

A PHASE 1 ARCHAEOLOGICAL ASSESSMENT OF THE VELDDRIF WASTE DISPOSAL SITE

Prepared for

SKC & Loubser, Consulting Engineers

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Prepared by

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1. INTRODUCTION

Expansion of the waste disposal currently in use by the Velddrif municipality has been proposed. The Archaeology Contracts Office of the University of Cape Town was appointed by SKC and Loubser, Consulting engineers on behalf of the Municipality of Velddrif to undertake an archaeological assessment of the waste disposal site, particularly areas to be affected by expansion. The Archaeology Contracts Office (ACO) undertook to visit the site, locate and evaluate any archaeological¹ and historical material and prepare a report documenting the findings.

The Velddrif Waste Disposal site is located just north of the town at the southern most end of a prominent rise - the Velddrif Fossil Shell Bar. This bar stretches parallel to the coast between the towns of Velddrif and Dwarskersbos (to the north). A previous investigation of the area (Miller and Hart 1994) has shown that not only is the shell bar itself a palaeontological site, but it is also a significant focus on the landscape which attracted prehistoric people in the past. Shell middens (debris left behind by prehistoric people) are explicitly protected by the National Monuments Act of 1969 (as amended) and may not be disturbed unless by permit issued by the National Monuments Council.

2. FINDINGS

2.1 Historical/archaeological material

The existing waste disposal site is situated on the southern end of the fossil shell bar. Waste has been dumped along the inland edge of the bar, and into craters left by shell mining operations, and then covered with overburden. The quarrying of shell for lime resulted in the exposure of portions of the fossil shell deposit. Overlying dune material has been removed at several places and used to cover dumped garbage, a process which would have destroyed any archaeological sites that were present.

The exposures in the quarries were examined for evidence of archaeological material and the surface of the shell bar to the north was searched. No archaeological material was found and no negative impacts are foreseen. No mitigatory action is required.

2.2 Palaeontological material

The dune on which the waste disposal site is currently situated is a significant palaeoenvironmental² feature. A specialist report detailing the history and significance of this feature is included as Appendix A. The core of the dune consists of fossil shell which was laid down over 100 000 years ago when the sea level was several meters higher than it is today. The Berg River flowed into St Helena bay via an extensive estuary which resulted in the accumulation of the shell bar which stretches between Velddrif and Dwarskersbos. The shell bar is considered to be a unique resource of both educational and scientific significance. It is also an important economic resource and an application has been lodged to mine the shell bar for its lime content. An arrangement for mitigation of the loss of palaeontological material has been negotiated between the mining company and John Pether of the South African Museum who will sample the contents of the bar when mining begins.

¹ Archaeological material is broadly defined as residues which have resulted from the activities of humans.

² The shell that is found in the shell bar is the result of natural processes.

3. IMPACT OF THE WASTE DISPOSAL SITE

Extension of the waste disposal site will involve earthmoving operations as it is envisaged that soil will be bulldozed over the waste once it has been dumped. The implication of this is that the bar itself will be subject to earthmoving and the stratified shell deposits will be impacted. The impact is exacerbated by the fact that the mining operation (if it is approved) will destroy a substantial portion of the shell bar to the north of the waste disposal site. Compounded with the extension of the waste disposal site, this could mean that virtually the entire bar will be impacted, if not destroyed.

4. RECOMMENDATIONS

All palaeontological material is protected by the National Monuments Act except in the instance of mining or engineering activities. Permission must be obtained from the National Monuments Council to destroy palaeontological material. Furthermore, cultural resources (including palaeontological sites) are considered to be part of the cultural environment and are covered by the Environmental Protection Act.

It is strongly recommended that Mr John Pether of the Department of the Earth Sciences Division at the South African Museum be contacted (Phone 021-243330) with a view to appointing him as a consultant (see Appendix A: Recommendations for future development). He would be able to implement a sampling strategy and suggest the best way forward to minimise the impact of development activity on this important palaeontological site.

5. REFERENCES

Miller, D. and Hart, TJG. 1994. Phase 1 Archaeological and Palaeontological survey of the proposed mining area on farm 110, Velddrif, Western Cape Province. Unpublished report prepared for Lime Sales Limited: Archaeology Contracts Office.

6. PROFESSIONAL TEAM

Fieldwork and report preparation

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APPENDIX A

SIGNIFICANCE OF THE VELDDRIF FOSSIL SHELL BAR

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INTRODUCTION

This part of the report deals with the palaeoenvironmental, and palaeontological potential of the Velddrif fossil shell bar. It is based on a number of informal visits by the author over the past ten years to inspect the existing exposures of shelly grit, and on formal visits to evaluate the impact of development activities on the deposit.

LOCATION AND EXTENT OF THE SHELLY FOSSIL BAR COMPLEX

A fossil shoreline/offshore bar complex exists on the eastern shores of St Helena Bay, between the villages of Laaiplek and Dwarskersbos, north of the mouth of the Berg River. A preliminary description by A.J. Tankard (1976) concluded that there are two major elements, an inner bar best exposed just west of the town of Velddrif, and an outer bar exposed in various places from the Velddrif rubbish dump north towards Dwarskersbos. In reality the deposit is more complex. Between Dwarskersbos and Laaiplek the inner bar is well developed, the outer bar bifurcates with an erosional channel separating the two limbs, and there is a former inlet channel cutting both limbs of the outer bar. Various parts of these deposits have been quarried in the past to form the present exposures, but most of the former and ongoing quarrying activity is focussed on the landward side of the outer bar, which forms the major deposit. Seaward of the shell bar is a series of prograded beach deposits of uncertain age. The existing Velddrif waste disposal site lies on southernmost extreme of the shell bar.

AGE AND ORIGIN

The shelly grit deposits of the inner and outer bars have not been dated directly, and nor has the series of prograded beaches. The shelly grit deposits of the bars are assumed generally to be late Pleistocene (ie. about 125 000 years old) on the basis of the presence of only one extinct sub-species of mollusc and the fact that the deposits lie only a few meters above modern mean sea level. Neither of these are particularly reliable criteria for dating such deposits, which may be either older or younger (Miller in press). In all probability the deposits are composites and contain material of potentially significantly different ages. On the west coast, with its characteristically low sedimentation rates and tectonic stability, it is common for Holocene beach deposits (ñ 5000 years old) to lie up against much earlier Pleistocene deposits (Miller et al. 1993).

The shelly bars formed at a time of considerably higher mean sea level when large areas of the Berg River estuary were flooded and formed a marine embayment, somewhat similar to the present Langebaan Lagoon. The shelly deposits in question accumulated in the shallow

mouth of this bay, although scattered shell deposits of different faunal composition are present up to 15 km inland (Tankard 1975, 1976). The bars are preserved because they form part of an actively prograding shoreline, one of only two known on the west coast at present (Rogers 1980, 1987; Miller et al. 1993).

STRATIGRAPHY AND SEDIMENTOLOGY

The geological characteristics of the deposit have received some scientific attention (Tankard 1975, 1976; Miller et al. 1993; Dingle & Honigstein in press) but they are very poorly documented and there have been no detailed stratigraphic or sedimentological studies. We know from field observations that in places the shell deposits are up to 3 m thick; that there is vertical and lateral variation in sedimentology and molluscan species distribution; that large sandy pockets exist which appear to be devoid of shell; and that the degree of comminution varies throughout the deposit. Lateral facies change is to be expected in large-scale sedimentary features such as these and the inhomogeneity of the deposit is clear even on cursory inspection.

PALAEOENVIRONMENTAL, PALAEONTOLOGICAL, AND GEOLOGICAL SIGNIFICANCE

The southern west coast of South Africa is mantled with Quaternary deposits, most of them poorly consolidated, and some of them fossiliferous. Although many of these deposits are of commercial significance and are exploited for fertilizer, lime, and building materials, the palaeoenvironmental study of this area is in its infancy. The number of scientific reports dealing even indirectly with the late Quaternary sediments is very small, and our understanding of the existing fossiliferous deposits of St Helena Bay is still rudimentary (Dingle and Honigstein in press; Kilburn & Tankard 1975; Miller in press; Miller, Yates, Parkington & Vogel 1993; Rogers 1980, 1982, 1987; Tankard 1975, 1976; Tankard & Rogers 1978). There are no detailed palaeoenvironmental studies of the St Helena coastline and we have very little knowledge of the geological history of the area.

The Velddrif fossil bar complex is the largest known of its kind on the west coast and is situated in a key geomorphological position. Up to now the sheer size of the sedimentary feature has precluded systematic investigation, and there has been no immediate threat to the bulk of the deposit. The fossil bar complex has been sampled very cursorily for macropalaeontological and micropalaeontological investigation (Tankard 1975, 1976; Dingle & Honigstein in press). A systematic sampling program has not yet been carried out for either palaeontological or sedimentological study. Both of these would be highly desirable because the fossil bar complex is the key to the sediment dynamics and geological history of the former St Helena embayment. This knowledge is not just of academic interest. The shell deposits are of commercial value and knowledge of their sedimentology and origins, and of the sedimentary dynamics of such an embayment, has obvious implications for exploration and locating other economic deposits (e.g. lime, salt, and phosphate) as well as for understanding the regional history of sea-level fluctuations and the geomorphological history of the Berg River estuary area as a whole.

A detailed palaeoenvironmental reconstruction of the Pleistocene history of St Helena Bay is becoming increasingly important. The current spurt in coastal development in the area is going to obliterate or obscure much of the evidence of former sea level change. The variation in sedimentology and in species composition of the complex fossil bar deposits is an

important record, to be studied in detail before we can attempt a thorough reconstruction of the local and regional Pleistocene history.

RECOMMENDATIONS FOR FUTURE DEVELOPMENT

In my opinion the fossil bar complex north of Laaiplek is the single most important deposit on the southern west coast for an understanding of the local dynamics of late Quaternary high stands of the sea. It has not been studied in detail yet because the resources were not available to sample such a large deposit systematically. The prospect of large-scale development of this deposit represents a threat to the core of this deposit and is simultaneously a potentially very fruitful opportunity. Not all parts of this deposit are equivalent and the variation within it is part of the information that must be recorded. If the destruction of the shell bar happens without a thorough sampling programme very important and irreplaceable palaeoenvironmental and palaeontological information will be lost.

I recommend that any further mining, quarrying or earthmoving development of the Velddrif deposit be required to build a sampling programme into its plans, to mitigate the loss of sedimentological and palaeontological information during the mining process. The details of this plan should be negotiated in collaboration with the relevant scientists of the South African Museum.

CONCLUSIONS

In my opinion measures such as those outlined above should be mandatory for any development that will destroy geological, palaeontological, or archaeological deposits of significant scientific worth. In the case of the Velddrif fossil bar deposit the recently proposed development activities will remove a large proportion of the most well developed part of the sedimentological unit. It is crucial for the palaeoenvironmental study of St Helena Bay and the Berg River estuary area as well as regional sea-level studies that representative samples of this deposit should be preserved for future research if at all possible.

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