McGregor Museum
Department of Archaeology

Heritage Impact Assessment for proposed drilling site at Mariaspan 223, near Wesselsbron, Free State Province

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Executive Summary

A Phase 1 Heritage Impact Assessment is presented.

Precise co-ordinates for one proposed drilling site was presented and De Beers Exploration personnel took the author directly to the specific site in question. This report describes the archaeological/heritage traces that were observed at the site.

Observations were limited by what was visible at the surface. It is possible that archaeological material of significance may occur subsurface. If encountered this should be brought to the attention of heritage authorities for further assessment, and mitigation if necessary.

In terms of this report, no significant heritage traces were found at the particular locale of proposed drilling, nor in the immediate vicinity, that are considered to require further mitigation.

The loss of heritage resources is assessed to be of ***low*** significance with and without the implementation of mitigation.

Background

The McGregor Museum Archaeology Department was appointed by The De Beers Group of Companies: Exploration Office – DBGS in order to conduct a Phase 1 Heritage Impact Assessment at a proposed drilling site at Mariaspan 223, south east of Wesselsbron in the north westerns Free State Province. This report addresses the possible impacts on heritage resources (archaeological and cultural) of this operation. It excludes palaeontological assessment.

The site was inspected on 2 October 2020 and relevant observations are indicated in this report.

Fieldnotes and photographs are lodged with the McGregor Museum, Kimberley.

Specialist

The author is a professional archaeologist (PhD) accredited as a Principal Investigator by the Association of Southern African Professional Archaeologists. He has worked as a museum archaeologist and has carried out specialist research and surveys mainly in the Northern Cape since 1985.

The author is independent of the organization commissioning this specialist input, and provides this heritage assessment (archaeology and colonial history but not palaeontology) within the framework of the National Heritage Resources Act (No 25 of 1999).

The National Heritage Resources Act no. 25 of 1999 (NHRA) protects heritage resources which include archaeological and palaeontological objects/sites older than 100 years, graves older than 60 years, structures older than 60 years, as well as intangible values attached to places. The Act requires that anyone intending to disturb, destroy or damage such sites/places, objects and/or structures may not do so without a permit from the relevant heritage resources authority.

Heritage is assessed in terms of a NEMA application, and must comply with section 38(3) of the NHRA. SAHRA would then comment and make recommendations on the potential impacts.

(Where archaeological sites and palaeontological remains are concerned, the South African Heritage Resources Agency (SAHRA) at national level acts on an agency basis for the Provincial Heritage Resources Agency (PHRA) in the Northern Cape. The Northern Cape Heritage Resources Authority (formerly called Ngwao Bošwa ya Kapa Bokone) is responsible for the built environment and other colonial era heritage and contemporary cultural values).

Description of environment and potential impacts

The site of proposed drilling is on the farm Mariaspan some 15 km south east of Wesselsbron in the Free State Province.

The most striking feature of the environment in which the Mariaspan drill site is situated is the feature that gives the region its name: the slightly undulating topography of the Wesselsbron panveld is liberally dotted with pans (Fig. 1). This astonishing and, as has been said, anomalous geomorphic occurrence forms the northern part of the Vet-Sand River-system between Welkom and the Vaal River. Geologically the remarkable concentration of pans relates to a local post-Karoo

palaeodrainage scenario where drainage lines were tectonically disrupted by warping and tilting of underlying rocks, forming local lakes. These lakes became dry pans as a result of late-Tertiary desiccation (Marshall 1986). Plinthic red soils mantle the landscape and are derived from Ecca sandstone, mudstone, shales, dolerite and calcrete (De Beers 2016).

The semi-arid environment of today receives less than 600 mm/annum, with the combination of low precipitation and high evapo-transpiration rates resulting in a predominantly dry *Cymbopogan-Themeda* grassland, part of the Western Free State Clay Grassland, with patches of Highveld Salt Pans vegetation, a component of the Grassland Biome. Parts of the landscape are under cultivation as can be seen in Figs. 2 and 3.

Figure 1. Landscape and vegetation. View from due south of the proposed Mariaspan 223 drill site, situated just below the horizon above the left-most major fence-post in this photo. Trees featuring on the skyline in this Grassland scene are all exotic. In the middle distance in the left half of the image is one of the pans (Steenrots) characteristic of this Wesselsbron panveld.

The proposed drilling locale is indicated in the following maps.

Figure 2. Locality: Mariaspan 223 (white square) about 15 km south east of Wesselbron. Numerous pans of the Wesselsbron panveld are clearly visible in this Google Easth image.

Figure 3. Locality map: Drill site on Mariaspan 223 (detail from Figure 2). Compare the extract from 1:50 000 sheet 2726DC in Figure 4.

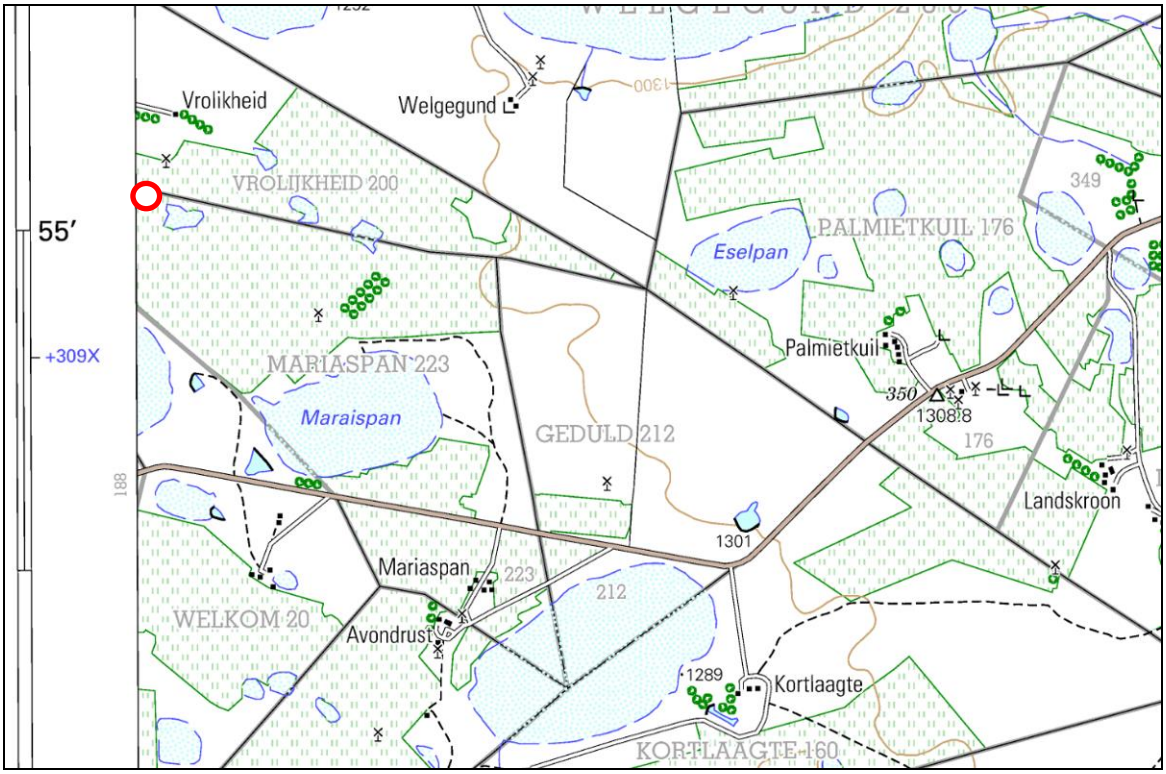

Figure 4. Locality map extract from 1:50 000 2726DC: Drill site on Mariaspan 223 is indicated by a red circle.

In terms of heritage features of the region, the following introductory comments may be made:

Previous studies

SAHRIS provides no pertinent records for the immediate vicinity. Case ID 7834 refers to the proposed prospecting by De Beers in areas north east and south east of Wesselsbron, with the Mariaspan 223 prospecting as envisaged in the present report, being part of the south eastern property cluster (De Beers 2016). No heritage studies had yet been undertaken for this case or any other in the immediate environment. Impact assessment studies near Bothaville (De Bruyn & Mosweu 2019) and Wesselsbron (Pelser 2019) relate to comparable nearby landscapes.

Recent history

Wesselsbron was laid out in 1920 and became a municipality in 1936 (Pelser 2019). Pelser indicates that conveyancing of some local farms to individual owners was taking place in the nineteenth century 1850s, with formal surveys dating from the 1880s. In the case of Mariaspan, the earliest Chief Surveyor General documentation dates from 1928 (Fig 5). However, this property was evidently a subdivision of

Steenrots, owned by Cornelis Janse Wessels [after whom Wesselsbron would be named] in August 1880 (and surveyed in 1881) (Fig. 6). It is interesting to note that Steenrots was "een zekere deel der plaats Rietpa No 373, gelegen in het district [sic] Winburg", while Steenrots was later Hoopstad No 188, and Mariaspan was registered under Wesselsbron. The maps record not only the subdivision of farms but also that of magisterial districts from the 1850s to early twentieth century.

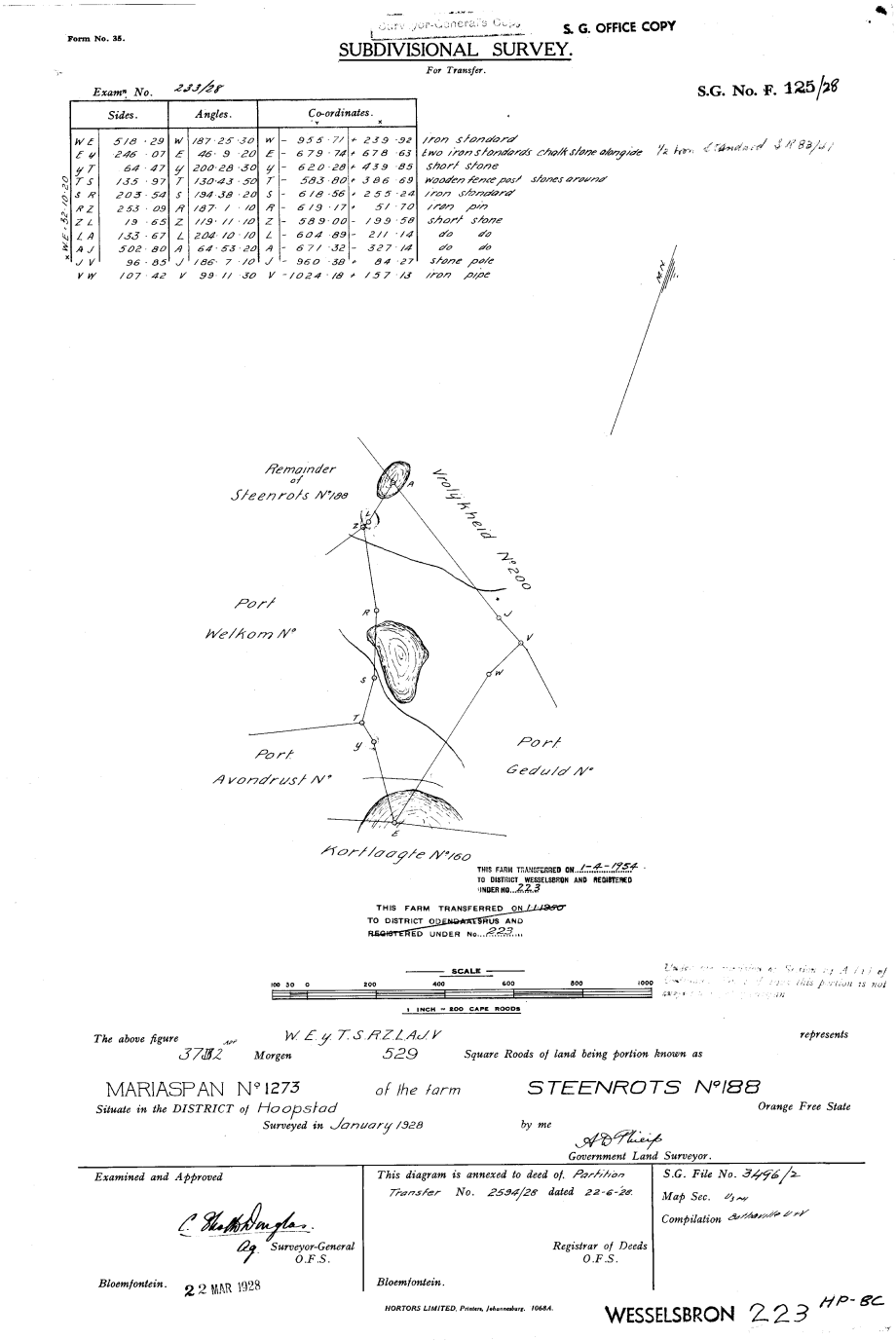

Figure 5. Chief Surveyor General survey, Mariaspan, 1928.

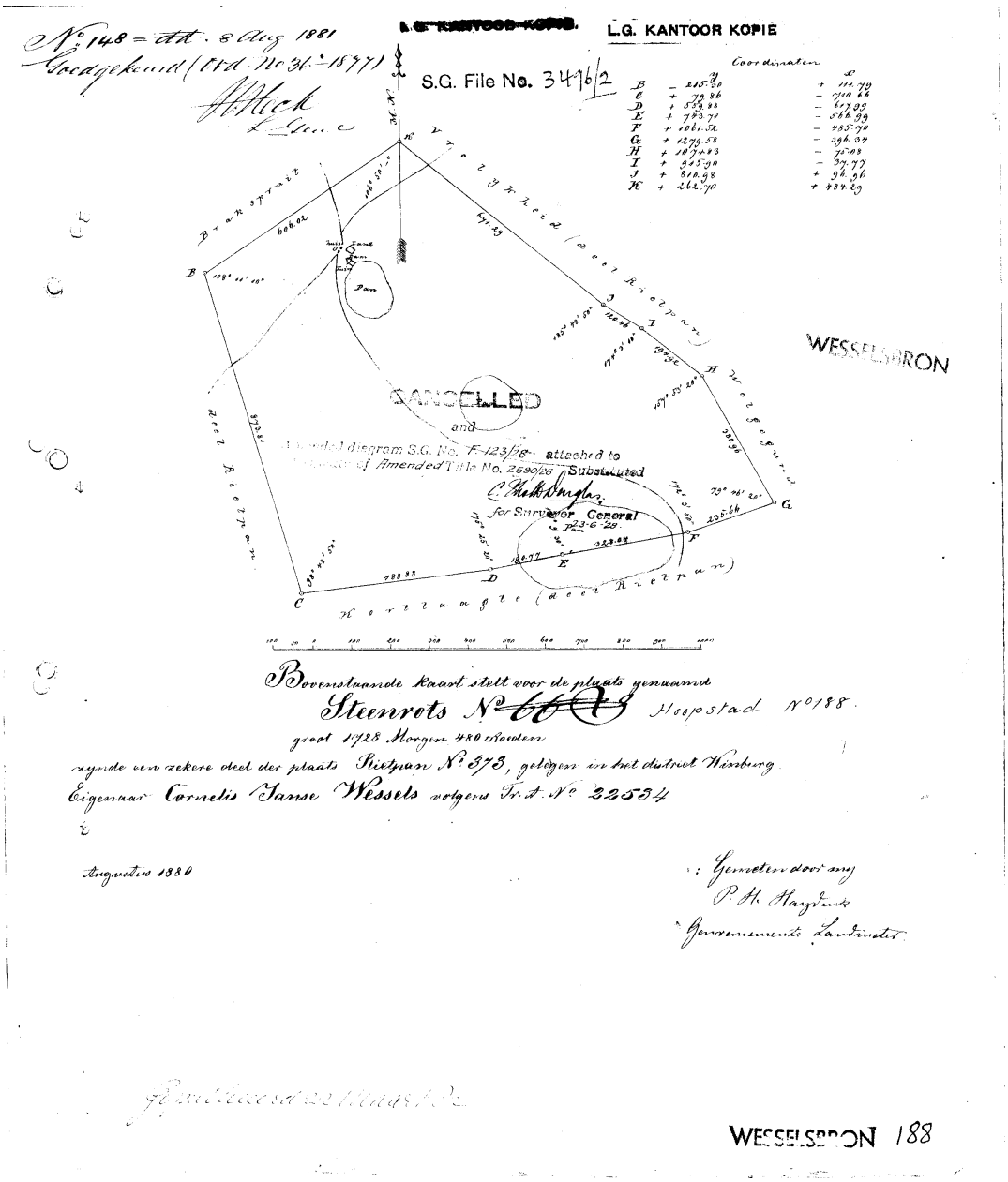

Figure 6. Chief Surveyor General survey, Steenrots, Aug 1881.

Precolonial

No archaeological literature was found pertaining to the specific area of Mariaspan or the Wesselsbron area. Anton Pelser summarises the Stone Age and Iron Age sequences for the Free State before stating that:

"There are no known Stone Age sites (including rock art) in the area, and none was found during the survey. This includes single or scattered concentrations of stone tools"; and
"No Iron Age sites, features or cultural material was identified during the assessment of the study area" (Pelser 2019:13).

Pelser notes that stone-walled settlements are known from the Vredefort Impact Structure site near Parys and that Makgwareng and Thabeng Facies Later Iron Age material might be expected in the wider area.

Ilan Smeyatsky (2017) conducted shape analysis on the rare, distinctive tanged stone arrowheads of late Holocene Later Stone Age contexts, and includes one example referred to in a map as from "Wesselsbron" – but no further information on it is provided.

Description and evaluation of environmental issues and potential impacts

Heritage resources including archaeological sites are in each instance unique and non-renewable resources. Area and linear developments can have a permanent destructive impact on these resources in cases where they are impacted. The objective of this study is to assess the significance of such resources, where present, and to recommend no-go or mitigation measures (where necessary) to facilitate or constrain the development.

Area impacts that would be spatially constrained within a few metres would occur in the area of the drilling site under consideration. An existing farm road leads close to the vicinity of the drill site and no major scraping or surface disturbance is expected to manouevre drilling equipment.

Direct, indirect and cumulative impacts (in terms of nature and extent)

The destructive impacts that are possible in terms of heritage resources would be direct once-off events occurring during drilling.

Indirect and cumulative impacts could result from on-going use of the site should further developments ensue.

Statement of significance

In addition to guidelines provided by the National Heritage Resources Act, a set of criteria based on Deacon nd and Whitelaw 1997 for assessing archaeological significance has been developed for Northern Cape settings (Morris 2000a).

Estimating site potential

Table 1 is a classification of landforms and visible archaeological traces for estimating the potential for archaeological sites (after J. Deacon nd, National Monuments Council). Type 3 sites tend to be those with higher archaeological potential. There are notable exceptions, such as the renowned rock art site Driekopseiland, near Kimberley, which is on landform L1 Type 1. Generally, moreover, the older a site the poorer the preservation. Estimation of potential, in the light of such variables, thus requires some interpretation.

Assessing site value by attribute

The second matrix (Table 2) is adapted from Whitelaw (1997), who developed an approach for selecting sites meriting heritage recognition status in KwaZulu-Natal. It is a means of judging a site's archaeological value by ranking the relative strengths of a range of attributes. While aspects of this matrix remain qualitative, attribute assessment is a good indicator of the general archaeological significance of a site, with Type 3 attributes being those of highest significance.

Table 1. Classification of landforms and visible archaeological traces for estimating the potential for archaeological sites (after J. Deacon, National Monuments Council).

Class	**Landform**	**Type 1**	**Type 2**	**Type 3**
L1	Rocky surface	Bedrock exposed	Some soil patches	Sandy/grassy patches
L2	Ploughed land	Far from water	In floodplain	On old river terrace
L3	Sandy ground, inland	Far from water	In floodplain or near feature such as hill	On old river terrace
L4	Sandy ground, Coastal	>1 km from sea	Inland of dune cordon	Near rocky shore
L5	Water-logged deposit	Heavily vegetated	Running water	Sedimentary basin
L6	Developed urban	Heavily built-up with no known record of early settlement	Known early settlement, but buildings have basements	Buildings without extensive basements over known historical sites
L7	Lime/dolomite	>5 myrs	<5000 yrs	Between 5000 yrs and 5 myrs
L8	Rock shelter	Rocky floor	Sloping floor or small area	Flat floor, high ceiling
Class	**Archaeo-logical traces**	**Type 1**	**Type 2**	**Type 3**
A1	Area previously excavated	Little deposit remaining	More than half deposit remaining	High profile site
A2	Shell or bones visible	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick; shell and bone dense
A3	Stone artefacts	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick

Class	Landform	Type 1	Type 2	Type 3
	or stone walling or other feature visible			

Table 2. Site attributes and value assessment (adapted from Whitelaw 1997)

Class	Attribute	Type 1	Type 2	Type 3
1	Length of sequence/context	No sequence Poor context Dispersed distribution	Limited sequence	Long sequence Favourable context High density of arte/ecofacts
2	Presence of exceptional items (incl regional rarity)	Absent	Present	Major element
3	Organic preservation	Absent	Present	Major element
4	Potential for future archaeological investigation	Low	Medium	High
5	Potential for public display	Low	Medium	High
6	Aesthetic appeal	Low	Medium	High
7	Potential for implementation of a long-term management plan	Low	Medium	High

Methodology for HIA assessment

A field visit to inspect the drilling site was undertaken on 2 October 2020 in the company of De Beers Exploration geologist Jacobus van den Heever. An assessment was made of heritage traces at the proposed drilling locale.

Open grassland vegetation cover allows for inspection of the surface, but the depth of unconsolidated soil may obscure possible palaeo-surfaces if archaeological material should occur subsurface.

Observations

The proposed drillhole situated at X(E) 26.50017° Y(S) -27.91465° (Fig. 9) and the surrounding area was investigated.
It is situated on a gentling rising slope northwards of the Steenrots pan, in the north western part of the Mariaspan farm.

As noted the environment is open grassland. Archaeological visibility is fair. No artefacts or heritage features of any kind were found at the specific locale nor in the wider landscape over up to some 50 m or more radius around it.

It is possible that material may occur below the surface.

Figure 6. Vicinity of drill site.

Figure 7. Vicinity of drill site.

No archaeological or cultural materials of any age were noted at the drill site.

Access to the site would be along existing farm tracks to the immediate vicinity of the drill site and no impacts along the route area anticipated.

Characterising the significance of heritage traces and contexts

In terms of Tables 1 and 2 (above), the classification of landforms and visible archaeological traces for estimating the potential for archaeological material at the proposed drilling site (Table 1) suggests landscape L2/L3 Type 1 (generally poor potential) and archaeological trace Class A3 Type 1 (likely to be insignificant). Table 2 site attribute and value assessment criteria suggest Type 1 for all of the Classes 1-7 (low significance).

Archaeological significance in terms of these criteria for the drilling site is thus consistently LOW.

Characterising the significance of impacts

The following criteria are used in this study to characterise the significance of direct, indirect and cumulative impacts:

- The **nature**, which shall include a description of what causes the effect, what will be affected, and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional:
  - local extending only as far as the development site area – assigned a score of 1;
  - limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
  - will have an impact on the region – assigned a score of 3;
  - will have an impact on a national scale – assigned a score of 4; or
  - will have an impact across international borders – assigned a score of 5.
- The **duration**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - 0 is small and will have no effect on the environment;
  - 2 is minor and will not result in an impact on processes;
  - 4 is low and will cause a slight impact on processes;
  - 6 is moderate and will result in processes continuing but in a modified way;
  - 8 is high (processes are altered to the extent that they temporarily cease); and
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:

- Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
- Assigned a score of 2 is improbable (some possibility, but low likelihood);
- Assigned a score of 3 is probable (distinct possibility);
- Assigned a score of 4 is highly probable (most likely); and
- Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).

- the **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- the **status**, which will be described as either positive, negative or neutral.
  - the degree to which the impact can be reversed.
  - the degree to which the impact may cause irreplaceable loss of resources.
  - the *degree* to which the impact can be *mitigated.*

The **significance** is determined by combining the criteria in the following formula:

S= (E+D+M) P; where

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

Impact table summarising the significance of impacts the Mariaspan 223 proposed drilling site

Nature
Acts or activities resulting in disturbance of surfaces and/or sub-surfaces containing

artefacts (causes) resulting in the destruction, damage, excavation, alteration, removal or collection from its original position (consequences), of any archaeological material or object (what affected).		
	Without mitigation	***With mitigation***
Extent	Local (1)	Local (1)
Duration	Permanent (5) where archaeological material is impacted – but this has been rated as insignificant and not requiring mitigation	Permanent – but no mitigation regarded as necessary (5)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (16)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	No	No
Irreplaceable loss of resources?	No artefacts seen in the vicinity of the proposed drilling site. No irreplaceable loss expected.	
Can impacts be mitigated?	No traces noted on the ground: mitigation not regarded as necessary other than by way of on-going management as per EMP in case unexpected archaeological material is encountered sub-surface.	On-going management as per EMP
Mitigation: Specific mitigation measures at the drilling site not regarded as necessary. Possible (unlikely) subsurface archaeological traces could include artefact occurrences, burials or ostrich eggshell cache. In the event of any such materials/features being found, halt work and report immediately to SAHRA.		
Cumulative Impacts: Where any archaeological contexts occur the impacts are once-off permanent destructive events. Future infrastructure development may lead to spatially extended impacts in the vicinity. EMP should provide for on-going monitoring.		
Residual Impacts: Depleted archaeological record if/where present.		

MEASURES FOR INCLUSION IN THE DRAFT ENVIRONMENTAL MANAGEMENT PLAN

OBJECTIVE: Archaeological or other heritage materials occurring in the path of any surface or sub-surface disturbances associated with any aspect of the development are highly likely to be subject to destruction, damage, excavation, alteration, or removal. The objective should be to limit such impacts to the primary activities associated with drilling and hence to limit secondary impacts during the medium and longer term if further development occurs.

Project component/s	Any road construction over and above what is necessary and any extension of other components.
Potential Impact	The potential impact if this objective is not met is that wider areas or extended linear developments may result in further destruction, damage, excavation, alteration, removal or collection of heritage objects from their current context in the area.
Activity/risk source	Activities which could impact on achieving this objective include deviation from the planned drilling site and of access road/s without taking heritage impacts into consideration.
Mitigation: Target/Objective	A drilling environmental management plan that takes cognizance of heritage resources in the event of any future expansion, access roads or other infrastructure.

Mitigation: Action/control	**Responsibility**	**Timeframe**
Provision for on-going heritage monitoring in a facility environmental management plan which also provides guidelines on what to do in the event of any major heritage feature being encountered during any phase of development or operation. Localize drilling activity and impacts in the immediate vicinity of the proposed drilling site.	Environmental management provider with on-going monitoring.	Environmental management plan to be in place before commencement of development.

Performance Indicator	Inclusion of further heritage impact consideration in any future expansion or infrastructural elements. Immediate reporting to relevant heritage authorities of any heritage feature discovered during drilling operations.
Monitoring	Officials from relevant heritage authorities (National and Provincial) to be permitted to inspect the operation at any time in relation to the heritage component of the management plan.

CONCLUSIONS

No archaeological artefacts or features were noted at or near the proposed drilling site. No colonial era or other cultural resources or features were in evidence. Archaeological significance was determined to be consistently low in terms of all criteria by which they were measured. Potential for subsurface material occurring is pointed out: steps for reporting any such archaeological material, if found, are indicated.

At the specific drilling site reported on, it is not regarded as necessary to carry out mitigation.

Acknowledgements

I thank Jacobus van den Heever of De Beers for setting up the site visit and guiding me to inspect the site.

References

De Beers Consolidated Mines 2016. Draft Basic Assessment Report. Part of a prospecting right application, 2 June 2016.

De Bruyn, C. & Mosweu, K. 2019. Basic Assessment Report for the amendment of the existing prospecting right and environmental authorization for Bothaville NE Ext A, situated in the Free State Province. (SAHRIS).

Deacon, J. nd. Archaeological Impact Assessment - specialist input to planning and design. Unpublished notes compiled for the National Monuments Council.

Marshall, T.R. 1986. Morphotectonic analysis of the Wesselsbron panveld. Economic Geology Research Unit University of the Witwatersrand. Information Circular 190.

Morris, D. 2000a. Gamsberg Zinc Project environmental impact assessment specialist report: archaeology. Unpublished report, McGregor Museum.

Morris, D. & Beaumont, P. 2004. *Archaeology in the Northern Cape: some key sites*. Kimberley: McGregor Museum.

Pelser, A. 2019. Phase 1 HIA report for the proposed Vergenoeg township development located on a portion of Herman 236 in Wesselsbron/Monyakeng, Free State Province.

Smeyatsky, I.R. 2017. Discerning and explaining shape variations in Later Stone Age tanged arrowheads, southern Africa. University of the Witwatersrand. URI: http://hdl.handle.net/10539/23560