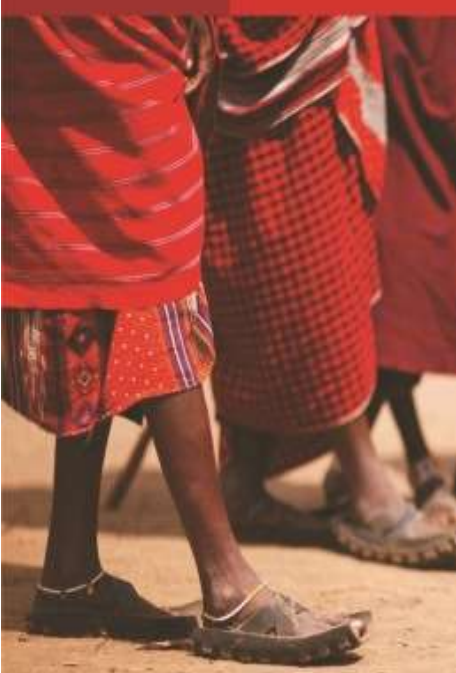




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Environmental Impact Assessment for the Blyvoor Gold Mining Project near Carletonville, Gauteng Province

Notification of Intent to Develop

Project Number:

BVG4880

Prepared for:

Blyvoor Gold Capital (Pty) Ltd

October 2018

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1 Introduction

Blyvoor Gold Capital (Pty) Ltd (hereinafter Blyvoor Gold) acquired the Mining Right (MR) (MR143GP) for the former Blyvooruitzicht operations through a transfer in terms of Section 11 of the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA). Blyvoor Gold intends to return these operations to production as the Blyvoor Gold Mine (“the Project”) and as such requires Environmental Authorisation (EA) to comply with the national South African legislative framework. To achieve this, Blyvoor Gold must bring existing documentation relating to the former Blyvooruitzicht operations in line with the requirements encapsulated in:

- The National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA);
- The NEMA Environmental Impact Assessment (EIA) Regulations (Government Notice Regulations [GN R] 982 as amended by GN R 326); and
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA).

To this effect, Blyvoor Gold appointed Digby Wells Environmental (hereinafter Digby Wells) to undertake an Environmental Impact Assessment (EIA) Process and Air Emission Licence (AEL) application in support of the required EA. Digby Wells submitted the Scoping Report to the Department of Mineral Resources (DMR), which was subsequently accepted¹ with the condition certain specialist studies be undertaken to update the baseline and impact assessments included in the current and historical Environmental Management Plans (EMPs). The required specialist studies included a Heritage Resources Management (HRM) process to comply with Section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

This document serves as the Notification of Intent to Develop (NID) to comply with Section 38(1) of the NHRA.

2 Project Details

2.1 Project Location

The Blyvoor Gold Mine is the most westerly along the West Wits Line. The Project is located approximately 6 km from Carletonville (refer to Plan 1). This area falls within the jurisdiction of the Merafong City Local Municipality (MCLM) within the West Rand District Municipality (WRDM) in Gauteng. Table 2-1 and Table 2-2 present a summary of the details of the Project location and the relevant landowners respectively.

¹ Dated 12 March 2018, accepted 27 March 2018

Table 2-1: Project location details

Name of property/ies	Blyvoor Gold Mining Right (MR143GP)
Street address or location (e.g.: Off R44)	No. 5 Shaft, unnamed road. South of the R501 and south-west of Carletonville. North of Fochville.
Erf or farm number/s	Blyvooruitzicht 116 IQ, Portion 10 (Surface Reclamation Metallurgical Plant) Doornfontein 118 IQ, Portion 24 (Underground Metallurgical Plant)
Coordinates of approximate centre of project area	26°25'36.12" S 27°30'30.20"E
Town or District	Carletonville Oberholzer Magisterial District
Responsible Municipality	MCLM WRDM
Maximum extent of proposed development	Approximately 32 hectares (ha) for both plants. Refurbishment of mining-related infrastructure to cover 510 ha.
Current use	Mining
Predominant land use/s of surrounding properties	Mining, agriculture, urban.

Table 2-2: Landowner details

Name	Property	Notified
Blyvoor Gold	Blyvooruitzicht 116 IQ, Portion 10	N/A
	Doornfontein 118 IQ, Remaining Extent (RE) of Portion 24	N/A

2.2 Project Background

Exploration activities at the Blyvooruitzicht operations began in the 1930s. The Blyvooruitzicht Gold Mining Company Limited (BGMC) was owned and managed by DRD Gold Limited (DRD Gold) and later by Village Main Reef Limited (VMR). Mining activities continued until 2013, when the BGMC was placed in liquidation. The mine premises and the plant were subsequently inundated by illegal artisanal miners (known colloquially as 'zama-zamas'). Much of the operation infrastructure, including the residential village and plant, was damaged during these events, as structures were vandalised and the electrical infrastructure

was stripped and stolen for re-sale as scrap. The subsequent non-utilisation of the installed infrastructure has resulted in additional degradation to the infrastructure.

Blyvoor Gold acquired the full MR relevant to the former Blyvooruitzicht operations in 2016 but not did purchase all the assets associated with MR143GP. Blyvoor Gold² purchased the underground operations and the surface infrastructure associated with these operations. Blyvoor Gold Operations (Pty) Ltd acquired the assets associated with the surface operations and Blyvoor Gold Capital (Pty) Ltd acquired the assets associated with the underground operations. In combination, these assets comprise the Blyvoor Gold Mine and are shown in Plan 2. The assets include:

- The BGMC No. 5 Shaft Complex;
- The BGMC Tailings Storage Facilities (TSFs) Blyvoor No. 1, 6 and 7; and
- Doornfontein TSFs No. 1, 2 and 3.

Blyvoor Gold has recently completed the purchase process for Blyvoor TSFs 4 and 5, bringing the total number of TSFs in Blyvoor Gold's ownership to eight. Although they fall outside the MR143GP boundary, the Department of Mineral Resources (DMR) considered these TSFs as Blyvoor Gold's liability, as they were part of the Blyvooruitzicht mine. Blyvoor TSFs 4 and 5 are considered Blyvoor Gold's assets.

The No. 5 Shaft itself provides access to the Carbon Leader and the Middelvlei reefs. These economic horizons occur within the Johannesburg Subgroup within the Central Rand Group of the Witwatersrand Supergroup (refer to Section 3). The sinking of No. 5 Shaft (formerly Doornfontein No. 3 Shaft) took place between February 1980 and October 1984. The shaft was operational in 1985 and the complex was completed in 1987.

The 'orphan infrastructure'³ includes Shaft No. 4 and Shaft No. 6⁴, Waste Rock Dumps⁵ and the surrounding villages which historically provided housing for the employees of the mine.

2.3 Project Description

The estimated LOM for the Blyvoor Gold Mine underground operations currently exceeds 30 years and Blyvoor Gold has an operational strategic plan for the first 15 years. Blyvoor Gold intends to recover gold through the existing metallurgical plant constructed at The No. 5 Shaft Complex. Additionally, Blyvoor Gold intends to re-treat the existing TSFs, which will be staggered throughout the LOM.

² Blyvoor Gold (Pty) Ltd is the umbrella company for two separate companies, namely Blyvoor Gold Capital (Pty) Ltd and Blyvoor Gold Operations (Pty) Ltd. 'Blyvoor Gold' in this document refers to Blyvoor Gold Capital (Pty) Ltd, as per Section 1.

³ Defined as infrastructure that was considered part of the Blyvooruitzicht operations but which is not the property of Blyvoor Gold

⁴ A separate company is operating these shafts to pump water out from the underwater workings and no mining is occurring at these shafts at present.

⁵ These are being processed by third parties

Much of the Project will be characterised by refurbishment and repair work to return the mine to operation. Wherever possible, the required infrastructure will be installed or constructed within existing footprints.

2.3.1 Underground operations

The underground Project will require the recommissioning of shaft facilities, ventilation fans, compressors and offices at No. 5 Shaft and the surface complex. No. 5 Shaft provides access to the existing underground network of tunnels and stopes. Ore will be excavated in the stoped areas, beginning in the shallower reaches of the deposit above 29-Level. The current water level occurs at 30-Level. The production levels above 30-Level are accessible and will allow for an estimated minimum nine years of mining. Blyvoor Gold plans to implement a dewatering programme for 30-Level and below from the ninth year of mining.

The waste rock will be deposited at the existing Waste Rock Dump (WRD) and the gold ore will be transported to the surface to be crushed and screened at the No. 5 Shaft Treatment Plant.

The ore will be hoisted up the existing No. 5 Shaft infrastructure, discharged into the existing ore bins in the shaft headgear and then loaded onto the existing Conveyor 1. This conveyor will deposit the ore into Coarse ore Silo. Ore is drawn out of the Silo by an apron feeder and fed into a jaw crusher via a static grizzly. The fines and crushed ore report to a conveyor that delivers it to a screen. Screen oversize reports to a recirculation conveyor that delivers the ore to the cone crusher for secondary crushing. The secondary crushed ore also reports to the screen feed conveyor allowing secondary closed circuit crushing.

Screen undersize reports to the crushed ore silo feed conveyor and is delivered to the shuttle conveyor above the crushed ore silos. The shuttle conveyor is used to deposit ore into one of two silos. Ore is drawn out each crushed ore silo by a light duty Apron feeder and discharged onto the mill feed conveyor that delivers it to the mill. Each mill is therefore fed by its own independent silo, feeder and conveyor system.

The milling circuit includes a 100% mill discharge feed to a Falcon gravity concentrator. Concentrate from the concentrator passes over a magnetic separator to remove magnetics before it is leached in a concentrate leach reactor. The tails from the leach reactor reports back to the milling circuit.

Cyclone overflow from the milling circuit flows over a trash screen before it is thickened and delivered to a leach and Carbon in Pulp (CIP) pump cell circuit. The loaded carbon from the pump cells is acid washed, eluted using a Zadra process and electrowinning, and regenerated before being returned for CIP adsorption. The gold plated onto the electrowinning cathodes is washed off, caked in a filter press, then dried and calcined in a calcine oven before smelting into bullion bars for delivery to a refinery.

The plant tailings will pass through an INCO process⁶ detox circuit prior to pumping to the tailings dam. Water recovered from the tailings penstock will be gravity and pump fed to the plant process water dam for reuse in the circuit.

Reagents utilised for the process will be stored and mixed on site. Cyanide will be stored and utilised within strict cyanide control requirements including a separate fenced and locked mixing and storage area within the plant boundary fence. Lime will be bulk delivered to a free standing silo from where it is delivered at a controlled rate for mixing and slaking with water prior to circulation around the plant for pH control. Caustic and Hydrochloric acid will be delivered in concentrated liquid form and stored in separate fenced areas within the plant prior to being diluted with water in storage tanks from which it is pumped for plant use.

Existing infrastructure includes the foundations and the coarse ore silo. The foundations will be modified to suit the designed plant layout. The crushed ore silo will be modified and reused. New plant fencing and a new laboratory, administration and security building will be erected for the plant.

2.3.2 Surface operations

Blyvoor Gold intends to reclaim the Blyvoor TSFs No. 7 and Doornfontein 1 and 2 first and the other TSFs will remain in care and maintenance until they are reclaimed later in the LOM. The approved method of reclamation is hydraulic mining and processing at the surface reclamation metallurgical plant, located near the old Blyvooruitzicht Golf Course

The reclaimed tailings will be pumped to a reception tank via a trash screen on top of the reception tank. The clean slurry is pumped to a cyclone which diverts coarse ore to the milling circuit and size ore to the thickener feed trash screen. The thickened slurry is pumped to a preoxidation tank in which the ore is oxidised by oxygen injection into a leach reactor. The oxidised ore reports to a Carbon in Leach (CIL) circuit that leaches and adsorbs the gold in a preg robbing environment. The gold will then be recovered through the existing plant elution and smelting circuit. The residue from the CIL will be pumped and disposed of, onto TSF 6.

The plant and associated water pipeline servitude (which runs from the plant to Blyvoor No. 6 and No. 7 TSFs) are approved. Should this option be chosen, this will constitute a separate EA process and is not considered in this assessment.

Blyvoor Gold will continue to deposit material on the Blyvoor TSF No. 6, as this TSF still has sufficient capacity for the LOM. Should more deposition capacity be required, materials will be deposited onto the area of Blyvoor No. 7 TSF after those tailings have been reclaimed. Alternatively, Blyvoor Gold may consider a new site on Blyvoor TSF No. 4 & No. 5.

⁶ A process for the destruction of sulphur dioxide cyanide to process tailings patented by INCO Ltd. This is one of two patented processes and this process has been used at over 80 mines globally.

2.4 Definition of the study areas

The following sections of the report will make reference to regional, local and site-specific study areas and the development footprint area. These areas are presented in Plan 1 and are defined as follows:



- *Regional study area*: the area bounded by the district municipality demarcation, in this case, the WRDM⁷. 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;
- *Local study area*: the area most likely to be influenced by any changes to heritage resources within the Project area, or where Project development could cause heritage impacts. The local study area is defined as the area bounded by the local municipality, in this case, the MCLM, with particular reference to the immediate surrounding properties or farms;
- *Site-specific study area*: the farm portions extent associated with the proposed Project, including a 500 m buffer area. In this case, the site-specific study area refers to the MR143GP area as purchased by Blyvoor Gold, inclusive of the Orphans; and
- *Development footprint area*: the surface area which will be affected by the activities described in Section 2.2 proposed for the next fifteen years LOM. This includes a sub-set of the site-specific study area, namely the surface operations and the surface area above the underground operations described in Section 2.3.

⁷ It must be noted that the WRDM includes both the Merafong City and the Mogale City Local Municipalities, both of which can be abbreviated to MCLM. For ease of reference, only Merafong City will be abbreviated to MCLM and Mogale City will be referred to in full.

Blyvoor EIA

Locality Map

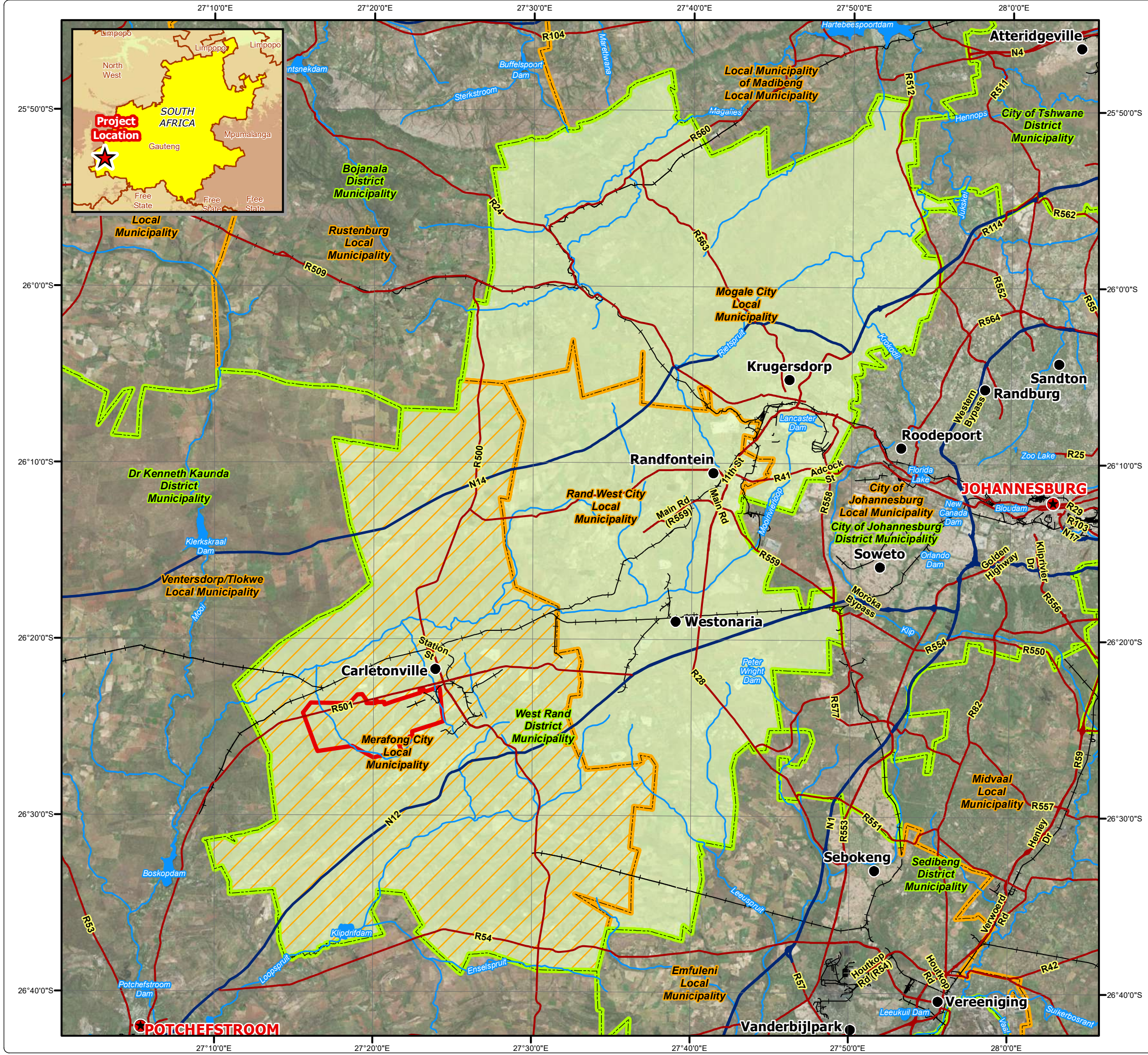
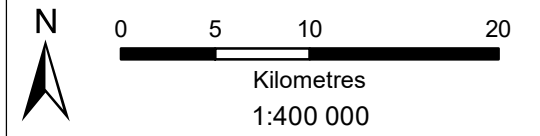
Legend

-  Project Area (Site Specific Study Area)
-  City
-  Major Town
-  Main Road
-  Arterial / National Route
-  Railway Line
-  Perennial Stream
-  Dam
-  District Municipality (2016)
-  Regional Study Area
-  Local Municipality (2016)
-  Local Study Area



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

Projection: Transverse Mercator Ref #: scm.BVG4880.201808.136
 Datum: WGS 1984 Revision Number: 1
 Central Meridian: 27°E Date: 31/08/2018



3 Baseline Description

The cultural heritage baseline description presented below considers the predominant landscape based on the identified heritage resources within the regional, local and site-specific study areas and within the development footprint area. Table 3-1 presents an overview of the archaeological periods relevant to the cultural heritage landscape. Figure 3-1 shows the distribution of the identified heritage resources across these archaeological periods. A total of 50 heritage resources were recorded for the regional study area, which was supplemented by additional data to inform Plan 4.

Table 3-1: Archaeological periods in South Africa (adapted from Esterhuysen & Smith, 2007)

The Stone Age	Early Stone Age (ESA)	2 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 ⁸)
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)

⁸ 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).

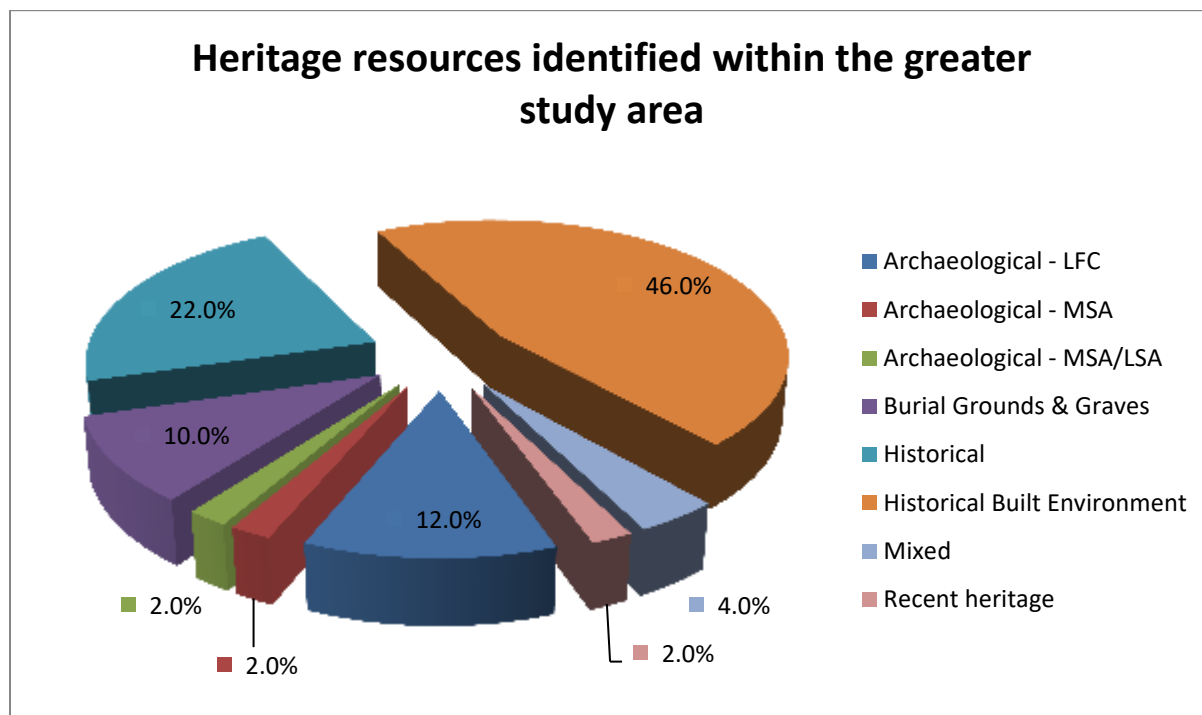


Figure 3-1: Heritage resources identified within the WRDM

Lithologies⁹ associated with the Witwatersrand, Transvaal and Karoo Supergroups underlie the regional study area. These lithologies represent the Mesoarchean through the Palaeozoic Eras, which range from approximately 2 800 million years ago (mya) to 266 mya (Johnson *et al* 2006).

The Witwatersrand Supergroup is the greatest source of gold on earth. These layers were deposited between 2 800 and 2 650 mya. Within the Witwatersrand Supergroup, the West Rand Group is the most relevant to the Project-specific study area. These formations comprise quartzite, shale and minor or subordinate conglomerates (Johnson *et al* 2006).

The Transvaal Supergroup overlies the Witwatersrand Supergroup (Johnson *et al* 2006). This geological feature is preserved in three basins, of which the most relevant is the Transvaal Basin. The Transvaal Basin dates between 2 650 to 290 mya. Within the Transvaal Supergroup are the Chuniespoort and Pretoria Groups. The Chuniespoort includes the Malmani Subgroup, a layer of dolomitic bedrock. The subgroup includes stromatolites and has a high potential for Karst topography. The upper Pretoria Group is approximately 6 to 7 km thick. The formation comprises predominantly mudrock, alternating with quartzitic sandstone, significant interbedded basaltic- andesitic lavas and subordinate conglomerate, diamictite and carbonate rocks. These layers have all been subject to low-grade metamorphism.

⁹ The palaeontological baseline was compiled by Shannon Hardwick and was reviewed by Prof. Marion Bamford from the University of the Witwatersrand.

The layers of the Karoo Supergroup overlie the Transvaal Supergroup and represent the uppermost lithologic units in the regional study area. The Karoo Supergroup is approximately 12 km thick and extends over an area in excess of 700 000 square kilometres (Johnson *et al* 2006). The Karoo Supergroup includes the Dwyka, Ecca, Beaufort and Drakensburg Groups, the last of which is underlain by the *Molteno*, *Elliot* and *Clarens Formations* within the Supergroup.

Palaeontologically-sensitive layers include the Chuniespoort Group (including the Malmani Subgroup), Pretoria Group and Karoo Supergroup (SAHRIS 2013). The Witwatersrand Supergroup is of negligible or zero palaeontological sensitivity and is not considered further. Table 3-2 presents a summary of the palaeontological sensitivities within the regional study area.

The Karoo Supergroup is well known for terrestrial vertebrate fossils, distinctive plant assemblages, thick glacial deposits and extensive dolerite dykes and sills within the sediments (Johnson *et al* 2006). The Ecca Group within the Karoo Supergroup also includes the following fossils: non-marine trace fossils; fish species, crustaceans and other marine shelly invertebrates, microfossils, fossil insects and coal floras in particular (SAHRIS 2013). Although it occurs in the regional study area, the Karoo Supergroup does not underlie the Project specific study area.

The Pretoria and Chuniespoort Groups include microfossils (SAHRIS 2013). The Pretoria Group, Malmani Subgroup and *Black Reef Formation* include stromatolites. These are the ancient predecessors of modern algal mats which have been fossilised.

Many layers of the Transvaal Supergroup are conducive to karst topography and the associated formation of caves and breccia (SAHRIS 2013). This is especially prolific within the Malmani Subgroup and the well-indurated dolostone within those layers (Johnson *et al* 2006). Perhaps the most famous example of karst topography and the paleontological potential of the breccia within these caves is the Fossil Sites of South Africa World Heritage Site (UNESCO, 2018).

The Fossil Sites of South Africa World Heritage Site, known colloquially as the Cradle of Humankind, occurs within the neighbouring the Mogale City Local Municipality of WRDM (UNESCO, 2018). The Cradle of Humankind area is approximately 50km from the proposed Metallurgical Plant. The fossils in these cave sites provide evidence for the occupation of the area for at least the last 2.3 mya. Hominid fossils recovered from these caves represent *Australopithecus africanus*, *Paranthropus* species and *Homo habilis*. New species recently identified in these caves include *A. prometheus*, *A. sediba* and *H. naledi*. The fossils of the Cradle of Humankind represent some of the earliest hominid species of southern Africa

Table 3-2: Geology and palaeontological sensitivities for the regional study area¹⁰

Eon	Era	Period	Lithostratigraphic Units			Palaeo-Sensitivity	Fossils
			Supergroup	Group	Formations		
Phanerozoic	Palaeozoic	Permian	Karoo Supergroup	Ecca Group	Waterford, Fort Brown, Ripon, Collingham, White Hill and Prince Albert	Moderate	Non-marine trace fossils; Vascular plants (including petrified wood) and palynomorphs of <i>Glossopteris</i> flora; Mesosaurid reptiles. Fish (including microvertebrate remains and coprolites); Crustaceans; and Insects.
Proterozoic	Eoproterozoic	Vaalian	Transvaal Supergroup	Pretoria Group	Silverton, Daspoort , Stubenkop, Hekpoort, Boeshoek, Timeball Hill and Rooihooigte	Low; Moderate; High	Stromatolites; Microfossils are possible where stromatolites occur; Fossils may exist within late Cenozoic cave breccias. These may occur within outcrop area of carbonate subunits, such as the 'Transvaal Dolomite' outcrop area

¹⁰ Geological formations of high palaeontological sensitivity are indicated in bold.

Eon	Era	Period	Lithostratigraphic Units			Palaeo-Sensitivity	Fossils
			Supergroup	Group	Formations		
				Chuniespoort Group	Duitsland, Penge	Low	Possible microfossils
					Frisco, Eccles, Lyttelton, Monte Christo and Oaktree <i>(Malmani Subgroup)</i>	High	Range of shallow marine to intertidal stromatolites (such as domes and columns); Organic-walled microfossils; Early continental shelf environments (margins of Kaapvaal Craton); and
					Blackreef	High	Fossils may exist within late Cenozoic cave breccias within the 'Transvaal Dolomite' outcrop area, which is similar to Sterkfontein karst topography
Archaean	Mesoarchaeon	Randian	Witwatersrand Supergroup	West Rand Group	Afrikander, Elandsplaagte, Palmietfontein, Tusschenin, Coronation, Promise <i>(Government Subgroup)</i>	Zero	None
					Bonanza, Brixton, Parktown and Orange Grove <i>(Hospital Hill Subgroup)</i>		

The Stone Age in southern Africa is divided into three broad phases, namely: the ESA, the MSA and the LSA. These phases are determined according to the lithic tools and material cultural produced by the various hominid species through time.

The Cradle of Humankind notwithstanding, no heritage resources representing the ESA were recorded in the regional study area. The regional study area includes expressions of the MSA, which account for 2% of the heritage resources recorded. This expression of the MSA included a low density scatter (Huffman *et al* 1994). The MSA was also identified in another low density scatter which also included LSA lithics. This was the only expression of the LSA for the regional study area.

The high proportion of blades that are minimally modified and which are created using the Levallois technique characterise the early MSA lithic industries (Clark 1982; Deacon & Deacon 1999). The presence of bone tools, ochre, beads and pendants as well as the use of good-quality raw materials further characterise this period.

LSA lithics are specialised, i.e. specific tools were created for specific purposes (Mitchell 2002). LSA assemblages commonly include diagnostic tools, such as scrapers and segment, and may also include bone points. The LSA is further defined by evidence of ritual practices and complex societies (Deacon & Deacon 1999). Three rock art painting traditions occur within South Africa and each is associated with specific groups. No evidence of rock art was noted in the literature review.

In southern Africa, the LSA is commonly associated with hunter-gatherers. The San (including Barsarwa, Bathwa and hunter-gatherer groups) are generally accepted as the first inhabitants of present-day South Africa (Makhura 2007). Later, the various peoples of the Farming Community, including the ancestors of the modern Sotho-Tswana and Nguni peoples, settled in the area.

The Farming Community period correlates to the movements of Bantu-speaking agro-pastoralists moving into southern Africa. The Farming Community is divided into the EFC and LFC periods. No expressions of the EFC were identified within the regional study area.

LFC resources account for 12% of the heritage resources identified in the larger study area (Huffman *et al* 1994; Digby Wells 2015; Van Schalkwyk 2017). LFC settlements are identified through stonewalling or secondary tangible surface indicators such as ceramics.

Stonewalling is the most visible indicator of LFC settlements and can attest to the complex processes of development and decline over several years (see for example Delius *et al* 2014). Different categories of stonewalling have been described through differences in the construction technique, coursing, height, shape and internal divisions. Within the regional and local study area, Type N and Klipriviersburg walling is known to occur.

Ceramics were an active part of cultural group dynamics and provided a social function through conveying symbols and metaphors. Because of this, archaeologists can use ceramics to show a relative cultural-historical temporal sequence to recognise ceramic users in the archaeological record (Huffman 2007). *Ntsuanatsatsi* and *Uitkomst* are the most common ceramic facies in the study area. *Uitkomst* ceramics occur between 1650 and

1820 CE and key characteristics include: stamped arcades, applique, blocks of parallel incisions, stamping and chord impressions. *Ntsuanatsatsi* ceramics are characterised by stamping in the neck, applique and stamped arcades on the shoulder. These ceramics occur between 1450 and 1650 CE (Huffman 2007).

Within the study area, the LFC settlements are thought to be associated ethnographically with the Tswana and Fokeng. The Tswana groups appear to have been in the area first and are primarily associated with three chiefs: Morolong, Masilo and Mokgatla. Masilo ruled in the northern Witwatersrand area in the 15th century and together with his son, Malope, founded the Hurutshe group (Ngcongco 1982). The Kgatla and Hurusthe may share a common ancestry and similar origins (Huffman 2007; Mbenga & Manson 2010). It is also possible that Mokgatla, who governed over the north-eastern Witwatersrand area and Pretoria during the 15th and 16th centuries, may have established the Kgatla lineage. Morolong founded the Rolong.

The Fokeng moved into the region later, possibly during the 16th century. The Fokeng may have Tswana origins (as described by Morton 2008) or may be a group with Nguni origins who were later '*Sotho-ised*' (as described by Huffman 2007). The Fokeng attribute their origins to the Ntsuanatsatsi Marsh and settled at the Ntsuanatsatsi Hill in the Free State between 1550 and 1650 CE, until increased rainfall facilitated the movement of groups further into the interior.

From the mid-16th century, communities started to move into condensed settlements wherein all inhabitants allied themselves to chiefs. These settlements included new spatial characteristics with domestic living areas becoming more elaborate and segmented. These further contributed to the increasing political centralisation (Huffman 2007; Anderson 2009).

The historical period¹¹ is commonly regarded as the period characterised by contact between Europeans and Bantu-speaking African groups and the written records associated with these interactions. However, the division between the historical period and the LFC is largely artificial and there is a large amount of overlap between the two. An important example of this artificial division is the Mfecane (in the Nguni languages) or the Difaqane (Sotho languages).

The Difaqane refers to the period between approximately 1817 and 1826 which is characterised by violence and political unrest associated with the movement of Mzilikazi and his Ndebele into the interior of South Africa (Anderson 2009; Landau 2010). As the Ndebele migrated, the occupants of settlements which were now abandoned or destroyed were either subdued and joined the Ndebele, abandoning their previous cultural identity or fled. European missionaries, settlers, traders and travellers moving into the interior further added to the instability and the resulting power struggles.

¹¹ In southern Africa, the last 500 years represents a formative period that is marked by enormous internal economic and political invention and experimentation that shaped modern identities and cultural contours outside of European contact. This period is currently not well documented but is being explored through the 500 Year Initiative (Swanepoel *et al* 2008).

Some of the 'empty lands' left behind from the Difaqane became host to the early white migrants who claimed large tracts of land and founded settlements and towns as they moved northwards during the 1830s. The Voortrekkers, and later the Boers, encountered resistance from inhabitants of these 'empty lands'. Soon thereafter, the British moved into the interior of South Africa. The British sought to implement British Imperial rule over the Boer republics which had recently been established. These building tensions culminated in the Transvaal War of 1880 to 1881.

The gold reef on the Witwatersrand was discovered in 1886, when George Harrison discovered gold on the farms Wilgespruit and Langlaagte in present-day Johannesburg. This discovery triggered the Transvaal gold rush. Shortly thereafter, Paul Kruger, the then president of the *Zuid Afrikaansche Republiek* (ZAR), declared the area around the informal tented mining settlement known as Ferreira's Camp as public diggings, exacerbating the rush. The gold rush led to the establishment of several large mining companies and towns, including Johannesburg (1886), Krugersdorp (1886) and Randfontein (1890).

The discovery of gold again exacerbated tensions between the British and the Boers which remained after the Transvaal War. The British sought to bring the gold fields under their control, along with the ZAR settlements established there. These heightened tensions resulted in the Jameson Raid of 1895. Leander Jameson, a close ally of Cecil John Rhodes, led the raid, which was intended to cause an uprising amongst the British residents of the Witwatersrand. The Boers were warned of British plans and captured Jameson and his men at Doornkop, near Krugersdorp. The Jameson Raid was an important catalyst for the South African War of 1899 to 1902.

Within the regional study area, the historical period and the associated built heritage represent 22% and 46% of the heritage resources respectively. Historical structures include those associated with the South African War and early European settlers (Huffman *et al* 1994). The built resources include: buildings, complexes (such as *werwe*) and structural remains (Digby Wells 2015; Van Schalkwyk 2017). Burial grounds account for a further 10% of the heritage resources and range from single graves to burial grounds of more than 100 graves (Digby Wells 2015; Van Schalkwyk 2017).

The farm Blyvooruitzicht was originally farmed by Pieter Daniel Roux. The farm name is a Dutch term, meaning 'happy outlook' or 'happy prospect'. Dr. R. Krahnemann successfully completed a geophysical magnetometer survey over the present lease area in the early 1930s. Further explorations confirmed the viability of the mine and BGMC opened in 1937. BGMC became the first mine to exploit the Carbon Leader Reef. In 1947, following the result of similar exploration activities on the neighbouring farm Doornfontein, the eponymous company became the fifth mine to open along the West Wits Line. Some of the earlier infrastructure associated with the Blyvooruitzicht operations remains standing and is afforded general protection under Section 34 of the NHRA (refer to Figure 5-2).

3.1 Data Sources

The following published literature informed this report:

- Behrens, J. & Swanepoel, N., 2008. Historical archaeologies of southern Africa: precedents and prospects. In: N. Swanepoel, A. Esterhuysen & P. Bonner, eds. *Five Hundred Years Rediscovered: South African precedents and prospects*. Johannesburg: Wits University Press, pp. 23-39;
- Clark, J.D. 1982. The Cultures of the Middle Palaeolithic/Middle Stone Age. In: Oliver, R. (ed) *The Cambridge History of Africa*. Cambridge: Cambridge University Press;
- Deacon, H. & Deacon, J. 1999. *Human Beginnings in South Africa*. Cape Town: David Phillip;
- Delius, P., Maggs, T. & Schoeman, A., 2014. *Forgotten World: The Stone-Walled Settlements of the Mpumalanga Escarpment*. First ed. Johannesburg: Wits University Press;
- Esterhuysen, A. & Smith, J., 2007. Stories in Stone. In: P. Delius, ed. *Mpumalanga: History and Heritage: reclaiming the past, defining the future*. Pietermaritzburg: University of KwaZulu-Natal Press, pp. 41-67.
- Landau, P. S., 2010. *Popular Politics in the History of South Africa, 1400-1948*. Cambridge: Cambridge University Press.
- Huffman, T.N. 2007. *A handbook to the Iron Age: the Archaeology of Pre-colonial Farming Societies in Southern Africa*. Pietermaritzburg: University of KwaZulu-Natal Press;
- Johnson, M.R., Anhaeusser, C.R. & Thomas, R.J. (Eds.). 2006. *The Geology of South Africa*. Johannesburg: Geological Society of South Africa and Council for Geosciences.
- Makhura, T., 2007. Early inhabitants. In: P. Delius, ed. *Mpumalanga: History and Heritage*. Pietermaritzburg: University of KwaZulu-Natal Press, pp. 91-135.
- Morton, F., 2008. Creating maps as historical evidence: reconsidering settlement patterns and group relations in the Rustenburg-Pilanesberg Area before 1810. *New Contree*, Volume 56, pp. 1-22;
- Mbenga, B. & Manson, A., 2010. *People of the Dew: A History of the Bafokeng of the Phokeng-Rustenburg Region, South Africa, from Early Times to 2000*. Johannesburg: Jacana Media
- Mitchell, P. 2002. *The Archaeology of Southern Africa*. Cambridge: Cambridge University Press;
- Ngcongco, L., 1982. Precolonial migration in south-eastern Botswana. In: *Settlement in Botswana*. Gabarone: Botswana Society, pp. 23-80.

- Swanepoel, N., Esterhuysen, A. B. & Bonner, P., 2008. *Five Hundred Years Rediscovered: Southern African Precedents and Prospects*. Johannesburg: Wits University Press.

The following unpublished sources informed this report:

- Anderson, M. S., 2009. The Historical Archaeology of Marathodi: towards an understanding of space, identity and the organisation of production at an early 19th century Tlokwa Capital in the Pilanesberg region of South Africa, Unpublished thesis submitted in fulfilment of the degree of Doctor of Philosophy: University of Cape Town;
- Digby Wells. 2015. Heritage Scoping Report: Sibanye Gold Limited's West Rand Tailings Retreatment Project. Unpublished report prepared for Sibanye Gold Limited;
- Huffman, T.N., van der Merwe, H.D. & Steel, R. 1994. Archaeological survey of the East and West Driefontein Mines. Archaeological Resources Management: unpublished report;
- SAHRIS, 2013. Fossil Heritage Layer Browser. [Online]. Available at: <http://www.sahra.org.za/sahris/fossil-heritage-layer-browser> [accessed 03 September 2018];
- UNESCO, 2018. World Heritage List: Fossil Hominid Sites of South Africa. [Online]. Available at: <http://whc.unesco.org/en/list/915> [accessed 25 July 2018]; and
- Van Schalkwyk, J.A. 2017. Phase 1 Cultural Heritage Impact Assessment: the proposed construction of the Fochville 132 kV powerline, Gauteng Province. Unpublished report prepared for Envirolution.

The reports listed above were sourced primarily from the South African Heritage Resources Information System (SAHRIS). Data from the SAHRIS database was also included in inform Plan 4. Table 3-3 below describes the sources used for the historical layering

Table 3-3: References for Aerial Photography

Job no.	Flight plan	Photo no.	Map ref.	Area	Date	Ref.
425	Row 10	917	2627 AD	Potchefstoom/Parys	1961	425/1961
		918				
		919				
	Row 11	880				
		881				
		882				
		883				
		884				
	Row 12	856				
		857				
		858				
		859				

3.2 Pre-Disturbance Survey

Shannon Hardwick undertook a pre-disturbance survey on 24 July 2018. Miss Hardwick completed the pre-disturbance survey as a non-intrusive pedestrian survey, i.e. no sampling was undertaken. Track-logs were recorded to demonstrate the area inspected, presented in Plan 3. The survey focused on the area of the No. 5 Shaft metallurgical treatment plant and the area overlying the proposed mining activities envisaged for the next fifteen years as determined through discussions with Blyvoor Gold Mine representatives, Dave Whittaker and Louis Lamsley. Miss Hardwick did not survey the area associated with the tailings retreatment plan, as it is assumed this area has been subject to a heritage assessment through earlier Project activities.











Miss Hardwick undertook informal consultation with custodians of the remaining hostel block. The informants indicated the presence of two graves on the neighbouring farm Doornfontein 118 IQ. As these occurred outside of the study area, they were not verified on site. No heritage resources¹² were identified within the development footprint area during the pre-disturbance survey.

¹² All built environment resources associated with the No. 5 Shaft complex are younger than 60 years, and not generally protected under Section 34. This NID is therefore submitted to Provincial Heritage Resources Authority Gauteng (PHRA-G) via SAHRIS for noting only.

Blyvoor EIA

Heritage Tracks

Legend

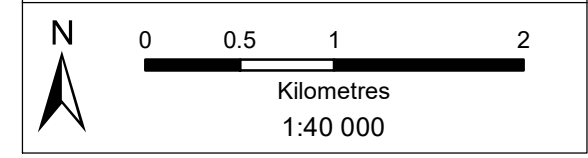
-  Project Area
-  Heritage Tracks
-  Major Town
-  Arterial / National Road
-  Main Road
-  Minor Road
-  Railway Line
-  Non-Perennial Stream
-  Dam Wall
-  Dam / Lake
-  Non - Perennial Pan
-  Wetland



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





Projection: Transverse Mercator	Ref #: scm.BVG4880.201808.137
Datum: WGS 1984	Revision Number: 1
Central Meridian: 27°E	Date: 31/08/2018

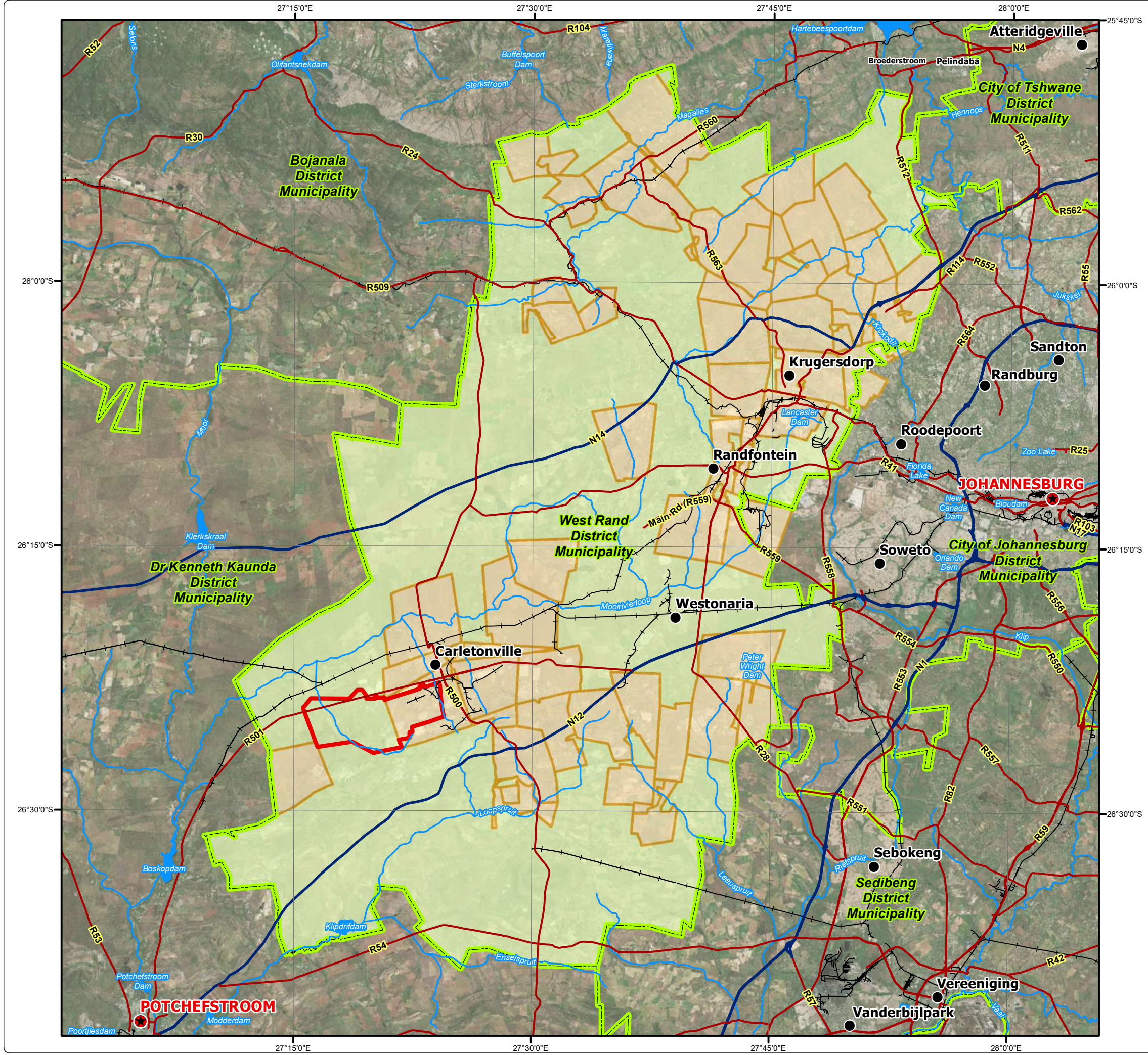


Blyvoor EIA

Properties with Identified Heritage Resources

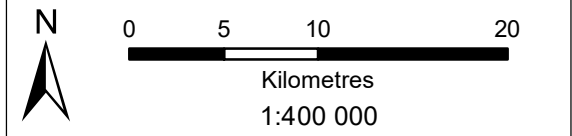
Legend

-  Project Area
-  Properties with Identified Heritage Resources
-  City
-  Major Town
-  Main Road
-  Arterial / National Route
-  Railway Line
-  Perennial Stream
-  Dam
-  District Municipality (2016)
-  Regional Study Area



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

Projection: Transverse Mercator Ref #: kam.BVG4880.201809.038
 Datum: WGS 1984 Revision Number: 1
 Central Meridian: 27°E Date: 06/09/2018



4 Assessment Process

Table 4-1 presents the EIA process and AEL application that are currently being conducted for the proposed Project.

Table 4-1: Current Assessment Processes

Legislation (E.g. NEMA, MPRDA, etc.)	Current phase of assessment process (E.g. Scoping, EIA, etc.)	Authorities who has / will receive information	Capacity of Authorities
NEMA	Application	Department of Mineral Resources (DMR)	Licencing
MPRDA	Application	Department of Mineral Resources (DMR)	Licencing
NEM:AQA	AEL Application	Department of Environmental Affairs	Licencing
NHRA	NID and Request for Exemption (RfE)	South African Heritage Resources Agency (SAHRA)	Commenting
	NID and RfE	Provincial Heritage Resources Authority Gauteng (PHRA-G)	Noting

These assessments are required in terms of legislated and/or regulated activities outlined in Sections 4.1 to 4.3 below.

4.1 EIA Regulations Listed Activities

Table 4-2 presents the activities listed in the EIA Regulations which generally require impact assessments.

Table 4-2: Identified Listed Activities

NEMA Activity No.	NHRA Trigger	Description	Expected duration/phase
Listing Notice 2, Activity 6	38(1)(e)	Air Emissions Licence: Activity which requires a permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent	Pre- construction and operation

4.2 NHRA Section 38(1) Activities

The proposed development will include the following activities listed in Section 38(1) of the NHRA, which generally require heritage assessments be undertaken.

Table 4-3: NHRA Section 38 triggers

NHRA Section 38 (1) Activities / Triggers		Summary description (E.g. 500 m conveyor belt, open cast pit, etc.)
<input type="checkbox"/>	a	Any linear development or barrier >300 m
<input type="checkbox"/>	b	Any bridge or similar structure >50 m
<input type="checkbox"/>	c	Any development or activity that will change the character of a site:
<input type="checkbox"/>	i	≥5 000m ² in extent
<input type="checkbox"/>	ii	Involving ≥3 existing erven/ subdivisions
<input type="checkbox"/>	iii	Involving ≥3 or more erven/ divisions consolidated within past 5 years.
<input type="checkbox"/>	d	Rezoning of a site ≥10 000m ² in extent.
<input checked="" type="checkbox"/>	e	Other triggers, e.g.: in terms of other legislation, (i.e.: National Environment Management Act, etc.)
		NEMA, MPRDA

4.3 Identified or known heritage resources and potential impacts

Certain categories of heritage resource, if existing and identified, generally require heritage assessments to be completed before any development may take place. These categories may be formally or generally protected in terms of the NHRA. Table 4-4 presents an overview of such heritage resources identified within the Project area.

Table 4-4: Identified heritage resources in terms of Section 3 of the NHRA

Section	Description
<input checked="" type="checkbox"/>	Places, buildings, structures and equipment of cultural significance
	Description of resource: None within the development footprint area. Historical structures do exist within MR143GP.
	Potential impact: None identified
<input type="checkbox"/>	Places to which oral traditions are attached or which are associated with living heritage
	Description of resource: None identified
	Potential impact: None

	Section	Description
<input type="checkbox"/>	3(2)(c)	Historical settlements and townscapes
		Description of resource: None within the development footprint area. Ruins of previous mining villages associated with older shafts within MR143GP do occur.
		Potential impact: None
<input type="checkbox"/>	3(2)(d)	Landscapes and natural features of cultural significance
		Description of resource: None identified
		Potential impact: None
<input checked="" type="checkbox"/>	3(2)(e)	Geological resources of scientific or cultural importance
		Description of resource: Palaeontologically sensitive layers underlying the Project area include the Chuniespoort and Pretoria Groups and the layers of the Karoo Supergroup.
		Potential impact: None identified.
<input type="checkbox"/>	3(2)(f)	Archaeology and/or palaeontology (Including archaeological sites and material, fossils, rock art, battlefields & wrecks)
		Description of resource: None identified
		Potential impact: None
<input type="checkbox"/>	3(2)(g)	Graves and burial grounds (e.g. ancestral graves, graves of victims of conflict, historical graves & cemeteries)
		Description of resource: Graves are known to occur on Doornfontein 118 IQ, outside of the development footprint of this Project
		Potential impact: None identified.
<input type="checkbox"/>	3(2)(h)	Other human remains
		Description of resource: None identified
		Potential impact: None
<input type="checkbox"/>	3(2)(i)	Sites of significance relating to the history of slavery in South Africa
		Description of resource: None identified
		Potential impact: None
<input type="checkbox"/>	3(2)(j)	Movable objects
		Description of resource: None identified
		Potential impact: None

5 Illustrative Material

Figure 5-1 below presents an overview of the current environment within the Project area. As described above, the area has a lengthy history of disturbance through anthropogenic activity.

Figure 5-2 presents the results of the historical imagery. The yellow dots represent historical structures which may potentially still be standing as structures or ruins. The eight dots in the north and east of the MRA are surrounded by historical structures which represent the early mining villages near the earlier shafts established within the BGMC. Most of these structures have been demolished and stand in ruin. No historical structures were identified within the development footprint area.

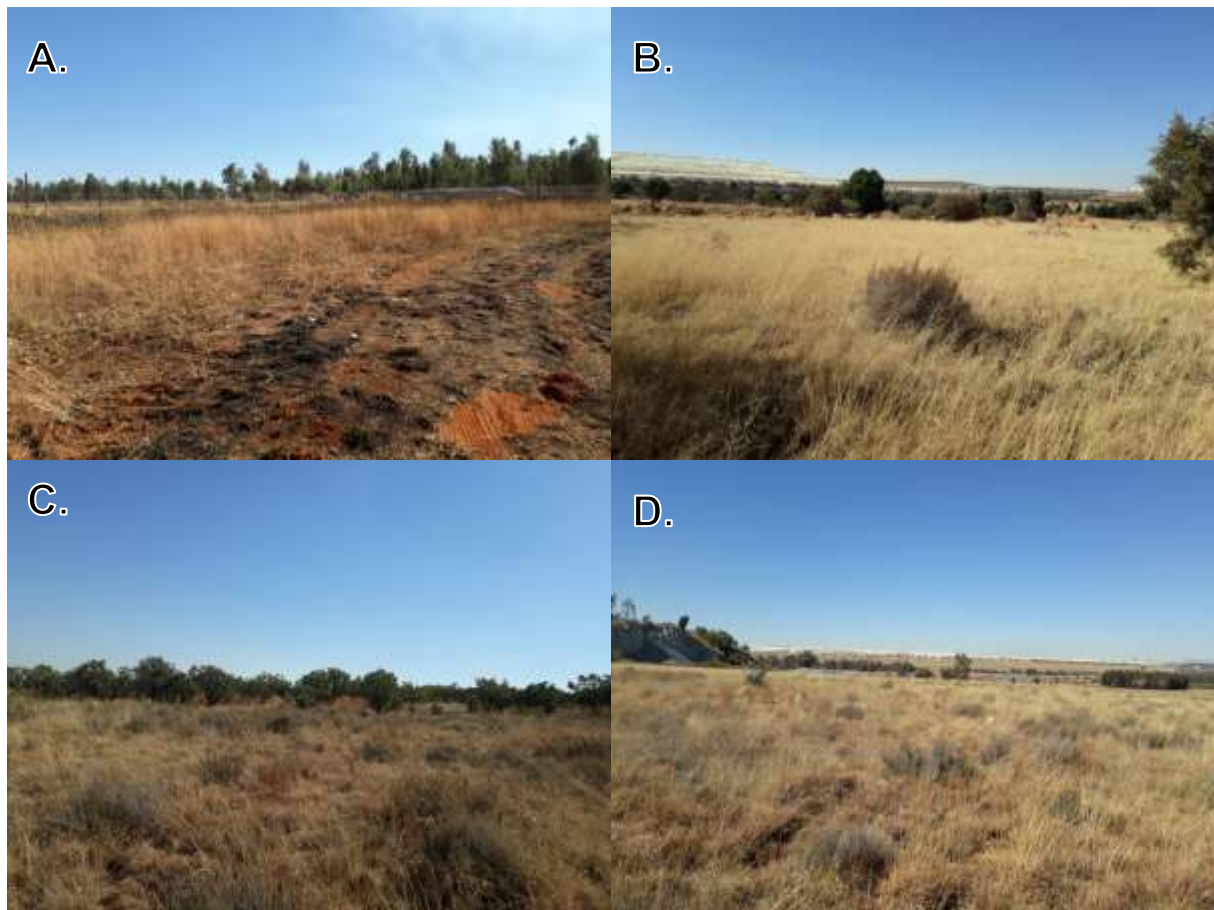


Figure 5-1: Photographs illustrating the current environment A.) Environment at the site of the No. 5 shaft metallurgical plant; B-D.) Conditions above area to be undermined

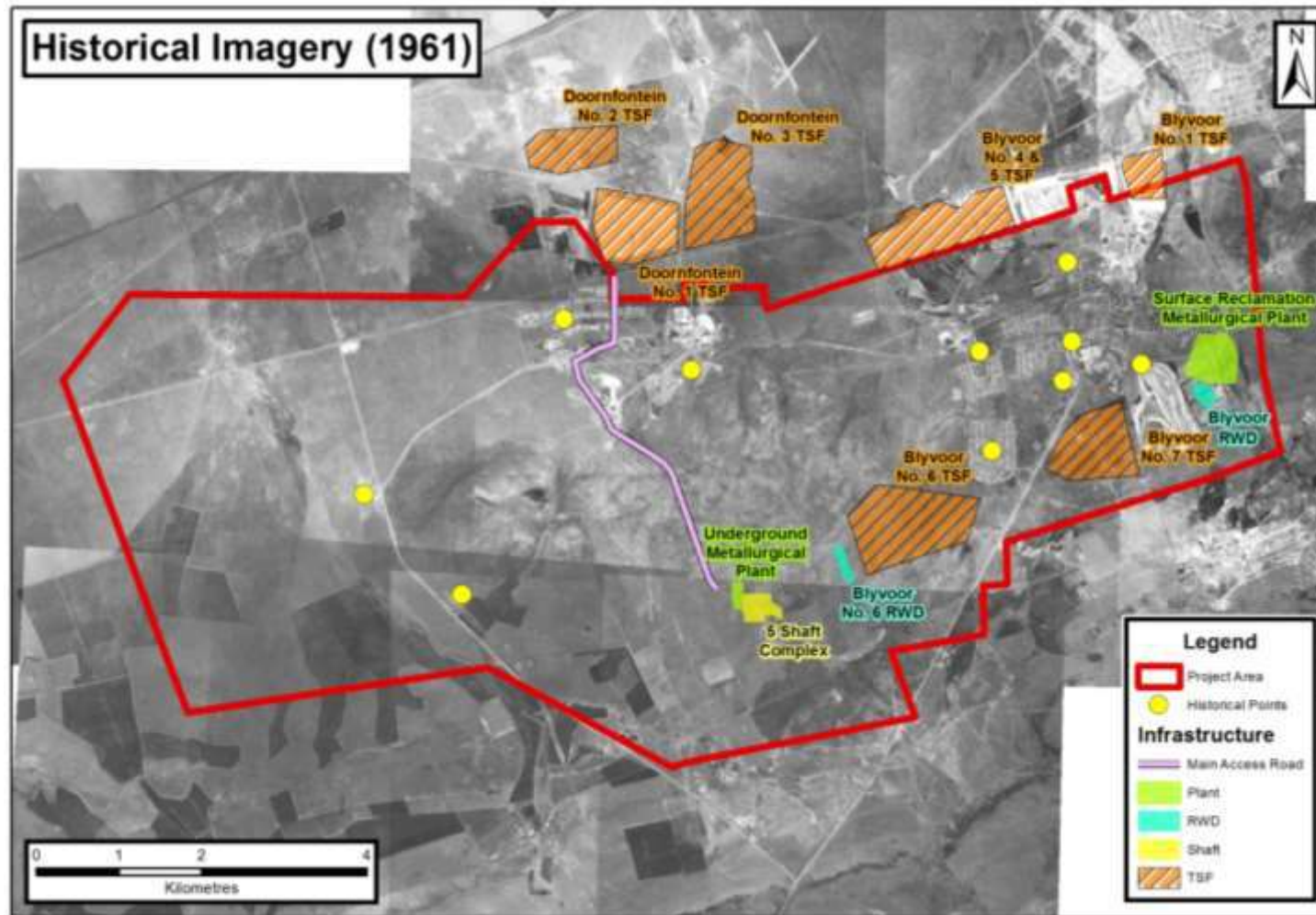


Figure 5-2: Historical Imagery of the site-specific study area

6 Recommendation

Table 6-1 presents a summary and motivation of the specialist recommendations.

Table 6-1: Specialist heritage recommendations

Is a Heritage Impact Assessment required?		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
If NO, provide motivation:			
<p>The baseline description as provided in Section 3 above demonstrates that the greater study area predominantly comprises a cultural landscape associated with the historical period, including the associated built heritage. Much of the archaeology in the greater study area is of low significance as determined in previously-completed heritage studies (Huffman <i>et al</i> 1994; Digby Wells 2015; Van Schalkwyk 2017).</p> <p>The Project area has been subject to a long period of anthropogenic disturbance as evidenced by the history of mining in the nearby area and the existing infrastructure which Blyvoor Gold wish to refurbish and return to operation. All Project activities will take place within the area which has already been disturbed.</p> <p>No outcrops of palaeontologically sensitive material and no heritage resources were identified during the pre-disturbance survey. Built heritage resources were identified through historical imagery but none of these resources exist within the development footprint area. The infrastructure associated with No. 5 Shaft and the No. 5 Sub-vertical Shaft was completed from the 1980s onwards and is therefore not afforded general protection under Section 34 of the NHRA.</p> <p>Digby Wells therefore recommends and requests exemption from further heritage assessment in terms of Section 38 of the NHRA. This recommendation and request is made on condition that:</p> <ul style="list-style-type: none"> ■ Blyvoor Gold develops a project-specific Chance Finds Protocol (CFP) and Fossil Finds Protocol (FFP) for implementation during the establishment and construction phase of the Project; and ■ The proponent immediately informs SAHRA of any chance finds identified and enlists the services of a qualified and accredited archaeologist to assess and recommend appropriate mitigation measures. 			
If YES, provide suggested components that may be required or undertaken during HIA.			
<input type="checkbox"/>	Archaeology	<input type="checkbox"/>	Architecture
<input type="checkbox"/>	Built Environment	<input type="checkbox"/>	Burial Grounds and Graves
<input type="checkbox"/>	Palaeontology	<input type="checkbox"/>	Public Participation
<input type="checkbox"/>	Townscapes	<input type="checkbox"/>	Visual Impact
<input type="checkbox"/>	Other:		
Recommendation made by:			
Name: Shannon Hardwick		Name: Justin du Piesanie	
Capacity: Assistant Heritage Resources Management Consultant		Capacity: Divisional Manager: Social and Heritage Services	

Notification of Intent to Develop

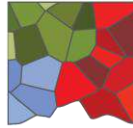
Environmental Impact Assessment for the Blyvoor Gold Mining Project near Carletonville,
Gauteng Province

BVG4880



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Appendix A: Specialist CV



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

1 Education

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

2 Language Skills

Language	Written	Spoken
English	Excellent	Excellent
Afrikaans	Basic	Basic

3 Employment

Period	Company	Title/position
2018 to present	Digby Wells Environmental	Assistant Heritage Resources Management Consultant
2017-2018	Digby Wells Environmental	Intern: Heritage Resources Management
2016-2017	Tarsus Academy	Facilitator
2011-2016	University of the Witwatersrand	Teaching Assistant
2011	University of the Witwatersrand	Collections Assistant

4 Experience

Shannon joined the Digby Wells team in May 2017 as a Heritage Management Intern, and has subsequently been appointed as an Assistant Heritage Resources Management Consultant. Shannon is an archaeologist who obtained a Master of Science (MSc) degree from the University of the Witwatersrand in 2013, specialising in historical archaeobotany in the Limpopo Province. She is a published co-author of one paper in *Journal of Ethnobiology*. Since joining Digby Wells, Shannon has gained generalist experience through the compilation of Notification of Intent to Develop (NID) applications as well as Heritage Basic Assessment Reports (HBARs), Heritage Scoping Reports (HSRs) and Heritage Impact Assessment (HIA) reports. Her other experience includes compiling a Community Health, Safety and Security Management Plan (CHSSMP) and researching Artisanal and Small-Scale Mining for input into a Livelihood Restoration Framework (LRF). Shannon's experience in the field includes pre-disturbance surveys in South Africa and fieldwork in Malawi.

5 Project Experience

My project experience is listed in the table below:

Project Title	Project Location	Date:	Description of the Project	Name of Client
Kilbarchan Colliery Environmental Authorisations and Closure Study	Newcastle, KwaZulu-Natal, South Africa	Ongoing	Heritage Impact Assessment	Eskom Holdings SOC Limited



Project Title	Project Location	Date:	Description of the Project	Name of Client
Belfast Implementation Project	Mpumalanga Province, South Africa	Ongoing	Section 34 Permit Application	Exxaro Coal Mpumalanga (Pty) Ltd
The South African Radio Astronomy Observatory Square Kilometre Array Heritage Impact Assessment and Conservation Management Plan Project	Northern Cape Province, South Africa	Ongoing	Heritage Impact Assessment and Conservation Management Plan	The South African Radio Astronomy Observatory (SARAO)
Heritage Resources Management Process for the Exxaro Matla Mine	Mpumalanga Province, South Africa	January 2018	Heritage Impact Assessment	Exxaro Coal Mpumalanga (Pty) Ltd
Newcastle Landfill Project	Newcastle, KwaZulu-Natal, South Africa	March 2018	Heritage Impact Assessment	GCS Water and Environmental Consultants
Tharisa Apollo (UG1) Plant	Marikana, North-West Province, South Africa	Ongoing	Heritage Impact Assessment	GCS Water and Environmental Consultants
National Heritage Resources Act, 1999 (Act No. 25 of 1999) Section 34 Permit Application Process for the Davin and Queens Court Buildings on Erf 173 and 174, West Germiston, Gauteng Province	Johannesburg, Gauteng, South Africa	April 2018	Section 34 Permit Application	IDC Architects
Environmental Impact Assessment for the proposed Future Developments within the Sun City Resort Complex	North West Province, South Africa	Ongoing	Heritage Impact Assessment	Sun International (Pty) Ltd
Basic Assessment and Environmental Management Plan for the Proposed pipeline from the Mbali Colliery to the Tweefontein Water Reclamation Plant, Mpumalanga Province	Mpumalanga Province, South Africa	January 2018	Heritage Basic Assessment Report	HCI Coal (Pty) Ltd (Mbali Colliery)



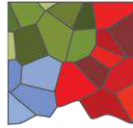
Project Title	Project Location	Date:	Description of the Project	Name of Client
Environmental Fatal Flaw Analysis for the Mabula Filling Station	Waterberg, Limpopo Province, South Africa	November 2017	Fatal Flaw Analysis	Mr van den Bergh
Zuurfontein NID	Ekurhuleni, Johannesburg, South Africa	July 2017	Notification of Intent to Develop	Shuma Africa Projects
Liwonde Additional Studies	Liwonde, Southern Region, Malawi	Ongoing	Resettlement Action Plan, Community Health, Safety and Security Management Plan	Mota-Engil Africa
National Heritage Resources Act, 1999 (Act No. 25 of 1999) Section 35 Archaeological Investigations, Lanxess Chrome Mine, North-West Province	Rustenburg, North West Province, South Africa	July 2017	Phase 2 Mitigation Assessment	Lanxess Chrome Mines (Pty) Ltd
Environmental and Social Input for the Pre-Feasibility Study	Bougouni, southern Mali	July 2017	Pre-Feasibility Study	Birimium Gold

6 Professional Registrations

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

7 Publications

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



DIGBY WELLS

ENVIRONMENTAL

Mr. Justin du Piesanie
Manager: Heritage Resources Management
Social and Heritage Services Department
Digby Wells Environmental

1 Education

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

2 Language Skills

Language	Written	Spoken
English	Excellent	Excellent
Afrikaans	Proficient	Good

3 Employment

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

4 Experience

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

5 Project Experience

Please see the following table for relevant project experience:

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



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



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



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

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

6 Professional Registrations

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

7 Publications

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

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