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Archaeological and Palaeontological Assessment of Farm 229, Rietvlei (3318DC)

1 Summary

The archaeological and palaeontological potential of Farm 229, Rietvlei was investigated.

A Later Stone Age artefact scatter is widespread over the surface, but extensively disturbed. This occurrence has no archaeological or palaeontological value (see 3.1.1 and 3.1.3).

A silcrete stone flake was recovered from iron-stained sand in one of the geo-technical test holes. Similar occurrences in the region include both stone artefacts and fossilized bones. They are of Middle Pleistocene age, some of them as old as 300,000 to 400,000 years old. Such occurrences are rare and important (see 3.1.2).

An organic-rich layer intersected by another geo-technical test hole is a potentially valuable source of pollens (see 3.2.1).

The types of occurrence noted are protected by the National Monuments Act[1] of 1969 (as amended). Should any development of the area be contemplated in the future, the iron-stained sands and organic-rich layer will require more detailed investigation to assess their nature and extent and whether others exist in the area in order to plan for appropriate mitigation.

Provided that appropriate controls are implemented to manage the eventuality that such material is encountered (see 7. Appendix A), the above should not be seen as a negative factor with regard to re-zoning. Re-zoning should be conditional on appropriate measures being put in place to ensure that the archaeological and palaeontological potential of Farm, 229, Rietvlei is managed appropriately in the future, if development of the farm is contemplated.

2 Introduction

2.1 Participants & Distribution of Report

The South African Museum was commissioned by Eileen Weinronk Environmental Consultant on behalf of client RAINCO (Pty) Ltd to assess the archaeological and palaeontological potential of Farm 229, Rietvlei.

A copy of this report will be lodged with the National Monuments Council.

2.2 Contact Details

[1] Note that a new Act, The Heritage Resources Act, has been passed and awaits the President's signature. This new Act makes significant amendments to the National Monuments Act (as amended).

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South African Museum

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2.3 Objective & Method

Assess the archaeological and palaeontological potential of the farm, which is bounded by the Diep River.

- A ground survey was conducted by traversing the area on foot and sub-surface observations were made in trial holes excavated during the geo-technical study conducted by Kantey & Templer.
- Information derived from current palaeontological and geological knowledge of the area has been incorporated.
- A procedure for the appropriate management of the archaeological and palaeontological potential of the farm is suggested.

2.4 General Observations

The survey area is sparsely covered by vegetation, which is grazed, more densely in places by lawn, and by an area of rubble fill. Low dunes of white to grey sand form the original surface where this is exposed. It was not possible to observe sediments obscured by vegetation.

Sub-surface examination was made possible through the co-operation of Kantey & Templer staff, who arranged for my attendance during their geo-technical investigation. This involved the excavation, by means of a backhoe, of 17 trial holes, most of which were taken to a depth of at least 2 m. While it was not possible to enter the trial holes, due to the danger involved, adequate observation was possible from above.

It is believed that the distribution of trial holes has provided adequate observations of the nature of underlying sediments.

3 Results

3.1 Zone A

3.1.1 Sandy Area between Buildings and Western Boundary Wall

This area comprises low sandy dunes with sparse or no vegetation where disturbance has taken place, for instance, as a result of the presence of the corral.

A sparse scatter of stone artefacts, probably of Later Stone Age origin, including silcrete and quartz flakes and chips and the odd core, occurs over much of the area. Sparse shell fragments of limpets, *Patella* sp., whelks, *Burnupena* sp., and black mussels, *Choromytilus meridionalis* may be associated with the artefacts. Relatively large numbers of oyster shells, around the corral area, suggest an origin, for them at least, relating to the farm rather than to indigenous people. Small quantities of dumped rubble are also present and the shell may have originated with this.

Current Cape dune molerat activity does not appear to have been responsible for bringing the stone artefactual material to the surface. It is presumed, therefore, that this material was originally deposited on the cover dunes or has been at the surface long enough for to obliterate evidence that it originated in older level(s). The degree of polish evident on silcrete pieces could be due to wind erosion or trampling by the horses.

The scatter has been heavily disturbed by recent human activity and may have been dispersed earlier by erosion of the dunes. The scatter appears to extend eastwards into areas in which the paddocks are located.

This surface scatter is no longer of any archaeological significance.

3.1.2 Geo-technical Trial Holes

Cover Sands

The trial holes indicate upper levels of white to grey sands, which represent the recent aeolian activity indicated by the low dunes in parts of Zone A. This material was continuous over the area and exhibited varying degrees of humification depending on ground cover. Although the artefactual scatter noted above occurred in areas around the test holes, none of the holes yielded any sub-surface archaeological or palaeontological material as far as could be observed. Depth varied from near surface (Test Hole 9) to 0.95 m in most holes.

Iron-Stained Sands

Underlying this material are iron-stained sands of variable depth, which sometimes include ferruginous nodules and, rarely, larger lumps (Trial Hole 14 only). In general, the yellow-orange to orange sands extended to just above the seep/water table level, but they did extend below this level in some holes.

Trial Hole 12 yielded silcrete flakes from a depth of 1.0 m. These were iron-stained and clearly *in situ*. In this hole, there was rubble to a depth of 0.6 m; grey brown sand to a depth of 1.0 m; yellow-orange sand and scattered ferricrete nodules from 1.0 m to 1.7 m; a light grey to white sand to 2.8 m. Seepage began at 1.6 m and the water table appeared to be at 2.6 m. This situation is not unlike that at Duinefontein 2 (Klein, 1976; Klein et al., 1999). This type of occurrence, associated with iron-stained aeolian sands, is typical of Early to Middle Pleistocene occurrences elsewhere in the Western Cape coastal areas. In situ occurrences are rare, however, and the one in Trial Hole 12 is, therefore, important.

There were no iron-stained sands in Trial Hole 17.

Grey Sands

Fine to coarse light grey sands underlie the iron-stained sands. These are often at or near the seepage/water table levels, which ranged between 0.9 m and 2.4 m.

Water/Seepage levels

Seepage and the 'water table' were reached between 0.9 m (Test Hole 11) and 2.7 m (Test Hole 17).

3.1.3 Paddocks and River Margin

Observation of the disturbed sandy areas created by the horses allowed variable opportunity, depending on the degree of disturbance.

Sparse stone artefactual material and shell fragments were observed on a number of paddocks. Their occurrence is very similar to that on the open areas noted in 3.1.1, suggesting that they are extensions of this.

Trial hole 11 struck basal Malmesbury shale, which suggests that the potential for encountering significant river deposits is limited, unless sediment-filled incised channels exist in the vicinity. It is possible that the shale provides a barrier, which might be responsible for the high water table noted in the geo-tech. trial holes.

3.1.4 Hard Top Surfaces Around Buildings

Observation was obscured by the artificial surfaces of roads and parking areas. Given the observable distribution of artefactual material elsewhere in zone A, it is likely that it extended across the area now covered.

3.2 Zone B

3.2.1 Rubble-covered area at entrance to the farm

The rubble is recent and has no obvious archaeological value. An isolated limpet shell (*Patella* sp.) was observed in the section of Hole No 17, but it may have been scraped down by the backhoe. While no evidence of an archaeological occurrence was observed, it is possible that the surface artefactual scatter in Zone A may extend across the area now covered.

In Hole No 17 rubble extended to 0.9 m and an apparently organic-rich 'layer' occurred at 1.7 m. This merged into a grey-green sand by 2.3 m. Water was encountered at 2.7 m. The organic material may represent an old land surface or vlei, and it might be possible to extract pollens from it. These would be considered valuable by palaeoecologists.

4 Palaeontological and Environmental Background

The present estuary of the Diep River (Milnerton Lagoon Mouth) and sediments underlying Rietvlei have yielded 4 to 5 million year-old fossil bones of mammals, fish and birds, Early Stone Age artefacts and bones (at least 500,000 years old), fossil pollens and shellfish (Millard and Scott 1954; Schalke, 1973; Salmon, 1977; Rogers 1982; Kensley, 1985; Olson 1985; Grindley et al. 1988; G. Avery pers. obs.). As far inland as Ysterplaat, marine fossil-bearing deposits going back over 5 million years (Simpson, 1973; Tankard, 1975) represent evidence of significant changes in the character of the coast well before the relatively recent formation of the Diep River and Rietvlei. In spite of this, existing observations are limited and relatively little is known. It is important, therefore, to record and recover new information whenever an opportunity to observe sub-surface sediments arises. The existence of these occurrences points to the likelihood that palaeontological and/or occurrences could be encountered during sub-surface investigations. It should be noted, however, that the occurrences described above are located below present sea and river levels.

With lower sea levels, Rietvlei would cease to exist and the Diep River would have traversed the area, probably at a lower base level. Indications of this have been observed in the form of at least two ancient channels incised into the basal Malmesbury shale (Schalke, 1973; Woodborne, 1982). During higher sea levels the present estuary and Rietvlei would have been flooded (Schalke, 1973; Grindley and Dudley, 1988). In relatively recent times, this could have occurred at the end of the Middle Pleistocene some 120,000 years ago when the sea level was at least 8 m above the present and the most recent time that this could have taken place was the mid-Holocene, around 5,000 years ago, when the sea was some 1.5 m to 3 m higher than at present. Even a rise of 1.5 to 3 m would have had a significant effect on the levels of the Diep River and the survey area. It might be expected that riverine deposits with pollen-rich organic or peat deposits would have formed above the present level and that some of these might have been preserved. Human activity would have been shifted to the location of then contemporary banks.

More-recent occurrences may exist in sediments at higher elevations, but unless future development activities penetrate the riverine and lower deposits that might exist below the Diep River, most of the above will not be at issue.

Another type of occurrence is more relevant in this context, however. At an archaeological/palaeontological site called Duinefontein 2, in the Koeberg Nature Reserve, iron-stained aeolian sands, at depths of less than a metre below a calcrete capping and the recent dune sands, contain 300,00 to 400,000 year-old palaeontological and archaeological remains (Deacon, 1976; Klein, 1976; Klein et al., in press). These sands are associated with ferricrete nodules and localized ferricrete blocks, which have to be removed with picks. Overlying the iron-stained sands is an eroded calcrete, which has been dated preliminarily to >150,000 years ago. The underlying fossils and artefacts are, however, considerably older. The site is located approximately 300 m from the coast at an elevation of 8 m. Depending on season, the water table is perched about 1.3 m from the surface. Cores drilled during geo-technical investigations for the nuclear power station revealed that iron-stained sands extended a further 5 m below this. A higher sea level would be consistent with a water table raised to the maximum height at which iron-staining occurred.

5 Conclusions

1) The conclusions and recommendations are made primarily on the basis of current knowledge of the area, rather than on factual information specific to the particular locality under investigation. They, nevertheless, provide as accurate an assessment of the archaeological and palaeontological potential as is currently possible.

2) Important archaeological and palaeontological material is found in the region and associated with the lower reaches of the Diep River and Rietvlei.

3) The surface archaeological scatter is of no value.

4) It should be assumed that disturbance of any iron-stained sands and lower sediments may encounter important remains, which will require mitigation. The occurrence intersected by Test Hole 12 is evidence of the reality of this possibility. Such occurrences are rare and important.

5) The organic-rich layer intersected by Test Hole 17 is a potentially valuable source of pollens.

6) The types of occurrence noted are protected by the National Monuments Act of 1969 (as amended).

7) Provided that appropriate controls are implemented to manage the eventuality that such material is encountered (Appendix A), the above should not be seen as a negative factor; exposure and recovery of fossil material and stone artefacts would make a positive contribution not otherwise possible. With these provisos, development could be contemplated. The scale of the option chosen will undoubtedly affect the potential for encountering archaeological and palaeontological occurrences.

6 Recommendations

1) From the archaeological and palaeontological perspective, re-zoning can proceed conditionally. The fact that archaeological and palaeontological material may exist in the iron-stained sands and ferricretes must be included in the conditions for re-zoning, together with requirements for the establishment of a management process to protect the interests of all stakeholders (see 7. Appendix A).

2) Any exploratory cores and profiles (walls of excavations) dug during the course of development activities should be logged and sampled with a view to resolving stratigraphic and chronological details and to enhance the existing archive of the region for future research.

7 Appendix A: Management of Archaeological and Palaeontological Resources

7.1.1 Principles

Should archaeological or palaeontological material of value be encountered during any future development of Farm 229, Rietvlei, this could be turned into a positive impact with appropriate planning and mitigation as outlined below.

Key goals for managing Palaeontological and Early Stone Age resources would be to protect the interests of all parties by:

- minimising the inevitable loss of heritage material and information; and
- minimising the costs and disruption to the Purchaser/Developer.

1) A developer will require a National Monuments Council permit to remove, damage or disturb any archaeological or palaeontological material. The provisions of the Monuments Act, including any required mitigation, would have to be fulfilled prior to such a permit being issued.

2) Acceptable mitigation will require the investigation, recovery and permanent archiving of documented samples that adequately reflect the diversity of palaeontological and early archaeological components and contexts of these deposits. The samples would be housed in a museum, where they would be available for future research. The philosophy underlying the need to create a museum archive stems directly from the inevitable destruction of material that would normally have been preserved *in situ*.

3) The cost of creating the archive will be borne by the Developer; the cost of subsequent maintenance and study of the material will be borne by the holding institution (museum) and future researchers.

7.1.2 Minimising delays if site development plans are submitted in the future

1) If not previously done. When plans of the extent of the proposed development are available, underlying sediments must be tested, by specialist

excavation or by coring, to establish what heritage material might underlie areas to be affected (Phase 1 continued). This will help to determine need and potential extent of mitigation, which could include excavation and/or monitoring of operations by a specialist (also see 6 below). This information would accompany the application as a specialist report and/or EIA specific to the development.

7.1.3 Procedure for adoption should approval include conditions regarding mitigation

1) Immediate systematic excavation of identified archaeological and palaeontological occurrences identified during Phase 1 (contd) is advised. The extent to which these excavations (Phase 2) can adequately represent the palaeontological potential of the site will also determine the need for subsequent monitoring and further excavation. It may be necessary to recover any additional material encountered *during* the building process.

2) Excavation, the handling and collection of fossil and archaeological material and monitoring will be under supervision of a specialist, who would be empowered to stop work if important material is encountered so that it can be assessed. This process will be streamlined if there is strong commitment from the Developer and its contractors to the implementation of the mitigation. This would include training and motivation of relevant construction staff on the importance of their role in achieving the key goals by timeous detection and reporting.

3) Formal procedures and lines of communication between the developer, construction staff, specialist monitors and other specialists should be established to ensure speedy transfer of information and instructions. A small committee representing the specialists, representatives of the Developer, the contractors and the National Monuments Council should oversee the process and assist in the assessment of the nature of mitigation required at each stage.

4) These and any further steps should be written into the contract and environmental management plan for the construction phase.

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