.2 above included:

- Pre-disturbance survey of the proposed development footprint;
- Assessment of the cultural significance of any identified heritage resources;
- Assessment of impacts on identified heritage resources;
- Developing mitigation measures to avoid and / or reduce negative impacts and enhance positive ones;
- Compilation of an HIA report;
- Submission of the HIA report to SAHRA and MPHRA for Statutory Comment;
- Compilation of an SCF Report.

### 1.4 Expertise of the Specialist

**Justin du Piesanie undertook the reconnaissance and compiled the HIA report.** He obtained his Master of Science (MSc) degree in Archaeology from the University of the Witwatersrand in 2008, specialising in the Southern African Iron Age. Justin also attended courses in architectural and urban conservation through the University of Cape Town's Faculty of Engineering and the Built Environment Continuing Professional Development Programme in 2013. He currently holds the position of Heritage Management Consultant: Archaeologist at Digby Wells. He has over 6 years combined experience in HRM in South Africa, including heritage assessments, archaeological mitigation and grave relocation. Justin has gained further generalist experience since his appointment at Digby Wells in Botswana, Burkina Faso, the Democratic Republic of Congo, Liberia and Mali on projects that have required compliance with International Finance Corporation (IFC) requirements such as Performance Standard 8: Cultural Heritage.

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

**Johan Nel undertook the technical review of this HIA.** He has more than 13 years of combined experience in the field of HRM including archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. He has gained experience both within urban settings and remote rural landscapes. Since 2010 he has been actively involved in environmental management that has allowed him to investigate and implement the integration of heritage resources management into EIAs. Many of the projects since have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. This exposure has allowed Johan to develop and implement a HRM approach that is founded on international best practice, leading international conservation bodies such as the United Nations Educational, Scientific and

Cultural Organisation (UNESCO) and ICOMOS and aligned to the South African legislation. Johan has worked in most South African Provinces, as well as Swaziland, the Democratic Republic of the Congo, Liberia and Sierra Leone.

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

## 1.5 Constraints and Limitations

The following constraints and limitations were experienced during this study:

- Archaeological sites commonly occur at sub-surface levels with no or limited trace evidence on the surface. To investigate the potential of subsurface occurrences, permits regulated under section 35 of the NHRA are required. No permits were held by the specialists, and as such, it is possible that archaeological sites may be identified during the construction phase of the project; and
- The heritage specialists did not participate in the formal consultation process with identified stakeholders.

## 1.6 Structure of the HIA Report

The remainder of the HIA Report is structured as follows:

- Chapter 2 provides the aims and objectives of this study;
- Chapter 3 describes the methodology employed during the quantitative data collection, evaluation of significance, field ratings and rationale for the mitigation measures and recommendations provided;
- Chapter 4 summarises the record of consultation undertaken for the environmental authorisation process;
- Chapter 5 provides an update of the cultural baseline described in detail in the HSR;
- Chapter 6 details the heritage impact assessment, including definitions and methodology utilised to determine impacts to identified heritage resources;
- Chapter 7 examines the socio-economic benefit of the Imvula Project versus the identified heritage impacts;
- Chapter 8 provides a narrative description of potential cumulative impacts on the cultural landscape;
- Chapter 9 identifies potential unplanned events and low risks to heritage;
- Chapter 10 provides specific heritage input into the EMP; and
- Chapter 11 summarises the most salient findings from the HIA Report.

## 2 Aims and Objectives

The primary aim of this HIA report, including the NID and HSR, was to furnish the responsible HRAs with details regarding the location, nature and extent of the proposed development, and the possible impacts associated. The specific objectives of the HIA report were to enable the responsible HRAs to:

- Decide timeously, in consultation with the proponent, i.e. Ixia Coal, whether or not the development may proceed;
- Stipulate any limitations or conditions to be applied to the development;
- Determine what general protections apply in terms of the NHRA, and what formal protections may be consequently be applied;
- Determine if any compensatory action is required in respect of any heritage resources damaged or destroyed as a result of the development; and
- Determine the need to appoint specialists as a condition of approval of the proposed development.

## 3 Methodology

### 3.1 Quantitative Data Collection

Three pre-disturbance surveys were completed for the proposed Imvula Project that focussed on undisturbed areas, outcrops and watercourses within the project boundaries. The surveys were non-intrusive (i.e. no-sampling was undertaken) primarily vehicular-based to cover the maximum extent of the project area within the designated time allotted. Areas of interest or potential for high heritage sensitivity were traversed through a pedestrian survey. The objectives of the survey were to:

- Record visually the current state of the cultural landscape;
- Ground truth certain heritage resources and sites identified through the literature; and
- Record a representative sample of visible tangible heritage resources present within the site specific project area.

Visible tangible heritage resources were recorded as waypoints using handheld GPS and documented through written and photographic record. The surveys were recorded as track logs (See Plan 1).



### 3.2 Evaluation of Significance

The significance rating process is designed to provide a numerical rating of the cultural significance<sup>3</sup> (CS) of identified heritage resources. The evaluation was done as objectively as possible through a matrix developed by Digby Wells for this purpose. In addition, the methodology aims to allow ratings to be reproduced independently should it be required, provided that the same information sources are used.

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)

**Box 1: NHRA section 3 criteria**

This matrix takes into account heritage resources assessment criteria set out in subsection 3(3) of the NHRA (see Box 1), which determines the intrinsic,

comparative and contextual significance of identified heritage resources. A resource's importance rating is based on information obtained through review of available credible sources and representivity or uniqueness (i.e. known examples of similar resources to exist). The final significance attributed to a resource furthermore takes into account the physical integrity of the fabric of the resource. The formula used to determine significance can be summarised in Box 2.

The rationale behind the heritage value matrix takes into account the fact that a heritage resource's value is a direct indication of its sensitivity to change (impacts). Value therefore needs to be determined prior to the completion of any assessment of impacts.

$$\begin{aligned}
 & \text{Value} = \text{Importance} \times \text{Integrity} \\
 & \text{where} \\
 & \text{Importance} = \text{average sum} \\
 & \text{of} \\
 & \text{Aesthetic} + \text{Historic} + \text{Scientific} + \text{Social}
 \end{aligned}$$

**Box 2: CS formula**

This matrix rates the potential, or importance, of an identified resource relative to its contribution to certain values – aesthetic, historical, scientific and social.

The significance of a resource is directly related to the impact on it that could result from project-related activities, as it provides minimum accepted levels of change to the resource. SAHRA has published minimum standards that include minimum required mitigation of heritage resources. These minimum requirements are integrated into the matrix to guide

<sup>3</sup> Cultural significance is defined in the NHRA as the intrinsic “aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance” of a heritage resource. These attributes are combined and reduced to four themes used in the Digby Wells significance matrix: aesthetic, historical, scientific and social.



both assessments of impacts and recommendations for mitigation and management of resources.

The weight assigned to the various parameters for significance in the formula, significance ratings and recommended mitigation are presented in Table 3-1.

### 3.3 Field Rating

Although grading of heritage resources remains the responsibility of heritage resources authorities, SAHRA requires in terms of its Minimum Standards that heritage reports include Field Ratings for identified resources to comply with section 38 of the NHRA. The NHRA in terms of section 7 provides for a system of grading of heritage resources that form part of the national estate, distinguishing between three categories.

The field rating process is designed to provide a numerical rating of the recommended grading of identified heritage resources. The evaluation was done as objectively as possible by integrating the field rating into the significance matrix. Field ratings guide decision-making in terms of appropriate minimum required mitigation measures and consequent management responsibilities in accordance with section 8 of the NHRA. The formula used to determine field ratings is summarised in Box 3. The weight assigned to the various field rating parameters in the formula and the sum of the average ratings are is presented in Table 3-1.

*Field Rating = average sum  
of  
Aesthetic + Historic + Scientific + Social*

**Box 3: Field rating formula**

**Table 3-1: Ratings and descriptions used in determining CS and field ratings**

<b>Rating</b>	<b>IMPORTANCE</b> <i>A heritage resource's contribution to aesthetic, historic, scientific and social value.</i>	<b>INTEGRITY</b> <i>The undivided or unbroken state, material wholeness, completeness or entirety of a resource or site</i>	<b>FIELD RATING</b> <i>Recommended grading of identified heritage resources in terms of NHRA Section 7</i>
-	Not assessed - dimension and/or attribute not considered in determining value.		Not assessed - dimension and/or attribute not considered in field rating.
0	The resource exhibits attributes that may be considered in a particular dimension, but it is so poorly represented that it cannot or does not contribute to the resource's overall value.	No information potential, complete loss of meaning, Fabric completely degraded, original setting lost	
1	Common, well represented throughout diverse cultural landscapes	Fabric poorly preserved, limited information, little meaning ascribed, extensive encroachment on setting	Resources under general protection in terms of NHRA sections 34 to 37 with Negligible significance
2	Generally well represented but exhibits superior qualities in comparison to other similar examples	Fabric is preserved, some information potential (quality questionable) and meaning evident, some encroachment on setting	Resources under general protection in terms of NHRA sections 34 to 37 with Low significance
3	The resource exhibits attributes that are rare and uncommon within a region. It is important to specific communities.	Fabric well preserved, good quality information and meaning evident, limited encroachment	Resources under general protection in terms of NHRA sections 34 to 37 with Medium to Medium-High significance
4	Rare and uncommon, value of national importance	Excellent preservation of fabric, high information potential of high quality, meaning is well established, no encroachment on setting	Resources under general protection in terms of NHRA sections 34 to 37 with High significance
5	The resource exhibits attributes that are considered singular, unique and/or irreplaceable to the degree that its significance can be universally accepted.		Resources under general protection in terms of NHRA sections 34 to 37 with Very High significance
6			Heritage resources under formal protection that can be considered to have special qualities which make them significant within the context of a province or a region
7			Heritage resources under formal protection that can be considered to have special qualities which make them significant within a national and / or international context.

### 3.4 Impact Assessment

The following are terms and definitions applicable to the EIA concept (ISO 14001):

- **Project Activity:** Activities associated with the project that result in an environmental interaction during the different phases (construction, operation and decommissioning), e.g., new processing plant, new stockpiles, development of open pit, dewatering, water treatment plant;
- **Interaction:** An “environmental interaction” is an element or characteristic of an activity, product, or service that interacts or can interact with the environment. Environmental interactions can cause environmental impacts (but may not necessarily do so). They can have either beneficial impacts or adverse impacts and can have a direct and decisive impact on the environment or contribute only partially or indirectly to a larger environmental change.
- **Environmental Aspect:** The term “environmental aspect” refers to the various natural and human environments that an activity may interact with. These environments extend from within the activity itself to the global system, and include air, water, land, flora, fauna (including people) and natural resources of all kinds.
- **Environmental Impact:** An “environmental impact” is a change to the environment that is caused either partly or entirely by one or more environmental interactions. An environmental interaction can have either a direct and decisive impact on the environment or contribute only partially or indirectly to a larger environmental change. In addition, it can have either a beneficial environmental impact or an adverse environmental impact.

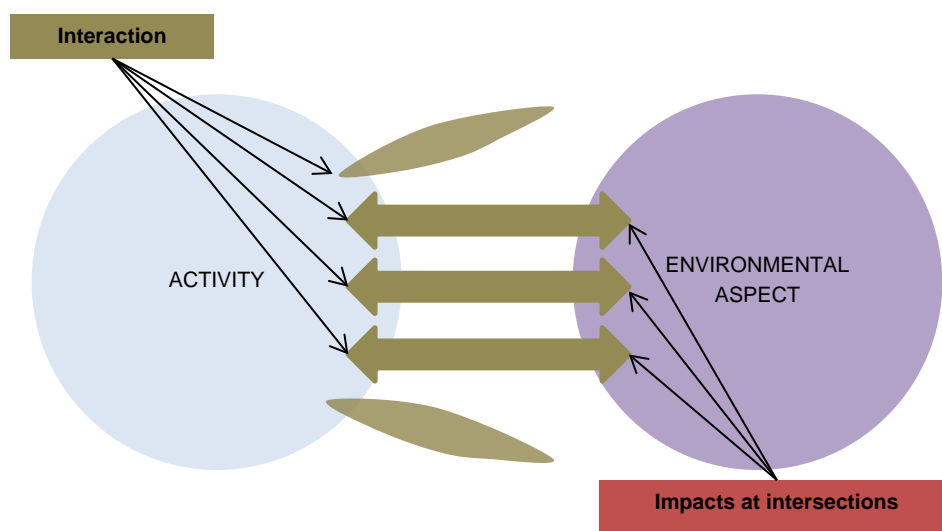
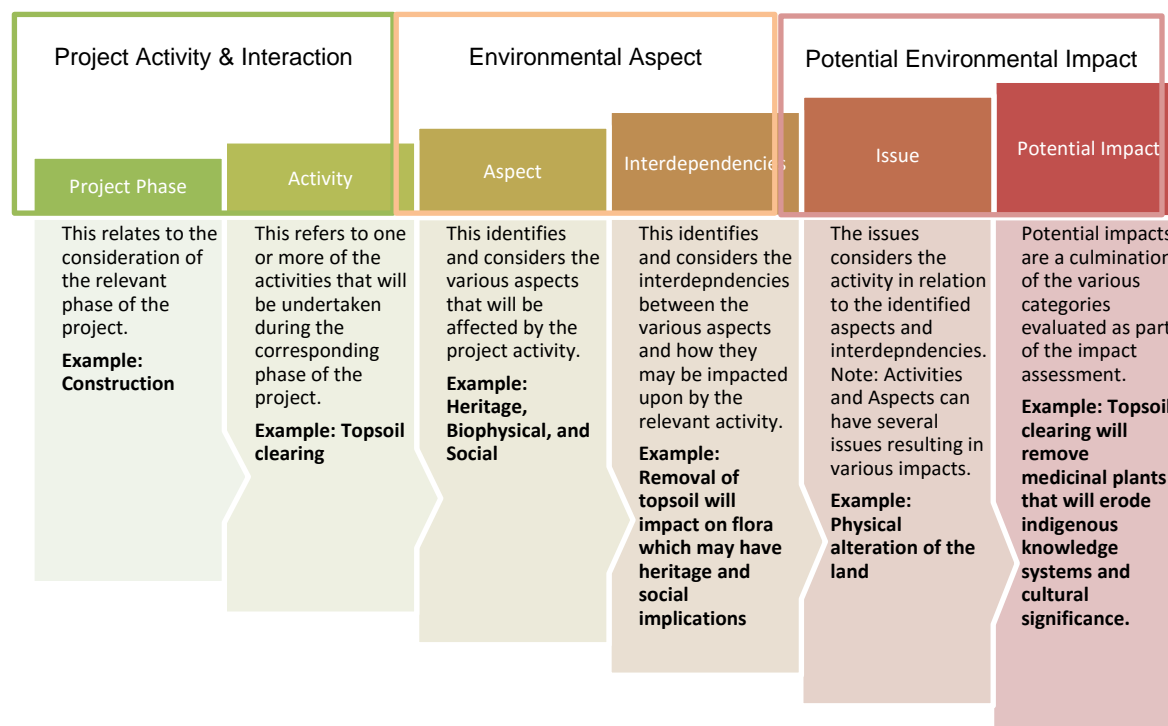


Figure 3-1: Graphical representation of impact assessment concept

The potential impacts were considered through an examination of the project phase and activity, the environmental aspect, the interdependencies between aspects, an assessment and classification of categories, and consideration of the potential impact on heritage resources. An example of this process is presented in Figure 3-2.



**Figure 3-2: Example of how potential impacts were considered.**

### 3.4.1 Defining Heritage Impacts

Different heritage impacts may manifest in different geographical areas and diverse communities. For instance, heritage impacts can simultaneously affect the physical resource and have social repercussions: this is compounded when the intensity of physical impacts and social repercussions differ significantly. In addition, heritage impacts can influence the cultural significance of heritage resources without any actual physical impact on the resources taking place. Heritage impacts can therefore generally be placed into three broad categories (adapted from Winter & Bauman 2005: 36):

- Direct or primary heritage impacts** affect the fabric or physical integrity of the heritage resource, for example destruction of an archaeological site or historical building. Direct or primary impacts may be the most immediate and noticeable. Such impacts are usually ranked as the most intense, but can often be erroneously assessed as high-ranking.

- **Indirect, induced or secondary heritage impacts** can occur later in time or at a different place from the causal activity, or as a result of a complex pathway. For example, restricted access to a heritage resource resulting in the gradual erosion of its cultural significance that may be dependent on ritual patterns of access. Although the physical fabric of the resource is not affected through any primary impact, its significance is affected that can ultimately result in the loss of the resource itself.
- **Cumulative heritage impacts** result from in-combination effects on heritage resources acting within a host of processes that are insignificant when seen in isolation, but which collectively have a significant effect. Cumulative effects can be:
  - **Additive:** the simple sum of all the effects, e.g. the total number of development activities that will occur within the study area.
  - **Synergistic:** effects interact to produce a total effect greater than the sum of the individual effects, e.g. the effect of each different activity on the archaeological landscape in the study area.
  - **Time crowding:** frequent, repetitive impacts on a particular resource at the same time, e.g. the effect of regular blasting activities on a nearby rock art site or protected historical building.
  - **Neutralizing:** where the effects may counteract each other to reduce the overall effect, e.g. the effect of changes in land use could reduce the overall impact on sites within the archaeological landscape of the study area.
  - **Space crowding:** high spatial density of impacts on a heritage resource, e.g. density of new buildings resulting in suburbanisation of a historical rural landscape.

In addition, the NHRA requires that heritage resources are graded in terms of national, provincial and local concern based on their importance and consequent official (i.e. State) management effort required. The type and level of baseline information required to adequately predict heritage impacts varies between these categories. Three 'concentric' study areas were defined for the purposes of this study and are discussed in detail in the HSR.

### 3.4.2 Impact Assessment

The impact rating process is designed to provide a numerical rating of the identified heritage impacts. The significance rating follows an established impact/risk assessment formula is shown in Box 5.

The weight assigned to the various parameters for positive and negative impacts in the formula is presented in Table 3-3 below.

Project-related impacts on heritage resources have taken into account the inherent value of heritage resources, described above, and only applied to resources with values above negligible. As a result, the impact assessment did not consider individual resources, but was applied to diverse resources grouped in terms of similar values.

The magnitude will then be applied to pre- and post-mitigation scenarios with the intention of removing all impacts on heritage resources. Where project related mitigation does not avoid or sufficiently reduce negative changes/impacts on heritage resources with high values, mitigation of these resources may be required.

*Significance = consequence of an event x probability of the event occurring*

*where:*

*Consequence = type of impact x (Intensity + Spatial Scale + Duration)*

*and*

*Probability = Likelihood of an impact occurring*

In the formula for calculating consequence:

**Type of impact = +1 (positive) or -1 (negative)**

**Box 5: Impact assessment formula**

This may include alteration, restoration or demolition of structures under a permit issued by the HRAs.

Impacts were rated prior to mitigation and again after consideration of the proposed mitigation measures. Impacts were then categories into one of eight categories listed in Table 3-3. The relationship between the consequence, probability and significance ratings is also graphically depicted in Table 3-3.

**Table 3-2: Description of duration, extent, intensity and probability ratings used in impact assessment**

Value	DURATION RATING - A measure of the lifespan of the impact		EXTENT RATING A measure of how wide the impact would occur		INTENSITY RATING- A measure of the degree of harm, injury or loss.		PROBABILITY RATING - A measure of the chance that consequences of that selected level of severity could occur during the exposure window.	
	Probability	Description	Exposure	Description	Intensity	Description	Probability	Description
7	<b>Permanent</b>	Impact will permanently alter or change the heritage resource and/or value (Complete loss of information)	<b>International</b>	Impacts on heritage resources will have international repercussions, issues or effects, i.e. in context of international cultural significance, legislation, associations, etc.	<b>Extremely high</b>	Major change to Heritage Resource with High-Very High Value	<b>Certain/Definite</b>	Happens frequently. The impact will occur regardless of the implementation of any preventative or corrective actions.
6	<b>Beyond Project Life</b>	Impact will reduce over time after project life (Mainly renewable resources and indirect impacts)	<b>National</b>	Impacts on heritage resources will have national repercussions, issues or effects, i.e. in context of national cultural significance, legislation, associations, etc.	<b>Very high</b>	Moderate change to Heritage Resource with High-Very High Value	<b>High probability</b>	Happens often. It is most likely that the impact will occur.
5	<b>Project Life</b>	The impact will cease after project life.	<b>Region</b>	Impacts on heritage resources will have provincial repercussions, issues or effects, i.e. in context of provincial cultural significance, legislation, associations, etc.	<b>High</b>	Minor change to Heritage Resource with High-Very High Value	<b>Likely</b>	Could easily happen. The impact may occur.
4	<b>Long Term</b>	Impact will remain for >50% - Project Life	<b>Municipal area</b>	Impacts on heritage resources will have regional repercussions, issues or effects, i.e. in context of the regional study area.	<b>Moderately high</b>	Major change to Heritage Resource with Medium-Medium High Value	<b>Probable</b>	Could happen. Has occurred here or elsewhere
3	<b>Medium Term</b>	Impact will remain for >10% - 50% of Project Life	<b>Local</b>	Impacts on heritage resources will have local repercussions, issues or effects, i.e. in context of the local study area.	<b>Moderate</b>	Moderate change to Heritage Resource with Medium - Medium High Value	<b>Unlikely / Low probability</b>	Has not happened yet, but could happen once in a lifetime of the project. There is a possibility that the impact will occur.

Value	DURATION RATING - A measure of the lifespan of the impact		EXTENT RATING A measure of how wide the impact would occur		INTENSITY RATING- A measure of the degree of harm, injury or loss.		PROBABILITY RATING - A measure of the chance that consequences of that selected level of severity could occur during the exposure window.	
	Probability	Description	Exposure	Description	Intensity	Description	Probability	Description
2	<b>Short Term</b>	Impact will remain for <10% of Project Life	<b>Limited</b>	Impacts on heritage resources will have site specific repercussions, issues or effects, i.e. in context of the site specific study area.	<b>Low</b>	Minor change to Heritage Resource with Medium - Medium High Value	<b>Rare / Improbable</b>	Conceivable, but only in extreme circumstances. Have not happened during the lifetime of the project, but has happened elsewhere. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures
1	<b>Transient</b>	Impact may be sporadic/limited duration and can occur at any time. E.g. Only during specific times of operation, and not affecting heritage value.	<b>Very Limited</b>	Impacts on heritage resources will be limited to the identified resource and its immediate surroundings, i.e. in context of the specific heritage site.	<b>Very low</b>	No change to Heritage Resource with values medium or higher, or Any change to Heritage Resource with Low Value	<b>Highly Unlikely /None</b>	Expected never to happen. Impact will not occur.



**Table 3-3: Impact significance ratings, categories and relationship between consequence, probability and significance**

Score	Description	Rating
109 to 147	A very beneficial impact which may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change.	Major (positive)
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the heritage resources.	Moderate (positive)
36 to 72	An important positive impact. The impact is insufficient by itself to justify the implementation of the project. These impacts will usually result in positive medium to long-term effect on the heritage resources.	Minor (positive)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the heritage resources.	Negligible (positive)
-3 to -35	An acceptable negative impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the heritage resources.	Negligible (negative)
-36 to -72	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the heritage resources.	Minor (negative)
-73 to -108	A serious negative impact which may prevent the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term change to the heritage resources and result in severe effects.	Moderate (negative)
-109 to -147	A very serious negative impact which may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects.	Major (negative)

Relationship between consequence, probability and significance ratings																																						
Probability	Significance																																					
	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
7	-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
6	-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
5	-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
4	-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
3	-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
2	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
1	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21



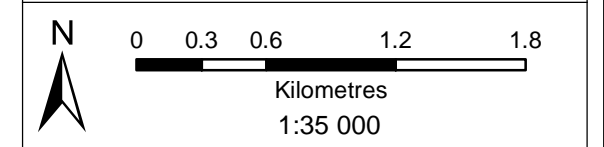
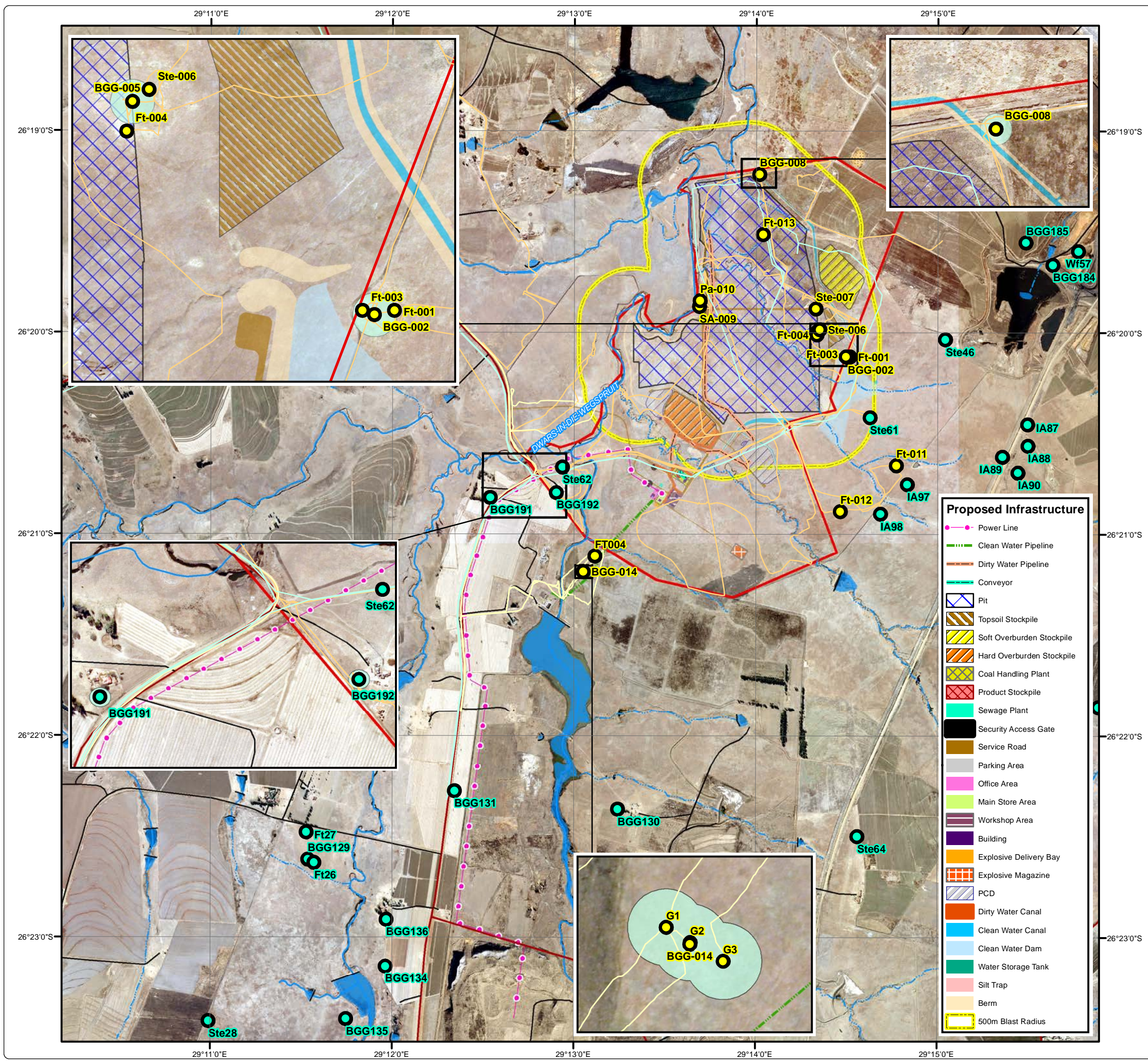
# Ixia Coal Imvula Mining Project Heritage Sites

## Legend

- Project Area
- Heritage Sites (Digby Wells Environmental)
- Previously Identified Heritage Resources
- Heritage Tracks - First Visit
- Heritage Tracks - Second Visit
- Heritage Tracks - Third Visit
- 25m Grave Buffer
- Main Road
- Minor Road
- Dam Wall
- Non-Perennial Stream
- Perennial Stream
- Dam / Lake
- Non-Perennial Pan
- Perennial Pan

## Proposed Infrastructure

- Power Line
- Clean Water Pipeline
- Dirty Water Pipeline
- Conveyor
- Pit
- Topsoil Stockpile
- Soft Overburden Stockpile
- Hard Overburden Stockpile
- Coal Handling Plant
- Product Stockpile
- Sewage Plant
- Security Access Gate
- Service Road
- Parking Area
- Office Area
- Main Store Area
- Workshop Area
- Building
- Explosive Delivery Bay
- Explosive Magazine
- PCD
- Dirty Water Canal
- Clean Water Canal
- Clean Water Dam
- Water Storage Tank
- Silt Trap
- Berm
- 500m Blast Radius





### 3.4.3 Risk versus Impact

Risk is defined as the potential consequence(s) of an interaction combined with its likelihood. Should a risk eventuate, it will manifest as an impact. These concepts are often misconstrued and lead to disproportionate amounts of effort spent on assessing minor risks with potentially insignificant impacts, at the cost of overlooking more important ones. The identification of project risks should take place during the scoping phase of the Environmental and Social Impact Assessment (ESIA). This allows for input from stakeholders prior to commencement of the impact assessment phase.

Example: The presence of vehicles on a site obviously creates the potential for hydrocarbon spills, but it cannot be seen as a foregone conclusion. Therefore hydrocarbon spillage is treated as a risk, as it has not yet eventuated.

Risks may include:

- Hydrocarbon spills from vehicles and machinery;
- Spills or leaks from pipelines, storage areas, berms and channels etc.; and
- Increased crime and breakdown of social order.

Broad mitigation measures and monitoring were provided for low risks and unplanned events, however, they **were not assessed in detail** (i.e., with significance ratings). In general monitoring is an accepted form of mitigation for low risks.

### 3.5 Mitigation Measures and Recommendations

The desired outcome of an impact assessment is the removal of negative impacts on heritage resources through the implementation of feasible mitigation measures. The mitigation and management measures recommended in this section comply with the General Principles set out under section 5 of the NHRA. The recommendations further considered the cultural significance of heritage resources and the recommended minimum level of mitigation as published in the SAHRA Minimum Standards<sup>4</sup> (See Box 5).

Designation	Recommended mitigation
Negligible	Sufficiently recorded, no mitigation required
Low	Resource must be recorded before destruction, including detailed site mapping, surface sampling may be required
Medium	Mitigation of resource to include detailed recording and mapping, and limited sampling, e.g. STPs.
Medium High	Project design should aim to reduce or remove changes; Mitigation of resource to include extensive sampling and recording, e.g. test excavation, analyses, etc.
High	Project design must aim to avoid change to resource; Partly conserved, Conservation Management Plan (CMP)
Very High	Project design must change to avoid all change to resource; Conserved in entirety, CMP

**Box 5: Recommended minimum level of required mitigation**

<sup>4</sup> It must be noted that these minimum standards serve as a guide, and the recommendations provided in this HIA are project specific.

Recommended mitigation is therefore divided into two categories: *project related* and *mitigation of heritage resources* defined below.

- Project-related mitigation requires changes or amendments to project design, planning and siting of infrastructure to avoid or reduce physical impacts on heritage resources. Project-related mitigation measures are always the preferred option, especially where heritage resources with higher cultural significance will be impacted on. Project-related mitigation may include:
  - *In situ* preservation (i.e. no-development) of heritage resources for which Conservation Management Plans (CMPs) are required; and
  - Conservation of heritage resources through, for example, incorporating the resources into project design and planning, for which CMPs are also required.
- Mitigation of heritage resources may be necessary where project-related mitigation will not sufficiently conserve or preserve heritage resources, thus resulting in partial or complete changes (including destruction) to a resource. Such resources need to be mitigated to ensure that they are fully recorded, documented and researched before any negative change occurs. This may require mitigation such as:
  - Intensive detailed recording of sites through various non-intrusive techniques to create a documentary record of the site – “preservation by record”;
  - Intrusive recording and sampling such as shovel test pits (STPs) and excavations, relocation (usually burial grounds and graves, but certain types of sites may be relocated), restoration and alteration. Any form of intrusive mitigation is a regulated permitted activity for which permits need to be issued by the relevant heritage authorities. Such mitigation may result in a reassessment of the value of a resource that could require conservation measures to be implemented. Alternatively, an application for a destruction permit may be made if the resource has been sufficiently sampled; and
  - Where resources have negligible significance the specialist may recommend that no further mitigation is required and the site may be destroyed, for which a destruction permit must be applied for.

Appropriate mitigation measures were identified for each impact, and the procedure discussed above was to assess the possible consequence, probability and significance of each impact post-mitigation.

The post-mitigation rating provided an indication of the significance of residual impacts, while the difference between an impact’s pre- and post-mitigation ratings represents the degree to which the recommended mitigation measures are expected to be effective in reducing or ameliorating that impact.

## 4 Consultation

### 4.1 Records of Formal Stakeholder Engagement

A Stakeholder Engagement Process (SEP) was initiated during the Scoping Phase of the EA. The SEP is central to the investigation of environmental and social impacts. It provides stakeholders affected by the proposed Project the opportunity to identify concerns and to ensure local knowledge, needs and values are understood and taken into consideration.

**Table 4-1: Summary of SEP activities undertaken during the Scoping Phase**

Activity	Details
Identification of stakeholders	Stakeholder database which includes I&APs from various sectors of society, including directly affected and adjacent landowners in and around the Project area.
Land Claims Commissioner	A letter was sent on the <b>16 October 2014</b> and then again on <b>19 January 2015</b> to Ms Thabile Mkhabela, Department of Rural Development and Land Reform: Land Claims Commission. We received a letter from Ms ND Nkambule on <b>29 January 2015</b> and indicated that there are no land claims for the farm portions associated with the Imvula Project.
Distribution of proposed project announcement materials	A Background Information Document (BID) and announcement letter with comment and registration sheet was emailed and posted to stakeholders on <b>Tuesday, 1 September 2015</b> . The Background Information Document was also made available on <a href="http://www.digbywells.com">www.digbywells.com</a> , on <b>Tuesday, 1 September 2015</b> .
Placement of Advertisement	An advertisement was placed in the Ridge Times on <b>Friday, 4 September 2015</b> .
Placement of site notices	Site notices were erected at various public places within and surrounding the proposed Project site. Site notices were placed on <b>Thursday, 3 September 2015</b> at the following venues: <ul style="list-style-type: none"> <li>▪ Kinross Public Library; and</li> <li>▪ Kriel Public Library.</li> </ul> A site notice placement map and report is provided.
Placement of Scoping Report	Copies of the Scoping Report were placed at the Kinross Public Library and Kriel Public Library from <b>Friday, 20 October to Monday, 30 November 2015</b> for (30 days). The Scoping Report was also made available on <a href="http://www.digbywells.com">www.digbywells.com</a> (Public Documents) and at the Open Day.

Activity	Details
Announcement of the Scoping Report	<p>Announcement of the availability of the Scoping Report was emailed and posted to the full stakeholder database to announce the availability thereof on <b>Wednesday, 28 October 2015</b>.</p> <p><i>An SMS was sent to the full database on Wednesday, 28 October 2015 indicating availability of the Scoping Report.</i></p>
Stakeholder Meeting	<p>An Open Day has held on <b>Wednesday, 18 November 2015</b> at the Multilink Conference Venue (4 Grey Street, Trichardt) from 10:00 – 13:00. Directly and indirectly affected landowners, key stakeholders and the general public were invited to this meeting.</p> <p>Comments received at this meeting were captured in the Comment and Response Report.</p>
Announcement of the updated Scoping Report availability	<p>Announcement letter of the availability of the updated Scoping Report was emailed and posted to the full database on Friday, 4 December 2015.</p> <p><i>An SMS to notify stakeholders that the updated Scoping Report is available for comment was sent to the full database on Friday, 4 December 2015.</i></p> <p>These reports are available on <a href="http://www.digbywells.com">www.digbywells.com</a> (Public Documents).</p> <p><b>(Public comment period: Friday, 4 December 2015 to Friday, 15 January 2016)</b></p>
Obtained comments from stakeholders	<p>Comments, issues of concern and suggestions received from stakeholders were captured in the Comment and Response Report.</p>

## 4.2 Records of Informal Consultation

Informal conversations with stakeholders were completed by the heritage specialists during the pre-disturbance surveys. In discussion with the foreman of the Greyling's properties, Mr Frans Geyser, information pertaining to the presence and location of burial grounds was gathered on 11 February 2015. According to Mr. Geyser, there are two burial grounds on the properties that are associated with families who used to reside on the land (BGG-005 & BGG-008).

This was confirmed by Mr. David Nkalanga, an employee on the Greyling's farm, who resides on the properties and has been in their employ for over 9 years. Mr. Nkalanga indicated to the heritage specialists that the graves are still visited by the respective families during the course of a year.

## 5 Updated Baseline Environment

### 5.1 Current Natural Environment

**The information summarised in this section is based on the *Fauna and Flora Scoping Report for the proposed Imvula Project* (Greffrath, 2015)**

The proposed Imvula Project falls within the Eastern Highveld and Soweto Grasslands occurring at an altitude of between 1520 m and 1780 m above sea level. Topographically it is characterised by slight to moderate undulating plains including some low hills and pan depressions supporting short to medium-high, dense, tufted grassland.

The dominant vegetation comprises grasses with geophytes and herbs also being well represented. Trees are absent, except in a few localised habitats. Dominant and diagnostic grass species are *Hyparrhenia hirta* and *Sporobolus pyramidalis*. Non-grassy forbs include *Acacia sieberiana*, *Searsia rehmanniana*, *Walafrida densiflora*, *Spermacoce natalensis*, *Kohautia cynanchica*, and *Phyllanthus glaucophyllus*.

The ecosystem has undergone degradation of ecological structure, function or composition as a result of human intervention primarily through agricultural and grazing activities, which is the dominant current land use of the project area.

The surrounding land use comprises mining operations associated with the Isibonelo and Kriel Colliery, and Sasol Syferfontein.



**Figure 5-1: Characteristic grasslands in the proposed Imvula Project Area**

### 5.2 Summary of Socio-Economic Aspects

**The information summarised in this section is based on the socio-economic baseline chapter is the *Draft Scoping Report that was derived from the Social Baseline Study for the proposed Imvula Project* (Swanepoel, 2015)**

The proposed Imvula Project is situated in Ward 27 of the Emalahleni Local Municipality (ELM). The ELM is described as an urban and rural area, comprising large farms, dispersed urban settlements, coal mines and power stations. This municipality ELM is the largest economic contributor of the Nkangala District Municipality (NDM), contributing 46% to the

regional economy: utilities account for 74.1%, within which mining and construction are the dominant contributors. The expected growth of the ELM's Gross Domestic Product (GDP) between 2011 and 2016 is at 3.3%, in line with the NDM and Mpumalanga expected growth rate.

The ELM population grew by 43.1% between 2001 and 2011: annualised population growth rate was measured at 3.6%. The unemployment rate of the economically active population (between the ages of 15-64) appears to be low. The majority of the population is included in the 'other' employment group. These individuals are either under the age of 15 years, over the age of 65 years or are of working age, but have surrendered the idea of searching for work.

The ELM Integrated Development Plan (IDP) listed following major employment per sector figures for the ELM population, accounting for 62.4% of total employment:

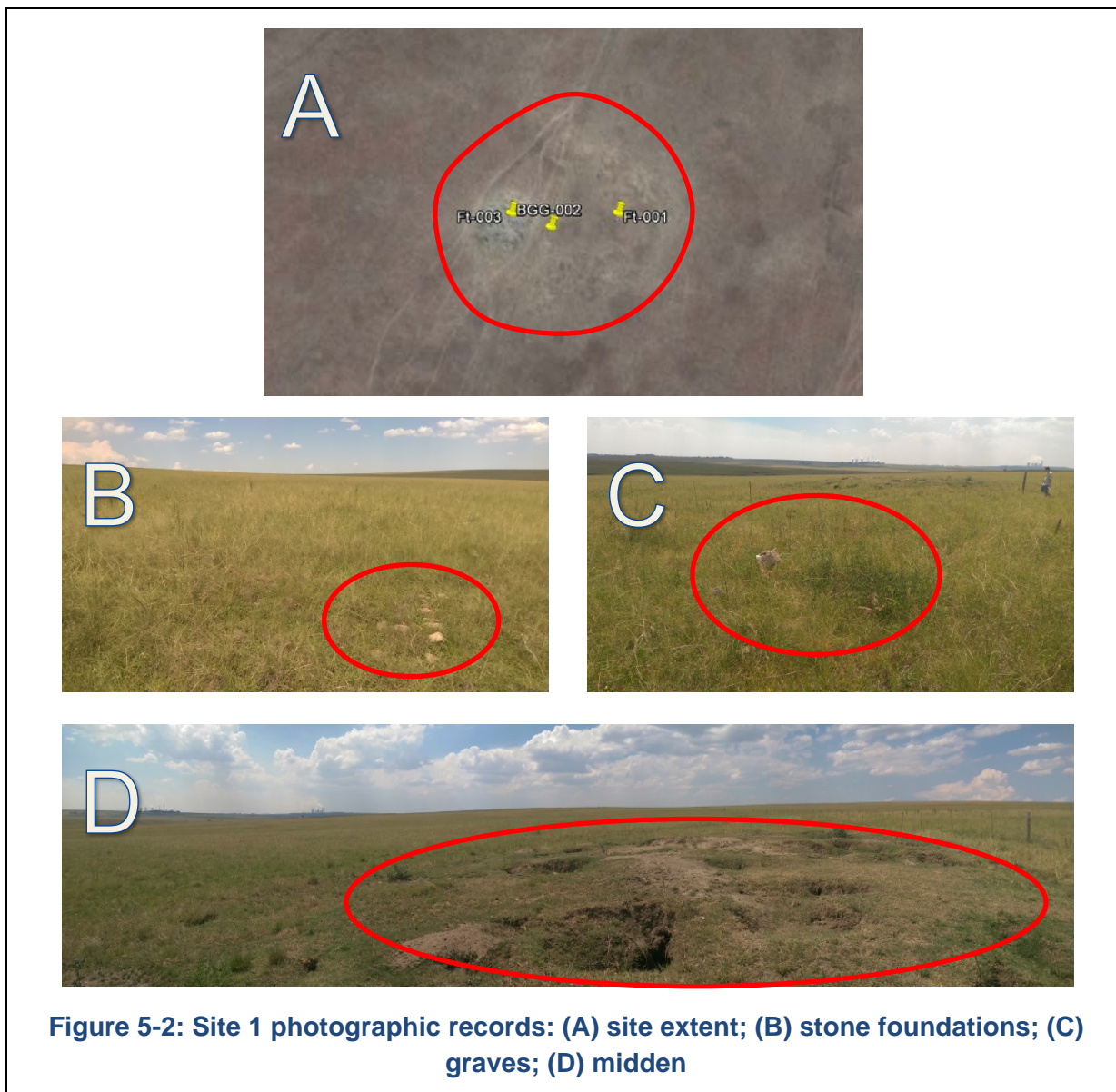
- 23% mining and quarrying;
- 13.2% community, social and personal services;
- 13.1% in wholesale and retail trade;
- 10% in manufacturing; and
- 3.1% in agriculture, hunting, forestry and fishing.

### 5.3 Results of Pre-disturbance Survey

Pre-disturbance surveys were completed between 11 – 13 February 2015, 10 July 2015 and 12 October 2015. During the survey, 9 heritage resources were recorded. The CS assessment is discussed under Section 3.4.3. The results from the pre-disturbance survey are discussed below.

<b>5.3.1 Site 1 / Historic</b>			
<b>Cultural Significance: Medium</b>	<b>Field Rating: Grade IV A</b>	<b>Co-ordinates</b>	
		26°20'9.42"S	29°14'29.24"E
<p>Site 1 comprises two features Ft-001 (homestead) and Ft-003 (midden) and burial ground BGG-002, recorded during the reconnaissance of the development footprint. The historic homestead (Ft-001) shown in figure B below, is characterised by squared, stone foundations. A large midden (Ft-003) (D) and graves (BGG-002) (C) are adjacent to the homestead. Only two of the possible ten graves have headstones. These were very weathered and no information was visible. The associated midden is characterised by ash deposit containing material cultural such as glass beads, porcelain and animal bones.</p> <p>Archaeological sites are protected under section 35 of the NHRA and burial grounds and graves are protected under section 36.</p>			





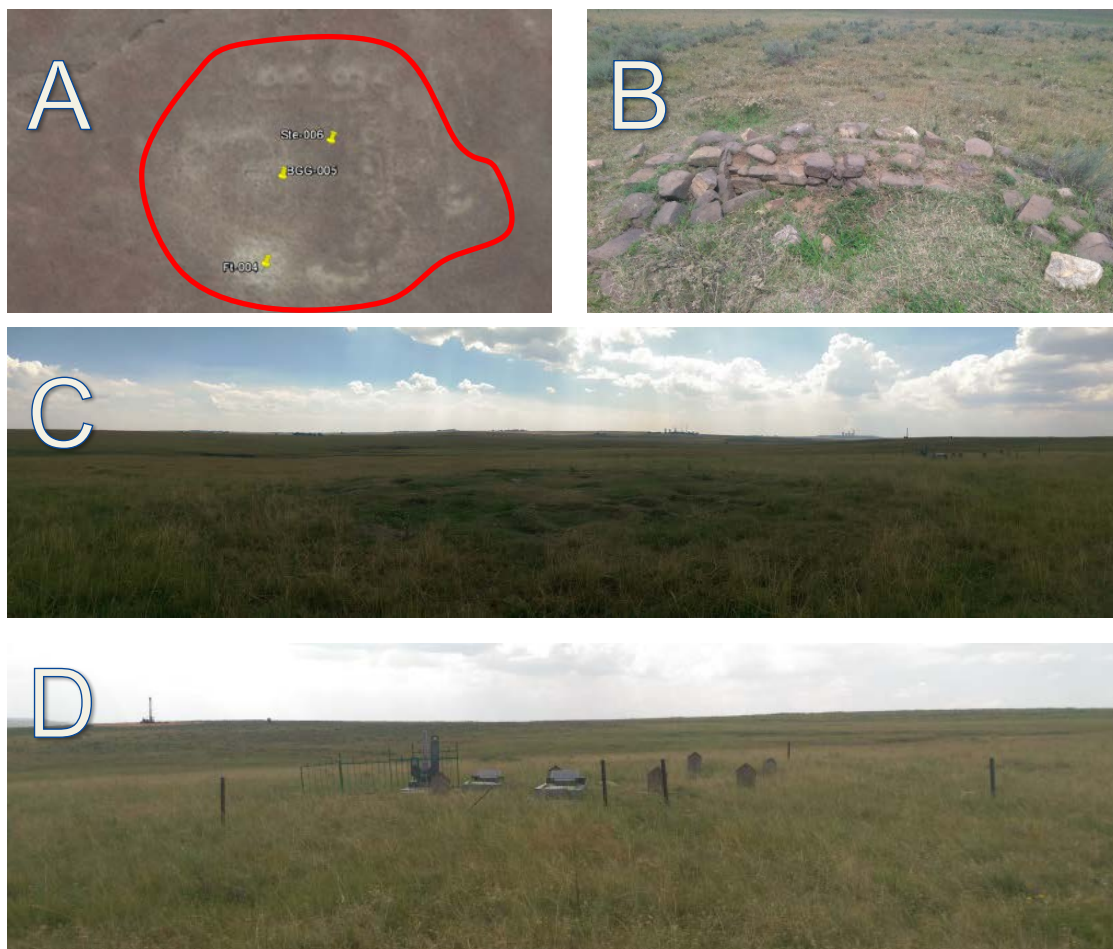
**Figure 5-2: Site 1 photographic records: (A) site extent; (B) stone foundations; (C) graves; (D) midden**

### 5.3.2 Site 2 / Historic

Cultural Significance: Medium	Field Rating: Grade IV A	Co-ordinates	
		26°20'1.60"S	29°14'19.36"E

Site 2 comprises Ft-004, BGG-005 and Ste-006. Large midden adjacent to BGG-005 and several larger mounds that appear to have been hut foundations, as evident by remnant stone walling. Material culture from this site includes bones and glass. Cemetery (BGG-005) containing at least 14 graves. Some have formal surface dressing, including granite and stone dressings. The earliest date observed is 1936. Family names include Shabangu, Masongo and Kabini. David Nkalanga stated that the graves are still visited.

Archaeological sites are protected under section 35 of the NHRA and burial grounds and graves are protected under section 36.



**Figure 5-3: Site 2 photographic records: (A) site extent; (B) stone foundations; (C) midden; (D) graves**

### 5.3.3 Ste-007 / Historic

Cultural Significance: Negligible	Field Rating: Grade IV C	Co-ordinates	
		26°19'55.03"S	29°14'18.73"E

The site constitutes the remains of a stone walled structure. These types of resources are generally protected under section 35 of the NHRA.

The site consists of collapsed stone walling and foundations of homesteads. The stone walling and foundations appear to be in a square shape and are most likely more recent / historic. The stone walling and foundations are adjacent to large mounds thought to be foundations. This could be associated with a larger settlement.



**Figure 5-4: Ste-007 stone foundation and collapsed walls of homestead**

### 5.3.4 BGG-008 / Burial Grounds and Graves

Cultural Significance: Very High	Field Rating: Grade IV A	<b>Co-ordinates</b>	
		26°19'14.95"S	29°14'0.15"E

The site constitutes a burial ground. Burial grounds and graves are generally protected under section 36 of the NHRA.

The burial ground contains at least 8 graves. The individual graves are identified through stone cairns and markers. The family name on most markers is Jiyane. No dates were visible on the markers. The burial ground is situated along a fence line in the northern portion of the project area. The burial ground itself is not fenced and is unkempt.



**Figure 5-5: BGG-008 graves**

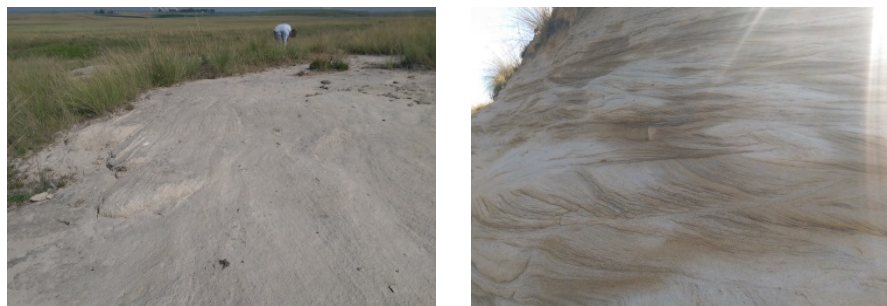
### 5.3.5 SA-009 / Stone Age

Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b>	
		26°19'54.34"S	29°13'40.33"E

The site constitutes a sandstone outcrop adjacent to a water course where undiagnostic lithics were noted. Stone Age lithics are generally protected under section 35 of the NHRA.

Few possible MSA lithics were noted at the sandstone outcrop. Possible lithics were exposed through erosion wash, and no discernible archaeological context was identified.





**Figure 5-6: SA-009 sandstone outcrop and section profile**

### 5.3.6 Ft-011 / Historic

Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b>	
		26°20'41.58"S	29°14'45.34"E

The site constitutes the remains of a stone walled structure. These types of resources are generally protected under section 35 of the NHRA.

The site comprise of collapsed stone walling and foundations of homestead. The stone walling and foundations are adjacent to large mounds thought to be foundations. This could be associated with a larger settlement.



**Figure 5-7: Ft-011 collapsed stone walling and foundations**

### 5.3.7 Ft-012 / Historic

Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b>	
		26°20'55.27"S	29°14'26.89"E

The site constitutes the remains of a stone walled structure. These types of resources are generally protected under section 35 of the NHRA.

The site comprise of collapsed stone walling and foundations of homestead. The stone walling and foundations are adjacent to large mounds thought to be foundations. This could

be associated with a larger settlement.



**Figure 5-8: Ft-012 remnants of stone walling**

### 5.3.8 Ft-013 / Historic

Cultural Significance: Negligible	Field Rating: Grade IV C	Co-ordinates	
		26°19'30.9"S	29°14'2.36"E

The site constitutes several mounds which could potentially be the remains of hut foundations.

The mounds were similar to those identified at Site 1 and 2, but unlike those sites no other features were identified within the immediate surrounds of the possible foundations. Ft-013 is situated approximately 400 m south of BGG-008, and may be part of a larger historic settlement.



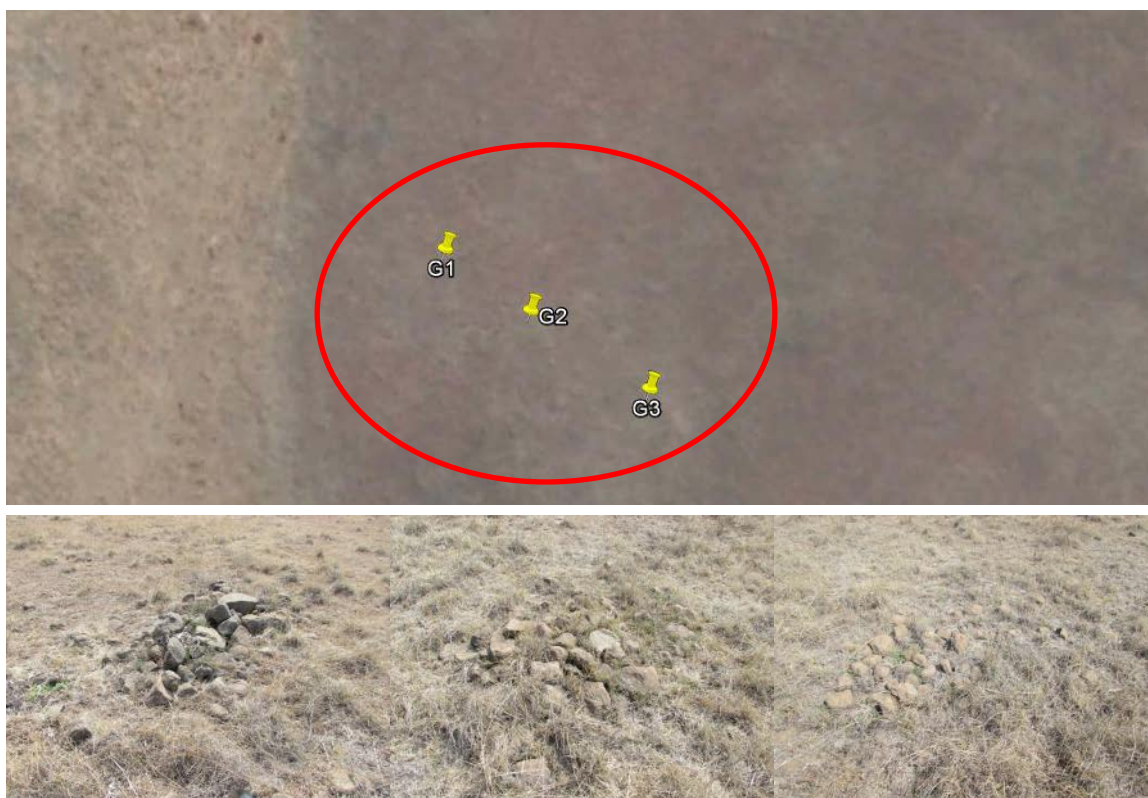
**Figure 5-9: View of Ft-013 and possible foundation in red**

### 5.3.9 BGG-014/ Burial ground

Cultural Significance: Very High	Field Rating: Grade IV A	<b>Co-ordinates</b> 26°21'13.21"S 29°13'2.09"E
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The site constitutes a burial ground consisting of at least three separate graves. Burial grounds and graves are generally protected under section 36 of the NHRA.

The three individual graves are identified through stone cairns, situated approximately 20 m apart. No other features were identified within proximity to the identified graves, and the potential for other graves to be situated amongst the visible graves is high. The burial ground itself is not fenced and is unkempt. Grave 2 (G2) in the middle of the site will be directly impacted by pipeline option 2.



**Figure 5-10: BGG-014 with the three graves and site extent**

## 5.4 Assessment of Cultural Significance

The CS assigned to the above identified heritage resources considered criteria defined in Box 1 above, specifically aesthetic, historic, scientific and social criteria. The CS assigned to the identified heritage resources is summarised in Table 5-1 and presented in detail in Table 5-2. These designations assist in providing appropriate mitigation measures in accordance with the published SAHRA minimum standards.

The assessment of CS indicated that the identified heritage resources designations range from negligible to very high significance.

**Table 5-1: Summary of CS of identified heritage resources**

Cultural Significance	Count of Type
<b>Very High</b>	<b>2</b>
Burial / grave	2
BGG-008	1
BGG-014	1
<b>Medium</b>	<b>2</b>

<b>Cultural Significance</b>	<b>Count of Type</b>
Site	2
Site 1	1
Site 2	1
<b>Negligible</b>	<b>5</b>
Occurrence	1
SA-009	1
Site	3
Ft-011	1
Ft-012	1
Ft-013	1
Structure	1
Ste-007	1
<b>Grand Total</b>	<b>9</b>

Following the prescribed SAHRA minimum standards, heritage resources with a CS designation of negligible have been sufficiently recorded. No further mitigation is required for the following sites:

- Ste-007;
- SA-009;
- Ft-011;
- Ft-012; and
- Ft-013.

These identified heritage resources are not considered further in this HIA report.



Table 5-2: CS of Identified Heritage Resources

Resource ID	Type	Description	Cultural Significance	CS Motivation	Field Rating	Field Rating Motivation	Mitigation	Latitude	Longitude
BGG-008	Burial / grave	Burial ground with at least 8 graves	Very High	The burial ground was assessed against social criteria with regards to its connection to communities or groups for cultural, religious, spiritual and social reasons. The fabric of the site is preserved with the meaning well established.	General Protection IV A	Burial grounds and graves are generally protected under section 36 of the NHRA	The project design should be amended to avoid all potential impacts on the burial ground and conserve the site in situ. A Burial Grounds and Graves Consultation (BGGC) process in terms of Chapter XI of the NHRA Regulations must be undertaken to identify bona fide Next-of-Kin, and reach agreement on the future management of the burial ground. Where in situ conservation of the burial ground is not feasible, a Grave Relocation Plan in terms of section 36 of the NHRA and Chapter XI of the Regulations to the Act must be completed.	26°19'14.95"S	29°14'0.15"E
BGG-014	Burial / grave							26°21'13.21"S	29°13'2.09"E
Site 1	Site	Site with stone foundations, burial ground and midden	Medium	The sites was documented and recorded as a single homestead containing residential areas, a midden and burial ground. The site was considered on aesthetic criteria as it displayed principal characteristics of a specific site type, scientific criteria based on possible information potential, and social criteria with regard to the associated burial ground.	General Protection IV A	The site includes a burial ground that is generally protected under section 36 of the NHRA	It is recommended that the site undergo archaeological mitigation to preserve the site through record. Burial grounds and graves must be avoided as far as is feasible to conserve the site in situ. Conservation of the burial ground must be completed through the establishment and implementation of a Conservation Management Plan. Where in situ conservation of the burial grounds is not feasible, a Burial Grounds and Graves Consultation Process and Grave Relocation Plan must be undertaken in terms of section 36 of the NHRA and Chapter XI Regulations to the Act	26°20'9.42"S	29°14'29.24"E
Site 2	Site	Site with stone foundations, burial ground and midden						26°20'1.60"S	29°14'19.36"E

Resource ID	Type	Description	Cultural Significance	CS Motivation	Field Rating	Field Rating Motivation	Mitigation	Latitude	Longitude
Ste-007	Structure	Collapsed stone walling	Negligible	The structure was assessed against aesthetic criteria in terms of displaying principle characteristics and scientific criteria for the potential to yield information. The fabric of the site is preserved and information potential exists, although the quality may be questionable	General Protection IV C	N/A	The structure has been sufficiently recorded through this assessment. No further mitigation is required.	26°19'55.03"S	29°14'18.73"E
SA-009	Occurrence	Sandstone outcrop with potential MSA lithic accumulation	Negligible	The potential Stone Age accumulation was assessed against scientific criteria for the potential to yield information. The fabric of the site is poorly preserved and limited information potential.	General Protection IV C	Stone Age accumulations are generally protected under section 35 of the NHRA	The site has been sufficiently recorded through this assessment. No further mitigation is required.	26°19'54.34"S	29°13'40.33"E
Ft-011	Site	Collapsed stone walling and possible foundations	Negligible	The structure was assessed against aesthetic criteria in terms of displaying principle characteristics and scientific criteria for the potential to yield information. The fabric of the site is preserved and information potential exists, although the quality may be questionable	General Protection IV C	N/A	The structure has been sufficiently recorded through this assessment. No further mitigation is required.	26°20'41.58"S	29°14'45.34"E
Ft-012	Site	Collapsed stone walling and possible foundations	Negligible	The structure was assessed against aesthetic criteria in terms of displaying principle characteristics and scientific criteria for the potential to yield information. The fabric of the site is preserved and information potential exists, although the quality may be questionable	General Protection IV C	N/A	The structure has been sufficiently recorded through this assessment. No further mitigation is required.	26°20'55.27"S	29°14'26.89"E

Resource ID	Type	Description	Cultural Significance	CS Motivation	Field Rating	Field Rating Motivation	Mitigation	Latitude	Longitude
Ft-013	Site	Mounds possibly representing foundations	Negligible	The feature was assessed against aesthetic criteria in terms of displaying principle characteristics and scientific criteria for the potential to yield information. The fabric of the site is preserved and information potential exists, although the quality may be questionable	General Protection IV C	N/A	The feature has been sufficiently recorded through this assessment. No further mitigation is required	26°19'30.9"S	29°14'2.36"E

## 6 Heritage Impact Assessment

This section considers the potential direct and indirect impacts on heritage resources identified within the development footprint of the Imvula Project, as well as those within the greater surrounding landscape. These impacts are considered in relation to a Scoping Risk Assessment completed during the Scoping Phase and the project related activities outlined in the Scoping Report and summarised in Table 6-1 below. The proposed activities for which environmental authorisation is being applied for correspond to Listing Notices GNR 983, 984 and 985 as presented in Table 6-2.

**Table 6-1: Project Activities**

<b>Activity No.</b>	<b>Activity</b>
<b>Construction Phase</b>	
1	The transportation of construction material to the project site (via national, provincial and local roads)
2	Storage of fuel, lubricant and explosives in temporary facilities for the duration of the construction phase.
3	Site clearance and topsoil removal across the Project area. This activity includes the stripping of soft overburden prior to blasting activities for mining.
4	The construction of overburden stockpile areas.
5	The construction of topsoil stockpiles.
6	The establishment of the initial box cut and access ramps to the open-pit mining areas.
7	The construction of the PCD.
8	The installation of water/sewage treatment plant.
9	The construction of haul roads on site, including the access roads onto site from provincial roads and the bridge over the Dwars-in-die-Wegspruit.
10	The construction of the hard park area (this is made up of the workshop, office block, change rooms, vehicle wash bay and parking lot) and electricity infrastructure.
11	Construction of storm water management infrastructure (including the flood attenuation berm) on the eastern side of the open pit, as well as the construction of water supply pipelines.
<b>Operational Phase</b>	
12	Drilling and blasting of the overburden rock.
13	Dumping of waste rock and maintenance of waste rock dump.
14	Removal and loading of coal onto trucks to the ROM stockpile.
15	Vehicular activity and maintenance of the haul roads.



<b>Activity No.</b>	<b>Activity</b>
16	Primary and secondary crushing of ROM coal.
17	Transportation of coal outside the Project area, via national, provincial and local roads or by conveyors.
18	The operation of the PCD (dirty water from storm water and dewatering activities).
19	Continuing operation and maintenance of the stockpiles, including topsoil and ROM stockpiles.
20	Dust suppression on the road in the mining area using water from the PCD.
21	Waste and sewage generation and disposal or treatment.
22	Maintenance of secondary infrastructure (offices, workshop, parking).
23	Storage of fuel in diesel tanks, as well as lubricant and explosives in facilities for the duration of the Project.
24	Concurrent replacement of overburden and topsoil and the re-vegetation of mined out strips.
<b>Decommissioning Phase</b>	
25	Removal of mining infrastructure (crusher, ROM pad).
26	Decommissioning of services (if necessary, depending on post land use) including waste treatment and removal, power & water facilities).
27	Rehabilitation of roads and cleared areas (offices and workshop area).
28	Rehabilitation of stockpile and dump areas.
29	Removal of fuel, lubricant and explosives.
30	Safe closure of mine access ramps.
31	Final replacement of overburden and topsoil and the establishment of vegetation on the final open pit void. Overburden will be backfilled into the final void and compacted. Subsequently, topsoil will be placed and the area vegetated.
32	Final handling of waste off the site – including scrap metal and used oil
<b>Post-closure Phase</b>	
33	Long term post-closure monitoring and rehabilitation

**Table 6-2: Proposed Invula Project infrastructure, aerial extent and listed GNR activity number**

<b>NAME OF ACTIVITY</b>	<b>AERIAL EXTENT OF THE ACTIVITY (Ha or m2)</b>	<b>LISTED ACTIVITY</b>	<b>APPLICABLE LISTING NOTICE (GNR 983, GNR 984 or GNR 985)</b>	<b>NHRA Triggers</b>
Establishment of box cut	4.61 ha	Activity 6 Activity 17	GNR 984 GNR 984	38(1)(c)(i)
Open pit development	248.32 ha	Activity 28 Activity 6 Activity 15	GNR 983 GNR 984 GNR 984	38(1)(c)(i)
Site clearance (all infrastructure areas)	Approximately 345 ha	Activity 15	GNR 984	38(1)(c)(i)
Topsoil stockpiles	To be confirmed			38(8)
Overburden stockpiles	Hard Overburden Stockpile: 15 ha Soft Overburden Stockpile: 15 ha	Activity 6	GNR 984	38(1)(c)(i)
Water and sewage treatment plant	To be confirmed	Activity 6	GNR 984	38(8)
Haul roads	To be confirmed	Activity 24 Activity 6	GNR 983 GNR 984	38(1)(a)
Access Roads	To be confirmed			38(1)(a)

<b>NAME OF ACTIVITY</b>	<b>AERIAL EXTENT OF THE ACTIVITY (Ha or m2)</b>	<b>LISTED ACTIVITY</b>	<b>APPLICABLE LISTING NOTICE (GNR 983, GNR 984 or GNR 985)</b>	<b>NHRA Triggers</b>
Hard park area including offices, change rooms, vehicle wash bay and workshop.	Approximately 5 ha			38(1)(c)(i)
ROM stockpile and crushers (Coal Handling Plant)	Approximately 3 ha	Activity 14 Activity 6 Activity 21	GNR 983 GBR 984 GNR 984	38(1)(c)(i)
Fuel, lubricants and explosives storage facility	Approximately 2 ha	Activity 14 Activity 6	GNR 983 GNR 984	38(1)(c)(i)
Rehabilitation of Project area (estimated until EIA process)	Approximately 345 ha			38(8)
River Diversion	Approximately 6 ha of channels	Activity 12 Activity 19 Activity 6	GNR 983 GNR 983 GNR 984	38(8)
Water control berms	Approximately 5 ha	Activity 12 Activity 19 Activity 6	GNR 983 GNR 983 GNR 984	38(1)(c)(i)
Electricity supply	To be confirmed			38(1)(a)

## 6.1 Impacts to Burial Grounds and Graves

### 6.1.1 Impact Description

Heritage impacts to burial grounds and graves located within the proposed Imvula Project area will manifest either as changes to the physical integrity of sites due to certain activities, or changes to the intangible nature of sites resulting from restricted and / or loss of access.

Physical changes to gravesites will occur as a result of activities associated with construction and operation of the proposed Imvula Project (see Table 6-1). Construction activities listed may for example include *inter alia* site clearance, topsoil removal and construction of diverse infrastructure. Operational activities may for example include *inter alia* blasting and active mining activities, as well as associated access restrictions that will apply to the mining area in general. Physical impacts are summarised in Table 6-3.

Intangible changes will occur as a result of the inherent access restrictions that will apply to the mining area in general. Restricted or loss of access impacts on the ability of descendants and family members, or other persons or communities who by tradition are concerned with graves, to express their living heritage as it may pertain to graves and associated ancestral rites. Intangible impacts are summarised in Table 6-4.

Both physical and intangible impacts may result in unplanned events such as the degradation of the intrinsic cultural significance of gravesites, as well as social repercussions. In addition, there are inherent health and safety risks associated with access to operating mine properties by visitors.

**Table 6-3: Summary of physical impacts to burial grounds and graves**

IMPACT DESCRIPTION: Direct impact to burial grounds and graves				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>Pre-Mitigation</b>				
Duration	Permanent (7)	Destruction to burial grounds and graves through construction activities will be permanent.	Consequence: Extremely detrimental (-20)	Significance: Major - negative (-140)



<b>IMPACT DESCRIPTION: Direct impact to burial grounds and graves</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
Extent	National (6)	Unmitigated alteration to the status quo of known burials will have repercussions to NoK and the reputation of Ixia Coal. In addition, unmitigated changes to graves will result in the involvement of local, provincial and national authorities, as well as potentially national media attention.		
Intensity x type of impact	Extremely high - negative (-7)	This will be a major change to a resource with very high significance		
Probability	Certain (7)	Without mitigation, the identified impact is certain to occur		
<b>Mitigation</b>				
Amend the proposed development footprint to preserve burial grounds in situ; Burial Grounds and Consultation Process (BGGC) as regulated by section 36 of the NHRA and Chapter XI of the Regulations to the Act must be implemented to: <ul style="list-style-type: none"> <li>▪ Identify as far as possible bona fide NoK</li> <li>▪ Consult and reach agreement with NoK as to the appropriate management of the burial ground or grave either through a CMP or if required, GRP.</li> </ul>				
<b>Post-Mitigation</b>				
Duration	Beyond project life (6)	The impact will extend beyond the project life, specifically if graves are relocated	Consequence: Moderately detrimental (-13)	Significance: Moderate - negative (-78)

<b>IMPACT DESCRIPTION: Direct impact to burial grounds and graves</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
Extent	Limited (2)	The extent of the impact will be limited to burial grounds and graves within the project boundaries and the identified NoK		
Intensity x type of impact	High - negative (-5)	The mitigation will result in a minor change to a heritage resource with very high significance. Grave relocation is inherently negative, as the physical and social contexts of graves are destroyed through the act of exhumation and relocation. In terms of <i>in situ</i> conservation, loss or restricted access will still negatively affect the graves and persons associated.		
Probability	Highly probable (6)	It is probable that mitigation measures will reduce the consequence of the identified impact.		

**Table 6-4: Summary of intangible impacts to burial grounds and graves**

<b>IMPACT DESCRIPTION: Indirect impact to burial grounds and graves</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
<b><i>Pre-Mitigation</i></b>				
Duration	Project Life (5)	Indirect impacts to burial grounds and grave will occur throughout the project life	Consequence: Highly detrimental (-16)	Significance: Moderate - negative (-80)
Extent	National (6)	Social repercussions resulting from unmitigated changes to graves could affect at the very least descendant communities residing in the region. In addition, unmitigated changes to graves will result in the involvement of local, provincial and national authorities, as well as potentially national media attention.		
Intensity x type of impact	High - negative (-5)	Indirect impacts will result in a moderate change to burial grounds and graves with a very high CS		
Probability	Likely (5)	If unmitigated, it is likely that identified indirect impacts will manifest		
<b><i>Mitigation</i></b>				
<p>Amend mining property boundaries to exclude burial grounds and graves. Where not possible, a CMP must be developed supported by an extensive BGGC Process.</p> <p>BGGC Process as regulated by section 36 of the NHRA and Chapter XI of the Regulations to the Act aims to:</p> <ul style="list-style-type: none"> <li>▪ Identify as far as possible bona fide NoK</li> <li>▪ Consult and reach agreement with NoK as to the appropriate continued conservation and management of the burial ground or grave, and stipulations for visitation rights by NoK</li> </ul>				

<b>IMPACT DESCRIPTION: Indirect impact to burial grounds and graves</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
The consultation process must enable a mutually agreed CMP to be developed and approved, allowing for visitation rights by families				
<b>Post-Mitigation</b>				
Duration	Project Life (5)	As for pre-mitigation		
Extent	Municipal Area (4)	The development of CMPs would require the involvement at the very least of the local municipal authorities. Any potential accidental damage to gravesites during project life could escalate to national level	Consequence: Highly beneficial (15)	Significance: Moderate - positive (75)
Intensity x type of impact	Very high - positive (6)	In terms of in situ conservation, loss or restricted access will still negatively affect the graves and persons associated. However, through developing a CMP in consultation with affected communities, the intrinsic CS of burial sites can be preserved.		
Probability	Likely (5)	Mitigation will ensure that grave sites are conserved in situ according to the requirements of affected communities, and within legal requirements. This will ensure that the CS of gravesites is enhanced through sustainable use by affected communities.		

### 6.1.2 Recommended Mitigation

A Burial Grounds and Graves Consultation (BGGC) process must be implemented in accordance with Chapter XI of the NHRA: Regulations. The BGGC process must aim to:

- Identify descendants and family members of the deceased and any other person or communities who by tradition are concerned with the graves;
- Consult with identified stakeholders regarding the effect of the proposed Project on graves; and
- Reach agreement with stakeholders on the future of identified graves, to retain sites *in situ* or exhume, relocate and reinter the contents of graves.

Where burial grounds and graves are located in areas where *in situ* preservation is possible, for example on the proposed project area boundaries, mitigation must consider redesigning mine plans to exclude burial grounds from the project area boundary or development footprints. Consultation with stakeholders will, however, still be required to reach agreement on the *in situ* conservation, including access requirements. The following minimum buffer zones are recommended for gravesites that may be conserved *in situ*:

- At least 15 m from any linear infrastructure footprints such as pipelines, roads or conveyors, including servitudes;
- At least 25 m from other infrastructure footprints such as offices, parking areas, etc.; and
- At least 100 m from open pit areas.

Where burial grounds and graves are located in areas where *in situ* conservation will not be feasible or unsafe, for example in the proposed opencast footprint or within 100 m from the pit, mitigation must consider the exhumation and relocation of graves. Exhumation and relocation is a permitted activity in accordance with Section 36(3) of the NHRA, and regulated by Chapters IX and XI of the NHRA: Regulations.

## 6.2 Direct Impacts to Historic Settlements

As demonstrated in the HSR, the site specific study area has historically been an agricultural landscape. Associated with this landscape, two historic settlements Site 1 and 2, comprising of foundations, burial grounds (BGG-002 and BGG-005) and middens were identified. Recent aerial imagery clearly indicates relatively traditional settlement patterns of the identified sites (Figure 5-2 & Figure 5-3).

Both Site 1 and 2 have 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 6-1).



**Figure 6-1: Material culture from Ft-001**

A review of the CS of the sites against aesthetic, scientific and social criteria was completed. These sites were assessed as single homesteads consisting of residential areas, midden and burial ground. The site was considered on aesthetic criteria as displaying principle characteristics of this type of site, scientific criteria in relation to the potential information that can be gathered, and social criteria as burial grounds have associations to specific communities for spiritual reasons. In addition, and as stated under Section 0, the significance of burial grounds and graves is universally accepted. The result of the CS assessment indicates that these historic settlement sites have medium significance.

Direct impacts to Site 1 and 2 were considered as part of the construction phase of the proposed project in relation to Activity 3, 'site clearance and topsoil removal across the project area' and Activity 11, 'construction of storm water management infrastructure'. This will have bearing on the heritage and social environmental aspects where direct impacts to resources will have social repercussions in light of the universally accepted CS of burial grounds and the special connection to these sites of descendants for cultural reasons. The issue is that site clearance and topsoil removal will result in the physical alteration of the landscape that will cause the destruction of the sites, erosion of the cultural significance of the sites, and a change to the sense-of-place.

The impact assessment for the potential damage and/or destruction of burial grounds is summarised in Table 6-5.

**Table 6-5: Summary of direct impact to historic settlements**

<b>IMPACT DESCRIPTION: Direct impact to Site 1 and 2</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
<b><i>Pre-Mitigation</i></b>				
Duration	Permanent (7)	Activity 3 will result in the permanent destruction of historic settlement sites	Consequence: Highly detrimental (-14)	Significance: Moderate - negative (-98)
Extent	Local (3)	The impact be local in extent		
Intensity x type of impact	Moderately high - negative (-4)	The impact will result in a major change to a resources with medium significance		
Probability	Certain (7)	Without mitigation, it is certain that the impact will occur		
<b><i>Mitigation</i></b>				
It is recommended that these resources undergo archaeological mitigation regulated under section 35 of the NHRA. This may include but is not limited to: <ul style="list-style-type: none"> <li>▪ Detailed mapping through the use of differential GPS technology;</li> <li>▪ Intrusive sampling of material remains through auger testing or Shovel Test Pits (STPs); and</li> <li>▪ Analysis and curation of material culture collected.</li> </ul>				
<b><i>Post-Mitigation</i></b>				
Duration	Beyond project life (6)	Mitigation will reduce the intensity of the impact, but it will extend beyond the life of the project	Consequence: Moderately beneficial (12)	Significance: Minor - positive (72)
Extent	Limited (2)	The extent will be limited to the specific sites		

<b>IMPACT DESCRIPTION: Direct impact to Site 1 and 2</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
Intensity x type of impact	Moderately high - positive (4)	Mitigation will result in major positive change by the preservation of the site through record that will contribute to the historic record of the settlements found within the local study area		
Probability	Highly probable (6)	It is highly probable that appropriate mitigation resulting in preservation through record will result in a positive impact		

### 6.2.1 Recommended Mitigation

Notwithstanding the specific recommendations made for burial grounds and graves located within Site 1 and 2 under Section 0, the SAHRA minimum requirements guidelines require Site 1 and 2 undergo mitigation. It is recommended that these resources undergo archaeological mitigation regulated under section 35 of the NHRA. This may include but is not limited to:

- Detailed mapping through the use of differential GPS technology;
- Intrusive sampling of material remains through auger testing or Shovel Test Pits (STPs); and
- Analysis and curation of material culture collected.

Archaeological mitigation will preserve the sites through record and provide the relevant HRAs with the necessary information for an application for destruction.

## 7 Heritage Impacts versus Socio-Economic Benefits

As demonstrated in the socio-economic summary presented in Section 5.2, the ELM and ward 27 have a relatively low unemployment rate and higher education level in light of the mining sector being the largest direct employer and indirect contributor to other employment opportunities who rely on providing products and services to the mining sector. Agriculture, however, only contributes 3.1% to local employment within the ELM.



The sustainable socio-economic benefits to the surrounding communities that could be derived from the proposed Imvula Project arguably outweigh the significance of the identified heritage impacts discussed under Section 6 above. This assumption is based on the following:

- The identified heritage resources within the project boundaries and immediate surrounds are not unique within the region, and potential impacts to these resources can be mitigated; and
- Burial grounds and graves are highly significant, but potential impacts to the burial grounds and graves can be managed and / or mitigated through appropriate plans in alignment with section 36 of the NHRA and Chapter XI of the Regulations to the Act.

## 8 Cumulative Impacts on the Cultural Landscape

Cumulative impacts occur from in-combination effects of various impacts on heritage resources acting within a host of processes that result in an incremental effect. The importance of identifying and assessing cumulative impacts is that the whole is often greater than the sum of its parts – implying that the total effect of multiple stressors or change processes acting simultaneously on a system may be greater than the sum of their effects when acting in isolation. The cumulative impacts identified for the Imvula Project are presented in Table 8-1.

**Table 8-1: Summary of potential cumulative impacts**

Type	Cumulative Impact	Direction of Change	Extent of Impact
Additive, Synergistic, Space-crowding	Alteration of sense-of-place. Change from agricultural landscape to an industrial landscape associated with mining.	Negative	Local, Regional
Additive, Synergistic	Sterilisation of tangible remains of historic settlements associated with groups who may have connections with land for cultural and spiritual reasons.	Negative	Local
Time-crowding	Blasting of overburden rock will result in frequent repetitive vibrations that could through time damage <i>in situ</i> heritage resources, such as graves or stone walled settlements	Negative	Local

The Imvula Project will alter the topography such that it will have an additive, synergistic cumulative impact on the cultural landscape. This will result in an alteration of the sense-of-place, changing from a historic agricultural landscape to an industrial, mining landscape. The ‘space crowding’ effect will contribute to coal mining heritage within this region of Mpumalanga.

An additional additive, synergistic cumulative impact will be the sterilisation of the history of the landscape through the removal of tangible remains of settlements and material culture. The removal of tangible remains will affect groups associated with the land for cultural and spiritual reasons. This may also result in the diminishing of significance of the landscape to the groups historically associated with it.

Finally, blasting activities during the operational phase will result in frequent repetitive vibrations that could negatively impact on heritage resources remaining *in situ*.

## 9 Unplanned Events and Low Risks

### 9.1 Unplanned Events

Certain project activities may represent low risks or cause unplanned events. Low risks can be monitored to gauge if the baseline changes and mitigation is required. Unplanned events may happen on any project.

Information on potential impacts of those events and management plans are provided in this section. Table 9-1 summarises possible unplanned events that could potentially impact on certain heritage resources.

**Table 9-1: Unplanned events, low risks and their management measures**

Unplanned event	Potential impact	Mitigation/ Management/ Monitoring
Accidental exposure of unidentified heritage resources	Damage and/or destruction of heritage resources generally protected under section 35 and 36 of the NHRA	Chance Finds Procedures (CFPs) must be developed and included in the EMP that clearly describes the process and appropriate management of the exposure of previously unidentified heritage resources.  The established and defined CFPs must be implemented.

### 9.2 Low Risks

As demonstrated in the HSR, the local study area comprises of a substantial amount of tangible heritage resources. These are primarily found in the form of Late Farming Community (LFC) stone walled settlements.

These resources may be at risk from the proposed Imvula Project through the following:

- Increased use of vehicle activity to transport coal from the development footprint; and
- Increase in population.

LFC stone walled settlements situated along primary routes to and from the proposed Imvula Project development footprint are at risk of being damaged through vehicular accidents. In addition to this, the increase in population through an influx of workers into the local study

area increase the risk of LFC stone walled settlements and other heritage resources being impacted upon through vandalism.

Where these risks manifest into impacts, SAHRA must be notified immediately to provide comment on the necessary mitigation measures required.

## 10 Environmental Management Plan

The objective of an EMP is (a) to manage undue or reasonably avoidable adverse impacts associated with the development of a project and (b) to enhance potential positives.

Mitigation measures will sometimes be built into the base of a project and should be considered as part of the “pre-mitigation” scenario; additional mitigation must be recommended if the impact assessment indicates it is necessary.

The key objectives of environmental and social management plans are to give S.M.A.R.T.<sup>5</sup> mitigation measures to:

- Identify the actual environmental, socio-economic and public health impacts of the project and check if the observed impacts are within the levels predicted in the ESIA;
- Determine that mitigation measures or other conditions attached to project approval (e.g. by legislation) are properly implemented and work effectively;
- Adapt the measures and conditions attached to project approval in the light of new information or take action to manage unanticipated impacts if necessary;
- Provide an auditable management plan that can follow the Deming Cycle<sup>6</sup>;
- Gauge if predicted benefits of the project are being achieved and maximized; and
- Gain information for improving similar projects and ESIA practice in the future.

The EMP must consider each activity and its potential (significant) impacts during the construction, operational, decommissioning and post closure phases.

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<sup>5</sup> S.M.A.R.T refers to specific, measurable, attainable, realistic and timely mitigation measures.

<sup>6</sup> The Deming cycle refers to a four-part management method that promotes continuous improvement. The Deming cycle is made up of:

Plan: Choose a process and set objectives

Do: Implement the plan and begin collecting data on the results

Check/Study: Analyze the results using statistical methods

Act: Decide what changes to make in order to improve the process

## 10.1 Project Activities with Potentially Significant Impacts

The significant impacts to heritage resources were discussed under Section 6 above, and summarised in Table 10-1.

**Table 10-1: Potential significant impacts of the proposed Imvula Project**

Aspects	Issue	Potential Impact
Heritage and Social	Physical alteration of the surface through land clearing and construction activities	Physical damage to and /or destruction of burial grounds and graves protected under section 36 of the NHRA
Heritage and Social	Fencing of the mining property and establishing access control	Loss of and / or loss of access to burial grounds and graves within the project boundary.
Heritage	Physical alteration of the surface through land clearing and construction activities	Physical damage to historic settlements that may be protected under section 35 of the NHRA.

## 10.2 Summary of Mitigation and Management

This section provides a summary of the proposed mitigation and management measures as relevant to the identified heritage resources within the proposed Imvula Project. Information on the frequency of mitigation, relevant legal requirements, recommended management plans, timing of implementation, and roles and responsibilities of persons implementing the EMP are also provided.

**Table 10-2: Impacts**

Activities	Phase	Size and scale of disturbance	Potential Impact	Mitigation Measures	Compliance with standards	Time period for implementation
3, 9, 11	Construction	270 ha	Damage and / or destruction of burial grounds and graves	Burial grounds and graves must be preserved <i>in situ</i> as far as is feasible. Here project design must be amended to avoid all changes to the resource and maintain the status quo. Regardless of whether the resource will be impacted upon, a BGGC process as must be implemented in order to as far as possible identify <i>bona fide</i> NoK and agree upon the requirements for a CMP or if required, a GRP.	Burial grounds and graves are protected under section 36 of the NHRA. The BGGC process is regulated by Chapter XI of the Regulations to the NHRA.	Prior to the development of the proposed Invula Project
3, 11	Construction	270 ha	Damage to and / or destruction of historical settlements	Archaeological mitigation regulated under section 35 of the NHRA. This may include but is not limited to: Detailed mapping through the use of differential GPS technology; Intrusive sampling of material remains through auger testing or Shovel Test Pits (STPs); and Analysis and curation of material culture collected.	Section 35 of the NHRA	Prior to the development of the proposed Invula Project

**Table 10-3: Objectives and Outcomes of the EMP**

Activities	Potential impacts	Aspects affected	Phase	Mitigation	Standard to be achieved/objective
3, 9, 11	Damage to and / or destruction of burial grounds and graves	Heritage & Social	Construction	Modify through amendment to the design of the development footprint as far as is feasible to preserve burial grounds and graves <i>in situ</i> , and conduct a BGGC process to establish in conjunction with identified bona fide NoK, a CMP for the identified burial grounds and graves. A buffer of 25 m must be established around BGG-014 and a Watching Brief must be implemented. Where project alternatives are not feasible, the potential impact to burial grounds and graves must be remedied through the implementation of a BGGC and GRP with the relevant SAHRA permits.	Compliance with the section 36 of the NHRA and Chapter XI of the Regulations to the Act (GNR 548).
	Damage to and / or destruction of historical settlements	Heritage		Modify through amendment to the design of the development footprint as far as is feasible to preserve the historical settlements <i>in situ</i> . Where potential project alternatives are not feasible, the potential impact to the historic settlements must be remedied through archaeological mitigation with the relevant SAHRA permits to conserve the site through record.	Compliance with section 35 of the NHRA
	Loss of and / or restricted access to burial grounds and graves	Heritage & Social	Construction, Operational & Decommissioning	Modify through amendment to the design of the development footprint as far as is feasible to preserve burial grounds and graves <i>in situ</i> and exclude the sites from the project boundary. Where project alternatives are not feasible, the potential impact to burial grounds and graves must be remedied through the implementation of a BGGC process to establish in conjunction with identified bona fide NoK, a CMP for identified burial grounds.	Chapter XI of the Regulations to the NHRA (GNR 548)

**Table 10-4: Mitigation**

Activities	Potential impacts	Aspects affected	Mitigation type	Time period for implementation	Compliance with standards
3, 9, 11	Damage and / or destruction of burial grounds and graves	Heritage & Social	Modify through amendment to the design as far as is feasible to preserve burial grounds and graves <i>in situ</i> , and conduct a BGGC process to establish in conjunction with identified bona fide NoK, a CMP for the identified burial grounds and graves. A buffer of 25 m must be established around BGG-014 and a Watching Brief must be implemented. Where project alternatives are not feasible, the potential impact to burial grounds and graves must be remedied through the implementation of a BGGC and GRP.	Mitigation measures must be implemented prior to any development in regards to the proposed Imvula Project	Mitigation measures comply with section 36 of the NHRA and Chapter XI of the Regulations to the Act (GNR 548).
	Damage to and / or destruction of historical settlements	Heritage	Modify through amendment to the design of the development footprint as far as is feasible to preserve the historical settlements <i>in situ</i> . Where potential project alternatives are not feasible, the potential impact to the historic settlements must be remedied through archaeological mitigation with the relevant SAHRA permits to conserve the site through record.		Compliance with section 35 of the NHRA



Activities	Potential impacts	Aspects affected	Mitigation type	Time period for implementation	Compliance with standards
	Loss of and / or restricted access to burial grounds and graves	Heritage & Social	<p>Modify through amendment to the design of the development footprint as far as is feasible to preserve burial grounds and graves <i>in situ</i> and exclude the sites from the project boundary.</p> <p>A buffer of 25 m must be established around BGG-014 and a Watching Brief must be implemented.</p> <p>Where project alternatives are not feasible, the potential impact to burial grounds and graves must be remedied through the implementation of a BGGC process to establish in conjunction with identified bona fide NoK, a CMP for identified burial grounds.</p>		Chapter XI of the Regulations to the NHRA (GNR 548)

**Table 10-5: Prescribed Environmental Management Standards, Practice, Guideline, Policy or Law**

Specialist field	Applicable standard, practice, guideline, policy or law		
Heritage	National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Chapter XI of the Regulations to the NHRA (GNR 548)	Municipal by-laws

## 11 Conclusion

Ixia Coal intends to undertake open pit coal mining near Secunda in the Mpumalanga Province at the proposed Imvula Project. Digby Wells was requested by Ixia Coal to conduct an EIA and EMP in support of the MRA for submission to the DMR, of which this report constitutes the HIA to ensure compliance with section 38(8) of the NHRA.

Through this assessment, a total of 9 heritage resources were identified within or in close proximity to the development footprint of the Imvula Project. These consisted of:

- One isolated Stone Age find spot with negligible significance;
- Two isolated burial ground with very high significance;
- Two historical settlement sites comprising burial grounds, potential hut foundations and middens with medium significance; and
- Four sites comprising of stone foundations or mounds that could potentially represent hut foundations with negligible significance.

Based on the recommended minimum standards outlined by SAHRA and presented under Section 3.4 above, heritage resources with a CS of negligible have been sufficiently recorded and no further mitigation on these resources is required.

Burial grounds and graves have been identified within or in close proximity to the project boundary of the Imvula Project. These resources will be both directly and indirectly impacted upon based on the current development footprint design. It is recommended that the design of the development footprint be amended as far as is feasible to exclude the burial grounds and graves and preserve the site *in situ* and maintain the present status quo. Furthermore, it is recommended that a BGGC process be undertaken in accordance with section 36 of the NHRA and Chapter XI of the Regulations to the Act to:

- Identify as far as possible bona fide NoK; and
- Consult and reach agreement with the NoK and Ixia Coal to the management of the burial grounds through a CMP, including access to the burial grounds.

For burial ground BGG-014 specifically, further recommendations include the establishment of a 25 m buffer around the extent of the burial ground, and the implementation of a Watching Brief during the construction phase of the pipeline.

Where *in situ* conservation of the burial grounds is not feasible, a GRP supported through the BGGC process must be completed.



Notwithstanding the recommendations for burial grounds and graves above, the two identified historic settlement sites are at risk of being directly impacted upon during construction activities, specifically Activity 3, 9 and 11 based on the current development footprint of the Imvula Project. These activities have the potential to damage and / or destroy the sites. It is recommended that the project design be amended as far as is feasible to remove the potential negative impacts to these sites. Where this is not possible, archaeological mitigation with the relevant SAHRA Section 35 permit is recommended.

Finally, Chance Find Procedures must be drafted and implemented as a condition of authorisation that clearly defines and described the necessary procedure to be followed in the event of accidental exposure of previously unidentified heritage resources.

Heritage Impact Assessment Report

Environmental Authorisation for the Proposed Invula Coal Mine

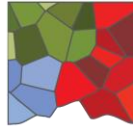
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DIGBY WELLS  
ENVIRONMENTAL

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## Appendix A: Specialists CV



# DIGBY WELLS

## ENVIRONMENTAL

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

Digby Wells and Associates (South Africa) (Pty) Ltd (Subsidiary of Digby Wells & Associates (Pty) Ltd). Co. Reg. No. 2010/008577/07. Fern Isle, Section 10, 359 Pretoria Ave Randburg Private Bag X10046, Randburg, 2125, South Africa  
Tel: +27 11 789 9495, Fax: +27 11 789 9498, [info@digbywells.com](mailto:info@digbywells.com), [www.digbywells.com](http://www.digbywells.com)

Directors: A Sing\*, AR Wilke, DJ Otto, GB Beringer, LF Koeslag, AJ Reynolds (Chairman) (British)\*, J Leaver\*, GE Trusler (C.E.O)  
\*Non-Executive

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 in compliance 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 worked 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



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
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 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



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
De Brochen and Booyensdal 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 Booyensdal	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
Bathako Mine Expansion	North-West Province, South Africa	2010 2010	Mapping of historical sites located within the Bathako 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	Oriental 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	Oriental Province, Democratic Republic of Congo	2012 2014	Assessment of 7 proposed hydro-power stations along the Kibali River	ESIA	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	EIA and EMP	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	EIA and EMP	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



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
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	EIA and EMP	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	5 Months	Aureus Mining	Grave Relocation completed	Aureus Mining
Falea Uranium Mine Environmental Assessment	Falea, Mali	2013 2013	Heritage Scoping for the proposed Falea Uranium Mine	Environmental Assessment	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	EIA and EMP	Heritage Consultant	6 Months	Atkins Limited	Completed Heritage Impact Assessment and provided recommendations for further studies	Atkins Limited Irene Bopp Irene.Bopp@atkinsglobal.com



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
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	2 Years	Exxaro	Burial Grounds and Graves consultation complete and applications to authorities submitted for permitting	Exxaro Johan van der Bijl Johan.vanderbijl@exxaro.com
Nzoro 2 Hydro Power Project	Orientele 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	2 Months	Randgold Resources	Completed introductory meetings – project has been placed on hold	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	EIA and EMP	Heritage Consultant	2 Months	AECOM	Completed HIA and submitted to the authorities	AECOM
Soweto Cluster Reclamation Project	Soweto, Gauteng, South Africa	2014 2014	Heritage Impact Assessment for reclamation activities associated with the Soweto Cluster Dumps	EIA and EMP	Heritage Consultant	3 Months	ERGO	Completed HIA and submitted to the authorities	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	EIA and EMP	Heritage Consultant	6 Months	BHP Billiton	HIA finalised and submitted to the authorities	BHP Billiton





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
Klipspruit Extension: Weltevreden Project	Ogies, Mpumalanga, South Africa	2014 2014	NID and Heritage Statement for the expansion of the Klipspruit Mine	EIA and EMP	Heritage Consultant	6 Months	BHP Billiton	HIA finalised and submitted to authorities	BHP Billiton
Ergo Rondebult Pipeline Basic Assessment	Johannesburg, South Africa	2014 2014	NID and Heritage Statement for the construction of the Rondebult Pipeline	BA	Heritage Consultant	1 Week	ERGO	Completed screening assessment and NID	ERGO Greg Ovens greg.ovens@drdgold.com
Kibali ESIA Update Project	Orientele Province, Democratic Republic of Congo	2014 2014	Update of the Kibali ESIA for the inclusion of new open-cast pit areas	ESIA	Heritage Consultant	1 Month	Randgold Resources	Completed heritage assessment and input into the ESIA	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	1 Month	Gold One International	Gap analysis complete and proposed way forward submitted	Gold One International
Yzermite PIA	Wakkerstroom, Mpumalanga, South Africa	2014 2014	Palaeontological Assessment for the Yzermite Project	PIA	Project Management	1 Month	EcoPartners	Completed report and submitted to authorities	EcoPartners San Oosthuizen san@ecopartners.co.za
Sasol Mooikraal Basic Assessment	Sasolburg, Free State, South Africa	2014 2014	Heritage Basic Assessment for the proposed Mooikraal Pipeline	HBA	Heritage Consultant	4 Months	Sasol Mining	Completed Heritage Basic Assessment and submitted to the authorities	
Everest North Mining Project	Steelpoort, Mpumalanga, South Africa	2012 2015	EIA and EMP for the Aquarius Everest North Mining Project	EIA and EMP	Project Manager	1 Year	Aquarius Resources	EIA and EMP amended and submitted to authorities. Authorisation received.	Aquarius Resources Robyn Mellett Robyn.Mellett@aquariussa.co.za
Oakleaf ESIA Project	Bronkhorstspuit, Gauteng, South Africa	2014 2015	Heritage impact Assessment for the Oakleaf Project	EIA and EMP	Heritage Consultant	4 Months	Oakleaf Investment Holdings	HIA report finalised and submitted to the authorities	



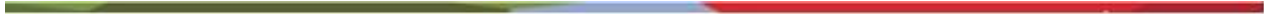
Project Title	Project Location	Date:	Description of the Project	Role of Firm in the Project	Own Role in the Project	Time involved (man months)	Name of Client	Contract Outcomes	Reference
Rea Vaya Phase II C Project	Johannesburg, Gauteng, South Africa	2014 2014	Heritage Impact Assessment on 2 structures along Rea Vaya Routing	HIA	Project Manager	1 year	Iliso Consulting	HIA report finalised and submitted to the authorities	Iliso Consulting
NTEM Iron Ore Mine and Pipeline Project	Cameroon	2014 2015	Review of Heritage Impact Assessment for the NTEM ESIA	EIA and EMP	Specialist Reviewer	1 Month	International Mining and Infrastructure Corporation plc	Specialist reports reviewed and comments provided	
Imvula Project	Kriel, Mpumalanga, South Africa	2014 2015	Heritage Scoping Report for Imvula EIA	EIA and EMP	Heritage Consultant	1 Year 4 Months	Ixia Coal	Project completed and submitted	
Sibanye WRTRP	Gauteng, South Africa	2014 2016	Heritage Impact Assessment for the Sibanye WRTRP	EIA and EMP	Heritage Consultant	On-going	Sibanye	Project is on-going	
VMIC Vanadium EIA Project	Mokopane, Limpopo, South Africa	2014 2015	Heritage Impact Assessment for the Vanadium Project	EIA and EMP	Heritage Consultant	1 Year	VM Investment Company	HIA report finalised and submitted to the authorities	
NLGM Constructed Wetlands Project	Liberia	2015 2015	Heritage Assessment for the proposed constructed wetlands	HIA	Heritage Consultant	1 Month	Aureus Mining	HIA report finalised and submitted	
ERPM Section 34 Destruction Permits Applications	Johannesburg, Gauteng, South Africa	2015 2015	Section 34 Destruction Permit Applications for the SEV and Cason Shafts	HIA and S.34 Applications	Project Manager	4 Months	Ergo Mining	Application submitted and permits received	Ergo Mining Greg Ovens <a href="mailto:greg.ovens@drdgold.com">greg.ovens@drdgold.com</a>
JMEP II EIA	Botswana	2015 2015	Heritage Impact Assessment for the JMEP II Wellfields	HIA	Heritage Consultant	2 Months	Jindal	HIA completed and submitted to authorities	
Gino's Building Section 34 Destruction Permit Application	Johannesburg, Gauteng, South Africa	2015 2016	Heritage Impact Assessment and Section 34 Destruction Permit Application	HIA and S. 34 Applications	Project Manager	On-going	Bigen Africa Services (Pty) Ltd	Project is on-going	Bigen Africa Services (Pty) Ltd Kamantha Veerasamy <a href="mailto:Kamantha.Veerasamy@bigenafrica.com">Kamantha.Veerasamy@bigenafrica.com</a>
EDC Block Refurbishment Project	Johannesburg, Gauteng, South Africa	2015 2016	Heritage Impact Assessment and Section 34 Permit Application	HIA and S. 34 Applications	Project Manager	On-going	Bigen Africa Services (Pty) Ltd	Project is on-going	Bigen Africa Services (Pty) Ltd Taka Sande <a href="mailto:Taka.Sande@bigenafrica.com">Taka.Sande@bigenafrica.com</a>



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
Namane IPP and Transmission Line EIA	Steenbokpan, Limpopo Province, South Africa	2015 2016	Heritage Impact Assessment	EIA and EMP	Heritage Consultant	On-going	Namane Resources (Pty) Ltd	Project is on-going	
Temo Coal Road Diversion and Rail Loop EIA	Steenbokpan, Limpopo Province, South Africa	2015 2016	Heritage Impact Assessment	EIA and EMP	Heritage Consultant	On-going	Namane Resources (Pty) Ltd	Project is on-going	



DIGBY WELLS  
ENVIRONMENTAL



## 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	Rock Art Mapping Project	Freelance archaeologist 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

<b>Authors and Year</b>	<b>Title</b>	<b>Published in/presented at</b>
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.



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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.