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ENVIRONMENTAL

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Namane Generation Independent Power Producer and Transmission Line Project, Lephalale, Limpopo Province

Heritage Impact Assessment

Project Number:

NAM3248

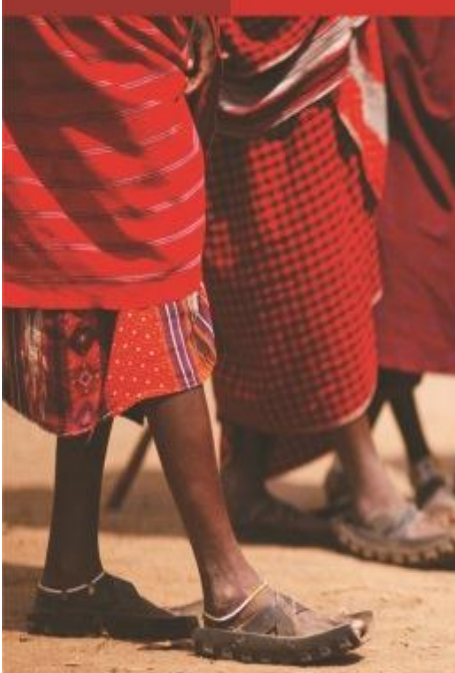
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DECLARATION OF INDEPENDENCE

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

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EXECUTIVE SUMMARY

Digby Wells Environmental (hereafter Digby Wells) was appointed to undertake the necessary environmental and social studies required for Environmental Authorisation for the Namane Generation (Pty) Ltd (Namane) Independent Power Producer (IPP) and Transmission Line Project. Namane intends to build a 600 MW coal-fuelled power plant, and associated infrastructure on the farm Duikerpan 249LQ in the jurisdiction of the Lephalale Local Municipality (LLM), Limpopo Province. The IPP also includes the evacuation of power via a transmission line from the power plant to connect with existing Eskom distribution networks.

The various alternative transmission line routings to connect to the Eskom transmission network presently comprise three possible options:

- Spitzkop Line: 400 kV;
- Canada Line: 132 kV; and
- Steenbokpan Line: 400 kV.

This report constitutes the Heritage Impact Assessment (HIA) to inform the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) completed in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and NEMA Environmental Impact Assessment Regulations, 2014¹ (EIA Regulations 2014), to comply with the requirements stipulated under Section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). The Scope of Work (SoW) required to complete the HIA included:

- Assessment of the Cultural Significance (CS) 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 the South African Heritage Resources Agency (SAHRA) and Limpopo Heritage Resources Authority (LIHRA) for Statutory Comment as required by section 38(8) of the NHRA; and
- Compilation of a Statutory Comment Feedback (SCF) Report.

A total of six heritage sites were identified within the development footprint of the Spitzkop transmission line routing that may be directly impacted upon by project related activities during the construction phase. These comprise of the following:

¹ GN R982 of 4 December 2014

Table: Identified heritage resources and the assigned cultural significance

Resource ID	Cultural Significance	Resource Period
MSA-001 & MSA-002	Low	Middle Stone Age (c. 300 thousand years ago (kya) to 30 kya) (MSA)
MSA-003	Low	
LFC-001 & LFC-002	Low	Late Farming Community (c. 1000 Common Era (CE) to 1840 CE) (LFA)
LFC-003	Medium	

Although the archaeological site with a medium CS (LFC-003) occurs outside of the proposed Spitzkop transmission line routing, this site is considered to be a component of a larger pan system cluster of sites through which the proposed transmission line is routed. At this stage, the inter-relationship between the individually identified heritage resources and the settlement around the pan system is unclear and would require further investigation. It is, however, certain that the project related activities will physically alter this complex, thereby producing a change in the *status quo* and reducing the physical integrity of the complex.

The recommended management actions and targets are divided into:

- Project related mitigation; and
- Heritage related mitigation.

Project related mitigation can be accomplished through the consideration of the Steenbokpan transmission line routing as the preferred routing of the 400 kV transmission line.

Where project related mitigation is deemed unfeasible in relation to other environmental factors or impacts, heritage mitigation must be undertaken to reduce the intensity of the direct negative impacts to the identified heritage resources. These measures must be completed in accordance with the minimum level of mitigation as published in the SAHRA Minimum Standards. In this instance, for the sites with low CS, the sites must be recorded through detailed mapping and surface sampling with the relevant permits required under Section 35 of the NHRA. LFC-003 and the greater pan system cluster of sites must be mitigated through detailed mapping, surface sampling and Shovel Test Pits (STPs) with the relevant permits required under Section 35 of the NHRA.

Heritage mitigation measures will reduce the intensity of the direct negative impacts on the identified heritage resources through preserving the sites through record. This form of preservation will result in a minor – moderately beneficial consequence as the information gathered from these measures will be available to the public and greater academic

community, as well as contribute to the scientific information of a region that is largely under-researched.

Furthermore, project specific Chance Find Protocols (CFPs) must be developed for the Namane IPP and Transmission Line Project. The purpose of the CFPs is to establish procedures that aim to minimise damage and destruction to any heritage resources that may be accidentally exposed during the course of development activities.

The CFPs must clearly describe the type of heritage resources that may occur within the site specific project area, the protocol to follow in the event of accidental exposure of previously unidentified heritage resources, and the appropriate management measures and reporting structures to be adhered to. The CFP at a minimum should include the following:

- Definitions as defined by Section 2 and 38(1) of the NHRA;
- Proactive archaeological monitoring procedures;
- Procedures that detail the following:
 - How to spot a chance find;
 - Steps to be undertaken when a chance find is made;
 - Internal reporting structures;
 - Recording of chance finds; and
 - Legal processes and requirements.

The CFPs must be defined and established as a condition of authorisation prior to the pre-construction phase of the proposed IPP Power Plant and associated infrastructure.



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LIST OF ACRONYMS

Abbreviation	Meaning
ASAPA	Association of Southern African Professional Archaeologists
BA	Bachelor of Arts
BID	Background Information Document
BSc	Bachelor of Science
c.	circa, meaning approximately
CAGR	Compounded Average Growth Rate
CE	Common Era
CFP	Chance Find Protocol
CMP	Conservation Management Plan
CRR	Comments and Response Report
CS	Cultural Significance
Digby Wells	Digby Wells Environmental
DoE	Department of Energy
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EFC	Early Farming Community (also known as Early Iron Age)
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESA	Early Stone Age
FBC	Fluidised Bed Combustion
GIS	Geographical Information System
GN R	Government Notice Regulation
GPS	Global Positioning System
HIA	Heritage Impact Assessment
Hons	Honours degree
HRAs	Heritage Resources Authorities
HRM	Heritage Resources Management
HSR	Heritage Scoping Report
ICOMOS	International Council on Monuments and Sites
IFC	International Finance Corporation



Abbreviation	Meaning
IPs	Independent Producers
IPP	Independent Power Producer
Kya	Thousand years ago
LED	Local Economic Development
LFC	Late Farming Community also known as Late Iron Age
LIHRA	Limpopo Heritage Resources Authority
LLM	Lephalale Local Municipality
LSA	Late Stone Age
MIA	Middle Iron Age
MPRDA	Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MSA	Middle Stone Age
MSc	Master of Science
MW	Megawatt
Namane	Namane Generation (Pty) Ltd
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID	Notification of Intent to Develop
OP	Observation Potential
PF	Pulverised Fuel
RoD	Record of Decision
RSV	RSV ENCO Consulting (Pty) Limited
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SCF	Statutory Comment Feedback
SEP	Stakeholder Engagement Process
SoW	Scope of Work
STP	Shovel Test Pit
ToR	Terms of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UP	University of Pretoria
WDM	Waterberg District Municipality
Wits	University of the Witwatersrand

Heritage Impact Assessment

Namane Generation Independent Power Producer and Transmission Line Project, Lephalale,
Limpopo Province

NAM3248



DIGBY WELLS
ENVIRONMENTAL



GLOSSARY

Term	Definition
Alter	Any action affecting the structure, appearance or physical properties of a place or object, whether by way of structural or other works, by painting, plastering or other decoration or any other means.
Archaeological	Material remains resulting from human activity that are in a state of disuse and older than 100 years, including artefacts, human and hominid remains and artificial features and structures. Rock art created through human agency older than 100 years, including any area within 10 m of such representation. Wrecks older than 60 years - either vessels or aircraft - or any part thereof that was wrecked in South Africa on land, internal or territorial waters, and any cargo, debris or artefacts found or associated therewith. Features, structures and artefacts associated with military history that are older than 75 years and the sites on which they are found, e.g. battlefields.
Archaeologist	A trained professional who uses scientific methods to excavate, record and study archaeological sites and deposits.
Artefact	Any object manufactured or modified by human beings.
Ceramic (syn. pottery)	In an archaeological context any vessel or other object produced from natural clay that has been fired. Indigenous ceramics associated with Farming Communities are low-fired wares, typically found as potsherds. Imported and more historic ceramics generally include high-fired wares such as porcelain, stoneware, etc.
Ceramic facies / facies	Subgroups of a primary ceramic tradition or sequence. Typically used in ceramic analyses. Various facies are attributed to different temporal periods based of radiometric dates obtained from archaeological contexts. Facies are often used to infer cultural identity of archaeological groups. However, in context of this study identified ceramic facies merely provide a relative temporal context for archaeological sites in the landscape.
Ceramic tradition	The sequence of ceramic styles that develop out of each other and form a 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.



Term	Definition
Ceramic classification	<p>Ceramic classification is universally used by archaeologists to establish relative cultural-historical temporal sequences within southern African Farming Communities. In this way, relative dates can be assigned to sites, as well as inferring tenuous cultural similarities or associations. Huffman (1970) postulated that the migration of farming communities could be recognised via a technique of 'ceramic seriation'. Ceramic seriation is based on the premise that certain styles of ceramics, including vessel shape and decorative motifs, follow each other chronologically, and can be attributed to certain archaeological 'cultures' (Huffman, 1970; 1980).</p> <p>Huffman (1970) and Phillipson (1977) demonstrated that Bantu-speaking groups may have migrated southwards in three 'streams' from a possible central homeland, over different periods (See Figure 6 4). These streams are generally associated with diverse Eastern Bantu-speaking societies and various farming community periods. Although these hypotheses have since undergone meaningful reviews and received significant opposition, a general consensus remains that ceramic seriation can be used to reconstruct population movements.</p>
Compulsory repair order	<p>A heritage resources authority may serve on the owner of a heritage site an order to repair or maintain such site, to the satisfaction of the heritage resources authority, within a reasonable period of time as specified in the order where the heritage resources authority considers that such site:</p> <p>Has been allowed to fall into disrepair for the purpose of effecting or enabling its destruction or demolition, enabling the development of the designated land, or enabling the development of any land adjoining the designated land.</p> <p>Is neglected to such an extent that it will lose its potential for conservation.</p>
Conservation	<p>In relation to heritage resources includes the protection, maintenance, preservation and sustainable use of places or objects so as to safeguard their cultural significance.</p>
Cultural significance (CS)	<p>The aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. A heritage may have cultural significance or other special value because of its:</p> <ul style="list-style-type: none"> Importance in the community, or pattern of South Africa's history. Possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage. Importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects. Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group. Importance in demonstrating a high degree of creative or technical achievement at a particular period. Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons. Strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa. Significance relating to the history of slavery in South Africa.



Term	Definition
Development	<p>Any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of a heritage authority in any way result in a change to the nature, appearance or physical nature of a place, or influence its stability and future well-being, including:</p> <p>Construction, alteration, demolition, removal or change of use of a place or a structure at a place.</p> <p>Carrying out any works on or over or under a place.</p> <p>Subdivision or consolidation of land comprising, a place, including the structures or airspace of a place.</p> <p>Constructing or putting up for display signs or hoardings.</p> <p>Any change to the natural or existing condition or topography of land.</p> <p>Any removal or destruction of trees, or removal of vegetation or topsoil.</p>
Early Farming Community/ies	<p>The first Farming Communities (also known as Early Iron Age) that appear in the southern archaeological record during the early first millennium CE. The EFC period is generally dated from c. 200 CE to 1000 CE.</p>
Early Stone Age	<p>The South African ESA dates from ~3 Mya to c. 250 Kya. This period is associated with later <i>Australopithecus</i> and early <i>Homo</i> species. The lithic industries that characterise the ESA include Oldowan and Early Acheulian, typically as simple core tools, choppers handaxes and cleavers.</p>
Excavation	<p>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.</p>
Farming Community/ies	<p>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.</p>
Field Rating	<p>SAHRA requires heritage resources to be provisionally rated in accordance with Section 7 of the NHRA that provides a three tier grading system of resources that form part of the national estate. The rating system distinguishes between four categories:</p> <p>Grade I: Heritage resources with qualities so exceptional that they are of special national significance.</p> <p>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.</p> <p>Grade III: Other heritage resources worthy of conservation.</p> <p>General Protected: i.e. generally protected in terms of Sections 33 to 37 of the NHRA.</p>



Term	Definition
General protection	<p>General protections are afforded to:</p> <p>Objects protected in terms of laws of foreign states.</p> <p>Structures older than 60 years.</p> <p>Archaeological and palaeontological sites and material and meteorites.</p> <p>Burial grounds and graves.</p> <p>Public monuments and memorials.</p>
Grave	A place of interment and includes the contents, headstone or other marker of such a place, and any other structure on or associated with such place.
Heritage Impact Assessment (HIA)	An assessment of the cultural significance of, and possible impacts on, diverse heritage resources that may be affected by a proposed development. A HIA may include several specialist elements such as archaeological, built environment and palaeontological studies. The HIA must supply the heritage authority with sufficient information about the sites to assess, with confidence, whether or not it has any objection to a development, indicate the conditions upon which such development might proceed and assess which sites require permits for destruction, which sites require mitigation and what measures should be put in place to protect sites that should be conserved. The content of HIA reports are clearly outlined in Section 38(3) of the NHRA and SAHRA Minimum Standards.
Heritage resource	Any place or object of cultural significance.
Heritage resources management	<p>Process required when development is intended categorised as:</p> <p>Any linear development exceeding 300m in length.</p> <p>Construction of a bridge or similar structure exceeding 50 m in length.</p> <p>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.</p> <p>Re-zoning of a site exceeding one hectare in extent.</p> <p>Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.</p>
Heritage site	Any place declared to be a national heritage site by SAHRA or a place declared to be a provincial heritage site by a provincial heritage resources authority.
Late Farming Community/ies	Farming Communities who either developed / evolved from EFC groups, or who migrated into southern African from the late first millennium / early second millennium CE. The LFC period evidences distinct changes in socio-political organisation, settlement patterns, trade and economic activities, including extensive trade routes. The LFC period is generally dated from c. 1000 CE well into the modern historical period of the nineteenth century.
Late Stone Age	The South African LSA dates from ~30 Kya. This period is associated with modern <i>Homo sapiens sapiens</i> and the complex hunter-gatherer societies, ancestral to the Bushmen / San and Khoi. The LSA lithic assemblage contains microlithic technology and composite tools such as arrows commonly produced from fine-grained cryptocrystalline, quartz and chert. The LSA is also associated with archaeological rock art including both paintings and engravings.



Term	Definition
Living / intangible heritage	The intangible aspects of inherited culture that could include cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems, the holistic approach to nature, society and social relationships.
Management	In relation to heritage resources, includes the conservation, presentation and improvement of a place protected in terms of the NHRA.
Middle Stone Age	The South African MSA dates from ~300 Kya to c. 30 Kya. This period is associated with the changing behavioural patterns and the emergence of modern cognitive abilities in early <i>Homo sapiens species</i> . The lithic industries that characterise the MSA are typically more complex tools with diagnostic identifiers, including convergent flake scars, multi-faceted platforms, retouch and backing. Assemblages are characterised as refined lithic technologies such as prepared core techniques, retouched blades and points manufactured from good quality raw material.
National estate	<p>The national estate as defined in Section 3 of the NHRA, i.e. heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations. The national estate may include:</p> <ul style="list-style-type: none"> Places, buildings, structures and equipment of cultural significance. Places to which oral traditions are attached or which are associated with living heritage. Historical settlements and townscapes. Landscapes and natural features of cultural significance. Geological sites of scientific or cultural importance. Archaeological and palaeontological sites. Graves and burial grounds, including ancestral graves, royal graves and graves of traditional leaders, graves of victims of conflict, graves of individuals designated by the Minister by notice in the Gazette, historical graves and cemeteries, and other human remains which are not covered in terms of the National Health Act, 2003 (Act No. 61 of 2003). Sites of significance relating to the history of slavery in South Africa. Movable objects, including objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens; objects to which oral traditions are attached or which are associated with living heritage; ethnographic art and objects; military objects; objects of decorative or fine art; objects of scientific or technological interest. Books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).
Object	Any movable property of cultural significance which may be protected in terms of any provisions of this Act, including: any archaeological artefact; palaeontological and rare geological specimens; meteorites; and other objects referred to in Section 3 of the NHRA.



Term	Definition
Pedestrian survey	A method of examining a site in which surveyors, spaced at regular intervals, systematically walk over the area being investigated.
Phase 1 Archaeological Impact Assessment (AIA)	Phase 1 AIAs generally involve the identification and assessment of sites during a field survey of a portion of land that is going to be affected by a potentially destructive or landscape-altering activity.
Phase 2 Archaeological Impact Assessment (AIA)	Phase 2 AIAs are primarily based on salvage or mitigation excavations preceding development that will destroy or impact on a site. This may involve collecting of artefacts from the surface and / or excavation of representative samples of the artefactual material to allow characterisation of the site and the collection of suitable materials for dating the sites. Phase 2 AIAs aim to obtain a general idea of the age, significance and meaning of the site that is to be lost and to store a sample that can be consulted at a later date for research purposes. Phase 2 excavations can only be done under a permit issued by SAHRA, or other appropriate heritage agency, to the appointed archaeologist.
Phase 3 Management Plan / Conservation Management Plan (CMP)	On occasion, a site may require a Phase 3 programme involving the modification of the site or the incorporation of the site into the development itself as a site museum, a special conservation area or a display. Alternatively it is often possible to relocate or plan the development in such a way as to conserve the archaeological site or any other special heritage significance the place may have. For example, in a wilderness area or open space when sites are of public interest the development of interpretative material is recommended and adds value to the development. Permission for the development to proceed can be given only once the heritage resources authority is satisfied that measures are in place to ensure that the archaeological sites will not be damaged by the impact of the development or that they have been adequately recorded and sampled. Careful planning can minimise the impact of archaeological surveys on development projects by selecting options that cause the least amount of inconvenience and delay. The process as explained above allows the rescue and preservation of information relating to our past heritage for future generations. It balances the requirements of developers and the conservation and protection of our cultural heritage as required of SAHRA and the provincial heritage resources authorities (ASAPA).
Place	A place includes: a site, area or region; a building or other structure which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure; a group of buildings or other structures which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures; an open space, including a public square, street or park; and in relation to the management of a place, includes the immediate surroundings of a place.
Pre-disturbance survey (syn. reconnaissance)	A survey to record a site as it exists, with all the topographical and other information that can be collected, without excavation or other disturbance of the site.
Presentation	In relation to a heritage resource, site or place includes: the exhibition or display of; the provision of access and guidance to; the provision, publication or display of information in relation to; and performances or oral presentations related to, heritage resources protected in terms of the NHRA.



Term	Definition
Provisional protection	A protected area or heritage resource provisionally protected by SAHRA or a provincial heritage resources authority by a notice in the Gazette or Provincial Gazette.
Reconnaissance	A broad range of techniques involved in the location of archaeological sites, e.g. surface survey and the recording of surface artefacts and features, the sampling of natural and mineral resources, and sometimes testing of an area to assess the number and extent of archaeological resources. However, in terms of South African practice, reconnaissance during a so-called Phase 1 AIA never includes sampling as this is a permitted activity, usually undertaken during so-called Phase 2 AIAs (ASAPA).
Site	Any area of land, including land covered by water, and including any structures or objects thereon.
Stop work order	An order served on a person by the Minister on advice of SAHRA or MEC to immediately cease all work in and around a heritage site for a period not exceeding 10 years. The order attaches to land is binding on the current owner and any future owner.
Structure	Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.
Tangible heritage	Physical heritage resources such as archaeological sites, historical buildings, burial grounds and graves, fossils, etc. Tangible heritage may be associated with intangible elements, e.g. the living cultural traditions, rituals and performances associated with burial grounds and graves and deceased persons.



1 Introduction

Namane Generation (Pty) Ltd (Namane) is an Independent Power Producer (IPP) which intends to build a 600 MW coal-fuelled power plant on the farm Duikerpan 249LQ in the Lephalale Local Municipality (LLM), Limpopo Province. The Project also includes the evacuation of power via a transmission line of which several routes have been proposed. Digby Wells Environmental (Digby Wells) was appointed to undertake the necessary environmental and social studies required for Environmental Authorisation. Digby Wells has completed the Scoping Report, and submitted a Notification of Intent to Develop and Heritage Scoping Report (HSR) to the South African Heritage Resources Agency (SAHRA) and the Limpopo Heritage Resources Authority (LIHRA) for Statutory Comment as required by section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) (*SAHRIS Case ID: 8728*).

This report constitutes the Heritage Impact Assessment (HIA) to inform the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) completed in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and NEMA EIA Regulations 2014.

1.1 Project Background

On 19 December 2012, the Minister of Energy issued three Determinations in terms of section 34 of the Electricity Regulation Act, 2006 (Act No. 4 of 2006). In terms of the first Determination, an additional 3 200 megawatts (MW) of energy was to be procured from renewable sources. The second Determination dealt with Medium Term Risk Mitigation and the proposed procurement of 800 MW of new generation capacity from industrial co-generation energy sources. The third Determination was for the procurement of additional baseload energy to supply the national grid. The additional baseload energy requirement as per Ministerial Determination includes:

- 2 500 MW to be generated from coal utilising Pulverised Fuel (PF) and Fluidised Bed Combustion (FBC) technology, in accordance with the capacity allocated to “Coal (PF, FBC, Imports)”, under the heading “New Build”, for the years 2014 to 2024, in the Integrated Resources Plan (IRP) 2010-2030;
- 2 652 MW (baseload or mid merit) to be generated from natural gas (which includes liquefied natural gas or natural gas delivered by pipeline from a natural gas field); and
- 2 609 MW to be generated from hydro energy sources.

In response to these Determinations, the South African national Department of Energy (DoE) is in the process of procuring 2 500 MW from Independent Power Producers (IPPs) as part of the Coal Baseload IPP Procurement Programme. Each bid from IPPs is capped at 600 MW. Namane commissioned RSV ENCO Consulting (Pty) Limited (RSV) to investigate the potential economic viability of Namane to participate in the DoE Base Load IPP Procurement Programme.

RSV has since compiled a pre-feasibility study that examined various options for Namane to consider.

1.2 Project Description²

Namane intends to construct a 600 MW coal-fuelled IPP power plant on the farm Duikerpan 249LQ, in the Waterberg District Municipality (WDM), Limpopo Province (detailed project location is presented in Table 1-1). Namane's rationale to construct the power plant is that it would contribute to the IPP Coal Baseload Procurement Programme, subject to preferred bidder status being reached.

Power generation will be completed through the implementation of Circulating FBC technology which can utilise lower bench coal and a reduced rate of water consumption. Coal will be sourced from the neighbouring Temo Coal Mine that will produce appropriate grade coal (lower-bench-coal: bench 5 to bench 10) to be used in fuelling the proposed 600 MW IPP.

Namane proposes to dispose of ash onto an ash dump that will be developed on Duikerpan 249LQ; the ash dump is expected to have a lifespan of 30 years. Another component of the proposed IPP development will be the construction of a 400 kV transmission line from the power plant to connect with existing Eskom distribution networks.

The development footprint of the proposed Project infrastructure (excluding the proposed transmission lines) will cover an area of approximately 360 ha. Associated infrastructure for the Project includes the following:

- Main power plant area including the following:
 - Auxiliary plant buildings and operational support buildings; and
 - Laboratory area and high voltage switchyard.
- Associated main infrastructure such as:
 - Stock yard and storage,
 - Conveyors and water supply pipelines;
 - Offices and medical centre;
 - Sewage treatment plant;
 - Access roads and internal roads;
 - Ash dump and ash dump runoff ponds;
 - Water storage reservoir and raw water treatment plant;

² A detailed project description, including definitions and the regulatory framework is provided in the HSR (Case ID: 8728, <http://sahra.org.za/sahris/cases/namane-ipp-environmental-authorisation>) and EIA, and is not repeated here for the sake of brevity. This section provides a summarised description of the Project to provide the reader with the context of the development.

- Maintenance workshops and storage facilities; and
- Construction camp and control room.

Namane is currently investigating various alternative transmission line routings to connect to the Eskom transmission network. Presently, three possible options have been identified although other alternatives may exist (Plan 1):

- Spitzkop Line: 400 kV;
- Canada Line: 132 kV; and
- Steenbokpan Line: 400 kV.

Namane proposed to utilise the 132 kV transmission line (*Canada Line – orange line*), which will connect directly to a planned 132 kV line to the north of the IPP development footprint, or one of the 400 kV line alternatives (*Spitzkop Line – yellow line, and Steenbokpan Line – purple line*). No alternatives have been considered for the 132 kV line as this will be the most direct route for the connection to the planned transmission line. The 132 kV route, is not however considered in this assessment as the proposed connection point is yet to be established. The Spitzkop Line is the most direct route to connect to the existing line, at a length of approximate 39.7 km. This routing option is the most direct from a technical perspective reducing the extent of the transmission line by 10 km, therefore it is more cost effective. Hence, from a cost and technical perspective, this is Namane's preferred option.

Table 1-1: Location of the study area

Province	Limpopo Province
Magisterial District / Local Authority	Lephale Magisterial District
District Municipality	Waterberg District Municipality (WDM)
Local Municipality	Lephale Local Municipality (LLM)
Nearest Town	Steenbokpan (10 km)
Affected Properties	
IPP Power Plant	Approximately 200 ha of Duikerpan 249LQ
Transmission Line (Spitzkop Line)	Approximately 39.7 km traversing the following farms from north to south:



	<ol style="list-style-type: none"> 1. Duikerpan 249LQ 2. Houwhoek 270IQ 3. Kameelbult 301IQ 4. Klipkloof 365IQ 5. Leliefontein 672IQ 6. Minnaarspan 322IQ 7. Mooipan 325IQ 8. Naauwpoort 363IQ 9. Nieuw Holland 247IQ 10. Rhenosterpan 361IQ 11. Rooipan 355IQ 	<ol style="list-style-type: none"> 12. Rooipan 357IQ 13. Slangkop 296IQ 14. Steenbokpan 295IQ 15. Toezicht 323IQ 16. Twsitpan 265IQ 17. Vangpan 294IQ 18. Vlakfontein 264IQ 19. Zandbult 300IQ 20. Zandheuvel 356IQ 21. Zandnek 358IQ 22. Zyverbult 324IQ
1: 50 000 Map Sheet	2327CB Steenbokpan	
GPS Co-ordinates (relative centre point of study area)	-23.596397	
	27.290909	

1.3 Terms of Reference

The Terms of Reference (ToR) for the Project heritage specialist study was to conduct a Heritage Resources Management (HRM) Process in support of environmental authorisation. The HRM Process for the HIA included the following:

- An impact assessment and evaluation of cultural significance of identified heritage resources;
- An impact assessment relative to the social and economic benefits of the proposed Project;
- Consideration of alternatives; and
- Provide specialist HRM input into the environmental authorisation process.

This was undertaken in accordance with section 38(3) and 38(8) of the NHRA.

1.4 Scope of Work

The Scope of Work (SoW) that was completed to comply with the ToR included:

- Identification of existing and potential tangible heritage resources through pre-disturbance surveys of the development footprint areas;
- Assessment of the Cultural Significance (CS) of heritage resources using a CS matrix;
- Identifying heritage impacts based on proposed Project activities and predicting the intensity of impacts using an impact matrix;
- 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 the SAHRA and LIHRA for Statutory Comment as required by section 38(8) of the NHRA; and
 - Compilation of an SCF Report.



1.5 Expertise of the Specialist

Natasha Higgitt undertook the pre-disturbance survey of the Project local and site specific study area (defined in Section 4.1 below). She obtained her Bachelor of Arts (BA) Honours degree in Archaeology in 2010 from the University of Pretoria. She held the position of Assistant Heritage Consultant: Archaeology Specialist at Digby Wells. She has more than three years' experience in archaeological survey and gained further generalist heritage experience since her appointment at Digby Wells in South Africa and Liberia.

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

Justin du Piesanie undertook the pre-disturbance survey 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 nine 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 pre-disturbance survey and the technical review of this HIA. He has more than 16 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*).

Refer to Appendix A for detailed specialist curriculum vitae.



1.6 Structure of the HIA Report

The remainder of the report is structured as follows:

Chapter	Description
2 -	Summarises listed activities as per GN R 983 Listing Notice 1 and GN R 984 Listing Notice 2 for which Environmental Authorisation will be required, and that may result in heritage impacts.
3 -	Outlines the aims and objectives of the specialist heritage study.
4 -	Describes the methodology employed in the data collection and impact assessment.
5 -	Identifies the specific constraints and limitations of the HIA.
6 -	Provides an update of the baseline cultural landscape.
7 -	Considers the real and potential sensitivities of the cultural landscape in relation to the various alternatives under consideration in this assessment.
8 -	Outlines identified impacts and assess the intensity of predicted heritage impacts.
9 -	Categorises cumulative impacts on the cultural landscape that may manifest due to various existing and proposed developments in the local study area.
10 -	Highlights potential unplanned events and low risks that may manifest as potential future impacts.
11 -	Examines the identified heritage impacts against the sustainable socio-economic benefits of the Project.
12 -	Provides a summary of the heritage inputs into the EMP.
13 -	Summarises the Stakeholder Engagement Process (SEP) that has taken place to date with specific reference to the heritage.
14 -	Details the heritage specific comments received from stakeholders and the comments provided.
15 -	Collates the most salient points of the heritage assessment and concludes with the specific outcomes and recommendations of the study
16 -	Lists the source material used in the development of the report.

2 Listed Activities

Environmental Authorisation (EA) of the proposed activities associated with the Project is triggered when thresholds of certain activities regulated in terms of the NEMA EIA Regulations, 2014 are exceeded. Specific reference is made to Government Notice Regulation (GN R) 983 and GN R 984.



The regulatory HRM Process is in turn required when thresholds of certain activities outlined in section 38(1) of the NHRA are exceeded, as well as in term of section 38(8) of the NHRA when impact assessments are required as part of EAs. A summary of the listed activities and NHRA triggers are presented in Table 2-1.

Table 2-1: Project activities

GNR and Listing No.	Listed Activity	Project activity description	NHRA Trigger
GNR 983 Listing Ntoice1	Activity 9	Water management infrastructure will be required on site yet the extent of the water requirement on site is currently still under investigation and will be confirmed during the EIA Phase.	Section 38 (1)(a) – the construction of a road, wall, power line, pipeline, canal or similar form of linear development or barrier exceeding 300 m in length; and 38 (8)
	Activity 10	Due to the relatively flat nature of the area, all dirty water will have to be pumped to either the holding facilities (ponds/dams) or the water treatment plant. It is assumed the combined length of these pipelines will exceed 1 000 m.	
	Activity 13	Namane will require off-stream storage of water in the form of an evaporation pond, storm water collection pond and raw water reservoir(s). The volumes of these facilities will be confirmed during the EIA Phase; however, the total combined surface area of these facilities is less than 10ha, thereby not triggering Listing Notice 2, Activity 16.	Section 38 (8)
	Activity 14	Storage of diesel will be required on site during the construction phase.	
	Activity 24 (ii)	A permanent access road will need to be constructed and maintained throughout the operational and decommissioning phase	Section 38 (1)(a) – the construction of a road, wall, power line, pipeline, canal or similar form of linear development or barrier exceeding 300 m in length; and 38 (8)



GNR and Listing No.	Listed Activity	Project activity description	NHRA Trigger
GNR 984 Listing Notice 2	Activity 2	The IPP is projected to generate 600 MW of power which will be fuelled by lower grade coal sourced from the Temo Coal mine, and fed into the national grid.	Section 38 (8)
	Activity 6	A water use licence will be required for Ash handling and disposal systems and ash dump; Ash dump runoff ponds; Water storage reservoir for raw water supply and evaporation ponds. An Atmospheric Emissions Licence will be required for the Power Plant.	N/A
	Activity 7 (iii)	Transportation of coal to the power plant and removal of ash to the ash dump. At this stage, it is assumed that coal will be transported from the neighbouring mine via a conveyor belt.	Section 38 (1)(a) – the construction of a road, wall, power line, pipeline, canal or similar form of linear development or barrier exceeding 300 m in length; and 38 (8)
	Activity 9	Transmission lines associated with the proposed power plant will most likely require a 400kV capacity.	
	Activity 15	The extent of the power plant, associated infrastructure and the ash dump totals an area of 320 ha.	Section 38 (1)(c) any development or other activity which will change the character of a site – (i) exceeding 5 000 m ² in extent; and 38 (8)
	Activity 25	The power plant will require a water treatment facility to generate deionised water for the production of steam to power the gas turbines	Section 38 (8)
	Activity 28	An Atmospheric Emissions Licence will be required in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004).	N/A



3 Aims and Objectives

The primary aim of this HIA report was to furnish the responsible Heritage Resources Authorities (HRAs), in this instance SAHRA and LIHRA, with details regarding the location, nature and extent of the proposed Project, and the possible associated impacts to the identified heritage resources. The specific objectives of the HIA report were to enable SAHRA and LIHRA to:

- Timeously decide, in consultation with the proponent, i.e. Namane, 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 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.

4 Methodology

This chapter details the methodology employed in the HIA. To complete the specialist heritage study, the following methodology was utilised:

- Defining of the study areas;
- Collection of both qualitative and quantitative data;
- Determining CS and field ratings for heritage resources;
- Assessing risks and potential impacts to identified heritage resources; and
- Decisive consideration of mitigation measures in relation to prescribed minimum standards.

These methodologies are discussed separately below.

4.1 Defining the Study Area³

The HSR included a motivation for defining three ‘concentric’ study areas for the purposes of the heritage study, each one encompassing its precursor and exceed it in scale. These areas were:

³ The HSR provides a motivation for the defined study areas as part of the assessment for the Project. This section provides an abbreviated summary of the study areas as previously defined.



- The **local study area** defined broadly by the boundaries of the local municipality;
- The **site-specific study area** defined by the area most likely to be influenced or impacted upon by the Project, commonly bounded by the farm portions of the preliminary development footprint and any buffers established; and
- The **preliminary development footprint** defined by the extent of the proposed infrastructure.

In context of this HIA report, the defined areas contributed to the CS of the cultural landscape and identified heritage resources. In turn, CS informed predicted intensity of heritage impacts, Field Ratings and minimum required measures to mitigate heritage impacts.

4.2 Data Collection

Data were initially collected to develop a heritage baseline profile that was presented in the HSR. Additional qualitative and quantitative data were collected as described below, to update the earlier baseline profile presented in 6 below. The initial and updated heritage baseline informed the development of CS, discussed in 4.3.1 below and assisted in predicting and assessing heritage impacts, discussed in 4.3.4 below.

4.2.1 Qualitative Data Collection

The heritage baseline presented in the HSR and other relevant text-based information was reviewed to:

- Gain an understanding of the cultural landscape within which the proposed IPP power plant is located;
- Identify any potential fatal flaws, sensitive areas and known or possible tangible heritage; and
- Inform the pre-disturbance survey of the proposed development footprint.

Sources that informed the heritage baseline contained in the HSR were listed and referenced in that report, and are hence not repeated here.

Additional sources reviewed and used to update the heritage baseline for this HIA report are summarised in Table 4-1 below and referenced in the bibliography in Section 16.

Table 4-1: Summary of literature reviewed in the compilation of the HIA

Works cited in the HIA		
Biemond, 2011	Beimond, 2012	Clark, 1982
Deacon & Deacon, 1999	Henshilwood, et al., 2001	Huffman, 1970
Huffman, 1980	Huffman, 2007	Huffman & van der Walt, 2010



Works cited in the HIA		
Kuman, et al., 2005	Legassick, 1969	Lombard, et al., 2012
Mitchell, 2002	Ngcongco, 1982	Parsons, 1973
Phillipson, 1977	Schapera, 1953	Schapera, 1970
Schapera, 1980	Sekgarametso, 2001	

4.2.2 Quantitative Data Collection

Pre-disturbance surveys were conducted to collect primary, quantitative data, i.e. the physical identification of heritage resources and sites in the study areas. The surveys were completed as adaptive, non-intrusive surveys, (*i.e. no sampling or Shovel Test Pits (STPs)*).

The objectives of the pre-disturbance survey were to:

- Verify heritage resources identified during the scoping assessment;
- Visually record the current state of the cultural landscape;
- Ground truth certain heritage identified in the literature review; and
- Record all tangible heritage resources within the proposed development footprint.

4.2.2.1 IPP Development Footprint

A pre-disturbance survey of the preliminary development footprint⁴ of the proposed power plant and ash dump options was completed by Johan Nel, Justin du Piesanie and Natasha Higgitt from 23 to 27 November 2015. Although the survey was technically completed in the wet season, no significant rainfall occurred before this site visit. Ground surface visibility was therefore good (see 4.2.3 below for more details).

The footprint was examined via pedestrian survey in transects bounded by the internal farm roads (Figure 4-1). The surveyed transects were recorded as a GPS track log depicted in Plan 1. Where tangible heritage resources were observed, their locations were captured as GPS waypoints and documented through written and photographic record.

Specific attention was paid to natural landscape features such as pans and ferricrete / calcrete outcrops, and animal burrows where subsurface material may be exposed. This consideration was based on the known presence of archaeological sites closely associated with such features in the local study areas.

⁴ Quantitative data collection focussed on the development footprint design available at the time of pre-disturbance survey. Subsequent amendments outside of the preliminary development footprint may not have been subject to field based data collection.

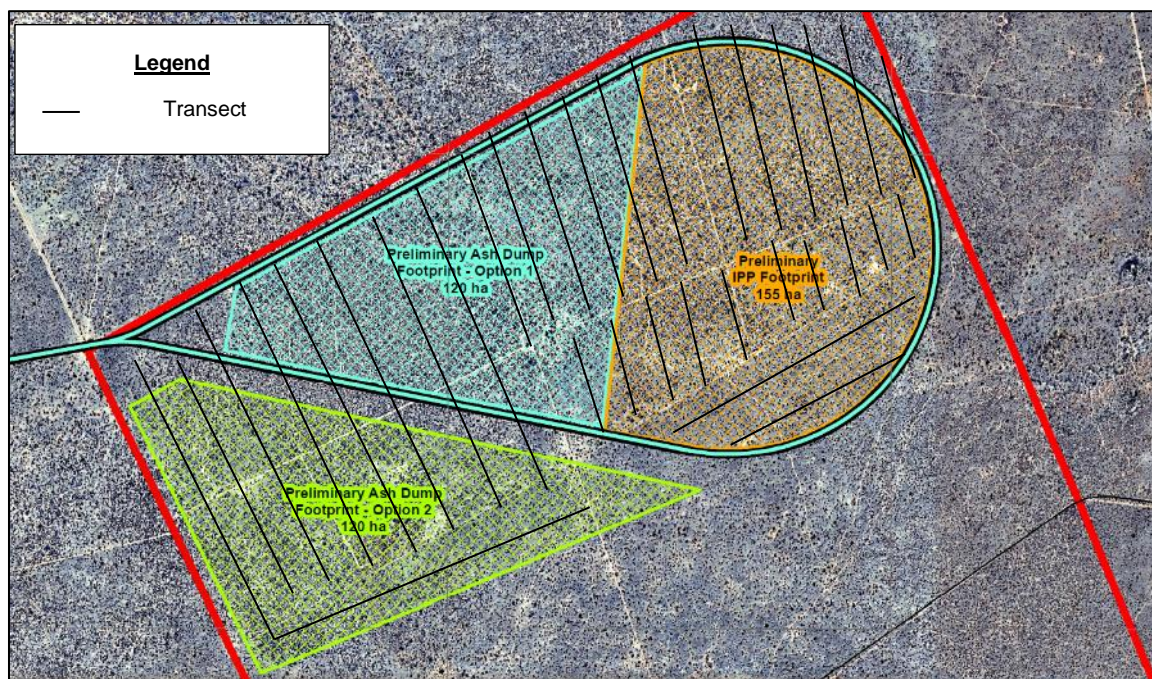


Figure 4-1: IPP development footprint area and survey tracks

4.2.2.2 Spitzkop Transmission Line Development Footprint

A pre-disturbance survey of Spitzkop Line of the proposed 400 kV transmission routing was completed from 16 to 30 January 2016 by Johan Nel and Justin du Piesanie. As stated above, the survey was completed in the wet season, however, no significant rainfall occurred before this site visit. Ground surface visibility was therefore good (see 4.2.3 below for more details).

The pre-disturbance survey of the Spitzkop transmission line was also completed through pedestrian survey along the proposed routing, taking into consideration a 100 m buffer zone. The length of the proposed routing was surveyed via a 500 m relay approach. This approach entailed one archaeologist surveying alternate 500 m lengths of the Spitzkop transmission line routing within the bounds of the various farm portions. The survey was recorded as a GPS track log depicted in Plan 1. Where tangible heritage resources were observed, their locations were captured as GPS waypoints and documented through written and photographic record.

Specific attention was paid to natural landscape features such as pans and ferricrete / calcrete outcrops, and animal burrows where subsurface material may be exposed. This consideration was based on the known presence of archaeological sites closely associated with such features in the local study areas.

4.2.3 Pre-Disturbance Conditions

The survey focused on the preliminary development footprint of the proposed Project. Survey conditions differed markedly along the linear footprint which comprised a 100 m by

39.7 km servitude (total footprint of approximately 397 ha), and influenced the observation potential to identify surface evidence of tangible heritage resources such as lithics, ceramics and deposits.

Observation Potential (OP) was calculated based on the ratio of visible ground surface per one square metre. This enabled OP to be divided into three ranges:

- OP 1: between 100% and 90% surface visibility, i.e. bare or near bare surface;
- OP 2: <90% to around 50% surface visibility; and
- OP 3: <50% surface visibility.

OP generally decreased southwards along the linear footprint, as vegetation became denser. Exceptions were noted in areas where, for example, on Zandbult *Spirostachys africana* copses were noted. In these areas, OP ranged between 1 and 2.

OP was greatly reduced in areas with grass species as the predominant vegetation type (for example on Minnaarspan and Toezicht). Similarly, areas in the southern section of the linear footprint were obscured with leaf litter from deciduous trees such as *Pterocarpus rotundifolius* (for example Rooipan), resulting in OP 3.



Figure 4-2: Examples of A – OP 1. B – OP 2. C – OP 3



4.3 Impact Assessment

A detailed method statement for the impact assessment is provided in Appendix C. This section provides a summary of the methodologies employed to determine cultural significance, field ratings, impact assessment, risks versus impacts, and recommended minimum mitigation measures. These are discussed separately below.

4.3.1 Cultural Significance

CS was determined based on identified resources' importance or contribution to four broad value categories: aesthetic, historical, scientific and social values. The resources' importance or contributions to these values were considered in terms of associative (qualitative) and / or rarity (quantitative) attributes. These attributes were based on the data collected and collated into the cultural heritage baseline profile.

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

Box 1: CS formula

The integrity or condition of resources further influenced the CS. Integrity is largely determined based on resources' current, observed state of conservation, as well as notable changes made to it over the years.

4.3.2 Field Rating

Field ratings assist the responsible heritage resources authority to grade heritage resources into national (Grade I), provincial (Grade II) or local (Grade III) categories. Each category requires specific minimum required mitigation measures and consequent management responsibilities. Field ratings are closely linked to the importance. The field rating process therefore aims to facilitate the decision-making process.

$$\begin{aligned} \text{Field Rating} &= \text{average sum} \\ &\text{of} \\ &\text{Aesthetic} + \text{Historic} + \text{Scientific} + \text{Social} \end{aligned}$$

Box 2: Field rating formula

4.3.3 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 EIA. This allows for input from stakeholders prior to commencement of the impact assessment phase.

Broad mitigation and monitoring measures were provided for low risks and unplanned events under Section 10 below, however, they **were not assessed in detail** (i.e., with significance ratings). In general monitoring is an accepted form of mitigation for low risks.



4.3.4 Impact Assessment Methodology

Impacts to heritage resources can be broadly divided into three categories – direct, indirect and cumulative. The assessments of these impacts are done by assigning a numerical value to the significance of the identified impacts.

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 3: Impact assessment formula

The assessment of impacts inherently considers the CS

and field ratings. The consequence of the potential impact was weighted against the parameters intensity, spatial scale and duration. To identify the significance of the impact, the consequence was measured against the probability of the impact occurring.

The magnitude of the potential impact was applied to both pre- and post-mitigation scenarios with the aim of removing all negative impacts on heritage resources, and enhancing positive ones.

4.3.5 Mitigation Measures

Recommended mitigation and management measures are guided by the General Principles encapsulated in the NHRA, and the SAHRA Minimum Standards (SAHRA, 2007) (See Box 4). Minimum required mitigation measures are intrinsically based on the CS of heritage resources and the intensity of predicted impacts on such resources.

Mitigation measures are grouped into two types:

- Project-related mitigation - requires changes or amendments to project design, planning and siting of infrastructure; and
- Mitigation of heritage resources - where project-related mitigation will not sufficiently reduce or remove impacts, resources need to be mitigated to ensure that they are fully recorded, documented and researched before any negative change occurs.

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 4: Recommended minimum level of required mitigation



5 Constraints and Limitations

- Detailed designs and siting of the proposed Power Plant and associated infrastructure were not available at the time of the pre-disturbance survey. To mitigate this limitation, the provided extent of the proposed development footprint was surveyed as per the methodology described under Section 4.2.2;
- The Spitzkop transmission line was subjected to a pre-disturbance survey, where tangible heritage resources were identified and recorded. The Canada and Steenbokpan transmission line routings were assessed at desktop level. The potential for unidentified heritage resources to occur in these proposed routings is high;
- The local study area is generally covered by windblown sand affiliated with Regic sands of the Namib form. This extensive coverage of sand imposed a visual limitation with regards to the extent material culture could be identified during the pre-disturbance survey;
- 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 is required. No permits were held by the specialists, and as such, it is possible that archaeological sites may be identified during the construction and operational phases of the Project; and
- Access to the properties Naauwpoort 363IQ, Rooipan 355IQ and Rhenosterpan 361IQ was not granted by the landowners at the time of the pre-disturbance survey. This resulted in an extent of approximately 4 km of the Spitzkop transmission line routing that was not subject to physical survey, and is therefore noted as a gap in this assessment.

6 Updated Baseline Environment

The updated cultural baseline environment considered the predominant landscape based on identified heritage resources within the local study area. The tangible cultural heritage landscape of the local study area was largely associated with an archaeological landscape, dominated by expressions of Middle Stone Age (MSA) and Later Farming Community (LFC) periods (See Figure 6-1). This finding was based on reviews of previous studies and other published sources referred to in Section 4.2.1 above.

The updated cultural baseline literature review therefore mainly focussed on the archaeological context of the study area to inform the pre-disturbance survey, provide a basis for the assessment of CS and potential impacts, and guide the recommendations provided under Section 12 below.

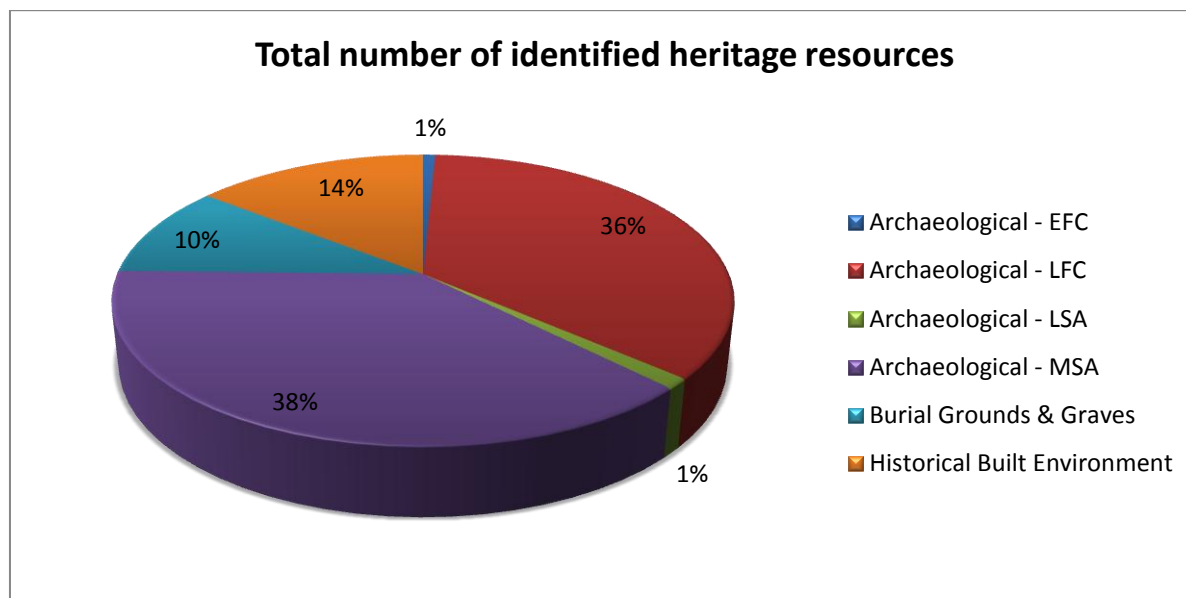


Figure 6-1: Distribution of heritage resources within the local study area

6.1 Local Study Area

6.1.1 The Middle Stone Age

The MSA dates from approximately <300 000 years ago (kya) to 20 kya, and is marked by a significant trend in manufacturing tools of smaller dimensions and increased variety when compared to the preceding Early Stone Age (ESA). This trend is significant as it coincides with the emergence of anatomically modern humans – *Homo sapiens* – and an exponential increase in human cognitive ability (i.e. abstract thinking). This is evidenced in the archaeological record through the increased complexity of tools and development of symbolic actions, such as personal adornment, art, and mortuary practices (Henshilwood, et al., 2001; Mitchell, 2002).

In Southern Africa the earliest MSA industries are characterised by high proportions of minimally modified blades, represented by the Levallois technique (Clark, 1982). In general however, the MSA can be broadly defined by the occurrence of blades and points produced from good quality raw material. (Deacon & Deacon, 1999).

Regional traditions become more varied with a greater degree of local differentiation (see Table 6-1), making the Southern African MSA difficult to interpret. This is especially true for the local study area, where limited research in the Stone Age has been conducted (Nel & du Piesanie, 2012).

The MSA is represented by 100 observations previously recorded in the IPP and Spitzkop transmission line local study area footprint areas (Huffman & van der Walt, 2011; Karodia & Higgitt, 2013; Nel, 2011a; Nel, 2011b; Pistorius, 2010). Of these identified sites, 15 were recorded within 1 to 5 km of the development footprint, as depicted in Figure 6-2.

Descriptions of the 100 recorded sites that included descriptions of the natural landscape features account for 64 sites. Of these 94% were documented in or near pans, and at least two of these (2327CA32b and 2327CB3) were recorded being embedded in calcrete matrices. Where lithics are embedded in a rock matrix, there is a high potential for good contextual information to be obtained that can be used for scientific research into the MSA of the local study area.

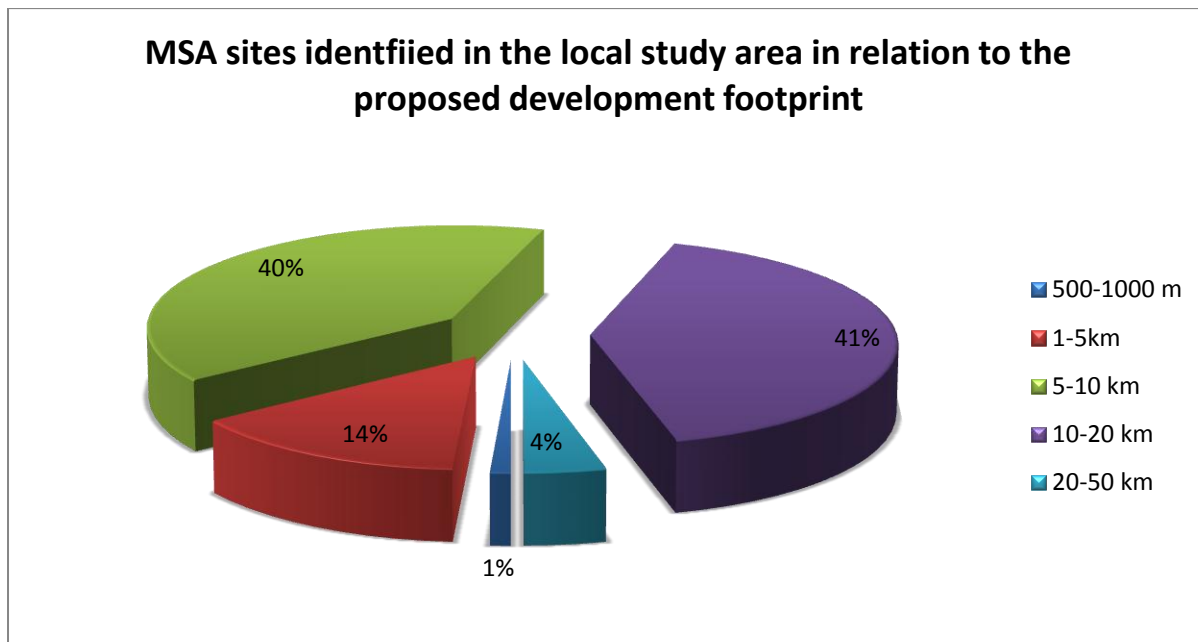


Figure 6-2: Distribution of identified MSA sites within the local study area

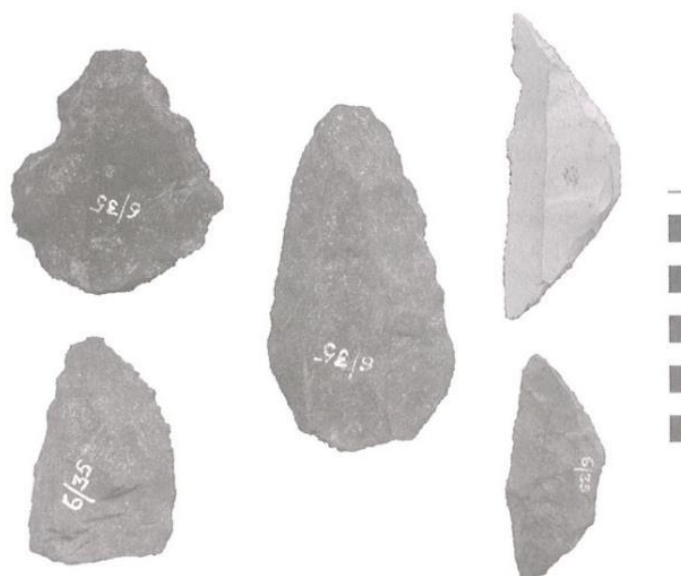


Figure 6-3: Examples formal early MSA stone tools found in Southern Africa (Kuman, et al., 2005)

**Table 6-1: The Southern African MSA sequence (Lombard, et al., 2012)**

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

6.1.2 Later Farming Communities

The archaeological record of farming communities as a whole is associated with the appearance and migration of Bantu-speaking people in South Africa from as early as 200 CE. Within the local study area, these migrations are specifically associated with the movements and settlement during the LFC period, dating from approximately the 14th century through to the colonial period. These migrations were necessitated by the need for natural resources, gradually resulting in the encroachment and colonisation of traditional hunter-gatherer territories, ultimately resulting in the subjugation of hunter-gatherer groups, or forcing them into more marginal areas (Nel & du Piesanie, 2012).

Common tangible identifiers for LFC sites are ceramics and evidence of domesticated animals, specifically cattle through dung or faunal remain deposits. Using ceramic classification, the various ceramic facies associated with the LFC period that occur within the local study area are summarised in Table 6-2.

The LFC in the local study area is represented in 94 previously recorded instances (Huffman & van der Walt, 2011; Karodia & Higgitt, 2013; Nel, 2011a; Nel, 2011b; Fourie, 2009; Fourie, 2010). Of these only 6% were recorded within 1 to 5 km of the proposed development footprint (See Figure 6-4).

The majority of the total identified LFC sites (56%) were recorded as low density surface scatters, with only 18 (20%) sites being classified as low complexity sites with multiple components (See Figure 6-5).

Of the LFC sites where ceramic facies have been documented, seven (87%) have been attributed to the *Letsibogo facies*, and one (13%) to the *Madikwe facies*. These two facies appear in the archaeological record from approximately 1500 CE. Both are intermediate between the *Icon* parent facies and historical types such as *Buispoort* that is later associated with western Sotho-Tswana identity (Huffman, 2007).

The *Letsibogo facies* has been recorded in the Motloutse drainage in Botswana, as well as in the Blouberg in the Limpopo Province. Research on the oral traditions of the Tswana indicates that this ceramic facies is linked to the baKaa who originally occupied the Shoshong Hills until 1849 CE (Beimond, 2012). The *Madikwe facies* has been recorded from the Makapans Valley area west into Botswana. These facies differ stylistically based on decoration technique: *Letsibogo* emphasises punctates as opposed to stabs and fingernail impressions in *Madikwe* (See Figure 6-6) (Huffman, 2007; Huffman & van der Walt, 2011; Biemond, 2011).

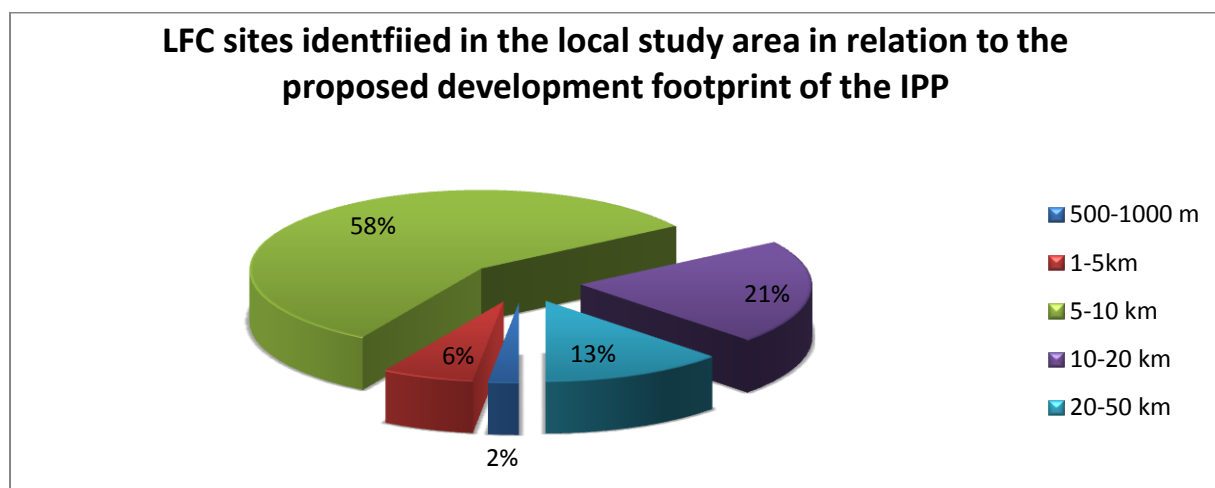


Figure 6-4: Distribution of identified LFC sites within the local study area

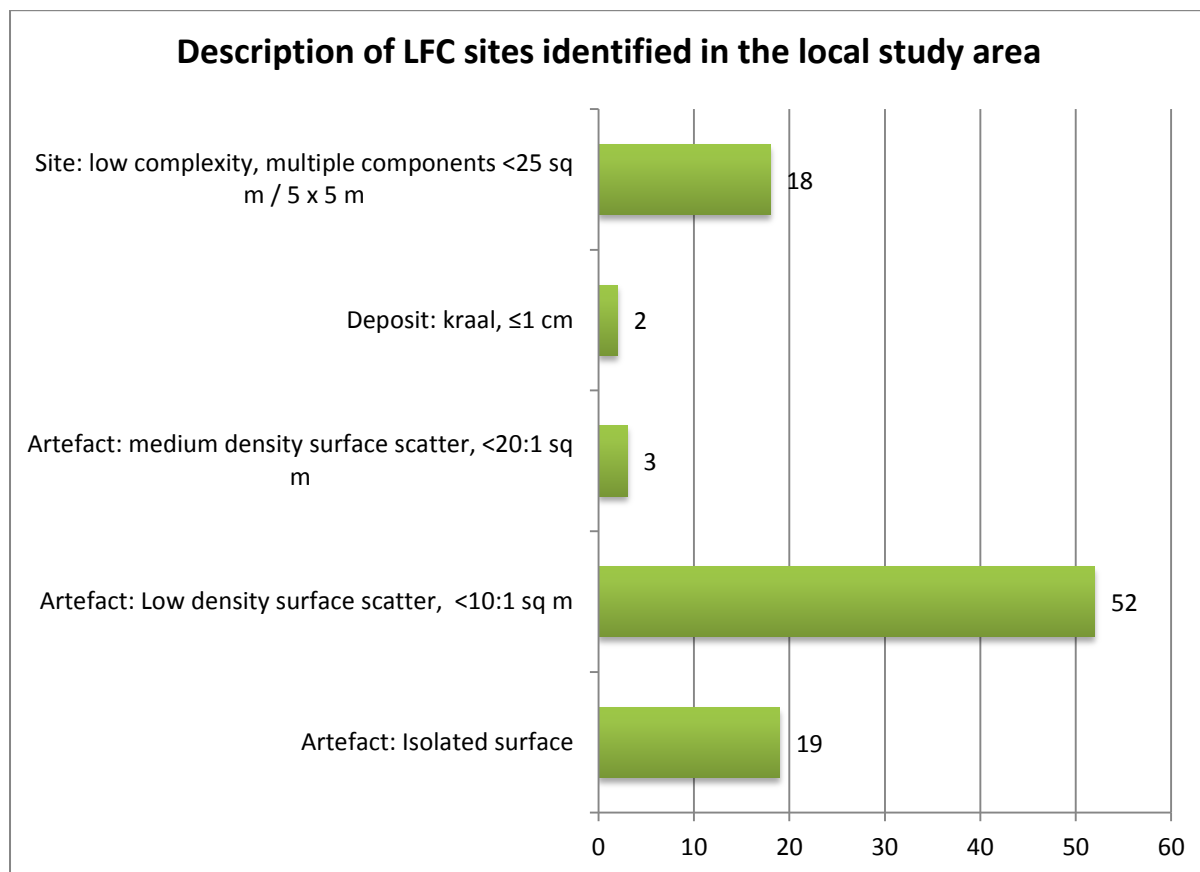


Figure 6-5: Description of LFC sites identified in the local study area

Table 6-2: Possible LFC ceramic facies in the local study area (Huffman, 2007)

Facies	Tradition	Time Range	Period	Characteristics
Broadhurst	Kalundu	1300-1430 CE	Middle-Late FC	Finely incised and stamped herringbone.
Madikwe	Urewe	1500-1700 CE	Late FC	Multiple bands of cord impressions, incisions, stabs and punctates separated by colour.
Letsibogo	Urewe	1500-1700 CE	Late FC	Lines of punctates separating black and red zones.
Buispoort	Urewe	1700-1840 CE	Late FC	Rim notching, broadly incised chevrons, white bands all with red ochre.

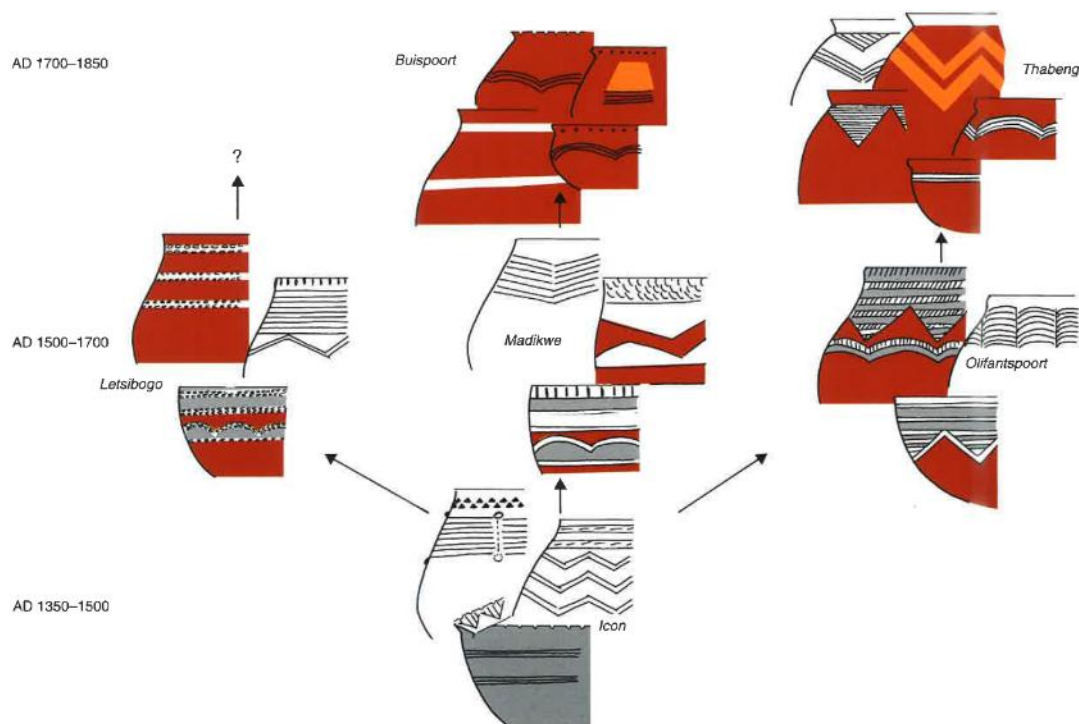


Figure 6-6: Example of relationship between *Madikwe* and *Letsibogo* facies (Huffman, 2007)

6.1.3 Socio-Economic Baseline Conditions

Socio-economic information summarised in this chapter is derived from an extraction of the socio-economic baseline conditions contained within the final Scoping Report (Digby Wells, 2016) .

The South African Government recognises the Waterberg Coalfields as a future growth point with mining as the primary economic activity. Policy documents of the Limpopo Province, the WDM and the LLM, all recognise that the Waterberg is facing major economic developments within the Limpopo Coal, Energy and Petrochemical Cluster which are critical to the achievement of its employment, growth and development objectives.

The tourism sector is also targeted by the LLM as a development priority to stimulate job creation and economic growth in the local eco-tourism sector. Mining, industrial and urban development in the greater Lephalale area is, however, impacting on existing game farming and eco-tourism activities. Several key strategic objectives are recommended in the Lephalale Local Economic Development (LED) Plan. These are:

- Promoting the Coal and Petro-chemical Cluster;
- Supporting livestock farmers on communal land;
- Growing the tourism and recreation industry;



- Assisting the informal sector; and
- Improving service delivery.

In order to achieve these objectives, the above LED Plan includes programmes and projects to provide housing, social infrastructure, skills development, local supply chain development, as well as development of by-products and waste products from mining / coal beneficiation.

Demographically, the LLM has a total population of 115 767 in 2015, which accounts for 17% of the District's population and 17% of its household. Its population density is 6 persons per km². This low density is consistent with the rural nature of most of LLM with the majority of the population being concentrated in towns. The level of education in LLM can be described as low, as only 19% of the population aged 20 and older has a matric qualification and 6% has higher education. The largest proportion of this population (35%) has some secondary education. A steady increase in educational levels has been noted, which is consistent with increasing industrialisation within the local study area. This low level of education is mirrored in the employment statistics. Almost two thirds of the working age population in the LLM were not economically active in 2010. Of the available labour force, 23% were unemployed, as against 20.4% in the WDM.

Table 6-3 provides a summary of the primary employment sectors within the LLM. In relation to the employment statistics of the LLM, the average monthly household income in the LLM was R13 086 in 2011, which was more than the national average household income. Average household incomes in LLM grew at a Compounded Average Growth Rate (CAGR) of 10.7% in real terms between 2005 and 2010. According to the LLM IDP, 15.5% of households in the municipality earned no income and 45.3% earned less than R9 600 per year in 2011. In 2015, 12.5% of households earned no income and 22% earn less than R9 600.

Table 6-3: Employment per sector for LLM 2008-2010

Sector	2008	2009	2010	2010 (%)
Agriculture, Forestry and Fishing	3633	2938	3392	14.0
Mining and Quarrying	4004	3812	4467	27.3
Manufacturing	805	677	628	3.8
Electricity, Gas and Water	851	927	1001	5.8
Construction	842	775	641	3.9
Wholesale and retail trade , catering and accommodation	3569	3165	3188	19.5
Transport, storage and communication	666	665	671	4.1
Community, social and personal services	2658	2451	2219	13.6
Finance, insurance, real estate & business services	799	678	673	4.1



General Government	1457	1394	1463	9.0
Total	19,283	17,481	17,243	100.0

Source: LLM IDP 2012/2013

6.2 Site Specific Study Area

The site specific study area comprises the farms presented in Table 1-1 and a buffer of roughly 100 m into the adjacent properties. This chapter details the heritage resources identified within the boundaries of this defined area in relation to the context of the greater cultural landscape described under Section 6.1 above.

A total of 33 heritage resources were identified within the site specific study area. Sites associated with the MSA are the predominant identified heritage resources, accounting for 34% (See Figure 6-7). The remainder of the identified sites within the site specific study area are associated with the LSA (6%), LFC (12%) historical period of the area, namely as farm and labourer houses (21%), and associated graves (27%).

The lack of archaeological evidence in the site specific study area may not necessarily imply little or sparse occupation, but may in fact be associated with the dominant soils. This in itself may raise interesting and important scientific issues as will be discussed under Section 6.2.1.

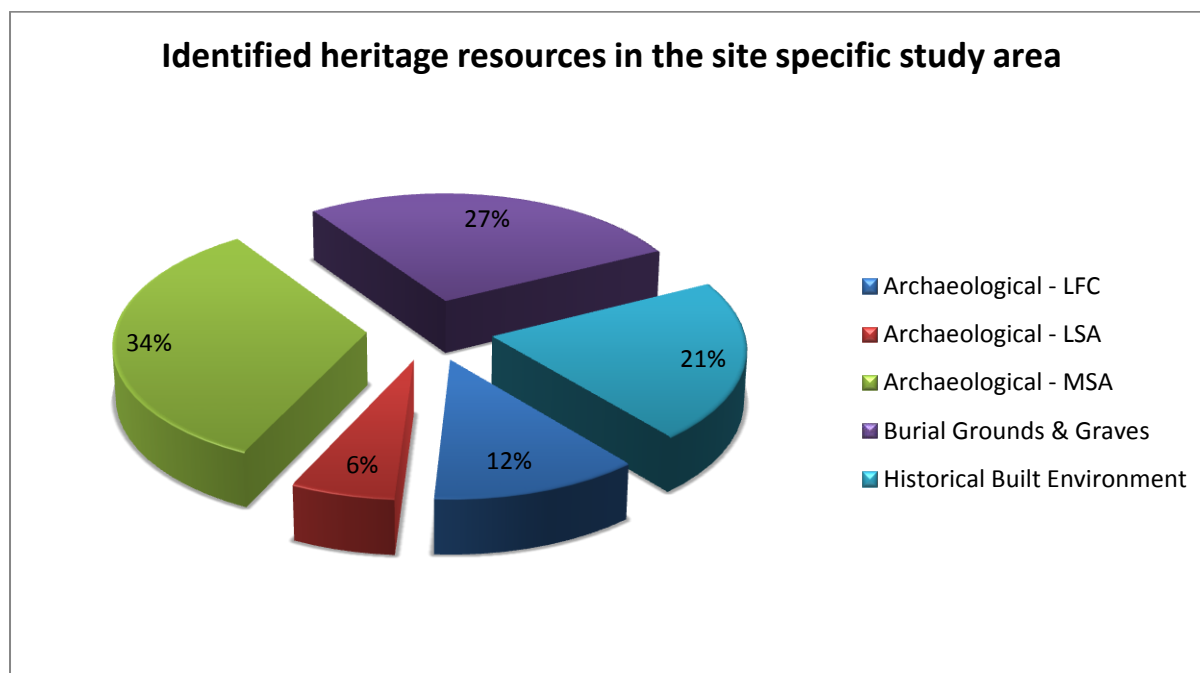


Figure 6-7: Identified heritage resources in the site specific study area



6.2.1 Soils and Land Capability

Soils and land capability information summarised in this chapter is derived from an extraction of the soils, land use and land capability baseline conditions contained within the final Scoping Report, as well as the Soils, Land Capability and Land Use Assessment for the Temo Coal Project (Smith, 2011).

The dominant soils for the site specific study area are classified into various forms within the broader soils groups, represented by the Ae and Ah land types of the 2326 Ellisras land type map. These are summarised in Table 6-4.

The formation of the dominant soil types present is influenced by topographic features, Kalahari sands and sandstone parent materials occurring in the landscape. These soils are deemed as nutrient poor soils inherently low in calcium, magnesium, potassium and sodium, with low to very low concentrations of organic materials. Furthermore, these soils are also prone to erosion. The texture properties of the soils analysed by Smith (2011, p. 10) allow most of the soils to be classed as sandy loam soils. Sandy loam soils are easily leached and hold less water in the soil profile than their clayey counterparts. The sandy soils present on Duikerpan are freely drained so water moves easily through them. However, the presence of wetness within the profile of the more clay rich shallower carbonate soils group is significant as they are important in the maintenance of the ecological diversity of the site specific study area.

Nevertheless, the land capability, based on the Chamber of Mines classification system, is rated as low intensity grazing land and/or wilderness potential.

Table 6-4: Dominant soil types in the site specific study area

Broad Soils Group	Soils Form
Regic sand	Namib
Red apedal B	Hutton
	Plooyburg
	Kimberley
Yellow-brown apedal B	Clovelly
Neocutanic B	Oakleaf
	Tukulu
Neocarbonate B	Addo
	Etosha
	Gamoep
	Montagu



6.2.2 The Middle and Late Stone Age

Stone Age accumulations account for 13 recorded sites in the site specific study area, nine within 1 – 5 km, and four within 5 – 10 km of the development footprint, generally in proximity or relation to the pans (Huffman & van der Walt, 2011; Nel, 2011a).

These accumulations were described as comprising of MSA artefacts, as well as LSA tools, including scrapers, flakes, and blades. Briefly, LSA tool technology is highly sophisticated when compared to MSA industries, with specific tools being created for specific purposes, and the inclusion of bone tools into the assemblages (Mitchell, 2002). LSA sites commonly contain diagnostic artefacts, such as microlithic scrapers and segments. In a southern African context, the LSA is closely associated with hunter-gatherer groups, such as the San. Due to the nomadic nature of LSA people, open sites are difficult to identify and usually poorly preserved.

Where lithics occur in stratified *in situ* contexts, the sites are regarded as highly significant in terms of the possible information potential to contribute to an understanding of the LSA industry in this region.

6.2.3 Late Farming Communities

Four LFC isolated findspots were identified in the site specific study area (Nel, 2011a). These findspots were recorded as individual potsherds outside of any discernible archaeological features or structures. Of the identified ceramics, one was noted to comprise of red burnish, which could possibly associated with *Letsibogo facies* as described above. Based on the ethnographic context of the greater region, this conforms to the assessment that these sites are possibly associated with the early settlement of Sotho-Tswana in the region.

6.2.4 Historical Period

A total of 16 sites associated with the historical period have been identified within the site specific study area (Huffman & van der Walt, 2011; Nel, 2011a). These comprise built structures (21%) and burial grounds and graves (27%). Of these sites, all occur at a distance of greater than 500 m from the proposed development footprint.

6.3 Preliminary Development Footprint

6.3.1 Results of Pre-Disturbance Survey

The pre-disturbance survey did not identify any tangible heritage resources within the proposed preliminary development footprint of the IPP Power Plant and ash dump options. As stated under 5, archaeological sites commonly occur at sub-surface levels with no or limited trace evidence on the surface. Therefore, there is the potential for unidentified



heritage resources to be exposed during the pre-construction and construction phases of the Project.

A total of six tangible heritage resources were identified within or in proximity to the development footprint of the Spitzkop transmission line routing. These comprised MSA and LFC sites, and are summarised in Table 6-5 and discussed in detail below.

Table 6-5: Summary of identified heritage resources

Identified heritage resources	Total No.
Archaeological - MSA	3
Artefact: Isolated surface	1
Artefact: Low density surface scatter, <10:1 sq m	1
Site: medium complexity, multiple components >25 sq m / 5 x 5 m to <2500 sq m / 50 x 50 m	1
Archaeological - LFC	3
Artefact: Isolated surface	1
Artefact: Low density surface scatter, <10:1 sq m	1
Site: medium complexity, multiple components >25 sq m / 5 x 5 m to <2500 sq m / 50 x 50 m	1
Total	6

6.3.1.1 MSA-001 & MSA-002

Co-ordinates:	-23.613654	27.282093
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Description:

The site constitutes a low density accumulation of possible MSA lithics within 100 m of the proposed Spitzkop transmission line routing.

Lithic accumulations were noted on the surface in association with a ferricrete outcrop connected to the larger pan system that spans across the farms Duikerpan 249LQ and Twistpan 265IQ. The site is situated within a clearing of approximately 20 m x 5 m (100 m²) with a surface visibility of OP 2. The low density scatter is associated with MSA-002, where MSA-001 (*approximately 200 m south of MSA-001*) is an isolated findspot within the greater pan system.

The identified flakes were not identified as formal tools.



Figure 6-8: A - MSA-001 isolated lithic flake. B – MSA-002 lithic accumulations. C – Location of MSA-002 with an OP 2

6.3.1.2 MSA-003

Co-ordinates:	-23.75745	27.362573
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Description:

The site constitutes a multi-component site with low density MSA lithic accumulations and LFC ceramics within the buffer of the Spitzkop transmission line routing.

Lithic accumulations were noted on the surface in association with a ferricrete outcrop connected to the larger pan system on Mooipan 325IQ. A low density scatter of undiagnostic LFC ceramics was identified within an area of the ferricrete outcrop that had previously been quarried. The site is situated within a clearing associated with the farm road and has a surface visibility of OP 1. Outside of the road clearing, denser stands of predominantly *Combretum apiculatum* trees and the foliage reduced surface visibility to OP 2.



Figure 6-9: A – Undiagnostic LFC ceramics and MSA accumulations identified at MSA-003. B – Ferricrete outcrop in the road clearing

6.3.1.3 LFC-001 & LFC-002

Co-ordinates:	-23.621545	27.285588
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Description:

The site constitutes a low density scatter of LFC ceramics within the buffer of the proposed Spitzkop transmission line routing.

Ceramics were noted on the surface, evidently exposed from two animal burrows at LFC-001. The pieces were undiagnostic, with only one sherd displaying an incised dashed motif. The site is located in a clearing of approximately 10 m x 5 m (50 m²), with surface visibility of OP 1. No other surface evidence was noted, nor any evidence of deposit in the burrows' vertical sections. A single undiagnostic potsherd (LFC-002) was noted on the surface in another clearing approximately 30 m from LFC-001. This clearing was similar in size and surface visibility, i.e. around 50 m² and with an OP 1. No other evidence was noted on the surface or from nearby burrows.



The clearings were two of several occurring in the area separated or 'enclosed' by denser stands of predominantly *Grewia* and *Commiphora* species shrubs and *Combretum apiculatum* trees.



Figure 6-10: A - Ceramic fragments exposed from animal burrow at LFC-001, arrow indicates decorated piece. B - LFC-001, arrows indicate burrows from where ceramics were exposed. Note near 100% OP

6.3.1.4 LFC-003

Co-ordinates:	-23.612696	27.278764
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Description:

The site constitutes a multi-component site with medium complexity associated with MSA accumulations and LFC ceramics. The site is situated outside of the 100 m buffer of the Spitzkop transmission line routing, but forms part of the greater pan system that spans



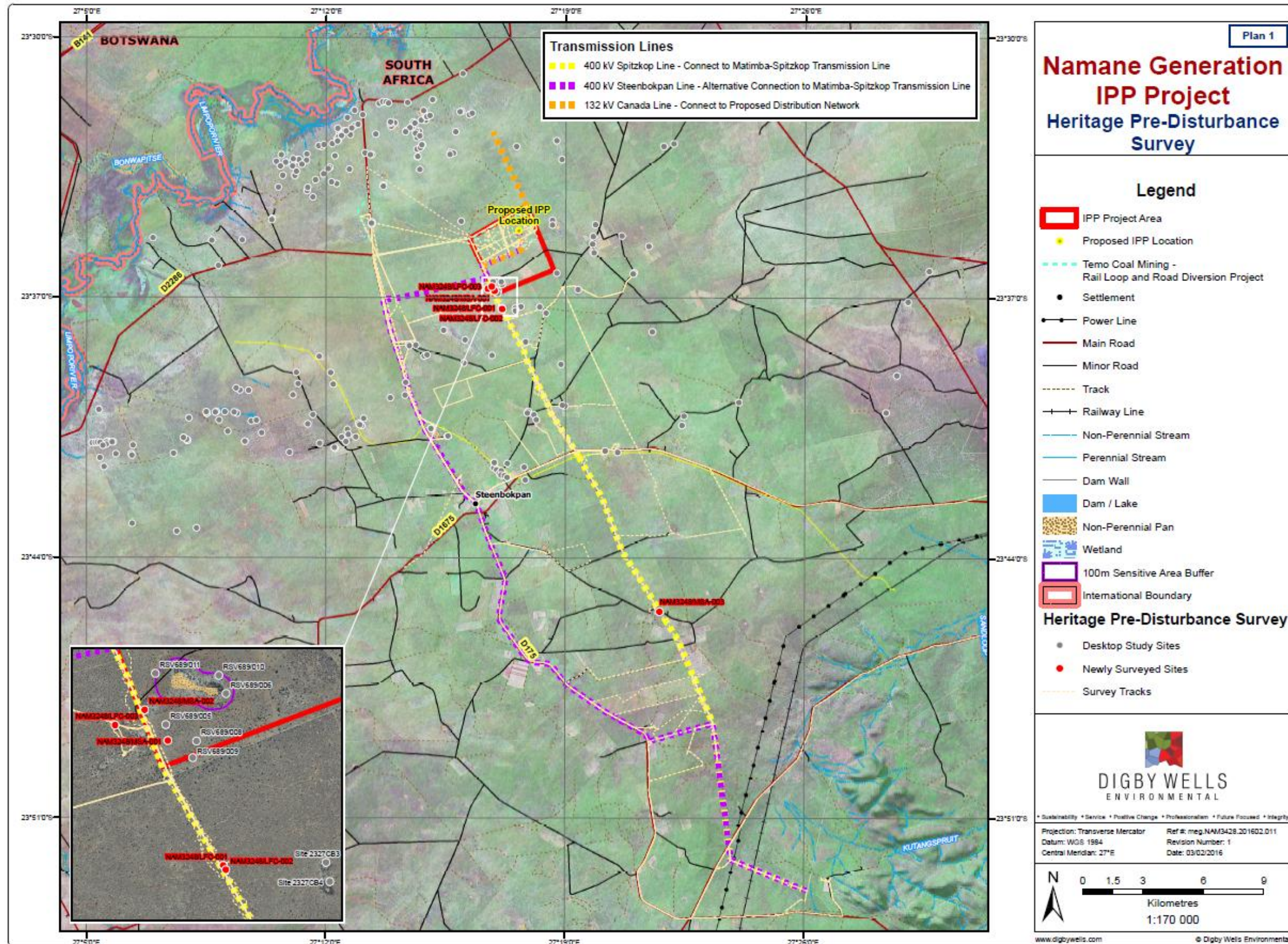
across the farms Duikerpan 249LQ and Twistpan 265IQ.

Identified material culture was identified on the surface, seemingly exposed through natural disturbance in the soil, i.e. animal burrows. The surface lithic accumulations appear to be associated with the MSA. No formal tools were identified. The identified ceramics sherds comprised of both undiagnostic and decorated pieces. The decorated pieces of ceramics included incised dashed motif separating bands of black and red, and punctates. Several pieces were recorded as having black burnish, both on the interior and exterior of the sherd.

The site is situated in a clearing of approximately 30 m x 50 m (1 500 m²), north of a pan on Twistpan 265IQ. The area is sparsely vegetated and has a surface visibility of OP 1. Based on the source of the material cultural remains, it is likely that sub-surface deposit exists.



Figure 6-11: A – Identified lithic accumulation. B – Identified LFC ceramics. C – Site LFC-003. Note the OP 1



Plan 1: Heritage pre-disturbance survey



7 Sensitivity Analysis and Consideration of Alternatives

No alternatives for the location of the proposed IPP Power Plant were considered. The reasoning for this is twofold:

- Duikerpan 249LQ is situated directly adjacent to the Temo Coal Mine; and
- The northern portion of Duikerpan 249LQ is the only land available to site the power plant and associated infrastructure without sterilisation of the coal resource.

The suitability of this location is, however, considered relative to the cultural landscape in this section of the assessment.

Namane has considered ash disposal and dump alternatives as part of the environmental authorisation process. For ash disposal, Namane intends to dispose of the ash on a permanent ash dump. Alternatives to this method of disposal include:

- In pit ash disposal into the open pit of the Temo Coal Mine; and
- The sale of fly ash for the use in concrete mix as a pozzolan.

For the preferred option of establishing a permanent ash dump, Namane will require an area of 120 ha for the facility. At present, two potential sites have been identified, both located on Duikerpan 249LQ. Both of these alternatives were subject to the pre-disturbance survey undertaken as part of the heritage assessment.

Three transmission line routing options, as presented under Section 1.2 above, have been considered as part of this assessment. These include two alternatives for the proposed 400 kV line, and one 132 kV line. Only the Spitzkop transmission line was subjected to a pre-disturbance survey, the remaining options were assessed at a desktop level.

Namane proposed to utilise the 132 kV transmission line (*Canada Line – orange line*), which will connect directly to a planned 132 kV line to the north of the IPP development footprint, or one of the 400 kV line alternatives (*Spitzkop Line – yellow line, and Steenbokpan Line – purple line*). No alternatives have been considered for the 132 kV line as this will be the most direct route for the connection to the planned transmission line. This is however, not considered further in this assessment as the proposed connection point has yet to be established. The Spitzkop Line is the most direct route to connect to the existing line, at a length of approximate 39.7 km. From a cost and technical perspective, this is Namane's preferred option.

The Steenbokpan Line is a longer route, with a length of approximately 50.6 km. It is proposed to construct the majority of the 400 kV transmission line of the Steenbokpan Line within or adjacent to an existing servitude.

The suitability of the proposed siting of infrastructures was subjected to a multi-criteria decision analysis utilising a simple linear additive evaluation model. In this instance, the suitability was considered against the following criteria:



- The level of existing anthropogenic disturbance of the development footprint of the various development footprint that will reduce the likelihood of identifying in situ heritage resources;
- Potential for occurrence of unidentified heritage resources, both on the surface and at sub-surface levels, in the development footprint that may be impacted upon;
- If heritage resources occur within or in proximity to the development footprint and may be impacted upon; and
- The potential that permitting requirements may be applicable if EA of the development footprint is approved.

These criteria were rated on a scale from 1 (unsuitable) to 5 (most suitable) to quantifiably compare the suitability of the various infrastructure sitings. Once the ratings were determined against the criteria above, these were calculated to determine the overall suitability ranking of the proposed infrastructures. The results of this assessment are presented in Table 7-1 and described in the narrative below.

Table 7-1: Consideration of alternatives against various criteria

Alternatives	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Total %	Rank	
IPP development footprint	1	1	5	4	60%	3	Negligible / Insignificant
Northern ash dump	1	1	5	4	60%	3	Negligible / Insignificant
Southern ash dump	1	1	5	4	60%	3	Negligible / Insignificant
Spitzkop Transmission line	1	1	3	2	40%	2	Less suitable
Steenbokpan Transmission line	5	4	4	2	80%	4	Suitable

Table 7-2: Rating definitions

Rating	
Score	Definition
5	Most suitable
4	Suitable
3	Negligible / insignificant
2	Less suitable
1	Unsuitable



The proposed development footprint of the IPP has very little to no evidence of anthropogenic disturbance. Based on our understanding of the soil conditions of this site specific study area, with specific reference to the regic sands as described in 6.2.1 above, there is a high likelihood that archaeological resources occur at sub-surface levels. Taking this understanding into consideration against the defined criteria, the siting of the IPP development footprint was deemed to have a negligible ranking based on the following:

- The proposed siting has no evidence of anthropogenic disturbance, therefore from an archaeological perspective the siting option is pristine and the likelihood of *in situ* archaeological material to occur at sub-surface levels is greater, rendering the site unsuitable against criteria 1 and 2;
- No heritage resources were identified within the development footprint at surface levels. This does not however, negate point 1 above. Based on the results of the pre-disturbance survey against criterion 3, the siting was rated as most suitable;
- Based on the results of the pre-disturbance survey, no permitting requirements are envisaged for the proposed siting of the IPP infrastructure. Therefore, against criterion 4, the siting option was deemed suitable.

The same consideration was given to the proposed 400 kV transmission line routings against the defined criteria. A comparison of this assessment is presented in Table 9-1 below:

Table 7-3: Comparison of Spitzkop and Steenbokpan 400 kV transmission line

Criteria	Spitzkop Line	Steenbokpan Line
1	<p>Unsuitable.</p> <p>While anthropogenic disturbance has been recorded, this has been limited to minimal disturbance of the regic sands through the development of farm roads and fencing.</p>	<p>Most suitable</p> <p>Greater anthropogenic disturbance in the establishment of existing servitudes is expected. These would have impacted beyond the archaeologically sterile layer of regic sands.</p>
2	<p>Unsuitable</p> <p>The potential for <i>in situ</i> sub-surface archaeological resources is greater.</p>	<p>Suitable</p> <p>It is assumed that the existing servitudes would have been subjected to a previous assessment where heritage resources would have been identified, and the appropriate mitigation measures implemented. This will reduce the potential of impacting upon previously unidentified heritage resources.</p>



Criteria	Spitzkop Line	Steenbokpan Line
3.	Negligible The Spitzkop Line was subject to a pre-disturbance survey where few heritage resources were identified. Appropriate mitigation measures have been recommended within this report to mitigate potential negative impacts.	Suitable As above, previously identified heritage resources should have been mitigated prior to the establishment of the servitude.
4.	Less suitable Permitting requirements may be required in the event of accidental exposure of previously unidentified heritage resources	Less suitable Permitting requirements may be required in the event of accidental exposure of previously unidentified heritage resources

Based on this analysis the Steenbokpan Line is the more suitable routing from a heritage perspective.

The final alternative consideration for the proposed IPP Power Plant is the 'no-go' option, where the Power Plant and associated infrastructure is not built, and the current *status quo* remains intact. At this stage, however, the benefits of the proposed development, including the practical use of lower bench coal, that would otherwise be discarded, for electricity production into the national grid, and the potential economic development, outweigh the maintenance of the current *status quo*.

8 Heritage Impact Assessment

8.1 Cultural Significance

The CS assigned to the identified heritage resources as presented in Section 6.3.1 considered the criteria defined in Box 1 above, specifically aesthetic, historic and scientific criteria. The assessment of the CS of the resources and the assigned designations assist in providing recommendations for the appropriate mitigation and management measures in accordance with the published SAHRA minimum standards.

The assessment of CS indicated that the identified heritage resources designation range from low to medium significance. The assessment is summarised in Table 8-1.

Table 8-1: CS assessment of identified heritage resources

Resource ID	Type	CS	CS Motivation	Field Rating	Field Rating Motivation
MSA-001 & MSA-002	Stone Age site	Low	The site contains MSA accumulations that demonstrate the characteristics principles in lithic production. While flakes were identified as surface scatters, these appear to have originated from the ferricrete outcrop, therefore there is potential to identify in situ accumulations. Where in situ accumulations occur within the ferricrete, the fabric will be well preserved with greater information potential.	General Protection IV B	The lithics represent a MSA site that is generally protected under section 35 of the NHRA
MSA-003	Stone Age site	Low	The site contains MSA accumulations that demonstrate the characteristics principles in lithic production. While flakes were identified as surface scatters, these appear to have originated from the ferricrete outcrop, therefore there is potential to identify in situ accumulations. Where in situ accumulations occur within the ferricrete, the fabric will be well preserved with greater information potential.	General Protection IV B	The lithics represent a MSA site that is generally protected under section 35 of the NHRA

Resource ID	Type	CS	CS Motivation	Field Rating	Field Rating Motivation
LFC-001 & LFC-002	Farming Community	Low	The site constitutes a low density scatter of potsherds that demonstrates principle characteristics in potsherd decorative motif and possibly settlement organisation. This site has the potential to yield scientific information about the historic settlement of the area / region that can contribute to the understanding of where settlements occur, why these areas were settled, and provide scientific information that is not available for the region. The site has limited encroachment, and as the majority of artefacts occur at natural disturbances, it suggests that the fabric of the sub-surface remains will be intact.	General Protection IV B	The ceramics provide evidence for LFC occupation and are generally protected under section 35 of the NHRA
LFC-003	Farming Community	Medium	The site contains both MSA and LFC artefacts that demonstrate the principle characteristics of each period. This is a rare / uncommon sites within the region as the majority of identified sites have been described as isolated scatters. This site has the potential to yield information about the historic settlement of the area / region that can contribute to the understanding of where settlements occur, why these areas were settled, and provide scientific information that is not available for the region. The site has had limited encroachment, and as the majority of artefacts occur at natural disturbances, it suggests that the fabric of the sub-surface remains will be intact.	General Protection IV A	The ceramics provide evidence for LFC occupation and are generally protected under section 35 of the NHRA



8.2 Activities Assessed

The activities considered as part of this assessment related to the Listed Activities as per GN R 983 Listing Notice 1 and GN R 984 Listing Notice 2 of the EIA Regulations, 2014, are presented in Table 2-1. The specific activities with relevance to the HIA are summarised and presented in Table 8-2.

Table 8-2: Activities relevant to the HIA

Activity	Relevance to the HIA
Construction Phase	
Site clearing (removal of vegetation)	Potential direct impacts to identified and unidentified heritage resources protected under Section 34 – 37 of the NHRA
Topsoil removal and stockpiling	Potential direct impacts to identified and unidentified heritage resources protected under Section 34 – 37 of the NHRA
Construction of access roads	Potential direct impacts to identified and unidentified heritage resources protected under Section 34 – 37 of the NHRA
Increased vehicular activity on access roads (D175)	Increased risk of damage to heritage resources protected under Section 34 – 37 of the NHRA
Construction of IPP infrastructure, including associated infrastructure and coal stock yard	Potential direct impacts to identified and unidentified heritage resources protected under Section 34 – 37 of the NHRA
Construction of ash dump	Potential direct impacts to identified and unidentified heritage resources protected under Section 34 – 37 of the NHRA
Construction of ponds: effluent pond and coal pile runoff pond and ash dump runoff ponds	Potential direct impacts to identified and unidentified heritage resources protected under Section 34 – 37 of the NHRA
Identification and establishment of transmission line construction camps	Potential direct impacts to identified and unidentified heritage resources protected under Section 34 – 37 of the NHRA
Servitude removal of vegetation exceeding the clearance height	Potential direct impacts to identified and unidentified heritage resources protected under Section 34 – 37 of the NHRA
Excavation, filling and compacting pylon foundations	Potential direct impacts to identified and unidentified heritage resources protected under Section 34 – 37 of the NHRA



Activity	Relevance to the HIA
Decommissioning Phase	
Demolition of Power Plant and associated infrastructure	Possible permitting requirements for structures older than 60 years protected under Section 34 of the NHRA.

8.3 Impact Assessment

This section considers the potential direct impacts on identified heritage resources by the proposed Project, specifically by the Spitzkop transmission line. As stated under Section 6.3.1, no heritage resources were recorded in the proposed development footprint of the IPP Power Plant and Ash Dump options. Consideration of the potential impacts of this component of the Project is given under Sections 9 and 10 below.

The direct impacts of the Spitzkop transmission line routing are considered in relation to the project related activities presented under Sections 9 and 8.2 above.

8.3.1 Impact Description

Project activities that may have a direct negative impact on identified heritage resources are primarily confined within the construction phase of the project. These activities, as presented in Table 8-2, consist of:

- Site clearing;
- Topsoil removal;
- Vegetation removal; and
- Construction of infrastructures, i.e. construction camps, transmission line and associated pylons.

The activities will physically alter identified heritage resources within the proposed development footprint of the Spitzkop transmission line routing. These specifically include identified sites with a low CS, i.e. MSA-001, MSA-002, MSA-003; LFC-001 and LFC-002, and medium CS, i.e. LFC-003.

Although the archaeological site with a medium CS (LFC-003) occurs outside of the proposed Spitzkop transmission line routing, this site is considered to be a component of a larger pan system with sites clustered around it, through which the proposed transmission line is routed (Figure 8-1). At this stage, the inter-relationship between the individually identified heritage resources and the settlement around the pan system is unclear and would require further investigation. It is, however, certain that the activities described above will physically alter this complex, thereby producing a change in the *status quo* and reducing the physical integrity of the complex.

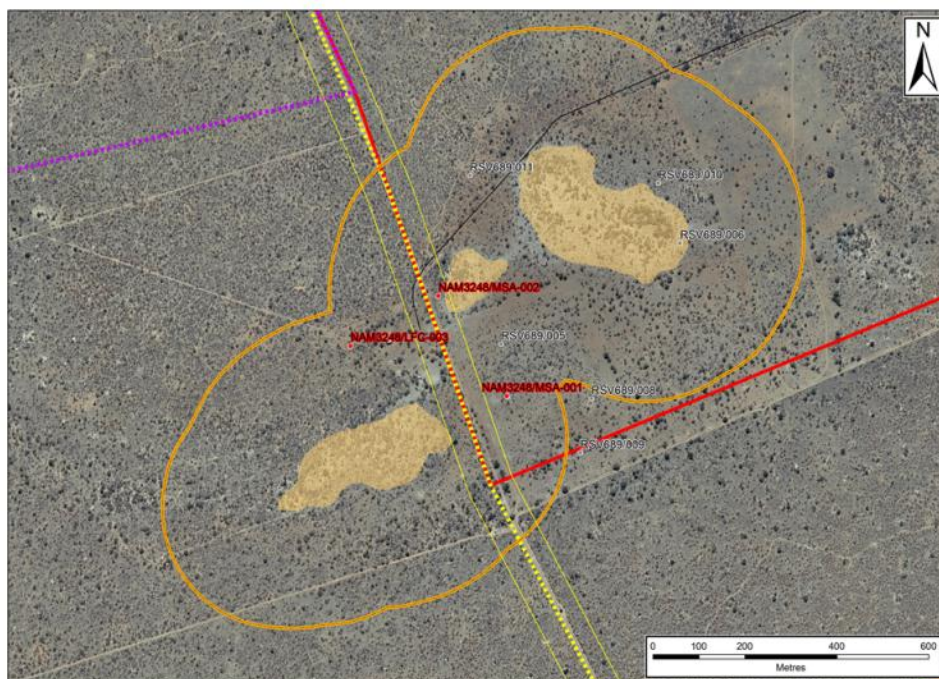


Figure 8-1: Pan Cluster of archaeological sites on Duikerpan 249LQ and Twistpan 265IQ

8.3.2 Management Objectives

The management objectives for the identified potential impacts to heritage resources are to firstly avoid through project related mitigation measures. Where this is not possible or feasible, heritage related mitigation measures should aim to reduce the severity of the negative impact, in accordance with the minimum level of mitigation as published in the SAHRA Minimum Standards⁵.

8.3.3 Management Actions and Targets

Management actions and targets are divided into:

- Project related mitigation; and
- Heritage related mitigation.

Project related mitigation can be accomplished through the consideration of the Steenbokpan transmission line routing as the preferred routing of the 400 kV transmission line. As demonstrated under Section 7 above, the Steenbokpan transmission line routing is the most suitable to avoid impacts to identified heritage resources.

⁵ It must be noted that these minimum standards serve as a guide, and the recommendations provided in this HIA are project specific.



Where project related mitigation is deemed unfeasible in relation to other environmental factors or impacts, heritage mitigation must be undertaken to reduce the intensity of the direct negative impacts to the identified heritage resources. These measures must be completed in accordance with the minimum level of mitigation as published in the SAHRA Minimum Standards. In this instance, for the sites with low CS, the sites must be recorded through detailed mapping and surface sampling with the relevant permits required under Section 35 of the NHRA. LFC-003 and the greater pan system cluster of sites must be mitigated through detailed mapping, surface sampling and STPs with the relevant permits required under Section 35 of the NHRA.

Heritage mitigation measures will reduce the intensity of the direct negative impacts on the identified heritage resources through preserving the sites through record. This form of preservation will result in a minor – moderately beneficial consequence as the information gathered from these measures will be available to the public and greater academic community, as well as contribute to the scientific information of a region that is largely under-researched.

8.3.4 Impact Ratings

This section summarises the impact assessment as discussed under headings 8.3.1 through 8.3.3. The impact assessment for direct impacts to heritage resources with low CS and medium CS are presented in Table 8-3 and Table 8-4 respectively.

Table 8-3: Summary of direct impacts to archaeological sites with low CS

IMPACT DESCRIPTION: Direct impact to archaeological sites with low significance				
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Permanent (7)	Unmitigated changes to archaeological sites will result in a permanent loss of information and destruction of the sites	Consequence: Moderately detrimental (-12)	Significance: Moderate - negative (-84)
Extent	Municipal Area (4)	Changes would manifest as local heritage impacts in a region where the archaeological record is relatively unknown or under researched		
Intensity x type of impact	Very low - negative (-1)	Given the low CS of the individual heritage resources, the intensity of the impact will be very low		



IMPACT DESCRIPTION: Direct impact to archaeological sites with low significance				
Dimension	Rating	Motivation		
Probability	Certain (7)	If the recommended mitigation plans are not implemented, changes to the status quo of the identified sites will occur and degrade the integrity and information potential		
MITIGATION				
It is recommended that the following mitigation measure be considered: - Utilise the Steenbokpan transmission line routing to avoid all negative direct impacts to the identified heritage resources; and - Where alternate routing is not feasible, the archaeological sites must be mitigated relevant to the SAHRA minimum standards, which includes recording the sites through detailed mapping and surface sampling with the necessary permits required under Section 35 of the NHRA.				
POST-MITIGATION				
Duration	Permanent (7)	Heritage related mitigation will result in a permanent change to the status quo of the archaeological sites	Consequence: Slightly beneficial (9)	Significance: Minor - positive (54)
Extent	Very limited (1)	Impacts will be limited to components of the archaeological sites		
Intensity x type of impact	Very low - positive (1)	Mitigation measures will ensure the preservation of information through record that can be accessible to the public and contribute to the greater academic community		
Probability	Highly probable (6)	With the implementation of the recommended mitigation measures, it is highly probable that the impacts to the archaeological sites will be either avoided or the intensity of the negative impact will be reduced		

**Table 8-4: Summary of direct impacts to archaeological sites with medium CS**

IMPACT DESCRIPTION: Direct impact to archaeological sites with medium significance				
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Permanent (7)	Unmitigated changes to archaeological sites will result in a permanent loss of information and destruction of the sites	Consequence: Moderately detrimental (-13)	Significance: Moderate - negative (-91)
Extent	Municipal Area (4)	Changes would manifest as local heritage impacts in a region where the archaeological record is relatively unknown or under researched		
Intensity x type of impact	Low - negative (-2)	Given the medium CS of the individual heritage resource, the intensity of the impact will be low		
Probability	Certain (7)	If the recommended mitigation plans are not implemented, changes to the status quo of the identified sites will occur and degrade the integrity and information potential		
MITIGATION:				
It is recommended that the following mitigation measure be considered: <ul style="list-style-type: none"> - Utilise the Steenbokpan transmission line routing to avoid all negative direct impacts to the identified heritage resources; - Where alternate routing is not feasible, the archaeological sites must be mitigated relevant to the SAHRA minimum standards, which includes recording the sites through detailed mapping, surface sampling and STPs with the necessary permits required under Section 35 of the NHRA 				
POST-MITIGATION				
Duration	Permanent (7)	Heritage related mitigation will result in a permanent change to the status quo of the archaeological sites	Consequence: Moderately beneficial (10)	Significance: Minor - positive (60)
Extent	Very limited (1)	Impacts will be limited to components of the archaeological sites		



IMPACT DESCRIPTION: Direct impact to archaeological sites with medium significance				
Dimension	Rating	Motivation		
Intensity x type of impact	Low - positive (2)	Mitigation measures will ensure the preservation of information through record that can be accessible to the public and contribute to greater academic community		
Probability	Highly probable (6)	With the implementation of the recommended mitigation measures, it is highly probable that the impacts to the archaeological sites will be either avoided or the intensity of the negative impact will be reduced		

9 Cumulative Impacts on the Cultural Landscape

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

To gauge the potential cumulative impacts on heritage resources effectively, one must consider the cultural landscape as a whole, as well as the number of existing and proposed developments within that landscape. The proposed IPP Power Plant and associated infrastructure does not occur in isolation from its surrounds, and these must be taken into account. Plan 2 illustrates that the dominant development plan for the local study area is focussed on mining and potential large industrial and related activities development (Zone 4 and 5 respectively), with a large number of proposed developments within this sector. No provision is made for the protection of the natural and cultural landscape (Zone 1) within this development corridor.

This proposed spatial development plan will increase the potential of cumulative impacts on the greater cultural landscape of the local study area. The identified potential cumulative impacts are discussed in the narrative below and summarised in Table 9-1.

The proposed IPP Power Plant and associated infrastructure, in conjunction with other existing and planned developments in the local study area will have additive and space-crowding cumulative impacts. This will entail the sum of all the effects and the high spatial



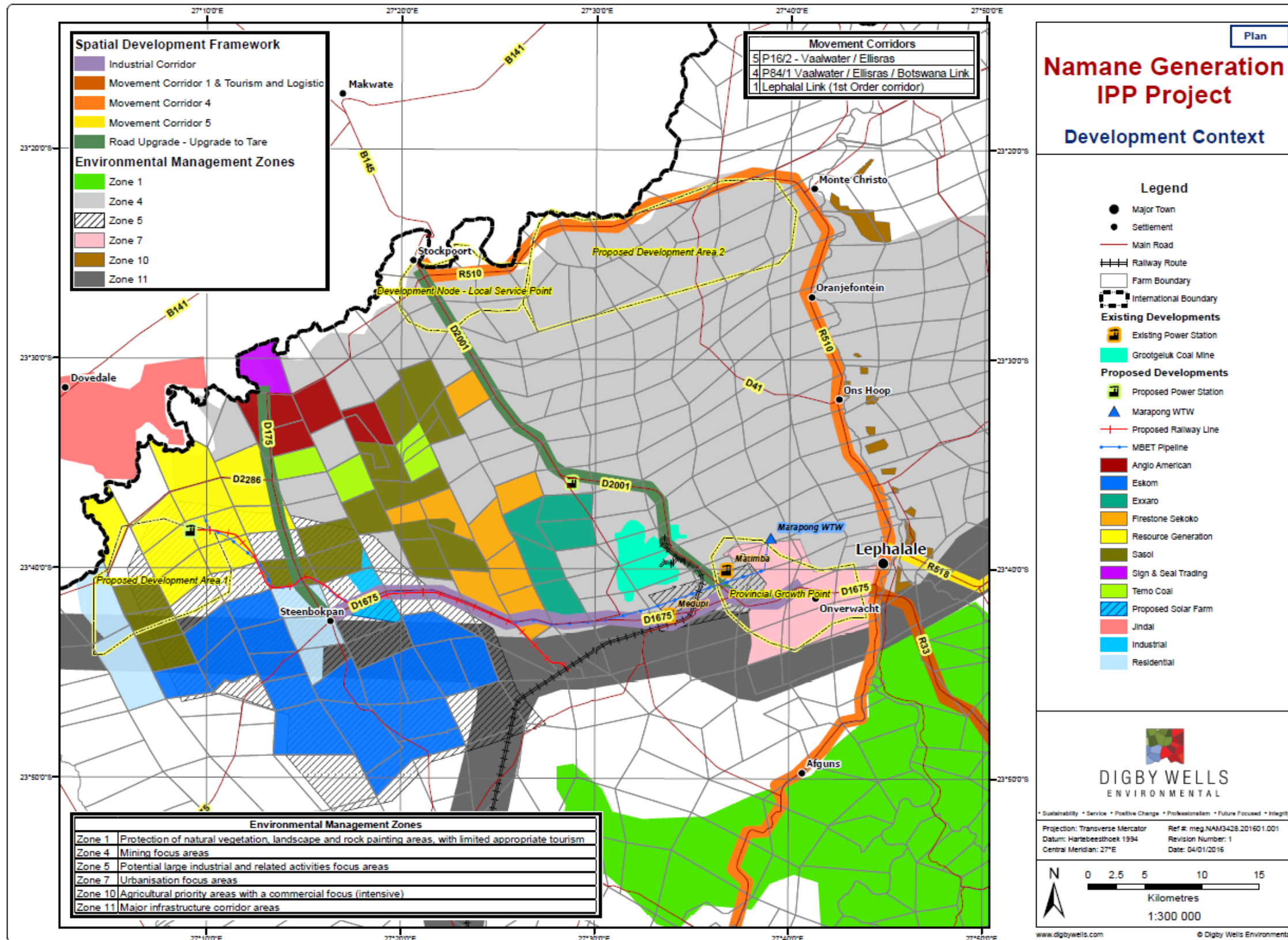
density of impacts on heritage resources resulting in negative cumulative impacts. This may include:

- Change to the sense-of-place from an archaeological landscape to an industrial landscape;
- Industrialisation that may promote the increase of informal settlements or urban sprawl that will encroach on the archaeological element of the cultural landscape; and
- Sterilisation of the land where tangible heritage such as archaeological sites are destroyed and consequently the integrity of intangible heritage is degraded.

Synergistic cumulative impacts were also identified. These impacts are categorised as the interaction of individual effects to produce a total effect greater than the sum of the individual effect. In this instance, the damage or destruction of heritage resources within the landscape will increase the CS of those resources that remain undisturbed and *in situ* regardless of integrity.

Table 9-1: Summary of potential cumulative impacts

Type	Cumulative Impact	Direction of Change	Extent of Impact
Additive Space crowding	Change to the sense-of-place of the cultural landscape	Negative	Local
Additive Space crowding	Increased industrialisation and potential urban sprawl that may encroach on the archaeological landscape	Negative	Local
Additive Space crowding Synergistic	Sterilisation of tangible heritage resources and consequently the possible effect on the integrity of the local intangible heritage, i.e. early history of the Sotho-Tswana	Negative	Local
Additive Synergistic	Increased significance of remaining <i>in situ</i> archaeological sites and accumulations regardless of integrity	Negative	Site specific and local



Plan 2: Current and planned operations within the greater local study area



10 Unplanned Events and Low Risks

Certain project activities may represent low risks to heritage resources or cause unplanned events. Low risks, where identified, can be monitored to gauge if the baseline changes and mitigation is required. Unplanned events are events that can occur on any project and cannot be monitored, but can, however, be planned for to reduce the severity of potential impacts if and where they occur.

Information on the potential impacts of these events and management plans are summarised in Table 10-1:

Table 10-1: Summary of potential unplanned events, potential impacts, and proposed mitigation and management

Unplanned event	Potential impact	Mitigation / Management / Monitoring
Accidental exposure of <i>in situ</i> MSA and LSA accumulations during the construction of the Project	Damage or destruction of heritage resources generally protected under section 35 of the NHRA	Project specific Chance Find Protocols (CFPs) must be developed and included in the EMP as a condition of authorisation. The CFPs must clearly describe the type of heritage resources that may occur within the site specific project area, the protocol to follow in the event of accidental exposure of previously unidentified heritage resources, and the appropriate management measures and reporting structures to be adhered to. The CFPs must be defined and established prior to the pre-construction phase of the proposed IPP Power Plant and associated infrastructure
Accidental exposure of <i>in situ</i> LFC settlement sites during the construction phase of the Project		
Accidental exposure of human remains during the construction phase of the Project	Damage or destruction of heritage resources generally protected under section 36 of the NHRA	

11 Heritage Impacts vs. Sustainable Socio-Economic Benefits

11.1 Coal Baseload IPP Procurement Programme

The main feature of the Coal Baseload IPP Procurement Programme is to facilitate the participation of independent power producers in the baseload power generation capacity industry in South Africa which will provide, amongst others increased energy security and contribute towards socio-economic and sustainable growth objectives of the country. The driving force behind the Programme is the procurement of capacity and energy at highly competitive levels that can filter to the consumer and facilitate growth objectives.

The benefits from the Coal Based IPP Procurement Programme and the potential electricity supply into the national grid arguably outweigh the potential heritage impacts, low risks and unplanned events identified. This is further supported when the potential economic growth for the country, through increased electricity supply and investment, is taken into consideration.

11.2 Socio-Economic Baseline Conditions

The socio-economic baseline, as presented under Section 6.1.3 above, indicates that the Waterberg Coalfields are recognised as a future growth point. This sentiment is repeated in the number of proposed developments in the local study area, and Zone 4 and 5 of the Spatial Development Plan (SDP) illustrated in Plan 2.

Demographically almost two thirds of the working age population were not economically active in 2010. Specifically, the LLM has an unemployment rate of 23%. To address in part unemployment amongst the local community, the proposed Project could result in several economic benefits through either direct employment or multiplier effects that result from capital expenditure. During the construction phase, it is envisaged that approximate 3 000 individuals will be employed, this will, however, decrease to roughly 200 during operation. Nonetheless, an injection of cash into the local economy for both the formal and informal retail and services sector may benefit individuals through indirect employment as a result of the Project.

The socio-economic benefits that may derive from the proposed Project are greater than the significance of the potential heritage impacts. This assumption is based on the following reasoning:

- Heritage resources identified within 100 – 500 m of the development footprint are not unique and comprise of low density or isolated surface scatters; and
- The remaining identified heritage resources occur outside of 500 m from the development footprint and it is unlikely that these will be impacted upon.

12 Environmental Management Plan

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

The key objectives of EMPs are to give S.M.A.R.T.⁶ 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 EIA;

⁶ S.M.A.R.T refers to specific, measurable, attainable, realistic and timely mitigation measures.



- 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 Cycle⁷;
- Gauge if predicted benefits of the project are being achieved and maximized; and
- Gain information for improving similar projects and EIA practice in the future.

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

12.1 Project Activities with Potentially Significant Heritage Impacts

A summary of potentially significant impacts to heritage resources in reference to project activities is summarised in Table 12-1.

Table 12-1: Potentially significant heritage impacts of the proposed Project

Activity: Site clearing, topsoil removal and construction of infrastructure		
Aspects	Issue	Potential Impact
IPP and ash dump options development footprint	None identified	-
Spitzkop transmission line routing	Physical alteration of the surface and sub-surface strata	Potential direct negative impact to identified heritage resources protected under Section 35 of the NHRA.

12.2 Summary of Mitigation and Management

Table 12-2 to Table 12-5 provides a summary of the proposed project activities, environmental aspects and impacts on the receiving environment. Information on the frequency of mitigation, relevant legal requirements, recommended management plans, and timing of implementation of the EMP is also summarised.

⁷ 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: Analyse the results using statistical methods

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

Table 12-2: Project Activities Requiring Management

Activities	Phase	Size and Scale of Disturbance	Potential Impact	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Site clearing, topsoil removal and construction of infrastructures	Construction	IPP Power Plant – 200 ha Ash dump – 160 ha Spitzkop: 400 kV Transmission Line - 39.7 km	Physical alteration to archaeological sites	Avoid direct impacts through consideration of Steenbokpan: 400 kV transmission line as the preferred routing. Reduce the intensity of direct negative impacts through mitigation relevant to the SAHRA minimum standards, which includes recording the sites through detailed mapping, surface sampling and STPs with the necessary permits required under Section 35 of the NHRA	Compliance with the section 35 of the NHRA and Chapter IV of the Regulations to the Act (GNR 548).	Prior to the construction phase

Table 12-3: Potential Impacts and Outcomes of the EMPr

Activities	Potential Impacts	Phase	Mitigation	Standard to be Achieved/Objective
Site clearing, topsoil removal and construction of infrastructures	Physical alteration to archaeological sites	Construction	Avoid direct impacts through consideration of Steenbokpan: 400 kV transmission line as the preferred routing. Reduce the intensity of direct negative impacts through mitigation relevant to the SAHRA minimum standards, which includes recording the sites through detailed mapping, surface sampling STPs with the necessary permits required under Section 35 of the NHRA	Compliance with the section 35 of the NHRA and Chapter IV of the Regulations to the Act (GNR 548).

Table 12-4: Proposed Mitigation and Management Measures

Activities	Potential Impacts	Aspects Affected	Mitigation Type	Time Period for Implementation	Compliance with Standards
Site clearing, topsoil removal and construction of infrastructures	Physical alteration to archaeological sites	Heritage	Avoid direct impacts through consideration of Steenbokpan: 400 kV transmission line as the preferred routing. Reduce the intensity of direct negative impacts through mitigation relevant to the SAHRA minimum standards, which includes recording the sites through detailed mapping, surface sampling and STPs with the necessary permits required under Section 35 of the NHRA	Prior to the construction phase	Compliance with the section 35 of the NHRA and Chapter IV of the Regulations to the Act (GNR 548).

Table 12-5: Prescribed Environmental Management Standards, Practice, Guideline, Policy or Law

Applicable Standard, Practice, Guideline, Policy or Law		
Title	Description of Requirements	Relevance to Project
Legislation (National, Provincial, Local)		
The National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Heritage resources within the Project development footprint are protected under section 35 of the NHRA, and may not be impacted upon without the approval and necessary permits issued by SAHRA	Heritage resources protected under Section 35 have been identified within the site specific study area.
Regulations to the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (GN R 548)	Provisions for permit applications are regulated under Chapter II of GN R 548. Furthermore, applications for heritage resources protected under Section 35 of the NHRA are regulated by Chapters IV.	Mitigation of archaeological sites is a permitted activity regulated by GN R 548. These activities must be cognisant of and adhere to the regulations to ensure compliance with the legislative framework.
Applicable Guideline/Standards		
SAHRA Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports	The guidelines provide the minimum standards for recommended mitigation under Section 7(1)(L)(d).	Specialist recommendations were considered against the minimum standards provided.



12.3 Monitoring Programme

Project specific CFPs must be developed for the Project. The purpose of the CFPs is to establish procedures that aim to minimise damage and destruction to any heritage resources that may be accidentally exposed during the course of development activities.

The CFPs must clearly describe the type of heritage resources that may occur within the site specific project area, the protocol to follow in the event of accidental exposure of previously unidentified heritage resources, and the appropriate management measures and reporting structures to be adhered to. The CFP at a minimum should include the following:

- Definitions as defined by Section 2 and 38(1) of the NHRA;
- Proactive archaeological monitoring procedures;
- Procedures that detail the following:
 - How to spot a chance find;
 - Steps to be undertaken when a chance find is made;
 - Internal reporting structures;
 - Recording of chance finds; and
 - Legal processes and requirements.

The CFPs must be defined and established as a condition of authorisation prior to the pre-construction phase of the proposed IPP Power Plant and associated infrastructure.

13 Consultation

Consultation was undertaken as part of the regulated Stakeholder Engagement Process (SEP). Table 13-1 summarises the activities completed as part of this process.

Table 13-1: Summary of SEP undertaken during the Scoping Phase

Activity	Details
Identification of stakeholders	A stakeholder database was developed which includes I&APs from various sectors of society, including directly affected and adjacent landowners, in and around the proposed project area.
Distribution of announcement letter and BID	A BID, announcement letter with Registration and Comment Form was emailed and posted to stakeholders on Tuesday, 3 November 2015.
Placing of newspaper advertisement	An English advert was placed in the Mogol Post on Friday, 6 November 2015.



Activity	Details
Putting up of site notices	<p>English site notices were put up at the proposed project site, local libraries and municipal offices on Thursday, 5 November 2015 at:</p> <ul style="list-style-type: none"> ▪ Lesedi Village, Steenbokpan; and ▪ Lephalale Local Municipality Public Library. <p>A site notice placement map and report were also developed to indicate geographically the various site notice locations.</p>
Announcement of Scoping Report	<p>Announcement of availability of the Scoping Report was emailed and posted to stakeholders together with the formal project announcement on Tuesday, 3 November 2015. Copies of the Scoping Report are available at:</p> <ul style="list-style-type: none"> ▪ Lesedi Village, Steenbokpan; and ▪ Lephalale Local Municipality Public Library. <p>The Scoping Report is also available on www.digbywells.com and will be made available the Public Meeting.</p> <p><i>(30-day comment period for the Scoping Report: Friday, 13 November to Monday, 14 December 2015)</i></p>
Stakeholder Meeting	<p>A Public Meeting was undertaken as follows:</p> <p>Mogol Club (Cnr George Wells and Nelson Mandela Drive, Onverwacht) on Friday, 27 November 2015 from 10:00 – 12:00.</p>
Announcement of finalised Scoping Report	<p>Announcement of availability of the finalised Scoping Report were emailed and posted to stakeholders together with a Comment Sheet and will be available on www.digbywells.com (Public Documents).</p>
Obtained comments from stakeholders	<p>Comments, issues of concern and suggestions received from stakeholders were captured in the Comments and Responses Report (CRR).</p>

14 Comments and Response

Two comments in relation to heritage were recorded as part of the SEP undertaken during the Scoping Phase of the Project. The comments and responses were recorded and presented in the CRR, and a summary is presented below in Table 14-1.



Table 14-1: Summary of comments and responses in relation to the heritage assessment

Name of individual	Consulted	Date	Issue raised	Response
SDJ De Villiers	Written comment	11 Nov 15	There is no water, heritage sites, rare plants or animals	Thank you for your comment. An HIA was undertaken of the development footprint, where heritage sites were identified (See Section 6). These sites comprise archaeological sites ranging from the Stone Age to LFC periods. The potential impacts to these resources were identified and assessed where appropriate mitigation measures recommended (See Section 8). These included <i>in situ</i> preservation or detailed recording.
Wim Moritz Biemond	Written comment	13 Dec 15	The Limpopo River, more than 100 archaeological and heritage sites and many rare plants and animals, which is on the farm Basinghall 31LQ in the Tuli Block, Botswana.	As part of the process, an HIA was undertaken that considered the greater cultural and archaeological landscape. The results of the HIA considered primarily the impacts to identified heritage resources within the proposed development footprint, but also took cognisance of the cumulative impacts to the landscape under Section 0 above.



15 Conclusion

Digby Wells undertook an HIA as part of the environmental authorisation process of the Project to promote compliance with Section 38(8) of the NHRA. This assessment considered the baseline cultural landscape at local, site specific and development footprint study area level to define the cultural landscape and identify any tangible heritage resources that may be impacted upon by the proposed Project.

A total of 270 heritage resources were identified within the local study area ranging from the MSA through to the historical period (Table 15-1). The identification of these resources, supported by the baseline environment described under Section 6 above, indicated that the Project is situated in a cultural landscape that is sensitive.

Table 15-1: Identified heritage resources within the local study area

Heritage Resource Type	Number Identified
Archaeological - EFC	2
Archaeological - LFC	97
Archaeological - MSA	103
Archaeological - LSA	3
Burial Grounds & Graves	27
Historical Built Environment	38
Grand Total	270

Of these identified heritage resources, 39 occur within the site specific study area of the development footprint of the IPP Power Plant and Spitzkop transmission line routing, six of which are in proximity to or within the development footprint and buffer of the Spitzkop transmission line routing and may be directly impacted upon. No heritage resources were identified within the development footprint of the IPP Power Plant.

The six identified sites that may be subject to direct impacts comprise of the following:

Table 15-2: Identified heritage resources that may be subject to direct impacts

Heritage Resources Type	Total
Archaeological - MSA	3
Artefact: Isolated surface	1
Artefact: Low density surface scatter, <10:1m ²	1
Site: medium complexity, multiple components >25m ² / 5 x 5m to <2500m ² / 50 x 50m	1
Archaeological - LFC	3
Artefact: Isolated surface	1



Artefact: Low density surface scatter, <math><10:1\text{m}^2</math>	1
Site: medium complexity, multiple components >25m ² / 5 x 5m to <math><2500\text{m}^2 / 50 \times 50\text{m}</math>	1
Grand Total	6

Project related activities that will be undertaken during the construction phase of the Project will physically alter the surface and sub-surface strata that may have a direct impact on the identified sites. These may manifest as damage to or destruction of archaeological remains that will degrade the integrity of the site and reduce the scientific information potential that can contribute to the understanding of the greater cultural landscape.

The recommended management actions and targets are divided into:

- Project related mitigation; and
- Heritage related mitigation.

Project related mitigation can be accomplished through the consideration of the Steenbokpan transmission line routing as the preferred routing of the 400 kV transmission line. As demonstrated under Section 7 above, the Steenbokpan transmission line routing is the most suitable to avoid impacts to identified heritage resources.

Where project related mitigation is deemed unfeasible in relation to other environmental factors or impacts, heritage mitigation must be undertaken to reduce the intensity of the direct negative impacts to the identified heritage resources. These measures must be completed in accordance with the minimum level of mitigation as published in the SAHRA Minimum Standards. In this instance, for the sites with low CS, the sites must be recorded through detailed mapping and surface sampling with the relevant permits required under Section 35 of the NHRA. LFC-003 and the greater pan system cluster of sites must be mitigated through detailed mapping, surface sampling and STPs with the relevant permits required under Section 35 of the NHRA.

Heritage mitigation measures will reduce the intensity of the direct negative impacts on the identified heritage resources through preserving the sites through record. This form of preservation will result in a minor – moderately beneficial consequence as the information gathered from these measures will be available to the public and greater academic community, as well as contribute to the scientific information of a region that is largely under-researched.

Furthermore, project specific CFPs must be developed for the Project. The purpose of the CFPs is to establish procedures that aim to minimise damage and destruction to any heritage resources that may be accidentally exposed during the course of development activities.

The CFPs must clearly describe the type of heritage resources that may occur within the site specific project area, the protocol to follow in the event of accidental exposure of previously

unidentified heritage resources, and the appropriate management measures and reporting structures to be adhered to. The CFP at a minimum should include the following:

- Definitions as defined by Section 2 and 38(1) of the NHRA;
- Proactive archaeological monitoring procedures;
- Procedures that detail the following:
 - How to spot a chance find;
 - Steps to be undertaken when a chance find is made;
 - Internal reporting structures;
 - Recording of chance finds; and
 - Legal processes and requirements.

The CFPs must be defined and established as a condition of authorisation prior to the pre-construction phase of the proposed IPP Power Plant and associated infrastructure.



16 References

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- Huffman, T. & van der Walt, J., 2011. A Field Study Prepared for Environmental Resources Management, Sasol Technology, SRK Consulting and Sustainable Environmental Solutions, Johannesburg: Archaeological Resources Management.
- Karodia, S. & Higgitt, N., 2013. Heritage Statement for the Dalyshope Phase 1 Coal Mine, Lephalale, Limpopo Province, Randburg: Digby Wells Environmental.



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- Pistorius, J. C. C., 2010. A Phase 1 Heritage Impact Assessment Study for Exxaro's Proposed New Thaba Metsi Open Cast Coal Mine near Lephalale in the Limpopo Province of South Africa, s.l.: Archaeology and Heritage Management Consultants.
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Smith, H., 2011. Soils, Land Capability and Land Use Assessment for the Temo Coal Project, Digby Wells Environmental: Unpublished Report.

Heritage Impact Assessment

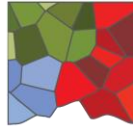
Namane Generation Independent Power Producer and Transmission Line Project, Lephalale,
Limpopo **Province**

NAM3248



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Appendix A: Specialist CV



DIGBY WELLS

ENVIRONMENTAL

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
2009/2011 to present	Digby Wells Environmental	Manager: Heritage Resources Management unit
2005/2010-2011	Digby Wells Environmental	Archaeologist
2010/2005-2005/2010	Archaic Heritage Project Management	Manager and co-owner
2003-2007		Freelance archaeologist

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

4 Experience

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

5 Project Experience

5.1 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.

5.2 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.

5.3 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.

5.4 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.

5.5 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.

6 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)	13839
Member	Society for Africanist Archaeologists (SAfA)	N/A

7 Publications

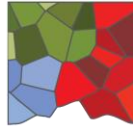
Authors and Year	Title	Published in/presented at
Nel, J. (2001)	Cycles of Initiation in Traditional South African Cultures.	South African Encyclopaedia (MWEB).
Nel, J. 2001.	Social Consultation: Networking Human Remains and a Social Consultation Case Study	Research poster presentations at the. Bi-annual Conference (SA3) Association of Southern African Professional Archaeologists the National Museum, Cape Town



Nel, J. 2002.	Collections policy for the WG de Haas Anatomy museum and associated Collections.	Unpublished. Department of Anatomy, School of Medicine: University of Pretoria.
Nel, J. 2004.	Research and design of exhibition for Eloff Belting and Equipment CC	Institute of Quarrying 35th Conference and Exhibition on 24 – 27 March 2004
Nel, J. 2004.	Ritual and Symbolism in Archaeology, Does it exist?	Research paper presented at the Bi-annual Conference (SA3) Association of Southern African Professional Archaeologists: Kimberley
Nel, J & Tiley, S. 2004.	The Archaeology of Mapungubwe: a World Heritage Site in the Central Limpopo Valley, Republic of South Africa.	Archaeology World Report, (1) United Kingdom p.14-22.
Nel, J. 2007.	The Railway Code: Gautrain, NZASM and Heritage.	Public lecture for the South African Archaeological Society, Transvaal Branch: Roedean School, Parktown.
Nel, J. 2009.	Un-archaeologically speaking: the use, abuse and misuse of archaeology in popular culture.	The Digging Stick. April 2009. 26(1): 11-13: Johannesburg: The South African Archaeological Society.
Nel, J. 2011.	'Gods, Graves and Scholars' returning Mapungubwe human remains to their resting place.' In: Mapungubwe Remembered.	University of Pretoria commemorative publication: Johannesburg: Chris van Rensburg Publishers.
Nel, J. 2012	HIAs for EAPs.	. Paper presented at IAIA annual conference: Somerset West.
Nel, J. 2013.	The Matrix: A proposed method to evaluate significance of, and change to, heritage resources.	Paper presented at the 2013 ASAPA Biennial conference: Gaborone, Botswana.
Nel, J. 2013	HRM and EMS: Uncomfortable fit or separate process.	. Paper presented at the 2013 ASAPA Biennial conference:



Gaborone, Botswana.



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
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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 Archaeological Excavations	Steelpoort, Mpumalanga, South Africa	2010 2010	Phase 2 archaeological excavations of Late Iron Age Site	Archaeological Excavation	Archaeologist	2 Weeks	Heritage Contracts Unit	Completed excavations	Heritage Contracts Unit Jaco van der Walt jaco.heritage@gmail.com



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@atkinglobal.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 greg.ovens@drdgold.com
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 Kamantha.Veerasamy@bigenafrica.com
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 Taka.Sande@bigenafrica.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
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



Heritage Impact Assessment

Namane Generation Independent Power Producer and Transmission Line Project, Lephhalale,
Limpopo **Province**

NAM3248



DIGBY WELLS
ENVIRONMENTAL

Appendix B: Site Table

Site Name	Latitude	Longitude	Heritage Resource Type	Description Detail	Reference/Source
Site 001	-23.58986	27.115788	Archaeological - LFC	A low density scatter of potsherds and six non-diagnostic potsherds recovered from the surface and around several animal burrows.	Fourie (2010)
Site 002	-23.59086	27.15922	Archaeological - LFC	A low density scatter of potsherds and 14 non-diagnostic potsherds recovered from the surface and around several animal burrows.	Fourie (2010)
Site 003	-23.60233	27.14765	Archaeological - LFC	A low density scatter of potsherds and six non-diagnostic potsherds recovered from the surface and around several animal burrows.	Fourie (2010)
Site 004	-23.59107	27.1443	Archaeological - LFC	12 non-diagnostic potsherds recovered from the surface of a possible midden. Fragments of two lower grinding stones were recovered on close proximity to the midden.	Fourie (2010)
Site 2327CA11	-23.68153	27.09653	Archaeological - LFC	A cattle kraal and midden with undecorated pottery, bone and a lower grindstone in a large cleared area.	Huffman (2011)
Site 2327CA12	-23.68153	27.09444	Archaeological - LFC	A cattle kraal and undecorated pottery.	Huffman (2011)
Site 2327CA13	-23.68139	27.09347	Archaeological - LFC	Cattle dung exposed in an antbear holes.	Huffman (2011)
Site 2327CA14	-23.68153	27.09306	Archaeological - LFC	A cattle kraal.	Huffman (2011)
Site 2327CA15	-23.68194	27.08611	Archaeological - LFC	A cattle kraal and midden with decorated Letsibogo pottery.	Huffman (2011)
Site 2327CA16	-23.68181	27.08778	Archaeological - LFC	A cattle kraal, pottery and a grain bin stand.	Huffman (2011)
Site 2327CA17	-23.68167	27.08889	Archaeological - LFC	Letsibogo pottery exposed by an animal burrow.	Huffman (2011)
Site 2327CA18	-23.68181	27.09014	Archaeological - LFC	A buried cattle kraal, plain pottery and a probable midden.	Huffman (2011)
Site 2327CA19	-23.68264	27.09306	Archaeological - LFC	Pottery and a lower grindstone.	Huffman (2011)
Site 2327CA20	-23.68319	27.09139	Archaeological - LFC	A cattle kraal, pottery, an upper grindstone, and a midden with pottery.	Huffman (2011)
Site 2327CA21	-23.68153	27.09597	Archaeological - LFC	A cattle kraal and pottery near Site 2327CA11.	Huffman (2011)
Site 2327CA23	-23.69264	27.09194	Archaeological - LFC	A cattle kraal with Letsibogo pottery.	Huffman (2011)
Site 2327CA28b	-23.66817	27.14181	Archaeological - LFC	Some Letsibogo pottery at an excavated pan.	Huffman (2011)
Site 2327CA32a	-23.68097	27.13264	Archaeological - LFC	Letsibogo potsherds on a slightly raised calcrete ridge.	Huffman (2011)
Site 2327CA33b	-23.67958	27.13069	Archaeological - LFC	Letsibogo pottery around an excavated pan.	Huffman (2011)
Site 2327CA5b	-23.68125	27.16056	Archaeological - LFC	Shallow pans with pottery.	Huffman (2011)
Site 2327CA65b	-23.66864	27.14206	Archaeological - LFC	A shallow pan with pottery.	Huffman (2011)
Site 2327CB1b	-23.582	27.31028	Archaeological - LFC	Undecorated potsherds on the calcrete rim of a pan.	Huffman (2011)
Site 2327CB31b	-23.67528	27.25111	Archaeological - LFC	Pottery at the north end of a large pan.	Huffman (2011)
VEN1590/2327/CB/S.35-044	-23.552566	27.222245	Archaeological - LFC	One undiagnostic potsherd found near an animal burrow	Karodia & Higgitt (2013)
VEN1590/2327/CB/S.35-047	-23.543731	27.211644	Archaeological - LFC	One undiagnostic potsherd found on the surface near a windmill and in a recently cleared area.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-001	-23.550112	27.24411	Archaeological - LFC	One undiagnostic potsherd found near an animal burrow	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-002	-23.54944	27.245911	Archaeological - LFC	One undiagnostic potsherd found near an animal burrow	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-004	-23.54808	27.246876	Archaeological - LFC	One undiagnostic potsherd found near an animal burrow	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-016	-23.542	27.238777	Archaeological - EFC	Isolated decorated (Mambo facies) undiagnostic potsherd found on the surface at the edge of a floodplain	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-017	-23.537927	27.242445	Archaeological - LFC	Isolated undiagnostic potsherd found on the surface at the edge of a floodplain	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-024	-23.55346	27.244471	Archaeological - LFC	Undiagnostic and diagnostic potsherds with associated iron slag fragment identified in a clearing	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-025	-23.553332	27.244548	Archaeological - LFC	Two undiagnostic potsherds found near an animal burrow	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-026	-23.566294	27.227832	Archaeological - LFC	One undiagnostic potsherd found near an animal burrow	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-029	-23.532792	27.213749	Archaeological - LFC	One undiagnostic potsherd and MSA quartzite flakes found near an animal burrow.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-031	-23.546183	27.205742	Archaeological - LFC	Undiagnostic and decorated (Letsibogo facies) potsherds found near a animal burrows.	Karodia & Higgitt (2013)

Site Name	Latitude	Longitude	Heritage Resource Type	Description Detail	Reference/Source
VEN1590/2327CB/S.35-032	-23.551855	27.218897	Archaeological - LFC	MSA flakes and diagnostic (Madikwe facies) and undiagnostic potsherds with associated metal fragments identified adjacent to a main farm road and a fence near a possible quarry.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-037	-23.527905	27.251807	Archaeological - LFC	One undiagnostic potsherd with graphite burnish found near an animal burrow.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-038	-23.533088	27.265862	Archaeological - EFC	One decorated (Baratani / Happy Rest / Mambofacies) potsherd found near an animal burrow.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-041	-23.537088	27.248296	Archaeological - LFC	On undiagnostic potsherd and MSA quartzite flakes found near an animal burrow.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-053	-23.533333	27.265191	Archaeological - LFC	Undiagnostic potsherds and MSA flakes identified next to a farm road.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-064	-23.542246	27.263022	Archaeological - LFC	Four undiagnostic potsherds identified next to a fence.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-065	-23.516132	27.266526	Archaeological - LFC	Two undiagnostic potsherds identified near an animal burrow.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-066	-23.527923	27.251701	Archaeological - LFC	One undiagnostic potsherd identified near an animal burrow.	Karodia & Higgitt (2013)
2327/RES901/004	-23.670917	27.218361	Archaeological - LFC	Iron Age find spot	Nel, May 2011
2327/RES901/008	-23.669318	27.19375	Archaeological - LFC	Iron Age find spot	Nel, May 2011
2327CA-PGS001	-23.5527	27.1781	Archaeological - LFC	Five non-diagnostic potsherds and 2 fragments of possible vitrified hut clay	Fourie, 2009
2327CA-PGS002	-23.5557	27.1757	Archaeological - LFC	30 x non-diagnostic potsherds and 3 x decorated potsherds, 1 x possible rubbing/smearing stone. On closer inspection of the animal burrows a layer of archaeological deposit was identified at a depth of approximately 10-15cm. The layer was approximately 5-10cm thick and consisted mostly of ash and dung deposits.	Fourie, 2009
2327CA-PGS003	-23.556	27.1803	Archaeological - LFC	5 x non-diagnostic potsherds	Fourie, 2009
2327CA-PGS004	-23.5559	27.1835	Archaeological - LFC	5 x non-diagnostic potsherds	Fourie, 2009
2327CA-PGS005	-23.5577	27.1837	Archaeological - LFC	10 x nondiagnostic potsherds and 3 x fragments of possible rubbing/smearing stones were recovered in and around several animal burrows from within the clearing.	Fourie, 2009
2327CA-PGS007	-23.5549	27.1861	Archaeological - LFC	3 x non-diagnostic potsherds were found in and around several animal burrows	Fourie, 2009
2327CA-PGS008	-23.5549	27.1868	Archaeological - LFC	More than 30 x non-diagnostic potsherds, 4 x potsherds with decorations (1 x graphite; 1 x impressions; 2 x graphite, ochre and impressions) and 1 x potsherd with a bored hole through it, were recovered in and around several of the animal burrows as well as from the surface within the clearing. Fragments of vitrified hut rubble and vitrified dung were found. 1 x possible rubbing/smearing stone was also found. On closer inspection of the animal burrows, a layer of archaeological deposit was identified at a depth of approximately 10-15cm. This layer consisted mainly of ash and vitrified dung, but animal bone fragments were also identified. The layer varied in thickness and measured approximately between 10cm and 15cm.	Fourie, 2009
2327CA-PGS009	-23.5524	27.1905	Archaeological - LFC	4 x potsherds were found in and around several animal burrows at this location	Fourie, 2009
2327CA-PGS010	-23.5551	27.1904	Archaeological - LFC	More than 20 x non-diagnostic potsherds, 1 x rim-shard and a fragment of an upper grinding stone were recovered in and around several of the animal burrows as well as from the surface within the clearing. Fragments of vitrified hut rubble and vitrified dung were found. On closer inspection of the animal burrows, a layer of archaeological deposit was identified in one of the burrows at a depth of approximately 10-15cm. This layer consisted mainly of ash and vitrified dung, but animal bone fragments were also identified. The layer varied in thickness and measured approximately between 5cm and 10cm. Another layer was identified in another animal burrow and this layer was also approximately 15cm underneath the present surface. This layer consisted mainly of ash and vitrified dung which was approximately 5cm to 10cm thick.	Fourie, 2009

Site Name	Latitude	Longitude	Heritage Resource Type	Description Detail	Reference/Source
2327CA-PGS013	-23.5582	27.2017	Archaeological - LFC	4 x non-diagnostic potsherds and 1 x decorated potsherd (graphite, ochre and impressions) were found in and around several animal burrows at this location	Fourie, 2009
2327CA-PGS014	-23.5657	27.2051	Archaeological - LFC	20 x non-diagnostic potsherds and 4 x decorated potsherds (1 x graphite; 1 x ochre; and 2 x impressions) were recovered in and around several animal burrows from within the clearing.	Fourie, 2009
2327CA-PGS015	-23.5649	27.2026	Archaeological - LFC	More than 25 x non-diagnostic potsherds, 8 x potsherds with decorations (2 x graphite; 4 x ochre and 2 x impressions) and 1 x rim-shard, were recovered in and around several of the animal burrows as well as from the surface within the clearing. 6 pieces of slag were also found in and around the animal burrows. An ashconcentration was identified in the middle of the clearing	Fourie, 2009
2327CA-PGS016	-23.5716	27.1935	Archaeological - LFC	A single non-diagnostic potsherd was found in one of several animal burrows at this location	Fourie, 2009
2327CA-PGS017	-23.5688	27.1907	Archaeological - LFC	1 x non-diagnostic potsherd, 1 x decorated potsherd (graphite, ochre and impressions) and an animal bone fragment were found in and around several animal burrows at this location.	Fourie, 2009
2327CA-PGS020	-23.5619	27.1848	Archaeological - LFC	2 x non-diagnostic potsherds were found in and around several of the animal burrows at this location.	Fourie, 2009
2327CA-PGS023	-23.5477	27.203	Archaeological - LFC	Over 30 x non-diagnostic potsherds, 4 x decorated potsherds (2 x graphite, ochre and impressions; 2 x impressions) were found in and around several animal burrows from within the clearing. No archaeological deposit could be identified in the animal burrows although many potsherds were recovered.	Fourie, 2009
2327CA-PGS024	-23.5455	27.2053	Archaeological - LFC	More than 30 x non-diagnostic potsherds, 6 x potsherds with decorations (2 x graphite; 2 x ochre; 1 x graphite, ochre and impressions; 1 x impressions) were recovered in and around several of the animal burrows as well as from the surface within the clearing. A possible ash-midden/ash-concentration was identified in the middle of the clearing	Fourie, 2009
2327CA-PGS025	-23.5433	27.2064	Archaeological - LFC	Over 15 x non-diagnostic potsherds were found in and around several animal burrows from within the clearing. No archaeological deposit could be identified in the animal burrows although a fair amount of potsherds were recovered.	Fourie, 2009
2327CA-PGS026	-23.5437	27.2071	Archaeological - LFC	Over 10 x non-diagnostic potsherds and 1 x rim-shard were found in and around the few animal burrows from within the clearing.	Fourie, 2009
2327CA-PGS027	-23.5418	27.209	Archaeological - LFC	2 x non-diagnostic potsherds were found in and around several of the animal burrows at this location	Fourie, 2009
2327CA-PGS028	-23.542	27.2097	Archaeological - LFC	1 x non-diagnostic potsherd and 1 x decorated potsherd (impressions) were recovered from the surface in a large open area at this location	Fourie, 2009
2327CA-PGS029	-23.5396	27.2137	Archaeological - LFC	7 x non-diagnostic potsherds and 1 x decorated potsherd (graphite, ochre and impressions) were found in and around the animal burrows from within the clearing.	Fourie, 2009
2327CA-PGS031	-23.5532	27.2042	Archaeological - LFC	3 x non-diagnostic potsherds were found in and around several of the animal burrows at this location	Fourie, 2009
2327CA-PGS032	-23.5347	27.2177	Archaeological - LFC	2 x non-diagnostic potsherds and a rim-shard were recovered from the surface at this location	Fourie, 2009
2327CA-PGS033	-23.539	27.2155	Archaeological - LFC	More than 60 x non-diagnostic potsherds, 5 x decorated potsherds (2 x impressions; 2 x graphite and ochre; 1 x graphite, ochre and impressions) and a fragment of a lower grinding stone were recovered in and around several of the animal burrows as well as from the surface within the clearing. Fragments of vitrified hut rubble and vitrified dung were found. On closer inspection of the	Fourie, 2009

Site Name	Latitude	Longitude	Heritage Resource Type	Description Detail	Reference/Source
				animal burrows, a layer of archaeological deposit was identified in two of the burrows at a depth of approximately 15-20cm. These layers consisted mainly of ash and vitrified dung, but animal bone fragments and potsherds were also identified. The layers varied in thickness and measured approximately between 10cm and 15cm. These layers of ash and dung occurred to the central parts of the identified site.	
2327CA-PGS034	-23.5407	27.2124	Archaeological - LFC	1 x non-diagnostic potsherd and 1 x rim-shard were found in and around several of the animal burrows at this location	Fourie, 2009
2327CA-PGS035	-23.5446	27.2061	Archaeological - LFC	6 x non-diagnostic potsherds were found in and around the animal burrows from within the clearing.	Fourie, 2009
2327CA-PGS036	-23.5578	27.1778	Archaeological - LFC	Over 30 x non-diagnostic potsherds, 7 x decorated potsherds (3 x ochre; 1 x impressions; 1 x graphite and impressions; 2 x ochre and impressions) were recovered in and around several animal burrows as well as from the surrounding surface from within the clearing.	Fourie, 2009
2327CA-PGS037	-23.5672	27.1768	Archaeological - LFC	15 x nondiagnostic potsherds and 2 x rim-sherds were recovered in and around several animal burrows as well as from the surrounding surface from within the clearing. The animal burrows on the southern end produced the most finds.	Fourie, 2009
2327CA-PGS038	-23.5619	27.1789	Archaeological - LFC	1 x non-diagnostic potsherd and 1 x decorated potsherd (ochre, graphite and impressions) were found in and around several of the animal burrows at this location.	Fourie, 2009
2327CA-PGS040	-23.549	27.1978	Archaeological - LFC	Over 50 x non-diagnostic potsherds, 2 x decorated potsherds (1 x impressions: 1 x graphite), 1 x rim-shard and a rubbing/smearing stone were recovered in and around several animal burrows as well as from the surrounding surface from within the clearing.	Fourie, 2009
2327CA-PGS042	-23.5638	27.1948	Archaeological - LFC	2 x non-diagnostic potsherds and a rubbing/smearing stone were found in and around several of the animal burrows at this location	Fourie, 2009
2327CA-PGS043	-23.5673	27.191	Archaeological - LFC	5 x non-diagnostic potsherds were found in and around several of the animal burrows at this location	Fourie, 2009
2327CA-PGS044	-23.557	27.1882	Archaeological - LFC	Over 20 x non-diagnostic potsherds, 1 x rim-shard and 2 x fragments of lower grinding stones were recovered in and around several animal burrows as well as from the surrounding surface from within the clearing. The animal burrows were closely inspected, but no archaeological deposit could be identified in them. Two circular structures were identified approximately 15m from each other. They were located approximately 50m from the main concentration of potsherds on the south-eastern section of the site. The first structure consisted of 6 rocks placed in the shape of a circle/oval and it measured approximately 1,2m x 0,8m in size. The second structure was similar in shape and size but consisted of 7 packed rocks. These two small structures could possibly be the remains of grain-bin foundations.	Fourie, 2009
2327CA-PGS006	-23.5601	27.1855	Archaeological - LFC	2 x non-diagnostic potsherds and a MSA-core	Fourie, 2009
2327CA-PGS012	-23.5589	27.201	Archaeological - LFC	1 x decorated potsherd (impressions) and a MSA-tool were found in and around several animal burrows at this location.	Fourie, 2009
2327CA-PGS021	-23.5486	27.1963	Archaeological - LFC	1 x non-diagnostic potsherd, 1 x decorated potsherd (impressions) and a MSA-tool were found in and around several of the animal burrows at this location.	Fourie, 2009
2327CA-PGS022	-23.5481	27.1989	Archaeological - LFC	5 x non-diagnostic potsherds and 2 x MSA-cores were recovered in and around several animal burrows from within the clearing	Fourie, 2009
2327CA-PGS030	-23.536	27.2103	Archaeological - LFC	Over a 100 x non-diagnostic potsherds, 9 x decorated potsherds (1 x ochre; 4 x impressions; 3 x graphite and impressions; 1 x graphite, ochre and impressions), 2	Fourie, 2009

Site Name	Latitude	Longitude	Heritage Resource Type	Description Detail	Reference/Source
				x rim-sherds and a MSA-tool were recovered in and around several animal burrows as well as from the surrounding surface from within the clearing. The animal burrows on the southern end produced the most finds. These animal burrows were closely inspected, but no archaeological deposit could be identified in them. A possible ash-midden/kraal was identified near the middle of the site. No other structures, finds or features were identified here. An amount of damage was caused to the surface of the area and most probably also to the subterranean archaeological deposits due to bush-clearing with earth-moving machinery.	
2327CA-PGS039	-23.5545	27.1839	Archaeological - LFC	Over 50 x non-diagnostic potsherds, 9 x decorated potsherds (4 x impressions; 3 x graphite; 2 x ochre), 2 x rim-sherds, 1 x MSA-tool, 1 x MSA-core and a piece of slag were recovered in and around several animal burrows as well as from the surrounding surface from within the clearing. The animal burrows were closely inspected and archaeological deposits were identified in them. These deposits were approximately 15cm from the surface and the layers varied in thickness. They consisted mainly of ash, animal bone fragments and a few potsherds.	Fourie, 2009
2327CA-PGS041	-23.5613	27.1988	Archaeological - LFC	3 x non-diagnostic potsherds and 1 x MSA-tool were found in and around several of the animal burrows at this location.	Fourie, 2009
RSV689/004	-23.582486	27.265748	Archaeological - LFC	Potsherd	Nel, April 2011
RSV689/005	-23.612654	27.281968	Archaeological - LFC	Potsherd	Nel, April 2011
RSV689/008	-23.613698	27.283893	Archaeological - LFC	Potsherd	Nel, April 2011
RSV689/009	-23.614741	27.28366	Archaeological - LFC	Potsherd	Nel, April 2011
RSV689/011	-23.609415	27.281299	Archaeological - LFC	Potsherd	Nel, April 2011
Site 2324CA10	-23.68306	27.10611	Archaeological - MSA	Stone artefacts near an animal burrow.	Huffman (2011)
Site 2324CA22	-23.68694	27.09778	Archaeological - MSA	Stone artefacts in a pan.	Huffman (2011)
Site 2324CA24	-23.68861	27.09	Archaeological - MSA	Stone artefacts around a shallow pan.	Huffman (2011)
Site 2324CA25	-23.72014	27.13708	Archaeological - MSA	Stone artefacts on the surface of a fericrete exposure around a pan.	Huffman (2011)
Site 2324CA26	-23.71806	27.10569	Archaeological - MSA	Stone artefacts in a small pan.	Huffman (2011)
Site 2324CA63	-23.72164	27.12742	Archaeological - MSA	A shallow pan.	Huffman (2011)
Site 2324CA69	-23.68694	27.10525	Archaeological - MSA	Calcrete with stone artefacts.	Huffman (2011)
Site 2324CA8	-23.68667	27.12583	Archaeological - MSA	Stone artefacts in the middle of a pan.	Huffman (2011)
Site 2324CA9	-23.6875	27.10556	Archaeological - MSA	Stone artefacts in a small pan.	Huffman (2011)
Site 2324CB35	-23.69311	27.28181	Historical Built Environment	A pre-1965 school.	Huffman (2011)
Site 2327CA1a	-23.63778	27.24028	Historical Built Environment	Venter house said to have been built on top of an older structure in the 1950s.	Huffman (2011)
Site 2327CA1b	-23.63822	27.24064	Burial Grounds & Graves	Venter family graveyard.	Huffman (2011)
Site 2327CA2	-23.643	27.24783	Historical Built Environment	Baobab house built by Mr Venter's grandfather in the 1940s.	Huffman (2011)
Site 2327CA29	-23.66708	27.08944	Historical Built Environment	Farm labourer housing near a pan.	Huffman (2011)
Site 2327CA3	-23.64244	27.24931	Burial Grounds & Graves	A small graveyard associated with the Baobab house at Site 2327CA2. It contains two graves with headstones and the remains of a few dogs.	Huffman (2011)
Site 2327CA30	-23.67083	27.13333	Archaeological - MSA	A few stone artefacts in a small pan.	Huffman (2011)
Site 2327CA31	-23.67167	27.14792	Archaeological - MSA	Many artefacts, including a quartzite core, on the edge of a small pan.	Huffman (2011)
Site 2327CA32a	-23.68097	27.13264	Historical Built Environment	Farm labourer housing that appears on a 1970 topographical map. Two wells have been dug through the calcrete.	Huffman (2011)
Site 2327CA32b	-23.68036	27.13214	Archaeological - MSA	Stone artefacts embedded in calcrete.	Huffman (2011)
Site 2327CA33a	-23.67958	27.13069	Archaeological - MSA	Stone artefacts in a pan which has recently been deepened. A soil heap yielded a fossilised elephant tooth of modern species.	Huffman (2011)
Site 2327CA34	-23.67417	27.21736	Archaeological - MSA	Many stone artefacts including cores and points at a large pan.	Huffman (2011)

Site Name	Latitude	Longitude	Heritage Resource Type	Description Detail	Reference/Source
Site 2327CA36	-23.67736	27.16875	Archaeological - MSA	Many stone artefacts including cores, flakes and scrapers in a small pan.	Huffman (2011)
Site 2327CA37	-23.66042	27.18389	Archaeological - MSA	Stone artefacts in a long pan.	Huffman (2011)
Site 2327CA39	-23.65028	27.18569	Historical Built Environment	A main farm house made of sun-dried bricks.	Huffman (2011)
Site 2327CA40	-23.65542	27.18653	Archaeological - MSA	Stone artefacts scattered throughout a string of pans.	Huffman (2011)
Site 2327CA41	-23.65042	27.20222	Archaeological - MSA	Stone stone artefacts in the center of a pan.	Huffman (2011)
Site 2327CA42	-23.64319	27.19681	Archaeological - MSA	Stone artefacts on the northern edge of a pan.	Huffman (2011)
Site 2327CA44	-23.67347	27.19111	Archaeological - MSA	Stone stone artefacts among fericrete.	Huffman (2011)
Site 2327CA46	-23.65472	27.23889	Archaeological - MSA	Stone artefacts around a pan.	Huffman (2011)
Site 2327CA4	-23.63806	27.24381	Burial Grounds & Graves	A graveyard with seven graves. Four of the graves are stone-packed graves while three others are marked with mounds of soil. A soil-heap nearby marks a labourer house built in 1965.	Huffman (2011)
Site 2327CA47a	-23.68431	27.20444	Historical Built Environment	The Prinsloo house with metal walls and roof.	Huffman (2011)
Site 2327CA47b	-23.68392	27.20411	Burial Grounds & Graves	The grave of Mavis Audrey Prinsloo near the Prinsloo house at Site 2327CA47a.	Huffman (2011)
Site 2327CA48	-23.66056	27.23861	Archaeological - MSA	A small pan with stone artefacts.	Huffman (2011)
Site 2327CA49	-23.66167	27.23139	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CA50	-23.65822	27.15817	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CA51	-23.65736	27.15631	Archaeological - MSA	A shallow pan with a few stone artefacts.	Huffman (2011)
Site 2327CA52	-23.66806	27.15083	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CA53	-23.66792	27.14667	Archaeological - MSA	A shallow pan with a few stone artefacts.	Huffman (2011)
Site 2327CA54	-23.66822	27.14617	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CA55	-23.67678	27.15217	Archaeological - MSA	A shallow pan with a few stone artefacts.	Huffman (2011)
Site 2327CA56	-23.67219	27.16364	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CA57	-23.67183	27.16625	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CA58	-23.66864	27.15675	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CA59	-23.66819	27.15533	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CA5a	-23.68125	27.16056	Archaeological - MSA	Stone artefacts 50 m from a pan.	Huffman (2011)
Site 2327CA6	-23.68211	27.19694	Archaeological - MSA	Artefacts in a drainage system.	Huffman (2011)
Site 2327CA60	-23.65844	27.16242	Archaeological - MSA	A shallow pan with a few stone artefacts.	Huffman (2011)
Site 2327CA61	-23.67328	27.21606	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CA62	-23.67594	27.21044	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CA64	-23.67942	27.20764	Archaeological - MSA	A scatter of stone artefacts.	Huffman (2011)
Site 2327CA65a	-23.66867	27.14206	Archaeological - MSA	A shallow pan with a few stone artefacts.	Huffman (2011)
Site 2327CA66	-23.68139	27.20983	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CA67	-23.67925	27.21456	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CA68	-23.68617	27.18236	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CA70	-23.66864	27.14206	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CA71	-23.67814	27.21097	Archaeological - MSA	A drainage line with artefacts embedded in calcrete.	Huffman (2011)
Site 2327CA8a	-23.66806	27.14181	Archaeological - MSA	Stone artefacts inside a wide and shallow pan.	Huffman (2011)
Site 2327CB10	-23.59261	27.32969	Historical Built Environment	The remains of the original homestead built in 1907/1908. According to oral history, the house was built out of mud bricks made with paraffin tins. The complex includes the remains of a windmill and stables.	Huffman (2011)
Site 2327CB11	-23.58389	27.33111	Historical Built Environment	A farm labourer house that was used from 1957 to 1980 during peanut farming.	Huffman (2011)
Site 2327CB12	-23.66978	27.37439	Historical Built Environment	The foundations of a pre-fabricated house.	Huffman (2011)
Site 2327CB13	-23.62083	27.30417	Historical Built Environment	An original house built in the 1930s.	Huffman (2011)
Site 2327CB14	-23.54208	27.24528	Historical Built Environment	A farm complex built in the 1930s by the De Lange family. The complex includes	Huffman (2011)

Site Name	Latitude	Longitude	Heritage Resource Type	Description Detail	Reference/Source
				house foundations, a windmill, a standing barn, and a farm labourer compound.	
Site 2327CB15	-23.6635	27.40117	Historical Built Environment	A homestead complex. A single brick building with wooden windows appears to be over 60 years old.	Huffman (2011)
Site 2327CB17	-23.59656	27.33039	Burial Grounds & Graves	The graves of two white children who died of flu in 1914. The children were members of a family passing through on the way to Botswana.	Huffman (2011)
Site 2327CB18	-23.58917	27.33	Burial Grounds & Graves	Three to five graves belonging to women who had worked for Mrs Van der Westhuizen for more than 60 years.	Huffman (2011)
Site 2327CB19	-23.54872	27.36428	Historical Built Environment	A farm labourer house.	Huffman (2011)
Site 2327CB1a	-23.58403	27.31028	Archaeological - MSA	A few stone artefacts scattered across a large pan. Besides the normal pebbles from the ferricrete, some artefacts were made from hornfels and dolerite.	Huffman (2011)
Site 2327CB2	-23.62072	27.29489	Archaeological - MSA	A concentration of artefacts.	Huffman (2011)
Site 2327CB20	-23.5475	27.36917	Historical Built Environment	A homestead.	Huffman (2011)
Site 2327CB21	-23.613	27.32267	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CB22a	-23.60547	27.34997	Historical Built Environment	A house.	Huffman (2011)
Site 2327CB22b	-23.60589	27.34956	Burial Grounds & Graves	Five graves	Huffman (2011)
Site 2327CB23	-23.59358	27.35706	Archaeological - MSA	A pan with stone artefacts covered by sand.	Huffman (2011)
Site 2327CB24	-23.60569	27.31242	Archaeological - MSA	A pan with stone tools and ferricrete.	Huffman (2011)
Site 2327CB25	-23.63556	27.26778	Archaeological - MSA	Stone artefacts scattered along a rocky ridge.	Huffman (2011)
Site 2327CB26	-23.64256	27.28089	Historical Built Environment	A farm labourer house with a coal cinder, bottle glass and cut bone.	Huffman (2011)
Site 2327CB27	-23.62361	27.30722	Historical Built Environment	A farm labourer house.	Huffman (2011)
Site 2327CB28	-23.64597	27.26722	Archaeological - MSA	A small pan with stone artefacts in the middle and on the southern side where the calcrete is exposed.	Huffman (2011)
Site 2327CB29a	-23.66764	27.29861	Archaeological - MSA	Stone flakes in a calcrete pan.	Huffman (2011)
Site 2327CB29b	-23.66847	27.29819	Historical Built Environment	A farm labourer house next to a pan.	Huffman (2011)
Site 2327CB3	-23.62136	27.29208	Archaeological - MSA	Stone artefacts around a pan embedded in calcrete.	Huffman (2011)
Site 2327CB30	-23.67889	27.25917	Historical Built Environment	The original house of the Hans Hermse family, also known as the Brakpan house, said to be over 100 years old. The remains include sundried brick walls built on a calcrete base as well as blue-on-white porcelain and square nails.	Huffman (2011)
Site 2327CB31a	-23.67542	27.25122	Archaeological - MSA	A large calcrete pan with many exposed stone artefacts.	Huffman (2011)
Site 2327CB32	-23.69072	27.28217	Burial Grounds & Graves	Five graves	Huffman (2011)
Site 2327CB33	-23.69108	27.28847	Archaeological - MSA	A calcrete outcrop with stone artefacts.	Huffman (2011)
Site 2327CB34	-23.69397	27.28328	Historical Built Environment	A pre-1965 farm labourer house.	Huffman (2011)
Site 2327CB36a	-23.6955	27.28458	Historical Built Environment	A pre-1965 farm house.	Huffman (2011)
Site 2327CB36b	-23.69436	27.28556	Historical Built Environment	A farm house less than 60 years old.	Huffman (2011)
Site 2327CB37	-23.69633	27.28539	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CB38	-23.69661	27.287	Historical Built Environment	A church built in 1948.	Huffman (2011)
Site 2327CB39	-23.69742	27.28844	Burial Grounds & Graves	A cemetery for the Van Rooyen and Van der Westhuizen families. One grave dates to 1933.	Huffman (2011)
Site 2327CB4	-23.62256	27.29231	Archaeological - MSA	Artefacts on top of a calcrete border around a pan.	Huffman (2011)
Site 2327CB40	-23.69275	27.29669	Historical Built Environment	A modern school.	Huffman (2011)
Site 2327CB41	-23.66525	27.31644	Historical Built Environment	Mud-brick housing built by Marthinus Steenekamp in 1955.	Huffman (2011)
Site 2327CB42	-23.66486	27.31519	Burial Grounds & Graves	Eight graves of the Erasmus and Steenekamp families associated with Site 2327CB41. The oldest graves dates to 1956.	Huffman (2011)
Site 2327CB43	-23.64653	27.3145	Burial Grounds & Graves	Three graves	Huffman (2011)
Site 2327CB44	-23.66925	27.30133	Burial Grounds & Graves	A single grave	Huffman (2011)
Site 2327CB45	-23.6715	27.30247	Archaeological - MSA	A shallow pan with a few stone artefacts.	Huffman (2011)

Site Name	Latitude	Longitude	Heritage Resource Type	Description Detail	Reference/Source
Site 2327CB46	-23.54892	27.29264	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CB47	-23.58892	27.34392	Archaeological - MSA	A pan with stone artefacts.	Huffman (2011)
Site 2327CB5	-23.63653	27.29722	Archaeological - MSA	A small scatter of artefacts near a fericrete exposure in an artificially enhanced pan.	Huffman (2011)
Site 2327CB6	-23.63131	27.25722	Archaeological - MSA	Artefacts scattered around half of a pan.	Huffman (2011)
Site 2327CB7	-23.63189	27.35892	Archaeological - MSA	An artefact scatter around a pan.	Huffman (2011)
Site 2327CB9	-23.67389	27.37333	Archaeological - MSA	MSA artefacts on a calcrete border and embedded in calcrete around a pan.	Huffman (2011)
VEN1590/2327/CB/S.35-042	-23.535051	27.249298	Historical Built Environment	Cement foundations with sun-baked bricks and associated with metal and glass fragments.	Karodia & Higgitt (2013)
VEN1590/2327/CB/S.35-043	-23.543387	27.22412	Archaeological - MSA	One MSA Quartzite flake found on the surface	Karodia & Higgitt (2013)
VEN1590/2327/CB/S.35-045	-23.559206	27.245583	Archaeological - MSA	One MSA Quartzite flake found on the surface	Karodia & Higgitt (2013)
VEN1590/2327/CB/S.35-046	-23.544047	27.207513	Archaeological - MSA	One MSA quartzite flake found near an animal burrow.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.34.040	-23.537113	27.246275	Historical Built Environment	Three 1.5 m fence posts approximately 5 m apart.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.34-036	-23.529146	27.239582	Historical Built Environment	One surveyor post found at the main entrance to the farm Wynberg 215 LQ.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.34-055	-23.535608	27.248556	Historical Built Environment	Two 5 m high posts approximately 5 m apart identified near old foundations at S.34-042.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.34-060	-23.551838	27.260735	Historical Built Environment	sun-baked bricks identified in a cleared area in close proximity to the burial at S.36-059.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-003	-23.548144	27.246563	Archaeological - MSA	One MSA quartzite broken flake found near an animal burrow	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-005	-23.544883	27.244173	Archaeological - MSA	One MSA quartzite flake found near a drill area	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-006	-23.542064	27.243875	Archaeological - MSA	Two MSA quartzite flakes found near an animal burrow	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-007	-23.53834	27.233331	Archaeological - MSA	One MSA quartzite flake found on the surface	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-008	-23.539836	27.231577	Archaeological - MSA	Two MSA quartzite flakes found on the surface	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-009	-23.538606	27.231226	Archaeological - MSA	One MSA quartzite flake found on the surface	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-010	-23.537986	27.231263	Archaeological - MSA	Three MSA quartzite flakes found on the surface	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-011	-23.542941	27.243487	Archaeological - MSA	Three MSA quartzite flakes found on the surface near an animal burrow	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-012	-23.544105	27.245596	Archaeological - MSA	One MSA quartzite flake found on the surface	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-013	-23.540359	27.241661	Archaeological - MSA	One MSA quartzite artefact found on the surface	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-014	-23.540567	27.240809	Archaeological - MSA	One MSA quartzite flake found on the surface	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-015	-23.542376	27.238709	Archaeological - MSA	Two MSA quartzite flakes found on the surface	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-018	-23.538371	27.243144	Archaeological - LSA	One quartzite hammerstone found on the surface	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-020	-23.552568	27.22144	Archaeological - MSA	One MSA Quartzite flake found on the surface	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-027	-23.566736	27.227755	Archaeological - MSA	One MSA quartzite flake found on the surface	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-028	-23.54078	27.205615	Archaeological - MSA	MSA flakes found on a calcrete ridge.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-030	-23.546484	27.205526	Archaeological - MSA	One MSA quartzite flake.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-033	-23.55914	27.21131	Archaeological - LFC	One undiagnostic potsherd and MSA quartzite flakes found near an animal burrow.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-034	-23.529616	27.225816	Archaeological - MSA	One MSA Quartzite flake found on the surface	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-050	-23.528861	27.227465	Archaeological - MSA	One MSA shale flake found on the surface	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-051	-23.528964	27.229212	Archaeological - MSA	One MSA shale flake found near an animal burrow	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-052	-23.529422	27.230264	Archaeological - MSA	One MSA Quartzite flake found on the surface	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-054	-23.535518	27.248855	Archaeological - MSA	One MSA quartzite flake.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-056	-23.532782	27.247413	Archaeological - MSA	One MSA quartzite flake.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-057	-23.534624	27.269625	Archaeological - MSA	One MSA quartzite flake found adjacent to a man-made ditch.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-058	-23.533974	27.27103	Archaeological - MSA	MSA quartzite flakes identified next to a farm road.	Karodia & Higgitt (2013)

Site Name	Latitude	Longitude	Heritage Resource Type	Description Detail	Reference/Source
VEN1590/2327CB/S.35-062	-23.551587	27.260582	Historical Built Environment	A metal pot fragment identified in close proximity to the sun-baked bricks at S.34-060.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-063	-23.551869	27.261965	Archaeological - MSA	On MSA blade identified near a small pan.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-067	-23.546227	27.312277	Archaeological - MSA	One MSA quartzite flake found near a pan.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.35-068	-23.554718	27.314754	Archaeological - MSA	Two MSA quartzite flakes identified next to a farm road.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.36-059	-23.552417	27.260238	Burial Grounds & Graves	An infant burial, entombed in a cement dome with a rectangular tombstone box on top. The burial dates to 1927.	Karodia & Higgitt (2013)
VEN1590/2327CB/S.36-061	-23.535009	27.25048	Burial Grounds & Graves	Two stone-packed graves dating to 1994. The graves are in close proximity to S.34-042.	Karodia & Higgitt (2013)
2327/RES901/001	-23.678778	27.259444	Historical Built Environment	House ruins	Nel, May 2011
2327/RES901/002 & 003	-23.675472	27.251139	Archaeological - MSA	Stone Age site / Pan	Nel, May 2011
2327/RES901/005	-23.673806	27.216639	Archaeological - MSA	Stone Age site / Pan	Nel, May 2011
2327/RES901/006	-23.685472	27.336	Burial Grounds & Graves	Burial site	Nel, May 2011
2327/RES901/007	-23.686	27.342111	Burial Grounds & Graves	Burial site	Nel, May 2011
2327/RES901/009	-23.655639	27.203528	Archaeological - MSA	Stone Age site	Nel, May 2011
2327/RES901/010	-23.698444	27.297167	Burial Grounds & Graves	Burial site	Nel, May 2011
2327/RES901/011	-23.690778	27.282167	Burial Grounds & Graves	Burial site	Nel, May 2011
2327/RES901/012	-23.697306	27.288389	Burial Grounds & Graves	Burial site	Nel, May 2011
2327CA-PGS018	-23.5813	27.1737	Historical Built Environment	Some of the remains and rubble of the possible labour quarters for the farm labourers were identified at this location. A make-shift kraal was identified next to the remains. The structures were demolished and most of the rubble was removed. The age, size and shapes of the structures are unknown. This site was to be associated with Site 2327CAPGS019	Fourie, 2009
2327CA-PGS019	-23.5818	27.1735	Historical Built Environment	Some of the remains and rubble of the main farm house of the farm. All of the structures were demolished and most of the rubble was removed. The age, size and shapes of the structures are unknown.	Fourie, 2009
RSV689/001	-23.582903	27.2223	Historical Built Environment	Building Remains	Nel, April 2011
RSV689/002	-23.583841	27.222236	Burial Grounds & Graves	Grave	Nel, April 2011
RSV689/003	-23.583242	27.222089	Burial Grounds & Graves	Possible Burial	Nel, April 2011
RSV689/006	-23.610709	27.285771	Archaeological - LSA	Scatter of LSA Lithics	Nel, April 2011
RSV689/010	-23.609554	27.285308	Archaeological - LSA	Flake (Possibly Associated with Lithics)	Nel, April 2011
Grave 01	-23.687517	27.545283	Burial Grounds & Graves	A single, stone-packed grave in an open veld.	Pistorius (2010)
Grave 02	-23.668033	27.472933	Burial Grounds & Graves	A single grave located next to a tree and covered with stones. It is fitted with an iron cross which serves as a headstone.	Pistorius (2010)
Grave 03	-23.618283	27.483467	Burial Grounds & Graves	A single, formal grave with a cement slab and a cement headstone.	Pistorius (2010)
Grave 04	-23.60455	27.4936	Burial Grounds & Graves	A single, formal grave.	Pistorius (2010)
Site SA 01	-23.651333	27.4781	Archaeological - MSA	Scatter of stone tools.	Pistorius (2010)
VED1565/2327CB/S.34-070	-23.52075	27.215194	Historical Built Environment	A house that may possibly have been built on a historical house associated with the burial ground and S.36-069.	Karodia, S (2013)
VED1565/2327CB/S.34-074	-23.476639	27.297333	Historical Built Environment	A house foundation.	Karodia, S (2013)
VED1565/2327CB/S.35-071	-23.505833	27.207528	Archaeological - LFC	Five undiagnostic potsherds identified next to several animal burrows.	Karodia, S (2013)
VED1565/2327CB/S.35-072	-23.490667	27.223111	Archaeological - LFC	Two undiagnostic potsherds found next to a farm road.	Karodia, S (2013)
VED1565/2327CB/S.35-075	-23.477639	27.297306	Archaeological - LFC	Undiagnostic potsherds found near animal burrows.	Karodia, S (2013)
VED1565/2327CB/S.35-076	-23.484028	27.287639	Archaeological - LFC	Two undiagnostic potsherds found near an animal burrow and a farm road.	Karodia, S (2013)
VED1565/2327CB/S.36-069	-23.520972	27.2145	Burial Grounds & Graves	A formal burial ground with six formal graves and 1 informal grave. The burial ground dates to 1916.	Karodia, S (2013)

Site Name	Latitude	Longitude	Heritage Resource Type	Description Detail	Reference/Source
VED1565/2327CB/S.36-073	-23.477	27.29675	Burial Grounds & Graves	Two informal graves.	Karodia, S (2013)

Heritage Impact Assessment

Namane Generation Independent Power Producer and Transmission Line Project, Lephhalale,
Limpopo **Province**

NAM3248



DIGBY WELLS
ENVIRONMENTAL

Appendix C: Heritage Impact Assessment Detailed Methodology



DIGBY WELLS ENVIRONMENTAL HERITAGE IMPACT MATRIX METHODOLOGY

HRM UNIT MANAGER: JOHAN NEL

FEBRUARY 2014



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1 INTRODUCTION

The impact assessment stage includes several steps aimed to evaluate the way in which environmental aspects will/may interact with the cultural landscape (the environment) resulting in environmental impacts to heritage resources. Environmental aspects and impacts are defined as:

- *Environmental aspects*: an element of an organisation's activities or products or services that can interact with the environment' (ISO 14001: 2004 - 3.6); and
- *Environmental impacts*: any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects (ISO 14001: 2004 - 3.7).

However, in terms of cultural heritage resources, environmental impacts should be assessed relative to the heritage value or significance of a resource. The methodology employed in the various stages of the impact assessment process is described in more detail below.

2 STATEMENT OF SIGNIFICANCE OR VALUE

Heritage resources – both cultural and natural – are finite, non-renewable and irreplaceable. They characterise community identity and cultures and are therefore intrinsic to the history and beliefs of communities. As sources of information, heritage resources have inherent potential to contribute significantly to research, education and tourism, as well as allowing capacity for reconciliation, understanding and mutual respect.

Considering the innate value of heritage resources, the foundation of heritage resources management (HRM) is the acknowledgement that heritage resources have lasting worth as evidence of the origins of life, humanity and society. Every generation is therefore morally obligated to act as trustees of heritage for future generations through conservation, preservation and protection.

Accordingly, HRM must take into account rights of affected communities to be consulted and to participate. Where heritage resources are developed and presented the dignity and respect of diverse cultural values must be ensured. In addition, heritage in its broadest sense must never be used for sectarian purposed or political gain.

Notwithstanding the fundamental value ascribed to heritage, significance of individual resources needs to be determined to allow implementation of appropriate management measures. This is achieved through assessing a heritage resource's value relative to certain prescribed criteria, encapsulated in international conventions as well as national legislation. This is addressed in Section 2.1 below.

The significance/value is established by determining the level of importance taking and assessing the degree of integrity of cultural heritage resources. A resource's value thus influences the intensity of environmental impacts. As a result, environmental impacts that are rated low may cause severe change in a heritage resources rated as highly significant. Vice versa, severe impacts may cause negligible change to an insignificant resource.



The steps involved in determining the value of a heritage resource is described in more detail below.

2.1 Importance

The importance of a heritage resource is determined on four dimensions – aesthetic, historic, scientific, and social. In turn, each dimension is measured against one or more descriptive attributes, defined in national legislation and international convention: NHRA (1999), UNESCO World Heritage Convention (1972), ICOMOS Guidance on Heritage Impact Assessments for Cultural World Heritage Properties and the Australian ICOMOS Charter for Places of Cultural Significance (1999) (Burra Charter). These attributes, or criteria, are aimed to provide a guide as to whether a resource should be included in the national estate as defined in these documents and presented in Table 2-1 below.

Importance of each dimension and subsequent attributes must be considered in relation to the resource's authenticity. Notions of authenticity are addressed under Section 2.1.1. Importance ratings must be informed and motivated by certain information sources. The credibility of information sources must therefore be evaluated and referred to when importance is discussed. Credibility is addressed under Section 2.1.2.

Table 2-1: Summary of dimensions and attributes

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



2.1.1 Authenticity

Authenticity is an integral concept in cultural heritage resources management and must be considered when determining significance/value of cultural landscapes and heritage resources. The Nara Document on Authenticity (Nara Document) (1993) forms the basis of determining authenticity. Authenticity can refer to design, material, workmanship and setting of a resource. Aesthetic and historical aspects of a landscape or site including its physical, social and historical context, use and function are also covered (Winter & Baumann, 2005, p. 4).

Determining authenticity of a resource requires a sound knowledge of the type of heritage resource as well as the context within which occurs – the cultural landscape. This knowledge can only be gained through a detailed baseline accessing credible information sources.

2.1.2 Credibility

The Nara Document (1993) accepts that understanding authenticity and thus determining importance attributed to heritage resources rely on credible information sources. Information sources are defined as all physical, written, oral, and figurative sources, which make it possible to know the authenticity – nature, specificities, meaning, and history – of cultural heritage resources. This requires knowledge and understanding of information sources employed in relation to original and subsequent characteristics of heritage resources, and their meaning.

Information that should be considered are published, peer reviewed literature, archival research, popular publications, and any other information source that may be relevant (Nara Document on Authenticity, 1993).

Information sources need to be assessed as credible and truthful and referenced when determining importance of a resource and in motivation of its authenticity. Credibility of information sources forms the basis in determining the importance of heritage resources. The importance rating per dimension and attribute discussed above is thus intrinsically linked to the credibility of information sources used.

2.2 Integrity

Integrity is determined by examining the physical condition of a heritage resource – as witnessed at the time of assessment – compared to an ideal or other existing example. Integrity ought to be assessed only after the resource's authenticity has been determined, as the information source/s used should provide comparative examples against which its present condition may be measured. Thresholds and definitions for integrity are described in Table 2-2 below.

**Table 2-2: Integrity definitions**

Integrity	
0	Resource degraded to extent where no information potential exists; resource cannot be restored; single, isolated find, without any site context;
1	Poor condition, active decay visible; excessive restoration required; little information potential
2	Fabric is preserved, some information potential (quality questionable) and meaning evident, some encroachment on setting
3	Fair to good condition; well preserved; some decay present; can be easily restored/conserved/preserved; good information potential
4	Excellent/pristine; extremely well preserved; little to no decay present; little restoration required/restoration will greatly enhance resource; excellent information potential

3 IMPACT ASSESSMENT

Assessing environmental impacts on heritage resources are based first on the value of a resource and second how that value may change due to environmental aspects. Environmental management systems employ relative standard terminology that characterises impacts. This terminology has been adapted to provide a well-defined descriptive terminology for use in assessing environmental impacts on heritage resources summarised in Table 3-1.

Table 3-1: Impact characteristic terminology

Characteristic	Description	Designation
Type	Relationship of an assumed impact to a heritage resource (in terms of cause and effect)	Direct Indirect Induced
Scale of change	The physical area (size) of a heritage resource that may change	None Isolated parts / aspects will change Large parts / aspects will change Most or entire resource will change



Characteristic	Description	Designation
Duration	Time period over which resource will change	<p>Immediate, non-permanent and fully reversible</p> <p>Long-term, non-permanent and reversible</p> <p>Long-term, permanent and irreversible</p> <p>Immediate, permanent and irreversible</p>
Intensity	How an impact could change the authenticity and integrity, thus importance, of a resource	<p>None</p> <p>Change in integrity without affecting authenticity</p> <p>Change in integrity will affect aspects of authenticity</p> <p>Change in integrity will affect overall authenticity</p>
Probability	Likelihood of change occurring	<p>None</p> <p>Project-related mitigation will remove change</p> <p>Project-related mitigation will reduce change</p> <p>Project-related mitigation will not reduce change</p>

The rating takes into account the following criteria:

- Spatial scale of impact;
- Expected duration of impact; and
- Severity of impact;
- Consequence of impact;
- Probability of impact occurring; and
- Value of heritage resource



$$\text{Impact significance} = \text{Value} \times \text{Magnitude}$$

Where

$$\text{Value} = \text{Importance} + \text{Credibility} + \text{Integrity}$$

And

$$\text{Magnitude} = \text{Consequence} \times \text{Probability}$$

And

$$\text{Consequence} = \text{Spatial scale} + \text{Duration} + \text{Severity}$$

The impact rating is applied to pre- and post-mitigation scenarios. The ideal is to remove all impacts to a heritage resource. Where post mitigation significance is not zero, the recommended field rating (heritage) mitigation must be undertaken. The tables below provide the various descriptions and thresholds applicable to the impact assessment ratings.

Table 3-2: Description of magnitude ratings

Magnitude	Description
Major	Complete / total change to meaning, fabric, quality, setting and association of heritage resource. Permanent change to heritage resource
Moderate	Partial change to meaning, fabric, quality, setting and association of heritage resource. Permanent change to heritage resource
Minor	Limited change to meaning, fabric, quality, setting and association of heritage resource. Reversible change to heritage resource

Significance		Consequence (severity + scale + duration)								
Probability / Likelihood		1	3	6	7	9	12	15	18	21
	1	1	3	6	7	9	12	15	18	21
	2	2	6	12	14	18	24	30	36	42
	3	3	9	18	21	27	36	45	54	63
	4	4	12	24	28	36	48	60	72	84
	5	5	15	30	35	45	60	75	90	105
	6	6	18	36	42	54	72	90	108	126
	7	7	21	42	49	63	84	105	126	147

Magnitude = Consequence x Probability	
where	
Consequence = scale + duration + severity	

**Table 3-3: Scores, descriptions and ratings determining consequence of impact**

Scale		
Score	Exposure	Description
1	Very Limited	Isolated aspects of individual heritage resource
2	Limited	One or more heritage resource will be changed
3	Local	Most or all heritage resources change
4	Municipal area	Heritage resources outside project area changed
5	Region	Heritage resources within region
6	National	Will affect the entire country
7	International	The effect will occur across international borders
Duration		
Score	Time period	Description
1	Transient	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
2	Short Term	Impact will remain for <10% of Project Life
3	Permanent	Impact will remain for >10% - 50% of Project Life
4	Beyond Project Life	Impact will permanently alter or change the heritage resource and/or value (Complete loss of information)
5	Project Life	Impact will reduce over time after project life (Mainly renewable resources and indirect impacts)
6	Long Term	The impact will cease after project life.
7	Medium Term	Impact will remain for >50% - Project Life
Severity		
Score	Scale of change	Description
1	Minor (Low Value)	No change to Heritage Resource with values medium or higher, or Any change to Heritage Resource with Low Value
2	Minor (Medium –	Minor change to Heritage Resource with Medium - Medium High



	High Value)	Value
3	Moderate (Medium – High Value)	Moderate change to Heritage Resource with Medium - Medium High Value
4	Major (Medium – High Value)	Major change to Heritage Resource with Medium-Medium High Value
5	Minor (High – Very High Value)	Minor change to Heritage Resource with High-Very High Value
6	Moderate (High – Very High Value)	Moderate change to Heritage Resource with High-Very High Value
7	Major (High – Very High Value)	Major change to Heritage Resource with High-Very High Value
Probability		
Score	Probability	Description
1	Highly Unlikely /None	Expected never to happen, impact will not occur
2	Rare / Improbable	Conceivable, but only in extreme circumstances, Have not happened during 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
3	Unlikely / Low probability	Has not happened yet but could happen once in the lifetime of the project, there is a possibility that the impact will occur
4	Probable	Could happen, has occurred here or elsewhere
5	Likely	Could easily happen, the impact may occur
6	High probability	Happens often, it is most likely that the impact will occur
7	Certain/Definite	Happens frequently, the impact will occur regardless of the implementation of any preventative or corrective actions



Table 3-4: Significance of impact on categories of heritage resources

Score	Magnitude of Impact			
	Rating	Archaeology, Palaeontology	Built Environment/Structures	Historic Landscape
1-37	No change	No change	No change to fabric or setting	No changes to landscape elements, parcels or components; no visual or audible changes; no changes in amenity or community factors.
38-74	Minor	Very minor changes to key archaeological materials, or setting.	Slight changes to historic building elements or setting that hardly affect it.	Very minor changes to key historic landscape elements, parcels or components; virtually unchanged visual effects; very slight changes in noise or sound quality; very slight changes to use or access; resulting in very small change to historic landscape character.
75-110	Moderate	Changes to key archaeological materials, such that the resource is slightly altered; slight changes to the setting.	Change to key historic building elements, such that the resource is slightly different; change to setting of an historic building, such that it is noticeably changed.	Change to few key historic landscape elements, parcels or components; slight visual changes to few key aspects of the historic landscape; limited changes in noise or sound quality; slight changes to use or access; resulting in limited changes to historic landscape character.



Score	Magnitude of Impact			
	Rating	Archaeology, Palaeontology	Built Environment/Structures	Historic Landscape
111-147	Major	Changes to many key archaeological materials, such that the resource is clearly modified; changes to the setting that affect the character of the asset	Change to many key historic building elements, such that the resource is significantly modified; change to setting of an historic building, such that it is significantly modified.	Change to many key historic landscape elements, parcels or components; visual change to many key aspects of the historic landscape; noticeable differences in noise or sound quality; considerable changes to use or access; resulting in moderate changes to historic landscape character.
		Changes to attributes that convey outstanding national value of national estate; Most or all key archaeological materials, including those that contribute to ONV such that the resource is totally altered; comprehensive changes to setting	Change to key historic building that contributes to outstanding national value of national estate such that the resource is totally altered; Comprehensive changes to setting.	Change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit and loss on outstanding national value.



4 REFERENCES

Nara Document on Authenticity, 1993. *ICOMOS: The Nara Document on Authenticity*, United Nations Educational, Scientific and Cultural Organisation: International Council on Monuments and Sites.

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