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2001/077745/23

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1st Phase

Cultural Heritage Resources Impact Assessment for a proposed extension of operations on portions of the farm SPANOVER 552 IO at the existing mine "KALGOLD" in the North-West province for "Harmony Kalgold Mining Operations", ***As well as updating*** *of the heritage remains on the existing mine*

The proposed new impact site adjacent to the existing operations of "Kalgold"

JULY 2013

Sidney Miller.
B.Sc (Eng) Civ. M.(Architecture) Conservation. ASAPA MEMBER NO 087

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1. EXECUTIVE SUMMARY

The author was tasked to execute a first phase heritage impact assessment on **portions 1, 4 and 5 of the farm SPANOVER 552 IO**, the property of ***Harmony Kalgold Mining Operations*** for the proposed extension of its operations. ***(Figures 02 and 04)***

Kalgold first started its mining operation during the mid-1990's on the farms ***Ferndale 554 IO, Goldridge 632 IO, Ferndale 551 IO, Portion 11 Ferndale 564 IO and the remainder of Koedoerand 569 IO*** where it at first focussed on mining of the ***D-zone*** ore body. The economic ore body was mined out by a single open pit operation, along a strike length of 1300m and to a depth of approximately 290m below surface. The mining operation at ***D-zone*** ceased in March 2009. Mining at ***Kalgold*** has continued despite the operation cessation at ***D-zone***. The ***A-zone, Windmill zone*** and ***Watertank zone*** are relatively new opencast operations, from which a remaining total resource estimated at 3.9 million ounces exists**.**

The ***Kalgold*** operation is located approximately 55km southwest of the town Mafikeng and 60km northeast of the town ***Stella*** in the ***Ratlou Local Municipality*** within the ***Northwest Province of South Africa***. Nearby villages include ***Kraaipan*** (15km to the south), ***Setlagole*** (18km to the southwest) and ***Mareetsane*** (20km to the east).

The ore reserves for ***Kalgold*** are estimated at 23 986 940 tons. The average mined tons as of the 2012 Business plan are 999 456 tons per year.

As proposed new operations now focus on mining the remaining ore body to the north, new undisturbed areas are required to receive both "overburden" tailings, as well as legally required slimes-dams on portions of the farm ***Spanover 552 IO***

Apart from the new requirements regarding heritage impact, it has come to the notice of the environmental consultant, Shangoni Management Services that previous execution of the 1999 Heritage Act and previous legislation, was scant, and was in need of upgrading. The total extent of the existing mine was therefore also investigated in this report to evaluate its present state of compliance to legislation regarding heritage issues.

Comment on the study for the proposed extension of operations on Spanover.
As will be found to be described in latter portions of this report it was established that there exist a disused dwelling of recent date (circa 1960) on the farm Spanover 552 IQ as well as three (?) small burial sites of presumably labourers associated with the farm. The existence of these burial sites was established through communication with the caretaker of the present herd of cattle that operates from the disused dwelling. He was able to direct the author to one of the burial sites that contains five graves. As he was uncertain of the location of the remaining two grave sites that is known to him, the author, and an official of the mine, Mr Tumi Segosapelo, tasked the herdsman to try and locate the two remaining burial premises.

As both the disused dwelling of recent date (circa 1960) as well as the three (?) burial sites is located far to the north from the proposed footprint of the new slimes dam and tailings it is safe to presume that for the foreseeable future that they will remain outside of the proposed new operations' impact area. The existence of these burial sites will be entered into the environmental management plan of the mine and will become part of the audit system for the mine.

Recommendation regarding the existing heritage remains on Spanover 552 IO is that as it is located well outside the footprint of the proposed new mining operations, the age of the dwelling and cattle post falls outside the sixty year rule and does not need mitigation in case of possible demolition.

The grave sites will not need to be moved for the present proposed operations on Spanover 552 IQ but must be protected by suitable demarcation and inclusion of the environmental audit system of the mine.

Comment on the heritage remains on the existing mines premises.
Regarding the previously "recording" of heritage estate and commencement of mining operations in the early 1990's it was established that four "farmyards" were originally documented as well as three burial sites. Two "monuments" recording the tragic death of an individual that drowned in the 1960's, as well as a Second South African War conflict site were also recorded. Although these heritage sites are recorded in the now defunct Environmental Management Plan of the mine there does not appear to be a physical copy of the original heritage impact assessment/s in the archives of the mine.

Even though there appears to be lack of evidence of the original heritage report it is clear that cognisance was taken of the mines heritage estate and that prior to the commencement of mining operations, Kalgold incorporated these "old farmyards" into the operational arrangement of the mine, and retained the gravesites in place.

The most important "farmyard" linked to the Nieuwoudt family became the on-site "headquarters" of Kalgold and is preserved and maintained for two reasons. In the first place one of the two dwellings has been adapted to contain offices for the officials directing operations of the mine. The second dwelling on the same site has been adapted to provide accommodation to visitors to the mine, as well a "canteen" to the workers and other visitors. This facility and the re-use of the farmyard with trees and some farm equipment are intact and are well preserved and managed.

A burial site of the occupants of this old farm also exists in close proximity to the aforesaid buildings and contains two double burials, one of which is not marked and five single burials, one of which is not marked.

Two other "farmyards" appears to have been targeted in the past by the tactical mining operations of the mine so as to accommodate mechanical workshops for logical reasons. Investigation of these sites buildings confirmed their exclusion from legal protection owing to their age falling outside of the sixty year regulation. There are burial sites linked to both these farmyards.

The larger of these burial sites contains approximately twenty "labourers' graves" that are at present in jeopardy owing to the proposed linking of The ***A-zone,*** and ***Watertank zone operations.*** Mitigation for the relocation of these graves is at present underway. For further information consult Mr Jan Nel Shangoni Management Services and Me Irene Nadunga Kalahari Goldridge Mining Company Limited) ***(See Contact details page 5)***

Secondly the remains of two Europeans that exist on the southern rim of the ***D-zone*** pit are intact and appear to be maintained

Finally, the last of the four "farmyards" is situated away from any mining operations. Apart from this, it is in an exceptionally ruinous state of preservation. As the building has no specific architectural style, only the materials used in its construction gives any indication of its age. This suggests that the building falls outside of the protection of the "sixty year rule"

It is recommended that the present use of the "Nieuwoudt" farmyard is continued "as-is" as it is well maintained and preserved.

It is recommended that the use of the other two farmyards as "workshop facilities" be continued under condition that buildings not in use must either be maintained or re-applied as storage facilities or accommodation, or application must be made for its demolition.

It is recommended that as the "fourth dwelling and garage" is a structural safety hazard and has no heritage value.

Mitigation regarding the retention or relocation of all graves must be linked to the operational plan of the Kalgold mine. Whatever the decision regarding this may be it is advised that all the grave sites are to be clearly demarcated and maintained on a seasonal base by the removal of vegetation. This demarcation and maintenance should also become part of the Environmental Audit system.

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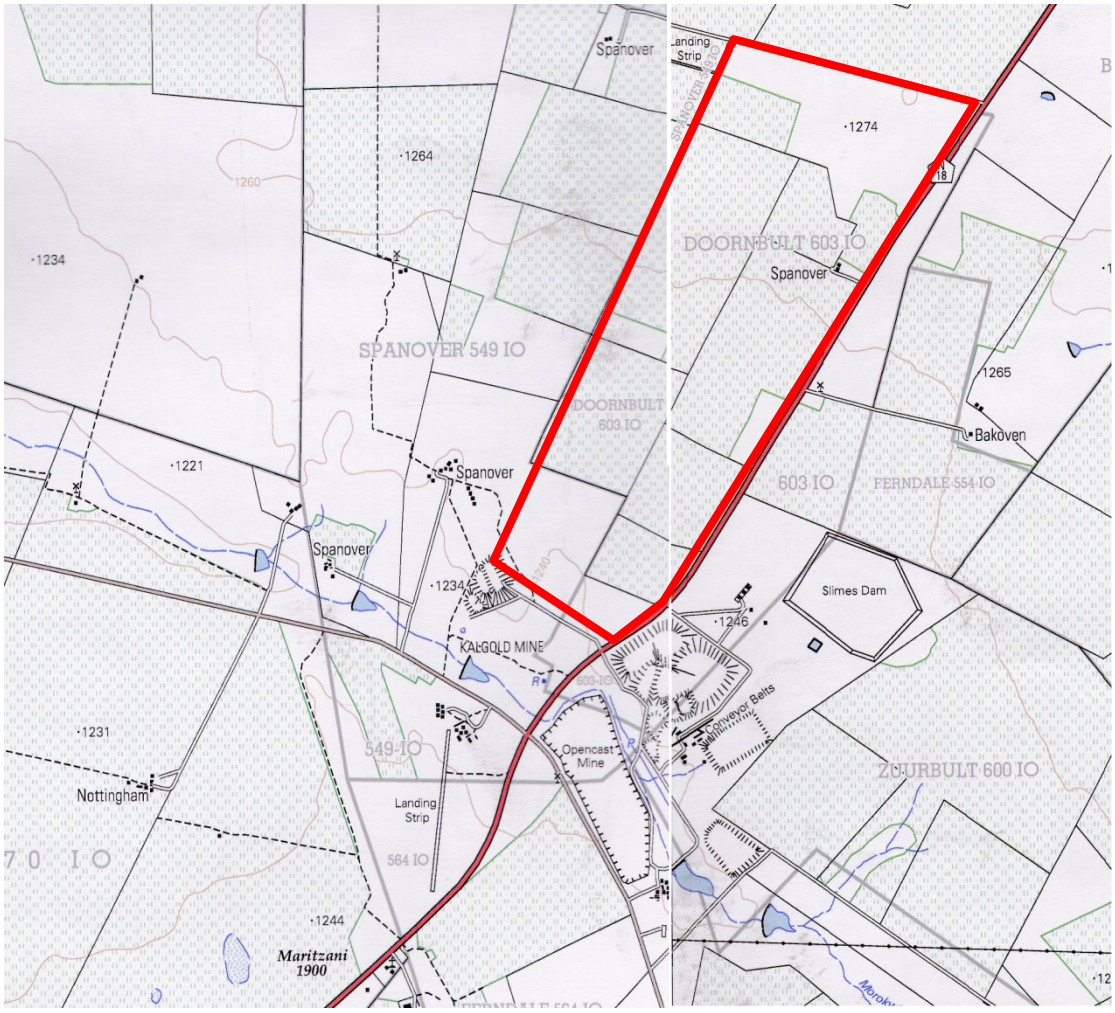

Figure 01. *The Kalgold operations as situated on the two 1 : 50 000 Maps 2625AB BATHOBATHO (second edition 2001) and 2625AA WEST END (second edition 2001). The area demarcated in red is the area investigated as a first phase heritage impact assessment.* ***(See figure 04)***

2. CONTACT DETAILS

2.1. Description of the farm (new application).

Spanover 549 IO Portion 4	T1234/1996	Kalahari Goldridge Mining Company Ltd.
Spanover 549 IO Portion 5	T2226/1998	Kalahari Goldridge Mining Company Ltd.
Spanover 552 IO Portion 1	T1236/1996	Kalahari Goldridge Mining Company Ltd.

District. Ratlou Local Municipality
Province. Northwest Province

2.2. Description of the farm (existing facility).

Ferndale 554 IO	T3024/1997	Kalahari Goldridge Mining Company Ltd.
Goldridge 632 IO	T1604/1998	Kalahari Goldridge Mining Company Ltd.
Ferndale 551 IO Portion 11	T1234/1996	Kalahari Goldridge Mining Company Ltd.
Ferndale 564 IO	T4009/1998	Kalahari Goldridge Mining Company Ltd.
Koedoerand 569 Rem.	T1998/2000	Kalahari Goldridge Mining Company Ltd.

District. Ratlou Local Municipality
Province. Northwest Province

2.3. Land Owner.

Name. Kalahari Goldridge Mining Company Limited
Company registration number. 82/02818/07
Contact person. Irene Nadunga
Telephone. Business 018 332 1110 Fax 086 763 7129
Cell078 330 9977
E-mail. Irene.Nadunga@harmony.co.za

2.4. Developers (Mining Company).

As above

2.5. Consultants.

a. Environmental

Company. Shangoni Management Services
Contact name. Jan Nel.
Contact telephone. Cell. 0823795935 Business 0128077036. Fax 0128071014
Contact e-mail. jan@shangoni.co.za

b. Heritage

Company. African Heritage Consultants
Contact name. Sidney Miller
Contact telephone. Cell. 082 939 6536
Contact e-mail. sidneymears@gmail.com.

2.6. Local Authorities detail.
Authority (governmental) Ratlou Local Municipality within the Northwest Province,

2.7. Type of Development.
Mining

2.8. Zoning of Site.
Mining.

2.9. GPS Positions taken

Beacons of Spanover 549 IO					
A	26° 07′ 23, 74′′	south	25° 15′ 18, 13′′	east	Beacon of Spanover 549 IO
B	26° 07′ 42, 71′′	south	25° 16′ 25, 79′′	east	Beacon of Spanover 549 IO
C	26° 09′ 43, 92′′	south	25° 15′ 00, 05′′	east	Beacon of Spanover 549 IO
D	26° 09′ 54, 87′′	south	25° 14′ 42, 75′′	east	Beacon of Spanover 549 IO
E	26° 09′ 23, 11′′	south	25° 14′ 11, 83′′	east	Beacon of Spanover 549 IO
Beacons of Spanover impact area					
F	26° 08′ 31, 54′′	south	25° 14′ 41, 54′′	east	Beacon of Spanover 549 IO
G	26° 08′ 52, 72′′	south	25° 15′ 36, 07′′	east	Beacon of Spanover 549 IO
C	26° 09′ 43, 92′′	south	25° 15′ 00, 05′′	east	Beacon of Spanover 549 IO
D	26° 09′ 54, 87′′	south	25° 14′ 42, 75′′	east	Beacon of Spanover 549 IO
E	26° 09′ 23, 11′′	south	25° 14′ 11, 83′′	east	Beacon of Spanover 549 IO
Beacons of dwelling and gravesite on Spanover					
	26° 08′ 19, 58′′	south	25° 15′ 47, 63′′	east	Dwelling and cattle post
	26° 08′ 04, 80′′	south	25° 15′ 46, 30′′	east	Grave site
Beacons of heritage remains and gravesites on existing mine premises					
	26° 10′ 13, 27′′	south	25° 14′ 03, 49′′	east	Nieuwoudt farmyard
	26° 10′ 10, 74′′	south	25° 13′ 59, 97′′	east	Nieuwoudt graves
	26° 10′ 53, 23′′	south	25° 14′ 57, 49′′	east	Lonfin workshops
	26° 10′ 48, 80′′	south	25° 14′ 49, 90′′	east	Van Der Merwe graves
	26° 09′ 09, 50′′	south	25° 13′ 59, 70′′	east	Kalgold workshops
	26° 09′ 20, 90 ′′	south	25° 14′ 01. 80′′	east	20 labourers graves
	26° 08′ 19, 50′′	south	25° 15′ 18, 13′′	east	Abandoned farmyard
	26° 10′ 55, 10′′	south	25° 14′ 57, 49′′	east	Memorial stone: - drowning
	26° 11′ 09, 36′′	south	25° 13′ 43, 22′′	east	Maretsane Skirmish memorial.

3. DEFINITION

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

4. PROTECTED SITES IN TERMS OF THE NATIONAL HERITAGE ACT, Act. NO. 25 OF 1999

The following are the most important sites and objects protected by the National Heritage Act:

a. Structures or parts of structures older than 60 years
b. Archaeological sites and objects
c. Palaeontological sites
d. Meteorites
e. Ship wrecks
f. Burial grounds
g. Graves of victims of conflict
h. Public monuments and memorials
i. Structures, places and objects protected through the publication of notices in the Gazette and Provincial Gazette
j. Any other places or object which are considered to be of interest or of historical or cultural significance
k. Geological sites of scientific or cultural importance
l. Sites of significance relating to the history of slavery in South Africa
m. Objects to which oral traditions are attached
n. Sites of cultural significance or other value to a community or pattern of South African history

5. METHODOLOGY

All relevant maps and documents on the site were studied. The site was visited and evaluated. The personnel of Shangoni Management Services, the environmental agent and the contact person of the mine, Mr Tumi Segosapelo accompanied the investigator to the site and pointed out all the relevant areas of impact. Google Earth was consulted for aerial information.

The investigation route was not recorded by a GPS tracking device. Owing to the fact that most of Spanover 552 IO has been ploughed in the past, and that the proposed footprint of the proposed mining operation forms only half of the investigation area. Owing to the barrenness of the area and the complete lack of vegetation, the investigation was limited to reasonable scale.

If any heritage resources are located underground and are not visible at present, but are located during progress of planned work, then the appropriate authorities should be alerted to the state of affairs

As background to the study, sections on the ecology and the history of the area were also included.

6. LOCATION OF THE LAND UNDER INVESTIGATION

Figure 02. *The above image is a Google Earth view of portions of the farm Spanover in relationship with the existing operations of the mine. It indicates the position of the proposed impact area (darker yellow) on the larger portion of Spanover (lighter yellow.) Also indicated on the image are the locations of the heritage remains on both the new and existing mining areas.*

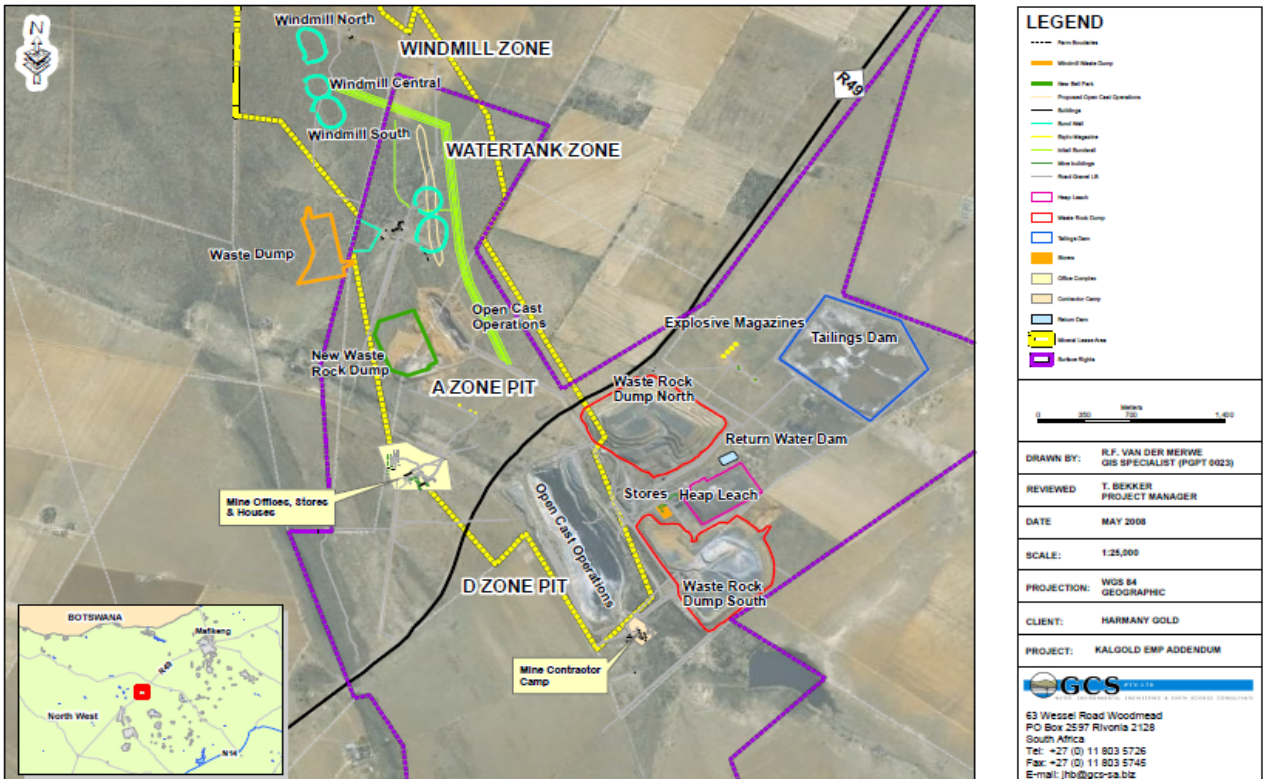

Figure 03. *The above drawing by GCS shows the layout and extent of the Kalgold mining operations as at present. The D- ZONE operations has ceased while the A-ZONE and WATERTANK–ZONE is being explored at present. The proposed renewed exploitation of these areas necessitates a new waste rock dump zone, a new heap leach zone as well as a new slimes dam facility that is proposed to be located on Spanover.*

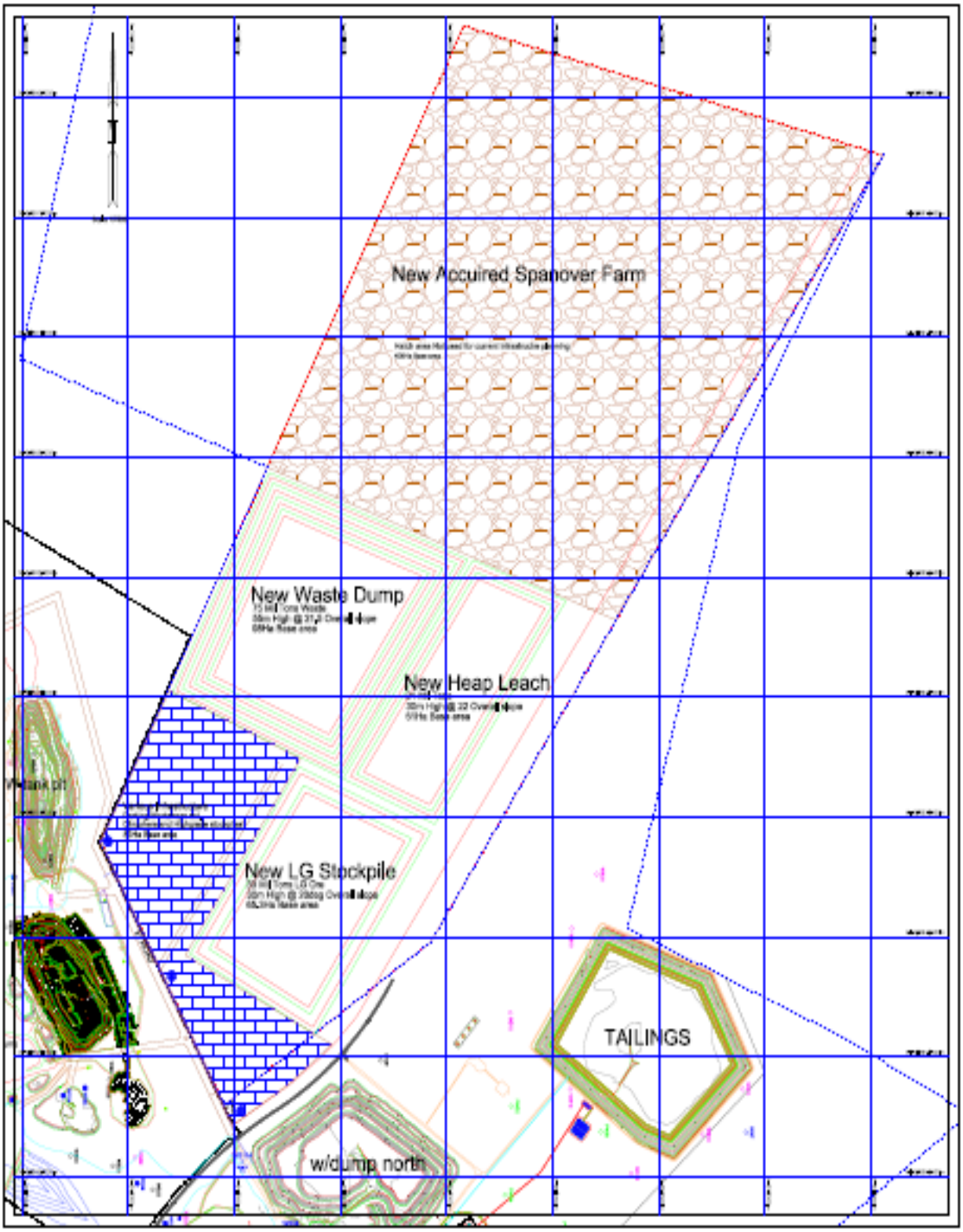

Figure 04. *The above figure is the official diagram of the proposed use of new portions of Spanover. Note that only the southern half of the property is to be impacted upon, while the northern area where the dwelling and grave sites are located will not be impacted on.*

7. ECOLOGY.

7.1. Geology

7.1.1. Regional and General Geology

Kalgold is located within the geological terrane of the Archaean Kraaipan Greenstone Belt. This greenstone environment is exposed in discontinuous outcrops of steeply dipping rocks that define three narrow, sub-parallel belts that strike approximately north-south. The Goldridge deposits occur within the central belt that comprises BIF, magnetite quartzite, chert, greywacke, shale and schist. Intrusive granites and gneisses surround the greenstones. These rocks have a complex history of deformation, which includes folding, faulting and shearing.

Younger cover rocks include isolated patches of lavas of the Ventersdorp Supergroup with much of the area blanketed by aeolian Kalahari sands. Sparse outcrops of quartz porphyry belonging to the Makwasie Formation occur in the region. Several large dykes with a predominant east-west trend have intruded the region.

7.1.2. General geology.

The geology of the lease area and its immediate vicinity is characterized by ferruginous chemical and clastic sediments interbedded with metalavas and non-ferruginous metasedimentary rocks. These rocks strike approximately north-northwest. Outcrops in the area are sparse and generally restricted to the ferruginous rock types, which are more resistant to erosion. Magnetite quartzites are clastic sediments, which form a low ridge to the west of the project area. Eastwards of this unit the iron-rich rocks generally comprise chemical sediments represented by magnetite-rich BIF, cherty BIF and banded chert. These units are interbedded with mafic schist, greywacke and sparse black shale.

7.1.3. Mineralisation

The gold mineralisation is hosted by steeply dipping banded iron formations that are interbedded with schist, shale and greywacke. The banded iron formations are rhythmically banded chemical sediments comprising alternating light and dark laminae that vary from 10 to 50mm in thickness. The BIF are oxidized to a depth of about 40m below surface. Near surface the material is red and porous, composed of quartz, haematite and goethite with minor magnetite. At depth the unaltered BIF consists of quartz, siderite, pyrite, pyrrhotite and magnetite with minor chlorite, calcite and stilpnomelane. The gold mineralisation in general has an erratic and localised distribution. Individual gold grains are on average less than 10µm in diameter and occur in clusters. Gold is generally associated with goethite in the weathered rocks and with pyrite in the fresh material.

7.1.4. Gold Deposits

Extensive exploration work has been conducted in the area since the deposits were discovered by Shell in 1989. Comprehensive technical investigations have included detailed geological mapping, geochemical sampling and geophysical surveys followed by diamond and percussion drilling, as well as metallurgical test work. Through exploration and evaluation drilling, four deposits (D-Zone, A-Zone, Watertank and Windmill have been proven and several prospective zones that warrant further investigation were identified.

The D-Zone is the largest of the ore body discovered in this area to date. It is hosted by a sheared, cherty-banded iron formation with associated silicification and carbonate alteration. The gold mineralisation occurs within blebs, veins and disseminations of pyrite and pyrrhotite, which are oxidized to goethite near surface. The deposit dips 70°E, has a strike extent of 1500m and varies in width from 15m to 45m. The footwall rocks predominantly

comprise chloritic schist, with subordinate BIF and carbonaceous shale. Carbonaceous shale and greywacke are exposed in the hanging wall. Thirty-seven diamond boreholes (8 593m in total) and 337 reverse circulation percussion boreholes (25 390m in total) have been drilled into the D-Zone ore body. These boreholes were drilled along section lines spaced from 10 to 50m apart.

The A-Zone occurs to the north of the D-Zone at a similar stratigraphic position. It is a composite deposit consisting of a number of mineralized cherty, banded iron formation units that are interbedded with schist and shale. The A-Zone has an overall strike of 850m and comprises individual zones of mineralisation that are steeply dipping and have strike lengths from 200 to 500m. Reef widths range between 2 to 15m. A total of 232 reverse circulation percussion boreholes representing a combined depth of 12 700 metres have been drilled into the A-Zone. Six diamond boreholes (1 310 metres) were also drilled.

The A-Zone West ore body is situated in the footwall of the A-Zone ore body. A chloritic schist unit that pinches out to the north separates the ore bodies. The A-Zone West has an overall strike length of 750m and width of 20m, thinning to 5m in the north. A total of 172 reverse circulation boreholes were drilled along section lines spaced 25m apart. A total of 6 450m were drilled.

The Watertank deposit is a long, narrow deposit hosted by cherty BIF, which has a similar stratigraphic position to the D-Zone and the A-Zone. The host rock BIF is steeply dipping and has a strike length of 950m and an average width of 45m. The mineralised zones within this unit range between 2 and 12m in width. A total of 163 boreholes representing 9 969m of drilling has been completed on section lines spaced at 25 to 50m intervals.

The Windmill deposit is the smallest of the Goldridge orebodies, but contains generally higher gold grades. It is positioned stratigraphically below the other three deposits and is hosted by a magnetite-rich BIF unit, which is interbedded with schist. The host rock BIF has a strike length of 950m and thins to the north and south with a maximum width of 25m in the centre. Mineralisation within this unit occurs over a length of 800m with widths ranging from 2 to 17m. This deposit is structurally complex with reef displacements by faulting, and dips varying from 75 to 90°E. A total of 99 boreholes representing 7 431m of drilling has been completed along section lines spaced 50m apart.

7.1.5. Overburden.

The Goldridge deposits are partly covered by soil, scree, rubble and gravel, as well as Aeolian sands. The hanging wall rocks in the open pit, which will be stripped as overburden, comprise greywacke, schist and shale.

7.1.6. Presence of dykes, sills and faults.

On a regional scale, the Kraaipan greenstones are intruded by numerous approximately east-west trending mafic dykes. One such dyke cuts across the southern boundary of the mining lease area. Smaller diabase dykes commonly intrude the greenstone lithologies. The area is characterised by abundant faults with displacements from a few metres to hundreds of metres. Groundwater movement in the area takes place in a northerly direction mainly along strike on the contacts of the cherty banded iron units, and is affected by cross cutting dykes and faults.

7.2. Vegetation of the region.

7.2.1. General.

The regional vegetation is classified within the savannah biome of wooded grasslands. Vegetation within the project area is no longer pristine, having been modified and

transformed over the last century or more by pastoralism, cultivation and interference with surface water drainage patterns by impoundments. This has led to the extensive degradation of indigenous plant resources. The precise extent of these transformations and their impact on the structure and functioning of the prevailing ecosystem is difficult to determine.

On the site, north of Waste Dump South, no vegetation cover exists. The area has recently been cultivated, and remnants of a sunflower crop were evident. No vegetation had re-established itself at the time of the site visit.

On the section west of the opencast pit, grass and some pioneer herbs and forbes have re-established in the area. Some Acacia eroiloba individuals occur to the southeast of this site.

7.2.2 Dominant Species.

Vegetation within this area may be subdivided into those species that occur in sandy soil, rocky suboutcrops and within the clays of the Morokwa watercourse.

Dominant tree species in sandy soils are – Acacia erioloba, Ziziphus mucronata, Rhus lancea, and Acacia karroo.

Shrubs in sandy soils are – Tarchonanthus camphoratus, Grewia flava, Acacia hebeclada sub hebeclada, and Dichrostachys cinera.

Dominant tree species in rocky sub-outcrops are – Acacia karroo, Rhus lancea, Boscia albitrunca, and Mundulea sericea.

Dominant tree species in clays of the Morokwa water course are – Acacia karroo, Rhus lancea, and Ziziphus mucronata.

Shrubs identified are – Tarchonanthus camphoratus and Grewia flava.

Large areas of land are under annual indigenous grasses. The main indigenous grasses are – Perotis patens, Phynchelytrum repens, Panicum natalense, Themeda triandra, Stipagrostis uniplumis, Digitaria eriantha and Cenchrus ciliaris.

Stands of Aloe davyana are common in the area.

7.3. Animal life.

Wild animal life on the property is generally sparse, being limited to invertebrates, amphibians, reptiles, birds and small mammals that have adapted to the modified ecosystems. These animals occupy both the wooded and grassland areas. There is no evidence for any rare or endangered animal species within the project area or on adjacent land.

8. ARCHAEOLOGICAL AND HISTORICAL FRAMEWORK.

8.1. Stone Age.

The Stone Age in Southern Africa covers most periods of human development through the last three million years with development from the Austrolophiticine to Homo Sapience and has been well described from the early times by the likes of Van Riet Lowe in the nineteen twenties, to Sampson in the nineteen seventies, the Deacons in the nineteen nineties and the modern group of specialist Stone Age archaeologists.

Early work centred on the identifying of ensembles of stone tools such as the Early Stone Age Victoria-West group, the Middle Stone Age Vereeniging group, and the Later Stone Age

Smithfield group that laid the foundation of understanding the development of stone artefacts. Together with the above, the research for identifying fossil and other remains of the human evolution line resulted in speleological investigation where the preservation of skeletal remains are assumed to be at its best. In due course the dolomite caves such as amongst others Taung, Sterkfontein and Mokopaan revealed very early stratified deposits of bones and artefacts, while the likes of Border Cave, Rose Cottage and Bushman Rock Shelter again revealed the remains of our more recent ancestors and their artefacts.

During the last thirty years though, technology and the specialisation of archaeologists focused more on aspects such as diet, social life, religion and art, and similar aspects, revealing more and more the similarities and differences between modern man and his predecessors.

Although one may then find stone tools distributed over much of the surface of Southern Africa, these tools on their own does not contribute much to science, if they cannot be linked in time or place to other remains, apart from their physical existence. For the purpose of evaluating Stone Age remains in a first phase impact heritage assessment it must therefore be established if stratified remains are present on the site under investigation and if there is any Rock Art preserved on the property. In the case of the present study the closest important Stone Age sites are the Taung dolomite site and the rock engravings located between Kimberley and Barkley West. On the site itself no Stone Age Material could be identified.

The possibility of Stone Age remains to be encountered in the study area is therefore very low.

8.2 Iron Age.

8.2.1. Early Iron Age.
The early Iron Age in Southern Africa can today clearly be mapped from its origins in Central and Central Western Africa from the Chad and Northern Nigerian context some 2400 years ago. Its metallurgical baseline and possession of domesticated animals and crops can again be traced back to the northeast of Africa and the Egyptian civilization before climatic conditions made the Sahara a proper desert and most communications to the north was lost.

In time the early Iron Age Peoples from central Africa spread southward, being bisected by the occurrence of the Central African "Great Lakes System", reaching Southern Africa in a number of locations by the fourth century. ***Huffman's 2007*** recording of the archaeology of Pre-Colonial Farming Societies in Southern Africa clearly demonstrates the demarcation and movement of early Iron Age peoples that preferred warmer and wetter summer rainfall regions, excluding the areas south of Botswana into the Northern Cape Province. This (without the knowledge of future research) excludes the present study area for the possible location of such occupation.

The possibility of Early Iron Age materials to be encountered in the study area is therefore very low.

8.2.2. Later Iron Age.
From the sixteenth century onwards there was a great expansion of the population of the summer rainfall region of Southern Africa. This could be attributed to higher rainfall, trade with the East and the arrival of new grains as staple diet. This, according to archaeological research, centred on the "Transvaal", "Natal" the "Freestate" and the eastern portions of the "Cape Province". In the general region north of the present study area population of the land culminated in mega-sites such as Molokwane and Khaditshwene of the Tswana excavated by Dr Julius Pistorius of the University of Pretoria and Prof Jan Boeyens of Unisa. Even Mafikeng is a remnant of this occupation as demonstrated below.

*..."**Mahikeng** is the headquarters of the **Barolong Boo Ratshidi** people. The town was founded by **Molema Tawana** (c. 1822). Born at **Khunwana** during the difaqane period, **Molema** was the son of **Kgosi Tawana** of the Tshidi Barolong. **Molema's** brother and close confidant, **Montshiwa,** later became chief. During the period that the Tshidi Barolong resided at **Thaba Nchu,** where they found refuge during the difaqane, **Molema** was converted to Christianity by the Wesleyan missionaries based there. In 1857 **Molema** led an advance guard to scout out the area along the Molopo River. This was a familiar area as they had previously lived in nearby **Khunwana. Molema** settled at **Mafikeng** (known in its early years as **"Molema's town"),** while the main body of the Barolong under **Montshiwa** followed. But **Montshiwa** did not feel safe at Mafikeng due to the close presence and encroachment of the Boers in the Transvaal. He led his followers to **Moshaneng** in the territory of the **Bangwaketse** in present-day Botswana.*
***Molema** remained at Mafikeng to ensure that the Barolong retained a presence there. Several of **Montshiwa's** other brothers were also stationed at crucial sites in the proximity of the Molopo. **Molema** had to use all his diplomatic skills on several occasions to prevent Boer incursion and settlement near Mafikeng. He has been described as a man of "strong personality and exceptional gifts...and **Montshiwa's** chief counselor in vital matters". After negotiations with **Molema, Montshiwa** decided to return to Mafikeng in 1876.*

***Molema** was a firm believer in Western education, having attended **Healdtown College**; he opened a school for the Barolong once they had settled in the district. **Molema** became a farmer and businessman, as well as advising his brother **Montshiwa.** He died in 1882. One of his sons, **Silas Molema**, became a Doctor and historian of the Barolong. The settlement was named Mafikeng, a **Setswana** name meaning "place of stones". Later British settlers spelled the name as "Mafeking". The Jameson Raid started from Pitsani Pothlugo (or Potlogo) 24 miles (39 km) north of Mafeking on December 29, 1895"……*

The possibility of Later Iron Age materials to be encountered in the study area is therefore very low as they exist to the north and east of the study area.

8.3. White occupation in the nineteenth century.

The circumnavigation of the ***"Cabo de Esperanza"*** by the Portuguese five hundred years ago paved the way for European settlement in Southern Africa. This evolved in the Dutch occupation of Koisan Land in the Cape that opened the Colonial Period where the Dutch, French and British tussled for the ownership of land that did not belong to any of these powers. In time the "settlement" of Europeans spread inwards until the arrival of the "eighteen twenty settlers". Information brought back to the Cape by hunters, naturalists and travellers such as ***François Le Vaillant (2008)*** in the late seventeen hundreds and ***Burchell (Notcutt, 1950)*** and ***Campbell (Campbel,1815)*** early in the eighteen hundreds, who crossed the 'Oori' or 'Gariep' River, (Orange River) and travelled as far as Litakung (Kuruman), were promising for the early French and British missionaries to bring the "Bible " to the "heathen".

The fact that the French opened a mission post at "Mosega" and its abandonment owing to the action fought by Potgieter 1836 shows that a large population of Tswana people resided in the region. ***Moffat (Wallis, 1976)*** and ***Smith (Lye, 1975)*** visited Mzilikazi to the North of the Magalies Mountains, crossing the present study areas. Rumours that this renegade Zulu general had left most of the South African interior a wasteland during the foregoing decade was confirmed. Similarly news from the small settlement of Port Natal was that the much feared Chaka Zulu was now deceased, killed by his loving brother, Dingaan. Even so, "Trekkers" arriving in the Marico region took forty years between 1838 an 1872 to establish the town Zeerust. In this period the value of the region lay in its resources of the game that occurred in large quantities, that was rapidly reduced to nothing by European hunters. Even though the land was "relocated" to "ownership" by European farmers, the actual occupation was low.

It was only with the discovery of the diamond fields of the lower Vaal and upper Orange Rivers were in 1872 that serious discontent became apparent between the Khoisan, the Tswana and the Europeans owing to ownership of the land and its minerals.

As always happened, the battle of the land for control of the mineral wealth was won by the people with the biggest guns. This battle then ended in the well known Siege of Mafeking.

Figures 05 and 06. *To the left is* ***William John Burchell*** *as depicted in a drawing from 1816, who was the first of the many "missionary" explorers that investigated the interior of Southern Africa before the advent of the Great Trek. To the right is* ***John Campbell,*** *the dapper explorer for the London Mission society, that reached Latakoo in June 1813. It was by then a well known destination known to amongst others such as* ***Burchell,*** *and the burgers* ***Truyter, Vanderlingen*** *and* ***Janz,*** *and the party of* ***Dr. Covan.***

Figure 07. *The above is a map of* ***Campbell's*** *visit to Latakkoo in 1813 and his journey to the upper reach of the* ***Malalareen (modern Hartz) River****. As can be seen here, already two decades before the Great trek there was a good knowledge of conditions in the interior regarding populations, water and vegetation.* ***(Campbell, 1818.)*** *Especially note '****Krooman'*** *and '****Makoon's Kraal****, both places that played major roles in missionary work of the American, the French and the British missionaries.* ***Makoon's*** *is also close to the famous battlefield of Mosega and the eventual Boer Town of Zeerust.*

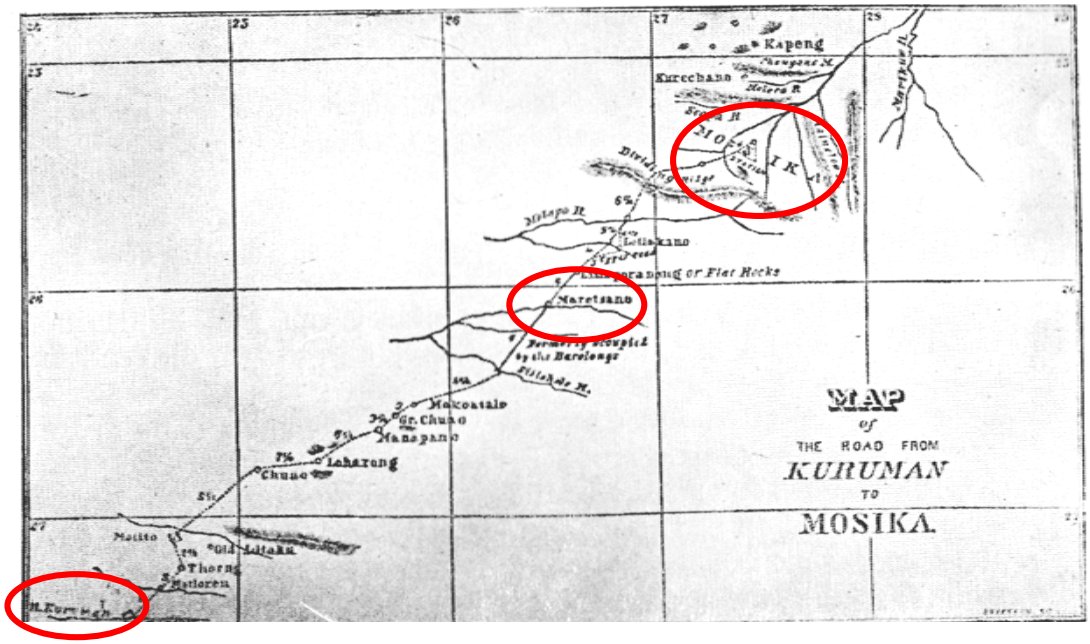

Figure 08. *This is the American Missionaries Map of their route between Kuruman and "Mosika" (Zeerust). It appears as if the old route and the modern road is much the same as they also passed Maretsane close to the present study area.* ***(Published in the "Missionary Herald" in 1837)*** *Note the "Station" at "Mosika" today the farm "Sendelingspos" in the Zeerust District.*

At the outbreak of the Second South African War in 1899, "Mahikeng" was besieged by the ZAR. The "Siege of Mafeking" lasted 217 days from October 1899 to May 1900, and turned Robert Baden-Powell into a national hero. In September 1904, Lord Roberts unveiled an obelisk at Mafeking bearing the names of those who fell in defense of the town. In all, 212 people were killed during the siege, with more than 600 wounded. Although it was outside the protectorate's borders, Mafeking served as capital of the Bechuanaland Protectorate from 1894 until 1965, when Gaborone was made the capital of what was to become Botswana. Mafeking also briefly served as capital of the pre-independence Bantustan of Bophuthatswana in the 1970s, before the adjoining town of Mmabatho was established as capital. Following a local referendum on the issue, Mafeking joined Bophuthatswana in 1980, three years after Bophuthatswana was awarded independence, and was renamed *Mafikeng*, and treated as a suburb of Mmabatho. Following the end of apartheid in 1994, the merged Mafikeng and Mmabatho was instated as capital of the new North-West Province under the name Mafikeng.

Figure 09. *Lord Baden-Powell, the "Hero" of Kimberly is quoted to have said that he would like to be posted where "it would get quite hot" during the war. His wish was granted in more ways than one.* ***(Illustration by Sillas Stewardt, 1900).***

9. PHOTOGRAPHIC RECORDING OF THE AREA INVESTIGATED

Figure 10. *The above is a compounded photographic image of portions of the farm Spanover that are proposed to be impacted upon. To the left is the existing A-Zone operations and to the right the propose area to be impacted on. All of this had once been ploughed and planted for dry-land crops. If any heritage remains occurred here it would have been destroyed by farming practises.*

Figure 11. *The above image is the A- Zone pit with waste dump facility to its west. This image demonstrates the "opencast" character of this goldmine.*

Figure 12. *The D- Zone slimes dam to the top left and the northern rock dump facility as viewed from the impact area. The general character of the proposed impact zone can be clearly seen here.*

Figure 13. *The above image was taken on the southernmost portion of the impact area on Spanover. It is vegetated with young camel thorn trees that are pioneers on land where dry-land agriculture has ceased sometime in the past. The general heritage character of this portion of the proposed impact zone can be seen here.*

Figure 14. *Many termite nests occur in the vegetated area of Spanover that provides habitat for a range of other species such as amongst others, snakes. During the survey three small antelope was also encountered.*

Figures 15 and 16. *The above images were taken on the southernmost portion of the impact area on Spanover. It shows the old farm roads that circumvented the fields when they were still being ploughed and planted. The general heritage character of this portion of the proposed impact zone can be seen here.*

Figure 17. *The above image was taken on the northern portion of the impact area on Spanover. As can be seen here it is still being used for dry-land cultivation of maize. These crops are mainly used as cattle fodder.*

Figures 18 and 19. *The above images were taken on the northernmost portion of Spanover. Although it will not be impacted on, this facility falls outside the protection of the sixty year rule. At present it is used by the person responsible for the herding of cattle on the property and his family.*

Figure 20. *The above photograph is of one of the five graves in the burial site located on the northernmost portion of Spanover. According to the herdsman there are two more similar burial sites in the area, but he was not certain of their location.*

Figure 21. *Location of the 1950's (?) dwelling on the mining property. It is situated outside the impact area of the mining operations. Apart from this, it is in such a ruinous condition that it can be considered to have no heritage value.*

Figures 22 and 23. *The 1950's (?) dwelling on the mining property and associated garage. It is situated outside the impact area of the mining operations. Apart from this, it is in such a ruinous condition that it can be considered to have a very low heritage value.*

Figure 24. *The above Google Earth image gives the location of the 1960's homestead and 20 unmarked graves adjacent to the Watertank- Zone pit. The graves will be impacted on if the Watertank-Zone pit and the A-Zone pit are linked as proposed. The relocation of these graves is under consideration at present (2013)*

Figure 25. *Workshops adjacent to the 1960's homestead farmyard. Some of these are new but others are part of the old farmyard's outbuildings.*

Figure 26. *This is an image of the 1960's farmyard homestead. This dwelling is not in use at present.*

Figures 27 and 28. *These are images of the outbuilding on the 1960's homestead farmyard and its present use as storage for equipment. The building is at present used as a store for machinery parts.*

Figure 29. *Tiles in the 1960's dwelling's bathroom is an excellent way of dating the building, as these were typical of the late 1960's and early 1970's*

Figures 30 and 31. *A modern, possibly 1980's, rondavel building on the 1960's homestead farmyard that is not in use and the trees surrounding the farmyard.*

Figures 32 to 34. *These are three of the twenty graves that are located as shown above in figure 24. These graves are very difficult to identify, even for the trained eye. As there is a lot of heavy machinery traversing the general area at present the graves may easily be destroyed. It is advised that they are properly demarcated in such a way that they can be safeguarded.*

Figure 35. *This is a Google Earth image of the early Spanover (?) farmyard and the location of the burial site of the Nieuwoudt family illustrated below.*

Figure 36. *The above is an image of the buildings retained and improved as offices for the Kalgold site management operations.*

Figures 37 and 38. *The above are images of the buildings retained and improved as accommodation and canteen for the Kalgold site management operations.*

Figure 39. *This is an image of the burial ground of the Underhay and Nieuwoudt families situated to the north of the operational "headquarters" of the Kalgold mine.*

Figures 40 and 41. *The image to the left is an unmarked grave in the burial ground of the Nieuwoudt family. On the right is the grave of George Sebastian Nieuwoudt that was born in 1901 and passed away in 1981*

Figures 42 and 43 *More Graves of the Nieuwoudt family*

Figures 44 and 45. *To the left is the unmarked "double grave" of people "unknown" and to the right the graves of the two Underhay's, J.C. passed away in1969 and M.C. passed away in 1970.*

Figures 46 and 47. These above images of the memorial stone of E.M. Snyman are representative of a person who died in 1954 owing to being drowned in a flood. This memorial was moved from the mining premises to its present location and is at present wrongly interpreted as a person that died owing to a car accident.

Figure 48. *Looking north into the worked-out D-zone pit. The Van Der Merwe burial site is located only several meters to the south of the position from where the above image was captured.*

Figures 49 and 50. *Premises of the present Lon fin mechanical workshops that also house labourers' quarters that are still in use. It is not apparent that these are remnants of an earlier farmyard but the use of the site relegated other sites on the farm.*

Figures 51 and 52. *These are two burials located immediately south of the D-Zone pit and may be associated to the Lonmin Works kop site farm.*

10. SUMMARY.

The above documentation and the investigation of the author revealed that the "Developer", in this investigation, a mining company named Kalahari Goldridge Mining Company Limited, has been active in the area for two decades. During this time there is no indication that the company has had any adverse impact on its "heritage environment" and has brought employment opportunities to the very small local society. The reason for this is twofold. In the first place both the open pit mining strategy that was applied had no adverse impact on the local heritage estate and the local community is the only source of labour in the environment.

It is clear therefore that the extension of the "life" of this mine has a very low "heritage impact" on the area and will continue to employ people of the district during the proposed extension of its operations.

11. RECOMMENDATION.

For mitigation of the cemetery sites there are two possibilities:-

1. The first possibility is the relocation of the grave to a facility that can be negotiated with the families of the deceased.

2. Secondly the grave sites may be left in place with a "protected Zone" of at least thirty meters in all directions surrounding the cemetery. This "protected Zone" must be supplied with a guaranteed "access" route as negotiated with the families of the deceased.

As the graves have no specific "heritage value" either in terms "time" or of "persons of stature", the retention or relocation of the graves is a matter of negotiation between the mining company Kalahari Goldridge Mining Company Limited, and the families of the deceased.

Legal Proof of this negotiation must be supplied to SAHRA Cape Town with this report

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APPENDIX A: DECLARATION OF INDEPENDENCE

I. SIDNEY MEARS MILLER (ID 541213 5029 082) declare that:

•I act as the independent environmental practitioner in this application
•I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favorable to the applicant
•I declare that there are no circumstances that may compromise my objectivity in performing such work;
•I have expertise in conducting environmental impact assessments, including knowledge of the National Heritage Resources Act (No 25 of 1999) and any guidelines that have relevance to the proposed activity;
•I will comply with the Act, regulations and all other applicable legislation;
•I will take into account, to the extent possible, the matters listed in regulation **8 of the regulations when preparing the** application and any report relating to the application;
•I have no, and will not engage in, conflicting interests in the undertaking of the activity;
•I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
•I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
•I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
•I will keep a register of all interested and affected parties that participated in a public participation process; and
•I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favorable to the applicant or not
•all the particulars furnished by me in this form are true and correct;
•will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations;
and
•I realize that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.

Disclosure of Vested Interest
I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations,2010.

Sidney Miller.
B.Sc (Eng) Civ. M.(Architecture) Conservation. ASAPA MEMBER NO 087