# Annex D

## HERITAGE SCOPING STUDY FOR THE PROPOSED PROSPECTING PROGRAM ON THE FARM ELANDSFONTEIN 349, WEST COAST OF SOUTH AFRICA

(Assessment conducted under Section 38 (8) of the
National Heritage Resources Act (No. 25 of 1999) as part of an EIA)

Prepared for

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## EXECUTIVE SUMMARY

ACO was requested by Recht Investments to conduct a Heritage scoping study for the prospecting area proposed in the region of Hopefield at what is currently the Elandsfontein Private Nature Reserve, Farm Elandsfontein 349 on the West Coast. The area applied for involves a 300ha area just west of the Elandsfontein fossil site.

The Elandsfontein farm and Acheulean site (33°05'S, 18°15'E) are located approximately 18 km east of the Atlantic shore and 95 km north-northwest of Cape Town in the Western Cape Province of South Africa. The nearby proposed prospecting area is characterised by established indigenous vegetation sandveld and calcrete ridges. The site can be reached via Elandsfontein turn off on the R27.

A desktop review was conducted in order to establish the heritage context for assessing the proposal. A limited amount of field survey was carried out, but much of the knowledge of the area comes from previous research and excavations done over the last 60 years.

The study has found that the general area is likely to be sensitive in terms of Pleistocene and Pliocene palaeontology and Pleistocene archaeology, while there is limited historical archaeology in the form of ruined vernacular buildings in the area.

Of greatest future concern is the palaeontological material which is of national significance. The negative impacts associated with the prospecting phase of operation will however be low, and from a scientific point of view, potentially informative, with respect to gauging future impacts of mining.

It has been determined that the heritage component of the EIA must contain:

- An assessment of the heritage significance (and impacts) of the underlying deposits (Varswater and Elandsfontein formation) prepared by a specialist palaeontologist.
- An assessment of the impacts to Plio-Pleistocene archaeology and palaeontology through field survey and with active input of Dr David Braun.
- An assessment of impacts to historic ruins within and close to the study area.
- An outline for the development of a heritage contract for appropriate mitigation, ongoing research, education and the development of relationships with other research organisations and individuals.
- A Visual Impact Assessment (VIA) should be considered (to assess the spatial extent of the visual impact and the impact to sense of place).

## GLOSSARY

**Archaeology:** *Remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.*

**Calcrete:** *A soft sandy calcium carbonate rock related to limestone which often forms in arid areas.*

**Caenozoic:** *The most recent of the three major geological times periods ongoing since 65 million years ago.*

**Early Stone Age:** *The archaeology of the Stone Age between 2 000 000 and 250 000 years ago.*

**Fossil:** *Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.*

**Heritage:** *That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).*

**Holocene:** *The most recent geological time period which commenced 10 000 years ago.*

**Late Stone Age:** *The archaeology of the last 20 000 years associated with fully modern people.*

**Middle Stone Age**: *The archaeology of the Stone Age between 20-300 000 years ago associated with early modern humans.*

**Midden:** *A pile of debris, normally shellfish and bone that have accumulated as a result of human activity.*

**National Estate:** *The collective heritage assets of the Nation.*

**Palaeontology:** The study of a*ny fossilised remains or fossil traces of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or traces.*

**Palaeosole:** *An ancient land surface.*

**Pleistocene:** *A geological time period (of 3 million – 10 000 years ago).*

**Pliocene:** *A geological time period (of 5 million – 3 million years ago).*

**Miocene:** *A geological time period (of 23 million - 5 million years ago).*

**SAHRA:** *South African Heritage Resources Agency – the compliance authority which protects national heritage.*

**Structure (historic:)** *Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.*

**Varswater Formation:** *Sediments laid down under estuarine circumstances by the proto-Berg River during the Pliocene. Certain layers of this formation are highly fossiliferous.*

**Declaration:**

We, Timothy Hart and Kyla Bluff of the Archaeology Contracts Office of the University of Cape Town declare with we have no interest or holdings in the proposed activity other than the rendering of professional services.

TJG Hart.

For ACO.

# 1. INTRODUCTION

The Archaeology Contracts Office of University of Cape Town was requested by Prodigy Pty Ltd on behalf of Recht Investments to conduct a Heritage scoping study for a prospecting program in the area of Hopefield on the farm "Elandsfontein", West Coast, South Africa (Figure 1).

The famous Pleistocene find-site of Saldanha Man, which is currently the subject of an ongoing research programme by Dr David Braun of UCT is situated just over 1 km east of the proposed mining area. Although this site will not be impacted by the proposed activity, its presence raises the heritage stakes as it is currently unclear as to how far the Pleistocene fossil deposits extend into the surrounding sandveld landscape. It is noted the Orton (2007) identified fossil rich sand in an area about 4 km north of the study area. The land involved, although it functions as a nature reserve is zoned agricultural.

### *6.5 The proposed activity*

The phosphate deposit which lies under Elandsfontein and potentially extends southwards under the boundaries of the neighbouring West Coast National Park, contains a very high grade of low arsenic content phosphate that is suitable for use in the food industry. Phosphate of this grade is scarce and of very high commercial value, hence the desire by the proponent to exploit the resource.

While the long-term intention is to mine the resource, detailed prospecting will need to be completed first. The prospecting will take place over a 300ha area within the 5000 hectare Elandsfontein Property. The prospecting phase will be achieved by sinking boreholes over a 400m grid, grading down to 200 and 100 sqm. Of these boreholes, 2-3 will be 1 m in diameter. The method of drilling (smaller boreholes) will use compressed air to blow out the soft sediments which are captured for analysis. Samples are retained every 1m of depth. The larger holes will be made by a wide diameter drilling machine utilising a revolving "corkscrew".

The proposed drilling is estimated to be up to 35 m, and penetrate potentially fossiliferous sediments (Langebaan, Varswater and Elandsfontein Formations). Associated infrastructure in the form of internal access roads to the site and a workshop and storage area will be needed for the prospecting phase. Diesel and materials and equipment will be stored in the staff lodge near where the work is to take place.

### *6.6 1.2 Heritage legislation*

The basis for all heritage impact assessment is the National Heritage Resources Act 25 (NHRA) of 1999, which in turn prescribes the manner in which heritage is assessed and managed.

Loosely defined, heritage is that which is inherited. The National Heritage Resources Act 25 of 1999 has defined certain kinds of heritage as being worthy of protection, by either specific or general protection mechanisms. In South Africa the law is directed towards the protection of human made heritage, although places and objects of scientific importance are covered. The National Heritage Resources Act also protects intangible heritage such as traditional

activities, oral histories and places where significant events happened. Generally protected heritage which must be considered in any heritage assessment includes:

- Cultural landscapes
- Buildings and structures (greater than 60 years of age)


**Figure 1. Location of the study area.**

- Archaeological sites (greater than 100 years of age)
- Palaeontological sites and specimens (other than fossil material for industrial use)
- Shipwrecks and aircraft wrecks
- Graves and grave yards
- Living heritage

Section 38 of the NHRA requires that Heritage Impact Assessments (HIA's) are required for certain kinds of development such as rezoning of land greater than 10 000 sq m in extent or exceeding 3 or more sub-divisions, or for any activity that will alter the character or landscape of a site greater than 5000 sq m. "Standalone HIA's" are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils Section 38 provisions.

This project is being conducted under the auspices of an Environmental Impact Assessment (EIA). As such, final decision making would rest with the Department of Environmental Affairs and Development Planning, Mineral and Energy affairs with Heritage Western Cape being required to provide comment on the proposal.

It is important to note that palaeontological material is defined in the National Heritage Resources Act as meaning "any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or traces". The intention of this clause is to exempt minerals of organic origin (fossil fuels) from protection, however the result of this definition is that highly significant palaeontological material is vulnerable, especially in the context of quarrying and mining of materials for industrial use.

Figure 2. A Google earth Image showing the proposed mining area in relation to the Elandsfontein Fossil site

# 2. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The proposed prospecting area lies about 10km inland of the coast and just over 1 km west of the Elandsfontein fossil site where much of the paleontological and archaeological heritage has been discovered in the past. Three towns lie within close proximity: Hopefield is 11 km to the northeast, Langebaan is about 10 km to the northwest and Saldanha lies 26km to the northwest. The Langebaan lagoon lies roughly 7km southwest of the site. The West Coast National Park and Buffelsfontein Private Game Reserve occur within 10km and 30km of the site respectively. The land in surrounding areas which is largely agricultural, is relatively flat with some undulation occurring. The prospecting area is largely covered with

dense vegetation, mostly indigenous, and includes several calcrete ridges which may be **palaeontologically sensitive**.

# 3. METHODS

A brief review of existing literature was carried out to describe the heritage context (section 5). This contextual information forms the basis upon which the potential impacts associated with the proposed mining operations are evaluated. The project was largely conducted as a desktop study and a 1 day site visit with the proponent and other consultants.

Palaeontologists Dr John Rodgers, Dr John Compton and Mr John Pether were solicited with respect to the state of current knowledge about the potentially deeper fossil bearing sediments at Elandsfontein. Discussions have been held with Dr David Braun (UCT Archaeology) and Prof Judith Sealy (UCT Archaeology).

## *3.1Limitations and assumptions*

Research in this area began in the 1950's and has continued to this day, hence there is a solid body of literature available. Field conditions are good and access to the site is easily facilitated. An assumption that has been made is that palaeontological material is likely to exist in areas away from the Elandsfontein dune field, and that observations about the fossil content of various geological units as described by Hendy (1982) and others from Langebaanweg are applicable to the study area, although this has never been thoroughly tested.

# 4. HERITAGE CONTEXT

## *4.1Palaeontology*

In the region of Elandsfontein, there are three key geological formations (Pepler 2010) that are present: Elandsfontein Formation which is older than the others, Varswater Formation which is phosphoritic and the Langebaan Formation which overlies this and is calcareous. According the geological description of the area (Pepler 2010), the first of these is of the Middle to Late Miocene age, and is characterised by clean white sands and clays. Pollen taxa show that this formation signifies a paleoenvironment that was characterised by marshes and forests. The second, Varswater Formation (highly fossiliferous in places), consists of marine deposits and a major occurrence of phosphate, and is characterised by more rounded quartz grains than the angular Elandsfontein Formation grains. The third Formation, Langebaan, was built up during the Quaternary period and consists of calcarenites that are found at sea level and extend upward, and is characterised by quartz grains that range from being gritty to fine-grained, and shell fragments. This formation also contains a large amount of early archaeological and fossil remains, which have been dated to around the Middle to Upper Pleistocene Age (Singer and Wymer 1968). The paleoenvironment in this region was altered from being forested woodlands to an open landscape with a dryer climate around the time of the late Miocene. Vast paleowinds blowing across the un-vegetated and exposed landscape resulted in the aeolian deposits found in the region today (Pepler 2010).

According to Mabbutt (In Goodwin 1953), the original fossil site (the find-site of "Saldanha Man") became exposed when bush cover was locally destroyed and wind erosion resulted in the exposure of Pleistocene fossil bearing dunes which have been the subject of research for so many years. Braun (pers. com.) who leads the University of Cape Town research field school which is held on the site, has mapped the extent of Pleistocene fossils throughout the dune field and conducted trial excavations on the major calcrete ridge to the west has established that this area is also highly sensitive in terms of both palaeontological and archaeological material. Both Braun (pers comm.) and Orton (2007) have observed archaeological and palaeontological material to the south and north of the proposed prospecting area. The implications of these observations is that Pleistocene archaeological and palaeontological material is a locally wide spread phenomenon and therefore likely to occur in the upper sandy and calcrete layers of the proposed prospecting area.

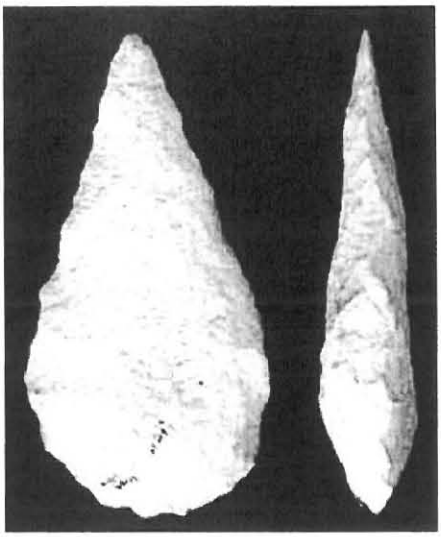

**Figure 3.** Silcrete handaxe from Elandsfontein.

The boreholes will penetrate the Varswater Formation which is where the bulk of the phosphates are likely to be found. This formation is highly fossiliferous containing at Langebaanweg the worlds densest known concentration of Pliocene vertebrate fossils. Exposures of the formation during the construction of the first Koeberg Nuclear Power Station some 70km south also produced a significant array of vertebrate marine fossils (Rogers pers com, Pether 2008).

In the Langebaan Formation of the Pleistocene, skeletal remains found in deflated localities suggest that animals inhabited the surfaces of calcareous sands before being killed by predators (Pepler 2010).

### *4.2 Archaeology*

In the Pleistocene sediments the archaeology and palaeontology of the area are closely related as the large amounts of human made artefacts indicate that people were exploiting the natural wealth of the area as far back as 400 000 years ago. The well-known hominin skull cap that was discovered in the area known as "Saldanha Man" is an example of *Homo heidelbergensis*, or ancient *H. sapiens* (Drennan 1953, 1954; Singer 1954). This fossil find places Elandsfontein into a category of a few unique sites world wide that contain rare early human material, and the potential certainly exists to find more.

Singer (1958) identified three different industries on site:

- **The Handaxe Industry** (Acheulian) – of silcrete, felspar, quartzite and sandstone
- **Middle Stone Age Industry** (Still Bay) – flakes and cores of silcrete and quartzite
- **Later Stone Age assemblage** – hammerstones and anvils of felspar and sandstone.

More recent observations include Stillbay points, Cape Coastal Pottery and a few Dutch clay pipes, which, according to Deacon & Deacon (1999:85) suggest that people were able to inhabit the area due to the many springs and waterholes.

Stone vernacular houses alongside the access road (outside the proposed area) have heritage potential as based on the structure and style of house, and building materials, they are likely to be greater than 100 years of age. Test excavations in and around these ruins would likely reveal archaeological material.

## 5. Statement of significance

In essence the archaeology of the larger Saldanha area reflects almost the entire sequence of human occupation in the Western Cape, however the greatest significance lies in the Pleistocene fossil fauna and associated archaeology. Indications are that this area is one of the richest sites of its kind in Africa (Braun pers comm.). Indications are that the distribution of Pleistocene archaeology and fossils at Elandsfontein is extensive.

## 6. ASSESSMENT OF POTENTIAL IMPACTS

NB Palaeontologically significant occurrences definitely occur outside the dune field: Lozodonta atlantica examined located by Braun et al.

### *6.1 Varswater formation Palaeontology*

The target of the proposed prospecting area is the phosphate rich sediments – potentially of the Varswater Formation. Although these sediments are highly fossiliferous, they are not protected by the National Heritage Resources Act as the material is to be used for industrial purposes. As demonstrated at the West Coast Fossil Park, the palaeontology is of high scientific, educational and general heritage value. The development of a close working relationship with palaeontologists in during the prospecting activities will go some way to offset any negative impact as really valuable information could potentially be derived from drilling activities.

*Prospecting impacts:* Impacts caused by prospecting will be moderate and in terms of scientific research, potentially informative.

6.2. Langebaan formation Pleistocene Archaeology and Palaeontology

Some exceptionally important finds have come from the Elandsfontein fossil site near the prospecting area, for example numerous fossil animal bone remains and stone artefacts, the 'Saldanha Man' skull cap which was found at the Elandsfontein site in the 1950's. It is possible that similar material occurs throughout the property. Successful mitigation of these impacts will require a solid commitment from the proponent to work with the heritage authority to honour any heritage contracts.

*Prospecting impacts:* Impacts caused by prospecting will be moderate and in terms of scientific research, potentially informative. The opportunity should be used to establish the heritage sensitivity of underlying deposits.

### *6.3 Holocene archaeological material*

This has been noted around significant springs and has been observed by Braun (pers comm.) in the vicinity of the old Elandsfonteinfarm house. As yet there is no data available with respect to the presence of later Stone Age archaeological sites within the prospecting area. This will have to be established through an archaeological survey.

### *6.4 Built Environment*

There is little urban/built environment in the surrounding areas of the proposed site, although three or four solitary buildings do occur on the landscape. The farm buildings alongside the access road are likely to be older than 60 years and thus the appropriate measures should be taken to assess any indirect impacts that might occur. In general, direct impacts to built structures are unlikely, although should the placement of any infrastructure or movement of heavy machinery or vehicles affect any structure the simplest mitigation measure to apply would be to alter the specific position roads and infrastructure. Impacts to the built environment should not affect the decision to proceed with the development if no structures are to be damaged or destroyed, although it might be necessary to enforce an appropriate buffer if any highly significant structures are found.

### *6.5 Graves*

It is unknown whether any graves or graveyards are associated with site. Should any be present they would be considered of high significance and it would be preferable to avoid them, otherwise the full legal exhumation process would need to be followed if they are in the way of the proposed activity. Pre-colonial graves can occur almost anywhere on the landscape, but sandy locations where digging is easy are obviously more common. Such graves are inevitably completely unmarked and would not be located during a surface survey. If human bones are uncovered during the construction phase these can be readily exhumed by an archaeologist in possession of an appropriate permit.

### *6.6 Further studies and possible mitigation requirements*

A Heritage Impact Assessment (HIA) will need to identify heritage sites falling within the proposed footprint, assess their significance and recommend mitigation measures where appropriate. This study should incorporate paleontology and archaeology as well as relevant aspects of general heritage including the few ruined buildings that are present in the area.

The HIA which must be prepared for inclusion within the EIA should include:

- An assessment of the heritage significance (and impacts) of the underlying deposits (Varswater and Elandsfontein formation) prepared by a specialist palaeontologist.
- An assessment of the impacts to Plio-Pleistocene archaeology and palaeontology through field survey and with active input of Dr David Braun.
- An assessment of impacts to historic ruins within and close to the study area.
- An outline for the development of a heritage contract for appropriate mitigation, ongoing research, education and the development of relationships with other research organisations and individuals.
- A Visual Impact Assessment (VIA) should be considered (to assess the spatial extent of the visual impact and the impact to sense of place).

- The proposed prospecting operation needs to be monitored and the contents of the cores checked for fossil bone.

## 7. CONCLUSIONS

The proposed detailed prospecting work will result in impacts of moderate to low significance. Provided that the operation is monitored, and the borehole material examined, useful information that could inform later mitigation design will be obtained.

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