

SPECIALIST ARCHAEOLOGICAL REPORT

DEPARTMENT OF ARCHAEOLOGY AND ANTHROPOLOGY
THEO VAN WYK BUILDING
PO BOX 392
UNIVERSITY OF SOUTH AFRICA
MUCKLENEUK
0003

MARIA VAN DER RYST

BA, HONS, MA, PhD (ARCHAEOLOGY)

NEELS KRUGER

MA CANDIDATE, BA, HONS, (ARCHAEOLOGY)

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FOR:

Rood & Rood Heritage Consultants
PO Box 1600
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MINING DEVELOPMENT ON

THE FARM MAANDAGSHOEK 254 KT

TUBATSE MUNICIPAL AREA

SEKHUKHUNE DISTRICT

S24°33'59.58", E30°06'28.29"

Map Reference: 2430 CA

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1...Executive Summary

The authors of this Specialist Report were contracted by Roodt & Roodt Heritage Consultants to investigate Stone Age archaeological assemblages recorded during a Phase 1 *Heritage Impact Assessment* of a demarcated surface area to be mined on the farm Maandagshoek 254 KT (Map Reference 1:50000 - 2430 CA, S24°33'59.58"-E30°06'28.29"). Following on a statement of high significance for said assemblages, the South African Heritage Resources Agency (SAHRA) requested that a Stone Age specialist assess the research potential of the archaeological occurrences present within the boundaries of the proposed mining development. The aim of the assessment was to establish the extent of, in particular, the Middle Stone Age (MSA) assemblages in the area, to consider the impact of proposed developments on these resources, and to submit appropriate recommendations with regard to the scientific value of the sites and cultural resources management measures that may be required.

During the consequent survey and assessment (September 2007), representative and relatively extensive MSA and a low incidence of Later Stone Age (LSA) archaeological occurrences were identified in context of erosion dongas.

The mitigation action recommended in this report includes a second phase of investigation to be carried out by a suitably qualified Stone Age archaeologist in view of the high significance rating for this locality based on its historic and archaeological scientific importance. A Phase 2 investigation should comprise a more comprehensive area survey, with sampling of the MSA assemblage through archaeological area and Shovel Test Spit (STP) excavations in order to assess the character and extent of the MSA at Maandagshoek. It is also recommended that a geologist should be involved during sampling for input on the rock types and origins of the raw materials used during the production of the lithic sequences.

OSL dating of the archaeological occurrences during the second phase mitigation is not recommended in view of the environmental study and the IRSL dating of the sediments that has been undertaken by Hancox et al in 2004.

Pending the outcome of the second phase assessment of the MSA archaeological occurrences, further mitigation might imply an environmental investigation of new exposures in the Maandagshoek sediments with the view to additional dating. The sedimentary sequences in the dongas are responses to climate changes in the region. Dating of the utilization of the resources of this locality by humans is dependant on reliable dates for the sedimentary succession and subsequent reworkings of the deposits, which can only be determined by soil and environmental scientists in collaboration with an archaeologist.

Note the following:

- It should be kept in mind that archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during construction activities, such activities should be halted, and a university or museum notified in order for an investigation and evaluation of the find(s) to take place (*cf.* NHRA (Act No. 25 of 1999), Section 36 (6)).
- A copy of this report will be lodged with SAHRA as stipulated by the National Heritage Resources Act (NHRA) (Act No. 25 of 1999), Section 38 (especially subsection 4).

2...Background to the Project

2.1 SCOPE AND MOTIVATION FOR INVESTIGATION

2.1.1 Introduction

An opencast platinum mine is developed in the Maandagshoek area which will affect large portions of land in the district. An assessment was requested by SAHRA on the Maandagshoek 254 KT archaeological occurrences of lithics identified in dongas by Frans Roodt (2006) on behalf of AGES Environmental Division (Pty) Ltd. A specialist study was required to examine lithic assemblages in the area archaeologically, to assess the archaeological significance and research value of the lithic collection and to supply recommendations as to conservation / mitigation measures. The investigation was subsequently conducted by members of the Archaeology Division of the Department of Anthropology and Archaeology, namely Maria van der Ryst, a Stone Age specialist, with the assistance of Neels Kruger in view of his knowledge of the area and also his broad AIA experience.

2.1.2 Nature of the proposed activity or development

Mining development on the Farm Maandagshoek 254 KT Tubatse Municipal Area Sekhukhune District.

2.1.3 Terms of reference (as set out in the SAHRA AIA review comment file no. 9/2/266/0027)

The terms of reference for this assessment were to assess the research potential of the Maandagshoek site within the boundaries of the proposed development with particular reference to the following:

- Provide a further description of the Stone Age archaeological occurrences at Maandagshoek.
- Assess the possibility of obtaining sediment samples for OSL dating in order to determine the age of the archaeological occurrences.
- Estimate the level of significance of the archaeological remains within regional contexts.
- Provide contextual information on the archaeological and historical sites in the area.
- Propose possible mitigation measures provided that such action is necessitated by the development
- The Phase 1 archaeological scoping report indicated a high significance for the site, and this recommendation was accordingly a premise for the specialist assessment (see 7).

2.2 LEGISLATION, CONSERVATION AND HERITAGE MANAGEMENT

SAHRA and their provincial offices aim to conserve and control the management, research, alteration and destruction of cultural resources of South Africa and to prosecute if necessary. It is therefore obligatory to adhere to heritage resource legislation contained in the Government Gazette of the Republic of South Africa (Act No.25 of 1999) as many heritage sites are threatened daily by development. Conservation legislation requires impact assessment reports that, in all cases must include EIA's and HIA's.

HIA's should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources including archaeological and palaeontological sites that might occur in areas of developed and (b) make recommendations for protection or mitigation of the impact of the sites.

2.2.1 The EIA and HIA processes

Phase 1 Archaeological Assessments generally involve the identification of sites during a field survey with

assessment of their significance, the possible impact development might have and relevant recommendations.

All Heritage Impact Assessment reports should include:

- a. The location of all sites identified
- b. A brief description of the characteristics of each site
- c. An assessment of the importance of each site, including conservation and mitigation recommendations
- d. An assessment of the potential impact of the development on the site/s
- e. Shovel test spit excavations (STP) to establish the extent of a site, or the collection of material to identify the archaeological associations of the site, may be required. In these instances a pre-arranged SAHRA permit should be obtained.
- f. Recommendations for conservation or mitigation.

This HIA report is intended to inform the client about legislative protection and the significance of heritage resources and to recommend appropriate mitigation or conservation measures. It is essential that the report also provides the heritage authority with sufficient information on the sites to enable confident assessment of the following:

- a. Possible objections to a development
- b. The conditions upon which such development might proceed
- c. Which sites require permits for mitigation or destruction
- d. Which sites require mitigation and what this should comprise
- e. Whether sites must be conserved, and proposed alternatives for relocation of the development in order to conserve other sites
- f. The relevant measures to be applied in order to protect sites recommendation for conservation.

When a Phase 1 HIA is part of an EIA, wider issues such as public consultation and assessment of the spatial and visual impacts of the development may be undertaken as part of the general study and may not be required from the archaeologist. However, should the Phase 1 project forms a major component of an HIA, it will be necessary to ensure that the study addresses such issues and complies with section 38 of the National Heritage Resources Act.

2.2.2 Legislation regarding archaeology and heritage sites

National Resource Act of April 1999

According to Act No.25 of 1999 a historical site is “any identifiable building or part thereof, marker, milestone, gravestone, landmark or tell older than 60 years”. This clause is commonly known as the “60-years clause”. Buildings are amongst the most enduring features of human occupation, and this definition therefore includes all buildings older than 60 years, modern architecture as well as ruins, fortifications and Iron Age settlements. The Act identifies heritage objects as:

- objects recovered from the soil or waters of South Africa including archaeological and palaeontological objects, meteorites and rare geological specimens.
- visual art objects

- military objects
- numismatic objects
- objects of cultural and historical significance
- objects to which oral traditions are attached and which are associated with living heritage.
- objects of scientific or technological interest.
- any other prescribed category.

With regard to activities and work on archaeological and heritage sites this Act states that:

“No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority.” (34. [1] 1999:58)

and

“No person may, without a permit issued by the responsible heritage resources authority-

- (a) *destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;*
- (b) *destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;*
- (c) *trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or*
- (d) *bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites. (35. [4] 1999:58).”*

and

“No person may, without a permit issued by SAHRA or a provincial heritage resources agency-

- (a) *destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;*
- (b) *destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority;*
- (c) *bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals (36. [3] 1999:60).”*

On the development of any area the gazette states that:

“...any person who intends to undertake a development categorised as-

- (a) *the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- (b) *the construction of a bridge or similar structure exceeding 50m in length;*
- (c) *any development or other activity which will change the character of a site-*
- (d) *exceeding 5000m² in extent; or*

- (e) *involving three or more existing erven or subdivisions thereof; or*
- (f) *involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
- (g) *the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;*
- (h) *the re-zoning of a site exceeding 10000m² in extent; or*
- (i) *any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development (38. [1] 1999:62-64)."*

and

"The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

- (a) *The identification and mapping of all heritage resources in the area affected;*
- (b) *an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;*
- (c) *an assessment of the impact of the development on such heritage resources;*
- (d) *an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;*
- (e) *the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;*
- (f) *if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and*
- (g) *plans for mitigation of any adverse effects during and after the completion of the proposed development (38. [3] 1999:64)."*

3...Method of Enquiry

Archaeological reconnaissance implies the systematic procedure of the identification of archaeological sites. Reconnaissance of the area under question at Maandagshoek was done by means of a systematic pedestrian survey along erosion gullies and doings.

The reconnaissance of the area under question served a twofold aim:

- The identification of archaeological areas of importance:
This was done in order to identify and determine the extent of the archaeological landscape of the area under question.
- The spatial recording of archaeological sites:
All archaeological cultures and historical events have spatial definitions in addition to their cultural and chronological context. Where applicable, spatial recording of these definitions were done by means of a handheld GPS (Global Positioning System).

3.1 SOURCES OF INFORMATION

In accordance with archaeological practise, a pedestrian survey was carried out as part of the assessment process of the areas under question at Maandagshoek during which standard archaeological procedures were followed. Most archaeological remains occur in single or multiple stratified layers beneath the soil surface, which required observations on all disturbances impacting on the archaeology and site formation. These include human intervention such as roads and clearings, as well as the role of natural agents such as burrowing animals and erosion. As such, the survey focused mainly on areas previously identified as of archaeological importance in large erosion gullies and dongas. Locations of archaeological material remains were recorded by means of a Garmin Map 76s GPS and general conditions on the terrain were photographed with a Sony DSC-F717 Digital camera.

3.2 LIMITATIONS

The surrounding vegetation in the area under question was mostly a combination of bush, scrubs and grasses with sickle bush (*Dichrostachy cinerea*) generally widespread. The general visibility at the time of the survey (27/08/2007) was good in all areas and in the erosion gullies.

It should be noted that other undetected heritage remains may still be present in sub-surface deposits, in which case it must be reported to the Heritage Resources Authority and the archaeologist and may require further mitigation measures.

4...Background to Area of Study

4.1 GENERAL DESCRIPTION

Maandagshoek lies in the Steelpoort Valley, west of the town of Burgersfort in the Limpopo Province. The numerous informal settlements within the area impacted on the landscape, and overgrazing by livestock manifested in the formation of erosion gullies and dongas. The area is mountainous with the Steelpoort River cutting through the Valley. The area is mined intensively and Maandagshoek is of particular historic significance as the earliest sampling of platinum in the eastern Bushveld Complex took place at this locality during the 1920's. Subsequent commercial mining activities at what became known as the Merensky Reef not only continues up to the present time, but also had an enormous impact on the world platinum industry.

4.2 GEOLOGY AND THE HISTORIC SIGNIFICANCE OF MAANDAGSHOEK

The hills on the farm Maandagshoek are composed predominantly of pyroxenites, norites and associated chromitites of the Upper Critical Zone of the Bushveld Complex (Hancox et al 2004:248). The palygorskite and sepiolite clay deposits of the ancient perennial streambeds and tributaries of the Moopetsi River just north of the centre of the farm Maandagshoek are also commercially exploited (Wilson & Anhaeusser 1998). The stone tools occur in the clay-bearing dolocrete and calcrete sediments of the dongas.

The locality is of particular historic interest. The first occurrence of platinum in the eastern Bushveld Complex has been noted at Maandagshoek by William Betel, who reported on his find in the 10 November 1906 edition of a journal, *South African Mines, Commerce and Industries*, which was then published weekly in Johannesburg (Cawthorn 2006).



Image 1: View of Maandagshoek

Publication of this earliest authenticated scientific report on platinum in rocks from the Bushveld Complex resulted in extensive prospecting for chromite-rich rocks to be mined for platinum during the period 1906 to 1923, but these ventures were fraught with difficulties. It was only in 1924 when Dr Hans Merensky received a sample of a white concentrate panned from a stream on the farm Maandagshoek by the then owner, Andries Lombaard, and on which he performed a mineralogical study, that he realized that the platinum at this locality had a grain size different from that in the chromite layers, indicating a different source rock (Cairncross & Dixon 1995; Cawthorn 2006). This resulted in his location of the eponymous Merensky Reef, followed by mining at this locality, which subsequently had an enormous impact on the world platinum industry.

It is therefore significant that the mining of platinum along the Merensky Reef not only continued for more than a century, but that the occurrence of platinum in the chromite-rich pipes and high demands for the platinum-group metals with correspondingly high prices, necessitated the heritage scoping survey undertaken by Roodt (2006) for a proposed new mining development. Whereas the archaeological occurrences identified during this scoping survey have no direct bearing on the geological developments, it is serendipitous that the importance of the former was realized by the archaeologist (Roodt 2006), and that this importance of the MSA occurrences was pointed out in the SAHRA Review (File 9/2/266/0027).

4.3 OTHER

Refer to the main EIA report for geographical, environmental and demographic attributes.

4.4 ARCHAEOLOGICAL CONTEXT: SEQUENCE AND DEFINITIONS

PERIOD	APPROXIMATE DATES
Early Stone Age (ESA)	more than 2 million years ago - 250 000/200 000 years ago

Middle Stone Age (MSA)	200 000/250 000 years ago - 25 000 years ago
Later Stone Age (LSA)	25 000 years ago - AD 200 (up to historic times in certain areas)
Early Iron Age (EIA)	AD 300 - AD 1025
Late Iron Age (LIA)	AD 1025 - AD 1830

5...Specialist Review: The scientific value of Maandagshoek 254 kt

5.1 THE STONE AGE ARCHAEOLOGY OF MAANDAGSHOEK

An investigation into the archaeological occurrences at this locality indicates an ephemeral surface overlay of Later Stone Age (LSA) artefacts produced on a variety of raw materials. These materials are mostly of igneous origin, and predominantly fine-grained Cryptocrystalline Silicas (CCS) including quartzes, chalcedony, agates and mudstones, but also fine-grained dolerite (Reeks 2007).

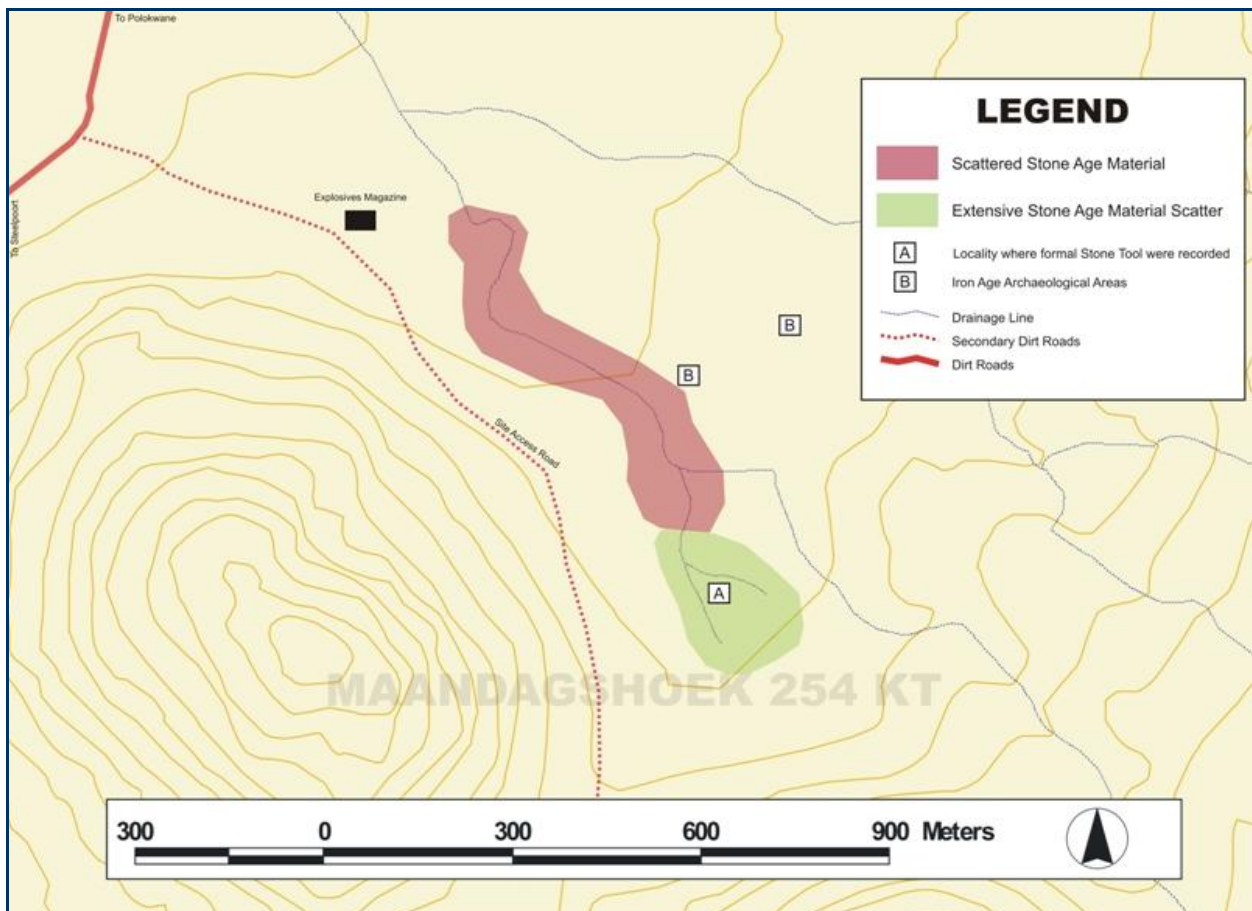


Image 2: Map indicating areas of archaeological importance

The MSA occurrences at this locality are much more abundant. Distinct production technologies were used to manufacture a range of specific tool types, resulting in characteristic features and attributes. Typical MSA tool

types comprise blades, convergent flakes and backed formal tools. The latter tool types are mostly unifacial and bifacial points, knives, a variety of scrapers and also perforating tools (Thackeray 1992; Wadley 2005; Soriano et al 2007).



Image 3: Maandagshoek - looking east, Stone Age areas discussed in text indicated by dotted line

The MSA artefacts sampled at Maandagshoek were produced on a range of rock types, which include dolerite, chalcedonies, quartz and other CCS, banded ironstone and quartzite, but with an observed preference for fine-grained dolerite. Cortical discoloration resulting from weathering, which is a feature of many of the dolerite lithics, is characteristic of this rock type. The preferential selection of dolerite for lithics <30 mm probably derives from functional requirements (Van der Ryst 2006). The materials used for the MSA lithics derived from water-borne nodules and outcrops of the 2050 Ma Bushveld Complex basement rocks (Eriksson et al 1994).



Image 4: MSA flaked stone tools on dolerite. Note oxidation of cortex in most specimens



Image 5: Unifacial MSA point on dolerite (see Image 2 reference point A)



Image 6: Various lithics produced on a range of tool types



Image 7: Cores on dolerite

Whereas there is certainly reworking of deposits through sedimentation cycles and erosion at Maandagshoek (Hancox et al 2004; see also 5.3.2), the MSA occurrences frequently tend to occur in lithic scatters. These clusters comprise primary and secondary classes, which include cores, primary cortical flakes, unretouched convergent flakes and blades, classic unifacial convergent MSA points and manufacturing debris of chunks, chips and broken flake sections. However, the evidence for stages of lithic reduction, as observed in the Maandagshoek dongas, does point to some primary deposition and site integrity. Only an in-depth technological study will identify a chain(s) of knapping operations, which can inform on such aspects, and also whether there are differences in knapping operations that may indicate chronological periods, e.g. early or final MSA depositions (Wadley 2001:216).

5.2 DATING

5.2.1 *Luminescence dating*

Luminescence dating (whereby light emissions from crystalline materials are measured according to prescribed procedures in order to resolve chronology) is becoming a much used chronometric tool in archaeology (Feathers 2003:1493). The SAHRA review required an assessment into the possibility of obtaining sediment samples for optical luminescence (OSL) dating in order to determine the age of the archaeological occurrences. Please note that *sedimentation events* are dated through the application of luminescence dating, and that this procedure merely provides *indirect* dates for associated archaeological occurrences.

OSL dating of deposits can potentially contribute much to the poorly dated South African MSA record but processing of samples is not only costly, but a complicated procedure that should be in agreement with evidence from sedimentology, archaeology and other dating methods (McCarthy 2007:e-mail; Woodborne 2007:pers. comm.). Such dating has, however, been applied to MSA deposits at various southern African sites such as Die Kelders, Klasies River Main site, Duinefontein and Sibudu (see Feathers & Bush 2000; Feathers 2002, 2003; Jacobs et al 2006).

Due to the complex nature of thermoluminescence (TL) dating procedures and a need for accurate measurement protocols, but also possible - and very likely - disturbances in the archaeological and sedimentary record, optical luminescence (OSL) and infrared-stimulated luminescence (IRSL) are used to verify TL dates. It is therefore important for sample integrity that a date can be reproduced by an independent laboratory with access to the original site for application of additional dating and, importantly, reconsideration of the depositional context (Rink 2007:1). TL is accordingly particularly costly and time-consuming.

5.2.2 *Dating of the Maandagshoek alluvial fan system*

It is therefore significant that Maandagshoek has been intensively researched. This includes luminescence dating of the alluvial fan system of the Moopetsi River flowing into Steelpoort to the north in an environmental study on the response of alluvial systems to Plio-Pleistocene base level and climatic change conducted by Hancox et al 2004. Note that the full paper is still being written, primarily by Dr Stephen Tooth at Aberystwyth in Wales (McCarthy e-mail 08/08/2007).

The results of the investigations indicated that donga, or gully, erosion of the fan has exposed parts of its internal stratigraphic composition and shows a fill of a number of stacked, fining-upward cyclic successions (see Hancox et al 2004 for illustrations of the Maandagshoek stacked cycles of coarse sands overlain by clay-rich palaeosols; and Tooth, S: <http://users.aber.ac.uk/set/> for the fan system and dongas).

Readings on IRSL were obtained for the terrace sediment successions and established pulses of sedimentation at approximately 13.5, 37-41 and 110-125 ka (Hancox et al 2004:248).

5.2.3 *The feasibility of applying TL dating to the MSA at Maandagshoek*

Woodborne (2007: pers. comm.) advised that it is important that the context and association of soils with the MSA lithics in the dongas should be established in view of the role of water and erosion impacts on the integrity of the archaeological occurrences. At Maandagshoek the former most likely contributed to secondary deposition of archaeological activity surfaces and lithic specimens.

Therefore the ages of the sediments may be older or younger than the artefacts. Many river terraces and alluvial fans in southern Africa are currently being eroded by dongas. Dongas can be attributed to poor land management, but donga formation is also in many instances a natural process resulting from river bed erosion at the foot of the terrace or fan. Where the river bed is currently eroding downwards, banks have become steeper and dongas have eroded downwards from the banks into the neighbouring terraces and fans. That erosion cycles are ongoing is demonstrated by evidence of former dongas which became buried by sediments and are now in the process of becoming reexposed by erosion (Woodborne (2007: pers. comm.).

It is therefore expected that the Maandagshoek dongas are more recent than the MSA presence on the landscape (Woodborne 2007:pers. comm.). This moreover suggests that the artefacts were displaced by ongoing sedimentation processes, contributing to a mixing of sediments and lithics. Assessment of the original context of the archaeological deposits is therefore essential, and as such requires the expertise and input of soil/geology specialists. This is particularly relevant in view of the Hancox et al (2004) environmental study discussed under 5.3.2 and also because the dating of the Maandagshoek fan sediments has proven to be problematic due to the lack of quartz grains and lack of organic carbon and fossils (Hancox et al 2004:248).

Redating of the sediments is therefore not recommended. This issue may be reconsidered when the results of a second phase of the archaeological investigations are available and should the archaeological occurrences provide evidence for exceptional importance.

5.3 THE SCIENTIFIC VALUE OF THE MAANDAGSHOEK MSA ARCHAEOLOGICAL OCCURRENCES

The MSA refers to a time span of around 200 000 to 40 000 years ago. During this period various forms of prepared core technologies were applied to produce flake blanks. These were used without further knapping, or retouched into formal tool types such as blades, convergent points, perforating tools and scrapers. Our reconstruction of MSA life was in the past mainly based on the stone artefacts (Mason 1962:235). A study of tool types still remains the basis of reconstructing lifeways during the MSA, but the emphasis of current studies on residues and use-wear, as well as improved dating techniques and a focus on environmental reconstructions, greatly expanded of research findings.

In the research area Revil Mason (1958, 1962) conducted most of the early research on chronological succession within the trans-Vaal in a study of the archaeology of the region. His findings were subsequently published in a book titled *The prehistory of the Transvaal*. The local sequence, as identified by him, included the so-called Pietersburg MSA assemblages, which he divided into three substages. Very little detailed research on the MSA of the Limpopo Province has since been undertaken, apart from work done by Kathy Kuman of Wits on final ESA-MSA sites in the Soutpansberg area of the northern Limpopo Province, and research in progress on the MSA of the Waterberg Plateau and the lower-lying regions near the Limpopo River (Van der Ryst 1998, 2006).

It is, moreover, important to note that South African MSA research has grown to a position near centre stage in African and world archaeology over the last couple of decades. The South African MSA archaeology, by being associated with the earliest known remains of anatomically modern people and also cultural modernity, represents a unique window on the physical, cultural and social developments within this time frame (Thackeray 1992; Wadley 2001, 2005; Deacon & Wurz 2001). The South African MSA is therefore a broadly defined time period of particular relevance with research focus on the technology, cognition and social development of humans.

6...Evaluation

6.1 CATEGORIES OF SIGNIFICANCE FOR MITIGATION GUIDELINES (BASED ON SAHRA GUIDELINES)

SIGNIFICANCE RATING	ACTION REQUIRED
No significance or not protected	1 None
LOW (Phase 1) Sites may require mitigation	2a Recording and documentation of site adequate; no further action required. 2b Controlled sampling (shovel test pits, auguring, mapping and documentation; permit required for sampling and destruction.
MEDIUM (Phase 2) Mitigation required	2a and 2b 3 Excavation of representative sample, dating, mapping and documentation (Phase 2 investigation); permit required for sampling and destruction.
HIGH (Phase 2 and/or 3) Mitigation required	2a, 2b and 3 4a Nomination for listing on Heritage Register (National, Provincial or Local) (Phase 2 & 3 investigation); site management plan; permit required if utilised for education or tourism 4b Human remains: Locate demonstrable descendants through social consulting; obtain permits from applicable legislation, ordinances and regional by-laws; exhumation and reinterment.

6.2 SITE EVALUATION OF MAANDAGSHOEK 254 KT

SITE EVALUATION OF MAANDAGSHOEK	Yes	No
1 Heritage value		
<i>1.1 Historic Value</i>		
Of importance to the community or the historical or precolonial historical record of South Africa	√	

A strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa		√
Of significance in relation to the history of slavery in South Africa		√
<i>1.2 Aesthetic value</i>		
Important in exhibiting particular aesthetic characteristics valued by a particular community or cultural group		√
<i>1.3 Scientific value</i>		
Potential to yield information contributing to an understanding of South Africa's natural and cultural heritage.	√	
Importance in demonstrating a high degree of creative or technical achievement during a particular period.	√	
Of importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation	√	
<i>1.4 Social value</i>		
Marked or special associations with a particular community or cultural group for social, cultural or spiritual reasons (sense of place)		√
<i>1.5 Tourism value</i>		
Of significance through contributing towards the promotion of a local socio-cultural identity and to be developed as a tourist destination		√
<i>1.6 Rarity value</i>		
Represents unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage		√
<i>1.7 Representative value</i>		
Of importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects	√	
2. REGIONAL CONTEXT		
Other similar sites within the regional landscape	√	
3. CONDITION OF SITE		

Integrity of deposits/structures	MSA occurrences in erosion contexts within dongas		
4. SPHERE OF SIGNIFICANCE	High	Medium	Low
International			√
National		√	
Provincial		√	
Local	√		
Specific community			√
5. FIELD REGISTER RATING			
National/Grade 1 [should be registered, retained]			
Provincial/Grade 2 [should be registered, retained]			
Local/Grade 3A [should be registered, mitigation not advised]			
Local/Grade 3B [High significance; mitigation, partly retained]			
Generally Protected A [High/Medium significance, mitigation]			√
Generally protected B [Medium significance, to be recorded]			
Generally Protected C [Low significance, no further action]			
E. GENERAL STATEMENT OF SITE SIGNIFICANCE			
Low			
Medium			
High			√
6. RATING OF POTENTIAL IMPACT OF DEVELOPMENT			

None	
Peripheral	
Destruction – possible impact of proposed access road	√
Uncertain	
7. RECOMMENDED MITIGATION Phase 2 investigation, which comprises a sampling of the MSA lithic occurrences with selective archaeological area and STP excavations	
8. APPLICABLE LEGISLATION AND LEGAL REQUIREMENTS <ul style="list-style-type: none"> • National Heritage Resources Act (Act no. 25 of 1999) • Destruction permit from SAHRA 	

7...Recommendations

In terms of mitigation it is recommended that a second phase of investigation be carried out by a suitably qualified Stone Age archaeologist in view of the high significance rating for this locality based on its historic and archaeological scientific importance. This Phase 2 investigation should comprise a more comprehensive area survey, with sampling of the MSA assemblage through archaeological area and Shovel Test Spit (STP) excavations in order to assess the character and extent of the MSA at Maandagshoek.

It is also recommended that a geologist should be involved during sampling for input on the rock types and origins of the raw materials used during the production of the lithic sequences.

OSL dating of the archaeological occurrences during the second phase mitigation is not recommended in view of the environmental study and IRSL dating of the sediments undertaken by Hancox et al in 2004.

Pending the outcome of the second phase assessment of the MSA archaeological occurrences, further mitigation might imply an environmental investigation of new exposures in the Maandagshoek sediments with the view to additional dating. The sedimentary sequences in the dongas are responses to climate changes in the region. Dating of the utilisation of the resources of this locality by humans is dependant on reliable dates for the sedimentary succession and subsequent reworkings of the deposits, which can only be determined by soil and environmental scientists in collaboration with an archaeologist.

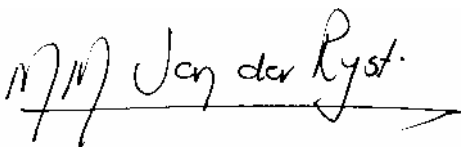
Whereas the Maandagshoek occurrences have an unquestioned MSA character, the position of this assemblage within the South African MSA as well as the precise scientific importance of this locality will be determined by the following:

- The high significance of the locality (see 5.5.1 and 5.5.2) as indicated in the scoping report by Roodt (2006) and the SAHRA brief was confirmed by the specialist assessment. A phase 2 investigation is therefore recommended whereby an archaeology team undertakes a statistical

sampling of a number of the major lithic scatters by using arbitrary criteria in the selection for sampling.

- That at least one lithic scatter is selected for area excavation. The procedure could be accompanied by Shovel Test Spits (STP) (Hester et al 1997:56-58) as a means of subsurface testing to examine the stratigraphy of the MSA occurrences at Maandagshoek.
- That a geologist accompanies the above sampling for input on the origin of the raw materials of the lithics.
- Technological and typological analyses of the collected material. The results will be applied to assess the collection and also to establish whether a chain of knapping operations can indeed be recognized in order to determine depositional integrity. The findings from the analyses will determine further recommendations.
- Construct a broad chronology of the local MSA sequence based on descriptive and analytical criteria.
- Aim to identify diachronic changes within the Maandagshoek MSA sequence based on typological or technological breaks, if any, in the sequence.
- A desktop study of published data on the MSA to establish possible chronological successions at Maandagshoek and to place these occurrences within a regional and broader southern African MSA context.
- Pending the outcome of this phase 2 further detailed investigations may be required.

Please note that the discovery of previously undetected cultural remains during development phases should not be ruled out. Should such remains be exposed, the find must be reported to the South African Heritage Resources Agency and the archaeologists immediately.

A handwritten signature in black ink that reads "MM van der Ryst". The signature is written in a cursive style with a long horizontal stroke at the end.

Dr MM van der Ryst

A handwritten signature in black ink that reads "Neels Kruger". The signature is written in a cursive style with a long horizontal stroke at the end.

Neels Kruger

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