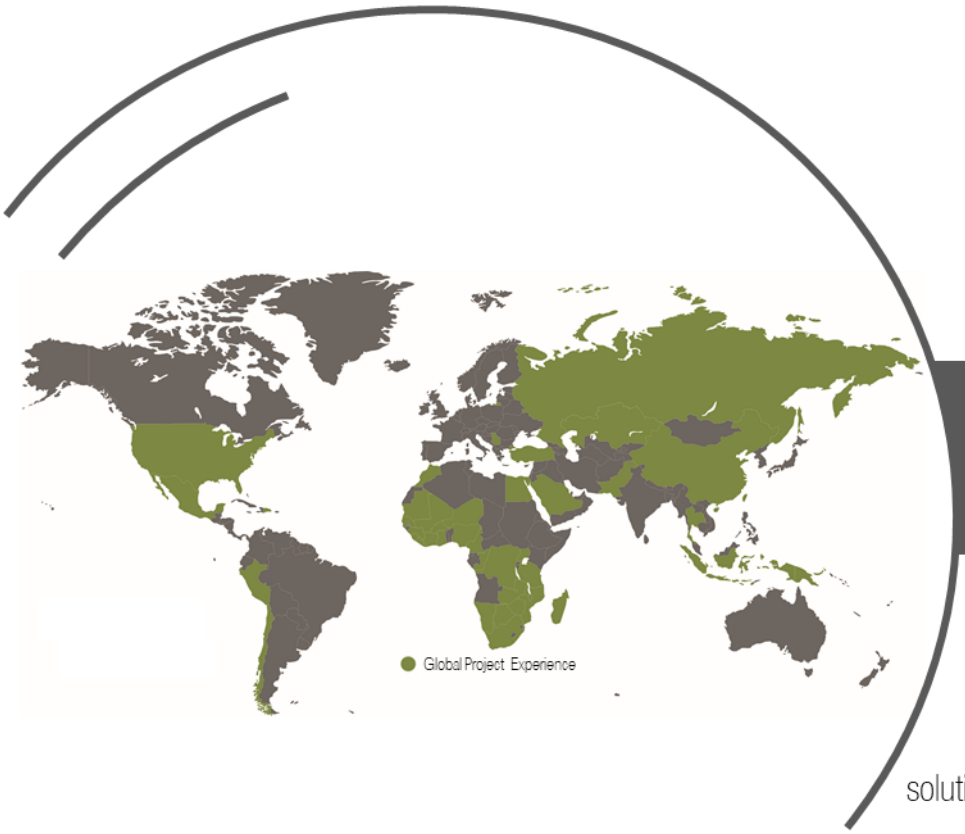

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Western Allen Ridge Gold Mine (Pty) Ltd Gas Exploration Right Application near Kroonstad in the Free State Province

Heritage Scoping Report

Prepared for:
Shango Solutions (Pty) Ltd

Project Number:
SHA6192

March 2020

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This document has been prepared by Digby Wells Environmental.

Report Type:	Heritage Scoping Report
Project Name:	Western Allen Ridge Gold Mine (Pty) Ltd Gas Exploration Right Application near Kroonstad in the Free State Province
Project Code:	SHA6192

Name	Responsibility	Signature	Date
Shannon Hardwick HRM Consultant ASAPA Member: 451	Report Compilation		March 2020
Justin du Piesanie Divisional Manager: Social and Heritage Services ASAPA Member 270	Technical Review		March 2020

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EXECUTIVE SUMMARY

Western Allen Ridge Gold Mine (Pty) Ltd (hereinafter Western Allen Ridge), a subsidiary of White Rivers Exploration (WRE), has been granted a Technical Cooperation Permit (TCP[1]) for a target area approximately 15 km east of Kroonstad in the Free State Province. Western Allen Ridge intends to apply for an Exploration Right over the TCP area ("the Project"). Western Allen Ridge proposes to apply for an Exploration Right for the entire TCP area for three years. Western Allen Ridge aims to drill and establish two gas exploration wells in the second year of the permit term and, based on the outcomes of these wells, will establish an additional two wells in the third year. Western Allen Ridge will need to construct access roads to these wells.

Shango Solutions (hereinafter Shango) are the geological consultants for WRE and Western Allen Ridge and are undertaking the Environmental Impact Assessment (EIA) process in support of the Exploration Right Application in compliance with application national legislation. Shango appointed Digby Wells Environmental (hereinafter Digby Wells) to undertake a Heritage Resources Management (HRM) process in support of the EIA process in compliance with the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

This report constitutes the Heritage Scoping Report (HSR), the second deliverable in the HRM process, for submission to the Heritage Resources Authorities (HRAs).

The cultural landscape of the regional study area predominantly comprises the historical built environment and archaeological artefacts representing the Middle Stone Age (MSA). This notwithstanding, archaeological artefacts representing the Later Stone Age (LSA) and Late Farming Community (LFC) periods as well as burial grounds and graves have been recorded. These resources may, to lesser or greater extent, be directly, indirectly or cumulatively impacted on by development activities. The table below presents an overview of the anticipated impacts to heritage resources by the Project.

[1] Granted 09 May 2019, Petroleum Agency of South Africa (PASA) Reference Number: 12/2/167 TCP.

Potential heritage Resources and Risks

Heritage Risks	Consequence of Identification
Impact to fossil-bearing material.	Digby Wells will assess the impact to these identified heritage resources, where such resources may be present in the Project area. This assessment will be based on the proposed infrastructure layout design and will be informed by the Cultural Significance (CS) of the heritage resources. Western Allen Ridge may need to implement mitigation measures in compliance with Sections 34, 35 and/or 36 of the NHRA, as may be applicable.
Impact to *in situ* archaeological material.	
Impact to *in situ* historical built environment sites.	
Impact to *in situ* burial grounds or graves.	

Based on the Project description, Digby Wells is of the opinion that there is potential to alter the current *status quo* of heritage resources identified within the Project area. The potential impacts posed by Project activities to the heritage resources require an assessment to provide reasonable and feasible mitigation and management measures aimed at removing or reducing the intensity of the potential impacts. Digby Wells will undertake a Heritage Impact Assessment (HIA) process to assess the impacts to cultural heritage resources and a desktop specialist Palaeontology Impact Assessment (PIA) process to consider impacts to the fossil heritage resources.

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1 Introduction

Western Allen Ridge Gold Mine (Pty) Ltd (hereinafter Western Allen Ridge), a subsidiary of White Rivers Exploration (WRE), has been granted a Technical Cooperation Permit (TCP[2]) for a target area approximately 15 km east of Kroonstad in the Free State Province. Western Allen Ridge intends to apply for an Exploration Right over the TCP area ("the Project").

Shango Solutions (hereinafter Shango) are the geological consultants for WRE and Western Allen Ridge presently undertaking the Environmental Impact Assessment (EIA) process in support of the Exploration Right Application in terms of Section 79 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA). The EIA process is being undertaken in compliance with:

- The National Environmental Management Act, 1998 (Act No. 107 of 1999) (NEMA); and
- The EIA Regulations, 2014 (Government Notice Regulation [GN R] 982 of 4 December 2014, as amended) (EIA Regulations, 2014, as amended) promulgated under the NEMA.

Shango appointed Digby Wells Environmental (hereinafter Digby Wells) to undertake a Heritage Resources Management (HRM) process in support of the EIA process in compliance with the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

This report constitutes the Heritage Scoping Report (HSR), the second deliverable in the HRM process, for submission to the South African Heritage Resources Agency (SAHRA) and Heritage Free State (HFS).

1.1 Project Background and Description

Western Allen Ridge holds the TCP over an area of 33 605.29 hectares approximately 15 km east of Kroonstad. WRE has investigated the Kroonstad area for gold and gas in the past and has held a TCP and a prospecting right over the Project area. Plan 1 presents the regional setting within which the Project is located.

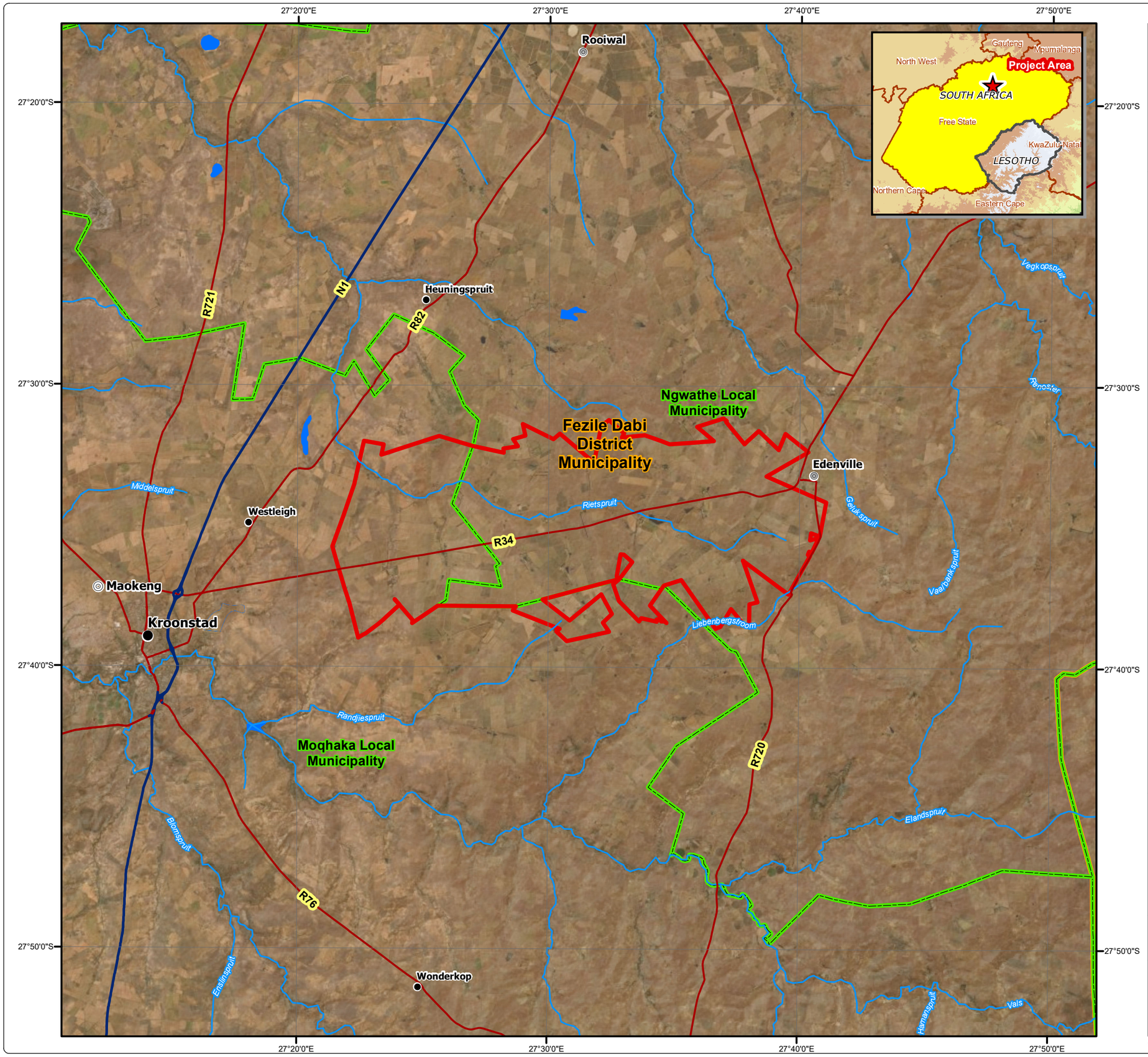
Western Allen Ridge intends to apply for an Exploration Right for the entire TCP area for three years. During the second year of the permit application period, Western Allen intends to drill and establish two gas exploration wells. Based on the outcomes of the results from the exploration wells, Western Allen Ridge may drill and establish an additional two exploration wells. Plan 2 presents the proposed location of these exploration wells.

[2] Granted 09 May 2019, Petroleum Agency of South Africa (PASA) Reference Number: 12/2/167 TCP.

Plan 1

Kroonstad Gas Exploration Project

Regional Setting



Legend

- Project Area
- Major Town
- Secondary Town
- Other Town
- Settlement
- Main Road
- National Road
- Perennial Stream
- Dam
- Local Municipality Boundary
- District Municipality Boundary

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Plan 2

Kroonstad Gas Exploration Project

Proposed Infrastructure Layout

27°25'0"E 27°30'0"E 27°35'0"E 27°40'0"E

27°30'0"S 27°35'0"S 27°40'0"S

Heuningspruit
HEUNINGSPRUIT
DORWIGSPRUIT
TWEESPRUIT
ROOIKRAALSPRUIT
Edenville
Target C
Target B
Target A
Target D
RIETSPRUIT
LIEBENBERGSTROOM
HODGMAN'S SPRUIT
BOSSIESPRUIT
RANDJIESPRUIT
KWAGGASPRUIT

Legend

- Project Area
- Other Town
- Settlement
- National Route
- Main Road
- Street
- Non-Perennial Stream
- Perennial Stream
- Dam / Lake
- Marsh / Swamp
- Non-Perennial Pan
- Perennial Pan

Proposed Infrastructure Layout

- Planned Boreholes

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1.2 Project Alternatives

Western Allen Ridge will base the activities in the third year of the application on the outcomes of the first two exploration wells. At this stage, no other alternatives have been considered in the Mine Works Programme (MWP).

An alternative that could be considered at this stage is the “no-go” alternative. Should the Project not obtain approval, or not go ahead for any reason, the potential environmental impacts associated with the development of the mine as described in Section 1.1 would not occur. However, the potential benefits associated with the Project would also not occur. These potential benefits will be explored in the Heritage Impact Assessment (HIA) report.

1.3 Terms of Reference

Shango appointed Digby Wells to undertake the specialist HRM process in accordance with the national regulatory framework, with specific reference to Section 38 of the NHRA.

1.4 Scope of Work

The Scope of Work (SoW) for the specialist HRM process included the compilation of an HSR to comply, in part, with the requirements of Section 38(3) of the NHRA. Digby Wells completed the following activities as part of this SoW:

- Describing the predominant cultural landscape, supported through secondary data collection;
- Identifying the potential impacts to heritage resources, based on Project-related activities and sources of risk to the heritage resources or the Project; and
- Recommending the specific Terms of Reference (ToR) for the pending HIA.

1.5 Expertise of the Specialists

Appendix A includes the CVs of the specialists involved in the HRM process.

1.6 Structure of the Report

This document constitutes a description of the proposed Project, a summary of the cultural heritage landscape within which the Project is situated, a brief methodology relevant to the activities undertaken to compile this report and a description of the risks and impacts foreseen should the Project go ahead.

The risks and impacts will be assessed in more detail in the HIA report. The HIA report will include a description of the legislation and policies applicable to the HRM process as well as a description of the constraints and limitations experienced in the HRM process. The HIA report will include a detailed table indicating compliance of the HRM process with Appendix 6 of Government Notice Regulation (GN R) 326 of 07 April 2017.

2 Methodology

The following section presents a summary of the methods employed in the compilation of this report. A more detailed methodology statement is included in Appendix B. Methodologies that will be used for the HIA process will be described in the HIA.

2.1 Defining the Study Area

Heritage resources do not exist in isolation to the greater natural and social, including the socio-cultural, socio-economic and socio-political, environments. In addition, the NHRA requires the grading of heritage resources in terms of national, provincial and local concern based on their importance and the resultant official (i.e. State) management effort required. The type and level of baseline information necessary to adequately predict heritage impacts varies between these categories.

Considering these requirements, Digby Wells defined four nested study areas for the purposes of study. These include:

- The *infrastructure area*: the farm portions associated with the proposed gas exploration wells and infrastructure design associated with the Project, including a 500 m buffer area. In some cases, the proposed infrastructure may extend linearly, in which case the infrastructure area will include the linear infrastructure as well as a 200 m buffer on either side of the infrastructure footprint;
- The *Project area* or *site-specific study area*: the farm portions included in the TCP area and which will constitute the proposed Prospecting Right;
- The *local study area*: the area most likely to be influenced by any changes to heritage resources in the Project area or where Project development could cause heritage impacts. Defined as the area bounded by the local municipality, in this instance the Moqhaka Local Municipality (MLM) and the Ngwathe Local Municipality (NLM), with particular reference to the immediate surrounding properties and/or farms. The local study area was specifically examined to offer a backdrop to the socio-economic conditions within which the proposed development will occur. The local study area furthermore provided the local development and planning context that may contribute to cumulative impacts; and
- The *regional study area*: the area bounded by the district municipality, which here is the Fezile Dabi District Municipality (FDDM). Where necessary, the regional study area may be extended outside the boundaries of the district municipality to include much wider regional expressions of specific types of heritage resources and historical events. The regional study area also provided the regional development and planning context that may contribute to cumulative impacts.

2.2 Secondary Data Collection

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

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

- Gaining an understanding of the cultural landscape within which the proposed Project is located; and
- Identify any potential fatal flaws, sensitive areas, current social complexities and issues and known or possible tangible heritage.

Repositories that were surveyed included the South African Heritage Resources Information System (SAHRIS), online/electronic journals and platforms and select internet sources. This HSR includes a summary and discussion of the most relevant findings. Table 2-1 lists the sources consulted in the literature review (refer to Section 9 for more detailed references).

Table 2-1: Secondary Data Sources

Reviewed Secondary Data		
Databases		
Genealogical Society of South Africa (2011)	University of the Witwatersrand (Wits) database (2010)	
SAHRIS Database	SAHRIS Palaeo-Sensitivity Map (SAHRA, 2017)	
SAHRIS Cases		
Map ID: 01496 Map ID: 01566 Map ID: 01540 Map ID: 02388 Map ID: 01608 Map ID: 01522 Map ID: 01812 Map ID: 01790	Map ID:01767 Case ID: 13515 Case ID: 11817 Case ID: 3169 Case ID: 5659 Case ID: 13583 Case ID: 5818 Case ID: 12861	Case ID: 12862 Case ID: 4117 Case ID: 2256 Case ID: 3332 Case ID: 9304 Case ID: 3420 Case ID: 4560 Case ID: 13222
Cited Text		
Behrens & Swanepoel, 2008	Clark, 1982	Deacon & Deacon, 1999
Daniels, 2013	Daniels & Tomsana, 2014	Delius & Cope, 2007
Delius, et al., 2014	De Bruyn & Tomose, 2018	De Bruyn & Mosweu, 2019

Reviewed Secondary Data		
Dreyer, 2005, 2006a, 2006b, 2006c, 2007, 2008	Esterhuysen & Smith, 2007	Fairbridge, 1918
Groenwald & Groenewald, 2014	Huffman, 2007	Johnson, et al., 2006
Kruger, 2018	Landau, 2010	Maggs, 1976
Mitchell, 2002	Pistorius, 2004	Sebogodi, 2014
Swanepoel, et al., 2008	Van Der Walt, 2013a, 2013b	

3 Cultural Heritage Baseline Description

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

The cultural heritage baseline description considered the predominant landscape based on the identified heritage resources within the regional and local study area. Table 3-1 presents the broad timeframes for the major periods of the past in South Africa.

Table 3-1: Periods in the South African past

The Stone Age	Early Stone Age (ESA)	2 million years ago (mya) to 250 thousand years ago (kya)
	Middle Stone Age (MSA)	250 kya to 20 kya
	Later Stone Age (LSA)	20 kya to 500 CE (Common Era[3])
Farming Communities	Early Farming communities (EFC)	500 to 1400 CE
	Late Farming Communities (LFC)	1100 to 1800 CE
Historical Period	-	1500 CE to 1994 (Behrens & Swanepoel, 2008)

Adapted from Esterhuysen & Smith (2007)

Figure 3-1 below presents the results of the review of previously-completed heritage assessments. In total, 28 heritage resources were identified within the regional, local and site-specific study areas. Plan 3 shows where such heritage resources have been recorded.

The predominant tangible heritage resources recorded in the area under consideration demonstrate affiliations with the historical period, dominated by burial grounds and graves and

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

the historical built environment. This notwithstanding, archaeological resources representing the Stone Age and LFC have been recorded in the greater study area.

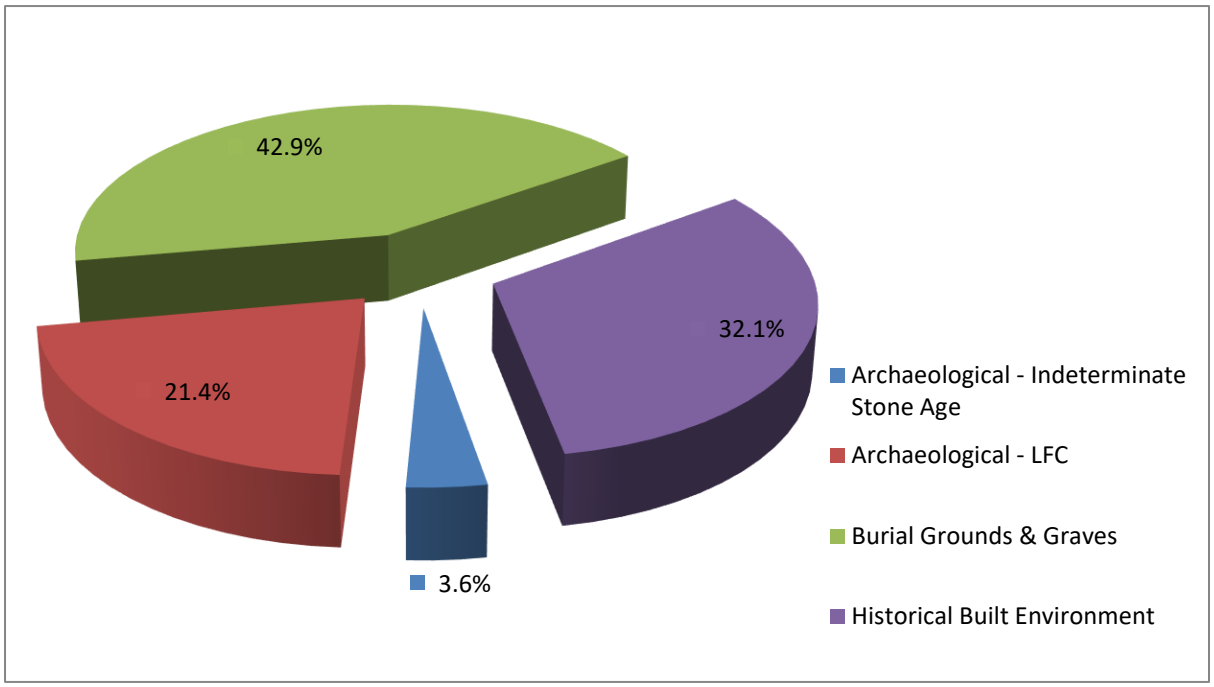

Figure 3-1: Heritage Resources Identified Within the Regional Study Area

Plan 3

Kroonstad Gas Exploration Project

Previously Identified Heritage Resources

Legend

- Project Area
- Previously Identified Heritage Resources
- City
- Major Town
- Secondary Town
- Other Town
- Settlement
- Main Road
- National Road
- Perennial Stream
- Dam

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3.1 Geological Setting and Palaeontological Setting

The geological context and palaeontological sensitivities of the Project area will be described in more detail in a specialist Palaeontological Impact Assessment (PIA) report which will be appended to the HIA report. This section presents a broad overview of the regional geological setting and the palaeontological sensitivities which may be expected within the Project area.

The regional study area is underlain predominately by lithologies associated with the Karoo Supergroup and forms part of the Main Karoo Basin. The Main Karoo Basin dates from the Late Carboniferous to the Middle Jurassic periods, which is approximately 320 to 145 mya (Johnson, et al., 2006). The Main Karoo Basin constitutes a retro-arc foreland basin. As described by Johnson *et al* (2006), this is because of:

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

These processes allowed for sedimentation of the basin, forming what is collectively known as the Karoo Supergroup (Johnson, et al., 2006). These sediments cover approximately 700 000 km^2, including the site-specific study area. Figure 3-2 illustrates the extent of the Main Karoo Basin and the envisaged plate tectonic setting of the basin in the Late Triassic.

Within the Karoo Basin, two geological features are relevant to the Project: the Volksrust Formation of the Ecca Group and the Adelaide Sub-group. Table 3-2 presents the geological sequence of these features.

The Ecca Group is the most palaeontologically sensitive of the layers within the Karoo Supergroup (labelled E in Figure 3-2) and the group is considered of very high palaeosensitivity, although the sensitivity of various layers may differ (Groenwald & Groenewald, 2014). Ecca Group sediments are well-known for their wealth of plant fossils, characterised by assemblages of Glossopteris (plant species defined by through their fossil leaves). These layers also include significant coal reserves.

In the north-eastern parts of the Free State Province, the Ecca Group consists of the lower *Pietermaritzburg Formation*, the *Vryheid Formation* and the upper *Volksrust Formation* (Groenwald & Groenewald, 2014). The Project area is underlain by the *Volksrust Formation*. This consists of monotonous sequences of grey shale. Fossils are significant but are rarely recorded. Table 3-2 includes the types of fossils found within the Formation.

Overlying the Ecca group is the late Permian to early Triassic Beaufort Group of sediments (Groenwald & Groenewald, 2014). These sediments are divided into two sub-groups – a lower Adelaide Sub-group and an upper Tarkastad Sub-group. The Adelaide Sub-group is comprised of sediments deposited in a range of environments, from deltaic environments in the lower part of the sub-group to lacustrine and playa lake environments in the upper part of the sub-group. Table 3-2 presents the types of fossils expected within the sub-group.

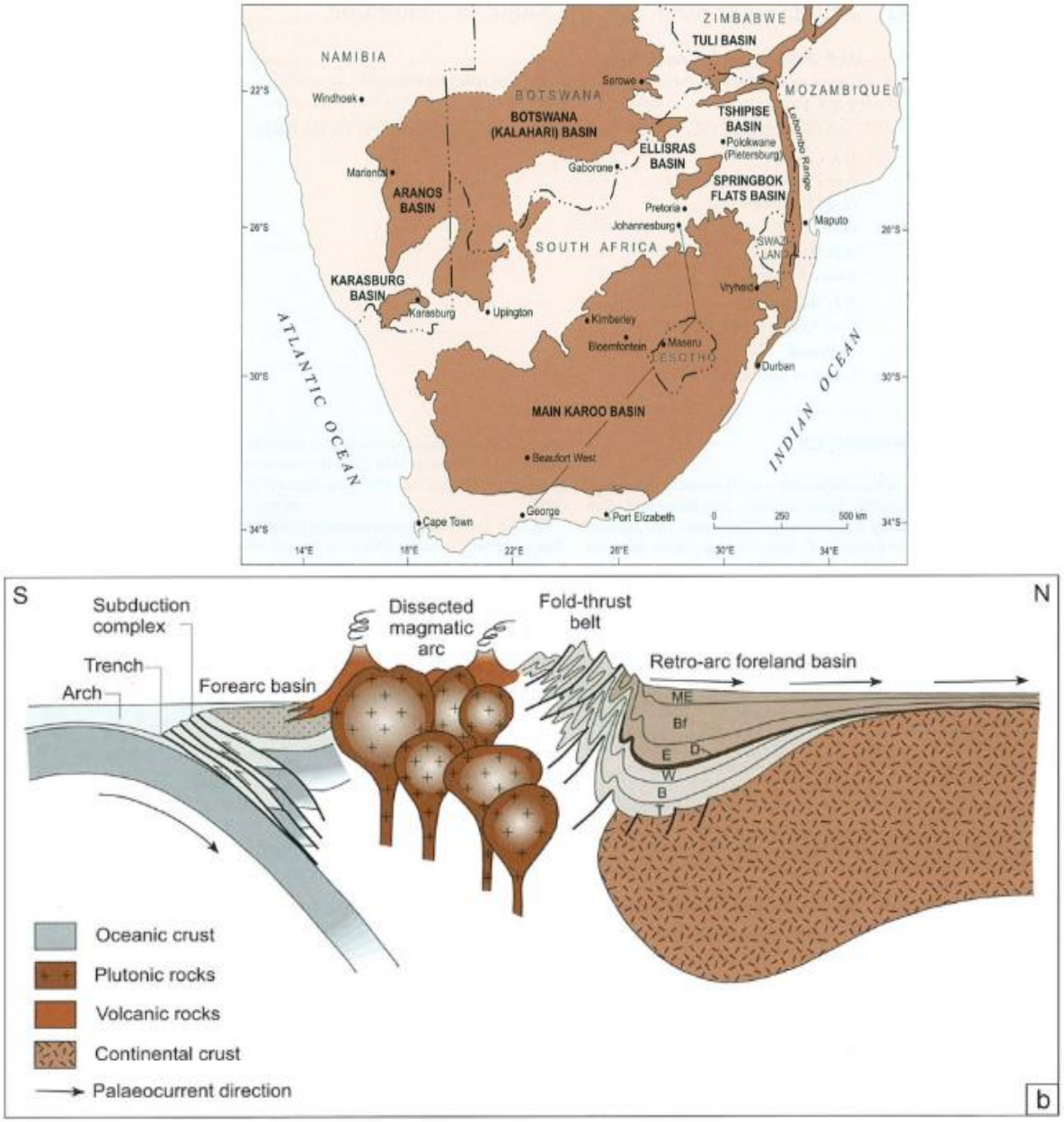

Figure 3-2: Location and Envisaged Plate Tectonic Setting of the Main Karoo Basin during the Late Triassic

Adapted from Johnson, et al. (2006)

Table 3-2: Lithostratigraphic Units underlying the Regional Study Area and Associated Palaeosensitivity

Eon	Era	Period	Ma	Lithographic Units				Significance	Fossils
				Supergroup	Group	Sub-group	Formation		
Phanerozoic	Mesozoic	Triassic	145	Karoo Supergroup	Beaufort Group	Adelaide Sub-group	Koonop Formation	Very High	Diverse terrestrial and freshwater tetrapods from the *Pristeognathus* to *Dicynodon* Assemblage Zones (amphibians, true reptiles and synapsids) and Lystrosaurus Assemblage Zone (dicynodonts, cynodonts, therocephalians, procolophonids and archosaurs), palaeoniscoid fish, freshwater bi valves, trace fossils (including tetrapod trackways, vertebrate burrows and coprolites), and insects. These formations may also include vascular plants (*Glossopteris* flora) and petrified wood.
	Palaeozoic	Permian					Middelton Formation		
							Balfour Formation		
			300		Ecca Group		Volksrust Formation	Moderate	Trace fossils, rare temnospondyl amphibian remains, invertebrates (bivalves, insects), minor coals with plant remains, petrified wood, organic microfossils (acritarchs), low-diversity marine to non-marine trace fossil assemblages.

Adapted from Groenwald & Groenewald (2014)

3.2 Archaeo-historical context

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

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

The survey of the heritage assessments previously completed within the regional study area yielded one expression of the indeterminate Stone Age (accounting for 3.6% of the identified records). The resource comprised of a low-density scatter of stone tools (Pistorius, 2004). Material associated with the MSA and LSA has been recorded within the province and may potentially be uncovered during Project activities. As such, a brief description of the periods within the Stone Age follows.

The ESA is comprised predominantly of large handaxes and cleavers made of coarse-grained materials (Esterhuysen & Smith, 2007). This period occurred between 2 mya and 250 kya and is associated with Australopithecus and early *Homo* hominid species.

The MSA dates from approximately 300 kya to 20 kya. High proportions of minimally modified blades, created using the Levallois technique, characterise the early MSA lithic industries (Clark, 1982; Deacon & Deacon, 1999). The MSA can be more broadly defined through the presence of blades and points produced on good-quality raw material. The presence of bone tools, ochre, beads and pendants also define this period.

The LSA dates between 40 kya to the historical period. LSA lithics are specialised where specific tools have been created for specific tasks (Mitchell, 2002). LSA assemblages can also include bone points and commonly include diagnostic tools such as microlithic scrapers and segments. In southern Africa, the LSA is closely associated with hunter-gatherer groups, such as the San. Regional hunter-gatherer occupation is well documented, although open sites are usually poorly preserved and difficult to identify because of the nomadic nature of these peoples.

The LSA is further defined by evidence of ritual practise and complex societies (Deacon & Deacon, 1999). This is often expressed through rock art. The literature survey did not yield any records of rock art within the regional study area.

The San were later followed by the various peoples of the Farming Community. The farming community period correlates to the movements of Bantu-speaking agro-pastoralists moving into southern Africa and is divided into two stages to distinguish between widespread events: the EFC and the LFC.

No EFC material was recorded in the reviewed literature.

LFC sites can be identified through secondary tangible surface indicators, such as ceramics and evidence for domesticated animals, i.e. dung deposits or faunal remains. These resources provide motivation for settlement and possible trade networks and are distributed across the region (Huffman, 2007; Delius, et al., 2014). The *Makgwareng facies* of ceramics occurs within the regional study area. These ceramics are characterised by decorations including appliqué, finely-stamped triangles and rim notching (Huffman, 2007). These ceramics date from 1700 to 1820 CE.

Stonewalling is the most visible indicator of LFC settlements. Table 3-3 presents a summary of the stonewalled settlement types within the province. Within the regional study area, Type V is the dominant stonewalling type. First described by Maggs (1976), these settlements consist of a ring around which primary enclosures are grouped. The closures are either contiguous or linked by secondary walling to form a secondary enclosure. There may be additional free-standing structures around the periphery of the settlement unit, but there is no surrounding wall. *Makgwareng* ceramics are typically associated with Type V walling.

Within the regional study area, the LFC accounts for nine records or 21.4% of the identified heritage resources included in the literature survey. These resources include stonewalling, low density artefact scatters and sites which include stonewalling and material culture including potsherds and metal fragments (Dreyer, 2005; 2006a; 2006b; WITS, 2010).

Table 3-3: Stonewalled Settlement Types

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

Adapted from Huffman (2007)

The historical period[4] is commonly regarded as the period characterised by contact between Europeans and Bantu-speaking African groups and the written records associated with this

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

interaction. However, the division between the LFC and historical period is artificial, as there is a large amount of overlap between the two.

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

As a result of social and political upheaval, the Highveld was vulnerable to intrusive groups including the Swazi and the Voortrekkers. Groups of Afrikaaners initiated a move from the Cape to the interior to establish an independent state in approximately 1835, in reaction to increased British liberalism and the abolishment of slavery and pass laws. The migration of these Voortrekkers is commonly referred to as the Great Trek (or *Groot Trek*) and it started with the Robert Schoon Party in 1836. By 1838, the Voortrekkers had settled on both sides of the Vaal River and declared the area Boer lands (Delius & Cope, 2007).

Chief Moshoeshoe resisted the influx of the Voortrekkers and sought the assistance of the British Kingdom, sanctioned through the signing of a treaty in 1843. In response, the British, under the Governor of the Cape, issued a proclamation declaring British sovereignty over all the lands between the Orange and Vaal Rivers (Fairbridge, 1918). This proclamation was superseded by the signing of the Sand River Convention in 1852. The Sand River Convention was an agreement between the British and the Voortrekkers to the north of the Vaal acknowledging their independence and the establishment of the Zuid-Afrikaansche Republiek (ZAR). ZAR independence allowed for land to be distributed to its citizens, though the demarcation of farms and the issuing of title deeds. It was not until 17 February 1854 that the independence of the Orange River Sovereignty was recognised, and officially became the Orange Free State with the signing of the Orange River Convention.

Subsequent to this, a breach of the agreements by the British resulted in the relationships with the Boers to break down and the start of the Anglo Boer Wars. The South African War of 1899-1902 (previously referred to as the Second Anglo-Boer War) officially started on October 9th, 1899. The war was the result of building tensions and conflicting political agendas between the Trekboers and the British.

The concentration camps associated with the South African War within the Free State province include:

- Kroonstad (approximately 17 km west of the Project area);

- Heilbron (40 km northeast);
- Vredefortweg (the concentration camp cemetery is located approximately 40 km north of the Project area, as the crow flies);
- Reitz (80 km east);
- Winburg (100 km south);
- Brandfort (150 km southwest);
- Harrismith (160 km southeast);
- Ladybrand (170 km south);
- Bloemfontein (200 km southwest);
- Edenburg (280 km southwest);
- Springfontein (330 km southwest); and
- Bethulie (350 km southwest).

Within the regional study area, historical resources are represented as:

- Built environment resources, including buildings, structural remains and industrial and functional structures (Pistorius, 2004; WITS, 2010; Daniels, 2013; Van Der Walt, 2013b; Daniels & Tomsana, 2014; De Bruyn & Tomose, 2018);
- A low-density scatter of historical artefacts including pottery and a smoking pipe (WITS, 2010); and
- Burial grounds and graves, ranging from burial grounds of less than ten graves to burial grounds of less than 50 graves and including burial grounds of indeterminate size (Pistorius, 2004; Dreyer, 2006c; 2007; 2008; WITS, 2010; Daniels, 2013; Van Der Walt, 2013a; 2013b; Sebogodi, 2014; De Bruyn & Tomose, 2018).

4 Potential Heritage Risks

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

Where Western Allen Ridge knowingly do not take proactive management measures against potential impacts discussed below and in the HIA report, risks arising from the heritage resources may manifest as:

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

Table 4-1 summarises the potential risks that may arise for Western Allen Ridge.

Table 4-1: Identified Heritage Risks That May Arise for Western Allen Ridge

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

Where heritage resources are identified during the assessment phase of the HRM process, the risks to such resources must be assessed. Table 4-2 provides an overview of these risks. This will be assessed in more detail during the assessment phase.

Table 4-2: Potential heritage Resources and Risks

Heritage Risks	Consequence of Identification
Impact to fossil-bearing material.	Digby Wells will assess the impact to these identified heritage resources, where such resources may be present in the Project area. This assessment will be based on the proposed infrastructure layout design and will be informed by the Cultural Significance (CS) of the heritage resources. Western Allen Ridge may need to implement mitigation measures in compliance with Sections 34, 35 and/or 36 of the NHRA, as may be applicable.
Impact to *in situ* archaeological material.	
Impact to *in situ* historical built environment sites.	
Impact to *in situ* burial grounds or graves.	

5 Predicted Heritage Impacts

Predicted heritage impacts are predominantly associated with Project-related activities and the assessment of impacts is therefore based on the Project description presented in Section 1.1 above. Table 5-1 presents a high-level overview of the predicted impacts to heritage resources. These impacts will be assessed in more detail in the HIA and PIA reports.

Table 5-1: Predicted Heritage Impacts

Activities	Potential impacts	Mitigation type	Potential for residual risk
Surface or vegetation clearing ahead of construction	Damage to or destruction of heritage resources generally protected under Sections 34, 35 and 36 of the NHRA (i.e. historical structures, archaeological and fossiliferous material or burial grounds and graves respectively)	Proactive – amend Project design where necessary to avoid negative impacts. Reactive – mitigate impact, where avoidance is not possible.	Potential exposure of previously-unidentified heritage resources. There is a risk that such heritage resources may be damaged or destroyed when exposed. Negative RoD and/or development restrictions issued by SAHRA and/or HFS in terms of Section 38(8) of the NHRA.
Construction of access roads			
Establishing gas exploration wells			

6 Scoping Assessment

The cultural landscape of the regional study area predominantly comprises the historical built environment and archaeological artefacts representing the MSA. This notwithstanding, archaeological artefacts representing the LSA and LFC as well as burial grounds and graves have been recorded. These resources may, to lesser or greater extent, be directly, indirectly or cumulatively impacted on by development activities. A preliminary scoping assessment of the potential impacts to heritage resources as described in Table 4-2 is presented in Table 6-1.

Digby Wells will assess the impacts to the cultural heritage landscape in further detail in the impact assessment phase. Section 8 includes a description of the recommended way forward.

Table 6-1: Scoping assessment

Specific activity	Risk	Probability of impacts *(0 - zero / negligible, 1 - low, 2 likely, 3 - certain)*										
		National / Provincial heritage sites (S.	Protected areas (S. 28)	Provisional protection (S. 28)	Heritage areas (S. 31)	Heritage objects (S. 32)	Structures (S. 34)	Archaeology (S. 35)	Palaeontology (S. 35)	Meteorites (S. 35)	Burial grounds and graves (S. 36)	Public monuments and memorials
Surface or vegetation clearing ahead of construction	Damage to or the destruction of heritage resources	0	0	0	0	0	1	2	1	0	1	0
Construction of access roads		0	0	0	0	0	1	2	1	0	1	0
Establishment of gas exploration wells		0	0	0	0	0	1	2	3		1	

7 Proposed Way Forward

Digby Wells will complete a HIA and PIA in compliance with Section 38(8) of the NHRA in support of the EIA for the Project. Digby Wells. Digby Wells will submit the HIA and PIA, together with the EIA report and supporting specialist studies, to the relevant heritage authorities for Statutory Comment.

In compliance with the requirements encapsulated in Section 38(8) of the NHRA, the HIA and PIA process will include the following:

- In-field assessment of the Project area with specific reference to the proposed infrastructure layout. This will include a pre-disturbance survey aimed at identifying cultural heritage resources within the Project area that may be impacted by the Project; and
- Assigning Cultural Significance (CS) values to and proposing Field Ratings for heritage resources identified in the pre-disturbance survey considering Sections 3 and 7 of the NHRA respectively;
- Assessing the impacts to heritage resources using the Shango Solutions impact assessment method (refer to Appendix B), considering the CS of the affected heritage resources;
- Developing reasonable and feasible management measures and mitigation strategies; and
- A specialist desktop PIA process to address the requirements of the South African Heritage Resources Information System (SAHRIS) Palaeosensitivity Map (PSM).

8 Conclusion

The aim of the HSR was to develop a cultural heritage baseline of the site-specific study area while considering the larger local and regional context. The identified baseline was used to complete the primary assessment of the potential risks, possible impacts and high-level scoping assessment to inform the proposed way forward, which will include an EIA and HIA phase.

Based on the Project description, Digby Wells is of the opinion that there is potential to alter the current *status quo* of heritage resources identified within the site-specific study area. The potential impacts posed by Project activities to the heritage resources require an assessment to provide reasonable and feasible mitigation and management measures aimed at removing or reducing the intensity of the potential impacts. The HIA report will consider impacts to cultural heritage resources and a PIA report will consider impacts to the fossil heritage resources.

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Appendix A: Specialist CVs

Miss Shannon Hardwick

Heritage Resources Management Consultant

Social and Heritage Services

Digby Wells Environmental

1 Education

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

2 Language Skills

Language	Written	Spoken
English	Excellent	Excellent
Afrikaans	Fair	Basic

3 Employment

Period	Company	Title/position
2019 to Present	Digby Wells Environmental	Heritage Resources Management Consultant
2017 to 2019	Digby Wells Environmental	Assistant Heritage Resources Management Consultant
2017 to 2017	Digby Wells Environmental	Social and Heritage Services Intern
2016 to 2017	Tarsus Academy	Facilitator
2011 to 2016	University of the Witwatersrand	Teaching Assistant
2011	University of the Witwatersrand	Collections Assistant

4 Experience

I joined the Digby Wells team in May 2017 as a Heritage Management Intern and has most recently been appointed as a Heritage Resources Management Consultant. I am an archaeologist and obtained a Master of Science (MSc) degree from the University of the Witwatersrand in 2013, specialising in historical archaeobotany in the Limpopo Province. I am a published co-author of one paper in *Journal of Ethnobiology*.

Since joining Digby Wells, I have gained generalist experience through the compilation of various heritage assessments, including Notification of Intent to Develop (NIDs), Heritage Scoping Reports (HSRs), Heritage Impact Assessment (HIA) reports, Heritage Basic Assessment Reports (HBARs) and permit applications to undertake permitted activities in terms of Sections 34 and 35 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). I have also obtained experience in compiling socio-economic documents, including a Community Health, Safety and Security Management Plan (CHSSMP) and social baselines and data analysis for Projects in South Africa, Malawi, Mali and Sierra Leone. My fieldwork experience includes heritage pre-disturbance surveys in South Africa, Malawi and the Democratic Republic of the Congo and social fieldwork in Malawi.

I am a registered member of the Association of Southern African Professional Archaeologists (ASAPA) and the International Council on Monuments and Sites (ICOMOS).

5 Project Experience

My project experience is listed in the table below.

Project Experience

Project Title	Name of Client	Project Location	Date of Completion	Project / Experience Description
Environmental Authorisation for the Dagsoom Coal Mining Project near Ermelo, Mpumalanga Province	Dagsoom Coal Mining (Pty) Ltd	Ermelo, Mpumalanga Province	Ongoing	Heritage Impact Assessment
Regional Tailings Storage Facility Heritage Mitigations	Ergo Mining (Pty) Ltd	Randfontein, Gauteng	Ongoing	Section 34 Permit Application Process
Weltervreden Mine Environmental Authorisation, Water Use Licence and Mining Right Application Project	Mbuyelo Group (Pty) Ltd	Belfast, Mpumalanga	Ongoing	Heritage Impact Assessment

Project Title	Name of Client	Project Location	Date of Completion	Project / Experience Description
Environmental Authorisation for the proposed Lephalale Pipeline Project, Limpopo Province	MDT Environmental (Pty) Ltd	Lephalale, Limpopo Province	2019	Notification of Intent to Develop
Heritage Resources Management Process Update for the Exxaro Matla Mine	Exxaro Coal Mpumalanga (Pty) Ltd	Kriel, Mpumalanga Province	2019	Heritage Site Management Plan Update
Environmental Authorisation for the proposed Musina-Makhado Special Economic Zone Development Project, Limpopo Province	Limpopo Economic Development Agency	Vhembe District Municipality, Limpopo Province	Ongoing	Heritage Impact Assessment Project Management
Songwe Hills Rare Earth Elements Project	Mkango Resources Limited	Phalombe District, Malawi	Ongoing	Heritage Impact Assessment
Elandsfontein Colliery Burial Grounds and Graves Chance Finds	Anker Coal and Mineral Holdings SA (Pty) Ltd Elandsfontein Colliery (Pty) Ltd	Clewer, Emalahleni, Mpumalanga Province	December 2018	Site Inspection Project Management
Environmental Authorisation Process to Decommission a Conveyor Belt Servitude, Road and Quarry at Twistdraai East Colliery	Sasol Mining (Pty) Ltd	Secunda, Mpumalanga Province	Ongoing	Notification of Intent to Develop
Environmental and Social Impact Assessment for the Bougouni Lithium Project, Mali	Future Minerals S.A.R.L.	Bougouni, Mali	Ongoing	Heritage Impact Assessment
Environmental Authorisation for the Nomalanga Estates Expansion Project, KwaZulu-Natal	Nomalanga Property Holdings (Pty) Ltd	Greytown. KwaZulu-Natal	Ongoing	Heritage Impact Assessment
Environmental Authorisation for the Temo Mine proposed Rail, Road and Pipeline Development, Limpopo Province	Temo Coal Mining (Pty) Ltd	Lephalale, Limpopo Province	Ongoing	Heritage Impact Assessment

Project Title	Name of Client	Project Location	Date of Completion	Project / Experience Description
Gorumbwa RAP Audit	Randgold Resources Limited	Kibali Sector, Democratic Republic of the Congo	December 2018	Resettlement Action Plan Audit
Sasol Sigma Defunct Colliery Surface Mitigation Project: Proposed Rover Diversion and Flood Protection Berms	Sasol Mining (Pty) Ltd	Sasolburg, Free State Province	November 2018	Notification of Intent to Develop
Basic Assessment and Regulation 31 Amendment / Consolidation for Sigma Colliery: Mooikraal and Sigma Colliery: 3 Shaft	Sasol Mining (Pty) Ltd	Sasolburg, Free State Province	Ongoing	Notification of Intent to Develop
Sasol Mining Sigma Colliery Ash Backfilling Project, Sasolburg, Free State Province	Sasol Mining (Pty) Ltd	Sasolburg, Free State Province	July 2018	Heritage Basic Assessment Report Update
Constructed Landfill Site for the Sierra Rutile Limited Mining Operation, Southern Province, Sierra Leone	Sierra Rutile Limited	Southern Province, Sierra Leone	May 2019	Social Impact Assessment
Environmental Impact Assessment for the Klipspruit Colliery Water Treatment Plant and associated pipeline, Mpumalanga	South32 SA Coal Holdings (Pty) Ltd	Ogies, Mpumalanga Province	Ongoing	Notification of Intent to Develop; Social baseline
Proposed construction of a Water Treatment Plant and associated infrastructure for the Treatment of Mine-Affected Water at the Kilbarchan Colliery	Eskom Holdings SOC Limited	Newcastle, KwaZulu-Natal Province	Ongoing	Heritage Impact Assessment
Belfast Implementation Project	Exxaro Coal Mpumalanga (Pty) Ltd	Belfast, Mpumalanga Province	Ongoing	Section 34 Permit Application

Project Title	Name of Client	Project Location	Date of Completion	Project / Experience Description
Newcastle Landfill Project	GCS Water and Environmental Consultants	Newcastle, KwaZulu-Natal	March 2019	Heritage Impact Assessment
NHRA Section 34 Permit Application process for the Davin and Queens Court Buildings on Erf 173 and 174, West Germiston, Gauteng Province	IDC Architects	Johannesburg, Gauteng Province	May 2018	Section 34 Permit Application Process
Basic Assessment and Environmental Management Plan for the Proposed pipeline from the Mbali Colliery to the Tweefontein Water Reclamation Plant, Mpumalanga Province	HCI Coal (Pty) Ltd Mbali Colliery	Ogies, Mpumalanga Province	February 2018	Heritage Basic Assessment Report
The South African Radio Astronomy Observatory Square Kilometre Array Heritage Impact Assessment and Conservation Management Plan Project	The South African Radio Astronomy Observatory (SARAO)	Carnarvon, Northern Cape Province	July 2018	Heritage Impact Assessment; Conservation Management Plan
Environmental Impact Assessment for the proposed Future Developments within the Sun City Resort Complex	Sun International (Pty) Ltd	Rustenburg, North West Province	Ongoing	Heritage Impact Assessment Conservation Management Plan Social Baseline
Environmental Fatal Flaw Analysis for the Mabula Filling Station	Mr van den Bergh	Waterberg, Limpopo Province	November 2017	Fatal Flaw Analysis
Environmental Impact Assessment for the Blyvoor Gold Mining Project near Carletonville, Gauteng Province	Blyvoor Gold Capital (Pty) Ltd	Carletonville, Gauteng	Ongoing	Notification of Intent to Develop; Social Baseline

Project Title	Name of Client	Project Location	Date of Completion	Project / Experience Description
Heritage Resources Management Process for the Exxaro Matla Mine	Exxaro Coal Mpumalanga (Pty) Ltd	Kriel, Mpumalanga Province	October 2018	Heritage Impact Assessment
Liwonde Additional Studies	Mota-Engil Africa	Liwonde, Malawi	June 2018	Community Health, Safety and Security Management Plan
Environmental Impact Assessment for the Millsite TSF Complex	Sibanye-Stillwater	Randfontein, Gauteng	December 2017	Heritage Impact Assessment
Heritage Resources Management Process for the Portion 296 of the farm Zuurfontein 33 IR Proposed Residential Establishment Project	Shuma Africa Projects (Pty) Ltd	Ekurhuleni (Johannesburg), Gauteng	June 2017	Notification of Intent to Develop
NHRA Section 35 Archaeological Investigations, Lanxess Chrome Mine, North-West Province	Lanxess Chrome Mine (Pty) Ltd	Rustenburg, North West Province	August 2017	Archaeological Phase 2 Mitigation
Environmental and Social Input for the Pre-Feasibility Study	Birimium Gold	Bougouni, Mali	October 2018	Pre-Feasibility Study; Heritage Impact Assessment

6 Professional Registration

Position	Professional Body	Member Number
Member	Association of Southern African Professional Archaeologists (ASAPA)	451
Member	International Council on Monuments and Sites (ICOMOS)	38048

7 Publications

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

Mr. Justin du Piesanie

Divisional Manager

Social and Heritage Services

Digby Wells Environmental

1 Education

Date	Degree(s) or Diploma(s) obtained	Institution
2015	Continued Professional Development, Intermediate Project Management Course	PM.Ideas: A division of the Mindset Group
2013	Continued Professional Development Programme, Architectural and Urban Conservation: Researching and Assessing Local Environments	University of Cape Town
2008	MSc	University of the Witwatersrand
2005	BA (Honours) (Archaeology)	University of the Witwatersrand
2004	BA	University of the Witwatersrand
2001	Matric	Norkem Park High School

2 Language Skills

Language	Written	Spoken
English	Excellent	Excellent
Afrikaans	Proficient	Good

3 Employment

Period	Company	Title/position
2018 to present	Digby Wells Environmental	Divisional Manager: Social and Heritage Services
2016-2018	Digby Wells Environmental	Unit Manager: Heritage Resources Management
2011-2016	Digby Wells Environmental	Heritage Management Consultant: Archaeologist
2009-2011	University of the Witwatersrand	Archaeology Collections Manager
2009-2011	Independent	Archaeologist
2006-2007	Maropeng & Sterkfontein Caves UNESCO World Heritage Site	Tour guide

4 Experience

I joined the company in August 2011 as an archaeologist. Subsequently, Digby Wells appointed me as the Heritage Unit Manager and Divisional Manager for Social and Heritage Services in 2016 and 2018 respectively. I obtained my Master of Science (MSc) degree in Archaeology from the University of the Witwatersrand in 2008, specialising in the Southern African Iron Age. I further attended courses in architectural and urban conservation through the University of Cape Town's Faculty of Engineering and the Built Environment Continuing Professional Development Programme in 2013. I am a professional member of the Association of Southern African Professional Archaeologists (ASAPA), and accredited by the association's Cultural Resources Management (CRM) section. I am also a member of the International Council on Monuments and Sites (ICOMOS), an advisory body to the UNESCO World Heritage Convention. I have over 10 years combined experience in HRM in South Africa, including heritage assessments, archaeological mitigation, grave relocation, and NHRA Section 34 application processes. I gained further generalist experience since my appointment at Digby Wells in Botswana, Burkina Faso, Cameroon, the Democratic Republic of Congo, Liberia, Malawi, Mali, Senegal and Tanzania on projects that have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. Furthermore, I have acted as a technical expert reviewer of HRM projects undertaken in Cameroon and Senegal. As Divisional Manager for Social and Heritage Services at Digby Wells Environmental, I manage several large capital Projects and multidisciplinary teams placing me in the best position to identify and exploit points of integration between the HRM process and greater social landscape. This approach to HRM, as an integrated discipline, is grounded in

international HRM principles and standards that has allowed me to provide comprehensive, project-specific solutions that promote ethical heritage management and assist in achieving the strategic objectives of our clients, as well as maintain or enhance Cultural Significance of the relevant cultural heritage resources.

5 Project Experience

Please see the following table for relevant Project experience:

PROJECT	LOCATION	DATES		PROJECT TYPE	CLIENT
Matla Mine 1 GRP	Kriel, Mpumalanga, South Africa	2020	-	Grave Relocation	Exxaro Coal Mpumalanga (Pty) Ltd
Mafube RAP and GRP	Middelburg, Mpumalanga, South Africa	2019	-	Grave Relocation	Mafube Coal
SARAO SKA Project: Heritage Mitigations	Carnarvon, Northern Cape, South Africa	2019	-	Heritage Management and Mitigation	SARAO
Kibali Kalimva & Ikamva Pit ESIA	Orientale Province, Democratic Republic of Congo	2019	2019	Heritage Impact Assessment	Barrick Gold Corporation
Ergo City Deep HSMP	Johannesburg, Gauteng, South Africa	2019	2019	Heritage Site Management Plan	Ergo (Pty) Ltd
Ergo RTSF Section 34 Process	Westonaria, Gauteng, South Africa	2019	-	Section 34 Destruction Permit Applications	Ergo (Pty) Ltd
Twyfelaar EIA	Ermelo, Mpumalanga, South Africa	2019	2019	Heritage Impact Assessment	Dagsoom Coal Mining (Pty) Ltd
Sasol River Diversion	Sasolburg, Free State, South Africa	2019	2019	Heritage Impact Assessment	Sasol Mining
Sun City EIA and CMP	Pilanesberg, North-West Province, South Africa	2018	2019	Heritage Impact Assessment and Conservation Management Plan	Sun International
Exxaro Matla HRM	Kriel, Mpumalanga, South Africa	2017	2019	Heritage Impact Assessment and Conservation Management Plan	Exxaro Coal Mpumalanga (Pty) Ltd

PROJECT	LOCATION	DATES		PROJECT TYPE	CLIENT
Exxaro Belfast GRP	Belfast, Mpumalanga, South Africa	2013	2019	Grave Relocation	Exxaro Coal Mpumalanga (Pty) Ltd
Eskom Northern KZN Strengthening	KwaZulu-Natal, South Africa	2016	2018	Heritage Impact Assessment	ILISO Consulting
Thabametsi GRP	Lephalale, Limpopo Province, South Africa	2017	2018	Grave Relocation	Exxaro Resources Ltd
SKA HIA and CMP	Carnarvon, Northern Cape, South Africa	2017	2018	Heritage Impact Assessment and Conservation Management Plan	SARAO
Grootegeluk Watching Brief	Lephalale, Limpopo Province, South Africa	2017	2017	Watching Brief	Exxaro Resources Ltd
Matla HSMP	Kriel, Mpumalanga Province, South Africa	2017	2017	Heritage Site Management Plan	Exxaro Coal Mpumalanga (Pty) Ltd
Ledjadja Coal Borrow Pits	Lephalale, Limpopo Province, South Africa	2017	2017	Heritage Basic Assessment	Ledjadja Coal (Pty) Ltd
Exxaro Belfast Implementation Project PIA	Belfast, Mpumalanga, South Africa	2017	2017	Palaeontological Impact Assessment	Exxaro Coal Mpumalanga (Pty) Ltd
Lanxess Chrome Mine Archaeological Mitigation	Rustenburg, North West Province, South Africa	2017	2017	Phase 2 Excavations	Lanxess Chrome Mine (Pty) Ltd
Tharisa Apollo EIA Project	KwaZulu-Natal, South Africa	2017	2017	Heritage Impact Assessment	GCS (Pty) Ltd
Queen Street Section 34 Process	Germiston, Johannesburg, Gauteng, South Africa	2017	2017	Section 34 Destruction Permit Applications	IDC Architects
Goulamina EIA Project	Goulamina, Sikasso Region, Mali	2017	2017	Heritage Impact Assessment	Birimian Limited

PROJECT	LOCATION	DATES		PROJECT TYPE	CLIENT
Zuurfontein Residential Establishment Project	Ekurhuleni, Gauteng, South Africa	2017	2017	Notification of Intent to Develop	Shuma Africa Projects
Kibali Grave Relocation Training and Implementation	Orientale Province, Democratic Republic of Congo	2017	2017	Grave Relocation	Randgold Resources Limited
Massawa EIA	Senegal	2016	2017	Heritage Impact Assessment and Technical Reviewer	Randgold Resources Limited
Beatrix EIA and EMP	Welkom, Free State, South Africa	2016	2017	Heritage Impact Assessment	Sibanye Stillwater
Sun City Chair Lift	Pilanesberg, North-West Province, South Africa	2016	2017	Notification of Intent to Develop and Heritage Basic Assessment	Sun International
Hendrina Underground Coal Mine EIA	Hendrina, Mpumalanga, South Africa	2016	2017	Heritage Impact Assessment	Umcebo Mining (Pty) Ltd
Elandsfontein EMP Update	Clewer, Mpumalanga, South Africa	2016	2017	Heritage Impact Assessment	Anker Coal
Groningen and Inhambane PRA	Limpopo Province, South Africa	2016	2016	Heritage Basic Assessment	Rustenburg Platinum Mines Limited
Palmietkuilen MRA	Springs, Gauteng, South Africa	2016	2016	Heritage Impact Assessment	Canyon Resources (Pty) Ltd
Copper Sunset Sand Mining S.102	Free State, South Africa	2016	2016	Heritage Basic Assessment	Copper Sunset Sand (Pty) Ltd
Grootvlei MRA	Springs, Gauteng, South Africa	2016	2016	Notification of Intent to Develop	Ergo (Pty) Ltd
Lambda EMP	Mpumalanga, South Africa	2016	2016	Palaeontological Impact Assessment	Eskom Holdings SOC Limited
Kilbarchan Basic Assessment and EMP	Newcastle, KwaZulu-Natal, South Africa	2016	2016	Heritage Basic Assessment	Eskom Holdings SOC Limited
Grootegeluk Amendment	Lephalale, Limpopo	2016	2016	Notification of Intent to Develop	Exxaro Coal Resources (Pty) Ltd

PROJECT	LOCATION	DATES		PROJECT TYPE	CLIENT
	Province, South Africa				
Garsfontein Township Development	Pretoria, Gauteng, South Africa	2016	2016	Notification of Intent to Develop	Leungo Construction Enterprises
Louis Botha Phase 2	Johannesburg, Gauteng, South Africa	2016	2016	Phase 2 Excavations	Royal Haskoning DHV
Sun City Heritage Mapping	Pilanesberg, North-West Province, South Africa	2016	2016	Phase 2 Mapping	Sun International
Gino's Building Section 34 Destruction Permit Application	Johannesburg, Gauteng, South Africa	2015	2016	Heritage Impact Assessment and Section 34 Destruction Permit Application	Bigen Africa Services (Pty) Ltd
EDC Block Refurbishment Project	Johannesburg, Gauteng, South Africa	2015	2016	Heritage Impact Assessment and Section 34 Permit Application	Bigen Africa Services (Pty) Ltd
Namane IPP and Transmission Line EIA	Steenbokpan, Limpopo Province, South Africa	2015	2016	Heritage Impact Assessment	Namane Resources (Pty) Ltd
Temo Coal Road Diversion and Rail Loop EIA	Steenbokpan, Limpopo Province, South Africa	2015	2016	Heritage Impact Assessment	Namane Resources (Pty) Ltd
Sibanye WRTRP	Gauteng, South Africa	2014	2016	Heritage Impact Assessment	Sibanye Stillwater
NTEM Iron Ore Mine and Pipeline Project	Cameroon	2014	2016	Technical Review	IMIC plc
NLGM Constructed Wetlands Project	Liberia	2015	2015	Heritage Impact Assessment	Aureus Mining
ERPM Section 34 Destruction Permits Applications	Johannesburg, Gauteng, South Africa	2015	2015	Section 34 Destruction Permit Applications	Ergo (Pty) Ltd
JMEP II EIA	Botswana	2015	2015	Heritage Impact Assessment	Jindal
Oakleaf ESIA Project	Bronkhorstspruit, Gauteng, South Africa	2014	2015	Heritage Impact Assessment	Oakleaf Investment Holdings

PROJECT	LOCATION	DATES		PROJECT TYPE	CLIENT
Imvula Project	Kriel, Mpumalanga, South Africa	2014	2015	Heritage Impact Assessment	Ixia Coal
VMIC Vanadium EIA Project	Mokopane, Limpopo, South Africa	2014	2015	Heritage Impact Assessment	VM Investment Company
Everest North Mining Project	Steelpoort, Mpumalanga, South Africa	2012	2015	Heritage Impact Assessment	Aquarius Resources
Nzoro 2 Hydro Power Project	Orientale Province, Democratic Republic of Congo	2014	2014	Social consultation	Randgold Resources Limited
Eastern Basin AMD Project	Springs, Gauteng, South Africa	2014	2014	Heritage Impact Assessment	AECOM
Soweto Cluster Reclamation Project	Soweto, Gauteng, South Africa	2014	2014	Heritage Impact Assessment	Ergo (Pty) Ltd
Klipspruit South Project	Ogies, Mpumalanga, South Africa	2014	2014	Heritage Impact Assessment	BHP Billiton
Klipspruit Extension: Weltevreden Project	Ogies, Mpumalanga, South Africa	2014	2014	Heritage Impact Assessment	BHP Billiton
Ergo Rondebult Pipeline Basic Assessment	Johannesburg, South Africa	2014	2014	Heritage Basic Assessment	Ergo (Pty) Ltd
Kibali ESIA Update Project	Orientale Province, Democratic Republic of Congo	2014	2014	Heritage Impact Assessment	Randgold Resources Limited
GoldOne EMP Consolidation	Westonaria, Gauteng, South Africa	2014	2014	Gap analysis	Gold One International
Yzermite PIA	Wakkerstroom, Mpumalanga, South Africa	2014	2014	Palaeontological Impact Assessment	EcoPartners
Sasol Mooikraal Basic Assessment	Sasolburg, Free State, South Africa	2014	2014	Heritage Basic Assessment	Sasol Mining

PROJECT	LOCATION	DATES		PROJECT TYPE	CLIENT
Rea Vaya Phase II C Project	Johannesburg, Gauteng, South Africa	2014	2014	Heritage Impact Assessment	ILISO Consulting
New Liberty Gold Project	Liberia	2013	2014	Grave Relocation	Aureus Mining
Putu Iron Ore Mine Project	Petroken, Liberia	2013	2014	Heritage Impact Assessment	Atkins Limited
Sasol Twistdraai Project	Secunda, Mpumalanga, South Africa	2013	2014	Notification of Intent to Develop	ERM Southern Africa
Kibali Gold Hydro-Power Project	Orientale Province, Democratic Republic of Congo	2012	2014	Heritage Impact Assessment	Randgold Resources Limited
SEGA Gold Mining Project	Burkina Faso	2013	2013	Technical Reviewer	Cluff Gold PLC
Consbrey and Harwar Collieries Project	Breyton, Mpumalanga, South Africa	2013	2013	Heritage Impact Assessment	Msobo Coal
Falea Uranium Mine Environmental Assessment	Falea, Mali	2013	2013	Heritage Scoping	Rockgate Capital
Daleside Acetylene Gas Production Facility	Gauteng, South Africa	2013	2013	Heritage Impact Assessment	ERM Southern Africa
SEGA Gold Mining Project	Burkina Faso	2012	2013	Socio Economic and Asset Survey	Cluff Gold PLC
Kibali Gold Project Grave Relocation Plan	Orientale Province, Democratic Republic of Congo	2011	2013	Grave Relocation	Randgold Resources Limited
Everest North Mining Project	Steelpoort, Mpumalanga, South Africa	2012	2012	Heritage Impact Assessment	Aquarius Resources
Environmental Authorisation for the Gold One Geluksdal TSF and Pipeline	Gauteng, South Africa	2012	2012	Heritage Impact Assessment	Gold One International
Platreef Burial Grounds and Graves Survey	Mokopane, Limpopo Province, South Africa	2012	2012	Burial Grounds and Graves Survey	Platreef Resources

PROJECT	LOCATION	DATES		PROJECT TYPE	CLIENT
Resgen Boikarabelo Coal Mine	Limpopo Province, South Africa	2012	2012	Phase 2 Excavations	Resources Generation
Bokoni Platinum Road Watching Brief	Burgersfort, Limpopo Province, South Africa	2012	2012	Watching Brief	Bokoni Platinum Mine
Transnet NMPP Line	Kwa-Zulu Natal, South Africa	2010	2010	Heritage survey	Umlando Consultants
Archaeological Impact Assessment – Witpoortjie Project	Johannesburg, Gauteng, South Africa	2010	2010	Archaeological Impact Assessment	ARM
Der Brochen Archaeological Excavations	Steelpoort, Mpumalanga, South Africa	2010	2010	Phase 2 Excavations	Heritage Contracts Unit
De Brochen and Booysendal Archaeology Project	Steelpoort, Mpumalanga, South Africa	2010	2010	Site Recording: Mapping	Heritage Contracts Unit
Eskom Thohoyandou Electricity Master Network	Limpopo Province, South Africa	2010	2010	Heritage Statement	Strategic Environmental Focus
Batlhako Mine Expansion	North-West Province, South Africa	2010	2010	Phase 2 Mapping	Heritage Contracts Unit
Wenzelrust Excavations	Shoshanguve, Gauteng, South Africa	2009	2009	Phase 2 Excavations	Heritage Contracts Unit
University of the Witwatersrand Parys LIA Shelter Project	Parys, Free State, South Africa	2009	2009	Phase 2 Mapping	University of the Witwatersrand
Archaeological Assessment of Modderfontein AH Holdings	Johannesburg, Gauteng, South Africa	2008	2008	Heritage Basic Assessment	ARM
Heritage Assessment of Rhino Mines	Thabazimbi, Limpopo Province, South Africa	2008	2008	Heritage Impact Assessment	Rhino Mines
Cronimet Project	Thabazimbi, Limpopo Province, South Africa	2008	2008	Archaeological surveys	Cronimet

PROJECT	LOCATION	DATES		PROJECT TYPE	CLIENT
Eskom Thohoyandou SEA Project	Limpopo Province, South Africa	2008	2008	Heritage Statement	Eskom
Witbank Dam Archaeological Impact Assessment	Witbank, Mpumalanga, South Africa	2007	2007	Archaeological survey	ARM
Sun City Archaeological Site Mapping	Sun City, Pilanesberg, North West Province, South Africa	2006	2006	Site Recording: Mapping	Sun International
Klipriviersberg Archaeological Survey	Meyersdal, Gauteng, South Africa	2005	2006	Archaeological surveys	ARM

6 Professional Registration

Position	Professional Body	Registration Number
Member	Association for Southern African Professional Archaeologists (ASAPA); ASAPA Cultural Resources Management (CRM) section	270
Member	International Council on Monuments and Sites (ICOMOS)	14274
Member	Society for Africanist Archaeologists (SAfA)	N/A
Member	International Association of Impact Assessors (IAIA) South Africa	5494

7 Publications

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

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

Appendix B: HRM Methodology

DIGBY WELLS
ENVIRONMENTAL

Cultural Significance, Field Rating and Impact Assessment

Methodology Statement

Project Number:

ZZZ9999

Prepared for:

Internal Document

June 2019

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This document has been prepared by Digby Wells Environmental.

Report Type:	**Methodology Statement**
Project Name:	**Cultural Significance, Field Rating and Impact Assessment**
Project Code:	**ZZZ9999**

Revision History

Name	Responsibility	Version	Date
Johan Nel ASAPA Member 095	HRM Unit Manager	Ver. 1	May 2014
		Ver. 2	October 2014
		Ver. 3	May 2015
Justin du Piesanie ASAPA Member 270	Divisional Manager: Social and Heritage Services	Ver. 4	January 2016
		Ver. 5	June 2016
		Ver. 6	June 2019

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1 Introduction

Cultural heritage resources are intrinsic to the history and beliefs of communities. They characterise community identity and cultures, are finite, non-renewable and irreplaceable. Considering the innate value of cultural heritage resources, Heritage Resources Management (HRM) acknowledges that these have lasting worth as evidence of the origins of life, humanity and society. It is incumbent of the assessor to determine the cultural significance[1] (CS) of cultural heritage resources to allow for the implementation of appropriate management. This is achieved through assessing cultural heritage resources' value relative to certain prescribed criteria encapsulated in policies and legal frameworks, such as the South African National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

Commensurate to the NHRA, with specific reference to Section 38, this methodology aims to ensure that clients protect cultural heritage during implementation of project activities by either avoiding, removing or reducing the intensity of adverse impacts to tangible[2] and intangible[3] cultural heritage resources within the defined area of influence.

The methodology to define CS and assess the potential effects of a project is discussed separately in the sections below.

2 Evaluation of Cultural Significance and Field Ratings

2.1 Cultural Significance Determination

Digby Wells developed a CS Determination Methodology to assign identified cultural heritage resources with a numerical CS rating in an objective as possible way and that can be independently reproduced provided that the same information sources are used, should this be required.

This methodology determines the intrinsic, comparative and contextual significance of identified cultural heritage resources by considering their:

1. Importance rated on a six-point scale against four criteria; and
2. Physical integrity rated on a five-point scale.

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

[2] (i) Moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values; (ii) unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls.

[3] Cultural knowledge, innovations, and practices of communities embodying traditional lifestyles.

The assigned ratings consider information obtained through a review of available credible sources and representativity or uniqueness (i.e. known examples of similar resources to exist), as well as the current preservation *status-quo* as observed.

Figure 2-2 depicts the CS formula and importance criteria, and it describes ratings on the importance physical integrity scales

2.2 Field Rating Determination

Grading of heritage resources remains the responsibility of heritage resources authorities. However, the South African Heritage Resources Agency (SAHRA) Minimum Standards requires heritage reports include Field Ratings for identified resources to comply with section 38 of the NHRA. Section 7 of the NHRA provides for a system of grading of heritage resources that form part of the national estate and distinguishes between three categories.

The field rating process is designed to provide a numerical rating of the recommended grading of identified heritage resources. The evaluation is done as objectively as possible by integrating the field rating into the significance matrix.

Field ratings guide decision-making in terms of appropriate minimum required mitigation measures and consequent management responsibilities in accordance with Section 8 of the NHRA. Figure 2-1 presents the formula and the parameters used to determine the Field Ratings.

Field Rating = Average Sum of Aesthetic + Historic + Scientific + Social

rated against

Value	Field Rating	Designation	Authority
0	Resource not assessed	None	None
1	Resources afforded general protection in terms of Sections 34 to 37 of the NHRA and with negligible significance	Grade IV C	Local
2	Resources afforded general protection in terms of Sections 34 to 37 of the NHRA and with low significance	Grade IV B	
3	Resources afforded general protection in terms of Sections 34 to 37 of the NHRA and with medium-high significance	Grade IV A	
4	Resources afforded general protection in terms of Sections 34 to 37 of the NHRA and with high significance	Grade III B	
5	Resources afforded general protection in terms of Sections 34 to 37 of the NHRA and with very high significance	Grade II A	
6	Resources under formal protection that can be considered to have special qualities that make them significant within a province or region	Grade II	Provincial
7	Resources under formal protection that can be considered to have special qualities that make them significant within a national or international context	Grade I	National

Figure 2-1: Field Ratings Methodology

IMPORTANCE = AVERAGE SUM OF AESTHETIC + HISTORIC + SCIENTIFIC + SOCIAL

where

Aesthetic
Importance in aesthetic characteristics

Degree of technical / creative skill at a particular period

Historic
Importance to a community or pattern in the country's history

Site of significance relating to the history of slavery

Association with the life work of a person, group or organisation of importance in the history of the country

Scientific
Possession of uncommon, rare or endangered natural or cultural heritage aspects

Potential to yield information

Importance in demonstrating principle characteristics

Social
Association to a community or cultural group for social, cultural or spiritual reasons

rated against

IMPORTANCE: a site or heritage resource may be important in terms of one or more dimensions - aesthetic, historic, scientific and social. Each dimension consists of one or more attributes against which importance is determined. Importance of each dimension and subsequent attributes must be considered in relation to the resource's authenticity. 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.	
0	The resource exhibits attributes that may be considered in a particular dimension, but it is so poorly represented that it cannot or does not contribute to the resource's overall value.
1	Common, well represented throughout diverse cultural landscapes
2	Generally well represented but exhibits superior qualities in comparison to other similar examples
3	The resource exhibits attributes that are rare and uncommon within a region. It is important to specific communities.
4	Rare and uncommon, value of national importance
5	The resource exhibits attributes that are considered singular, unique and/or irreplaceable to the degree that its significance can be universally accepted.
-	Not assessed - dimension and/or attribute not considered in determining value.

×

Integrity
Physical status quo of preservation from observation

rated against

INTEGRITY: the undivided or unbroken state, material wholeness, completeness or entirety of a resource or site	
0	No information potential, complete loss of meaning, Fabric completely degraded, original setting lost
1	Fabric poorly preserved, limited information, little meaning ascribed, extensive encroachment on setting
2	Fabric is preserved, some information potential (quality questionable) and meaning evident, some encroachment on setting
3	Fabric well preserved, good quality information and meaning evident, limited encroachment
4	Excellent preservation of fabric, high information potential of high quality, meaning is well established, no encroachment on setting

Figure 2-2: CS Determination Methodology

3 Impact Assessment Methodology

The rationale behind CS determination recognises that the value of a cultural heritage resource is a direct indication of its sensitivity to change (impacts) as well as the maximum acceptable levels of change to the resource. Therefore, the assessor must determine CS prior to the completion of any impact assessment.

These requirements in terms of international best practice standards are integrated into the impact assessment methodology to guide both assessments of impacts and recommendations for mitigation and management of resources.

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

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

The assessment process identified potential issues and impacts through examination of:

- Project phases and activities,
- Interactions between activities and the environmental aspect; and
- The interdependencies between environmental aspects.

Figure 3-1 presents a graphical summary of this concept and Figure 3-2 provides an example of the process.

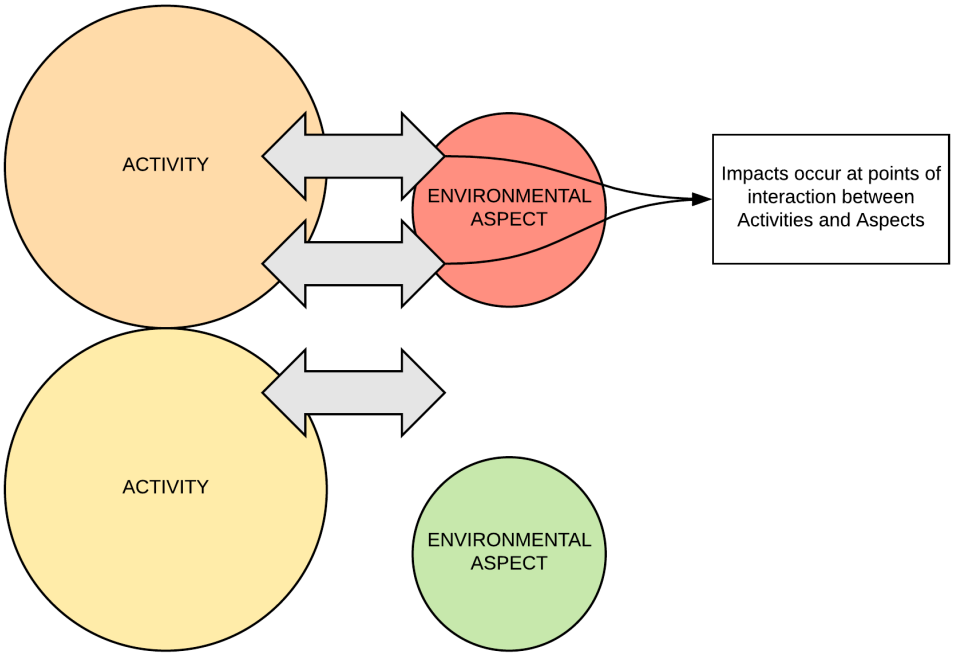

Figure 3-1: Graphical Representation of Impact Assessment Concept

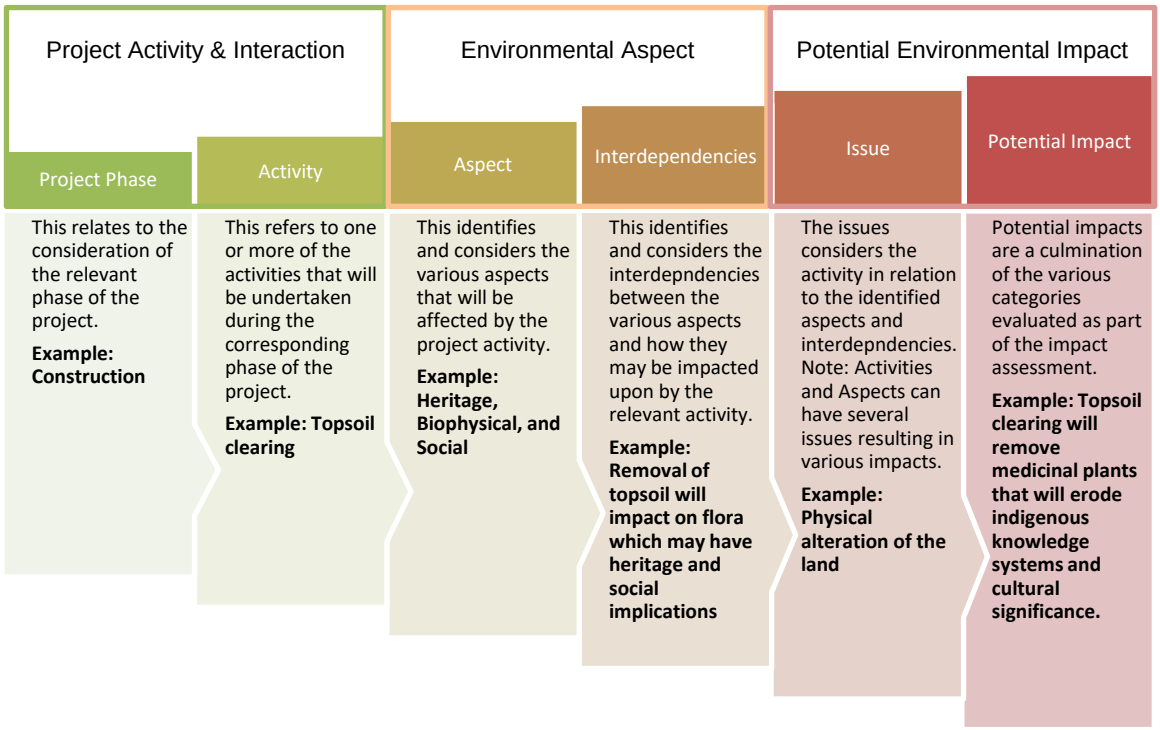

Figure 3-2: Example of how Potential Impacts are considered

3.1 Categorising Impacts to Cultural Heritage

Impacts may manifest differently among geographical areas and diverse communities. For instance, impacts to cultural heritage resources can simultaneously affect the tangible cultural heritage resource and have social repercussions. The severity of the impact is compounded when the intensity of physical impacts and social repercussions differ significantly, e.g. removal of a grave surface dressings results in a minor physical impact but has a significant social impact. In addition, impacts to cultural heritage resources can influence the determined CS without a physical impact taking place. Given this reasoning, impacts as considered here are generally placed into three broad categories (adapted from Winter & Bauman 2005: 36):

- **Direct or primary impacts** affect the fabric or physical integrity of the cultural heritage resource, for example destruction of an archaeological site or historical building. Direct or primary impacts may be the most immediate and noticeable. Such impacts are usually ranked as the most intense, but can often be erroneously assessed as high-ranking. For example, the destruction of a low-density scatter of archaeological material culture may be assessed as a negatively high impact if CS is not considered;
- **Indirect, induced or secondary impacts** can occur later in time or at a different place from the causal activity, or because of a complex pathway. For example, restricted access to a cultural heritage resource resulting in the gradual erosion of its CS that may be dependent on ritual patterns of access. Although the physical fabric of the cultural heritage resource is not affected through any primary impact, its CS is affected, which can ultimately result in the loss of the resource itself; and
- **Cumulative impacts** result from in-combination effects on cultural heritage resources acting within a host of processes that are insignificant when seen in isolation, but which collectively have a significant effect. Cumulative effects can be:
  - **Additive**: the simple sum of all the effects, e.g. the total number of development activities that will occur within the study area;
  - **Synergistic**: effects interact to produce a total effect greater than the sum of the individual effects, e.g. the effect of each different activity on the archaeological landscape in the study area;
  - **Time crowding**: frequent, repetitive impacts on a cultural heritage resource at the same time, e.g. the effect of regular blasting activities on a nearby rock art site or protected historical building;
  - **Neutralizing**: where the effects may counteract each other to reduce the overall effect, e.g. the effect of changes in land use could reduce the overall impact on sites within the archaeological landscape of the study area; and/or

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

The fact that cultural heritage resources do not exist in isolation from the wider natural, social, cultural and heritage landscape demonstrates the relevance of the above distinctions: CS is therefore also linked to rarity / uniqueness, physical integrity and importance to diverse communities.

3.2 Impact Assessment

The impact assessment process is designed to provide a numerical rating of the identified potential impacts. This methodology follows the established impact assessment formula:

Impact = consequence of an event x probability of the event occurring

where:

Consequence = type of impact x (Duration + Extent + Intensity)

and

Probability = Likelihood of an impact occurring

In the formula for calculating consequence:

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

Table 3-1 presents a description of the duration, extent, intensity and probability ratings. The intensity rating definitions consider the determined CS of the identified cultural heritage resources. These criteria are used to determine the impact ratings as defined in Table 3-2 below. Table 3-3 represents the relationship between consequence, probability and significance.

The impact assessment process considers pre- and post-mitigation scenarios with the intention of managing and/or mitigating impacts in line with the EIA Mitigation Hierarchy, i.e. avoiding all impacts on cultural heritage resources. Where Project-related mitigation does not avoid or sufficiently minimise negative impacts on cultural heritage resources, mitigation of these resources may be required.

Table 3-1: Description of Duration, Extent, Intensity and Probability Ratings Used in the Impact Assessment

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

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

Table 3-2: Impact Significance Scores, Descriptions and Ratings

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

Table 3-3 Relationship between Consequence, Probability and Significance

Relationship between consequence, probability and significance ratings

Significance

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

Consequence

4 Recommended Management and Mitigation Measures

The CS of an identified heritage resource informs the level of the identified potential impact to that resource which in turn informs the recommended management and mitigation requirements. Table 4-1 presents an overview of the minimum recommended mitigation requirements considering the CS of the heritage resource.

Table 4-1: Minimum Recommended Management or Mitigation Requirements Considering CS

Determined CS	Minimum Management / Mitigation Requirements[4]
Negligible	Sufficiently recorded through assessment, no mitigation required
Low	Resource must be recorded before destruction, may include detailed mapping or surface sampling
Medium	Mitigation of the resource to include detailed recording and limited test excavations
Medium-High	Project design must aim to minimise impacts; Mitigation of resources to include extensive sampling through test excavations and analysis
High	Project design must aim to avoid impacts; Cultural heritage resource to be partially conserved, must be managed by way of Conservation Management Plan
Very High	Project design must be amended to avoid all impacts; Cultural heritage resources to be conserved in entirety and conserved and managed by way of Conservation Management Plan

The desired outcome of an impact assessment is the avoidance of all negative impacts and enhancement of positive ones. While this is not always possible, the recommended management or mitigation measures must be reasonable and feasible taking into consideration the determined CS and nature of the Project.

Two categories of impact management options are considered: avoidance and mitigation.

Avoidance requires changes or amendments to Project design, planning and siting of infrastructure to avoid physical impacts on heritage resources. It is the preferred option, especially where cultural heritage resources with high – very-high CS will be impacted.

[4] Based on minimum requirements encapsulated in guidelines developed by SAHRA

Mitigation of cultural heritage resources may be necessary where avoidance is not possible, thus resulting in partial or complete changes (including destruction) to a resource. Such resources need to be protected until they are fully recorded, documented and researched before any negative impact occurs. Options for mitigating a negative impact can include minimization, offsets, and compensation. Examples of mitigation measures specific to cultural heritage include:

- Intensive detailed recording of sites through various non-intrusive techniques to create a documentary record of the site – "preservation by record"; and
- Intrusive recording and sampling such as shovel test pits (STPs) and excavations, relocation (usually burial grounds and graves, but certain types of sites may be relocated), restoration and alteration. Any form of intrusive mitigation is normally a regulated permitted activity for which permits[5] need to be issued by the Heritage Resource Authorities (HRAs). Such mitigation may result in a reassessment of the value of a cultural heritage resource that could require conservation measures to be implemented. Alternatively, an application for a destruction permit may be made if the resource has been sufficiently sampled.

Where resources have negligible CS, the specialist may recommend that no further mitigation is required, and the site may be destroyed where authorised.

Community consultation is an integral activity to all above-mentioned avoidance and mitigation measures.

[5] Permit application processes must comply with the relevant Section of the NHRA and applicable Chapter(s) of the NHRA Regulations, 2000 (Government Notice Regulation [GN R] 548) and must be issued by SAHRA or the Provincial Heritage Resources Authority (PHRA) as is applicable.