1 November 2021

ECC Environmental
Windhoek
Namibia

For attention: Lester Harker

ARCHAEOLOGICAL ASSESSMENT OF ML 134, ERONGO REGION, NAMIBIA

DECLARATION

I hereby declare that I do:

(a) have knowledge of and experience in conducting archaeological assessments, including knowledge of Namibian legislation, specifically the National Heritage Act (27 of 2004), as well as regulations and guidelines that have relevance to the proposed activity;

(b) perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;

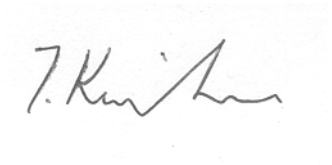
(c) comply with the aforementioned Act, relevant regulations, guidelines and other applicable laws.

I also declare that I have no interests or involvement in:

(i) the financial or other affairs of either the applicant or his consultant

(ii) the decision-making structures of the National Heritage Council of Namibia.

Note: The purpose of this report is to assist the client in gaining consent under the National Heritage Act (27 of 2004) to proceed with mineral exploration and related activities at specific locations as defined herein. The report must always be quoted in full, and not in part, summary or précis form. The report may not be distributed or used for any other purpose by the client, the National Heritage Council of Namibia or any other party and remains the copyright of the author.



John Kinahan, Archaeologist

EXECUTIVE SUMMARY

An archaeological field survey and assessment was carried out on ML 134 in the western parts of Namibia and including the mining settlement of Uis. The lease is situated close to the Dâures massif, or Brandberg, a feature of outstanding archaeological importance. A total of 50 archaeological and historical sites were located in the course of the survey, both within and immediately adjacent to ML 134. The lease has been the focus of mining activity in the past and there is a considerable legacy of impact to the archaeological landscape. However, much of the area is undisturbed and contains a significant concentration of archaeological sites that may require more detailed work in mitigation if mining and related work was to occur in the same vicinity.

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1. INTRODUCTION

1.1 Background

Environmental Compliance Consultancy (ECC) is carrying out an environmental assessment of ML 134 held by AfriTin Mining in western Namibia. The lease includes the long-established mining settlement of Uis and lies close to the Dâures massif, or Brandberg, a feature of outstanding archaeological importance. Mining and exploration are listed in the Environmental Management Act (2007) as requiring environmental assessment and the issuance of an Environmental Clearance Certificate.

Archaeological remains in Namibia are protected under the National Heritage Act (27 of 2004) and National Heritage Regulations (Government Notice 106 of 2005), and ECC appointed the undersigned, J. Kinahan, archaeologist, to carry out an assessment of ML 134. A field survey of the lease was carried out between 18th and 23rd October 2021. The following report sets out the results of the survey and an assessment of the of the lease against the background of previous work in the same area.

1.2 Terms of Reference

The primary task of the archaeological assessment reported here was to identify sensitive archaeological sites that could be affected by exploration and mining activities. The archaeological assessment forms the basis of recommended management actions to avoid or reduce negative impacts, as part of the environmental assessment. The study is intended to satisfy the requirements of the relevant legislation and regulations, in which the process of review and clearance may require further, or different mitigation measures to be adopted.

Specifically, the archaeological assessment addresses the following primary elements:

1. The identification and assessment of potential impacts on archaeological/heritage resources, including historical sites arising from the proposed exploration and mining activities.
2. The identification and demarcation of highly sensitive archaeological/heritage sites requiring special mitigation measures to eliminate, avoid or compensate for possible destructive impacts.
3. Formulation and motivation of specific mitigation measures for the project to be considered by the authorities for the issuance of clearance certificates.
4. Identify permit requirements as related to the removal and/or destruction of heritage resources.

1.3 Assumptions & Limitations

Archaeological assessment relies on the indicative value of surface finds recorded in the course of field survey. Field survey results are augmented wherever possible by inference from the results of surveys and excavations carried out in the course of previous work in the same general area as the proposed project, as well as other sources such as historical documentation. Based on these data, it is possible to predict the likely occurrence of further archaeological sites with some accuracy, and to present a general statement (see Archaeological setting,

below) of the local archaeological site distribution and its sensitivity. However, since the assessment is limited to surface observations and existing survey data, it is necessary to caution the proponent that hidden, or buried archaeological or palaeontological remains might be exposed as the project proceeds

2. LEGAL REQUIREMENTS

The principal instrument of legal protection for archaeological/heritage resources in Namibia is the National Heritage Act (27 of 2004). Part V Section 46 of the Act prohibits removal, damage, alteration or excavation of heritage sites or remains. Section 48 *ff* sets out the procedure for application and granting of permits such as might be required in the event of damage to a protected site occurring as an inevitable result of development. Section 51 (3) sets out the requirements for impact assessment. Heritage sites or remains are defined in Part 1, Definitions 1, as "any remains of human habitation or occupation that are 50 or more years old found on or beneath the surface".

It is important to be aware that no specific regulations or operating guidelines have been formulated for the implementation of the National Heritage Act in respect of archaeological assessment. However, archaeological impact assessment of large projects has become accepted practice in Namibia during the last 25 years, especially where project proponents need also to consider international guidelines. A document entitled *Archaeological Guidelines for Exploration and Mining in the Namib Desert*[1] has been compiled and widely circulated in the mining community. These guidelines are attached as Appendix 1 to this report. In cases where international guidelines are applicable, those of the IFC, specifically Guidance Note 8: Cultural heritage, are most appropriate. Of these guidelines, those relating to project screening, baseline survey and mitigation are the most relevant.

Archaeological impact assessment in Namibia may also take place under the rubric of the Environmental Management Act (7 of 2007) which specifically includes anthropogenic elements in its definition of environment. The list of activities that may not be undertaken without Environmental Clearance Certificate: Environmental Management Act, 2007 (Govt Notice 29 of 2012), and the Environmental Impact Assessment Regulations: Environmental Management Act, 2007 (Govt Notice 30 of 2012) also apply to the management of impacts on archaeological sites and remains whether these are considered in detail by the environmental assessment or not.

[1] Kinahan, J. (2012) *Archaeological Guidelines for Exploration and Mining in the Namib Desert*.

3. ARCHAEOLOGICAL SETTING

The western parts of Namibia are recognized as a globally important archaeological landscape, having abundant evidence of human settlement spanning the last one million years.[2] Of particular interest and significance are archaeological sites dating to within the last 12 000 years, a period of marked climatic instability that brought many changes in human settlement and subsistence behaviour.[3] This period, the Holocene, commenced with the onset of warm, moist conditions following the Last Glacial Maximum, and saw a rapid expansion of human occupation over the entire Namib Desert. A sudden onset of arid conditions about 5 000 years ago caused a general retreat from the desert, but with a small number of notable exceptions. One of these was the Dâures massif which lies a mere 40km west of ML 134. High elevation and favourable rainfall catchments sustained a refugium habitat suitable for small groups of hunter-gatherers, and systematic archaeological investigations have shown the development of specialized food gathering and processing techniques during this period, as well as the existence of complex social networks maintained by mutual gift exchange. Of major significance is the elaboration of a complex ritual rock art tradition linked to the rise of specialized shamans, or ritual practitioners. During the last 2 000 years, hunter-gatherer communities in this area acquired domestic sheep and pottery, establishing a highly productive semi-nomadic pastoral mode of subsistence.

An essential component of the Namib Desert pastoral economy was the extensive and highly specialized use of wild food plants which were processed to be stored for later use. The most important of these was grass seed obtained from the underground storage caches of harvester ants *Messor denticornis*. The use of these resources enabled desert communities to achieve a measure of food security which seems to have resulted in improved infant survival and a growth in human population during the last two thousand years. The archaeology of these adaptations is subtle and requires detailed analysis of a range of related evidence, including that of pottery, site position and layout as well as isotopic evidence which allows the reconstruction of human diet from skeletal remains. The evidence of settlement in the desert by hunter-gatherer and nomadic pastoral communities tends to be scattered and fragmentary, requiring the recording and investigation of large numbers of small, insubstantial sites. Field survey and analytical methods have been developed in the last few decades of research in this area, to obtain the maximum yield of high precision data from the available archaeological sites. Each new field survey and investigation draws from and builds upon previous work, leading thus to an improved understanding of the regional archaeology.[4]

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[2] Mitchell, P. 2002. *The archaeology of southern Africa.* Cambridge: Cambridge University Press.

[3] Deacon, J. & Lancaster, N. 1988. *Late Quaternary palaeoenvironments of southern Africa.* Oxford: Oxford University Press.

[4] Kinahan, J. 2020. *Namib: the archaeology of an African desert*. Windhoek, University of Namibia Press

4. OBSERVATIONS

A field survey was carried out over ML 134 to locate and document its archaeological features. The terrain is typical of the Namibian central and western plains, with subdued outcrops of Damara schist and Syn- to post-Tectonic granite stocks and bornhardt features, on a landscape otherwise characterized by extensive aeolian sand sheets and alluvial deposits marking the courses of ephemeral streambeds. Rainfall averages about 100mm/$y^{-1}$and vegetation is consequently limited to sparse thorn scrub, except along drainage lines which support narrow margins of riparian woodland.

Figure 1 (A) indicates the known distribution of archaeological sites in the area surrounding ML 134, and Figure 1 (B) shows the contribution of the survey reported here to a more detailed knowledge of the archaeological site distribution. In the field, archaeological sites were located by hand-held GPS, and recorded as to size, estimated age and affinity and then assessed as to their archaeological significance and vulnerability (S/V) using standard parallel scales Table 1). The sites are listed within the report with their location and S/V ranking. Figure 2 shows the distribution of archaeological sites in two age classes, namely recent historical sites (A) and sites of late Holocene age (B).

Table 1: Significance and Vulnerability Ranking of archaeological sites

Significance Ranking		**Vulnerability Ranking**	
0	no significance	0	not vulnerable
1	disturbed or secondary context	1	no threat posed
2	isolated minor find	2	low or indirect threat
3	archaeological site	3	probable threat
4	multi-component site	4	high likelihood of disturbance
5	major archaeological site	5	direct and certain threat

Figure 2 (A) shows the location of sites related to the establishment of the Uis mining settlement after 1946[5]. These sites, listed in Table 2, include four cemeteries and a single (suspected) precolonial grave, as well as historical mine workings and settlement remains. The suspected precolonial grave Site 312/847 is an isolated and slightly dispersed circular cairn approximately 0.8m in diameter. All other cemetery sites on ML 134 were representative of Christian burial and are therefore no older than the late 19th century in this particular area. Site 312/849 is a village cemetery of 22 graves, unfenced. The cemetery sites 312/860 and 312/893 were both fenced and contained an estimated 400 and 100 graves, respectively. The former is currently in use with some graves added within the last year while the latter appears to be fully utilized, and closed.

[5] Schneider, G. 2004. *The Roadside Geology of Namibia*. Sammlung Geologischer Führer, Berlin: Gebr. Borntraeger.

In addition to these, is Site 312/901, a line of 26 graves located on the south-eastern edge of Uis and adjacent to the main road passing through the settlement. The graves are fenced but unmarked. Local tradition has it that these are the graves of a party of migrant workers who were waiting at this spot for transport to northern Namibia. It is said, although not confirmed, that the group died as a result of eating a meal of meat roasted on a fire of *Euphorbia virosa*, a common local plant containing an irritant latex that is highly toxic to humans and most animals[6]. Other sites relating to the recent history of Uis include workings such as the adits at Site 312/899 and the remains of a mine village with evidence of hand concentrated ore at Site 312/900.

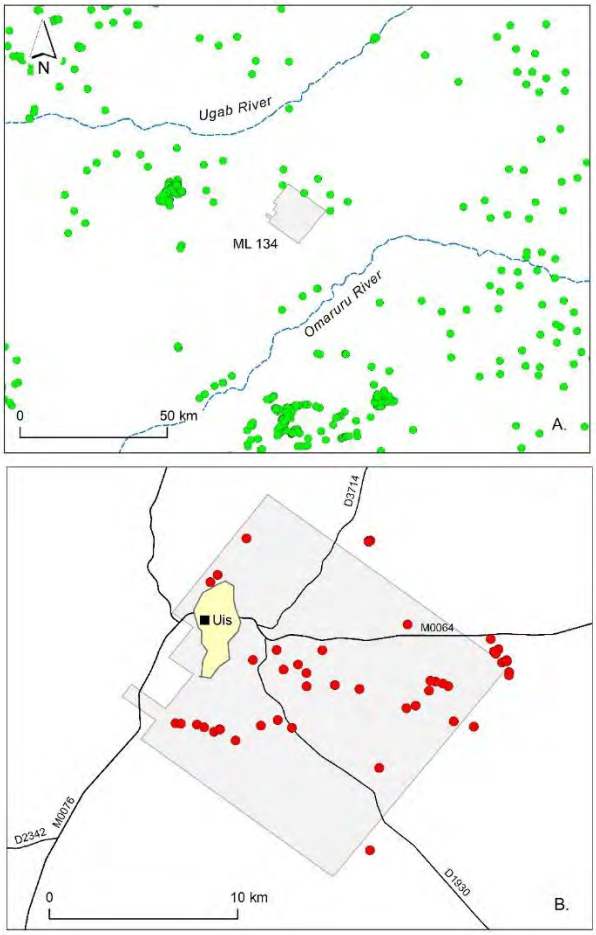

Figure 1: (A) The archaeological setting (green cicles) of ML 134, and (B) the distribution of archaeological sites documented during the present survey (red circles), and showing the location of the Uis mining settlement, the extent of mine works (yellow polygon) and the road network serving the settlement.

[6] Curtis, B. & Mannheimer, C. 2005. *Tree Atlas of Namibia.* Windhoek, National Botanical Research Institute; see also https://en.wikipedia.org/wiki/Euphorbia_virosa

Table 2: Location, description and S/V ranking of historical sites on ML 134

Site	Latitude	Longitude	Description	S/V
Site 312/847	-21,275122	14,855791	1 grave	4/1
Site 312/849	-21,275682	14,8659	22 graves	4/1
Site 312/860	-21,240231	14,925834	>400 graves	4/1
Site 312/893	-21,207755	14,87235	ca 100 graves	4/1
Site 312/901	-21,220642	14,868696	26 graves	4/1
Site 312/899	-21,244841	14,892674	mine adit	4/1
Site 312/900	-21,24009	14,904011	mine village	4/1
Site 312/891	-21,186831	14,889571	village site	4/1

Table 3: Location, description and S/V ranking of archaeological sites on ML 134

Site	Latitude	Longitude	Description	S/V
Site 312/862	-21,241824	15,008651	processing site	4/3
Site 312/863	-21,239756	15,009927	processing site	4/3
Site 312/864	-21,240775	15,007816	processing site	4/3
Site 312/865	-21,241615	15,008244	processing site	4/3
Site 312/866	-21,246063	15,011589	processing site	4/3
Site 312/868	-21,245407	15,013953	processing site	4/3
Site 312/870	-21,250657	15,014971	processing site	4/3
Site 312/871	-21,252104	15,014858	processing site	4/3
Site 312/879	-21,266636	14,970423	processing site	4/3
Site 312/888	-21,187841	14,948679	processing site	4/3
Site 312/889	-21,188036	14,94788	rock art site	4/2
Site 312/890	-21,188408	14,947886	rock art site	4/2
Site 312/859	-21,296417	14,952913	seed digging	2/2
Site 312/867	-21,245466	15,013632	seed digging	2/2
Site 312/872	-21,257318	14,985953	seed digging	2/2
Site 312/873	-21,256074	14,983288	seed digging	2/2
Site 312/874	-21,255154	14,979856	seed digging	2/2
Site 312/875	-21,254849	14,977436	seed digging	2/2
Site 312/876	-21,259511	14,976759	seed digging	2/2
Site 312/877	-21,276687	14,998153	seed digging	2/2
Site 312/878	-21,27412	14,988518	seed digging	2/2
Site 312/880	-21,267855	14,966005	seed digging	2/2
Site 312/881	-21,258709	14,943556	seed digging	2/2
Site 312/882	-21,256762	14,931809	seed digging	2/2
Site 312/883	-21,251094	14,918254	seed digging	2/2
Site 312/884	-21,247003	14,914225	seed digging	2/2
Site 312/885	-21,24949	14,907301	seed digging	2/2
Site 312/886	-21,257448	14,918327	seed digging	2/2
Site 312/887	-21,227909	14,966517	seed digging	2/2
Site 312/892	-21,204248	14,87582	seed digging	2/2

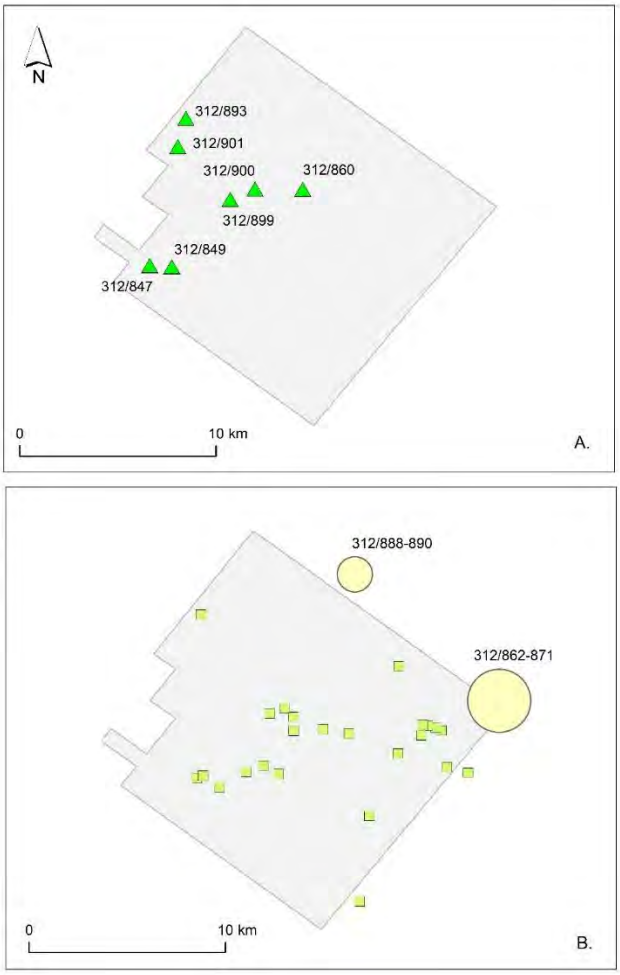

Figure 2: (A) The distribution of historical sites on ML 134, and (B) the distribution of seed digging sites (green squares) documented during the present survey in relation to a group of late Holocene seed processing sites 312/862-871 and a group of mid-Holocene rock art sites 312/888-890.

Figure 2 (B) shows the location of mid- to late Holocene sites on and adjacent to ML 134. These sites, listed in Table 3, include 18 seed digging sites (as described above) spread mainly over the unconsolidated sands and coarse gravel foot-slopes of localized topographic features. Seed digging sites are not considered as sites of archaeological occupation but as reliable indicators of occupation sites within a radius of 4-5km. In present case occupation sites used for the processing of grass seed were located at the eastern extremity of ML 134 where they are concentrated around a complex of small granite bornhardt features (Sites 312/862-871). Fractures and weathered hollows in the rock outcrops form water reservoirs that can hold up to 5m^2 for several months after rain. Seed processing or grinding surfaces are generally found on the same outcrops and an example from ML 134 is shown in Figure 3.

Figure 3: Seed grinding surfaces (circled with white chalk) on a bornhardt feature, ML 134.

Photomicrographs of dental putty impressions from these surfaces reveal parallel and sub-parallel striations caused by the abrasive action of a grinding pestle (see Figure 4), and their association with grass seed is demonstrated by the presence of siliceous phytoliths from cracks in the rock surface[7].

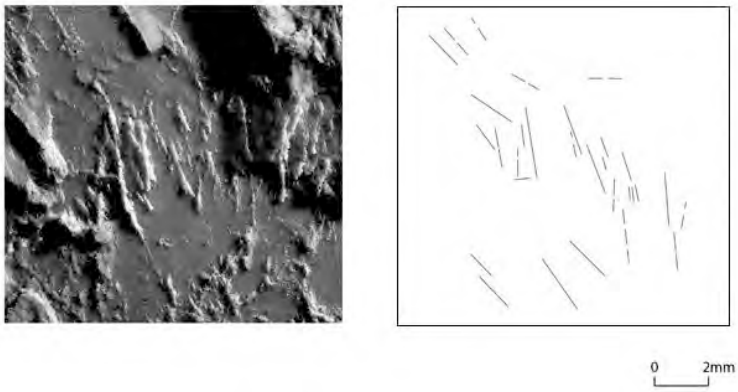

Figure 4: Striations from grinding surfaces on a granite bornhardt.

[7] Kinahan, J. 2020. *Namib: the archaeology of an African desert*. Windhoek, University of Namibia Press, page 239.

The evidence of grass seed exploitation from ML 134 is consistent with a pattern found throughout the Namib Desert and most strongly represented on its eastern fringes and mainly dating to within the last 1000 years. The combination of seed processing sites on rocky outcrops with water sources, and a more widespread distribution of seed digging sites is often associated with a range of other evidence. This would include small homestead groups of huts with storage cairns where processed seed was accumulated in large clay vessels. Other evidence found in the vicinity of these sites might include stone hunting blinds and the remains of scaffold supports at bee's nests in rock crevices. The main focus of the site distribution seen on ML 134 probably lies a few kilometres to the east and well outside the lease area.

Evidence of earlier human settlement in the vicinity of ML 134 consists mainly of occasional scattered stone artefacts, some of late Pleistocene age. A remarkably dense local distribution of mid- to late Holocene sites, mainly stone artefact scatters, is associated with an isolated granite inselberg adjacent to the northern edge of the lease. Sites 312/888-890 (Figure 2 B and Table 3) include two painted friezes, both integral to the stone artefact scatters on the same sites. The scatters have neither pottery nor metal, strongly suggesting an age of about 5000 years when elaborate shamanic art first appeared in this area. Site 312/889 provides a fairly typical example of the shamanic art of this period. Figure 5 shows the setting of the painted frieze within the confines of a small cavity among the rocks, while Figure 6 shows one part of the frieze which seems to depict a row of bundles or of humans in animal skin cloaks, the heads having long since disappeared if as is often the case, these were painted in unstable white pigment.

The seclusion of the frieze within the rock crevice and the paintings themselves conform to the basic principle of occultation which is common to mid-Holocene rock art in this area. Occultation refers to the preparatory stage of shamanic performance when the ritual practitioner disappears from view and then re-emerges to carry out a ceremonial healing or other function. The hidden painting parallels the depiction of the bundles which commonly show ritual participants hidden in animal skin cloaks from which they emerge. Occultation and emergence are the two principal features of a ritual tradition in which the participant disappears into the supernatural realm and then reappears in the familiar world bring with him supernatural powers to heal the sick, or social discord, or to make rain, among many other functions. There is also evidence that the ritual paraphernalia used by the shaman was buried or otherwise hidden when not in use, returning it temporarily to the supernatural realm.[8]

As with the late Holocene seed gathering sites, it is likely that the focal area to which the rock art at Site 312/889 belongs, lies outside the ML 134 lease and probably to the north of it. From these observations it would appear that the Holocene archaeology of the area is unlikely to be affected by exploration and mining activities taking place on the lease.

[8] Kinahan, J. 2018. A ritual assemblage from the third millennium BC in the Namib Desert and its implications for the archaeology and rock art of shamanic performance. *Azania* 53: 40–62.

Figure 5: The location if the painted frieze at Site 312/889

Figure 6: Dark red-brown monochrome painting of bundles at Site 312/889

5. CONCLUSIONS & RECOMMENDATIONS

The field survey of ML 134 reported here documented evidence of mid and late Holocene settlement as well as more recent evidence mainly in the form of cemeteries associated with the history of the mining settlement at Uis after 1946. The cemetery sites are in this case not of strictly archaeological significance and their conservation would resort under the Burial Place Ordinance (27 of 1966) rather than the National Heritage Act (27 of 2004). The earlier sites fall directly under the protection of the Heritage Act.

Tables 2 and 3 list the sites and co-ordinates together with their archaeological significance and vulnerability (S/V). Significance and Vulnerability ranking of the Holocene sites ranges from a low 2/2 to a relatively high 4/3. However, the Vulnerability ranking may be adjusted when the programme of exploration, and related development is made available. The values only reflect the current situation and would need to be reconsidered and adjusted when exploration activities have advanced further.

It is recommended on the basis of this assessment that the proponent be granted consent to continue with exploration although further investigation of the leases may need to be carried out depending on the nature of the mining programme on ML 134. Mitigation of such activities as may affect protected archaeological sites will require a permit from the National Heritage Council. It is further recommended that the proponent should adopt the Chance Finds Procedure in Appendix 1 as part of the project Environmental Management Plan.

APPENDIX 1

Archaeological Guidelines

for

Exploration & Mining

in the

Namib Desert

John Kinahan

SUMMARY

This handbook is intended to help exploration and mining projects to minimize their impact on the archaeology of the Namib Desert, a unique environment of global importance to the understanding of the human past. A short introduction to the National Heritage Act is followed by an overview of the archaeological evidence, and a description of the most sensitive elements of the archaeological landscape. With this background and a few principles of site management, it is possible to avoid inadvertent damage to archaeological sites. Also included is an outline of the basic standards for archaeological field survey and assessment that are most widely applied in the Namib.

An archaeological landscape in the southern Namib Desert: the basin or playa in the middle distance has dense shoreline scatters of late Pleistocene artefact debris, and the inselberge on the margins of the basin have densely clustered mid- to late Holocene settlement remains including hunting blinds, grave cairns, ritual sites and rock shelters with stratified archaeological deposits.

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Preface

Modern humans and their ancestors have lived in the Namib Desert for more than one million years, leaving a rich legacy of archaeological remains which lie scattered over the landscape. This is by far the longest archaeological record in all the deserts of the southern hemisphere, and it contains unique evidence of how humankind learned to cope with one of the most hostile environments on earth[9].

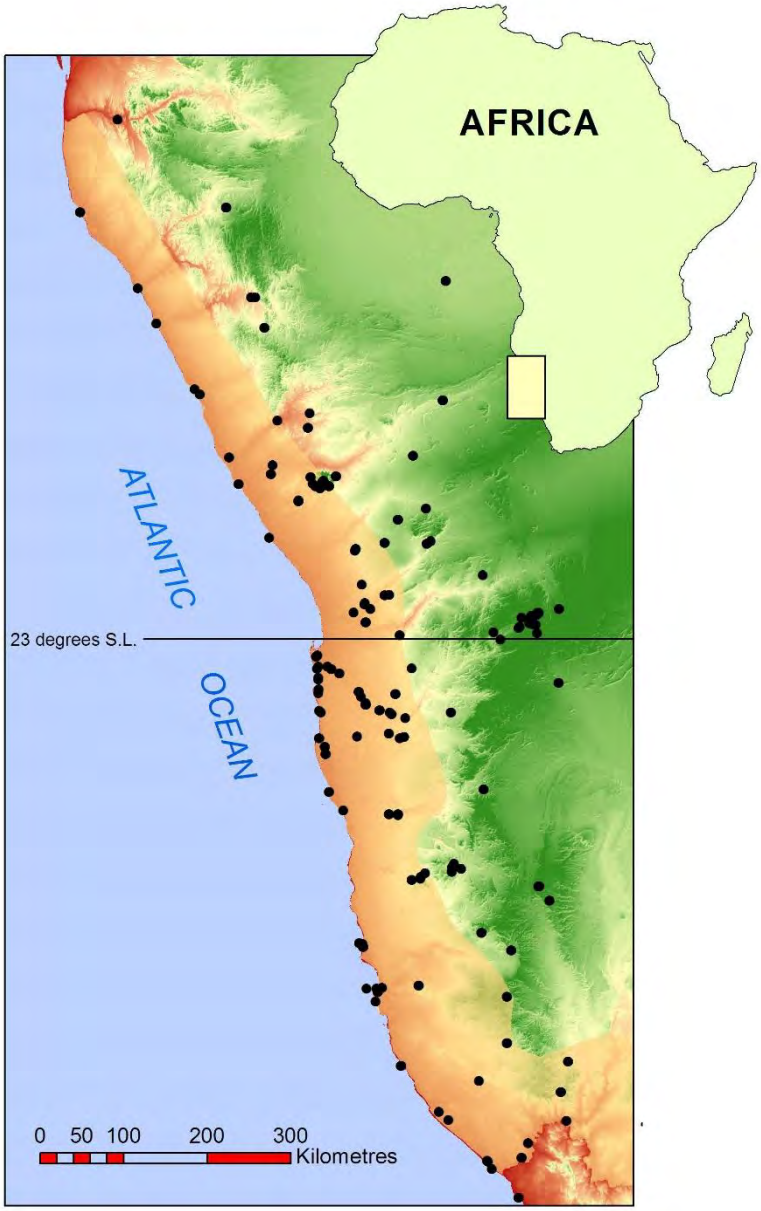
Indigenous communities, the descendants of people who lived in the Namib over thousands of years, still maintain important cultural links with the desert. Much of the Namib is enclosed by national parks and wildlife reserves, but this is no wilderness. Desert plants and animals, and the landscape itself, are an integral part of the cultural heritage of desert communities.

You and I are the most recent visitors to this extraordinary place, but our activities have the potential to cause it irreversible damage. If we do not proceed with caution and consideration, our legacy will be a wasteland of destruction. Of course one cannot build a mine, a road or a power-line without impact, but we can reduce this impact significantly by avoiding unnecessary damage.

It is important to realize that every archaeological site is part of a large and very complex puzzle. Damage to archaeological sites cannot be repaired, and the best way to avoid damaging them is to make sure by means of field survey and assessment, what sites lie in the path of a potential development. Only then is it possible to either conserve the sites or mitigate the impact of development.

This handbook contains simple guidelines for exploration and mining projects, as well as their associated infrastructure. It is based on the premise that we only see what we already know. If this publication helps the geologist, engineer or project manager to see and understand the archaeology of the desert, it may succeed where legislation and policy often fail.

[9] See Mitchell, P. 2002. *The archaeology of southern Africa.* Cambridge University Press, for a general introduction.



The Namib Desert forms a continuous strip 100-150km wide between the Atlantic coast and the escarpment. Here, the desert is shown in light brown, with the escarpment zone in shades of green. During the Last Glacial Maximum, ending approximately 10 000 years ago, the coastline lay up to 100km further west and the desert extended at least 400km into the interior. The black dots are dated archaeological sites.

1. First steps: the law and best practice

Almost every country has some sort of legislation to protect its cultural heritage, and compliance with these laws is important for any exploration and mining operation. Most large mining companies also have their own cultural heritage policies and procedures to guide their operations and reduce the risk of damaging their reputation.

The principal instrument of legal protection for archaeological sites or remains in Namibia is the National Heritage Act (27 of 2004). Some incidental but nonetheless important protection is provided by the Environmental Management Act (7 of 2007) which includes man-made features in its definition of the environment. Other guidelines include those of the IFC (International Finance Corporation) and the ICMM (International Council on Mining and Metals).

A short guide to the National Heritage Act

The National Heritage Council of Namibia is a statutory body and its work is administered by a Secretariat, based in Windhoek and assisted by a number of specialist committees. All enquiries and applications for permits should be addressed to:

The Director

National Heritage Council

Private Bag 12043

Ausspannplatz

Windhoek

There are as yet no official regulations or guidelines to the Act for exploration and mining projects to consult. The following précis and commentary is intended to indicate and explain some important provisions of the Act. However, it is strongly recommended that exploration and mining project managers obtain legal advice especially with regard to permits.

PART I: In terms of the Act, "heritage" is restricted to places and objects, including those of archaeological, cultural, historical, scientific and social significance. The legislation does not address what is sometimes known as "intangible heritage", such as customs, beliefs and oral history.

The Act defines "archaeological" as *any remains of human habitation or occupation that are more than 50 years old found on or beneath the surface on land or in the sea*, and especially notes *rock art, being any form of painting, engraving or other representation on a fixed rock surface or loose rock or stone which is 50 or more years old.*

It is important to understand that legal protection can extend beyond the archaeological object or site, to include *the natural or existing condition or topography of land,* as well as the *trees, vegetation or topsoil.*

PART IV: The Council has the responsibility of establishing and maintaining the Namibian Heritage Register which records heritage places and objects. The register is defined as a public document, and project managers may inspect it to determine whether any protected sites lie within their exploration or mining lease area.

However, not all archaeological or other heritage sites qualify for listing in the register. Listing is subject to a prolonged process of approval based on the "heritage significance" of the object or site, and this ultimately involves publication of the site in the *Government Gazette.* Unless there is a listed site, or unless a previously unknown site of high significance comes to light, this part of the Act is of limited concern for exploration and mining projects.

PART V: Damage, disturbance and encroachment on protected sites is strictly prohibited. However, a permit may be granted in some circumstances, and the Council is also empowered to suspend protection of a listed site under some circumstances. This means that protected status is not irrevocable.

Before issuing a permit, the Council may require the applicant to *obtain from a person with appropriate professional qualifications or experience, at the applicant's expense, a statement as to the impact the proposed works and activities may have on the place or object to which the application relates and the risk of damage to the place or object.*

In view of the fact that large areas of Namibia, including much of the Namib Desert, are archaeologically unknown, the precautionary principle dictates that an archaeological survey and assessment should be carried out at an early stage in any large exploration and mining project. Most large mining companies will commission a field survey and assessment as a matter of course.

The Act stipulates that all archaeological assessment, including field surveys, is subject to permits issued by the National Heritage Council. This means that the archaeologist who carries out the survey must be appropriately qualified and in good standing with the authorities.

The appointment of an archaeologist is the prerogative of the project proponent. Best practice requires that the archaeologist should be independent of the National Heritage Council and all other national authorities.

PART VI: All archaeological objects are the property of the State. It is important to note that State ownership extends to all archaeological remains, known or unknown. This means that mining personnel and contractors need to be aware of the legal status of archaeological remains and their legal obligation to report the discovery of any new archaeological remains to the National Heritage Council.

Relevant provisions of the Environmental Management Act

PART I: The definition of the environment employed by the Environmental Management Act (7 of 2007) specifically includes “anthropogenic factors” such as archaeological remains or any other evidence of human activity.

PART II: Environmental impact assessment (EIA) in Namibia is governed by this legislation and usually includes a specialist archaeological survey and assessment, following the stated Principles of Environmental Management which require that *Namibia’s cultural…heritage…must be protected and respected for the benefit of present and future generations.*

In the process of environmental assessment set out in the regulations to the Act there are several stages of consultation, including public participation, preceding the issue of an environmental clearance certificate by the Environmental Commissioner. There is also provision for external review, and an appeal process in the event that environmental clearance is withheld.

Credible environmental assessment must be independent of both the project proponent and the national authority. For this reason environmental assessment, as well as archaeological assessment is not carried out by government institutions and should not include government scientists as specialist consultants.

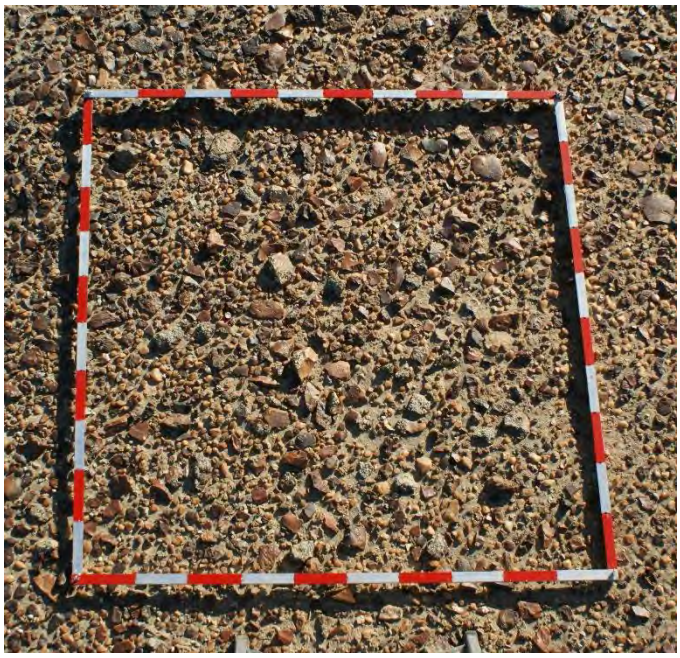
In addition:

The International Finance Corporation (IFC) has specific guidance notes and performance standards applicable to cultural heritage preservation. These standards refer to both tangible forms of cultural heritage, such as archaeological sites and objects, and intangible forms. The standards apply whether or not the archaeological material is protected, and irrespective of whether is may have been previously disturbed. To comply with these standards, a baseline survey and assessment is required.

There are general guidelines issued by the International Council on Mining and Metals (ICMM) and detailed cultural heritage management guidance notes issued by large corporations, for example, Rio Tinto (RT) and Santos. Where such guidelines indicate standards other than the laws of Namibia, their application is subject to group member standards. Best practice in Namibia directly benefits from mining companies with group standards and global experience.

2. Seeing things: what the archaeological evidence looks like

Human occupation of the Namib Desert in the past was entirely dependent on prevailing climatic conditions, and the climate of the last one million years has been consistently arid, with short periods of higher than usual rainfall. Occupation was therefore sporadic, with long periods in which the desert was unoccupied. Evidence of human occupation is widespread, but thinly scattered. Interpretation of this archaeological record relies on piecing together a large number of fragile and subtle clues[10]. Some of these clues will be easily noticed by the observant field geologist, and noted as an indication that the area might have sensitive archaeological sites.



The most abundant traces of human occupation in the Namib Desert are stone artefacts. These are easily recognized as isolated finds and as surface scatters on the gravel plains of the Namib. Other less common traces include shell middens (usually within less than 5km of the coast), natural rock shelters with evidence of occupation, including rock art, and stone features such as hut circles, hunting blinds and grave cairns. Historical sites include cemeteries, old mine workings, and important traces of World War I military engagements. While some kinds of archaeological sites are highly visible (such as the larger grave cairns), their significance is not obvious. Most archaeological sites in the Namib are difficult for the untrained eye to recognize and most damage to the sites is therefore unintentional.

LEFT: A dense scatter of late Pleistocene artefact debris.

[10] See Deacon, J. and Lancaster, N. 1988. *Late Quaternary Palaeoenvironments of Southern Africa*. Oxford, Clarendon Press; and Kinahan, J. 2011. From the beginning: the archaeological evidence. In Wallace, M. and Kinahan, J. 2011. A History of Namibia. London, Hurst.

ABOVE: A late Pleistocene artefact workshop with chert core flakes and dolerite hammer-stone (pocket-knife for scale). The site is intact and undisturbed after approximately 120 000 years.

Identifying stone artefacts

Stone artefacts were made by removing flakes from a selected core, or block of raw material, using precise blows that leave unmistakeable evidence of human manufacture. Similar breakage patterns very rarely occur in nature. Over time, methods of artefact production became more sophisticated and the different techniques of flaking provide some indication of age[11].

MODE 1: Pebble tool (mid- to late Pleistocene, >500 000 years)

This well preserved example made in fine-grained quartzite was loosely cemented in a conglomerate exposed by recent collapse of a stream bank south of the Omaruru River.

MODE 2: Bifacial hand-axe (late Pleistocene, <500 000 years)

This highly symmetrical tool made in weathered basalt was an isolated surface find on an outwash fan east of Cape Cross. The artefact is 150mm in length.

MODE 3: Blade flake with terminal retouch (end Pleistocene <100 000 years)

This punch-struck blade is 60mm in length. Such artefacts form part of complex toolkits including heavy spear points. Dense scatters of debris are found near outcrops and large nodules of chert.

[11] The modal classification used here is based on Clark, J.D. 1969. *Kalambo Falls prehistoric site Volume 1: the geology, palaeoecology and detailed stratigraphy of the excavations.* Cambridge, Cambridge University Press; this approach is generally applied by Barham, L. and Mitchell, P. 2008. *The First Africans: African archaeology from the first toolmakers to most recent foragers*. Cambridge, Cambridge University Press.

MODE 4: Bladelet flake with slight edge retouch (mid- to late Holocene <5 000 years)

This artefact in crystalline quartz is 15mm in length. Flaking debris on recent Holocene sites is characterized by fragments less than 10mm in length but these are often visible in gravel float. These scatters often contain raw material brought from sources up to 50km away.

Typical stone features sites

Settlements and grave sites are significant and often highly visible features of the archaeological landscape in the Namib. Most of these sites are less than 1 000 years old and they often contain important material evidence of desert subsistence strategies. Grave sites may be construed as evidence of traditional land ownership.

ABOVE: Hut circle within hilltop settlement dated 250 years bp, with shallow archaeological trench on left. Significant soil phosphorus concentrations in such features indicate that they supported wooden frameworks plastered with domestic animal dung.

BELOW: Large grave cairn probably dating to within the last few centuries. These features are usually found isolated from settlement sites, on natural routes across the desert.

The recent past

Visible evidence of early links with the outside world has been found in the course of mining operations on the Namib coast, such as the ca1552AD wreck of the *Bom Jesus*, north of Oranjemund. The intensive trade that developed around Walvis Bay in the 1700s has also left abundant traces, and the desert interior has many sites which document early colonial penetration of the country. Such remains

are often overlooked, or mistaken for modern trash. Glass bottles and trade beads are one of the most enduring types of evidence found in the Namib. The characteristic square “case” gin bottles found in the Namib mostly originated from distilleries in the Netherlands. Early bottles were hand blown and exhibit tell-tale imperfections, while more recent bottles show evidence of technological advances in glass production. Such clues make it possible to accurately estimate the age of bottles, trade beads and other items.

ABOVE: Neck and shoulder fragment of a "case" gin bottle from the distillery of Henkes in Delfthaven, Netherlands, found on the 19th century cattle-droveing route or "Bay Road" across the central Namib. Such items help to identify the overnight camps used on this route.

LEFT: One side of an iron ox shoe from the central Namib. These were commonly used in the mid-19th century, before the German colonial period, when oxen, rather than horses, were preferred as riding animals. The oxen were shoed to cope with long-distance travel in the rocky terrain in the Namib. These items are valuable indicators of the early colonial presence in some remote parts of the desert.

ABOVE: Well preserved waste rock walling around the edges of adits at the late 19th century Annaberg tin mine, near Trekopje.

3. Sensitive places: where impacts happen

Water was the main limiting factor for human occupation of the Namib, and the distribution of archaeological sites tends to reflect this. However, it is not possible to accurately predict where archaeological sites are likely to occur on this basis alone. The reasons are simple: the availability of water has changed over time and during moist periods people occupied areas that are otherwise dry. In the past, small groups of people could live for many weeks on water trapped in natural rock basins, or by digging for water in drainage lines.

There were other important requirements for human settlement, such as shelter; the availability of edible plants; the movement of game species, and the location of raw material outcrops for stone tool manufacture. Together with all of these considerations people in the Namib had also to deal with competing claims for the same resources: the Namib was a pantry, but it was also a neighbourhood, and archaeologists are interested in trying to understand both the social and the ecological dimensions of life in this environment.

An exploration geologist or project manager who is sensitive to the archaeology of the desert can do a great deal to reduce the impact of exploration and mining because many field surveys have shown that there are particular kinds of terrain that have high concentrations of archaeological sites. Although some kinds of terrain are less sensitive none can be definitively excluded.

Archaeological sites commonly occur in these locations:

OUTCROPS and INSELBERGE: Features ranging in size from minor isolated outcrops to massifs are often associated with archaeological sites because they usually have some surface water and other resources. In most cases, archaeological sites are found only on the foot-slopes of these features, especially where very large boulders provide shelter. These sites may have high concentrations of rock art and stratified occupation deposits.

Archaeological sites usually occur in association with smaller outcrops, often so small that they are not indicated on the regional geological mapping. Important outcrop settings for archaeological sites include: early Cretaceous granites, dolerite ridges and sedimentary formations such as the Twyfelfontein (formerly Etjo) sandstones, and localized occurrences of fine-grained quartzite, crystalline quartz and fine- or crypto-crystalline chert. Marble outcrops have relatively few archaeological sites.

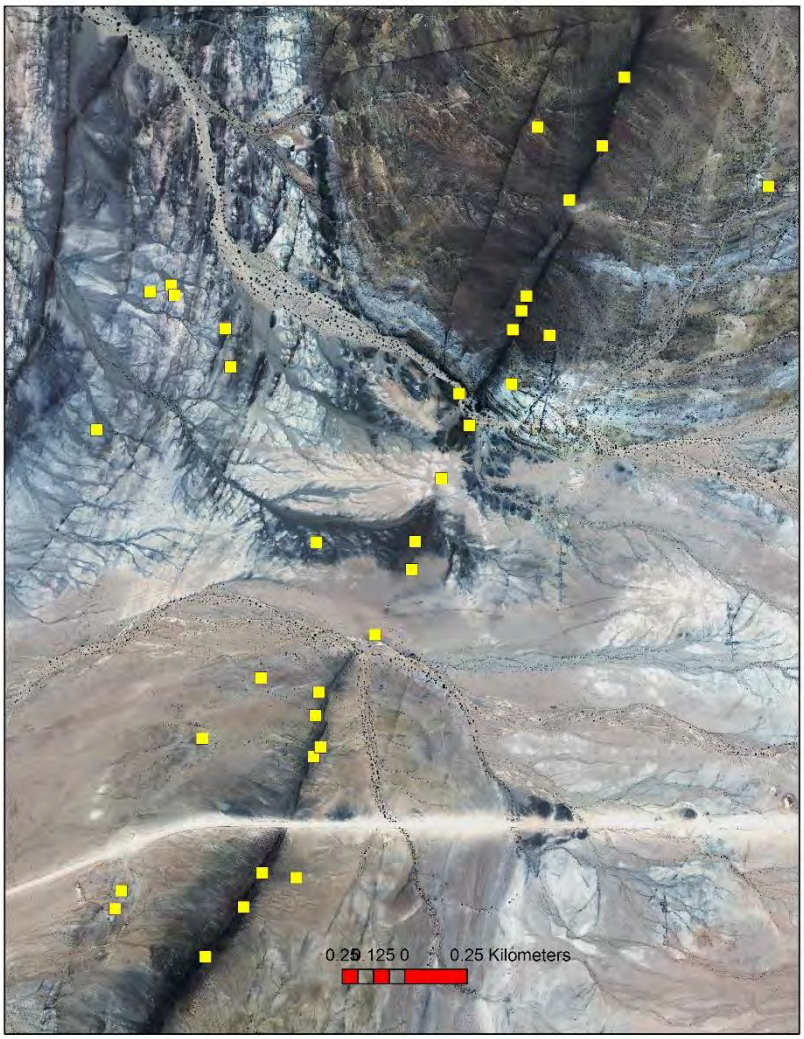
SADDLES: Natural routes between drainage basins often pass over low saddles. These locations sometimes have hut circle sites, grave cairns and, occasionally hunting blinds. Hill saddles with archaeological sites can be very minor terrain features, but the more significant examples are easily identified on topographic maps, aerial photographs and satellite imagery.

DRAINAGE LINES: River mouths on the Namib coast are invariably associated with shell middens and other archaeological remains. However, because most Namib drainage has a relatively steep gradient, high energy flooding results in extensive reworking of sediments. Outwash fans have

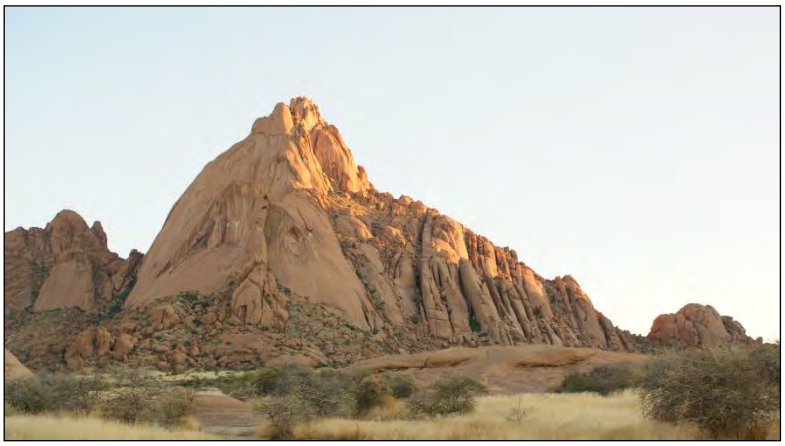
relatively few archaeological sites. Older river terraces and over-bank flood deposits provide level and elevated settings that often have archaeological sites.

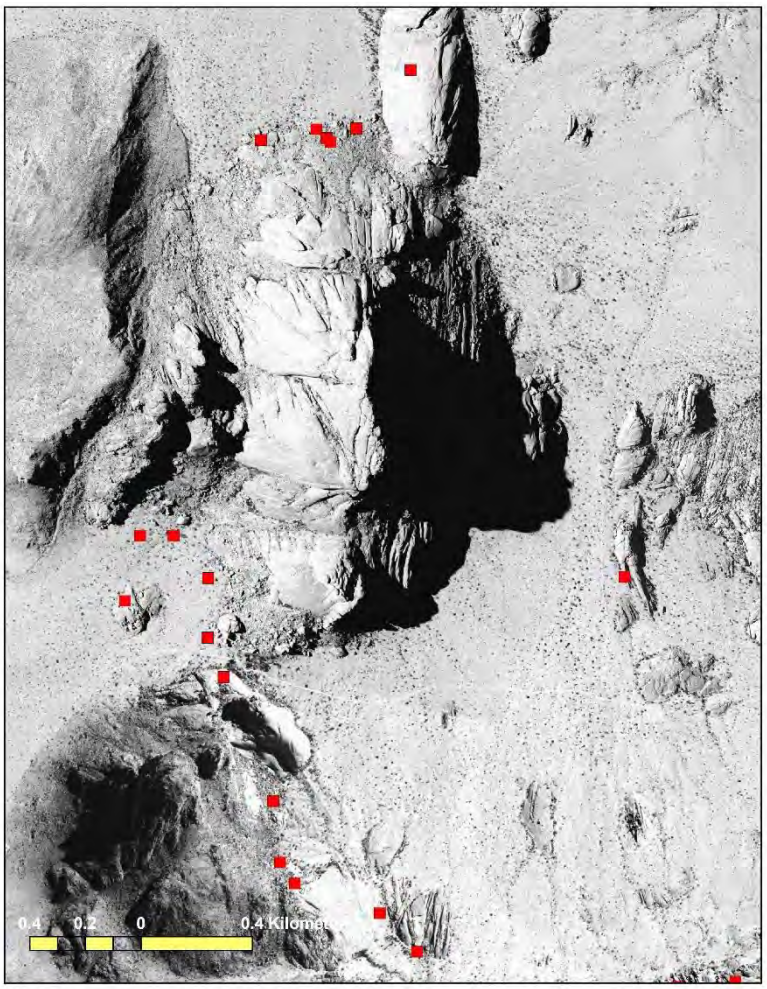
PANS: Pan-like drainage features in the Namib are subject to occasional flooding and may hold standing water for many weeks. Archaeological sites, mainly stone artefact scatters are commonly found on the strandlines of pans and up to 4km away, after which their density quickly declines. The lee-sides of stable dunes and small outcrops near pans have high archaeological concentrations, Saline pans have relatively few archaeological sites.

DUNEFIELDS and GRAVEL PLAINS: Coastal and near-coastal dunefields, especially those associated with exposed silt deposits (such as the Kuiseb) may have very high concentrations of archaeological sites within reach of water and other resources. Gravel plains in the Namib have highly stable features such as desert pavements, with well preserved and undisturbed artefact scatters.



ABOVE: Typical example showing the close association of archaeological sites with a minor dolerite ridge. The high ridge in the background of the photograph (top) has very few sites compared to the low ridge in the foreground and shown in the satellite image.





ABOVE: Archaeological sites associated with the prominent Spitzkuppe inselberg are primarily on the footslopes among large boulders. Most of the sites are within less than one kilometre of water seepages in the sheet joints of the granite, or rock hollows that retain water after rain.

4: Critical steps in exploration & mining

This chapter considers the archaeological impacts associated with mining activity, and how they might be avoided. Some measures are simple and carry no significant costs. Most impacts can be prevented by identifying archaeological sites in advance and avoiding them where possible. Adopting appropriate measures may save costs and delays, and will certainly enhance the reputation of the company as a responsible corporate citizen.

Relatively few exploration projects result in the development of a mine, but as far as destructive impacts on the archaeology of the Namib are concerned, exploration can result in a disproportionate amount of damage. Much of this damage can be avoided, and even if the project leads to the establishment of a mine it is possible to conserve key archaeological sites right through to the final closure of the mine. To achieve this, it is necessary to adopt key measures at each stage of the project.

Exploration

A pre-fieldwork archaeological assessment is a necessary precaution for exploration in the Namib. There is sufficient field survey data available to allow for an estimation of likely archaeological impacts, even if the exploration area itself has not been surveyed in detail. A pre-fieldwork assessment can form part of the environmental impact scoping study, but it can also be carried out independently to assist with practical planning of exploration fieldwork.

Some prior knowledge of likely archaeological impacts will provide valuable guidance for siting of field camps, access roads, lay-downs for contractors, fuel storage tank farms and various other facilities. The pre-fieldwork assessment can also identify high impact risk areas of the exploration tenement, such as the terrain features discussed in Chapter 3. The pre-fieldwork assessment can be a useful aid to exploration planning by helping to schedule field surveys of sensitive areas before exploration begins on the ground.

As soon as areas of likely archaeological impact have been identified, detailed field survey should be carried out. The elements of field survey are set out in Chapter 5, including data collection and the integration of archaeological spatial data into the exploration programme and area mapping. Here it is important to list the practical precautions required at the exploration stage of the project:

- Use existing access tracks as far as possible; signpost as private all tracks turning off from public roads; observe strict track discipline by employing verge markers, passing points, and clear demarcation at track junctions; avoid establishing new tracks parallel to gradient; rehabilitate redundant tracks for at least 100m from their junction with public roads.
- Field camps and other facilities should be established on archaeologically least sensitive surfaces, such as on drainage lines with naturally rehabilitating substrates. Where practical, temporary structures should be placed on pilings to reduce the development of a permanent footprint. All sensible precautions should be adopted for storage, waste disposal etc.
- All terrain features that are suspected to be archaeologically sensitive should be avoided until they have been surveyed in detail. For example, natural outcrop features should not be used to shelter camps or other facilities; terrain such as hill saddles, pan fringes and outcrop footslopes should be inspected on foot before being entered by vehicle. Highly sensitive sites may be designated as No-Go Areas (see Appendix).

- Personnel and contractors should be informed about the specific archaeological sensitivity of the exploration area, and the relevant terms of the National Heritage Act, through the application of a specific project archaeological management plan (AMP). As soon as baseline archaeological survey data are available these should be consulted on a continuous basis when planning access and exploration activities. Where new archaeological finds are located in the course of exploration, field personnel should observe the Chance Finds Procedure (see Appendix).

ABOVE: Drilling in progress on the central Namib gravel plains. This is an archaeologically sensitive surface and detailed survey should precede drilling.

Development and operation

Ideally, archaeological assessment and mitigation should be completed before development of the mine site commences. This is almost never the case, however, because the process of mine development can require multiple changes in design and layout – with possible implications for sensitive sites. Moreover, development requires infrastructure to link the mine with local road networks, as well as power and water supplies – again with possible implications for sensitive sites, both within and adjacent to the mine licence area. Even the most thorough field survey cannot exclude the possibility that new archaeological discoveries will be made in the course of mine development and operation. To accommodate these needs it is advisable for the mine to adopt a formal archaeological management plan at an early stage in the development process.

THE ARCHAEOLOGICAL MANAGEMENT PLAN (AMP): The purpose of an AMP is to ensure appropriate protection and preservation of archaeological sites through informed decision-making, in line with the law and best practice. The AMP should provide a framework in which management procedures are based on consistent standards and linked to expected outcomes. These procedures should serve as practical guidelines with clearly identified steps and responsibilities. To achieve this purpose, the AMP is accompanied by additional documentation including induction material for personnel and contractors, and detailed background information based on the results of the field survey carried out during the exploration phase.

The AMP should include the following elements:

- A baseline record of sites and remains protected in terms of the National Heritage Act
- A baseline record of mining activity (historical impacts) before and during present operations
- A management system with appropriate decision and risk assessment procedures
- Explicit measures to reduce impacts on known archaeological sites
- Procedures to secure approval for unavoidable disturbance of archaeological sites
- Procedures for the reporting of inadvertent disturbance of archaeological sites
- Measures to enlist the involvement of interested and affected parties in site conservation
- Consideration of indigenous communities' cultural rights in respect of archaeological sites

In principle, the AMP applies to all archaeological sites and remains found within the project licence area, and it applies to all personnel and contractors. It provides a practical means to manage site protection, using a functional and accessible database as a platform for risk management. The AMP is

integral to all land disturbance decision-making, and it provides a set of explicit management guidelines to deal with Chance Finds, and management of access to No-Go Areas (see Appendix).

SOME LANDSCAPE PRINCIPLES:

Landscape integrity is often neglected in the planning of mine infrastructure. Coordinated infrastructure planning should aim to minimize fragmentation of the landscape by establishing service corridors (roads, power-lines, pipelines &c), and consolidating infrastructure hubs (pump-stations, pipeline tee-offs, substations, road junctions) wherever possible.

In the Namib Desert surface rehabilitation by raking and other means has become a common practice in the final stages of exploration. This is a largely cosmetic practice, and its long-term benefit to the restoration of desert surfaces has to be weighed against the destructive effect on Pleistocene archaeological sites where raking merely propagates disturbance caused by vehicle tracks. It is therefore essential to integrate archaeological assessment with the rehabilitation programme.

Maintaining areas of archaeological value can provide an important and easily managed offset benefit within the mining licence area. This has obvious advantages: enclosed offset areas are easily managed by the mine because access is controlled; and such areas can provide important archaeological assets to assist the development of alternative land uses (e.g. tourism) after closure of the mine.

The archaeological record in the Namib Desert is a record of highly mobile and temporary settlement. To understand this record, archaeologists adopt a landscape perspective, combining evidence from many sites. Likewise, meaningful conservation of the Namib archaeological record requires a landscape approach, achieved by minimizing fragmentation, especially around areas of especially high significance.

TWO FURTHER POINTS TO REMEMBER: Mining operations, past and present, are part of the archaeological record of human activity in the Namib. It is historical nonsense to attempt to erase this imprint entirely. The remains of mining activity are not only an integral part of the “memory” of the desert landscape, they also provide a valuable physical demonstration of how the desert responds to disturbance and how the scars of human impact persist or vanish over time and under natural conditions. Such demonstration material will become more valuable in future, as impacts and management challenges accumulate. We all know that in physical terms the Namib has a very long memory; it is as well to consider what the legacy of our mining operations will be, and act thoughtfully.

The responsibility of mining companies to the conservation of Namib Desert archaeology extends beyond the mine site, the licence area and related infrastructure. Corporate responsibility and best practice require that mining companies also consider the impact of their personnel in the pursuit of recreation. It makes no sense to scrupulously observe archaeological conservation principles on site and ignore them elsewhere. Archaeological tourism, especially to coastal sites and inland rock art sites is increasingly popular. Mine personnel should consider the impact of uncontrolled archaeological tourism. Recreational use of archaeological sites requires a permit from the National Heritage Council. Tourism operators, both community-based and private should have such permits: *if in doubt ask your tour operator to produce his permit.*

ABOVE: There are many traces of historical exploration and mining enterprises in the Namib Desert. In some cases these may be considered as important cultural heritage assets because there are few written records and few people left to tell us anything about life on small remote mines.

5: Standards for archaeological survey & assessment

In the absence of official regulations under the National Heritage Act, archaeological assessment in Namibia follows appropriate international best practice. The assessment process, set out in the flow diagram overleaf is based on a conventional three phase approach: a Phase 1 evaluation, usually a desk assessment; a Phase 2 site assessment involving detailed field survey, impact assessment and limited testing; and a Phase 3 mitigation programme, if required. Sometimes Phases 1 and 2 are combined, but Phase 3 is generally separate because it requires prior approval of mitigation measures.

The following notes are not intended as a manual of survey and assessment, but as a guide to the mining company or project proponent as to what the archaeological services to the project might include:

Basic survey requirements

The National Heritage Act stipulates that archaeological assessment should be carried out by a person with appropriate qualifications and experience. The mining company, or project proponent, may appoint an archaeologist of their own choosing. All archaeological fieldwork is however subject to permits issued by the Heritage Council.

Since the Phase 1 evaluation is usually based on literature and database sources, it is very important that the consulting archaeologist has a detailed familiarity with current knowledge and research directions in southern African archaeology. Phase 2 field survey and assessment will require a more detailed familiarity with Namibian archaeology although this is not a prerequisite. Phase 3 is based on mitigation measures approved by the Heritage Council and could be carried out by an archaeologist without local experience.

Best practice requires not only that archaeological survey and assessment should observe legal provisions and standards set out by company guidelines and lending institutions: they should also reflect acceptable standards of archaeological research. This means that the investigation should be based on an explicit methodology; employ standard techniques of field documentation; and provide an assessment that is well founded both in the field evidence presented and in the context of available knowledge.

Archaeological survey and assessment should consider the potential research value of a site, or what is sometimes referred to as the “knowledge dividend”. Conserving a particular site may have a high potential dividend for future research, and this should be taken into account, as would be the potential loss of dividend if the site is damaged or destroyed.

Field methods

Mineral exploration tenements (EPLs) are often very extensive, in excess of 500km^2. Archaeological survey should therefore reflect both the archaeology of the tenement, and place appropriate emphasis on areas of exploration interest. It should therefore be an informed survey in the sense that it considers the terrain context of the archaeology, thus allowing some extrapolation from representative sample

areas, and at the same time provide detailed knowledge of areas likely to be affected by exploration. Effective field survey is designed to be representative, informative, and practically feasible.

Some field reconnaissance is helpful in selecting terrain units for survey. The survey itself may be based on transects, random or stratified quadrats, whichever seems appropriate. Site locations should be established by hand-held GPS and plotted in the field on the standard topographic map scale (1: 50 000). The physical setting of the site must be noted, i.e. terrain type, prevailing geology and soil, vegetation cover; the type of site should be noted, i.e. surface scatter, stone feature, rock shelter; the site dimensions should be measured or estimated.

Field survey should include a provisional estimate of the site age, based on characteristic archaeological associations, and a field inventory of the archaeological evidence observed. Any samples collected for identification or analysis should be properly bagged and labelled. All field collecting is subject to permits issued by the National Heritage Council. The site should be photographed if appropriate, both close-up and in context, noting orientation. Further notes and sketches may be added as an aid to interpretation and as a record of any historical site disturbance.

Assessment

Field experience in Namibia has lead to the development of an assessment methodology based on two separate, parallel scales of archaeological *significance* and archaeological *vulnerability*. The two scales consist of interval values from zero to five, and allow the significance of the archaeological site to be considered separately from its vulnerability to disturbance resulting from the project under assessment. Thus sensitivity can be represented as a numerical value based on significance and vulnerability. For example, a site of very high significance that is not vulnerable will have a lower sensitivity value than one that is vulnerable, according to the values assigned on the separate scales. Sensitivity values generated in this way can be adjusted according to project design and brought, though mitigation, to an acceptable level. Note that both significance and vulnerability ranking can change: assessment is subjective and the judgement of the archaeologist may be mistaken or fail to anticipate the future significance of any one find or site.

SIGNIFICANCE RANKING:

0 no archaeological significance

1 disturbed or secondary context, without diagnostic material

2 isolated minor find in undisturbed primary context, with diagnostic material

3 archaeological site forming part of an identifiable local distribution or group

4 multi-component site, or central site with high research potential

5 major archaeological site containing unique evidence of high regional significance

VULNERABILITY RANKING:

0 not vulnerable

1 no threat posed by current or proposed development activities

2 low or indirect threat from possible consequences of development (e.g. soil erosion)

3 probable threat from inadvertent disturbance due to proximity of development

4 high likelihood of partial disturbance or destruction due to close proximity of development

5 direct and certain threat of major disturbance or total destruction

Mitigation

Archaeological mitigation consists in the reduction of a potential threat of destruction, either by timely intervention in the planning and execution of exploration and mining work, to avoid needless impacts, or by investigation or documentation of the site to a sufficient level of detail that its loss or destruction is in some way compensated by the existence of adequate records.

Archaeological survey and assessment will identify the sites and risks of impact that form the basis of a mitigation plan. The mitigation plan submitted to the National Heritage Council must provide sufficient detail for the Council to independently assess the significance of the site and the adequacy of the proposed mitigation measures.

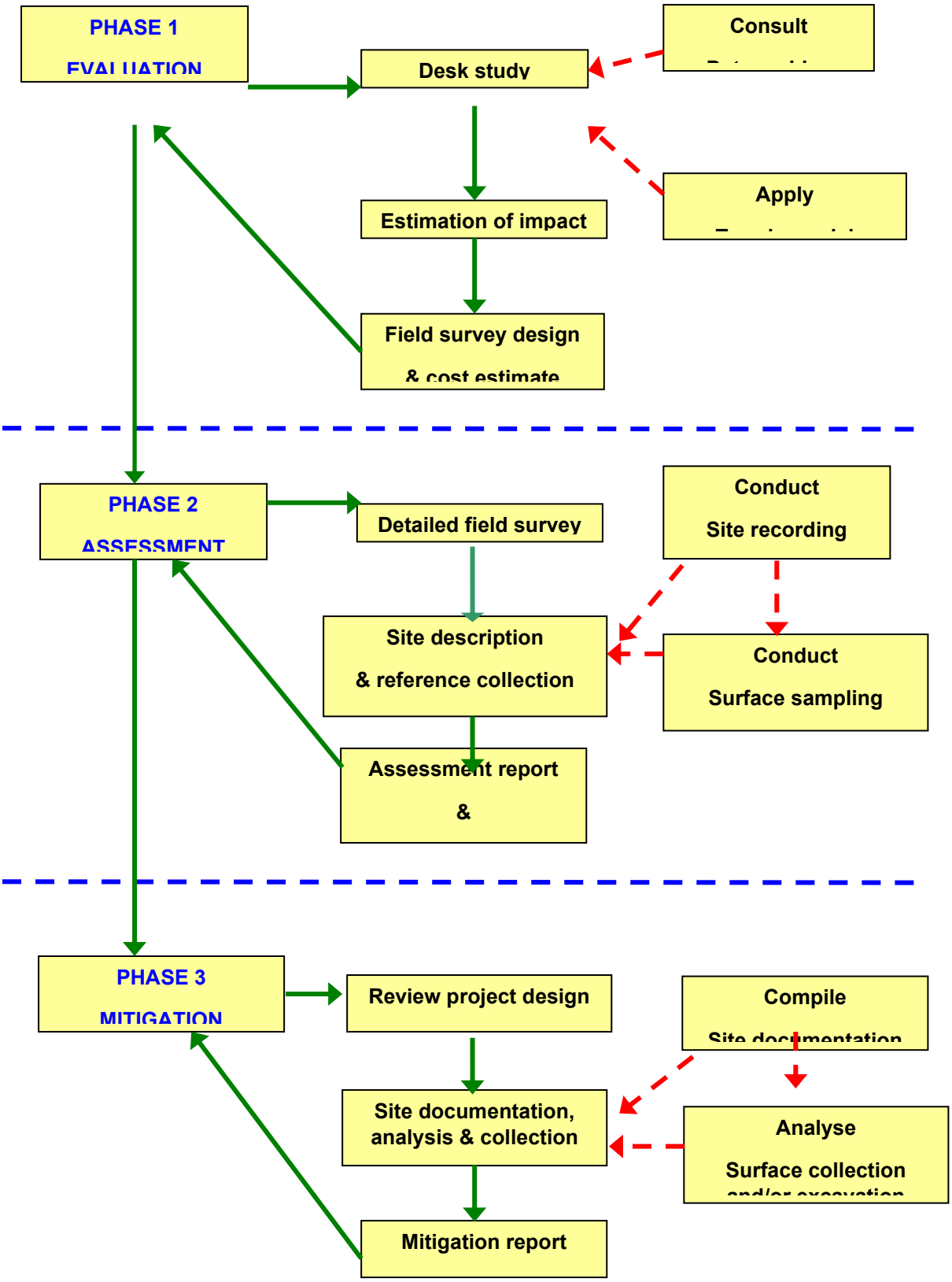
Damage or destruction of an archaeological site is subject to a permit issued by the National Heritage Council. The archaeological survey and assessment process can minimize or even avoid such impacts. In the form of an Archaeological Management Plan (AMP) the results of the survey and assessment will help to minimize or avoid destructive impacts during the operational life of the mine.

Reporting

The structure and layout of archaeological reports may be subject to standard company report templates, but the report should provide a detailed and systematic account of the investigation, with the evidential basis of all inferences clearly set out. The report should be accompanied by digital GIS files including field GPS data, spatial files with attribute tables for the sites, and other files such as sensitivity maps generated from the field survey data.

All reporting of archaeological survey, assessment and mitigation work is the confidential property of the project proponent. In some circumstances, such as mitigation, the National Heritage Council may request part of the investigation results. It is important to note that the project or mine will be the effective custodian of archaeological sites on its lease or licence area. It is therefore very important to consider the vulnerability of archaeological sites and strictly control the distribution of survey data. Site location data should be degraded to a maximum precision of 2.5km before being made available to other parties.

BELOW: Flow diagram illustrating the three phase process of archaeological assessment and mitigation in Namibia. The sequence of steps is indicated with green arrows, and the flow of information from the investigation is shown with dashed red arrows.

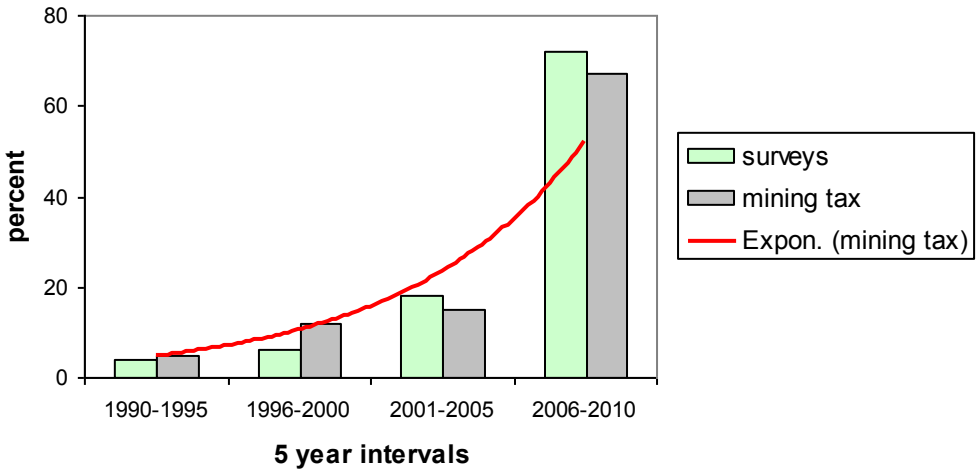

PHASE 1
EVALUATION
Desk study
Consult
Estimation of impact
Apply
Field survey design
& cost estimate
PHASE 2
ASSESSMENT
Detailed field survey
Conduct
Site recording
Site description
& reference collection
Conduct
Surface sampling
Assessment report
&
PHASE 3
MITIGATION
Review project design
Compile
Site documentation
Site documentation,
analysis & collection
Analyse
Surface collection
Mitigation report

6: In the public eye

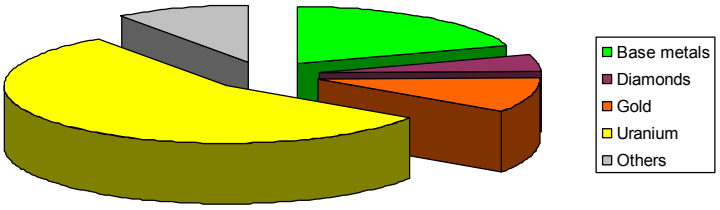
archaeology and the image of the mining industry

During the last two decades, exploration and mining in the Namib Desert have gone well beyond mere compliance with the law, to make a major contribution to furthering archaeological knowledge. On the basis of the accumulated record of archaeological survey from this period, the Namib is among the most intensively surveyed desert regions of the world. However, since nearly all of this survey cover is the result of exploration assessments, it is still patchy and much ground remains to be covered.

There is almost no official funding of archaeological research in Namibia, and survey results from mining and other project assessments represent the largest contributor to field research. The diagram below illustrates the proportionate increase in archaeological survey since Namibian independence, compared to the proportionate increase in taxable mining revenues (non diamond) as an illustration of the growth of archaeological survey in Namibia.

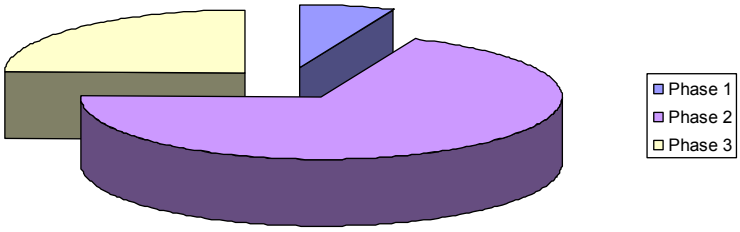


As reflects the general profile of exploration and mining in the Namib Desert, most archaeological surveys (55%) were carried out for uranium projects, followed by base metals (19%), with diamonds, gold and other projects such as dimension stone featuring less prominently. This pattern is likely to change as uranium projects enter the operational stage and exploration for other resources continues.



ABOVE: Relative importance of mining resources to archaeological survey and assessment in the Namib Desert.

The three phases of archaeological survey and assessment are clearly reflected in the record of exploration and mining in the Namib during this period. Phase 1 evaluation, or desk assessment, accounts for a relatively small proportion of archaeological investigation (7%). This may be related to the fact that uranium projects, as the dominant exploration field, combined the Phase 1 and Phase 2 stages in order to establish reliable baseline data. Thus, Phase 2 investigations account for 68% of the total. The fact that Phase 3 mitigation accounts for 25% of the total may reflect the advanced stage of development in a number of uranium projects.



ABOVE: Percentage distribution of archaeological survey and assessment phases in Namib Desert exploration and mining projects.

These simple statistics show that archaeological survey and assessment is an increasingly integral part of exploration and mining in the Namib, that archaeological investigations reflect the general resource profile of the industry in this part of the country, and that most projects accommodate the three phase sequence of archaeological evaluation, assessment and mitigation discussed here.

Beyond compliance with legal and policy requirements there are many opportunities for mining companies to make a contribution to archaeological conservation and education in Namibia. Some sites are suitable for small-scale tourism and could generate local employment and income; others may be used for school or university groups. There is also a need for informative and modern museum exhibitions on the subject of Namib Desert archaeology, and there is a ready demand for both popular and scientific publications on the subject. As mining in the Namib enters a more mature stage in its history it would be appropriate to consider some of these options.

The Namib Desert Archaeological Survey

In the last five years the Namibia Archaeological Trust (est. 1991) has launched a major project to maximize the research potential of archaeological survey and assessment results from the Namib. This project, the Namib Desert Archaeological Survey **http://antiquity.ac.uk/projgall/kinahan325/** has collated all available data to create a common spatial platform; collated all available radiocarbon dating results to provide a single integrated sequence; and adopted uniform standards of site and terrain description to aid regional scale comparative research. The results of the project will appear as a series of research publications, handbooks, and on-line data resources. Some of these are already available at **www.archaeologynamibia.com** The Namib Desert Archaeological Survey would welcome direct support from the mining sector to help it realize some of these goals.

RESOURCES

Namibian legislation

National Heritage Act (27 of 2004) Government Notice 287 29th December 2004

www.archaeologynamibia.com

Environmental Management Act (7 of 2007) Government Notice 232 27th December 2007

www.archaeologynamibia.com

Commencement of the Environmental Management Act, 2007. Government Notice 28 6th February 2012-04-27

www.archaeologynamibia.com

List of activities that may not be undertaken without Environmental Management Certificate: Environmental Management Act, 2007. Government Notice 29 6th February 2012-04-27

www.archaeologynamibia.com

Environmental Impact Assessment Regulations: Environmental Management Act, 2007. Government Notice 30 6 February 2012

www.archaeologynamibia.com

Baseline assessment

Strategic Environmental Assessment for the central Namib Uranium Rush (2011) Windhoek, Ministry of Mines and Energy, prepared by the Southern African Institute for Environmental Assessment

http://www.saiea.com/uranium/index.html

Cumulative effects analysis: Archaeology

http://www.saiea.com/uranium/24Chap7_8March2011.pdf

International conventions & guidelines

Convention concerning the protection of the world cultural and natural heritage. UNESCO 1972. **www.unesco.org**

Cultural heritage management guidance: Rio Tinto Community relations guidance note. Rio Tinto 2007

www.riotinto.com

Good practice guide: Indigenous peoples and mining, ICMM (International Council on Mining & Metals) 2010

www.icmm.com

Guidance note 8: Cultural heritage. IFC (International Finance Corporation) 2007

www.ifc.org

Procedure for the Management of Indigenous Cultural Heritage Sites. Santos Ltd 2007

www.santos.com

Archaeological resources and links

The Namibia Archaeological Trust

www.archaeologynamibia.com