

McGregor Museum

Department of Archaeology



Heritage Impact Assessment for a fourth proposed drilling site at Glen Ross, south of Koopmansfontein, Northern Cape.

David Morris
September 2016

**Heritage Impact Assessment for a fourth proposed drilling site at
Glen Ross, south of Koopmansfontein, Northern Cape.
(NC 30/5/1/1/2/11571 PR Glenn Ross B6 Farm 394_5)**

David Morris, McGregor Museum, Kimberley
P.O. Box 316 Kimberley 8300
Tel 082 2224777 email dmorriskby@gmail.com
September 2016

Executive Summary

A Phase 1 Heritage Impact Assessment is presented.

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

It is unlikely that archaeological material of significance would occur subsurface. If encountered, however, 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 that are considered to require further mitigation. Highly dispersed isolated artefacts were noted over a wide area in the general vicinity.

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 this fourth proposed drilling site at Glen Ross 275 south of Koopmansfontein, Northern Cape. Three previous studies have been conducted for nearby drilling sites, separately reported upon. This report addresses the possible impacts on heritage resources (archaeological and cultural) of this operation. It excludes palaeontological assessment.

The site was inspected on 20 September 2016 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 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) provides general protection to 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. This means that a Heritage Impact Assessment should be performed, resulting in a specialist report as required by the relevant heritage resources authority/ies to assess whether authorisation may be granted for the disturbance or alteration, or destruction of heritage resources.

Where archaeological sites and palaeontological remains are concerned, the South African Heritage Resources Agency (SAHRA) at national level acts on an agency basis for Provincial Heritage Resources Agencies (PHRAs) which have not been accredited for these categories of heritage management.

Description of environment and potential impacts

The environment in question consists of essentially flat terrain, with scattered small pans, on the Ghaap Plateau. Vegetation consists of vaalbos, wild olives and karee trees interspersed with grass on a calcrete substrate making for high archaeological visibility for any traces at the surface. Stone Age material would possibly be buried subsurface in places, e.g. in small pans (dolines?), as has been noted at other sites in the region (e.g. Beaumont & Morris 1990). The site in question is not within such a depression and calcrete is exposed locally with very shallow sandy patches.

The locality is indicated in the following map.

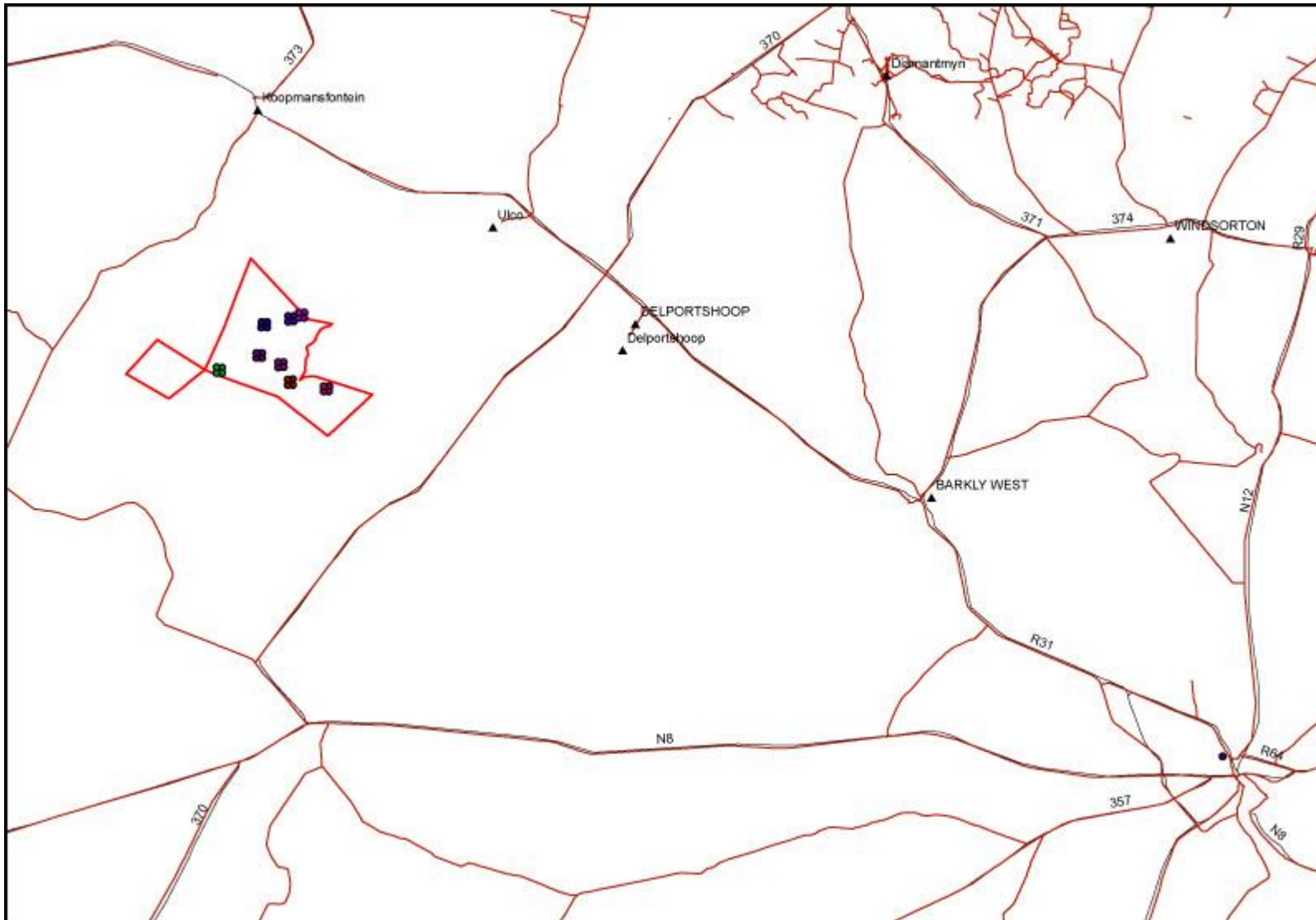


Figure 1: Locality Map

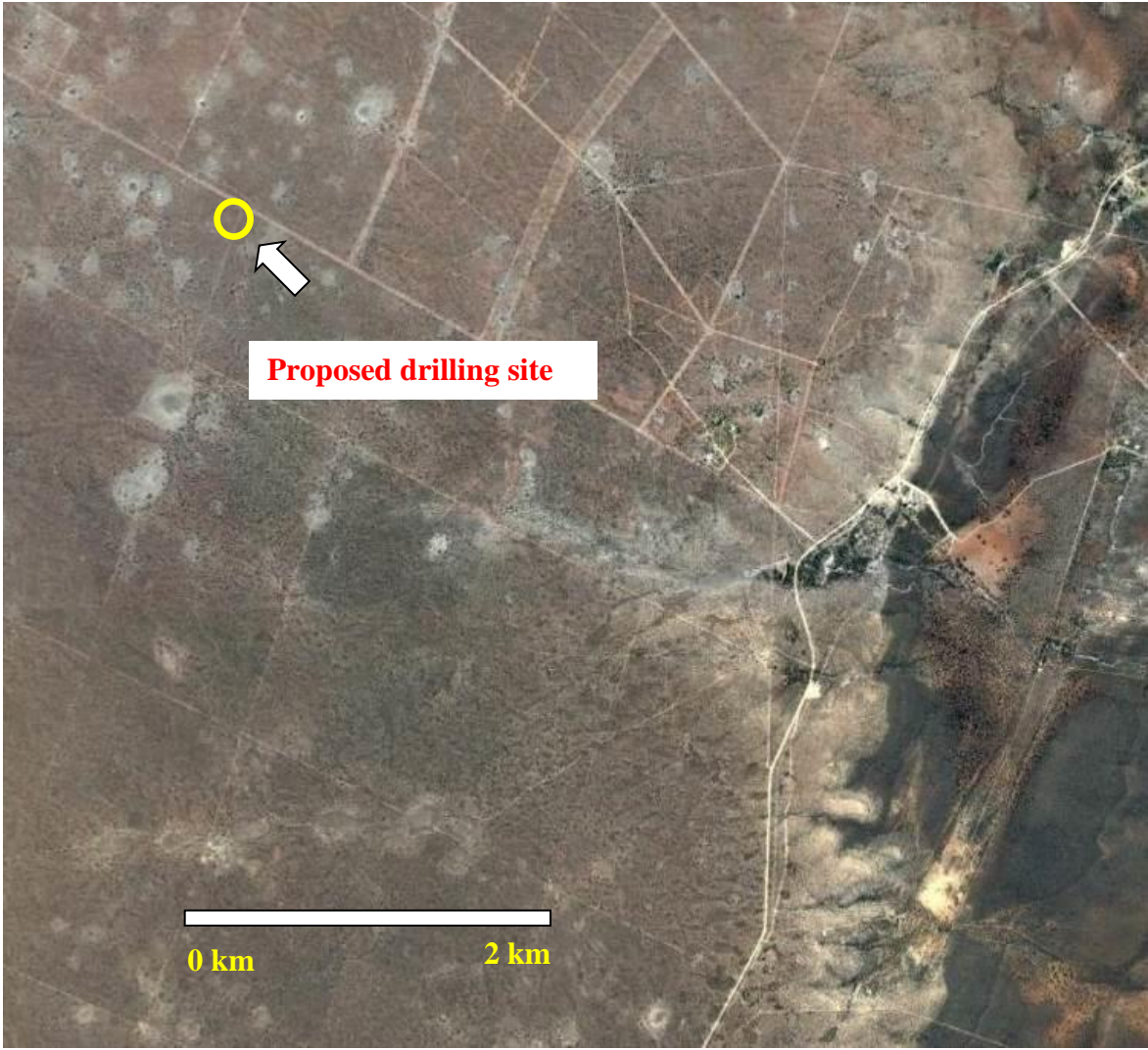


Figure 2. Google Earth image showing locality of drilling site

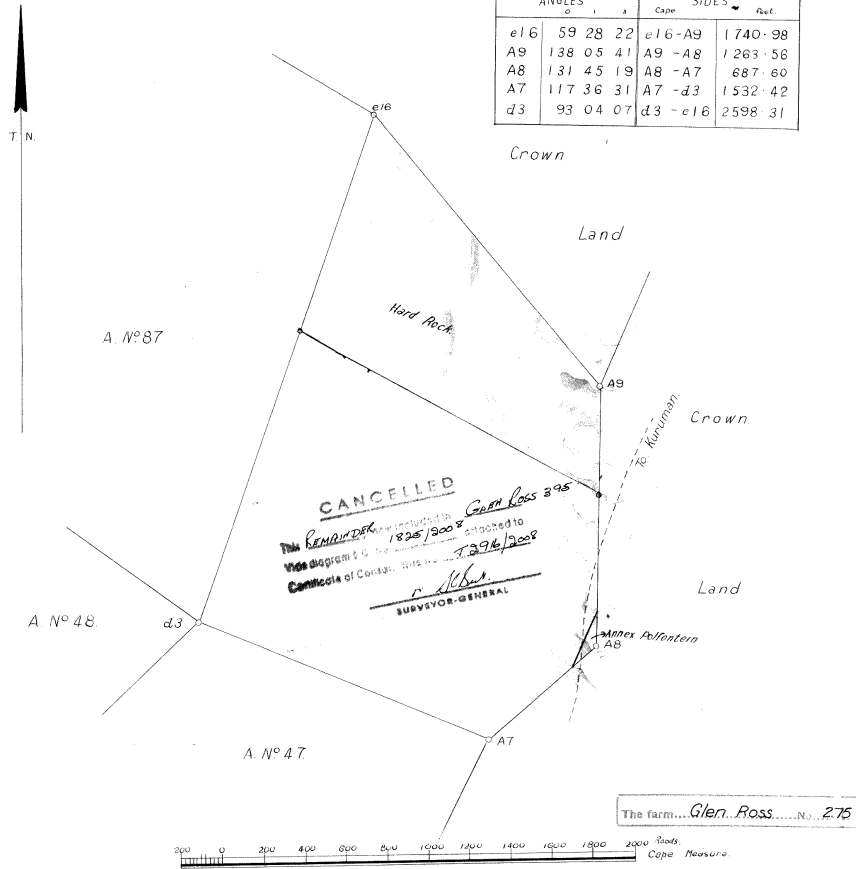


Figure 3. Google Earth image showing position proposed drilling site.

F 26/1/1877
 DG N° 2695/1878

The numerical data are sufficiently consistent.
 (Sgd) Alex C. Bailie
 Examiner.

Angles	Sides		
	o	'	"
e16	59	28	22
A9	138	05	41
A8	131	45	19
A7	117	36	31
d3	93	04	07



For subdivisions of this diagram see outline GWL 4-337

* Now Division of Barkly West

The figure e16, A9, A8, A7, d3 represents 6075 morgen
 253 sq^m roads of land on the 'Kaab Plateau being THE FARM A.N°88
 in the division of *Barkly, Griqualand West.

Surveyed by me
 (Sgd) John H. Ford
 Gvt Sur^m
 1877.

T.C. 275

Land Grant
 1-4 1877
 Richard Southey
 GWL 12.6
 No 390-1945 - 7 NOV. 1915

GM-4
 GN-3



T.C. 275

2695/1878
 J.H. Ford

Figure 4. Glen Ross, surveyed by J.H. Ford in 1877.

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

Previous studies

SAHRIS provides no records for the immediate vicinity (apart from a nearby powerline corridor), indicative that no previous studies/surveys have been conducted on this property. Observations from three previous drilling site inspections on the same property (Morris 2016a, b & c) are directly relevant.

Colonial history

A plan at the Chief Surveyor General's office (Fig. 4) shows that the property known as Glen Ross was surveyed by J.H. Ford in 1877, indicating Land Grant Richard Southey. This was prior to the incorporation of Griqualand West into the Cape Colony. The map indicates no features on the property of interest or significance.

Stone Age

Stone Age material found in the broader region spans the Earlier, Middle and Later Stone Ages through Pleistocene and Holocene times (Beaumont & Morris 1990). The Ghaap Escarpment, which is situated some 5 km south east of the proposed drilling site, contains many shelters which have mainly late Holocene Later Stone Age occupation (Humphreys & Thackeray 1983). The flat plains of the Ghaap Plateau generally have dispersed low density scatters of artefacts of varying age, often in slightly higher densities around pans (Morris 2016).

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 would occur in the area of the drilling site under consideration.

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

The destructive impacts that are possible in terms of heritage resources would tend to 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 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 and 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	Buildings without extensive basements over known historical sites

Class	Landform	Type 1	Type 2	Type 3
			basements	
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 or stone walling or other feature visible	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick

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 site visit to inspect the site was planned for 20 September 2016 in the company of De Beers Exploration personnel Lorraine Mothobekhi. An assessment was made of heritage traces at the proposed drilling locale.

The sparse vegetation/grass and calcrete substrate at the drill site made it easy to detect any archaeological material that may occur at the surface, but it was possible (though in this instance unlikely) that artefacts would occur sub-surface in some places.

Observations

The site was found to be on a flat plain typical of the Ghaap Plateau, somewhat comparable to other drilling sites on Glen Ross (Morris 2016a, b, c), with very shallow soil over calcrete (frequently exposed at surface).



Figure 5. View of proposed drilling site. $28^{\circ}24'12.3''$ S $24^{\circ}02'04.4''$ E

Isolated and widely dispersed Middle and Later Stone Age mostly chert artefacts have been noted over different parts of the property and around the proposed drilling site. Two of Later Stone Age flakes were found in the area measuring about 30 x 30 m centred on the point of proposed drilling (Fig 6-7).



Figure 6. cf LSA flake found at drill site



Figure 7. cf LSA flake found at drill site.

As isolated surface finds, lacking any stratigraphy and without organic preservation, the artefacts have nearly zero archaeological context or integrity.

No colonial era traces were found on the site nor in the vicinity.

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 sites at the proposed drilling site (Table 1) suggests landscape 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).

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 at Treurhoek/Doordam 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?	Very few artefacts noted, lacking context.	
Can impacts be mitigated?	Minimal traces noted on the ground: Not regarded as necessary other than by way of on-going management as per EMP.	On-going management as per EMP
Mitigation: Specific mitigation measures at the drilling site not regarded as necessary. Possible but unlikely subsurface Stone Age archaeological traces, and if present then not expected to be significant; yet, if found, 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 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.	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

Only two stone artefacts were found on the surface in the vicinity of proposed drilling. No colonial/historical/cultural resources were found.

From an archaeological perspective the observed heritage resources may be regarded as being of low significance, but with (albeit unlikely) potential for subsurface occurrences.

It is not regarded as necessary to carry out mitigation.

Acknowledgements

I thank Ms Lorraine Mothobekhi of De Beers Group of Companies who conducted us to the site and Mr Koot Msawula of the McGregor Museum who assisted with the fieldwork.

References

- Beaumont, P.B. & Morris, D. 1990. *Guide to archaeological sites in the Northern Cape*. Kimberley: McGregor Museum.
- Deacon, J. nd. Archaeological Impact Assessment - specialist input to planning and design. Unpublished notes compiled for the National Monuments Council.
- Humphreys, A.J.B. & Thackeray, A.I. 1983. *Ghaap and Gariep: Later Stone Age studies in the Northern Cape*. Cape Town: South African Archaeological Society. Monograph Series 2.
- Morris, D. 1988. Engraved in place and time: a review of variability in the rock art of the Northern Cape and Karoo. *South African Archaeological Bulletin* 43:109-121.
- Morris, D. 2000a. Gamsberg Zinc Project environmental impact assessment specialist report: archaeology. Unpublished report, McGregor Museum.
- Morris, D. 2016a. Heritage Impact Assessment for a proposed drilling site at Glen Ross, south of Koopmansfontein, Northern Cape (June 2016).
- Morris, D. 2016b. Heritage Impact Assessment for a second proposed drilling site at Glen Ross, south of Koopmansfontein, Northern Cape (August 2016).
- Morris, D. 2016c. Heritage Impact Assessment for a third proposed drilling site at Glen Ross, south of Koopmansfontein, Northern Cape (August 2016).
- Morris, D. & Beaumont, P. 2004. *Archaeology in the Northern Cape: some key sites*. Kimberley: McGregor Museum.
- Wilman, M. 1933. *Rock engravings of Griqualand West and British Bechuanaland, South Africa*. Cambridge: Deighton Bell.